



Fig. 1: Late Roman London (after Watson 1998)

Red or yellow? The changing colour of Roman London's roof-line

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Roman London changed considerably during the 3rd and 4th centuries. Archaeological investigations in London, particularly in recent years, have enabled archaeologists to gain a reasonably accurate picture of the capital in the later years of the empire (Fig. 1). The archaeological evidence suggests a decline in economic activity and the decay of official buildings. Essential public buildings of Roman London were closed down, such as the forum/basilica complex and the Cripplegate Fort.¹ The early port is also likely to have been disused by AD 270

due to the construction of the riverside wall which must have caused the port's dislocation and probable decline.² Further evidence of the town's recession was revealed during excavations close to the Walbrook Valley, the probable industrial quarter of London, which was no longer in use by the late 3rd century.³ Roman Southwark also saw this decline, with the industrial quarter abandoned and much of the land likely to have been disused by the 4th century.⁴ In contrast to this evidence for decaying public buildings and declining economic

activity, the later Roman period saw the restoration of religious buildings such as the Temple of Mithras. A Christian basilica may also have been constructed in this period.⁵ It seems that *Londinium* evolved into a city filled with villas, gardens and temples rather than official business or trading activities. Excavations in the capital suggest that there was a marked move from the widespread timber structures towards more private, masonry buildings and suburban villas with more luxury features such as mosaics and hypocausts.⁶ This may indicate that

later Roman London was a vibrant and religious urban centre rather than a city in decline.

The changes occurring in London during this period are pivotal to the study of Roman building materials. The renewed interest in high-class private residences must have led to an increased demand for specialist building materials. Similarly, material required to undertake the temple rebuilding and waterfront wall project needed to be sourced. The decline in London's industrial base could have imposed constraints on building work if the city did not have any links to alternative outside suppliers. In order to understand the economic and social situation in later *Londinium*, it has proved useful to investigate one of the rural suppliers, situated at Harrold in Bedfordshire.

Harrold production centre

Roman ceramic production began 2 km south-west of the village of Harrold in the early 1st century and continued until the late 5th (Fig. 2).⁷ Between 1968 and 1971, nine kilns were excavated; one was identified as a probable tile kiln.⁸ Harrold was well placed to take advantage of road and river links, only a short distance to the west of the River Ouse and c. 2–3 km south-east of the probable route of the Ircchester Roman road.⁹ The tiles manufactured at Harrold are quite distinctive because of shelly inclusions in their clay and their consistently pale yellow or orange-brown colour.¹⁰ The most common tiles in the Harrold material are the roofing tiles *tegula* and *imbrex* (Fig. 3). Box flue tiles used in hypocaust heating are also found in this material. In addition, bricks in a shelly

fabric were produced at the Harrold site and although rare, have been found both there and on sites in London. The first phase of production began in the 2nd century, with a later phase of manufacture, probably Harrold's most successful phase, in the 3rd and 4th centuries.¹¹

Distribution

South-east England

A map of the distribution of Harrold products shows distinct clusters of sites in the Milton Keynes and Dunstable/Luton areas, perhaps reflecting the intensity of fieldwork here (Fig. 4). Over 78% of the sites, excluding London, are within a 50 km radius.¹² This is significant, as many researchers suggest that brick and tile was often made close to the construction site where it was used, due to the problems of distributing such a heavy and awkward commodity.¹³ However, Harrold-type tile was widespread in southern Britain, with a distribution area encompassing the south Midlands, London, Essex, Cambridge and even Kent. The sites were predominantly rural, categorised either as villa or rural estates.¹⁴ Nearly all are linked to the second phase of tile production, which occurred at the same time as the late Roman boom in villa and townhouse construction, particularly in London.

