

CHAPTER 15

TRADE AND INDUSTRY

Boon, in his chapter on 'Industry, crafts and trade', summarised much of the material evidence from the excavations of Joyce through to Richmond, based on his incisive knowledge of the collections (Boon 1974, 267–96); meanwhile Fulford's excavations have provided even more detail about specific activities, particularly metal-working, within the areas of the Basilica and Insula IX. This is the topic where fine-grained excavation data, from material culture recovered in stratigraphic sequence and analysed using the latest techniques, have so much to say. Nonetheless, the geophysics, the historiographical survey and the mapping of previous work open up possible discussions about a number of specific activities.

This chapter is limited to four themes: shops and housing, examining zoning within the town; a discussion of livestock and the possible evidence for large-scale tanning just outside the town (a commonly elusive activity in Roman towns in Britain); the new evidence for tileries and potteries near the walls; and finally a discussion of the major dyeing industry of Roman Silchester imagined by the Antiquaries.

SHOPS AND HOUSING

SHOPS: *TABERNAE*, STRIP-BUILDINGS AND ARCADES

The development of the market and the infrastructure that went with it was one of the major developments of the first century A.D. in Britain. Apart from the material culture, the key manifestation in terms of structures was the creation of specific buildings for commerce, *tabernae*. Their morphological evolution in Italy helps provide a background to what we will examine at Silchester. Originally *tabernae* could be found framing the forum square and built near the entrances of atrium houses. As the Republic and urban elite developed, building larger lavish houses, so too did the number of *tabernae* constructed along the front of their buildings, increasing from one or two by the house entrance to entire rows along the front and round the corner. The second century B.C. saw the development of purpose-built long rows of commercial buildings (e.g. along the Via degli Augustali in Pompeii, or between the forum and the river at Ostia); this development happened in tandem with the creation of apartments to be rented out. Commerce was attracting private investment (Flohr 2014). Individual investment can be seen in these developments, not just on a large scale as in Pompeii, Ostia and Rome, but also on a more modest scale, particularly in northern Europe which saw the construction of individual strip-houses combining shop, workshop and residence. MacMahon (2003) has recently surveyed the evidence for all the different forms of architecture he identified as *tabernae* in Roman Britain. His work details much of the theoretical background and structural evidence, though without a strong chronological dynamic. At sites like Silchester this is understandable as dating evidence for most of the buildings from the Great Plan is entirely absent. Nonetheless, it provides a good starting-point from which the geophysics, combined with the re-analysis of earlier excavations, have managed to draw out some new patterns and suggest new ways that the spatial patterning of other Roman towns can be analysed where large-scale survey has also taken place.

THE EVIDENCE FROM SILCHESTER

From the Late Iron Age onwards, traders from both within the community and from afar

must have had some kind of presence at Silchester. From the temple in Insula XXXV came an inscription referring to a *collegium peregrinorum* (RIB 69–71). Frere and Fulford re-analysed this and considered that *peregrinus* did not necessarily mean non-Roman citizens, but non-local citizens of the Atrebatian *civitas*, whose *origo* or registered domicile was elsewhere. They considered a guild of traders was most likely, and on the basis of both the orientation of the temple (not aligned to the possibly Flavian street-grid as they then saw it) and the date of other Purbeck marble inscriptions, suggested the building might date to either the Cogidubnian kingdom or a little later in the first century A.D. (Frere and Fulford 2002). If non-local traders were present, some degree of infrastructure was likely to have been created either *by* them from their own investment, or *for* them through local benefaction potentially controlling their activity.

From the Great Plan a series of *tabernae* can be identified. These range from individual strip-buildings to rooms on the periphery of larger residences, but they also include larger commercial ranges.

Individual *tabernae*: strip-buildings

The dominant form of suspected shops is the individual strip-building, where the short end of the structure is open onto the street and is the accessible retail section, while workshops or residential accommodation are at the back. At Silchester this type of building predominates on the main east–west street between the London and western gates, while it is almost absent along the roads leading out to Old Sarum, Winchester, Chichester and Dorchester-on-Thames.

Geophysics also have something to offer here beyond adding the occasional wall to the Great Plan. The distribution of areas of notably enhanced magnetic field, termed here ‘hotspots’ (>10 nT), most likely represents traces of heat. These areas have already been mentioned as being prominent *just outside* the town where funerary pyres, noxious industrial activities or middens may have existed (p. 377), but *within* the town they also cluster along the east–west road in the same locations as the strip-buildings. Since many of these would have been workshops, smithies, bakers, brewers, and many other trades requiring the manipulation of heat throughout the day, this prominence makes sense above that which might be seen in a simple domestic residence. Perring observed how many strip-buildings in Britain had large ovens often built on the right-hand side of the workshops, roughly half-way along the building, and this may help explain the geophysical signatures (Perring 2002, 56). He was also right to caution that not all strip-

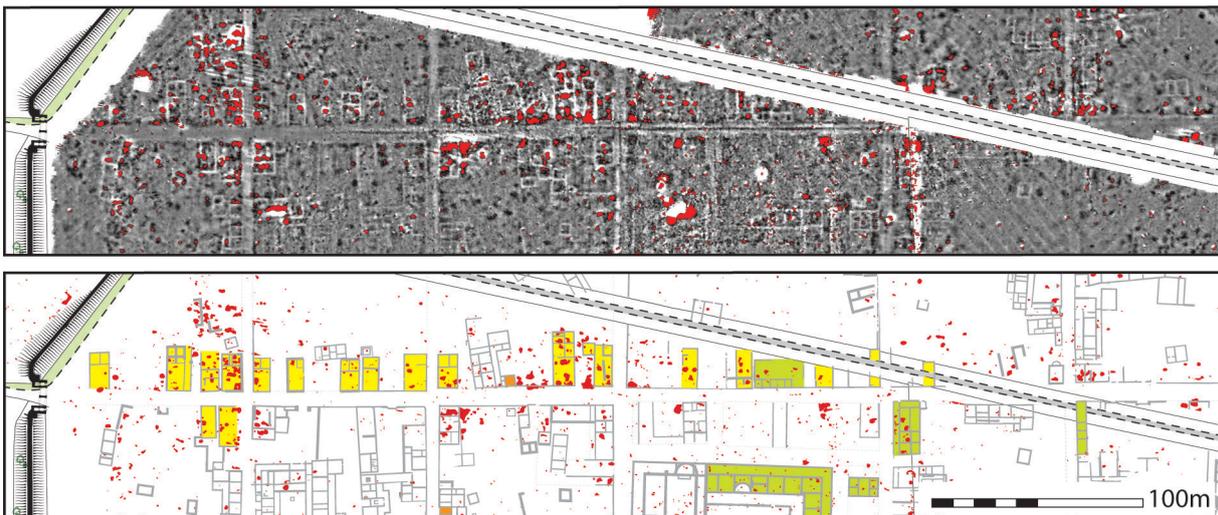


FIG. 15.1. The main east–west road showing lots of readings >10 nT (in red) in the fluxgate gradiometry data (above) and the distribution of strip-houses (yellow) and other *tabernae* (green) against a background of these features (largely representing heat signatures), but excluding dipoles (largely representing metal). For a wider view see FIG. 13.3.

buildings were shops, but in this case the combination of positioning and geophysical signature does make the identification of most of them as workshops or shops highly likely (Perring 2006).

This location of strip-buildings along one street almost to the exclusion of all others does show a very strong degree of zonation. The other areas within the town where there are slight clusters of 'hot-spots', apart from the Forum, are around the South and Lesser West Gates, one of the ranges of the *Mansio*, and perhaps towards the North Gate (the evidence from the East Gate is too confused with both the change in boundary and the modern farm).

Clearly, however, the east–west road was the principal thoroughfare and prime trading location. By the later Roman period, which the Great Plan is more likely to represent, this had certainly established itself, but the consistency in the 'hotspot' distribution does not suggest there had been other significant zones of activity elsewhere beforehand.

Examining the strip-buildings, what is perhaps surprising is that, given their longevity in that location, there was no attempt to unify any of these by building a covered walkway in front of them. This had happened at Wroxeter, where multiple strip-buildings created an awning to join themselves creating a unified covered façade in Insula VIII (Bushe-Fox 1916, pl. XXIX); similarly the Flavian shops in Cirencester Insula V were gradually amalgamated, again with a portico added to unify them (Holbrook 1998, 189–211). Perring cites other examples in Lincoln and Heronbridge where multiple strip-buildings were rebuilt in co-ordinated building programmes (Perring 2002, 56). Perhaps at Silchester they had all been constructed too close to the road so that there was simply no space to construct a front portico.

The only remaining stand-alone shop is the possible mill-house, interpreted as having settings for six millstones, on the north–south road near the South Gate (House XVIII.3; St John Hope and Fox 1898a, 113–14), situated close to the road going down to the lower fields and more-likely arable land than the plateau top, if this interpretation is believed (see p. 146).

Tabernae as part of larger residences

Tabernae built into larger houses were another type of store common in Mediterranean architecture, but, as has been observed, in the northern provinces shops were only occasionally subordinate to larger residences (Mayer 2012, 77). A number of cases of these have been suggested at Silchester, but few of them are particularly compelling. The Antiquaries suggested the following:

- House II.2, Rooms 3, 4, 7 and 8 (FIG. 5.28; Fox 1892, 276), with no specific justification.
- House VII.3, Rooms 1 and 3 (FIG. 5.41; Fox and St John Hope 1894, 204), with no specific justification.
- House VII.4, Room 1, where the thickness of the western wall adjacent to the road suggested to them a counter (FIG. 5.41; Fox and St John Hope 1894, 205), though additional walls to the plan of the building from the geophysics make this less likely.
- House IX.3, Room 3, a small room positioned like a winged pavilion on a corridor building, but it had a seemingly thick wall and double set of rooms (4 and 5) separating it from the rest of the house, so a shop was thought a possibility (FIG. 5.15; Fox 1895, 445).
- House XIII.1, it was considered that one or two of Rooms 1–4 could have been shops but there was no other evidence and the Antiquaries concluded it was unlikely on a quiet side road (so not marked on FIG. 15.1; see FIG. 5.25; St John Hope and Fox 1896, 219).
- House XIV.1, Rooms 2 and 3, because they were street-facing and had a simple red tesserae mosaic and no floor respectively; otherwise no evidence, though it was thought Rooms 4 and 5 behind could have been store rooms for them (FIG. 5.25; St John Hope and Fox 1896, 221).

It was noticeable how the identification of individual rooms as shops tailed off in the reports as St John Hope took over the lead writing the reports rather than Fox. MacMahon only drew on Houses XIV.1 and II.2 when in search of examples (MacMahon 2003, 34), though House IX.3 is perhaps the strongest case.

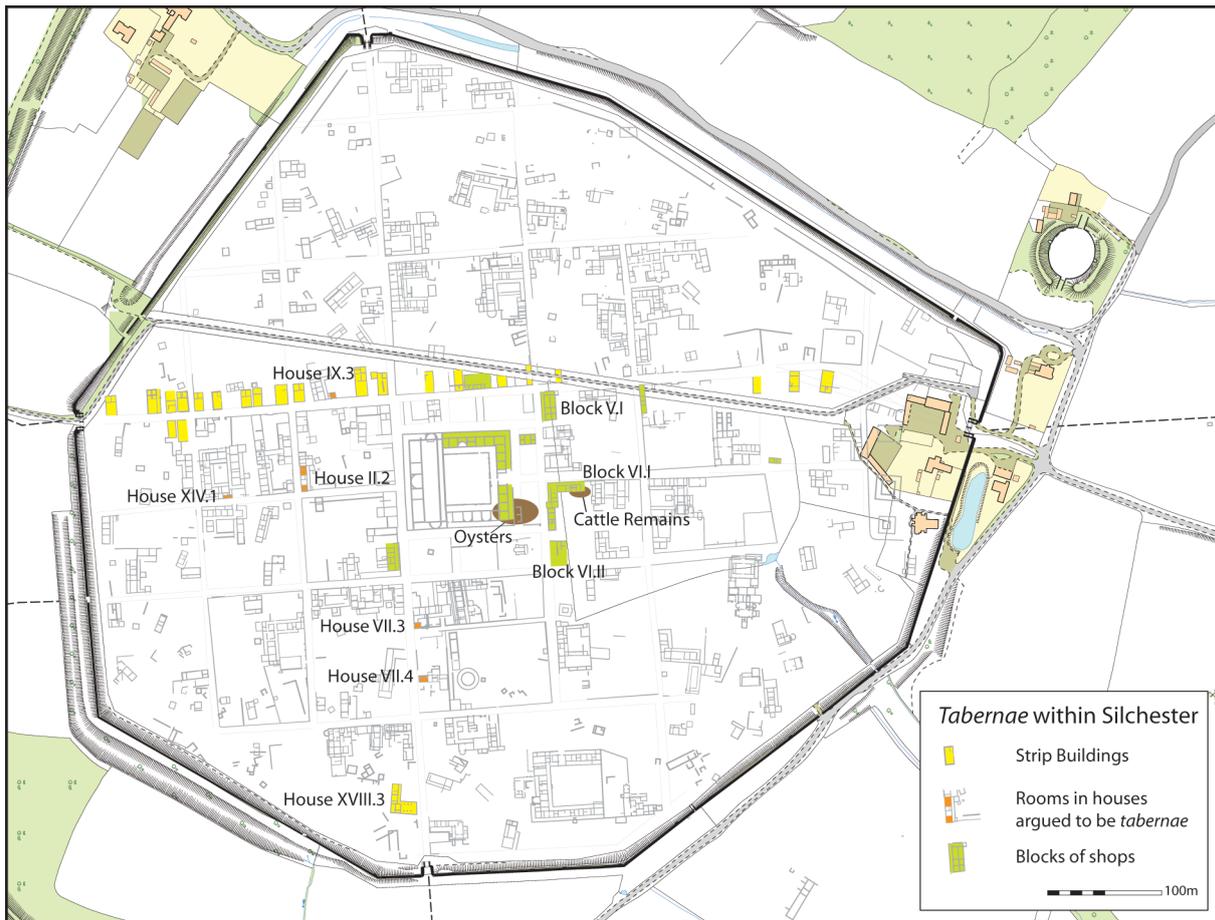


FIG. 15.2. The location of buildings argued to be *tabernae* in yellow across the town.

This type of shop does not appear to be a significant factor in the development of the market at Silchester. There is little evidence that the grander houses in mid- to late Roman Silchester (assuming that is what the Great Plan mainly reveals to us) constructed as part of their design shops for conveying surplus products on to others directly.

Blocks of shops

The final type of building which can be interpreted as possible *tabernae* is represented by the potential multiple shop units or arcades. There are several of these at Silchester. One is along the main east–west road, co-located with all the strip-buildings (Boon 1974, 54, 188). However, the others show a strong degree of clustering around the Forum; indeed the Forum porticoes themselves can be envisaged as offering this service in part. Unlike the strip-buildings, which can be imagined as individually owned, multiple-*taberna* buildings, with the exception of the Forum, represented a specific investment by an individual or *collegium*, constructing shops and presumably renting them out.

The Forum cluster includes several multiple units with covered walkways or porticoes (FIGS 5.28 and 5.32). Block VI.I was in the most prominent location and had ten separate units and a covered walkway running around the corner site (St John Hope 1906, 156). Just to the north was Block VI.II which similarly had a fronting portico, but combined both small units and also a larger hall containing a flue for some form of hearth. The Antiquaries at the time interpreted this as being a dyeing house, a running theme throughout their excavations (see p. 421), but whatever its actual purpose a workshop/*taberna* is certainly possible (St John Hope 1906, 150–1). The Antiquaries also claimed the five-room building to the north-east of the Forum entrance

might represent shop units, though in this case on little evidence (Fox and St John Hope 1893a, 562); MacMahon thought they might be lock-up shops precisely because there was otherwise no domestic evidence cited for the buildings (MacMahon 2003, 141).

These arcades were all set back from the Forum leaving a space where the Antiquaries found no significant trace of buildings, suggesting that this might have been an open area that could have been used for livestock sales or other kinds of markets.

Behind the Forum, Boon suggested that the front of the bathhouse on the south-east corner of Insula III was shops with a fronting colonnade. Though with a hypocaust in the corner room, I think it is more likely these rooms were part of the baths suite (Boon 1974, 54).

Only two other buildings are suggested in this category: first, a lone three-room structure, Block XXIX.III, though with no ancillary evidence supporting the interpretation, so not included on the illustration (St John Hope 1903a, 420); this was on the east–west street from the Forum to the Temple complex, a road with a large number of closed façades as many of the insulae were walled. Secondly, a later Roman building from the Insula IX excavations. Late Roman Building 8 had a row of posts along its northern side (FIG. 5.18); MacMahon referred to this as a possible colonnaded arcade, but by the final report it was believed these post-holes encroaching onto the roadway were more likely to be a fence-line, so again it has not been included on the illustration (Fulford *et al.* 2006, 62; MacMahon 2003).

