

Early box flue tiles from London

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Introduction

This study is the result of several years spent recording and analysing Roman ceramic building materials from London, first for the Department of Urban Archaeology (DUA) and latterly for the Museum of London Archaeology Service (MoLAS). Over time, it has become increasingly clear that discrepancies exist between the evidence from stratigraphic excavations and that of the building material. For instance, recent publication reports of sites in Southwark have remarked on the presence in early contexts of dumps of building materials, such as painted plaster and flue tile, which appear to derive from high-status buildings with hypocaust heating systems for which there is no other evidence.¹

As a dissertation topic for a recent course of study I chose to examine the distribution of these early specialised building materials in and around the City of London and Southwark.² The presence of small and thin-walled flue tiles in early contexts in Southwark has been noted by both Betts and Crowley,³ but little work has been done on them; most of the research into flue and *voussoir* tiles from London has been on relief-patterned tiles, which are predominantly a late-1st- and 2nd-century type.⁴ The most important published research into early flue tiles is that of Black, who has studied thin-walled box flues from a number of sites in south-east England outside Greater London.⁵

It should be noted that the dates given here for deposits on the sites AUT01, FER97, HIB79 and TEA98 are provisional pending full publication of these sites.

Small or thin-walled box flues

There is no standard size for Romano-British box flue tiles. Brodrigg cites the following range of dimensions for simple single-box flues: heights of 155–450mm, widths of 130–330mm and depths of 85–280mm, with an average dimension of 366 x 190 x 131mm (sample of 306 box flues from 166 sites).⁶ Black suggests a depth of c. 80mm for

the small tiles, on the assumption that they were used in conjunction with half-box tiles (*tegulae hamatae*), which have flanges c. 80–85mm in height.⁷

Thin-walled box flue tiles of this size have been found at several urban and villa sites in south-east England. At Fishbourne, they were found in deposits of the First Period and make-up levels for the Second Period, and were probably used in the baths of the proto-palace, dated AD 65–75. These tiles have lattice-scored faces with circular, D-shaped or square vents in their narrower plain faces. There are no complete heights, but sides are c. 110 x 70mm, with walls 8–12mm thick.⁸

Similar small thin-walled tiles have been found at Colchester, Canterbury and Verulamium. An almost complete example from Colchester with scored lattice keying is 342–343mm high, 138–140mm wide and 81–85mm deep, with a rectangular cutaway of c. 31 x 50mm (Black's type B1).⁹ The dating of these tiles at Colchester points to their use in an early bath-house, destroyed in the Boudican revolt, for which there is no structural evidence.

At Canterbury, fragments of small lattice-scored flue tiles with rectangular vents in narrow plain faces have been found in 1st-century contexts close to the St Margaret's Street baths, and examples from Period 2 levels of the Marlowe Car Park excavations appear to pre-date the excavated Period 3I bath-house, dated to the early 2nd century (Black's types 2a and 2b).¹⁰ Type 2b, height unknown, width and depth 145 x 70mm with walls 8–10mm thick, is found here with half-box flue tiles (Black's type 2c).

At Verulamium, distinctive thin-walled flue tiles were associated with a mid-first-century bath-house on the east side of insula XIX which also had elaborately painted wall plaster and a colonnade of oolitic limestone columns. The bath-house is not securely dated, but is thought to have been built shortly after the Boudican revolt.¹¹

The common features of this group of tiles are their relatively small size, thin walls, scored lattice keying and early dates, usually being attributable to the earliest building phase and associated with a bath-house.

A preliminary typology of the smaller box flue tiles from London

The box flue tiles from London discussed here have a maximum depth of 90–95mm. They have been divided into types on the basis of the technique used for keying the tile and the shape of the vents. The tiles are often, but not always, distinctively thin-walled.

Box flue type 1 (Fig. 1, Fig. 4)

Box flue type 1 has lattice scoring on all external surfaces, which are frequently sanded. This is unusual for box flues, which generally have two keyed and two plain faces, and has given rise to confusion with hollow voussoirs. The narrow face contains a rectangular vent. Widths range from 115–125mm and depths are 90–95mm (precision is not possible with this type, as the tiles are fairly crudely formed and the junctions of the faces rounded). Body wall thickness is 12–18mm. The vents, cut into the narrow face, vary slightly in size, but are *c.* 47mm high by 18–25mm wide and are placed 110–132mm from the end of the tile. No complete heights have been recorded but if, as looks likely, there is one vent per face, an average tile may have stood *c.* 297mm high, approximately one Roman foot. In spite of the slight variations in size this is a consistent and distinctive type. It occurs only in the coarser fabrics of the 2815 group, 3004 and occasionally 3006, and in fabric 3070; all are probably made from red-firing London Clay.¹²

Box flue type 2 (Fig. 2; Fig. 4)

Box flue type 2 is a thin-walled tile with fine combing on the broad face and a circular vent in the plain narrow face. The keying pattern varies from tile to tile, but crossed diagonal bands are common, and latticed or curved bands of combing are also seen; a seven- or eight-toothed comb appears to have been used on several examples. Less common are tiles with open lattice keying, scored with a pointed tool instead of a knife. The broader face of this type is 105–110mm wide, and the narrower face 65–85mm.



