A LATE MEDIEVAL TILE-KILN AT SHENLEY CHURCH END, MILTON KEYNES, BUCKINGHAMSHIRE

G. P. EDMONDSON AND A. T. THORNE

A tile kiln exposed during grading work was excavated, and recognized as being of a type found so far at only three other sites in Buckinghamshire. Associated pottery finds suggest a fifteenth-century date. Its capacity, and the method of stacking the tiles, are discussed.

The tile-kiln here described was exposed during grading work for a new section of Fulmer Street (V3), one of the Milton Keynes N–S arterial roads. The site is situated on the NE edge of Shenley Wood, close to the village of Shenley Church End (SP828363) (Fig. 1). The kiln was first noted by Mr G. Heritage and reported to the Milton Keynes Archaeological Unit. As the site was due to be destroyed the developers willingly agreed to adjust their programme to allow a short rescue excavation.

The Excavation

The kiln (Fig. 2) was orientated ENE–WSW and measured 3.78×2.40m. It consisted of three vaulted flues, each approximately 1.8×0.50m. beneath what must have been a single large firing chamber. The flues were heated via three stoke-holes, all of which were fed from a single large stoke-pit located to the W. The stoke-holes were some 0.66m long and 0.50m wide, and survived to a depth of 0.34m. The entire structure was built into a revetted trench cut into the natural boulder clay.

The revetment was about 0.35m thick and survived to a maximum height of 0.60m. The walling was constructed of horizontally coursed limestone slabs which were generally some 150–200mm long, 100mm wide and 30mm thick, and the whole structure was bonded with clay. Packed between the walling and the edge of the foundation trench was a thick deposit of stiff clay which contained several fragments of tile and other burnt debris, perhaps suggesting that there was an earlier kiln in the vicinity.

The interior of the kiln was divided into three roughly equal flues by two spine-walls running parallel to its long axis. The two spine-walls were constructed of roughly coursed limestone slabs (each about 180×120×50mm) and were also plastered with clay. The floor of the firing chamber itself was formed by a series of arches linking the two spines with the N and S walls of the kiln (Fig. 3). Although much of the interior had collapsed, two sets of these arches did survive in a fairly intact condition and evidence was found for five more. The arches were built about 200mm apart and were constructed of small tiles (about 90×90×150mm); some of these tiles contain peg-holes and appear to have been cut from unfired roof tiles. The tile-built arches were centred on wattles some 20mm in diameter and carried the remains of stone walling which must have carried the floor of the firing chamber. The whole structure was then plastered with clay, so preserving the casts of the wattles (Fig. 5, no. 2). Impressions of textiles survived on two fragments, of which one is discussed on p. 86. The western wall of the kiln was poorly preserved. It had slumped towards the W and was probably more massively built than the other external walls, as the collapsed debris contained larger than usual limestone slabs (up to 320×200×40mm).

