

### III. PRODUCTION AND DISTRIBUTION

#### THE ROMAN BRICK INDUSTRY

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##### 1. Research objectives

This project was an investigation into the organisation of the brick industry in central Italy from archaeometric and social networks viewpoints. The aim was to understand and explain the dynamics of the socio-economic relationships between the city of Rome and its hinterland in the Tiber Valley over the first three centuries AD, using brick and tile as an indicator of these relationships. Brick and tile is suitable for this purpose because the physical relationships in the fabrics can be used to interpret the changing patterns of clay exploitation. Also, the stamps record the names of the landed estates where the brick was made. From the appearance of named individuals in the stamps (ranging from slaves to the Emperor himself), something of the social relationships between manufacturers and landlords, and their social equals, can be deduced. The *shape* of the networks of relationships evident in the fabric of brick and tile itself or in the stamps (networks of manufacturers using the same clay sources; networks of family relationships; networks of patrons and clients) have ramifications for our understanding of Roman society as a whole. The principal objective therefore was to identify groups of bricks using similar clays (and to a much lesser extent, to locate the sources of those clays), and to tease apart the relationships that enabled their exploitation - to uncover the shape of the network. The archaeometric results could then be analysed from the point of view of complexity theory (especially evolving networks). Complexity allows the pattern of social relationships between individuals uncovered in the brick industry to be taken as indicative of the deeper structure of Roman society. This structure can be mapped over time and the kinds of higher-scale phenomena that emerge from such a structure characterise the city-hinterland dynamic.

##### 2. Data collection and analysis

The project examined the main collection of stamped brick - the *Corpus Inscriptionem Latinarum XV.1* - with regard to the numbers of examples per stamp type, shapes, *signa*, and the occurrences of consular dates (over 2000 stamp types, accounting for over 12,000 examples), to understand the basic outlines of the industry. A subset of 95 stamped and unstamped bricks from the South Etruria Survey collection were selected for archaeometric study. The survey collection covers a temporal span from the first to fourth centuries AD and a geographical area of the middle Tiber Valley from Veii in the west to Cures Sabini in the east, Seripola in the north and Rome in the south. The 177 examples in the collection were recovered during field survey from 102 sites. Of those sites, two or more stamps were recovered from only 22 sites - in total, 75 stamped bricks, forming the dataset of stamped bricks. By selecting these stamped bricks for study we increase the chances that they do represent a real building event at the site, and that any relationships we can discern between this site and others are meaningful. The remaining 20 examples were unstamped brick from Forum Novum, Falerii Novi, plus samples from modern brickyards. The 75 stamped bricks account for 14% of all the stamped bricks recorded as having been found in the Tiber Valley to date (total: 523 examples, Filippi and Stanco unpublished

catalogue). The probability of a sample of this size being representative is just under 95%, nine times out of ten. The principal archaeometric methods employed for this study were X-Ray Diffraction and Fluorescence. The data created through the archaeometry were analysed via discriminant and cluster analyses (the resultant groupings of bricks on the basis of their fabrics were compared with the analyses of a number of samples from nineteenth and twentieth century brick yards in the region, to give a possible indication of the geographic location of the original sources).

The drawing out of the interrelationships between bricks as indicated by their sharing of the same clay sources, or the usage of the same stamp, or their consumption at the same site provides an analytical framework for interpreting the functioning of the industry. Sites can be connected on the basis of stamps, and also on the grounds that they have access to the same clay source. Different manufacturers can be connected to each other because they exploit the same clay body etc. The picture developed depicts both the patterns of consumption and production (Figure 1 and Figure 2).

Finally, the information regarding *domini, officinatores* and other players in the trade (as recorded in *CIL XV.1*) is plotted out and analysed using social networks analysis. The shapes of the social networks are studied to determine whether they resemble ‘small-worlds’, a very particular configuration that allows spontaneous self-organisation in networks (which grow and evolve) to emerge from the dynamics of the network. The archaeometric data is also analysed from a networks analysis point of view, to understand the dynamics of the industry at the level of the manufacturers themselves.

It is in the interactions between the two levels - manufacturers and landlords - that we are able to examine the overall dynamics of this rural industry in the hinterland of Rome. Because brick stamps can be dated, in understanding the interactions within and between the different networks we necessarily move to a historic mode of discussion: explaining the changing dynamics of the networks allows us to write history from archaeology.

### 3. Selected results and a general conclusion

1) Meaning of the word *figlina*: with certain caveats, archaeometry indicates several geographically dispersed sources could be united under the banner of a single *figlina*. Alternatively, one source could be exploited in the name of several *figlinae* (Figure 3). This pattern suggests particular forms of land-tenure to exploit clay, in particular tenancy, making certain kinds of stamp types akin to a mechanism for indicating that the *merces*, the land-rent, had been paid in kind, annually.

2) Brick had inherent value, and so it would have been worth the while to invest in, to make, and to sell brick. Transportation costs from the different clay bodies were largely uniform so long as access to the river could be guaranteed; profit margins were therefore more dependent on the mode of production than on how the bricks were distributed. At the building sites in the countryside, some builders were able to build with the same materials as were used in Rome. Choice of materials is as ideological as it is economic (Graham, forthcoming).

3) The interrelationships between sites suggested a pattern of hubs and spokes, taking only four steps to get from one end of this network to another. The process of modelling the inter-

connections was based on geographical proximity and the likelihood of interaction between any two sites (Rihll and Wilson 1991). The model is probably a better depiction of site interactions in the Tiber valley than the Thiessen Polygons usually deployed. The four links in the network might correspond to a process involving movement from site to warehouse to transshipment centre to warehouse to site. They also indicate a division of the valley not into eastern and western sectors, but rather upper and lower.

4) Modes of production: the patterning of clays used in brick assemblages suggests three modes of production/distribution. Mode 1: the bricks at a site have a common origin and travelled through the same distribution channels; Mode 2: the brick maker had multiple kiln-sites throughout the region; Mode 3: brick makers shared clay resources, or at least exploited the same general clay body. Over time, Mode 1 was never very important. Modes 2 and 3 seemed to mirror each other over the first three centuries AD. