

# A BUILDING IN PUDDING LANE DESTROYED IN THE GREAT FIRE OF 1666: EXCAVATIONS ON THE PENINSULAR HOUSE SITE, 1979–80

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## SUMMARY

*Evidence of the Great Fire of London has been recorded on many of the Museum of London's archaeological excavations, from Baynard's Castle in the west to Billingsgate in the east. This report considers one of those sites, a property very close to the infamous bakehouse in which the Fire actually started. The excavations exposed a cellar, fronting onto Pudding Lane, in which barrels of pitch were being stored at the time of the Fire. The evidence is described and discussed, and the context established for the large and closely-dated group of late-seventeenth century finds associated with it. The majority of the finds themselves are discussed in detail elsewhere (Vince et al forthcoming).*

## INTRODUCTION

From October 1979 to March 1980 rescue excavations were conducted on the eastern side of Pudding Lane, at the Peninsular House site now occupied by the Trade Development Bank (Fig. 1). The work was generously funded by the developers, Vitiglade Ltd and Verronworth Ltd, and was conducted by a small professional team supervised by the writers, ably supported by volunteers. The results are written up in the archive reports housed in the Museum of London Library where they may be consulted by request (Site Reference Code: PEN 79). Evidence of Roman waterfront installations (Bateman and Milne 1983, Milne 1985), a Roman building in which fish was processed (Bateman and Locker 1982), and substantial evidence of Saxon occupation (Milne 1980) was recovered. In addition, in the 8m by 5m trench laid out parallel to the Pudding Lane frontage (Area B on Fig. 2), part of a well-preserved post-medieval cellar was recorded. Three main phases of development were identified, and these are described below.

## THE LATE FIFTEENTH-EARLY SIXTEENTH CENTURY CELLAR

(Figs 3–6)

The sub-Roman levels on Area B had been truncated by the insertion of a cellar with a floor at *c.* +3.8m OD, extending to the northern, eastern and western limits of excavation. A 4.6m length of the southern wall survived, incorporating a chalk, flint and ragstone core bonded with yellow sandy mortar. It was faced with stock-moulded bricks made from a local brickearth and was laid in a stretcher bond, of which some five courses remained. The lowest course was offset by 100mm, a feature shared by a brick plinth which was an integral part of this southern wall (Fig. 6). The plinth was also built in stretcher bond and incorporated rubbed bricks with chamfered corners.

Some 3m to the north, two post-pits had been cut in the middle of the floor, 2m apart. Both were 1m square and *c.* 1m deep, and each contained a rubble raft over which was an offset brick plinth (Figs 3, 5). On top of this was a padstone which supported the base of a substantial timber post (Fig. 4). Both posts had been carbonized, but their decayed feet protruded above the surface of the brick floor described below. The extensive spread of yellow/cream mortar and crushed chalk which sealed the uppermost backfill of both pits as well as the offset on the southern wall formed the first major



Fig. 1 Pudding Lane: Excavating on the Peninsular House site, Pudding Lane, in the shadow of the Monument. The polythene cover on Area B has been rolled back revealing the cellar of a building burnt in the Great Fire of London.



Fig. 2 Pudding Lane: Plan showing location of Area B on the Peninsular House excavations (site code PEN 79) in relation to the street plan of 1979, and also to the late 17th-century survey by Ogilby and Morgan (shown tinted).