The two freestanding walls that separated the

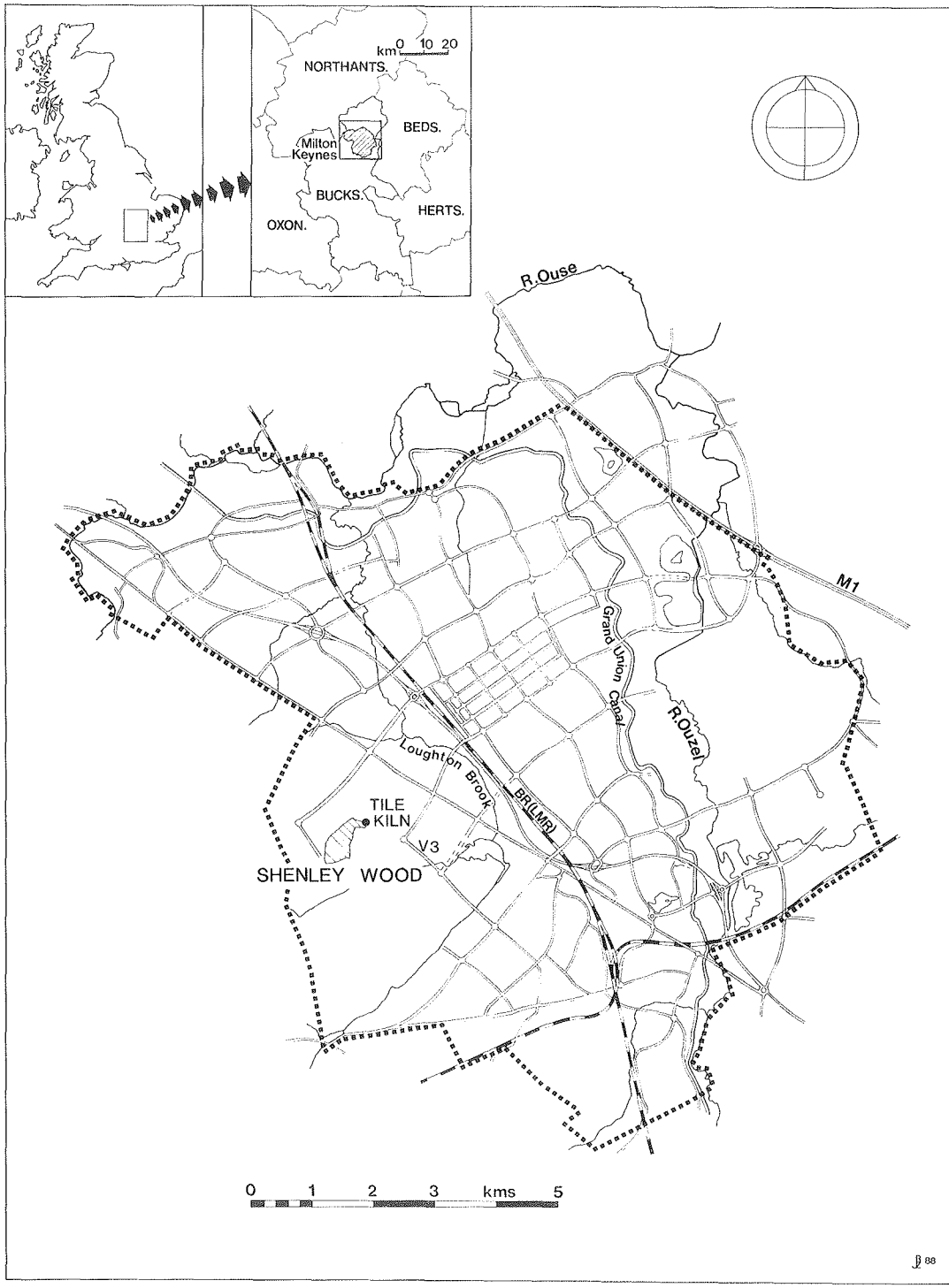

Fig. 1. Map showing the location of Milton Keynes and the Tile Kiln.