Fig. 1: tile type 1, showing lattice-scored narrow face with vent (WP83 [1613]).

The body wall is 10–15mm thick. Vents were cut 110mm and 111mm from the end of the tile but only one vent dimension, a diameter of 45mm, has been recorded. With a single vent on each plain face, and there is no evidence of more than one, the tiles may have been only 265–270mm in height. It has been recorded only in fabric 3227, an orange fabric from an unknown source.

Box flue type 3 (Fig. 3; Fig. 4)

This type is unkeyed and thin-walled, with a rectangular knife-cut vent in the narrow face. Faces are sanded internally and externally, and the tiles neatly made and knife-trimmed. Almost complete examples have been found on two sites; height 413mm, width 155–170mm and depth 71–85mm.¹³ Body wall thickness is 10–18mm. The vent, cut into the narrow face, is *c.* 35 x 65–70mm. Some of the tiles (from AUT01) have been modified post-firing with the addition of a small circular hole chipped in the broader face. This feature does not seem to occur in this type on other sites, so may be associated with the use or re-use of the tile on this site. Evidence of tile coursing impressions in the mortar on one of these tiles, which shows that the tile was set vertically against a masonry wall; this supports Black's suggestion that they formed a vertical channel in the wall leading directly to a



Fig. 2: combed keying on tile type 2: (28PS84 [2097]).

chimney.¹⁴ The fabric is a sandy version of fabric 2454, which is made from yellowish-white or pale orange firing clay and comes from north-west Kent.

Type 4 flue tiles are less easy to identify and date as they occur in a variety of fabrics and a range of sizes. However, as thin-walled examples occur in early contexts as well as later in the 1st century, they are included here.

Box flue type 4 (Fig. 4)

This type has lattice-scored keying on the broad face and the narrow face is unkeyed and perforated with one (type 4a), or less commonly two (type 4b), rectangular vents. It is less well-defined than the previous types, occurring in at least two fabrics and a variety of dimensions. The best and most numerous examples are in the red fabrics of the 2815 group; there is less information for this type in fabric 2454.

There are no complete height measurements for tiles in the 2815 group of fabrics and the width varies, perhaps according to fabric; all are *c.* 80mm deep. Tiles in fabric 3006 are 160–161mm wide, and in fabric 2459A, 185–186mm. Wall thicknesses vary from 9–19mm, the median being 12mm. The rectangular vents also vary in size; examples are 45mm, 66mm, 75mm and 110–115mm in height.

In fabric 2454, there is little information on the dimensions of type 4a; the only near-complete depth recorded is 80mm and a vertical vent cut is 45+mm high. The thickness of the body wall in this fabric is in the range 12–14mm. A variant in fabric 2454, also with scored lattice keying on the



Fig. 3: sooting on internal surface of tile type 3 (AUT01 [171]).

broad faces, has two rectangular vents in each plain face, designated type 4b (Fig. 4). One example has two vent cuts 85mm apart, and another with a vent cut 85mm high set 75mm from the end of the tile may also have had two vents. This type tends to occur in variants of fabric 2454 which may contain extra quartz or iron-rich pellets.

The dates of the London tiles

On the available evidence, the earliest of the tiles described here is type 1. In Southwark, a large deposit of these tiles came from Open Area 4 at Winchester Palace, representing landfill behind timber Waterfront 1, dated to *c.* AD 60.¹⁵ The dumped material underlies Road 3 and Building 1, both of which were constructed in the period AD 60–70. The earliest occurrence, dated AD 50–70, at nearby Hibernia Wharf, is consistent with these dates, although the majority of the tiles there come from Flavian deposits.¹⁶ In the City, it occurs south of Fenchurch Street (FER97) where the first well-dated deposits are in dumps on Open Area 11 and the make-up for Road 4, which date from immediately after the Boudican fire to the early Flavian period.¹⁷ The likely date range for disuse on this site is thus AD 60–*c.* 85, which does not rule out a pre-Boudican date for the first use of the type.