If individuals were investing in constructing and renting out multiple-unit arcades, then this location, in front of the Forum, would have been considered prime real-estate. That this is where we see this happening suggests the development of these values and concepts in the *civitates* of Britain, or at least at Silchester.

The Forum arcades

There is one further range of shops that should also be considered, the Forum itself. From their origin as an open square in the heart of a town, fora attracted stalls and shops, though over time they were architecturally transformed into a specific form of civic architecture as they became political and administrative centres. In Rome, literary evidence traces their development, starting with butchers and cook shops around the original *Forum Romanum* in the fifth century B.C. ‘As the dignity of the Forum increased, ordinary traders disappeared and their shops were occupied by dealers in precious metals, gold and silver smiths and moneylenders and were in turn replaced by public buildings’ (MacMahon 2003, 8). In Rome the transition to an almost exclusive civic arena only happened around the Augustan era (Wallace-Hadrill 1994, 129–30). Away from Rome in Pompeii, the replacement of *tabernae* with monumental civic structures happened later after the earthquake of A.D. 62 (Zanker 1999, 85). So what is the evidence at Silchester? The Hadrianic-Antonine Period 6 masonry building was entirely monumental with both an interior and exterior portico around three sides. Joyce over-interpreted the function of each room from the material culture he uncovered. He perceived evidence for *tabernae argentariae* and other different types of shops, meat-hooks concentrated in one, and lots of game in another; some of the interpretations are not implausible, even if we have to reject his oyster-bar interpretation caused by a confusion of digging down into a pre-Forum midden. Nonetheless, Boon was still confident enough to suggest some of the rooms were likely to be shops on the east and north range, while others probably were reserved for administration (Joyce 1881b, 353–8; Fox and St John Hope 1893a, 547; Boon 1974, 111). Certainly at other contemporary sites, such as Wroxeter, the forum had traders selling nested sets of samian, mortaria and a collection of Kentish whetstones in its outer porticoes which were preserved there when the building burnt down (Atkinson 1942, 64, 122–4). So a retail function in this period is highly likely.

Moving earlier to examine the Flavian timber building of Period 5, we know nothing of its structure other than the excavated Basilica. However, considering the preceding enigmatic Claudio-Neronian Period 4 building, if this square was a proto-Forum, then its form as a series of individual rooms with a colonnaded walkway in front can also potentially be interpreted as shops (rather than as a military *principia* or military stores; see p. 360). There is a good parallel for this from London.

In early pre-Boudican London adjacent to the gravelled area which was destined to become the forum, a large timber building was constructed *c.* A.D. 50, 56.5 m long, with a series of 10 m-deep rooms, which had a south-facing portico added along its front (168 Fenchurch Street: Philp 1977, 9–16; Marsden 1980, 22–3; 1987, 19–20; Dunwoodie 2004). This sill-beam construction, with mud-brick walls, was interpreted as a series of shops. The characteristics of the rooms varied: one contained the bases of circular storage vessels up to 0.9 m in diameter suggesting storage for foodstuffs; another had fragments of *semesanto* marble from the island of Skyros, one of the earliest imported coloured marbles found in London (possibly decorative inlay from a high-status piece of furniture). A large assemblage of unused samian was also recovered suggesting a pre-consumption site (Dunwoodie 2004, 19, 38). Finally, another room contained traces of imported grain which has been argued by Straker to come from the Mediterranean or Near East (Straker in Marsden 1987, 151–3). No evidence characteristic of domestic life was observed. This building met its demise in the Boudican revolt, whereupon the site was rebuilt and monumentalised as the London Forum.

Dunwoodie highlighted the commercial nature of the building. Given the ongoing debate about whether London had military origins, she recognised that military supply could often be in the hands of private contractors, but saw nothing specifically military in the nature of the assemblage or structure. Indeed any suggestion of pre-Boudican forts in London is looking increasingly tenuous (Wallace 2013). The commercial nature of this range of shops looks secure. It demonstrates significant investment by someone in the construction of a major building to facilitate trade into the newly annexed territory.

In terms of constructional detail it is not dissimilar to the Silchester Period 4 buildings (Fulford and Timby 2000, 37–40). The 0.45 m-square wooden sill beams are similar; the London walls were built of mud-brick, the Silchester walls of clay; both had multiple rooms with larger rooms at either end. The portico is similar. The London rooms were a bit deeper, but in terms of overall size it was 56.5 x 14.8 m versus Silchester's *c.* 55 x 10 m. Not only is the construction comparable but the location next to a gravelled area that is about to become a forum is identical.

The construction of such a building at Silchester, from the Tiberio-Claudian period which it dates to, makes sense with the range of imports rapidly coming into the town: ceramics and foodstuffs from abroad, Purbeck marble from Dorset, oysters from the south coast, salt from the Thames estuary. The non-local traders required premises and Frere and Fulford's reading of *RIB* 69–71 suggests it is most likely that they were organised into a *collegium* early on. In Chichester we also see *collegia* being organised at an early date (as the *collegium fabrorum* of *RIB* 91).

The pattern of someone willing to invest in a range of shops close to where a forum is about to develop is also seen with Frere's Insula XIV shops in *Verulamium* (Frere 1972, 13–23). The range here may not have been quite as regimented as his reconstruction illustration suggested (see the critique by Millett 1990, 70), but it does appear to be of one build, again suggestive of an investment opportunity with units to rent out.

Discussion

In terms of interpreting Silchester, the lack of chronological dynamic remains a problem, but the reinterpretation of the Basilica Period 4 building as an arcade comparable to the Fenchurch Street building shows the development of a commercial hub in the Cogidubnian town on a par with early London, though the latter had the river-borne transport links for commerce that *Calleva* was never to have.

The zonation within Silchester is, however, surprising. The separation of strip-buildings in one area and all the multi-unit shops in another is marked. MacMahon in his discussion of retail location in Romano-British towns highlighted as good positions sites close to the public baths and temples, though in the case of Silchester none of these appears to have had a significant draw upon businesses. He imagined there could have been wooden stalls to sell *ex votos* or trinkets to supplicants within the *temenos* boundary of the polygonal temple. Perhaps this was the case, but the Antiquaries found no direct evidence for it; on the other hand, they were not particularly

good at finding timber structures, and the area of the Insula XXX temples has only been partially explored as it is under St Mary's church and the old Manor House. The suggestion remains possible, but entirely speculative (MacMahon 2003, 14–15, 138).

In terms of taking the topic further, the examination of the distribution of the higher fluxgate gradiometry readings, excluding metallic spikes or dipoles, clearly provides interesting results in relation to the distribution of activities across towns. It would be instructive to analyse the datasets from other greenfield cities which have seen extensive prospection, such as Wroxeter, Caistor St Edmund and *Verulamium*, or indeed within and around major fortresses and extramural settlements like Caerleon; then we can investigate to see whether comparable zonation took place elsewhere.

THE LIVESTOCK MARKET AND TANNERIES

THE TRADE IN LIVESTOCK AND ANIMAL SACRIFICE

If the Forum was the political and administrative centre of the town, the space in front of it, between the impressive entrance to the Hadrianic-Antonine building to the west and the arcade of shops to the east, was an open area. It is easy to imagine this potentially being used for livestock marketing, butchery and quite possibly sacrifice, if that did not take place on an altar in the early Forum or in front of one of the temples.

In the early stages of the development of this area the evidence revealed a significant amount of butchery debris. There were several major deposits here: middens of cattle mandibles, deer antlers and oyster shells (FIG. 15.2). While chronology is vague, we know the oysters and mandibles predated the shops as the deposits ran under them; we have no such check on the deer antlers.

The cattle mandibles formed the largest deposit; they were found in a spread underneath the arcade, Block VI.I Rooms 7–10, and extending east under House VI.1. Lyell calculated the extent of the spread to be *c.* 15.2 x 7.6 x 0.36 m. Since a 0.83 m² (9 sq. foot) trench yielded 70 jaws, representing 35 oxen, he calculated there might be 4,865 oxen in total, or less if the deposit thinned at the sides; so a reduced number of 2,520 oxen was his final estimate. Boon considered the deposit dated to the first century A.D. as it was built over by the row of shops; included amongst the bones was an early paste intaglio (St John Hope 1906, 156, 165–7; Boon 1974, 90, 290; Fulford 2001, 207).

