CHAPTER 9

THE WORKED STONE

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With contributions on the tesserae and calcite by John R. L. Allen

INTRODUCTION

This chapter assesses the geological character, source and function of the retained 'bulk' and 'small find' stone assemblages from the Period 3 and 4 occupation. It complements an earlier study of the Period 2 to 4 sequence of town-houses and other structures on the 'House 1' footprint (Hayward 2007). The character and source of the stone tesserae assemblage is assessed by John Allen.

The discussion then synthesises both sets of data in order to provide an overview of stone use during Periods 3 and 4. Its purpose is to address two important aspects of stone use in Insula IX, namely, its geological source, including the different scales of quarrying and supply in operation in the Silchester region, and its distribution across the excavation. This will relate the material to the principal structures and features associated with the Periods 3 and 4 occupation: Masonry Buildings 1–3, the south-east pits and the occupation spreads. The study will draw on earlier work from the Insula IX project (Hayward 2007; Shaffrey 2006a) as well as other recent studies of stone used in Silchester, particularly those by Wooders (2000) of the assemblage from the forum-basilica and by Sellwood (1984) of the town wall.

QUANTITY AND CONDITION

Retained 'bulk' stone from Period 3 and 4 features and structures amounted to 422 examples from 111 contexts (total weight 107kg), excluding the flint rubble recorded from the foundations of MB 1–3 of Periods 3 and 4. Nevertheless, it is a sizeable assemblage and, unlike Shaffrey's (2006a) study, which did not consider the residual 'bulk' stone assemblage, and the earlier study of the succession of buildings on the 'House 1' footprint (Hayward 2007), this report takes account of all material from Periods 3 and 4 from the excavation. The condition of the material is mixed, consisting of broken and reused worked stone and walling rubble spread throughout the site, but with discrete zones of deposition in the Period 3 and 4 spreads and pits.

To the above total 1,587 examples (3.2kg) of stone tesserae (including the waste raw material) can be added. Their distribution is comparable to that of the 'bulk' stone assemblage with isolated pockets of waste derived from their manufacture, as well as complete tesserae, deposited in certain Period 3 and 4 pits.

PETROLOGY: METHODOLOGY AND RESULTS

UNWORKED AND WORKED STONE

All retained worked and unworked stone was subject to hand lens inspection in order to identify the type of rock in use. Comparison was then made with the author's reference collection of geological samples so that an outcrop source might be determined. Finally, referral to existing

studies of Silchester lithologies (Allen and Fulford 2004; Hayward 2007; Sellwood 1984; Shaffrey 2006a; Wooders 2000) provided further comparative and contextual information.

Including the stone types used solely for tesserae production (FIGS 95–96), 30 different material types could be identified from the retained assemblage, the majority of which could be assigned a geological source. The varieties of material types are comparable with those described previously at Silchester (e.g. Wooders 2000), though the stone types used in architectural and decorative elements are significantly less well represented in Insula IX than in the forum-basilica. Table 17 below lists the main types, their geological source, function and distance from source, whilst FIG. 97 illustrates the position of the sources relative to Silchester.

TABLE 17. PERIODS 3 AND 4 STONE ASSEMBLAGE: ROCK TYPES, FUNCTION, GEOLOGICAL SOURCE AND DISTANCE FROM OUTCROP

Rock Type	Function	Geological Source (Hayward unless stated otherwise)	Distance to Source
1. *sarsen* – pale grey cryptocrystalline quartz sandstone	walling	Tertiary (Silchester Gravels) Local (Sellwood 1984, pl. 26 no. 1)	0–10km
2. *ironstone* – chocolate-brown coarse-grained iron sandstone	walling whetstone quernstone	Tertiary (Silchester Gravels) Local (Sellwood 1984, pl. 26 no. 2)	0–10km
3. *chalk* – fine white powdery limestone	walling	Upper Chalk (Upper Cretaceous) Nearest outcrop Mapledurwell (Sellwood 1984, 224)	12–30km
4. *flint* – micro-crystalline silica either nodular (walling) or tabular (tesserae) form	walling tesserae	Upper Chalk (Upper Cretaceous) Nearest outcrop Mapledurwell (Sellwood 1984, 224) Lithotype Fa of Allen & Fulford (2004)	12–30km
5. *crystalline calcite*	raw material for plaster	Upper Chalk (Upper Cretaceous) Nearest outcrop Mapledurwell (Sellwood 1984, 224)	12–30km
6. *hard chalk (clunch)* – low density pale yellow rock	walling	Upper Cretaceous – Melbourn Rock Nearest suitable outcrop Berkshire Downs (Blake 1903, 8)	20–30km
7. *calcareous greensand* – fine hard olive-green glauconitic sandstone	walling	Lower or Upper Greensand (Lower Cretaceous) Hampshire/West Surrey Nearest outcrop Kingsclere (Sellwood 1984, 225, pl. 26 no. 6)	25km +
8. fine banded micaceous greensand	walling whetstone	Lower or Upper Greensand (Lower Cretaceous) Hampshire/West Surrey Nearest outcrop Kingsclere (Sellwood 1984)	25km+
9. *pink shelly greensand* – medium-grained glauconitic sandstone with or without black and pink inclusions	walling	Lower or Upper Greensand (Lower Cretaceous) SE England most probably Oxfordshire (Sellwood 1984, pl. 26 no. 5)	25–50km
10. red-brown chert	blades	Mesozoic SE England unknown source	25–100km
11. *ferruginous sandstone* – hard red/black–black ironstone	tesserae	either Tertiary of Hampshire Basin or Early Cretaceous southern English Midlands Lithotype Sb of Allen & Fulford (2004)	25–100km
12. *Lodsworth greensand* – pale-green medium-grained glauconitic sandstone	quernstone	Lower Greensand Pulborough/Lodsworth area of West Sussex (Peacock 1987; Shaffrey 2003, 150)	50km