Tiles of type 2 appear slightly later in the archaeological record. They were first recognised in the Winchester Palace excavations in 1983–4 where they occur, re-used, in demolition material associated with Buildings 4, 7 and 8. Building 4 is dated *c.* AD 70–80; the broad date range for the phase is AD 70–120. At Winchester Palace, they were found with thin-walled flue, probably type

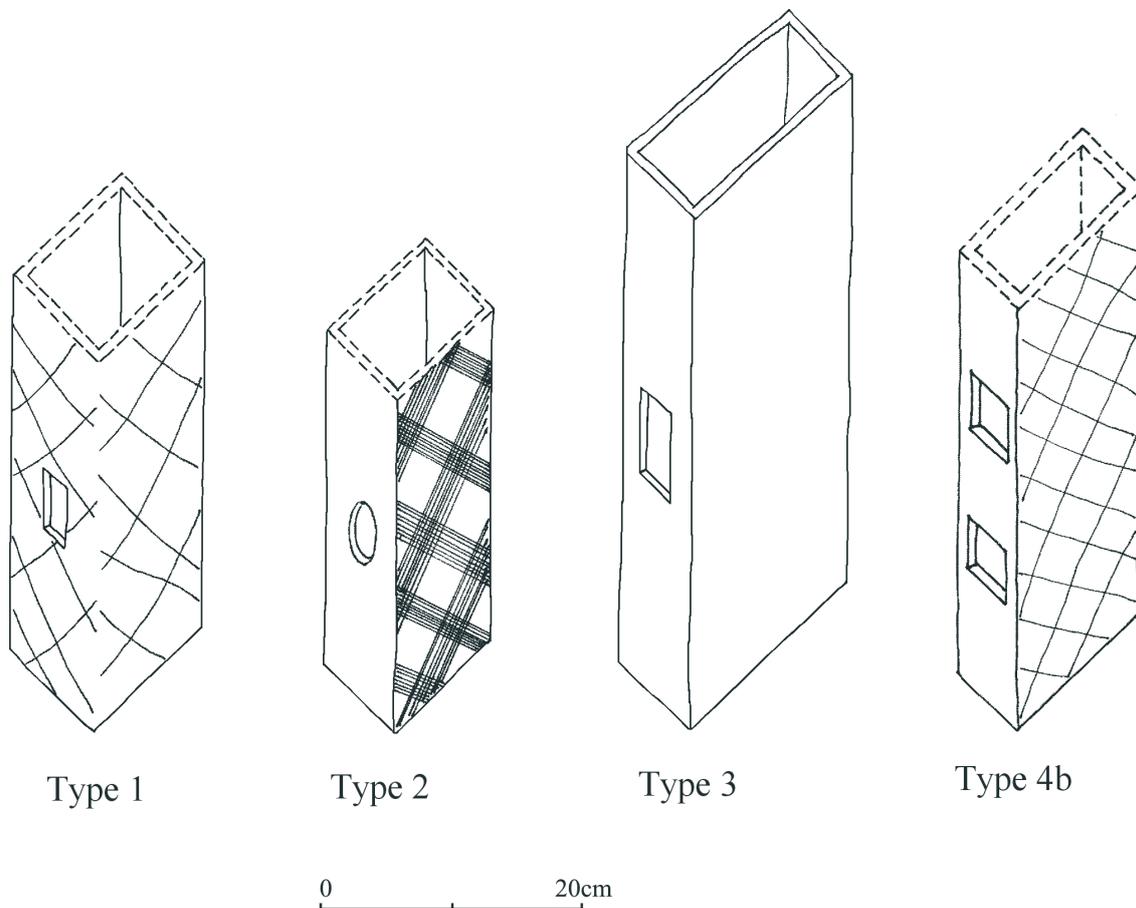


Fig. 4: suggested reconstruction of the box flues at the same scale.

4, in fabric 2454, which is dated in London to *c.* AD 50–75/80.¹⁸ Type 2 flues also occur in some quantity at 28 Park Street in north-west Southwark, where most come from dumps dated AD 70–100¹⁹ and at Hibernia Wharf in deposits dated AD 70–100; all three sites are close together. In the City, this type has been identified in Fenchurch Street (FEN83) in Period 5 deposits, AD 70–120, associated with the disuse of Period 4 Building 13 (AD 60–65).²⁰ These dates suggest that this tile type may first have been used in the Neronian period, possibly post-Boudican fire.

Tile type 3 may be later still. All the securely identified occurrences are from the City; in Fenchurch Street (FER97) it first appears in Period 4 dumps dated to *c.* AD 85–120/130, and is also incorporated into make-up for the construction of Period 5 Building 31, dated to the

early 2nd century.²¹ A similar date range is suggested for its appearance in quarry pit fills of the late 1st and early 2nd centuries at TEA98.²² On AUT89, almost complete tiles were found in dumps behind Waterfront 3, which is dated to the early 2nd century; the same infill includes high status material such as white limestone *opus sectile* flooring and *opus spicatum* floor tiles.²³ On all three sites, the tiles come from dumps of disused material dating from the late 1st or early 2nd centuries which suggests that they may have been used in pre- or early Flavian buildings.

Type 4a in fabric 2454 is dated to *c.* AD 70–80, by its occurrence in the same deposits at Winchester Palace as type 2 (see above); tiles of type 4b in the same fabric come from deposits of AD 70–100 in north-west Southwark.²⁴ Type 4a tiles in fabrics of the 2815 group seem to have a similar chronology although they occur in larger

versions; this suggests that they started early and continued to be made well into the Flavian period.

Discussion

The dating of ceramic building materials is relatively straightforward when they are found *in situ* and can be related to a clearly defined building phase. In urban contexts, however, this is rare and most tile comes from demolition dumps which reflect the date the structure was demolished rather than its date of construction. The dating of brick and tile is further obscured as it was often salvaged for re-use.

Given the above constraints, the dating evidence shows that early types of small box flue were being discarded in London in the twenty years or so between the Boudican fire and the beginning of the Flavian period. At least two of the flue tiles described above, types 1 and 2, and probably type 4a, are similar in size and date range to the small box flues from Fishbourne, Colchester and Canterbury. If it can be shown that they were used with wall-jacketing tiles, as was probably the case at Fishbourne, or half-box flue tiles as at Colchester and Canterbury, they would seem to provide evidence for the existence of pre-Flavian, and possibly pre-Boudican, bath-houses in London. Both these types of wall-jacketing are found on sites in London, and their distributions together with that of the early flue tiles will be explored in more detail in a subsequent article. The dates for type 3 are the latest, indicating disuse by the end of the 1st or early in the 2nd

century, although its narrow faces suggest that it is part of the very early group under discussion.

The main implication for our understanding of Roman London is that these small and relatively lightweight box flues were almost certainly used in bath-houses which pre-dated the Flavian expansion of the later first century and, in the case of type 1 flue tiles, perhaps even the Boudican revolt. There is now general agreement amongst archaeologists that the first major phase of public building in Roman London took place in the Flavian period, that is, after AD 69, with the construction of the first forum and basilica, the Huggin Hill bath-house and the first amphitheatre, with a second phase of construction taking place in *c.* AD 90.²⁵ There is less certainty, however, about the character of the buildings in the settlement in the preceding two decades. The evidence of these structural ceramics may help to elucidate some of the mysteries of Neronian London.

Acknowledgements

Thanks are due to the Museum of London Archaeological Service for giving me access to their ORACLE database and permitting the use of unpublished data, to the London Archaeological Archive for access to their paper and object collections, and for permission to photograph the tiles; also to University College London Institute of Archaeology, for permission to use material from my M.Sc. dissertation. Many thanks also to former colleagues Ian M. Betts and Terence Paul Smith for their help and advice.

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1. J. Drummond-Murray and P. Thompson, with C. Cowan *Settlement in Roman Southwark: archaeological excavations (1991–98) for the London Underground Limited Jubilee Line Extension Project* MoLAS Monogr Ser 12 (2002) 52; C. Cowan *Urban development in north-west Roman Southwark: excavations 1974–90*, MoLAS Monogr Ser 16 (2003) 26, 118; B. Yule *A prestigious Roman building complex on the Southwark waterfront: excavations at Winchester Palace, London, 1983–90*, MoLAS Monograph Ser 23 (2005) 21.
 2. S. Pringle *A spatial analysis of specialised ceramic building materials in early Roman London from the Conquest to the Flavian period (circa AD 50–80)*, unpub M.Sc. dissertation, University College London Institute of Archaeology (2003).
 3. I.M. Betts, 'Stone and ceramic building materials', in Cowan, *op cit* fn 1, 105–119; N. Crowley, 'Building materials', in Yule, *op cit* fn 1, 90–100, 97.
 4. I. Betts, E.W. Black and J. Gower 'A corpus of Roman relief-patterned tiles in Roman Britain', *J Roman Pottery Studies* 7 (1994).
 5. E.W. Black, 'Box flue-tiles in Britannia: the spread of Roman bathing in the First and Second centuries' *Archaeol J* 153 (1996) 60–78, 60. This paper summarises Black's research in the field and gives references to his excavation reports.
 6. G. Brodribb, *Roman Brick and Tile*, Gloucester (1987) 65–7, Fig. 27.
 7. *Op cit* fn 5, 61–2.