The oyster deposit underlay the south-east corner of the Forum, and apparently also extended under the north–south street to its east. It was 0.45–0.60 m thick and at least 15.2–18.3 m wide. It is unclear how early in date this was in relation to the Basilica Periods 1–5, though the Period 6 stone Forum and the road were laid over it (Joyce 1881b, 355; Fox and St John Hope 1893a, 562, 573). Given the discussion above about the chronology of road development, this north–south road is likely to have been constructed fairly early on in the Claudio-Neronian period, but it would be difficult to say if this was a late pre-conquest or a Cogidubnian kingdom deposit.

Also, in the area to the east of the Forum were found 'numerous' large deer antlers, not in pits but on the 'Roman' land surface; unfortunately the report is ambiguous as to the scale of the deposit or any idea of date (Fox and St John Hope 1893a, 572; see also Fulford 2001, 207).

As well as in front of the Forum, butchery waste has been found in other parts of the town: Claudio-Neronian material, including evidence for the skinning of cattle, came from the excavation outside the south-west corner of the Town Wall. The full extent of this deposit was not established but it contained a minimum number of ten cattle. Maltby considered the remains demonstrated the organised butchery of cattle carcasses and the redistribution of their meat, horns, skins and marrow.

Elsewhere, outside the Inner Earthwork close to House XXXVI.1, a pit containing 60 horn-cores was discovered together with a coin of Domitian and an enamelled bronze lid from a seal-box (St John Hope 1909a, 480; Fulford 2001, 207). More largely third-century primary butchery waste from cattle was found outside the North Gate (Fulford *et al.* 1997, 131–5).

So, as we would imagine in a large town, butchery took place on a large scale and we can see this happening from an early date. The majority of the taking of lives of animals in the Classical period was ritualised as sacrifices (Deschler-Erb 2010), and this space in front of the

Forum and on the road to the main temple complex for these deposits are therefore apposite. It was a commonplace in early Christian writing to suggest that all meat sold in the market had been sacrificed, with a token part having been offered to the gods; hence the proximity of the temple to related butchery areas and places for sale of the meat. The cattle mandible deposit can give us an indication of the scale of this activity. A large bull weighs over a metric tonne, so imagining individual food portions of around 300 g, Deschler-Erb came up with the figure of a single animal being able to serve 3,000 people (3,000 portions at 300 g = 900 kg, leaving 100 kg for bone and hide) (Deschler-Erb 2010, 57). The cattle at Silchester may have been slightly smaller, so let us give a conservative estimate of each only feeding 2,000 people, in which case our midden represents something of the magnitude of 2,000 x 2,520 or *c.* 5 million servings of around 300 g (the current UK average red meat consumption is much less at 70 g a day, so in reality this could have fed a lot more). There are a significant number of variables in this, but the order of magnitude will be about right.

HIDES AND SKINS

As well as selling and distributing the meat, the other crucial by-product was the hide or skin. In the medieval marketplace butchers would buy the cattle, slaughter them, sell the meat, and sell the hides to the tanneries. In the Roman period we know of some temples involved in a similar practice, passing on for sale the meat and hides of the animals given to it for sacrifice (*lex aedis furfensis c. 58 B.C.*, *CIL I*, 756, 1.16).

Tanning in the first century A.D. was going through a revolution. Leather hitherto had been cured, which meant that very little leather from prehistory survives. However, new methods of vegetable tanning, often in north-west Europe with oak bark, meant that leather now lasted longer and also started to survive more readily in the archaeological record (van Driel-Murray 2001, 55; 2008, 485). One of the key drivers for this new kind of leather would have been the huge military demand; this has been highlighted by van Driel-Murray. The army's need, especially while mobile on campaign, was extensive. One estimate suggested that each legion would require 1,500 hides a year just to keep it in shoes, let alone tents and clothing (van Driel-Murray 2001, 63). So the 2,520 oxen represented in the midden would not even have generated enough hides to supply a single legion for a couple of years.

So, army procurement is an aspect we should investigate. It is an issue that crops up repeatedly in the Classical sources in the period from Caesar to Claudius. In 58–55 B.C. L. Calpurnius Piso Caesoninus, after the end of his consulship, was sent by the triumvirs to Macedonia with 'extraordinary powers' to requisition as many cattle as were needed to supply hides for armour, shields and horse trappings, which he exacted with much incompetence drawing Cicero's ire (Forbes 1966, 53; *Cic.*, *Pis.* 84). In another example, Drusus upon winning over the Frisii demanded a moderate tribute of cattle hides from them. Unfortunately, after 40 years of relative quiet (or literary silence at any rate), in A.D. 29 Olenius, appointed to govern them, insisted each hide was that of a wild bull, and not one of their smaller domesticated cattle. Tensions grew and soldiers sent to collect the tribute were killed as the Frisians rose up in revolt. They spectacularly defeated the Roman force, regained their independence for a while and proved an embarrassment to Tiberius (Cassius Dio 54.32; Tacitus, *Ann.* 4.72). Certainly planning for the provision of hides for the campaigning army will have been considered in the logistical requirements for the Claudian conquest and Flavian expansion of Britannia.

South-East Britain was already set up to provide hides to the Empire: they were on Strabo's list of exports in the Augustan period (Strabo, *Geog.* 4.5.2), though whether these were raw unprocessed, cured or oak-tanned hides is unknown. It will be interesting to see how early leather starts to appear in the waterlogged well deposits being excavated in Insula IX, to establish how early this switch to the new tanning technology and hence leather survival began.

The interaction between the dynasts of Southern Britain and Rome in the pre-Claudian era will have meant that some of them probably had a fair degree of familiarity with Roman military clothing and equipment (Creighton 2006, 46–69), though the direct evidence for leather in pre-conquest Britain is minimal. There were 17 fragments of leather, possibly from a jerkin,

surviving in the Lexden tumulus (Foster 1986, 139); at Stanway hobnails were found from funerary Enclosure 3, an unurned cremation (DF28) and a pit with pyre debris in it (DF13). However, Crummy took the hobnails to be indicative of a post-conquest date in each case, which, of course, they need not be (Crummy *et al.* 2007, 73, 405–10, 413). Folly Lane had hobnails as well, and dates sometime between the conquest and A.D. 55 (Niblett 1999). Alas burials are not the best location to find waterlogged leather.

Upon the arrival of the Claudian legions and *auxilia* it is likely the Friendly Kingdom of Cogidubnus (or his predecessor if Cogidubnus was not installed yet) was drawn into the supply chain. The legions might have tanned their own sheep and goat skins as these could take only a few weeks, but tanning a cattle hide took over a year, so establishing tanning-pits within temporary bases was unlikely. Yet the knowledge transfer required to create a large-scale tanning supply line where one had either not existed before, or had only been on a small scale, would have required individuals providing the know-how. Immigrant personnel would be needed in support, though doubtless local civilian entrepreneurs could have taken over rapidly. The investment in space required, as we shall see, suggests the involvement of wealthy individuals (van Driel-Murray 2001, 56–8). We actually have some written testimony to the development of the industry in Britain, and its scale, though from further north. One of the *Vindolanda* tablets, from Octavius to his brother Candidus, reports a delivery of 170 hides from *Cataractonium* to the base (Bowman *et al.* 1994, no. 343).

Military involvement in cattle supply to Silchester was suspected in Maltby's work on the animal bone from Claudio-Neronian deposits just outside the south-west corner of the Town Wall. He noted the similarities in the butchery practice between the deposits there and from a late first-century site identified as military from the Aldgate in London (Maltby in Fulford 1984, 27, 199–205). Unfortunately this comparison does not stand up to scrutiny. The Aldgate deposit Maltby referred to as Pit 15 dated to the Flavian to second century. However, the excavator had only assigned a V-shaped ditch in the pre-Boudican layers to any military activity or influence, and even that has subsequently been dismissed and reinterpreted (Chapman and Johnson 1973, 10; Wallace 2013, 277–8), so the military link to this assemblage has disappeared. However, this does not preclude military involvement in supply, but it does not confirm it either. So can we find any direct evidence for the actual process of tanning?

THE TANNING INDUSTRY: WHAT SHOULD WE BE ABLE TO FIND?