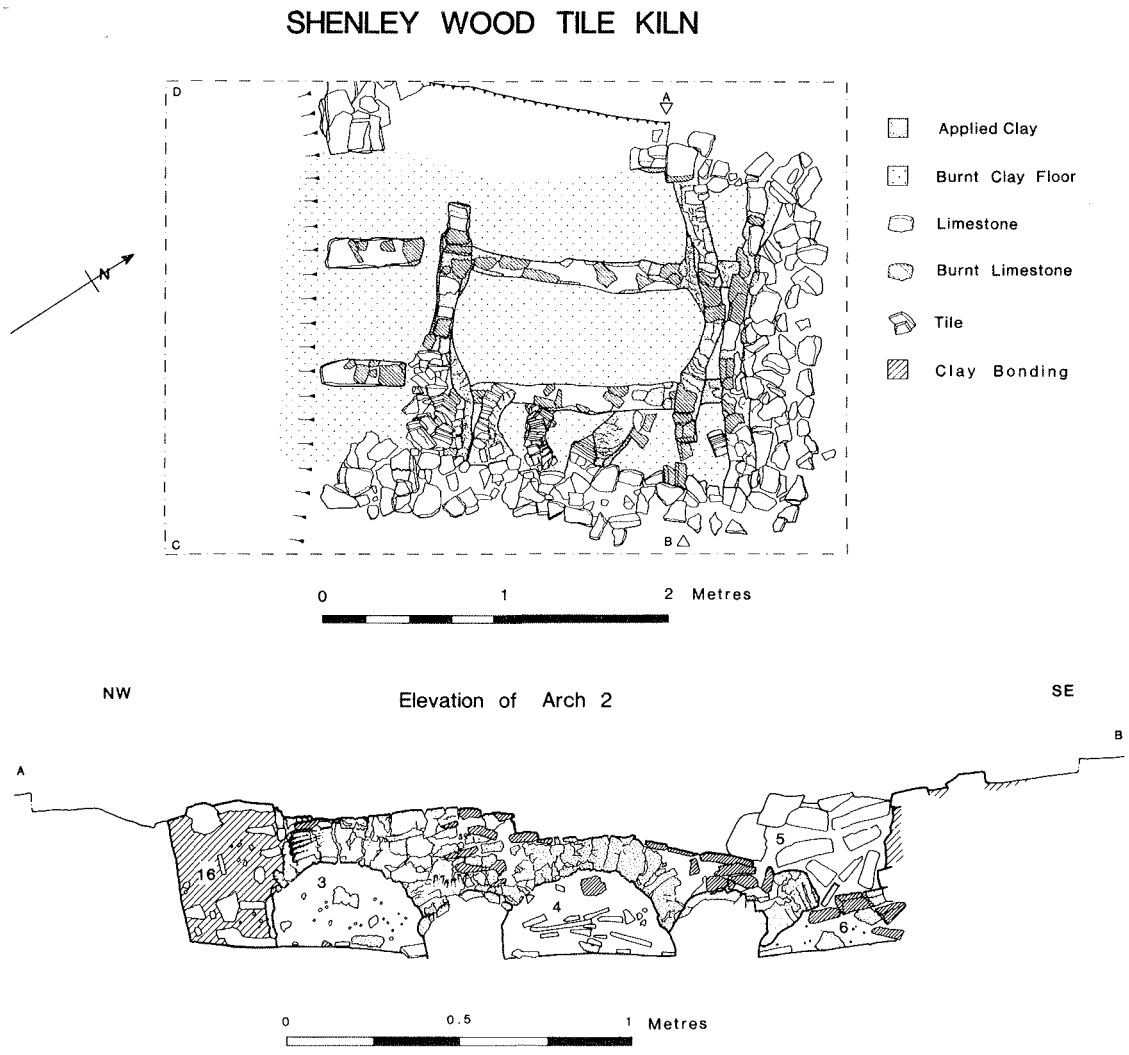

Fig. 2. Plan of Shenley Tile Kiln and elevation of Arch 2.

three stoke-holes were constructed of limestone and tile and had a clay coating, which was fired on all four sides. They may have supported some kind of roof over the stoke holes.

The stoke-pit was filled with deposits of burnt material, including the layer of charcoal (Fig. 3, context 8). Several tiles sealed this charcoal deposit and these could be regarded as a temporary stoking-floor; alternatively they may be no more than debris raked from the flues. The bottom of the stoke-hole was 150mm lower than the burnt floor of the kiln itself.

The all too evident collapse of the kiln structure seems to have started with one of the central arches, the others following domino fashion. Even the three intact arches were found to be distorted to the W, as were the back and front walls of the kiln.

The S chamber was largely filled with lime-

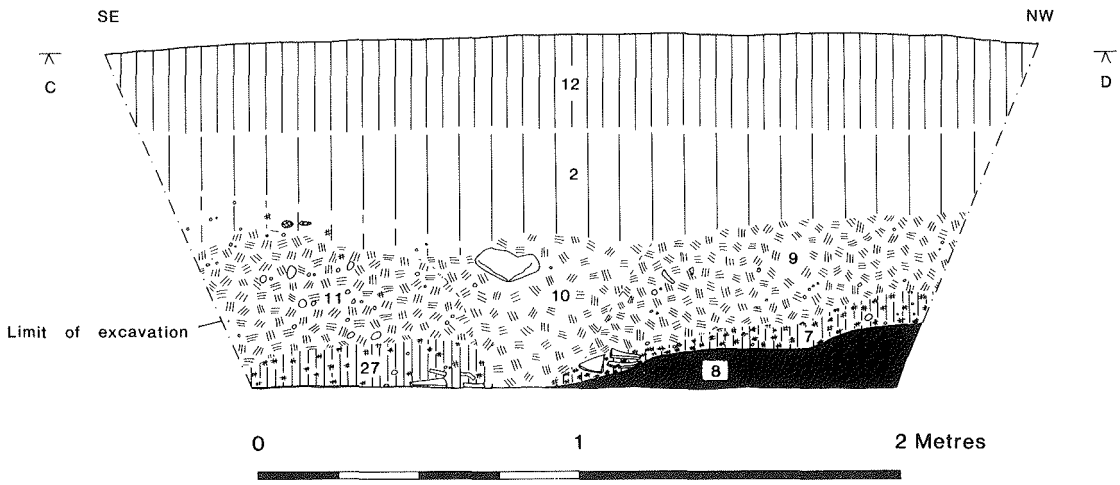

Fig. 3. West section across the stoke-hole.

stone rubble (Fig. 2, context 5). This debris lay directly on top of some of the collapsed arches and seems to have fallen in, following the ruin of the southern kiln wall. The quantity of collapsed stone indicates that the revetting walls once stood well above the modern ground level. No evidence survived to indicate how, or even if, the kiln was roofed over.

Preserved under the debris, and resting on the surviving westernmost arch and against the southern kiln wall, were the broken remains of a fired tile stack.