Rock Type	Function	Geological Source (Hayward unless stated otherwise)	Distance to Source
13. *Culham greensand* – medium-grained glauconitic sandstone with hard black nodular chert	quernstone	Upper Greensand (Lower Cretaceous) Oxfordshire	50km
14. *indurated chalk* – hard chalk	tesserae	Upper Chalk, Upper Cretaceous, Chalk Downlands – Portsdown area of Hampshire or SE Dorset (Wilkinson *et al.* 2008) Lithotype Lb of Allen & Fulford (2004)	50–120km
15. *Stonesfield slate* – oyster-rich mudstone	roofing	Middle Jurassic (Bathonian) North Oxfordshire	60km
16. *coral limestone* – hard fossiliferous ragstone	walling	Corallian (Upper Jurassic), Swindon, Wiltshire (Morley & Wilson forthcoming)	60km
17. *friable sandstone* – light grey sandstone	tesserae	Upper Jurassic (Portlandian), Swindon, Wiltshire Lithotype Sa of Allen & Fulford (2004)	60km
18. *Pusey Flags* (2 varieties) (1) fissile calcareous sandstone – trace fossils (2) fissile calcareous sandstone – shelly	roofing/ paving	Corallian (Upper Jurassic) South Oxfordshire (Arkell 1933) (Morley & Wilson forthcoming)	60km
19. *Combe Down oolite/Box Groundstone* – banded shelly oolitic limestone	architectural funerary	Middle Jurassic (Bathonian) Bath/Box Region (Hayward 2007; 2009)	90km
20. *Pennant Sandstone* – hard grey/green fine micaceous sandstone	paving whetstone	Upper Carboniferous Bristol Region (Kellaway & Welch 1993, 67; Wooders 2000, 87)	110km
21. *Purbeck marble* – hard grey fine shelly limestone with small freshwater snails *Paludina carinifera*	inlay mortar	Upper Jurassic (Portlandian) Isle of Purbeck, Dorset (Arkell 1947, 134; Williams 2002, 126; Wooders 2000, 87)	110km
22. *dolomite cementstone* – dark grey fine mudstone	tesserae	Upper Jurassic (Kimmeridgian) – Dorset Lithotype La of Allen & Fulford (2004)	110–120km
23. *red burnt mudstone*	tesserae	Upper Jurassic (Kimmeridgian) – Dorset Lithotype Mc of Allen & Fulford (2004) (Allen *et al.* 2007)	110–120km
24. *yellow burnt mudstone*	tesserae	Upper Jurassic (Kimmeridgian) – Dorset Lithotype Ma of Allen & Fulford (2004) and Allen (2009)	110–120km
25. *orange burnt mudstone*	tesserae	Upper Jurassic (Kimmeridgian) – Dorset Lithotype Mb of Allen & Fulford (2004)	110–120km
26. *quartz conglomerate* – fractured quartz pebbles, red lithic sandstone inclusions in a fine grey/ brown quartz matrix	quernstone	Quartz Conglomerate Formation, Basal Upper Devonian, Bristol and Forest of Dean (Welch & Trotter 1961, 49; Shaffrey 2003, 147–50)	110–130km
27. *Brownstones* – hard maroon fine sandstone	paving whetstone	Highest division of Lower Old Red Sandstone (Lower Devonian), Forest of Dean (Welch & Trotter 1961, 33)	130km
28. *Millstone Grit* – medium-grained quartz rich sandstone	quernstone	Upper Carboniferous (Namurian), South Wales (Neville-George 1970, 75) or Derbyshire/South Yorkshire	150–300km

Rock Type	Function	Geological Source (Hayward unless stated otherwise)	Distance to Source
29. *basaltic lavastone* (Niedermendig lava) – hard, coarse, dark grey vesicular lava rock with white (leucite) inclusions	quernstone	Tertiary – Andernach Region, NW Germany (Shaffrey 2003, 154)	800km
30. *Cipollino Mandalato* – brecciated grey-green marble	inlay	Tertiary – Pyrenees	2000km

FUNCTION

BUILDING RUBBLE

The retained and recorded building rubble derives principally from two different parts of the excavation: first, from Period 3 MB 1–2 (and Period 4 MB 3) which produced large quantities of *in-situ* flint and Lodsworth Greensand from their foundations; second, from the spreads and pits to the south of these structures.

Excluding the reuse in the internal walls of Period 3 MB 1 and 2 of Lodsworth Greensand, which is more appropriately discussed under quernstones, the material choice for these buildings is almost exclusively nodular flint.

The choice of using many tonnes of flint as the principal building material in the construction of the earliest (Period 3) masonry houses is governed by three factors: Silchester's topographic position, the local geology, and the consequent practicalities and economic cost of transporting bulk stone over distance.

Silchester lies in an area of upland topography characterised by geologically young Pleistocene fluvial gravels which (apart from some sarsen and ironstone blocks) are not hard enough to be used for construction. The nearest suitable outcrop material is the hard flint from the Upper Chalk, seen within 12km of Silchester (Sellwood 1984) and further afield in the Berkshire Downs. A further advantage of using this material is that it can be used along with other stone from this formation, namely white and grey, low density chalk 'clunch' both of which are present in Periods 3 and 4. The choice of flint as the preferred material is therefore determined, as in its use in the late third-century town wall (Sellwood 1984), by the proximity of the outcrops.

Less easy to explain is the purpose and function of *c.* 25kg of building rubble dumped in the later, Period 4 Pits (Object 50033) and spreads (Object 700). This varied assemblage consists not only of local materials (ironstone, sarsen, clunch, chalk) but older Upper Jurassic and Lower Cretaceous sediments, including shelly greensands, grey sandstones and corallian limestone from much further afield (25–100km) than the flint. Some of these materials have been identified from the late third-century town wall (Sellwood 1984), so the possibility of them belonging to a consignment associated with this construction should not be discounted.

ROOFING

Quantities of stone roofing-tile were considerably less (5.5kg) than the recorded assemblage of ceramic *tegulae* and *imbrices* (Warry, below, Ch. 10). Fragments of stone tile were identified only from Period 4 spreads and surfaces in the south-east of the excavation trench (Object 700: 2488, 2610, 3459, 3468) and from the contemporary MB 3 (Object 50046) (FIG. 94).

These thin-bedded (fissile) rocks come in two forms. The calcareous sandstone from Object 700 is from the Pusey Flags (Corallian) of South Oxfordshire (Arkell 1933) (FIG. 98, No. 7). The rock has also been identified in roofing slate from the Groundwell Ridge villa, near Swindon, Wilts. (NGR SU 1408 8935) (Morley and Wilson forthcoming). The second type, an oyster-rich calcareous limestone, comparable with the Middle Jurassic Stonesfield Slate of west Oxfordshire and Gloucestershire, for which quarries have been identified at Brimpsfield, Glos. (Rawes and

FIG. 94. Distributions of stone artefacts other than tesserae from Periods 3 (upper) and 4 (lower).

Gander 1978), is only present in MB 3 (Object 50046). The discrete occurrence of Corallian flagstone rock-types away from the main Period 4 building would suggest that these roofing materials were derived from a separate building project elsewhere in Insula IX, or from an adjacent insula.

PAVING

Broken-up paving slabs of Palaeozoic Brownstones from the Forest of Dean (Welch and Trotter 1961) and Pennant Sandstone from the Bristol region (Kellaway and Welch 1993) occurred in Period 4 spreads (Object 700) and may have derived from the flooring of an adjacent building of Insula IX or nearby (FIG. 94). Both of these West Country materials have, like the Pusey Flag roofing, been identified at Groundwell Ridge Villa near Swindon (Morley and Wilson forthcoming).

QUERNSTONE

A sizeable quantity (26kg) and variety (seven) of rotary quernstone materials were recovered from the Period 3 and 4 assemblages (FIG. 94). Many of the fragments, however, had either degraded or been reused as whetstones or building material, making it difficult to determine their original typology. The variety and proportional representation of the different quern materials, which are listed below (Table 18), are comparable with those from the late Roman occupation phases at Silchester noted by Shaffrey (2006a), who also describes their petrology (Shaffrey 2003).

TABLE 18. QUANTIFICATION OF QUERNSTONE (INCLUDING REUSED MATERIAL)

Stone type	No.	No. %	Weight (g)	Wt %
Lodsworth greensand	18	45	17400	67.2
German lavastone	16	40	1523	5.9
Quartz conglomerate	2	5	2538	9.8
Millstone Grit	1	2.5	383	1.5
Culham greensand	1	2.5	478	1.8
Sarsen	1	2.5	2905	11.2
Ironstone conglomerate	1	2.5	700	2.7

A significant proportion (10kg, 38 per cent) of this assemblage consisted of large (1–5kg) chunks of Lodsworth greensand reused as building material in the internal walls (1161, 1163) of Period 3 MB 2 (Object 50019). Lodsworth greensand, a chert-rich, glauconitic sandstone from West Sussex, was used for querns in many Iron Age and Roman settlements in South-Central England and it is well represented at Silchester in the late Iron Age/earliest Roman phases of the occupation on the site of the later forum-basilica (Peacock 1987; Shaffrey 2003; Wooders 2000). The existence of discarded quernstone from the earliest occupation at Silchester through the first century A.D. would have provided a ready source of building stone for incorporation into the earliest masonry buildings of the insula. The absence of greensand from the external walls of the buildings may well be deliberate as the green mineral glauconite is vulnerable to physical and chemical weathering.

For the majority of the assemblage of quernstone, however, the spread is diffuse, with material deposited either in wells (Object 41016) or in Period 3 and 4 spreads (Objects 700 and 701). Examples of quern fragments in Lodsworth greensand, Millstone Grit, quartz conglomerate and Niedermendig lava are illustrated in FIG. 98, Nos 1–6.

WHETSTONE

Hard, fine-grained sandstones quarried from three geological sources: Brownstones (Lower Devonian, Forest of Dean) (Welch and Trotter 1961), Pennant Sandstone (Upper Carboniferous, Bristol) (Kellaway and Welch 1993), and ironstone (Tertiary, local) were used in the small assemblage (1.5kg) of whetstone in Periods 3 and 4 (FIG. 94).

MORTAR

A large piece of a Purbeck marble mortar (SF 3131) was recovered from Period 3 occupation (Object 701 (3396)) (FIG. 99, No. 9).

DECORATIVE AND ARCHITECTURAL STONE

A handful of decorative stone inlay fragments (total weight 1.1kg) made from hard, polished native limestone (Purbeck marble) and continental, polychrome marble (Cipollino Mandalato) were all identified in the Period 3 and 4 dumps and spreads (Objects 700 and 701). Their presence attests to the demolition or renovation of a major building of some pretension, and of early Roman, probably first-century, date (cf. Fulford 2008).

Pyrenean Cipollino Mandalato, represented by a fragment from the Period 3 dump (3396) (FIG. 99, No. 10), has only previously been identified at Silchester in a stratified context from the Hadrianic-Antonine construction phase (Period 6) of the nearby, masonry forum-basilica (Wooders 2000, 89). Rather than being destined for the forum-basilica, it has been suggested that fragmentary, decorative and architectural material incorporated in its construction (or earlier) contexts probably originated from an earlier building or buildings situated just to the west of the forum-basilica (Fulford 2008). The probability is that the Insula IX Pyrenean fragment, along with the shelly Purbeck marble, was also originally used to adorn the walling or flooring of the same, first-century building or buildings, located to the west of the forum-basilica, but south of the northern part of Insula IX.

Finally, one fragment of worked Combe Down oolite, a Middle Jurassic freestone from the Bath/Box region, was also uncovered from the Period 4 dump (Object 700 (2792)) (FIG. 99, No. 8). As this material is identical in character to over 80kg of architectural stone broken up and reused in one room of Period 2 ERTB 2 (Hayward 2007; 2009) the most likely explanation is that it, too, also originally derived from the same first-century building(s).

CALCITE

By John R.L. Allen

A sizeable assemblage (169 examples, 1kg) of lumps of colourless, coarsely fibrous crystals of calcite without inclusions was concentrated in the Period 3 dumps and accumulation layers from the southern part of the excavation trench (Object 701, particularly 4307, 4469) (FIG. 94). The use of calcite crystals is very probably to be associated with the production of Roman wall-plaster and similar material was recovered from the forum-basilica from Period 5 (Flavian–early second century) (Morgan 2000, 114–15; Wooders 2000, 87, 100). Whether the Insula IX material is waste from the construction of the Period 3 town-houses, or, as has been suggested above for the associated decorative and architectural stone material, derives from nearby first-century building(s) cannot easily be determined.

The many fragments from Insula IX that show the crystals growing at a steep angle from surfaces of chalk assign the material to a provenance in the Upper Cretaceous Chalk Group, but to establish the particular horizon calls for micropalaeontological analysis. The coarsely fibrous crystals, which are a few to several centimetres long, are very similar to the bedding parallel layers of displaced, fibrous calcite known as 'beef' that grow vertically during the early lithification especially of organic-rich shales subject to over-pressure (e.g. Marshall 1982). Arkell (1947), however, does not mention any such masses in the Chalk Group of the Isle of Purbeck, and they are not known in the Group outcropping to the south of Silchester (Osborne White 1909).

TESSERAE

By John R.L. Allen

Periods 3 and 4 afford many examples of the geomaterials known to have been used for floorings and mosaic designs in the earlier Roman period in southern Britain (Allen and Fulford 2004; Allen *et al.* 2007; Wilkinson *et al.* 2008). They take two forms. Stone border tesserae are 2–3cm square and were laid around the margins of a mosaic design. The design tesserae are much smaller, typically 10–15mm square, and are restricted to the pattern itself. The petrology of the border and design tesserae is summarised below, on the basis of new evidence and the types previously described in detail (Allen and Fulford 2004; Allen 2009).