The tanning industry was highly polluting so it is often thought that tanneries should be found on the outskirts of towns and close to streams or rivers, though it is clear that was not always the case in the medieval period (Cherry 1991, 296). The process first involved trimming and washing the hides, removing any feet or horns left on them. In the medieval period this was often done in a local stream. The hides would then be de-haired by soaking in lye (potassium hydroxide from wood-ash), urine or a fermenting liquid of bran for several days before scraping off any remaining hair and fat (the use of lime at this stage seems to be a post-medieval innovation). The tanning process would begin with the hides hung vertically in increasingly stronger tanning solutions of water infused with ground oak bark. Each hide would be lifted from one pit to another, perhaps daily, each solution increasing in the concentration of tannins within (these are the 'handler' pits in medieval parlance). Eventually, after a few weeks, the hides would be removed and stacked horizontally, alternately layered with oak chippings, in a new pit for 9–19 months (the 'layaways' pits). Finding multiple pits, and ones large enough to contain complete cattle hides stacked flat, is crucial for the identification of a hide tannery. Finally the hides are lifted out, washed, dried and oiled (Serjeantson 1989, 133–5; Cherry 1991, 296; van Driel-Murray 2001, 61). An ethnographic survey by Douglas found that the pits could be rectangular, round, lined with stone, clay, wood, or any combination thereof, and for hides averaged at 1.8 m diameter (Douglas 1956; cited in Serjeantson 1989, 135). For skins (i.e. from sheep or smaller animals) the whole process was simpler and might only take a few days or weeks; the scale of the operation also meant that mobile buckets or barrels could be used so the archaeological evidence would be significantly harder to find.

THE TANNING INDUSTRY: EXAMPLES

Despite their importance archaeological examples of Roman tanneries are *exceptionally* elusive. In *The Towns of Roman Britain* Wachter's survey could only summon up one potential isolated tanning-pit that he thought more likely related to horn-working (a house in Leicester, Insula XVI) (Wachter 1995, 349).

Similarly amongst small towns Burnham and Wachter found only one at Alcester (Warwicks.): 'one of the few reliable instances yet found for this industry' (Burnham and Wachter 1990, 95). Unfortunately, the report published later only revealed a solitary waterlogged pit with offcuts of leather, not the multiple large pits a tannery requires, and the report's discussion restricted the interpretation to just leather-working (Mahany 1994, Pit II 21 near structure AA, Microfiche 1:B10). Within London considerable evidence for leather-working has come from the Walbrook; a pegged-out skin for tanning was supposedly found in Bucklersbury House (WFG44: Grimes 1968, 97; Milne 1995, 62), while in the Upper Walbrook at London Wall (LOW88), wood-lined tanks could relate to tanning, though they might also be for fulling or dyeing. There are few published details. A survey and dismissal of some of the other claims of tanneries can be found in van Driel-Murray (2011, 69–70).

Perhaps the problem with finding tanneries in towns is that because of their polluting nature, most of the tanneries were on the outskirts in the peripheral areas, away from the zones which have received most attention.

Out in rural Britain the problem of identification is no easier. Lullingstone Roman Villa had a kitchen area which it has been argued was converted into a tannery. One pit was rectangular, cut into the chalk and lined with clay, and curiously had lots of leather shoes impressed into the lining; it contained lots of fruit seeds. It *could* be a tannery but finds of made leather artefacts in a pit would be unlikely and the solitary pit implies small-scale activity at best (Meates 1979, 105–8).

Across in northern Europe examples are also hard to find. Closest is an example from Tongeren (Belgium), where at the Elisabethwal site a possible Flavian tannery was found evidenced by a well and multiple pits lined with clay or wood. Many were sub-rectangular and up to 2 m square, while another was 4.3 x 4.6 m (Vanderhoeven and Eryvynck 2007). In *Augusta Raurica* (Switzerland) in Insula 31 a complex was found containing a slaughterhouse, butchery, tannery and a bone-working and horn-core workshop, with smokehouses nearby. Also on the edge of town on the map, tanning-pits are marked along Westtorstrasse (Deschler-Erb 2005b, 71; 2005a, 33–4). The dark organic remains in the pits were taken to be indicative of vegetable tanning. At *Vitudurum* (Switzerland) a strip-building was found with three barrels sunk into the floor, perhaps too small for large hides, but possible for smaller skins (Pauli-Gabi *et al.* 2002, 18–21); extensive leather-working is known to have taken place in the town. Possible structural evidence has also been found at other Swiss sites: Sursee, Käppelimatt and Zurzach, Kastell-Vicus (Deschler-Erb 2005a, 33). The easiest way identification takes place is when the tanning-pits are lined with timber, such as at *Aquincum* in Pannonia (Fitz 1980, 325); while in the Mediterranean some are built in masonry (such as the *officina coriariorum*, Pompeii Regio I.5.2).

THE TANNING INDUSTRY AT SILCHESTER: EVIDENCE WITHIN THE TOWN

House XXXIV.1 was the most likely building to have been associated with tanning in the town (Interior 10, FIG. 5.32). It had a water source fed to it from the other side of the road, feeding a submerged water butt, and then forming an open channel. It was also in an insula adjacent to the only spring within the town. To the south of the building, in a large yard, was a large trough, 19 x 1–1.5 m, imagined as being for steeping. The presence of skulls without their jaw bones made the Antiquaries think of tanning, but they noted that there was no obvious tanning-pit in the yard, and the geophysics have not given any strong evidence for a significant number of pits. Space for tanning skins here is certainly possible, hides less likely (St John Hope 1907a, 446–9; Boon 1974, 291).

The second candidate was House XIX.2, where there was again an enclosed large yard on the southern side, also interpreted by the Antiquaries as a tannery because of the presence of water-tanks and one large pit they identified as a 'tanning-pit' (Interior 12, FIG. 5.38). However, they

also admitted the scale would be so small it could only be for goat and sheep skins (St John Hope and Fox 1899a, 236–7).

So within the town while some skins might have been tanned, there was nothing evident on the scale necessary for processing hides.

THE TANNING INDUSTRY AT SILCHESTER: EVIDENCE OUTSIDE THE TOWN

Off the plateau to the south-west of the town, beneath the earthworks of Rampier Copse, there is a small brook dividing LP 2900. According to the soil survey maps, the plateau gravels and Bagshot formation sand give way to London Clay down here. The geophysical survey also shows an unusual response of mottling here, suggestive of a large number of pits, 4–8 m in diameter, down by the stream. The pits continue for at least 700 m following the brook, though the field on the southern side was not geophysically surveyed (FIGS 6.60–61, 6.69–70; Exteriors 20 and 23; LP 2900, 5673 and 7468). These features are certainly not natural. Clay-pits are one possibility, but the multiplicity of small pits would be a curious method of extraction. The fields hereabouts have been fieldwalked and no evidence has been forthcoming of kilns or tile clamps, so tannery pits offer another possibility.

Tanning-pits cut into well-draining soils, such as gravels and sand, were often lined with timber to reduce seepage, for example the pits at the fourteenth-century tannery at St Andrews Castlecliffe, where the sharp edges of the *c.* 2 x 3 m pits suggested plank-linings had been removed just before the pits were filled in (Lewis 1996, 615–22). At Silchester, cut directly into London clay close to the water table, seepage would have been minimised. The pits appear to vary a bit in size, so some of these could be the smaller vertical handling pits and others the larger longer-term horizontal layering pits. Their proximity would allow for easy handling moving from one pit to another and easy access to the stream for washing. The location is well away from the town to prevent contamination of the water source, and there is also a road running down the slope to it from the town making for easy access. The final stage of the process, drying and oiling the hide, would have required shelter, though that does not necessarily require masonry buildings. Hides could have been washed and carted up to the town to dry there, wherever the curriers or leather-workers were. Within the town in the metal-worker hoard were found three shoe-maker's feet, needles and awls (Evans 1894, 142; Boon 1974, 289–90).

Can this kind of evidence be paralleled at any other Roman towns where extensive geophysics have taken place? Perhaps a parallel can be found in the results from Wroxeter where the survey indicated a large number of pits to the north-west of the town, along either side of the Bell Brook. This was an area the project team identified with water-based industries, such as tanning or fulling, though there the density and size of the pits are not as extensive as at Silchester (White *et al.* 2013, 189–90).

OTHER NECESSARY INGREDIENTS FOR TANNING

Various other ingredients are required for there to be a tannery at Silchester. Large quantities of finely-ground oak bark were required. Certainly much of the waterlogged wood identified has been of oak. Also the charcoal evidence from the Basilica site shows oak was the dominant taxon from all periods. The pollen also suggested that the Late Iron Age/Early Roman woodland clearance that did take place saw an increase in grassland suggestive of the presence of hay meadow and a cattle-based economy, so the environmental factors were certainly right for a large-scale tannery (Fulford and Timby 2000, 522, 533).