Although they were heavily burnt, the flues contained no evidence of fire debris and it seems likely that they were cleared out after the final use of the kiln.

Only one complete tile was found among the debris and this may also suggest that the last firing was largely salvaged; the kiln may have been slighted shortly after, either because it was no longer required or because it was damaged beyond repair.

At a later date a large part of the northern kiln wall was robbed out. Fired clay and other small debris were thrown back into the robber trench.

The Finds

Roof Tiles

Hand-made peg-tiles appear to have been the only product of this small kiln. Only one was recovered intact and this has maximum dimensions of 295×178×21mm, which seems to be typical of the tiles produced at Shenley (Fig. 4). This is slightly larger than the minimum specifications of 10½×6¼×½ins (266×157×16mm) laid down in a statute of 1477 (Salzman 1967, 230). The tiles were produced by rolling slabs of clay into a sand-lined mould. Many of the edges of the tiles show slight lips, where the clay has been pushed up to, or slightly over the edge of the mould. A few fragments of tile carry finger impressions and several have dented corners, which may be taken as evidence of handling during the stacking of the kiln or perhaps whilst the peg-holes were impressed. Each tile had been partly pierced by two holes positioned approximately 35mm in from one of the shorter edges; the centres of the holes were set 65 to 75mm apart. These holes appear to have been created by pressing a sharp stamp into the tile.

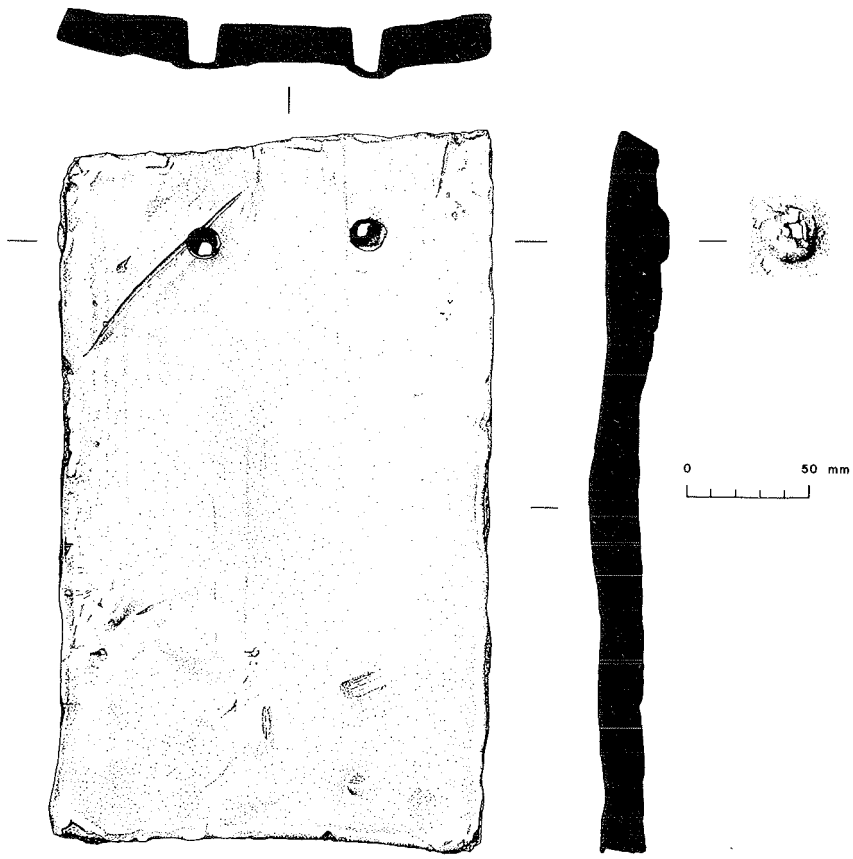

Fig. 4. The complete peg-tile (1:3).

However, the extruded plug had not been fully removed, leaving a capping on the upper surface of the tile.

The reasons for preparing two such incomplete perforations are not immediately obvious. It may be that the tiler used the peg to punch through the last thin layer so creating a tight fit. However, it has also been suggested that such tiles were hung by a single peg, and so the tiler could choose which peg hole to use and still leave the other intact (Lewis 1987, 8).

The measurements of the single complete tile (Fig. 4) were as follows:

breadth of top edge 174mm (6 7/8 ins)
breadth of bottom edge 178mm (7 ins)
length of left side 280mm (11 ins)
length of right side 294 mm(11 5/8 ins)
thickness 15–21mm (5/8–13/16 ins)
weight 1.16kg.