Border tesserae

Although chiefly of ceramic material, this variety includes examples of two kinds of stone. Type Sa is a feebly glauconitic, shelly, pelloidal quartz sandstone that is indistinguishable microscopically from Portlandian (Upper Jurassic) beds once quarried extensively from the restricted outcrop that underlies (Old) Swindon in east Wiltshire (Arkell 1933). The distinctive tesserae assigned to type Sb are of a tough, reddish-black to black sandstone composed of well-rounded quartz grains cemented by iron compounds. They were made from a thin, wind-polished slab (or slabs) of rock probably collected from a Pleistocene gravel deposited periglacially. The ultimate geological source could be in either early Cretaceous beds of the south Midlands or the Tertiary of the London or Hampshire basins.

Design tesserae

These represent a greater range of rock types and include very few made from ceramics. On mineralogical and palaeontological grounds (Allen and Fulford 2004; Allen *et al.* 2007; Allen 2009), a distinctive group comes from sources in the Kimmeridge Clay Formation (Upper Jurassic) of the south-east Dorset coast. Type La is a dark grey, finely granular dolomite cementstone marked by tiny, subparallel shreds of carbonaceous material (kerogen). Type Mc is an originally dark grey, finely laminated, fossiliferous mudrock burnt to a dark red colour. Closely related to it, but pinkish orange in colour, is type Mb. Another burnt mudrock, type Ma, is bright yellow, very fine grained, and only sparsely fossiliferous. As the colour is unchanged by refiring fragments to 750°C in an oxidising atmosphere, the parent mudrock was probably calcareous rather than organic-rich like that of Mc and Mb. A molluscan fauna consistent with a Kimmeridgian age, including a form specific to the stage, has been identified by Dr Jon Todd (Natural History Museum, London) among raw material and *opus sectile* from the Roman Palace at Fishbourne, thus proving earlier speculation concerning the source of this distinctive but poorly fossiliferous lithology (Allen 2009).

Tesserae of hard chalk (type Lb) are common. The microfossils they contain assign them to the uppermost parts of the Upper Cretaceous Chalk Group (White Chalk Subgroup) of southernmost Britain (Wilkinson *et al.* 2008), possibly in the Weymouth-Swanage area from which it is clear that Kimmeridgian tesserae were sourced.

Tesserae of other kinds of rock are very rare. They include a very-fine-grained quartz sandstone (type Sc), a siltstone–very-fine-grained sandstone (type Sd), a yellowish-green, richly fossiliferous limestone (type Lc), a light grey, microcrystalline limestone (type Ld), and flint (types Fa, Fb).

Quantification of the large, loose, stone tessera assemblage from Periods 3 and 4 involved the weighing, measuring and counting of all the individual cubes. This was carried out not only to identify the size and shape of the different materials but the relative importance of each rock-type.

There is not an even distribution of tesserae across the excavation in Periods 3 and 4. With the exception of the concentration of waste from the manufacture of tesserae in Period 4, the bulk of material is to be found within 20m of the southern edge of the excavation (FIGS 95–96). In Period 3 there is a very small number associated with MB 1 and 2 and immediately to the north-east in the area generally assigned as ERTB 4, but in insufficient quantities overall to suggest

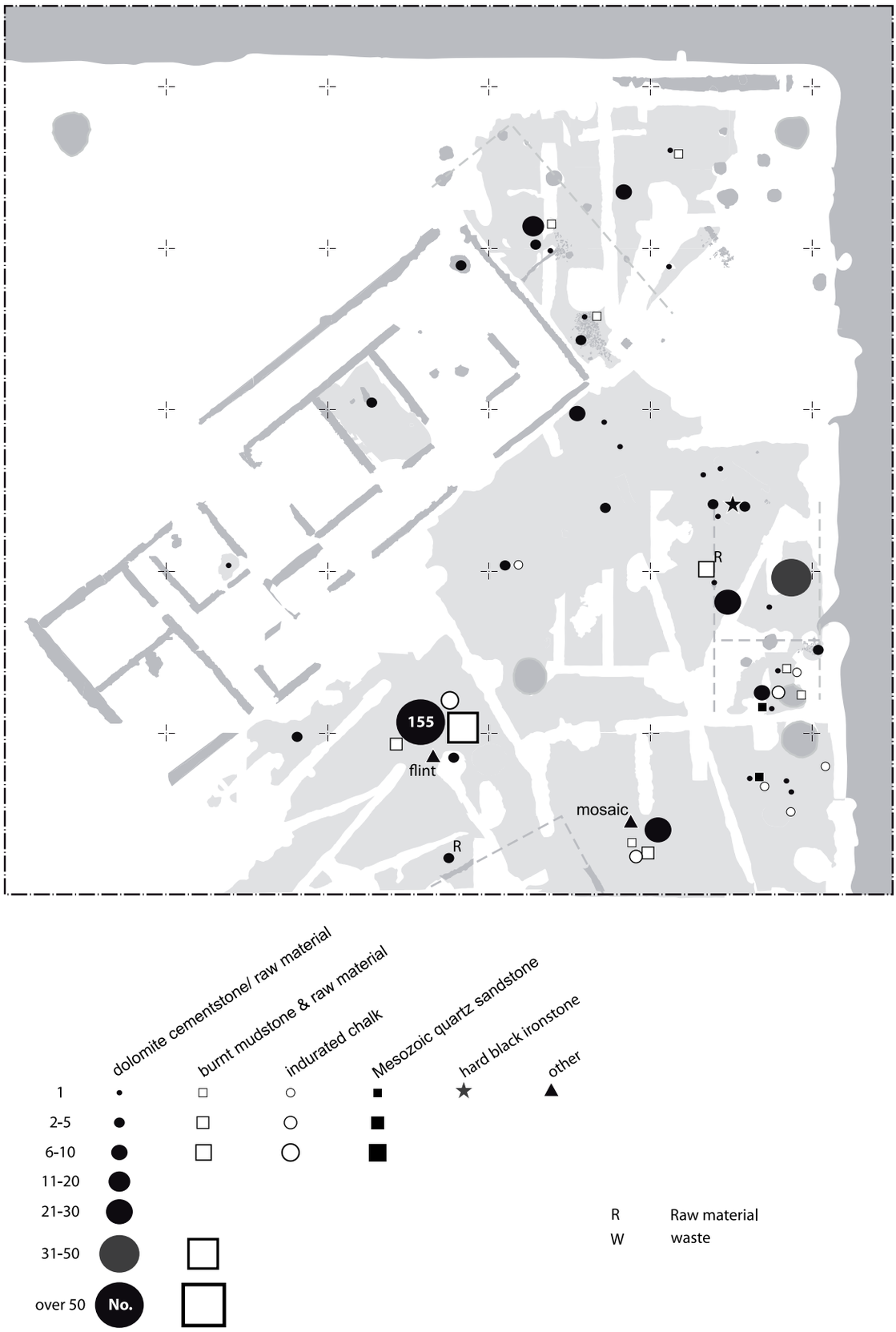

FIG. 95. Distribution of stone tesserae of Period 3.