London

The presence of Harrold building material was recorded at 61 sites in London, the majority of which lie inside the city's Roman walls (Fig. 5). Ten sites were outside the walls and four were in Southwark. There is no distinct pattern, although there seems to be a large cluster of sites towards the riverside, which is interesting to note when considering that the riverside wall would have been built at this time. Trade and distribution must have been difficult in *Londinium*, especially after the port closure. The Thames may still have had a role in the distribution of tiles if smaller harbours near Shadwell, for example, were used to receive goods. The most logical route for the tiles to be distributed by road would have been along Watling Street, which ran directly into London (cf. Fig. 4). Comparing the late Roman London map (Fig. 1) and the distribution map (Fig. 5),

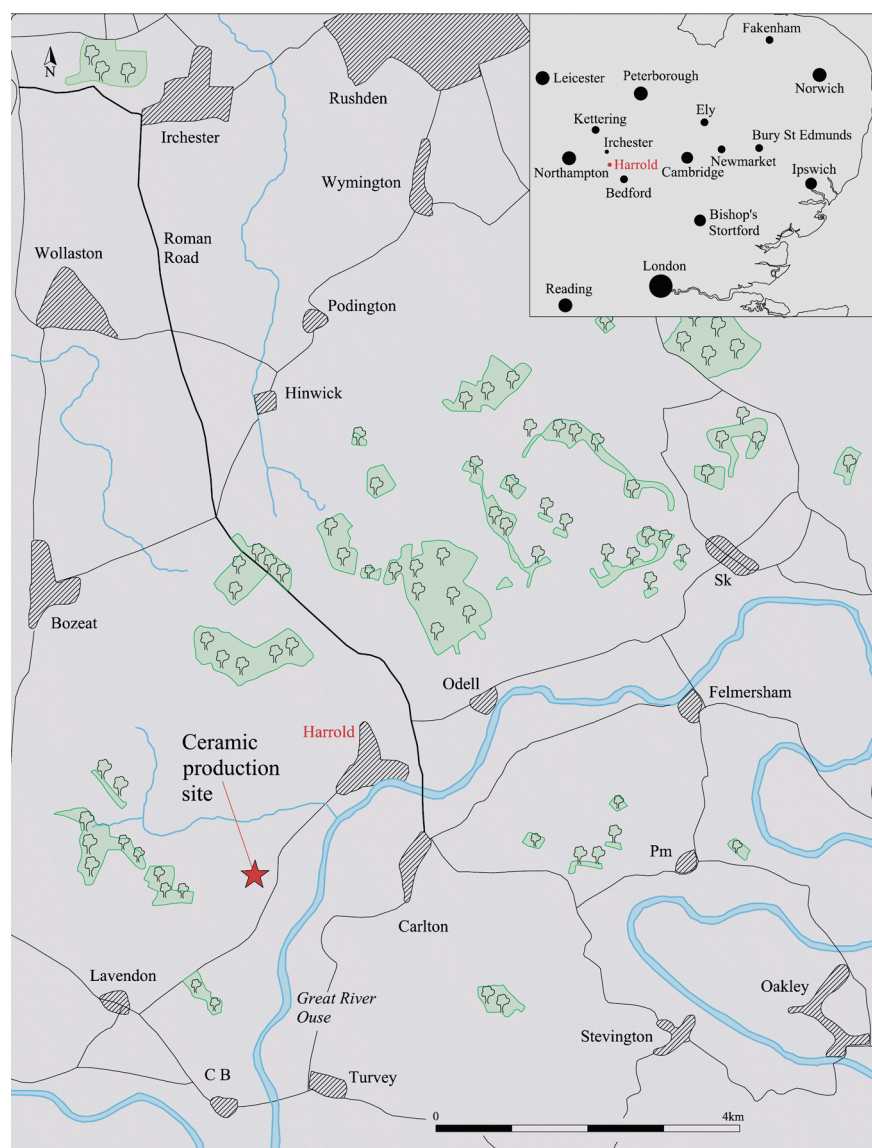


Fig. 2: site location of Harrold (after Brown 1994)