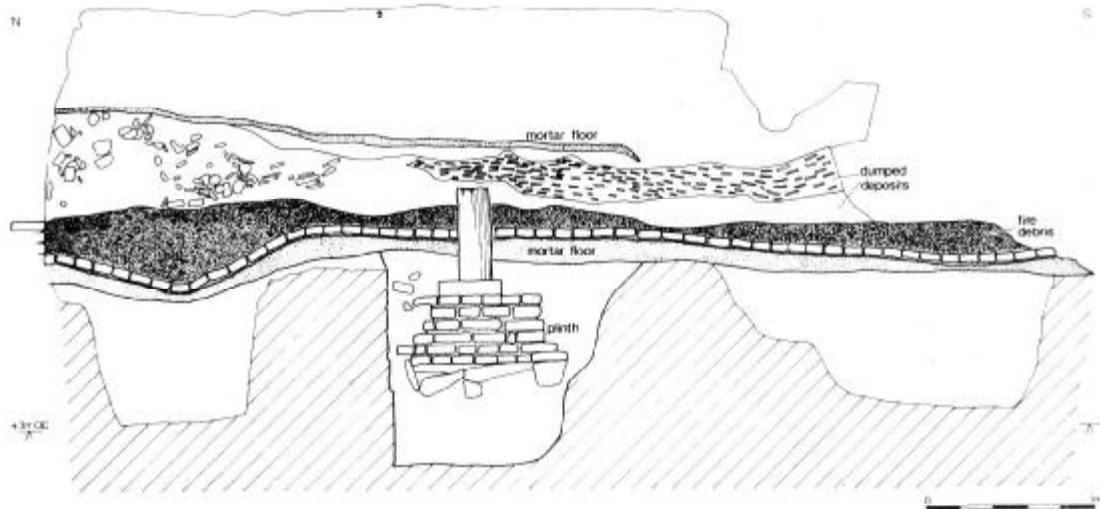


Fig. 3 Pudding Lane: Part of a north-south section across the PEN 79 site at Pudding Lane showing archaeological deposits revealed beneath the 19th-century basement floor. The earliest cellar floor cuts through medieval pits and Roman levels (shown hatched). Note the 17th-century brick floor overlain by debris from the Great Fire of London.



Fig. 4 Pudding Lane: The 1m scale rests on late 15th to early 16th-century cellar floor, discoloured by burning pitch seeping through the 17th-century brick floor which once covered it. Note charred remains of posts which would have supported the ground floor of the building (see Fig. 5).

internal surface of the cellar. Sherds of pottery provisionally dated to the 15th century or later were recovered from this floor level.

## THE PRE-FIRE CELLAR FLOOR

(Figs 7, 8)

Overlying that floor was a compacted mortar layer 100mm thick interpreted as the bedding layer for the brick floor which sealed it. Analysis has shown that similar bricks were found in the walls described above, and also in Henry VIII's palace at Bridewell, London which was built between 1515 and 1520 (Gadd and Dyson 1981). On average they were  $9 \times 4\frac{1}{4} \times 2\frac{1}{8}$  inches ( $228 \times 108 \times 54$ mm), and thus conformed closely with the dimensions stipulated in the regulations of 1571, which were  $9 \times 4\frac{1}{2} \times 2\frac{1}{4}$  inches ( $228 \times 115 \times 57$ mm: Bell 1938, 18–9). They were laid on their face butted end-to-end in east-west rows. The bricks had to be cut to butt flush against the south wall of the cellar, demonstrating that the floor was laid from north to south, and that the cellar did not form a perfect rectangle in plan. The level of the surface undulated from +3.8m OD to +4.3m OD, with the major depressions overlying areas of early medieval pitting showing that the floor must have been operative long enough for such subsidence to take place (Fig. 3). The bricks did not appear to be reused, but some ten per cent showed signs of wear consistent with the installation and use of table or racks rather than the passage of feet. Observations made during the contractors earthmoving operations on the site in May 1980 showed that the brick floor extended up to the Pudding Lane frontage, some 3m to the west of the controlled excavation. In that area, a hole had been cut into the floor into which a complete 17th-century Woolwich-ware storage jar *c.* 250mm in diameter had been deliberately set.

Directly overlying the floor was a mass of moderately compacted carbonized material representing features burnt *in situ* (Fig. 8). After careful dissection of the deposit, it was possible to identify the remains of some twenty barrels closely-bound with wooden hoops, which had been stored on five racks (Fig. 7). The best preserved elements of these structures were in the south-west corner of the area and these justify detailed description.

At least three parallel carbonized undressed timber poles lay horizontally east-west: the longest fragment was *c.* 2.1m long and all were *c.* 50mm in diameter, cut from trees at least ten

years old. The largest member was overlain by four groups of up to sixteen carbonized hoop fragments. Each fragment was up to 30mm wide and 500mm long, was D-shaped in cross-section, and had been cut from coppiced sweet chestnut (*Castanea sativa*). They lay curved face downwards, aligned east-west but with their east and west ends raised, forming a slight concave profile (Figs 10, 11).

Each group was directly overlain by more substantial timbers representing the barrel staves themselves, which were also carbonized. The most westerly assemblage comprised two sets of oak (*Quercus sp.*) stave fragments all aligned north-south, conforming to the east-west concave profile of the underlying hoops (Figs 9, 11). Three of the more northerly group of four fragments seemed to be part of the same staves as the southern fragments, from which it was deduced that they would have originally been *c.* 0.92m long. The staves were 110mm wide, tapering to 90mm at both ends, which were chamfered and cut by the V-shaped groove characteristic of barrel staves.