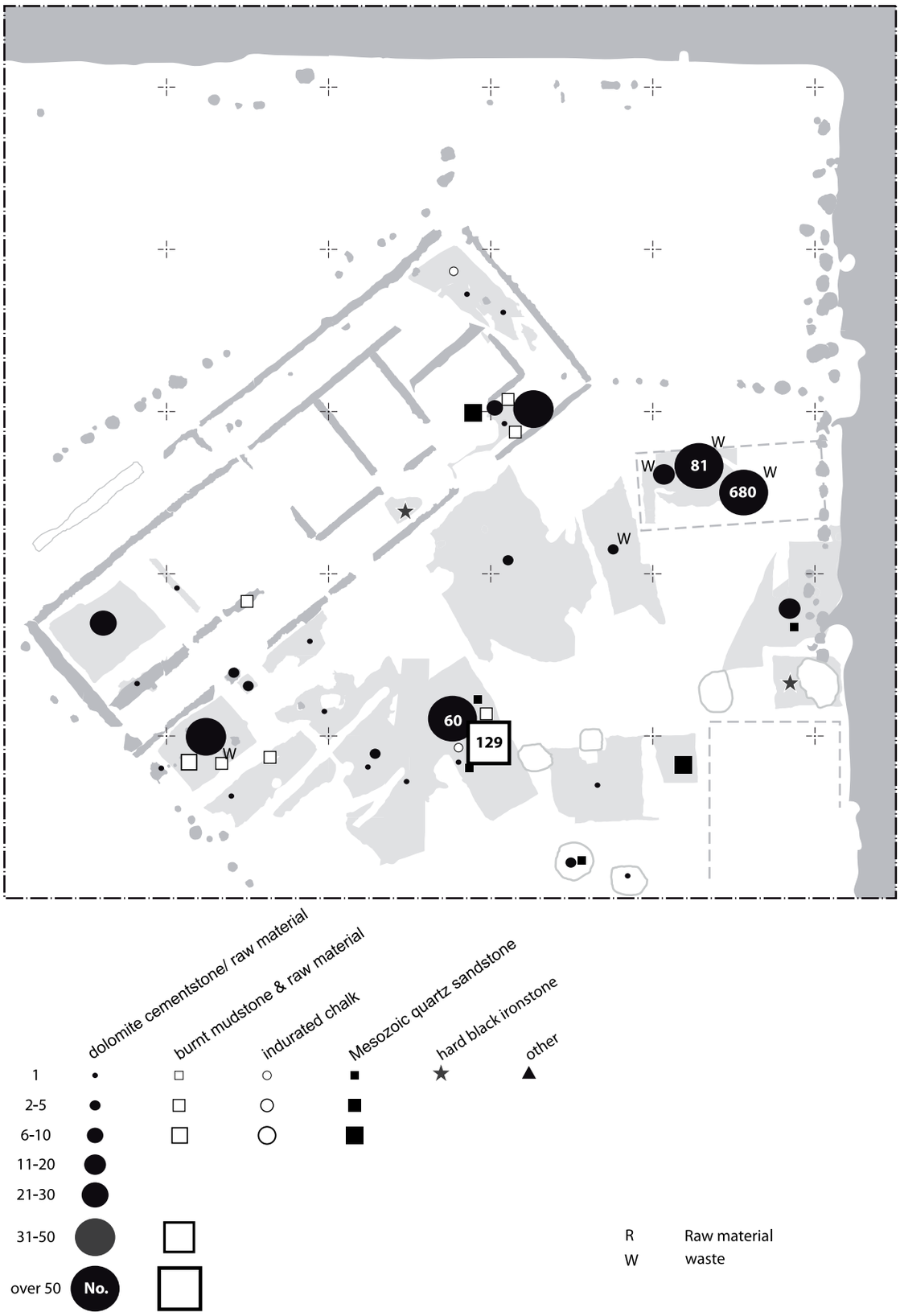

FIG. 96. Distribution of stone tesserae of Period 4.

that they derived from floors of either building. The vast majority of tesserae of this period were found to the south and east of the two houses, with a particularly large cluster to the south of MB 2 (FIG. 95). The same holds for Period 4, with the greatest concentration overlying that from Period 3 (FIG. 96). However, larger numbers were also associated with MB 3 with clusters at each end of the building. The predominant material was dolomite cementstone which was also represented by significant quantities of waste material (*c.* 800 fragments), mostly buried in pits immediately to the east of the house (FIG. 96). This indicates that this material at least continued to be imported from the Isle of Purbeck into Silchester during the late second/early third century, with the probability that it was used in the flooring of MB 3. This use is a little later than the general range proposed by Allen and Fulford (2004, 30–4). Otherwise there is a strong possibility that the tesserae derived from a building or buildings which pre-dated the early second century.

Carbonate tesserae

Kimmeridge cementstone (lithology La) — by far the most common rock-type (1,325 examples: 83 per cent) to be worked into small (*c.* 10mm) cuboidal tesserae from the Period 3 and 4 occupation. These totals also include large quantities of waste derived from on-site tessera manufacture, chiefly in the Period 4 spreads to the east of MB 3 (Object 700) (2609, 2610, 2763).
Indurated chalk (lithology Lb) — small quantities (25 examples: 1 per cent) of these small (*c.* 10mm) cuboidal tesserae are present throughout the excavation trench, apart from Period 3 MB 1 and 2.

Burnt mudrock tesserae

Red burnt mudstone (lithology Mc) — the second most common rock-type from the Period 3 and 4 occupation (199 examples: 13 per cent) has been worked into very small (5–7mm) cuboidal tesserae as well as a range of other shapes (Allen and Fulford 2004, 15). The totals also include the secondary (post-burning) raw material (4070) identified in the Period 3 spreads (Object 701).
Yellow burnt mudstone (lithology Ma) — rare (10 examples: 0.6 per cent), occurring in the Periods 3 and 4 levels as small, 5–7mm cubes.
Orange burnt mudstone (lithology Mb) — very rare (3 examples: 0.2 per cent), occurring only in the Period 4 MB 3 (Object 50046) as small, 5–7mm cubes.