Fig. 3: examples of tegula (top) and imbrex (bottom) tiles from London

several interesting observations can be made. The excavation in 1981 at the unfinished palatial structure by St Peter's Hill, a site near the riverside and dated to AD 294, produced several pieces of shelly tile: not only roofing but also one piece of combed box flue tile (Table 1). The box-flue tile would suggest that a hypocaust heating system was a planned feature of the building, indicating that it may have been a villa complex. If this structure was intended as a palace for the Emperor, it suggests that shell-gritted tile may have been a rather prestigious and expensive building material.¹⁵ Another cluster of sites seems to be concentrated towards the site of the amphitheatre, revealed at Guildhall Yard in 1992 (Fig. 1). There are nine fragments of combed box-flue tiles with one tegula and two imbrex tiles. Their presence may indicate that the surrounding complex was rebuilt. It is possible that the buildings close to the amphitheatre were of high status and the owners could rebuild their houses into more rural-style complexes with hypocaust heating systems. The rather large number of domestic buildings revealed at the site of No. 1 Poultry, with the discovery of one box-flue tile and three imbrex tiles, is further evidence that masonry-built villa-style houses were becoming increasingly widespread in later Roman London. The excavation at No. 1 Poultry revealed firm evidence for late activity, including a possible bathhouse structure with a hypocaust heating system built after AD

299, which coincides closely with the Harrold tile production dates.¹⁶

Statistics

The data collection was split into two sections, because the post-1992 and pre-1992 sites had different databases and dating techniques (Tables 1 and 2).

Form

The tegulae and imbrex tiles account for the highest proportions of tiles found in London, with 53 and 39 fragments respectively. The discovery of 38 box-flue tiles indicates that hypocaust heating must have been relatively important to late Roman Londoners. The statistics indicate that roofing tiles were more in demand than the box-flue tiles. Hypocaust heating systems were a luxury household feature, which may account for their less common appearance in London. Although, equally, the amount of tiles needed to

cover a roof are likely to have been significantly higher than that required to build a heating system, which may account for the greater number of roofing tiles in London.

Dating

As suggested above, the date for Harrold-type tile production originates from the second phase of manufacture (AD 270–350) and the tiles, including nearly all of the national examples, concur with this date. The tile dates from London have never been compared, but when analysed, an overwhelming majority of the tiles in Roman London also matches this date. Thirty-nine of the examples of the tiles, discovered from post-1992 sites, provide dates from stratified late Roman contexts. However, there are also 47 tiles found residual in later layers. This is not unexpected considering the date of the tiles; they were probably reused,