Several similar groups of barrel fragments were recorded, usually aligned north-south on racks aligned east-west. All the barrels seemed to be of the same size and type, each 0.9m long, comprising up to fourteen staves closely-bound with wooden hoops around a cask with a diameter of 1.5m in the middle, tapering to 1.25m at the ends.

All these features were covered by the tar-like substance once contained in the barrels. It had formed a compacted crust on the upper surface of the blackened brickwork and had percolated between the bricks, the sides of which were also stained, discolouring the earlier surfaces beneath (Fig. 4). Microscopic analysis of samples taken from this deposit was conducted by the British Carbonization Research Association. It concluded that the carbonaceous material had the open spherical structure associated with the later stages of carbonization of pitch (Briggs 1980). In northern Europe, resinous woods such as pine, larch or fir were burnt in a supply of air inadequate to allow complete combustion so that the tar which then oozed from the wood could be collected. This impure form of resin, known as "Stockholm Tar" could be used for waterproofing, although further distillation would produce "wood pitch", a substance which was more viscous than tar and was often of more value for waterproofing (Hodges 1964, 164–5). It is suggested that it was this commodity, wood pitch, which was stored in the Pudding Lane

cellar at the time of the fire. This compound cannot have been derived directly from the burning of the barrel staves themselves, since they were cut from non-resinous oak.

Over this horizon had been dumped mixed deposits of bricks, tiles, mortar and other material, some of which showed signs of burning and vitrification (Figs 3, 12). They represent the debris from the clearance or collapse of fire-damaged structures. The presence of over 100 whole stock-moulded bricks in these dumps suggests that the debris had not been sorted. Analysis has shown that there were also fragments of roof tile of the standard peg tile form characteristic of local manufacture from the late 15th century. Many had been badly burnt, contorted and warped by the fire, and some fragments had exploded with the intensity of the heat. Molten and twisted nails were mixed in with the building debris, as were fragments of window glass, metal objects possibly representing iron brackets of varying sizes, part of a pivot, a hinge and a lock. Four fragments of badly burned and par-



Fig. 5 Pudding Lane: Detail of sub-surface brick plinth on which posts supporting the ground floor were set: 2 × 100mm scale.



Fig. 6 Pudding Lane: Brick facing of cellar's south wall: 5 × 100mm scale.

tially vitrified stove tiles of north European manufacture were also recovered, on which a moulded figure of a Triton (merman) was identified.

Many broken earthenware storage jars of the same hitherto unknown type were also found in these deposits (Fig. 13), as were two unused tin glazed polychrome tiles which had fallen so that their lower edges were just over the scorched cellar floor. Only this edge of the tiles was burnt (Fig. 12), which suggests that at least some of the debris was introduced into the cellar while the fire was still smouldering, and cannot therefore have been brought from a great distance.

#### THE POST-FIRE CELLAR

A mortar surface had been laid out over the fire debris (Fig. 3), and its worn appearance shows that it was subjected to considerable wear. Traces of a slot probably mark the line of an internal partition, while a pit and a pad stone occupied similar positions to the earlier more elaborate post-pits. This surface was sealed by



Fig. 8 Pudding Lane: General view of 17th-century cellar covered with deposits of carbonised material before excavation. Looking east, 10 × 100mm scale.

the make-up levels for the series of concrete floors associated with the 19th-century building which occupied the site prior to the archaeological excavations.

#### DATING THE DEPOSITS

Pottery from the pits which had been truncated by the earliest floor in the cellar has been provisionally dated to the Late Saxon period, while sherds recovered from that mortar floor can be dated no earlier than the late 15th century (A Vince, pers comm).

The brick floor overlying that surface had clearly been in use for some time before the fire, as its worn appearance and the considerable subsidence demonstrates. The large assemblage from the deposits which sealed it have been argued to represent material burnt *in situ* or dumped very shortly after the conflagration, and therefore can be assumed to be broadly contem-

porary. As a result, it is possible to propose a much closer date for this phase.