8. B. Cunliffe, *Excavations at Fishbourne, II, The Finds* (1971) 45, Fig. 24, no. 23.
9. E.W. Black 'Keyed tile fragments' in P. Crummy (ed.) *Excavations at Culver Street, the Gilbert School, and other sites in Colchester 1971–85*, Colchester Archaeol Rep 6 (1992) 261–72, 262.
10. E.W. Black 'The Building Materials. Voussoirs and wall-tiles' in K. Blockley, M. Blockley, P. Blockley, S. Frere and S. Stow, *Excavations in the Marlowe Car Park and Surrounding Areas*, The Archaeology of Canterbury 5, Canterbury Archaeological Trust (1995) 1267–93, 1268.
11. R. Niblett, *Verulamium: The Roman City of St Albans*, Tempus, Stroud (2001) 65.
12. *Op cit* fn 1: all these reports contain descriptions of Roman tile fabrics. Examples of the MoL tile fabrics can be examined by appointment at Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED.
13. I.M. Betts, The building materials, 12 Arthur Street, EC4, in prep.; T.P. Smith, The building materials, Lion Plaza, 40–53 Threadneedle Street, 1–18 Old Broad Street, in prep.
14. *Op cit* fn 5, 61.
15. Yule, *op cit* fn 1.
16. C. Cowan, L. Wheeler and A. Westman *Settlement and Economy in Roman Southwark: Excavations in Southwark 1973–1991* (in prep.) MoLAS Monogr ser (HIB79).
17. I.M. Betts, The building materials, in L. Dumwoody, C. Harward and K. Pitt *Military and civilian development in London east of the Walbrook: excavations at Plantation Place, City of London* (in prep.) MoLAS Monogr. Ser.
18. N. Crowley 'Building materials' in Yule, *op cit* fn 1, 97.
19. I.M. Betts in Cowan, *op cit* fn 1, 115.
20. F. Hammer, unpublished archive report (FEN83), DUA (1987).
21. *Op cit* fn 16.
22. T.P. Smith, *op cit* fn 13.
23. I.M. Betts, *pers. comm.*
24. I.M. Betts in Cowan, *op cit*, fn 1, 114.
25. G. Milne 'A palace disproved: reassessing the provincial governor's presence in 1st-century London' in J. Bird, M. Hassall and H. Sheldon (eds) *Interpreting Roman London: Papers in memory of Hugh Chapman*, Oxbow Monograph 58 (1996) 49–55, 53.

Excavations and post-excavation work

London Archaeological Archive and Research Centre, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED. Contact Archive Manager, Roy Stephenson (020 7566 9317).

Croydon & District, processing and cataloguing of excavated and museum collections every Tuesday throughout the year. Archaeological reference collections of pottery fabrics, domestic animal bones, clay tobacco pipes and glass ware also available for comparative work. Enquiries to Jim Davison, 8 Brentwood Road, South Croydon, CR2 0ND.

Borough of Greenwich. Cataloguing of excavated and other archaeological material, the majority from sites within the Borough. Contact Greenwich Heritage Centre, Building 41, Royal Arsenal, Woolwich, SE18 6SP (020 8854 2452).

Hammersmith & Fulham, by Fulham Archaeological Rescue Group. Processing of material from the Borough. Tuesdays, 8 p.m. to 10 p.m. At Fulham Palace, Bishops's Avenue, Fulham Palace Road, SW6. Contact Keith Whitehouse, 85 Rannoch Road, W6 9SX (020 7385 3723).

Kingston, by Kingston upon Thames Archaeological Society (KUTAS). Processing and

cataloguing of excavated and museum collections every Thursday (10 a.m.) at the North Kingston Centre, Richmond Road, Kingston upon Thames KT2 5PE. Enquiries 020 8546 5386.

Pre-Construct Archaeology Ltd., Unit 54, Brockley Cross Business Centre, 96 Endwell Road, Brockley Cross, London SE4 2PD. Environmental- and finds processing, cataloguing and archiving of excavated material. Contact Finds Manager, Märit Gaimster (020 7639 9091).

Surrey, by Surrey County Archaeological Unit. Enquiries to Rob Poulton, Archaeological Unit Manager, Surrey History Centre, 130 Goldsworth Road, Woking GU21 1ND (01483 594 634).

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