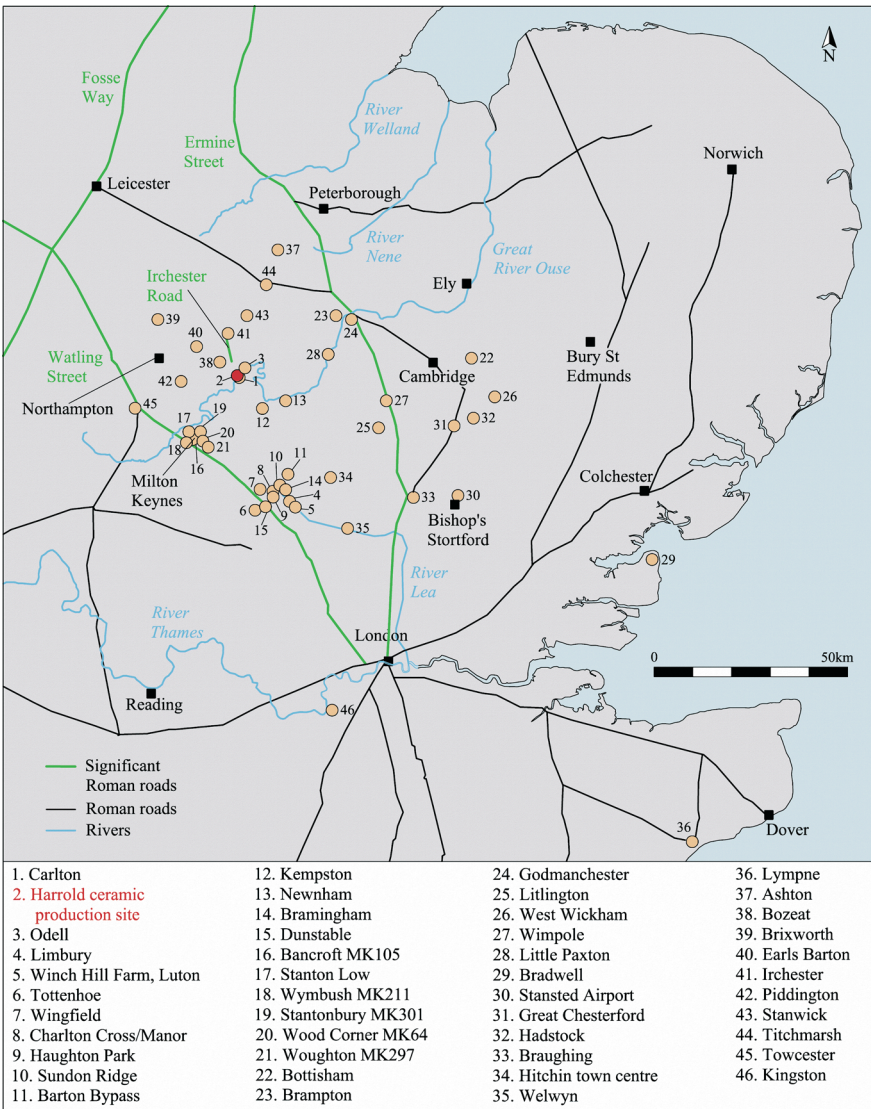


Fig. 4: distribution of shell-gritted tile in south-east England

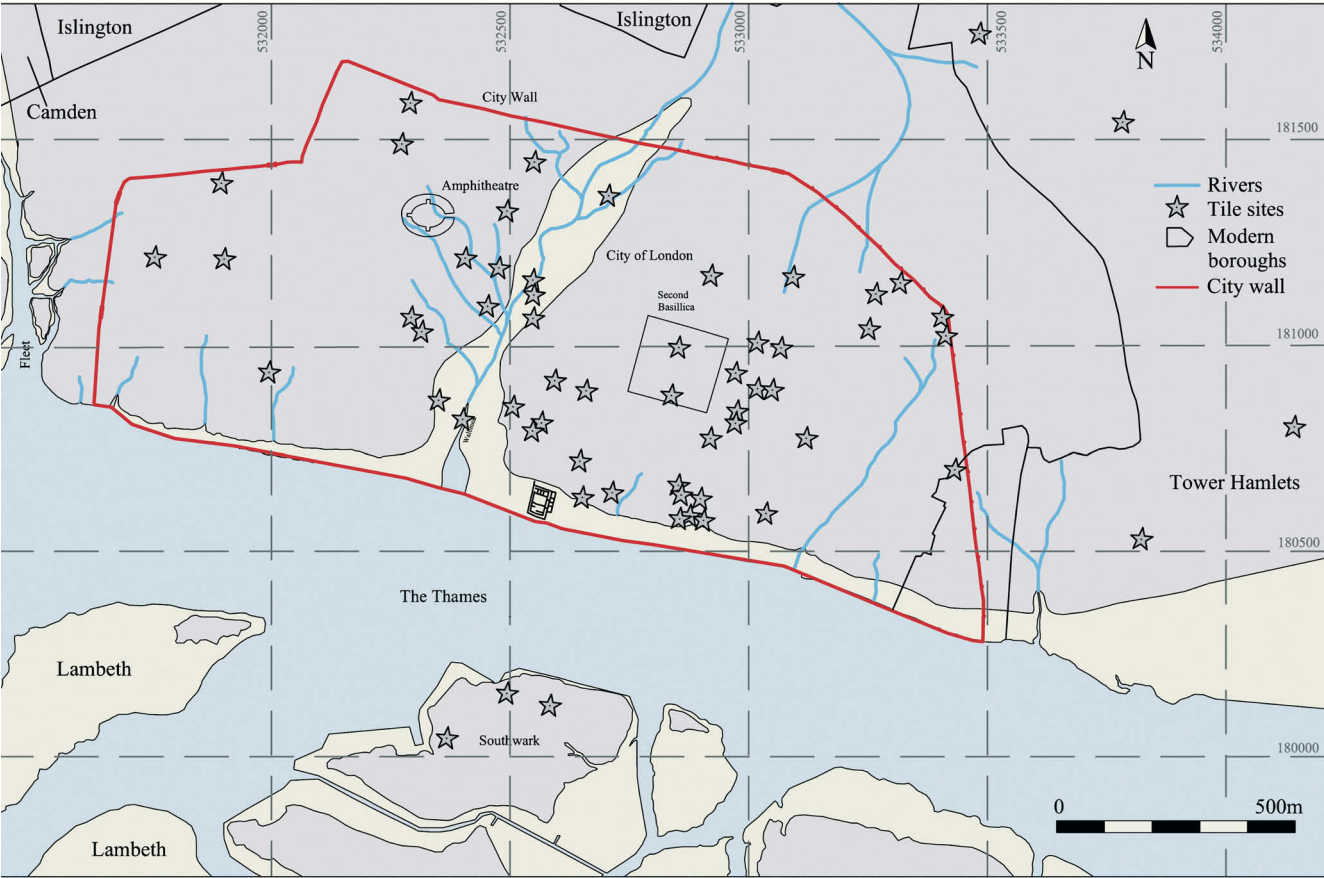


Fig. 5: distribution of shell-gritted tile in London

dumped or buried between the end of the Roman occupation and the beginning of the medieval period. The rest of the 31 fragments are either poorly dated or are from contexts without any dating evidence.

Land use

The overwhelming majority of sites where the tiles have been discovered are described as ‘open areas’. These could be courtyards, dumps, gardens or pits, and were often near to or inside a settlement site. For example, the tile may have been discarded in these open areas near to a villa or townhouse when the occupation ended or rebuilding occurred. No Harrold tiles have been found *in situ* in any London buildings, but ten fragments from post-1992 sites have been found associated with known Roman buildings, such as those from Guildhall Yard and No. 1 Poultry.

Other tile sources