The association finds included a very worn sixpence of Elizabeth I (1558–1603) (North 1960, 107–9; EHC Nos 1997 or 2013); clay tobacco pipes of the types usually dated 1660–80 (Atkinson and Oswald 1976, 9, Fig. 1); local lead glazed monochrome floor tiles and (?Dutch) tin glazed polychrome tiles of types dated to the late 16th to mid-17th century, and the neck and shoulder of a glass “wine” bottle of a type introduced in *c.* 1650 (Noel Hume 1970, 63, Fig. 8). In addition, radiocarbon determinations of 1685 ± 70 (BM 1824: 150 ± 40 BP) and 1640 ± 70 (BM 1825: 230 ± 35 BP) were obtained from the carbonized fragments of barrel staves and hoops (Burleigh *et al* 1982, 270).

Taken together, it seems reasonable to assume that the cellar was resurfaced with bricks in the early seventeenth century, and that the late 17th-century conflagration which destroyed it

was that of September 1666. The succeeding phase would therefore represent the rebuilding of the area, known to have taken place in *c.* 1670 (Reddaway 1940).

Much of the material can therefore be associated with events in the decade *c.* 1660 to *c.* 1670. Such closely-dated deposits clearly have significant implications for the study of 17th-century sites elsewhere in this country and abroad, and for this reason material recovered from many deposits excavated in the City associated with the Great Fire is being brought together for publication as an important corpus (Vince *et al* forthcoming).

#### DISCUSSION AND CONCLUSIONS

Although the cellar discussed in this report was floored and faced with brick, it is thought that the overlying building was timber-framed, as were most of the

other buildings in the street at that time. The use of brick or stone for a cellar or undercroft and timber in the associated superstructure is known elsewhere in London (eg. Salzman 1952, Appendix B Nos 15, 49, 51) and also in other towns (Faulkner 1966; Smith and Carter 1983). For example, evidence for a similar timber-framed building with an unvaulted brick cellar was recorded in Pottergate, Norwich. It had also been destroyed by fire, in that instance the Great Fire of 1507 (Carter *et al* 1977, 45).

In September 1666, the Great Fire of London destroyed 13,200 houses, 87 churches, St Paul's Cathedral and the Guildhall as it swept through the nar-



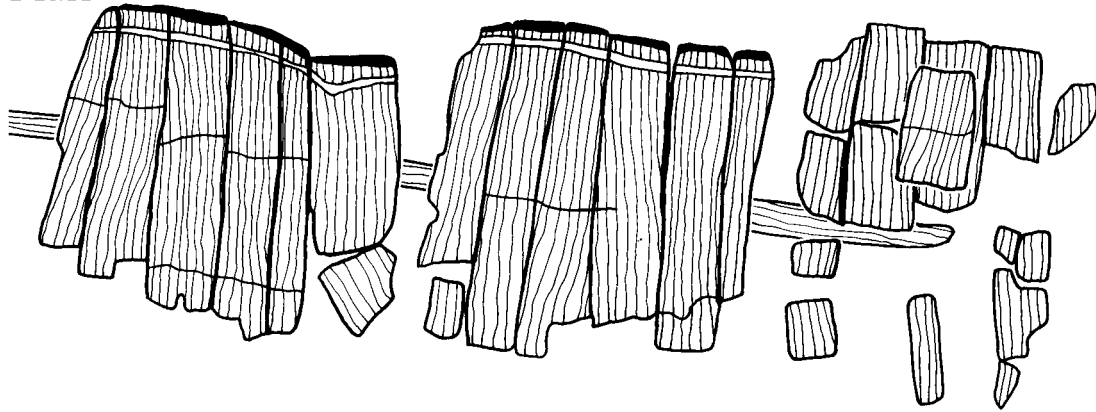
Fig. 9 Pudding Lane: Careful cleaning of the deposits shown in Fig. 8 revealed remains of several carbonised barrels. The lower staves of a line of five barrels are shown here, to north of 2 × 100mm scale.





Fig. 10 Pudding Lane: Beneath the staves shown in Fig. 9 were the carbonised remains of hoops binding the barrels, shown here running east-west, to north of  $2 \times 100\text{mm}$  scale.