The tile has 2 blind holes, 15mm (5/8 ins) in diameter, placed 70mm (2¾ ins) apart with the uppermost edge 30mm (1 3/16 ins) away from the top edge of the tile. The upper surface is smooth and an impressed groove runs across the top left edge. This feature was noted on three other tile fragments and could represent evidence of stacking tiles whilst still leather hard. The lower surface is very rough and sandy and bears several finger marks where the tile seems to have been picked up and held, perhaps in order to punch the holes. This may also account for

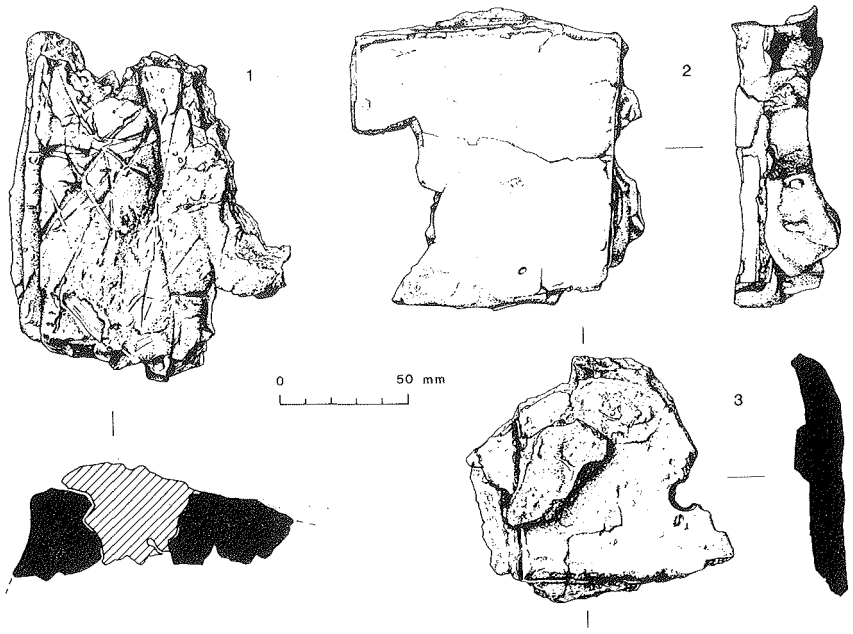

Fig. 5. Finds: (1) Incised applied clay; (2) Tile from arch showing wattle impression in applied clay bonding; (3) Broken tile from arch with cut marks and incomplete peg hole; (all 1:3).

the slight distortion of the top left edge and part of the right side.

Tiles from the Kiln Structure

The tiles used to construct the arches in the kiln are small and approximately square (sides vary from 90 to 110mm in length). These seem to have been prepared by dividing a standard tile into six. This was achieved by scoring and then snapping along the score marks; score marks 2–5mm deep are commonly found on these tiles with the occasional example being cut all the way through (Fig. 5, no. 3). Several examples bear wattle impressions indicating that the arches were constructed of unfired tiles.

Four smaller cut-down pieces of tile, either rectangular (70×30mm) or square (40×40mm) were also recovered. Two of these survived *in situ* (within the arch structure) and they were clearly intended to infill small spaces or gaps between the larger square tiles and so maintain the regular arch shape.

Many of these structural tiles were heavily warped and cracked, as was the clay coating of the arches. No doubt this caused structural weaknesses within the arches which eventually led to their collapse.

Applied Clay from the Kiln Structure

Two fragments of the clay lining carry textile impressions and are discussed further below. A further two pieces of clay from the spine walls have small areas of surface covered by criss-crossed incised lines. These appear to be repairs to the kiln lining which had presumably been damaged during an earlier firing.

The Medieval Pottery (Fig. 6)

A total of 151 sherds (2.01kg) were recovered. These can be divided into five basic fabrics, four of which correspond with the Milton Keynes medieval fabric type series. Fabric type MC3 was manufactured at Olney Hyde, Buckinghamshire while fabrics MS3 and LMS3 are thought to have been produced in the vicinity of Great Brickhill, Buckinghamshire and MS13 in Bedfordshire (Mynard 1984, 56–85).