Analysing other potential sources for London’s tile suggest the possibility that a decline of kilns within a 30 km radius of the capital may have allowed

Site Code	Site Address	Form (I, T, F, B, ?)
BGH95	Ticket Hall, Borough High St, Southwark	I
BAX95	St Mary Axe, 19–28 Bury St, EC3	T
RWT93	Redcross Way, Southwark	F
SUF94	Suffolk House, 154–156 Upper Thames St	2xF, T, I
NST94	Noble St	I, 2xT
ONE94	No, 1 Poultry, EC2	F, 3xI, 2x?
OJW98	8-10 Old Jewry	F
MRG95	20-28 Moorgate, EC2	T
GYE92	Guildhall Yard, EC2	8xF, ?, 2xI, T
FER97	Plantation House	F, I, 2xT
SRP98	Spital Sq, E1	F
GHT00	Blossoms Inn Yard, EC2	F, I
SLY00	Juxon House, Paternoster Sq, EC4	T
TEA98	Lion Plaza, 1–17 Old Broad St, EC2	I
BKT01	Borough Market, Southwark	I
LME01	Lime St, EC3	T
KEW98	King Edwards Buildings, 2 King Edward St EC1	F
WAO06	St Swithen's House, Walbrook House, EC4	T
WGW04	Watling St, EC4	F
CCP04	Cannon Place, EC4	F
BAZ05	35 Basinghall St, EC2	F
POU05	36 Poultry, EC2	?
BBBO5	Bow Bells House, Bread St, EC4	2x?