Sandstone tesserae

Medium-grained quartz sandstone (lithology Sa) — small quantities (21 examples: 1.3 per cent) of large (25–35mm), cuboidal, border tesserae, nearly all occurring from the Period 4 spreads (Object 700) and MB 3 (Object 50046).
Iron-cemented sandstone (lithology Sb) — both examples (0.1 per cent) are large (25–35mm), roughly cuboidal, border tesserae, one from the Period 3 spreads (Object 701) (3826), the other from Period 4 MB 3 (2233).

Other stone tesserae

Flint (lithology Fa) — a solitary, sub-cuboidal example (3396) from the Period 4 spreads (Object 700).

Ceramic tesserae

Tesserae representing a range of ceramic materials are not quantified here. They include large, border tesserae made either from roof tiles or specially divided tiles, and tesserae from mosaic patterns produced by clipping pottery sherds (oxidised wares) (see also Warry, below, Ch. 10).

DISCUSSION

GEOLOGICAL SOURCE

A review of the worked stone and tessera assemblage from the Period 3 and 4 occupation has been successful in identifying 30 different geological materials, most of which have been assigned an outcrop source (FIG. 97). One explanation for this diversity, apparent from other studies of the lithologies employed at Silchester (Allen and Fulford 2004; Sellwood 1984; Wooders 2000; Shaffrey 2006a; Hayward 2007; 2009), may be linked to Silchester's central, geographical position in southern Britain.

The region is characterised by a considerable variety of rock types (Jurassic, Cretaceous and Tertiary limestones, sandstones and mudstones), many of which have properties suitable for portable, structural and decorative stonework. Although we cannot so far identify which means of transport were used, possibilities for moving these materials from outcrop are provided both by the road network which radiates from Silchester and the river system of the Thames catchment, which includes the River Kennet. However, it is possible to examine the relationship of the type of stone and the purpose for which it was used at Silchester with its distance from outcrop. Three zones of extraction can be identified:

Local (10–30km)

It has been shown from the assessment of the retained and analysed building-stone assemblage from Periods 3 and 4 (Table 17; FIG. 97) that nearly all of this material was coming from either the Silchester Plateau or within a 10–30km radius of it. The selection of flint and chalk, in particular, both here and in the late third-century town wall (Sellwood 1984) was probably

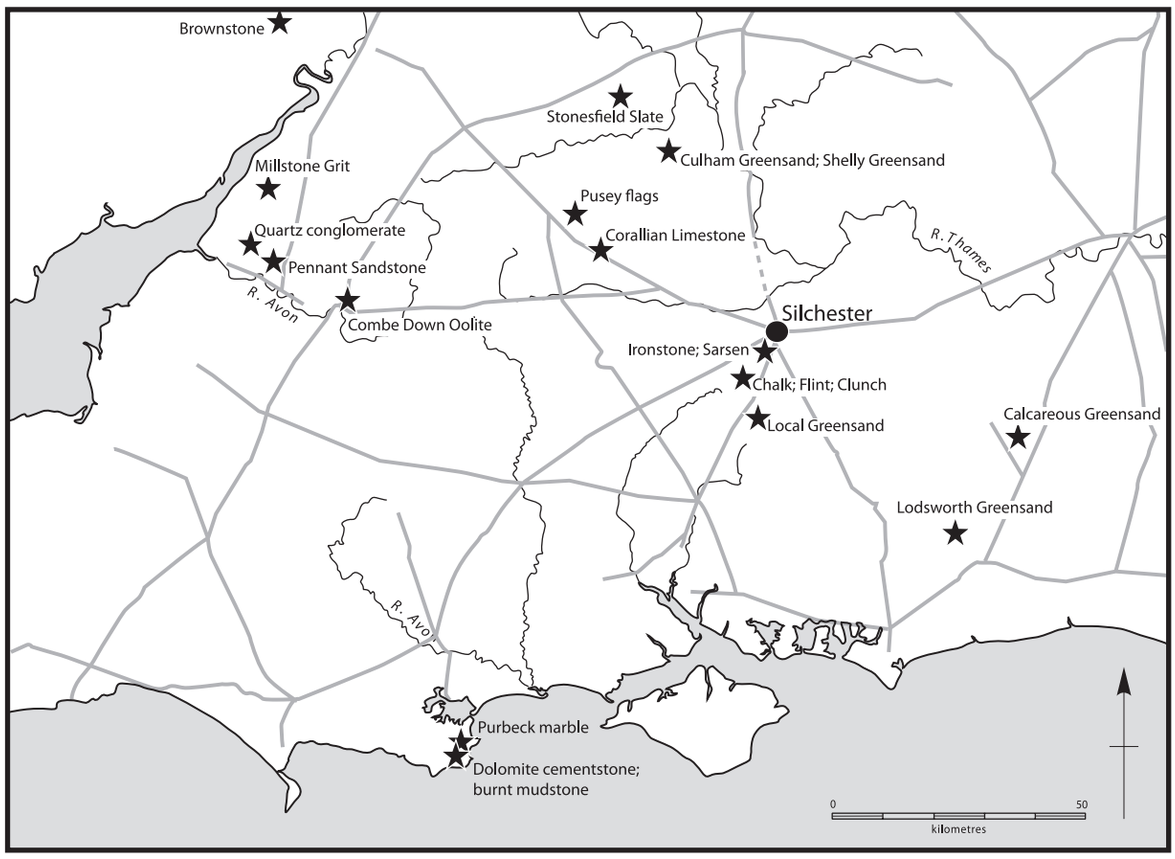

FIG. 97. Map showing the location of rock outcrop sources for the stone from Period 3 and 4 contexts.

made for reasons of economic practicality rather than for its quality as stone. The exception to this is the reuse of Lodsworth greensand quernstone as building rubble in the Period 3 Masonry Building 2.