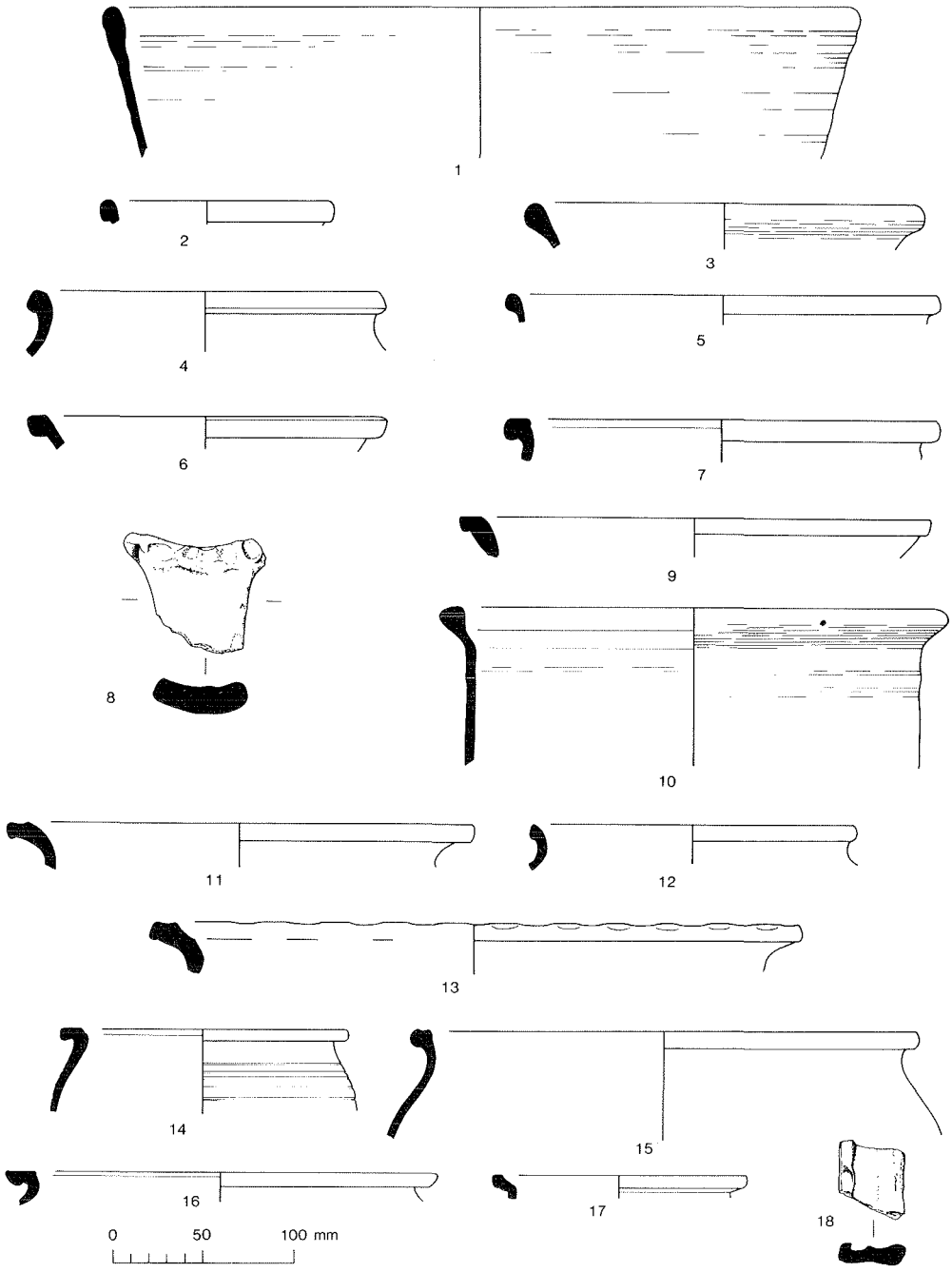

Fig. 6. The Medieval pottery (1:4).

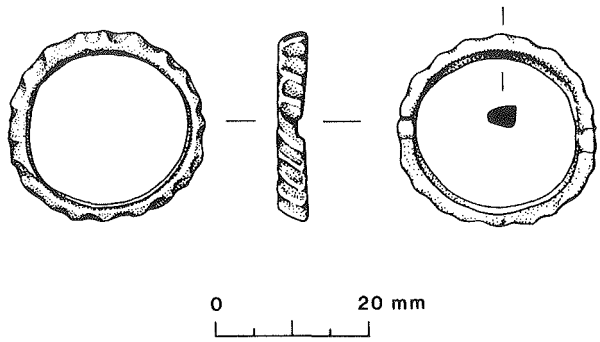

Fig. 7. The copper-alloy ring brooch (1:1).

Fabric A MC3, 13th to 14th Century
Fifty-three sherds, including thirteen rims and one base, were recovered from contexts 1, 1A, 2, 5, 9, 10, 11, 12 and 13. This soapy fabric is mainly gritted with shelly limestone but also contains occasional grits of coarse sand and ironstone. External surfaces vary from buff red-brown to grey-brown; and cores are a reduced grey colour.