Table 1: post-1992 sites with shell-gritted tiles

Site Code	Site Address	Form (I, F, T, B, ?)
ABS86	St Albans House, 124 Wood St, EC2	F, T
ACE83	77–79 Gracechurch St, EC3	I
BEV80	2–9,10–16, Bevis Marks,EC3	F
BIG82	Billingsgate Market Lorry Park	?
BOP82	28–32 Bishopsgate, EC2	T
BRL87	19–25 Birchin Lane, EC3	T
CID90	72–80 Cheapside, EC2	?
CLE81	29–32 Clements Lane, EC4	F, T
DEN91	104–106 Leadenhall St, EC3	F
DOW86	3, 5–7 Dowgate Hill	T
EDE89	Eden St	2xF
FEN83	5–12 Fenchurch St, EC3	I, 3xT
FMO85	37–40 Fish Street Hill, EC3	T
GM111	Coal Exchange, 100 Lower Thames St, EC3	F
HTP79	Mitre Square, Mitre St, EC3	T
HOO88	Hooper St, Back Church Lane, E1	T
IME83	Lime St, EC3	4xT
IRO80	24–25 Ironmonger Lane, EC2	T
LCT84	Leadenhall Court, EC3	2xF, 12xI, 5xT
LEA84	71–77 Leadenhall St, EC3	T
LH74	42–46 Ludgate Hill, EC4	T
LYD88	Cannon St, Dowgate Hill, Bush Lane, EC3	2xF, I, 2xT
MIN86	Royal Mint, East Smithfield, E1	I
NFW74	New Fresh Wharf, 2-6 Lower Thames St, EC3	I
PDN81	11–11a Pudding Lane, EC3	I
PEN79	Peninsular House, 112–116 Lower Thames St, EC3	2xT, ?
PET81	St Peter's Hill, EC4	F, 2xI, 2xT, ?
PPO87	2-3 Philpot Lane, EC3	F
QUN85	51 Queen St, EC4	I
RAC89	Brabant House, 55–58 Gracechurch St, EC3	F
SH74	Seal House, 106–108 Upper Thames St, EC4	T
SKI83	2–4 Skinners Lane, EC4	B
SM75	New Fresh Wharf, 2–6 Lower Thames St, EC3	I
SSL84	18,19, 21–23 St Swithin's Lane, EC4	2xF
SWA81	95–103 Upper Thames St, EC4	I
WAT78	Watling St, EC4	F
WFG3	Windsor Court & Castle Street, EC2	?
WIV88	1–7 Wittington Ave, EC3	4xI, 5xT

Table 2: pre-1992 sites with shell-gritted tiles

opportunities for new manufacturers to meet *Londinium's* needs. We know that there were several tile kilns in operation during the 1st and 2nd centuries within this radius; many were located outside London, chiefly in Hertfordshire (Fig. 6). It is thought that the highest concentration of these kilns occurred

between Brockley Hill and *Verulamium*. However, by the mid-2nd century many of these kilns were abandoned, except for Gaynes Park in Essex which was still producing tiles in the late 2nd century.¹⁷ This decline in Hertfordshire kilns has been explained by an economic downturn in the

Antonine period which reduced further building construction in both London and *Verulamium*.¹⁸ If this was the case, then London would have needed other tile suppliers, even though the demand for tiles may have been lower. Focusing on tile kilns closer to London, a kiln discovered at Paternoster Square began to decline by the late 1st century. The only other known kiln, discovered beneath St-Martin-in-the-Fields church, was in use between the late 4th and the early 5th centuries. As the Paternoster Square kiln finished production in the early 2nd century and the kiln at St Martin in the Fields began production in the late 4th century, the evidence suggests a substantial lack of local kilns supplying tiles between the 2nd and 4th centuries. It appears that this gap in London's tile production was almost certainly filled by Harrold-type tiles. Kilns supplying London with building materials beyond the 30 km radius also need to be considered. In 2004, a rather distinctive kiln was found at Reigate in Surrey; pottery found close by dated it tentatively to between AD 90–120,¹⁹ with a later phase of tiles thought to have been imported to London up until AD 230.²⁰ Similarly, the tile kiln at Ashted is thought to have finished production in the mid-2nd century.²¹ This all provides evidence towards a shift in building material suppliers, possibly as a result of market forces, or a voluntary organisational change taking place in the industry.²²

Discussion

There are several possible reasons why Harrold-type tile was imported and used in the building of 3rd- and 4th-century Roman London.

Economic downturn

An economic downturn in Roman London or in the province as a whole, as suggested by Betts, may have forced the local kilns to cease production by the mid-2nd century.²³ Looking at Roman Britain, human error and civil unrest caused numerous severe fires which may have had an impact on the economies of several towns including *Verulamium*, London and numerous smaller towns.²⁴ The boom in the villa construction in London from the mid-2nd century must have been an expensive enterprise, which suggests