## Plan



## Elevation

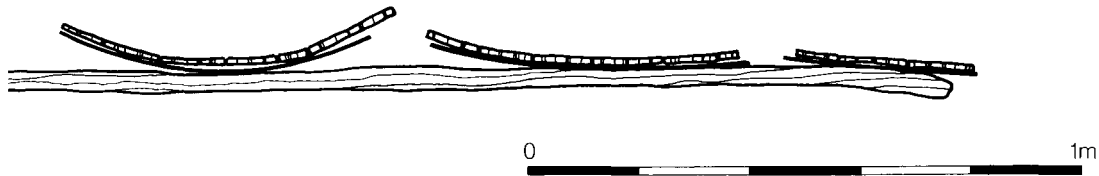


Fig. 11 Pudding Lane: (A) plan, and (B) elevation of barrel remnants shown in Figs 9 and 10, still lying on the rack.

row lanes of the town crowded with half-timbered jettied buildings (Bell 1920). In the wake of this destruction, the City was rebuilt with wider streets lined almost exclusively with brick buildings conforming to more rigidly-enforced building regulations designed to prevent a repeat of that tragic conflagration (Reddaway 1940, 80; Fig. 5). 1666 is therefore an important date for students of London's development, since it effectively marks the dramatic demise of the fabric of the medieval City.

The building which directly replaced the one destroyed in the fire on the Pudding Lane site would therefore have been quite different from its predecessor. However, given that the padstones and posts marked the middle

of the buildings, then the northern and southern walls of both structures were probably the same, corresponding with the northern and southern limits of the 19th-century warehouse which ultimately replaced them. This suggests that the width and position of the property plot that the pre- and post fire buildings occupied were identical. At least part of the post-Fire reconstruction represented on the Ogilby and Morgan plan of 1677 can therefore be argued to encapsulate the broad plan of the late medieval property layout in the City, even if the associated superstructure was radically different. This suggestion is indeed supported by analysis of the late 17th-century survey of the City conducted by John Oliver and Peter Mills (Jones and Reddaway 1967, xxii-xxvi).

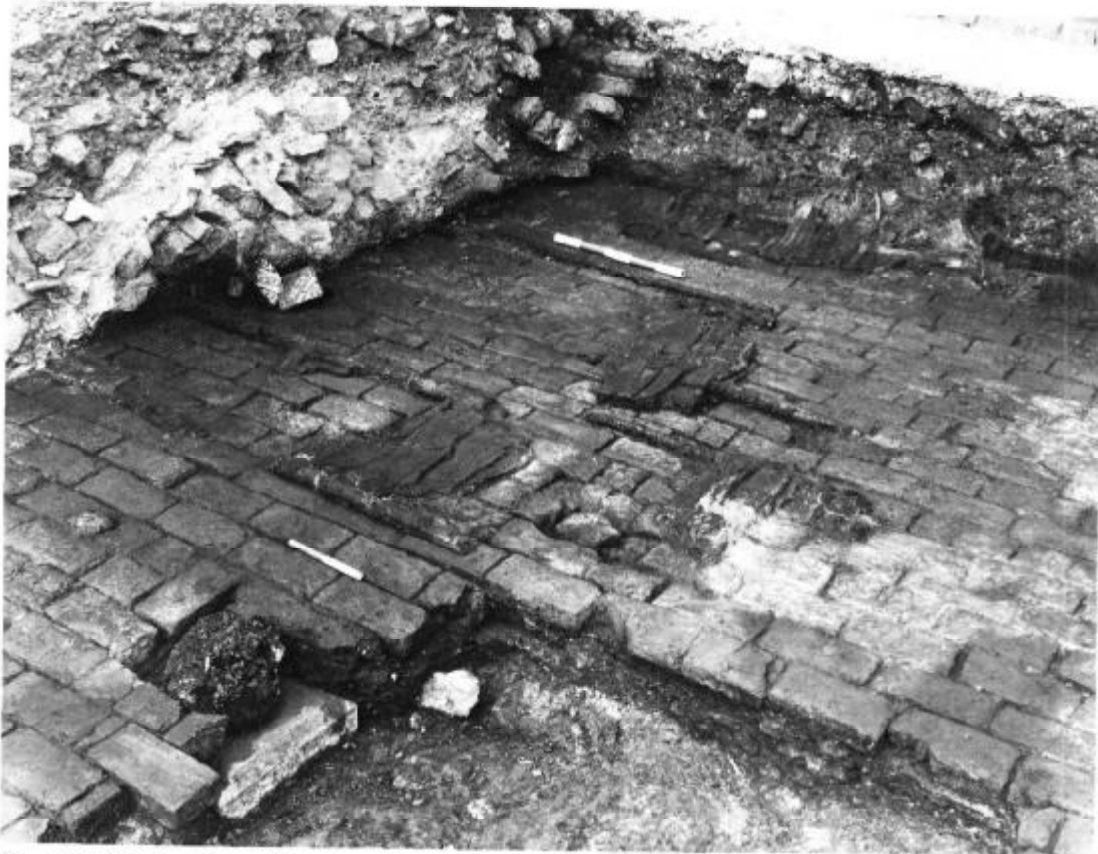


Fig. 12 Pudding Lane: Remains of burnt barrels and racks in north-west corner of cellar, sealed by dumped deposits shown in section to west of  $2 \times 100\text{mm}$  and  $5 \times 100\text{mm}$  scales.