Forms:
Bowls with small bead (no. 2) or thick everted (nos 1 and 3) rims.
Cooking pots with out-turned (no. 5). everted (no. 4) or squared (nos 6 and 7) rims.
Jar with everted rim (no. 10)
Handle (no. 8)

Fabric B MS3, 13th to 14th Century
53 sherds, including 4 rims and 3 bases, were recovered from contexts 1, 1A, 2, 9, 10, 11 and 12. A coarse sandy fabric containing occasional grits of mica and calcite. Red-brown to dark grey outer surfaces, mid to light grey interior surfaces and cores.

Forms:
Cooking pots with everted or out-turned rims, (nos 11 and 12)
Bowls with squared (no. 9) or everted and thumbed (no. 13) rims.

Fabric C LMS3, 15th to 16th Century
43 sherds, including 8 rims and 2 bases, recovered from contexts 1, 2, 9, 10, 11 and 12. A hard fired sandy fabric containing calcite, often mid to dark grey throughout but sometimes showing a red margin in section.

Forms:
Cooking pots, one with a squared rim (no. 15) and two with flattened rims (nos 14 and 16). No. 14 also has grooving on the shoulder and no. 16 is slip-coated.

Fabric D LMS13, 15th to 16th Century
1 rim recovered from context 12. A hard fired fine sandy fabric containing sparse calcite, mica and iron.

Form:
Cooking pot with squared rim (no. 17)

Fabric E
Dark grey coarse, pink surface layer except where covered with a thick speckled olive-green glaze. The fabric is quite harsh and is moderately gritted with sub-round to angular quartz grains (up to 0.2mm diameter) together with sparse calcite fragments (up to 0.75mm long) and FeO nodules (up to 0.2mm in diameter). This is not a local fabric.

Form:
Handle, green glazed (no. 18).

Copper Alloy Objects (Fig. 7)

Circular ring brooch with ribbed decoration. Pin lost. Although unstratified, it is not out of place with the pottery dated to the thirteenth to fifteenth centuries.

Iron Objects (not illustrated)

Four rectangular-headed, square-sectioned nails (unstratified). One small wedge-shaped piece (unstratified). One square-sectioned staple (?) (unstratified). Two unidentified fragments (unstratified).

Animal Bone

Ovis, ulna fragment (context 1). *Ovis*, rib fragment (context 2). *Bos*, metapoidal, distal epiphysis fused, proximal end absent (context 12). *Ovis*? several very fragmentary articulated ribs and vertebrae.

Date and Discussion

The date of this small kiln cannot be established with any great confidence. It is similar in form to the kilns at Little Brickhill (Mynard 1971, 74) and Lyveden (Steane and Bryant 1975, 39) which are both dated to the fifteenth century. A slightly later peg-tile and pottery kiln of similar form has also been excavated in

Brill and another recorded at Penn (Yeoman 1988; Trench pers. comm.). The only firm evidence for dating the Shenley Kiln comes from the pottery found amongst the backfilled debris. Most of this material is from local potteries and dates to the thirteenth, fourteenth and fifteenth centuries. Clearly the kiln cannot have been finally demolished before the fifteenth century and this does seem to be the most likely period for its use; though of course it is possible that it is somewhat earlier and remained in an open and ruined condition for a considerable time.

This kiln does not appear to be part of an established industry and one might speculate that the kiln was built specifically for a single job. There are well documented cases of the purchase of tiles for an entire roof. For example Merton College, Oxford purchased tiles for a new chamber in Brill, Buckinghamshire in 1315 (Ivens 1985, 232). In this case of course there was a well established ceramic industry in Brill itself (Jope 1953–4, 39–42; Farley 1979, 127–52; Ivens 1981, 102–6; Farley 1982, 107–18; Ivens 1982, 144–77 and Yeoman 1988, 123–55). The late medieval Manor House sited within the adjacent monument now known at the Toot (a motte and bailey castle) might be regarded as a likely candidate; the Manor House was demolished in 1774 (Sheahan 1862, 598).

The stack of surviving tiles does give some clues as to the method of loading the kiln and perhaps the size of each firing. These tiles were stacked on edge with the long axis of the tiles spanning the gap between each pair of arches. No evidence for spacers was found. The tiles were densely packed with two tiles taking up a width of approximately 50mm. Assuming this is an accurate guide to the stacking density then approximately seventy-two tiles could be stacked across the width of the firing chamber. The probable seven sets of arches could therefore have held at least seven stacks (there would have been one between the seventh arch and the W wall). This would give a kiln production load of up to 504 tiles for each layer of tiles stacked in the kiln. The number of layers the kiln could hold depends on the original height of its superstructure. No clues as to this survived at Shenley, but at Lyveden it was suggested that five or six feet might be reasonable (Steane and Bryant 1975, 40–1 and fig. 14 for a reconstruction drawing). On this basis the Shenley kiln could have produced as many as five thousand tiles per firing.