Regional (30–200km)

A total of 16 stone types from Insula IX could be sourced to outcrops well-away from the local hinterland of Silchester (50–200km) (Table 17; FIG. 97). These materials also had particular attributes that set them apart from the local, poorer quality building-stone, and for this reason it would appear that they were in demand for use throughout the southern half of the province. This is particularly the case with the high-quality freestone from the Bath region and Gloucestershire which was required for architectural and monumental purposes and was widely selected for public and private building in southern Britain. Otherwise, this group of materials embraces Purbeck marble, which is well attested elsewhere in Britain for inscriptions, mortars, statuary, inlays and tombstones as far west as Exeter and north as Chester (Allen *et al.* 2007, fig. 8). Other examples include the use of different coloured, burnt mudstones and carbonates (e.g. white indurated chalk from East Dorset, dark grey dolomitic cementstones, as well as red and yellow burnt mudstones from Kimmeridge Bay) in the tessellated pavements at Silchester and elsewhere (Allen and Fulford 2004; Allen *et al.* 2007, fig. 7). The waste from the production of tesserae in Period 4 indicates that the Isle of Purbeck dolomite cementstone was still being exploited and imported to *Calleva* at the turn of the second and third centuries. Finally, the widespread use of hard, angular, coarse sandstones from the Devonian and Carboniferous of western England and South Wales for paving, roofing and querns (Shaffrey 2006b), as well as the chert-rich greensands for quernstones from West Sussex should also be noted (Peacock 1987). Comparison of the stone assemblage from Insula IX and that from the Groundwell Ridge villa near Swindon, Wilts. (Morley and Wilson forthcoming) illustrates well the widespread use of some of these materials. At both sites Pusey Flagstones for roofing and Brownstones and Pennant Sandstone for paving can be identified.

Overseas

Finally, the presence of continental materials from Insula IX, such as Mayen (Germany) lavastone querns and an example of a Cipollino Mandalato marble inlay, provide further instances of particular types of stone used for specialised purposes.

DISTRIBUTION WITHIN INSULA IX

Differences in the character and function of the stone from the Period 3 and 4 occupation require this section to be divided between the material recovered from the two periods of town-house (MB 1–3) and that from the southern spreads and the south-eastern pits.

Period 3 Masonry Buildings 1 and 2

The construction of two masonry town-houses (MB 1 and 2) during the second quarter of the second century is the first time that only stone is used in the walling of a structure from the excavation trench in Insula IX. The external walling consists almost entirely of flint, a material that would have been readily available at this time as it was used in vast quantities during the construction of the Hadrianic-early Antonine forum-basilica (Wooders 2000, 84). Only the reuse of Lodsworth greensand quern fragments in the internal walling of MB 2 represents a significant departure in the choice of building materials. This may have been on the grounds of cost, or, simply, an opportunistic recycling of locally available material.

The complete absence of either freshly quarried or reworked Bathstone architectural fragments from these town-houses deserves note, particularly given that this material was present in the underlying Period 2 Room 6 of ERTB 2 (Hayward 2007). Two possibilities need to be considered:

either the plundered 'supply' of freestone from an earlier monumental building had all been used up or, more probably, the supply of such stone was now being redirected to meet the demands of a major, contemporary masonry construction, such as the Hadrianic-early Antonine forum-basilica where stone of this variety has been identified (Hayward 2007).

With few exceptions, the tesserae from this period have all been sourced to the Kimmeridge Bay area of Dorset (*c.* 120km) (Allen and Fulford 2004). The very small quantities of dolomite cementstone and the red burnt mudstone from contexts associated with MB 1 and 2 are not such as to suggest that they were necessarily used in flooring, rather than occurring residually.

Period 4 Masonry Building 3

Flint continued to be used in the construction of MB 3, as it was in very large quantities for the construction of the later third-century town wall at Silchester (Sellwood 1984, 224). The use of shelly greensand and ironstone in the town wall (Sellwood 1984) corresponds with a shift towards the use of these materials rather than reused quernstone fragments in the walling of MB 3. Examples of Stonesfield roofing-slate are also associated with MB 3. Larger numbers of tesserae, particularly of dolomite cementstone, from either end of MB 3 suggest that they may have been employed in the flooring of the house. The occurrence nearby of large quantities of waste dolomite cementstone adds weight to this idea.

Southern spreads and layers

Compared to the building-stone used in MB 1–3, there is not only a greater variety of materials (17 alone in Object 700), but also a greater variety of uses to which stone was put in the southern part of the excavation trench. These spreads and dumped layers (Objects 700 and 701), which accumulated over a period of more than a century, not only contain broken up decorative inlays of Purbeck marble and Cipollino Mandalato, but also a wide variety of quernstone materials, as well as a quantity of raw material and waste associated with the production of tesserae and plaster. A wide variety of origins must account for this assemblage, not all of them necessarily associated with activity in Insula IX.

Period 3

One key feature of the earlier dumps and levelling deposits (Object 701) is the presence of a large quantity of calcite crystal, over 1kg, especially in the contexts around the vicinity of context 3396. This material was used in the preparation of wall-plaster. Whether or not plaster production took place within Insula IX is not clear, but the demand for plaster for contemporary private and public building at Silchester would certainly have been considerable. Similar levelling and dump deposits (4070) also contain prepared (red burnt Kimmeridge mudstone) raw material for tesserae and several complete tesserae, including a fragment of a mosaic (3858), as well as Purbeck marble and Cipollino Mandalato inlays (3396). There are also large quantities of other tesserae, particularly of dolomite cementstone, towards the southern edge of the excavation.

What all these materials have in common is their association with decoration and embellishment, presumably of an important, but earlier, public or private building(s). What the archaeological evidence has shown, however, is that such a structure cannot have existed in the north of Insula IX. One possibility is a first-century palatial building immediately to the south of Insula IX and to the west of the forum-basilica (Fulford 2008).

Period 4

The character and function of the spreads from Period 4, the third century, are essentially the same as in Period 3, but with the addition of a small quantity of stone roofing-tile and some types of stone (e.g. Brownstone paving), also associated with the later third- and fourth-century occupation of Insula IX (Shaffrey 2006a). It has been commented that stone roofing in southern Britain is essentially a third- and fourth-century phenomenon (Boon 1974) and the presence of