However, since the floor level within the post-Fire cellar was *c.* 1m above the brick floor, it seems likely that the external contemporary ground surface (including that of Pudding Lane itself) would have been raised by a similar amount. This would seem to be in accordance with the 'Rules and Directions for Pitching and Levelling the Streets and Lanes of the City' issued on 8th July 1667 (Reddaway 1940, 291; Guildhall Library Broadside 12, 91). This directive was concerned with such problems as the steep slope from Thames Street up to East Cheap. One year later, Samuel Pepys observed that walking up Fish Street Hill (the street just to the west of Pudding Lane) 'has become

very easy and pleasant' (Latham and Mathews 1976, 285).

The importance of the large closely-dated assemblage from this building to post medieval archaeologists working elsewhere has already been stressed (Vince *et al* forthcoming). That the function of the building could be deduced from examination of the contents of the cellar and of its infill material is also of interest. Clearly the presence of so many barrels on racks shows that the cellar was used as a store, and the analysis of the contents shows that it was probably 'pitch in the later stages of carbonization' (Briggs 1980). The pitch would have been a byproduct of wood-tar, produced when

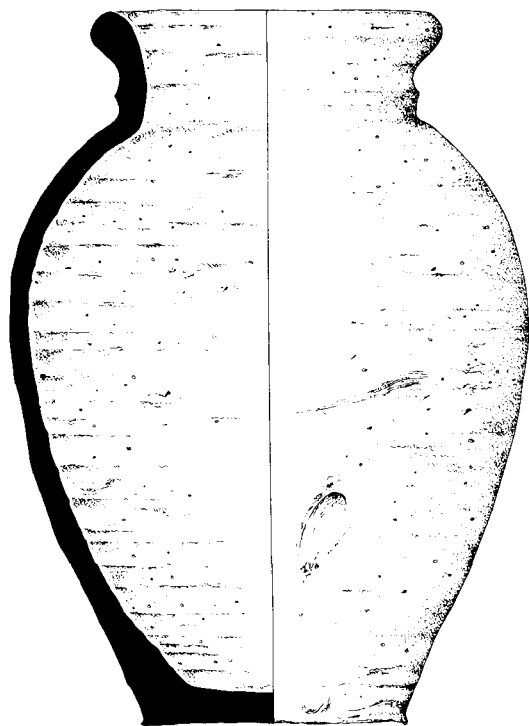


Fig. 13 Complete storage jar, made in a white, grog-tempered fabric ('PEN Ware'). This is one of over 30 almost identical examples found in the fire debris filling the cellar. Drawn by K. H. Armitage, (4).

making charcoal, and was extensively used for the waterproofing of buildings as well as ship's hulls. The material in the dumped deposits overlying the barrel fragments not only contained the remains of many identical earthenware storage jars, but also quantities of metal hooks and eyes contorted by the heat. This implies that the premises above the cellar may have been used as a shop.

Fires were very common in medieval London, as they were in all such crowded towns, but they were usually small or localised. In the late 12th century, William Fitzstephen had complained that the only inconveniences of London were the immoderate drinking of fools and the frequency of fires. In 1632 a considerable

area around the northern end of Old London Bridge had been burnt down, the rebuilding of which had not been completed by 1666. What made the Great Fire so devastating was that it started in the waterfront area where large quantities of combustible material were stored. It was the proximity of such fire hazards as timber-framed warehouses with cellars full of pitch barrels to the infamous bakehouse that turned what could have been just another minor fire into a major catastrophe. A contemporary account describes the area as 'the lodge of all combustibles, oil, hemp, flax, pitch, tar, cordage . . . and materials favourable to fire' (Waterhouse 1667, 47), and such subterranean cellars, although open to the heavens, 'were still burning in stench and dark clouds of smoke like hell' five days after the Great Fire started (de Beer 1955, 261). Although the pitch barrels found near Pudding Lane did not start the blaze, they did provide fuel for it. Without that, the fire which started in the neighbouring bakery might have burnt itself out unremarked on Sunday 2nd September, 1666.

#### ACKNOWLEDGEMENTS

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