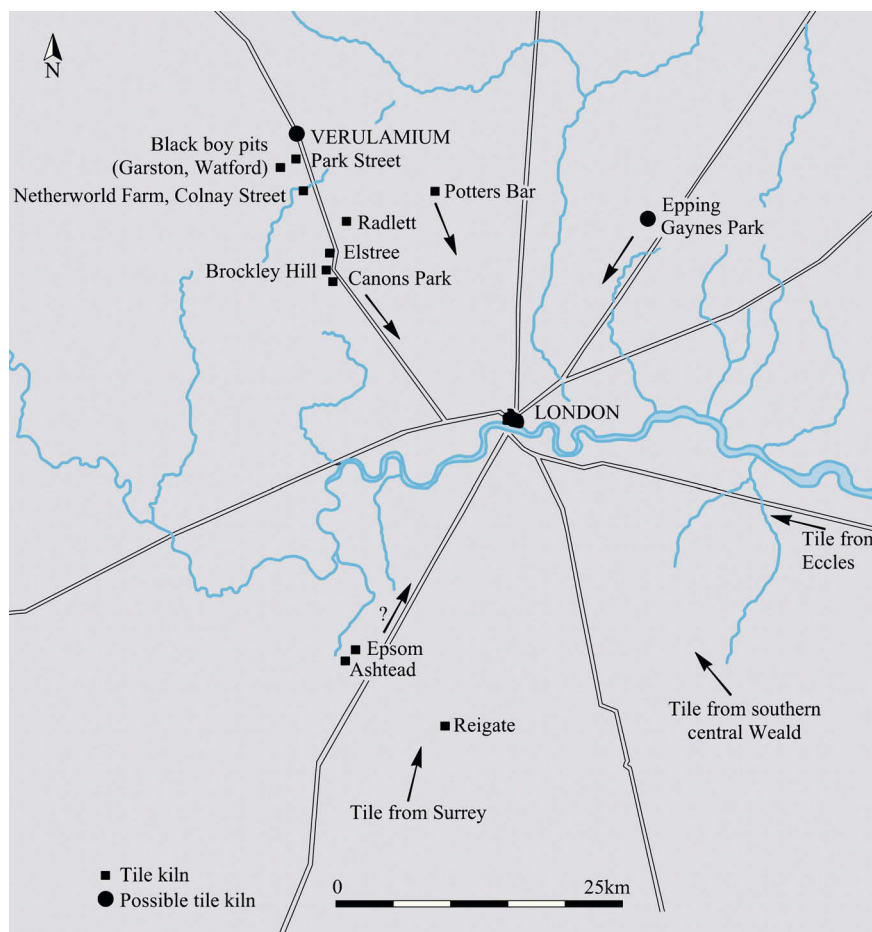


Fig. 6: Roman tile kiln sites around London

that any recession was simply a short-lived downturn in the fortunes of *Londinium* and the province. It is likely that the shell-gritted tile manufacturers filled the gap until local tile suppliers (such as the one at St-Martin-in-the-Fields) could begin production again.

After a relative recession, it is also possible that any local producers may have struggled in the short term to cope with a surge in building activity. This may have caused an opening in the market, possibly filled by manufacturers situated further afield such as Harrold.

Possible centralisation?

It has also been suggested that there may have been a centralisation of building material suppliers in the late Roman period.²⁵ The evidence suggests that smaller tile producers were supplying larger areas. This includes not only the shell-gritted tile but other types such as calcareous and *Classis Britannica* (CLBR) stamped tiles which are known to have been imported from long distances at a similar time.²⁶ The question remains whether the

importation of tiles from longer distances was a change purposefully made. The Procurator may have decided to take control of the industry in order to make the process of buying ceramic building material (CBM) easier, and to fix prices in the hope of stimulating the economy after its slight decline around AD 140. This may have led to a centralisation of tile producers in Roman Britain, so that there were only official avenues of the production and purchasing of CBM. The official stamps found on limited tiles in London indicate some form of local government intervention in the industry and implies that state intervention was entirely feasible.²⁷ Importantly, the city of London underwent a large-scale public building programme under the Severan dynasty between AD 200 and 250, after which demand for tiles may have dwindled.²⁸ However, if centralisation did occur at this time, reduced demand for tiles would have impacted on suppliers from as far away as Harrold, who would have found it difficult to distribute as many tiles as a local kiln.