Another ingredient required by tanneries and fullers was urine, and within the town there were certainly the people and production facilities. An often repeated idea was that in Roman towns much might be collected through amphorae positioned as public urinals around towns. However, the literary and archaeological basis of this has been recently critiqued by Flohr and Wilson (Flohr and Wilson 2011), concluding that owing to the purity of collection necessary, this could not have been the method used, though alas leaving us none the wiser as to what the actual method was.

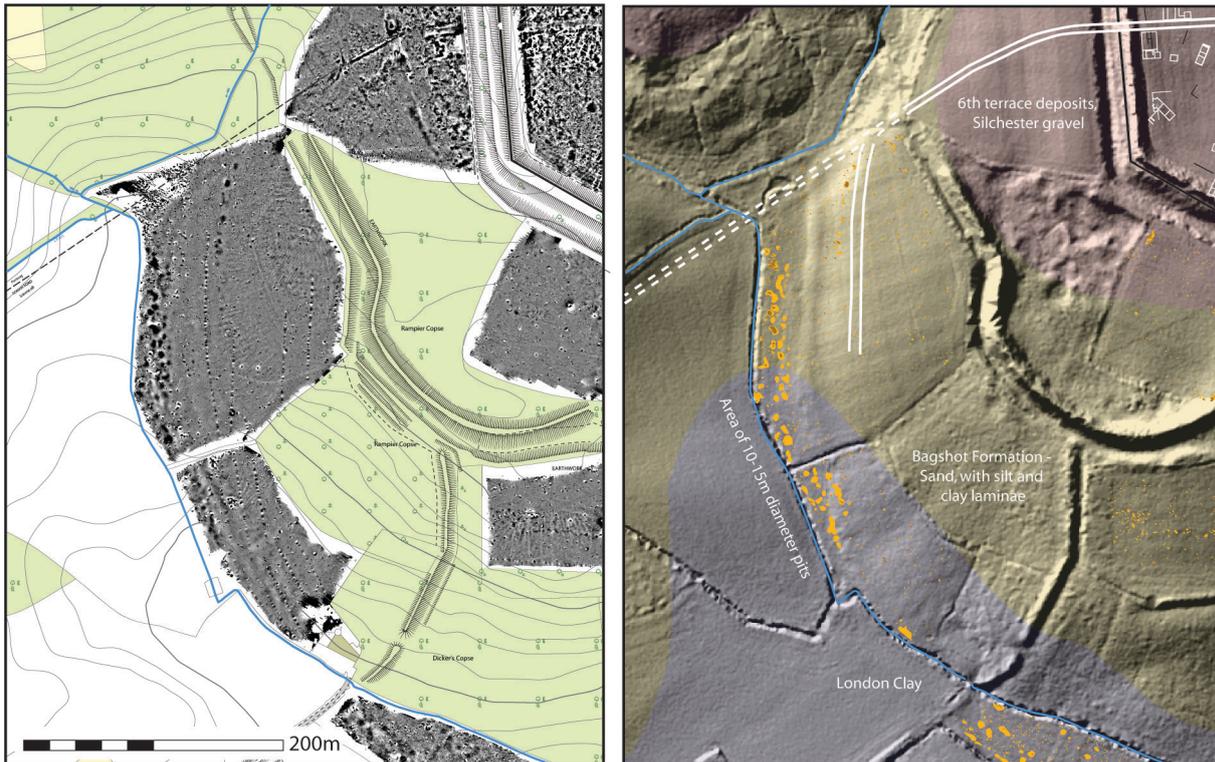


FIG. 15.3. Pits to the south-west of the Town Wall in relation to the London Clay and valley – possible tanning-pits.

Another potential ingredient in leather production, though one where there were plenty of alternatives, was mulberry leaves, which Pliny described as being used in the de-hairing stage of the process along with urine (Pliny, *NH* 23.140). Reid identified Black mulberry (*morus nigra*) from a seed discovered in 1902 when they were excavating the south-east part of Silchester (Insulae XXIX–XXXII) (St John Hope 1907a, 449). It has also been found in London and York. It is, however, generally assumed to have been imported as an elite food rather than grown locally, but if that were the case it is curious it is only found on urban sites and not villas or military sites (van der Veen *et al.* 2008, 17; Livarda 2008, 81). The tree was already known in Belgium by the Late Bronze Age (Gelorini and Bourgeois 2005), so it is worth continuing to look out for the pollen to see if there was an attempt to import this aspect of the new tanning technology as well in the Early Roman period, though other liquids for de-hairing were available such as lye or fermented bran.

TANNERIES: A CONCLUSION

Overall about 80–100 pits can be seen in the surveyed area, which can probably be doubled if there were a comparable number on the other side of the brook which has not been geophysically surveyed. This number of pits is probably not unreasonable. If one legion required 1,500 hides a year just for shoes, that would require 75–100 layering pits in operation concurrently, each containing 15–20 hides. If tents, clothing and civilian needs are added, then the scale of the industry would need to be increased accordingly.

Excavation is needed to test the hypothesis. While the morphology of the pits themselves might not be particularly diagnostic, evidence is beginning to accumulate for the kind of plant remains and invertebrates which might be associated with hides and tanning-pits: carrion beetles, flies, small fragments of bark sclereids, all the kind of things which a simple clay extraction pit would not particularly attract (Hall and Kenward 2011).

So far, the notion that these pits at Silchester and the ones at Wroxeter are tanneries is just a

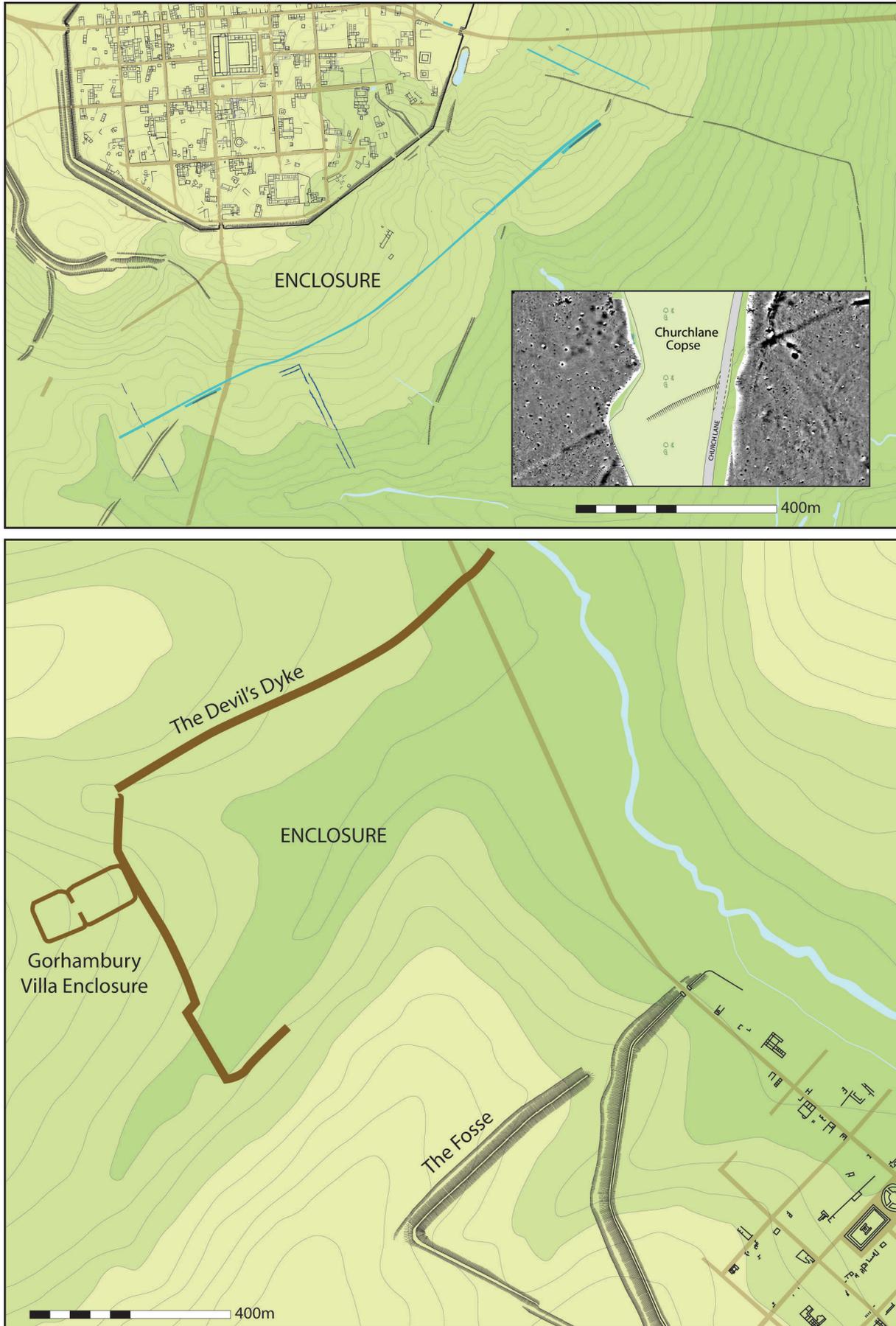


FIG. 15.4. The potential stock enclosures at Silchester and *Vérulamium*.

hypothesis, but the scale of production that must have existed within Britain is such that both are of the order of magnitude that we should be expecting for this most elusive industry. Some small-scale investigative work at either site could establish whether this interpretation is plausible.