Note on Textile Impression
by F. Pritchard

Description

Fragment of a tile waster with the negative impression of a lozenge-patterned cloth on the smooth, curved upper surface of the tile. The cloth is woven from fine, evenly spun yarn and has a regular all-over pattern of small lozenges woven in twill with a point repeat.

Area of impression: h 65mm, w 45mm. Size of pattern unit: h 10mm, w 17mm.

Discussion

Lozenge-patterned cloths were widely produced throughout the medieval period. They were woven from a wide range of different natural fibres: silk, flax, wool and cotton; and in various combinations, for example fustian, a mixed cloth of linen and cotton. It is not possible to establish what fibre was used for this cloth and earlier attempts to identify fibres from negative textile impressions on daub, using an electron scanning microscope, have proved disappointing. In addition, it is difficult to determine the precise character of the lozenge twill without knowing what both sides of the cloth were like.

Despite the paucity of evidence, certain conclusions can be drawn about the cloth. Fine, worsted lozenge-twills are not common after the twelfth century; there are none, for example, among the very large assemblage of fourteenth-century textiles from excavations in London (Crowfoot *et al.* forthcoming). By contrast, diaper-patterned linen was popular throughout the medieval period. This is apparent from inventories and from visual sources which often show tablecloths patterned with small lozenges of the type impressed on the tile (Henisch 1976, 151). Fustian, too, was often patterned in this manner since it enabled the warp and weft

yarns, which were sometimes dyed different colours, to be shown to better advantage. Lozenge-patterned silk cloths were also produced in the thirteenth and fourteenth centuries (Desrosiers *et al.* 1989, 213) but the weft yarn was not twisted and the impression on this tile is not consistent with silk. Overall, the textile impression suggests a good quality fabric woven from vegetable fibre.

Department of Urban Archaeology
Museum of London

Acknowledgements

The authors and Milton Keynes Archaeological Unit are grateful to Mr M. R. Kearney, the Resident Engineer, for his co-operation. The authors would also like to thank R. J. Ivens, B. Hurman and J. Burbridge of the Milton Keynes Archaeology Unit for their generous advice, assistance and encouragement in carrying the project through to completion.

BIBLIOGRAPHY

Crowfoot, E., Pritchard, F. and Staniland, K. (forthcoming). *Medieval Finds from Excavation in London: 4. Textile and Clothing* (London).

Desrosiers, S., Vial, G. and Jonghe, D. de. 1989. 'Cloth of Aresta. A preliminary study of its definition, classification, and method of weaving', *Textile History* **20/2**, 199–223.

Farley, M. 1979. 'Pottery and the Pottery Kilns of the Post-Medieval Period at Brill, Buckinghamshire', *Post-Medieval Archaeology* **13**, 127–52.

Farley, M. 1982. 'A Medieval Pottery Industry at Boarstall, Buckinghamshire', *Recs. Bucks* **24**, 107–18.

Henisch, B. A. 1976. *Fast and Feast. Food in Medieval Society* (Pennsylvania).

Ivens, R. J. 1981. 'Medieval Pottery Kilns at Brill, Buckinghamshire', *Recs. Bucks* **23**, 102–6.

Ivens, R. J. 1982. 'The Medieval Pottery from Excavations at Temple Farm, Brill, Buckinghamshire', *Recs. Bucks* **24**, 144–70.

Ivens, R. J. 1985. 'Medieval Building Trades', *Cake and Cockhorse* **9**, 222–36.

Jope, E. M. 1953–4. 'Medieval Pottery Kilns at Brill, Bucks', *Recs. Bucks* **16**, 39–42.

Lewis, J. M. 1987. 'Roof Tiles: some observations and questions', *Medieval Ceramics* **11**, 3–14.

Mynard, D. C. 1975. 'The Little Brickhill Tile Kilns and their Products', *Journal of the British Archaeological Association* **38**, 55–80.

Mynard, D. C. 1984. 'A Medieval Pottery Industry at Olney Hyde', *Recs. Bucks* **26**, 56–85.

Salzman, L. 1952/1967. *Buildings in England* (Oxford).

Sheahan, J. J. 1862. *History and Topography of Buckinghamshire* (London).

Steane, J. M. and Bryant, G. F. 1975. 'Deserted Medieval Settlement at Lyveden', *J. Northamptonshire Museums and Art Gallery* **12**, 1ff.

Yeoman, P. A. 1988. 'Excavation of an Early Post-Medieval Kiln at Temple Street, Brill, 1983', *Recs. Bucks* **30**, 123–55.