Fashion

Another possible reason for the emergence of these tiles in *Londinium* could have been a cosmetic one due to fashion tastes changing in the mid-2nd century. The distinctive colour of Harrold-type tile was relatively unusual in *Britannia's* tile manufacturing industry before AD 270, as most were various shades of red or orange-red.²⁹ Harrold-type tiles were imported at the same period as the villa-style townhouses were being built in London.³⁰ It could be that the fashion for lighter tiles was connected to the construction of rural-style buildings, which were appearing in late 3rd/early 4th-century Roman London. If the fashion was for lighter coloured tiles, it is quite likely that these patrons could afford to import this tile the substantial distance from Bedfordshire. It must be noted that a reasonable quantity of shell-gritted tile was found in excavations of the building at St Peter's Hill, a building thought to have been intended as Allectus' Palace. Of course, only wealthier patrons could afford to follow changing fashions and visible status symbols were important to the Roman élite.³¹ This does imply the shell-gritted tile was imported for higher-status people rather than the everyday individual (the élite rather than the plebeians), which may explain why the tiles are not widespread across *Londinium*, as perhaps only wealthy individuals could afford them.

Transportation

In considering other reasons why Harrold-type tiles were used in London, perhaps the transportation of shell-gritted tile had advantages over tiles made from other types of clay. If the local kilns had closed down because of an economic recession, and their successors needed to be imported from a long distance, there are some positive reasons why Harrold-type tiles would have been chosen. Following the probable port closure in London due to the construction of the riverside wall in c. AD 255 (or relocation to an unidentified position) it is uncertain whether the Thames was used for distribution at this period. Assuming, therefore, that the tile could not have been brought into London *via* the river, road would have been the only other

option, either *via* Ermine or Watling Street. A combination of water and road is feasible if the tile was taken to transshipment points (possibly along the tributaries of the River Ouse) and transported by road to London. The Harrold-type tile fabrics, with their characteristically high proportion of shell inclusions makes these wares particularly advantageous for distribution by road due to their smaller and lighter nature.³² However, if local tile suppliers were decreasing and the port had closed entirely then the considerable advantages of importing Harrold-type tile by road (smaller and lighter and therefore more carried per journey) would have been apparent.

Decline in demand

The demand for Harrold-type tiles ceased c. AD 350 and there may have been several reasons for this. First, fine-grained sandstone roofing increased in popularity in this period. Stone roofing may have been an alternative after the closure of the Harrold production site, so preventing the importation of new supplies of ceramic tile into London. It is also possible that stone roofing may have been a fashionable competitor to the ceramic roofing tile, thus causing a decline in demand for CBM. Laminated stone discovered at Colchester House has been interpreted as roofing tile dating from AD 350–400, which may suggest a new innovation in using stone. Second, there may have been a general move away from the ceramic tiles industry in this period. As well as

Harrold-type tile, calcareous tile was also in decline from AD 350. This could be due to the increased demand for stone roofing tile or simply a decline in building occurring at this time.

Although it was to be over 100 years until the final collapse of the Western Roman Empire, the construction of more rural-type housing in the late 3rd century may have meant that no more urban-style housing was needed in the city, especially if the population appeared to be moving into the countryside.³³ It is likely that there was a widespread collapse of the tile industry in southern England for a production site such as Harrold to close. Stone roofing could have filled the opening in the market in London until new local kilns could start up. In considering that the kiln at St-Martin-in-the-Fields began production from the late 4th century, perhaps a proportion of the villa-style housing was becoming ruinous, and it was at this point that a kiln was set up to deal with the smaller and more local demand.

Other reasons

Another possible reason for the decline in the ceramics industry in general, but also in London, could have been the introduction of a tax on CBM.³⁴ As argued above, it was not only the use of Harrold-type tile which was in decline but also calcareous tile which may therefore indicate a general pattern of decline. The administration of Roman Britain was changing in this period and perhaps local finance officials decided

that taxation on CBM, an essential industry, would produce revenue and maintain good government. At a time when *Londinium* was losing power and status in *Britannia*, the government would have benefited from further revenue, which may have been intended for new public buildings, a way of returning *Londinium* to its previous eminence. It could have been the decline in the tile industry which encouraged the use of stone roofing and it may well have been the introduction of a ceramic tax which contributed to the decline of the ceramic tile industry.

Conclusion

There is much information to be gained from investigating why shell-gritted tile began appearing in London from AD 270–350. This study is based on the currently available evidence and data, which is relatively sparse. Further evidence of shell-gritted tile in London and across Britain may help to validate or identify further reasons for the transport of these ceramics the 84 km from Harrold to Roman London in this period.

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