LIVESTOCK AND ENCLOSURES

Upon the Roman conquest cattle and hides were clearly needed on a large scale, not only for the army but also for the new towns developing such as Silchester itself and nearby London. The Roman roads facilitated the long-distance movement of cattle with their hard surfaces for carts and marching soldiers, complemented by green lanes on either side within the *agger* ditches for livestock. The demand from the city of London in the medieval period drew cattle down from the Highlands, so it is not unlikely that in the Roman period there too was large-scale movement generated by the new order. As discussed earlier, to the south-east of the town is a large possible enclosure which appears to have the ditch on the inside rather than the outside (see pp. 320–2). Its size and scale are very similar to the deer park pale of 1204 which overlaps it.

Another large enclosure close to a Roman town, where the ditch is on the inside, is known from *Verulamium*. This was constructed in the very Late Iron Age, comprising the Devil's Ditch, New Dyke and White Dyke. The enclosure was adjacent to the smaller Gorhambury enclosure, soon to house a grand Roman villa. It also had the potential to act as a large stock enclosure down by the meadow of the River Ver, controlling the movement of livestock coming towards the town from the north down the valley and later Ermine Street (Neal 1990, 20; Niblett and Thompson 2005, 31).

Fishbourne had a different kind of stock enclosure; Sykes (2006) has demonstrated that breeding pairs of fallow deer were imported from abroad and introduced into the area in the later first century, so presumably this was a deer park for elite hunting, to which can be added the use of the Isle of Thanet as a game reserve (Sykes *et al.* 2011). All this management of wild and exotic animals was part of a new discourse about nature as Britain became part of the Roman world (Allen and Sykes 2011).

At Silchester, the northern part of the area was encroached upon in the later Roman period by the inhumation cemetery. However, if it was a deer park or other form of livestock enclosure, it would be interesting to investigate the large rectangular building which appears as a cropmark and the pottery scatter within the area (see p. 254).

CERAMIC PRODUCTION

The geophysical survey did not reveal any additional kiln sites, but the combination of datasets and some additional detail from the geophysical survey of the known sites does provide a useful opportunity to pull together existing knowledge.

THE ANTIQUARIES' POTTERY KILNS NORTH-EAST OF THE TOWN (LATER FLAVIAN-TRAJANIC)

In 1906 'a tenant of a field on the north-east side of the city' hit some remains which an excavation by Mill Stephenson and Challenor Smith revealed to be two small kilns (St John Hope and Stephenson 1910, 327–9). Unfortunately, there were no further locational details provided, but the report by the excavators which said they were to the 'north-east' should surely be preferred to May's later reference to them being just outside the North Gate, which is categorically not north-east. It was this later positioning, however, that was picked up on by Boon, though he did not cite May, and then subsequently became incorporated into the Historic Environment Record (May 1916a, 192; Boon 1974, 280). The assemblage was summarised by May (1916b, 192–5), and the kiln products were assigned by Timby to the later Flavian and early Trajanic period (Fulford 1989c, 89).

THE POTTERY KILNS NEAR THE AMPHITHEATRE (CLAUDIO-NERONIAN)

A kiln must have existed either under or very close to where the Amphitheatre was constructed. Within the V-shaped ditch (F216) which the west stadium sealed were 319 sherds of wasters weighing 5.7 kg, which made up 43 per cent of the assemblage by weight. Timby assigned the kiln furniture and wares to the Claudian or Claudio-Neronian period, and noted that the work appeared to have been done by an inexperienced potter on a fast wheel (Fulford 1989c, 88–93). It was also noted that the fabric was very rare amongst the large assemblage from the Basilica site, so the kiln could not have had an extensive output.

Corney's fieldwalking also noted kiln debris immediately west of the Amphitheatre, associated with first-century pottery which may relate to a kiln site. This was presumably within LP 3862 where the V-shaped ditch can be seen continuing (Exterior 14; FIG. 6.43 [9]), and is adjacent to a number of high magnetic anomalies which are directly adjacent to a small 35 x 30 m trapezoidal enclosure. This area has been used in the twentieth century for poultry sheds, so there is the possibility that the features are modern, but the congruence makes their interpretation as kilns highly possible. I concur with Corney that they are unlikely to be the ones excavated by the Antiquaries who would have then described them as being next to the Amphitheatre rather than just to the north-east of the town (Corney 1984, 246; see also Grew *et al.* 1980, 394–5).

TILE PRODUCTION: BACKGROUND

A survey of the analysis of tiles in the excavations can be found above (pp. 277–8). Here, the focus is on the location of the production sites.

Evidence for the number of supply sites we should expect to find comes from the plurality of the size and fabrics of the tiles. Green noted in Fulford's excavations of the South and South-East Gates the difference in size of the tiles at each (Fulford 1984, 58, 198). As fabric analysis became more routine, Timby noted that four of the seven tile fabrics found at Lowbury Romano-Celtic temple, 23 km to the north-east, were also found at Silchester, suggesting some large-scale producers involved in the area (Fulford and Rippon 1994, 201). Warry's large-scale work on the topic observed that the best-known tiliary fabric from Little London, based on Bracklesham clay beds, only constituted a small proportion of the overall assemblage from Silchester, the more typical tile there being from closer local Reading and London clay beds (Warry 2012, 51).

Warry's work also estimated the overall production requirements for the town. He concluded that it probably had its own local tile-works for roof-tiles, flat-tiles and flue-tiles. 'The number of buildings in the town suggests that at least two kilns were needed to produce the fluctuating demand for roof tiles, with at least one further kiln for flat tiles, whilst the metrological analysis supports the proposition that there were four producers during the 1st-2nd c.' (Warry 2012, 74). Later on there was more of a shift to the use of stone tiles for roofs (Warry 2012, 49).

Hitherto, only two tileries are known: one from Little London to the south, and indirect evidence of wasters from immediately north-east of the town. Evidence for the latter can now be expanded upon, and evidence for the excavation of the London clays adjacent to the site can also be cited.

TILE KILNS AT LITTLE LONDON (NERONIAN TO MID- TO LATE SECOND CENTURY)

Deep ploughing near Little London in 1925 produced a large number of vitrified wasters of brick and tile which were investigated by Karslake. Some were as deep as 2.7 m below the surface. Amongst the fragments he found one with a Neronian brick stamp 'NER.CL.CAE.AUG.GR', similar, but not identical, to that discovered in 1903 near the Public Baths. Close by he also identified a depression about 300 x 30 m and 1.2–1.5 m deep which he contended was where the clay came from (FIG. 10.1; Karslake 1926; see also Taylor and Collingwood 1925, 243, 250). Boon originally cast doubt on Karslake's find and the tile (Boon 1974, 278–9), but Greenaway (1981) has subsequently located it in the British Museum (Acc. No. 1925, 12-12.). Fulford subsequently found more of these tiles in the Basilica excavation, though from different dies

again (Fulford and Timby 2000, 119). Lowther examined the material from the Little London site in Basingstoke Museum that had been collected by Barton fieldwalking the site in 1957. He noted that as well as brick and tile wasters it included a waster flue-tile with roller-stamp diamond-lattice decoration (Lowther Group 5 No. 39) of a type he had already found amongst the Silchester collection (Lowther 1948) which Boon noted dated from A.D. 80 to the mid- to late second century (Boon 1974, 101, 278).

Warry observed how some of its products were so specialised they must have been for a regional market rather than just Silchester alone, such as the flue-tiles (Warry 2012, 74).

TILE KILNS ADJACENT TO SILCHESTER

Immediately adjacent to the town on the north-east side wasters were discovered in LP 2673 when the water main was cut through. A mass of poorly-fired tiles above a charcoal-rich layer, likely to be the remains of a tile clamp, was found close to a series of pits and enclosure ditches (590–606 m along) (Fulford *et al.* 1997, 161).