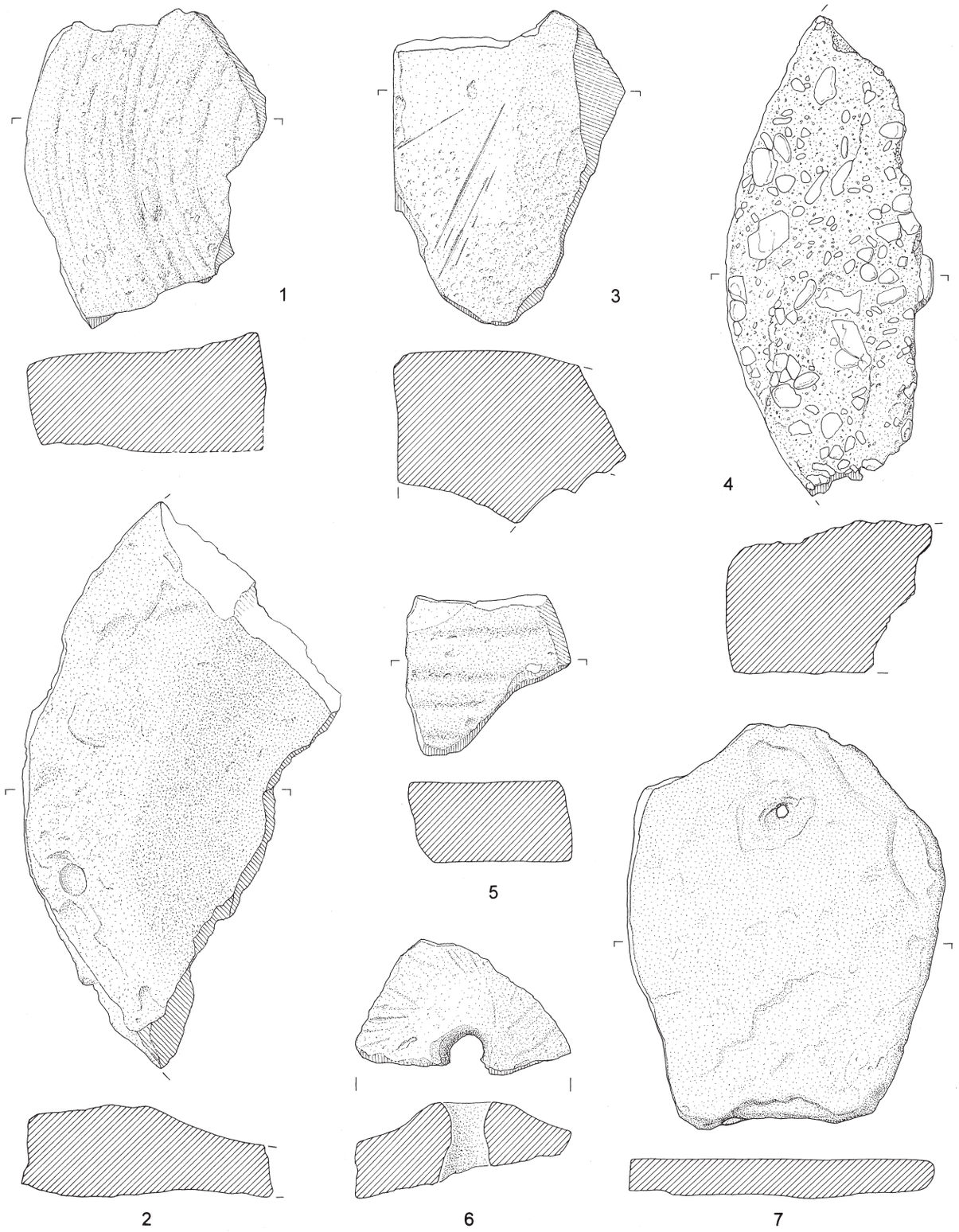

FIG. 98. Fragments of quernstones (Nos 1–6) and a roofing slate (No. 7). Scale 1:3. (*Drawn by Brian Williams*)

such tiles in both the Period 4 town-house (MB 3) and the associated spreads merely supports this. The petrological character and source (Pusey Flags – South Oxfordshire) of the tiles from Object 700 are different to those from MB 3 and they were clearly used to cover another third-century building in Insula IX or its vicinity. Finally, the tesserae are represented by a larger number of calcareous sandstone cubes from the Portlandian (Upper Jurassic) of Swindon (Lithology Sa) (Allen and Fulford 2004) and by the large quantity of waste from the manufacture of dolomite cementstone tesserae from contexts immediately to the east of MB 3.

ILLUSTRATED FINDS

FIG. 98

1. Quern fragment: Lodsworth greensand (SF 1545): Period 3 well 2234.
2. Saddle-quern fragment: Lodsworth greensand (SF 2112): Period 3 well 2234.
3. Quern fragment reused as whetstone: Lodsworth greensand (2613): Period 4 (Object 700).
4. Quern fragment: quartz conglomerate (SF 1990): Period 4 (Object 700).
5. Quern fragment: Millstone Grit (3424): Period 3 (Object 701).
6. Quern fragment: Niedermendig lava (SF 2385): Period 3 (Object 701).
7. Roofing slate: probably Corallian (Swindon beds) (2610): Period 4 (Object 700).

FIG. 99

8. Architectural fragment: Combe Down oolite/Box Groundstone (2792): Period 4 (Object 700).
9. Mortar: Purbeck marble (SF 3131): Period 3 (Object 701).
10. Marble inlay: Cipollino Mandalato (SF 3297): Period 3 (Object 701).

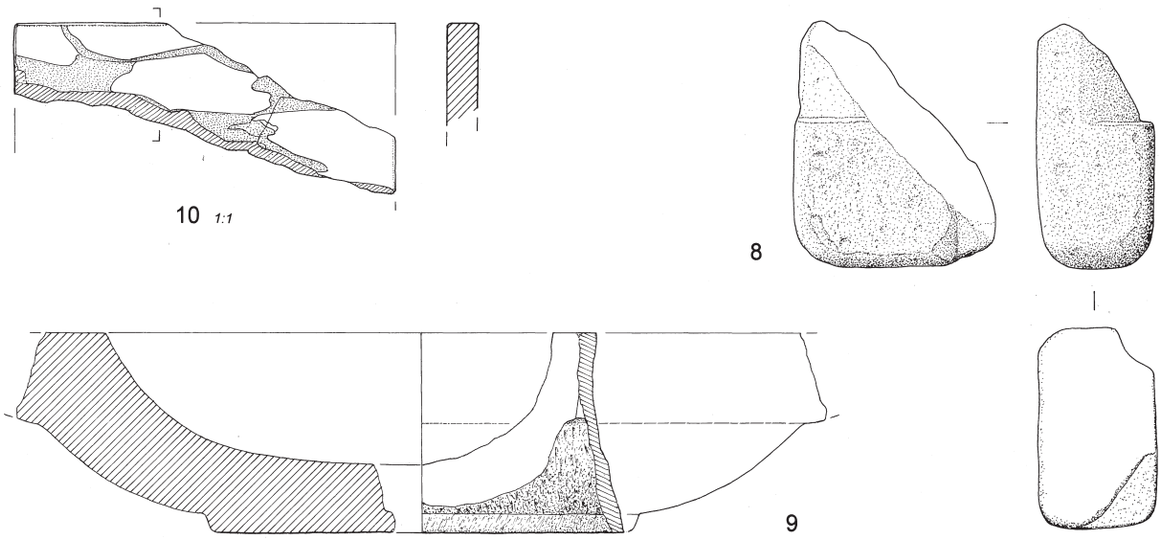

FIG. 99. Architectural fragment, mortar and fragment of marble inlay. Scale 1:3 except No. 10 (1:1). (*Drawn by Brian Williams*)