Logistical estimations worked out by Warry suggested that were a kiln used, firing chambers might be 3 x 2 m containing enough room for up to 1,440 *tegulae* or else a mixed load. However, the layout space prior to the firing for the tiles to harden would cover 168 m² (c. 13 x 13 m). Animal impressions are legion on the tiles from Silchester suggesting this probably took place outdoors rather than in an enclosed building (Warry 2012, 52–4). If we examine the geophysics of the surrounding area, it is clear that there is a series of small enclosures with lots of features within them, some with fairly high readings. This complex is highly likely to be a large tilerie (Exteriors 10 and 14; FIGS 6.31 [8] and 6.43 [10]). The clay could easily come from just off the terrace in the north, in a copse now called Collin's Copse and auspiciously Kiln Yard Copse, suggesting modern workings in the vicinity as well. The section in the water main watching-brief showed the possible clamp to be sealed by a layer of yellow clay, which was probably dumped over it when the Town Ditch was excavated, reducing the site's visibility from Corney's fieldwalking.

OTHER CLAY EXTRACTION NEAR SILCHESTER

The other location where clay extraction took place close to the town was on the south-west side where a large number of medium-sized pits were cut into the clay close to the brook (FIGS 6.61 and 6.70). This is discussed above in the section on potential tanneries (p. 416). It is likely that there would be tileries here where clay extraction was taking place, though at present there is no positive evidence. There are no enclosures or wasters noted, and no geophysical signatures of kilns have been observed. However, the southern side of the brook was not surveyed, and there are large areas of woodland around that could be concealing evidence.

THE RISE AND FALL OF THE SILCHESTER DYEING INDUSTRY

One of the running themes of the Antiquaries' excavations was that Silchester was the centre of a major dyeing industry, with a large proportion of space on the western side of the town devoted to hearths heating vats of dye-laden cloth. The idea got short shrift from Boon who neglected to have a section on dyeing at all in the part of his book on industries, crafts and trades at Silchester; instead he considered brewing a far more likely explanation for some of the hearths (Boon 1974, 286). However, the notion does sometimes recur uncritically in the secondary literature (MacMahon 2003, 62), so it is worth addressing head on and contextualising where the idea came from, and laying it firmly to rest.

THE BEGINNINGS OF AN IDEA

The notion began in 1894, the fifth season, while excavating Insulae X and XI. Unlike the earlier insulae, these had no obvious domestic buildings within them, so Fox considered the area

must have been given up for industry. As well as T-shaped furnaces, they found the bases of circular ones with a flue of what was then a distinctive type, but which Wachter and others now would consider 'suitable for a wider variety of purposes, such as brewing, baking or cooking' (Wacher 1995, 205). They rejected the idea of bakeries (not enough querns) and potters' kilns (not enough wasters). The circular cakes of metallic substance found in Insulae IX and XI brought metal-working to mind, though for some reason they rejected this idea as well. That the heat had anything to do with tanning or fulling was dismissed because of the lack of a water supply. In the end they decided that the circular furnaces were the bases of large dyeing vats drawing upon analogies from House VII.2.11 in Pompeii, the *officina tintoria di Ubonius*, which was undoubtedly for dyeing as shown by graffiti and its nine lead kettles set in masonry (Fox 1895, 460–1). The Antiquaries' report went into a long excursus on the different plants that could be used to make dyes and how that was done. The Silchester circular furnaces ranged from 0.66 to 0.84 m in diameter, the majority being around 0.76 m; the Pompeii ones were 0.84 m. Nonetheless, in Fox's writings his conviction meant this became: 'in diameter they coincide even to an inch' (Fox 1899b, 84). Other elements of the argument were decidedly inconsistent: while the absence of water had led them to exclude fulling or tanning, he subsequently described the area as 'riddled with water pits and wells' (Fox 1899b, 84). The querns, which occurred in quantities no different to elsewhere, were re-imagined as being used to grind up the plants to give up their colouring matter (Fox 1895, 464). The idea had taken a firm hold. The following season Insula XV joined the list of those they now thought were devoted to this industry (Insulae IX, X, XI, XII and XIII) (St John Hope 1897a, 413).

In pursuing this idea, Fox was building upon his earlier interpretations of the 1860s excavations at Chedworth Roman Villa (Glos.). Here, the addition of Room XXIV, which contained a channelled hypocaust with a semi-octagonal end, was associated not with another bathhouse but with a fulling complex and dye works (Fox 1887, 331), with his *idée fixe* gradually taking over the interpretation of nearby rooms as well as drying halls and other functions.

WILLIAM MORRIS' INFLUENCE

Inspiring them was another Fellow of the Society of Antiquaries, William Morris, key proponent of the Arts and Crafts movement. Morris had begun designing printed textiles in 1873 and engaged in extensive practical and historical research to develop his applied knowledge of dye processes and chemistry (Davis 1995). His studies even took him back to Pliny, though he focused mainly on sixteenth- and seventeenth-century French works (Morris 1889). At some point Fox and St John Hope had consulted with him, and Morris had not only afforded them long discussions about the processes involved, but also demonstrated them in operation (Fox 1895, 466 note), even though by this stage Morris' health was failing and he was to die the following year. This certainly explains the otherwise out-of-character, over-long footnotes on the details of the preparation of dyes that appeared in that season's report.

PURSUING THE IDEA

During each successive season new features were recruited to serve the interpretation. While in Insulae X and XI the absence of domestic buildings had indicated the area must have an industrial purpose, the following year the presence of heating in buildings was interpreted not as evidence of domesticity but of drying rooms for cloth (Block XIII.II: St John Hope and Fox 1896, 217). Soon even grander buildings with architectural pretensions were brought into the fold. Two small buildings, Blocks XVII.II and XVI.IV, each with a room and hypocaust, were considered as also related to the dyeing industry, the buildings being explained as for cloth drying rather than any form of human comfort (St John Hope and Fox 1898a, 109). Finally Block V.1, the potential arcade with a hall in front of the Forum, was excavated. Within the main hall was a substantive, 6.1 x 2.3 m, structure with flues (Goodchild 1943) which led to this being interpreted as a dyeing house, with Fox considering that Room 4, which contained a mosaic, could be the dyer's office.

What would now be described as a T-shaped corn-drying oven in Block XXXIII.III was also pressed into service: 'the arrangement can have had nothing to do with any metallurgical process, but could well have sustained a long boiler or vat for dyeing stuffs of some such purpose, and so would take its place with the remains of the many other furnaces found within the town' (St John Hope and Fox 1905a, 336).

This notion persisted even though scientific analysis by Gowland of two pieces of metallic debris from a hearth in the area that had originally generated the idea suggested the remains related to silver refining (Gowland 1900); the fragments probably came from Block XI.I, but the report was not terribly specific.

The idea never waned, even though the arguments supporting it became wholly inconsistent and self-supporting. Nowadays the T-shaped flue would conventionally be referred to as a corn-drying oven, with the caveat that it might be used for malting in brewing as well; while the ovens with a circular base and flue would now be seen as multi-purpose ovens for corn-drying, malting and heating.

CONCLUSION

In this chapter a number of themes have been discussed which relate to trade and industry. The development of retail premises is an interesting new angle on the development of the Forum at the heart of the town, and the oyster and butchery waste deposits in front of this area correlate well with this later evidence. In the construction of these new shops and in the importation of oysters we see new retail technologies being invested in and exploited on a large scale. Britain took to harvesting oyster beds to such an extent that by the Flavian era the export of its oysters and pearls was famous (Pliny, *NH* 9.169, 32.62; Juvenal 4.141; Tacitus, *Agric.* 12).

Tanning was another major technological revolution. The excursus on the tanning industry discussed not only knowledge transfer in the conquest period, but the scale of operation that was necessary to provide for the Roman army from both within the province and abroad. Large-scale tanneries must have existed here and at other towns, and the evidence to the south-west of the Silchester provides a plausible candidate for this, alongside comparable features at Wroxeter.

Amongst other industries outside the Town Walls there would have been tileries and pottery kilns. Some have been found, and the geophysical survey gives clear form to the tileries to the north-east in their own small enclosures near the Amphitheatre. Close by, kilns existed as well, but alas not all of them can be traced.

Finally the Antiquaries' obsession with finding evidence for dyeworks everywhere is a cautionary tale about how a speculative idea can take hold and be difficult to let go.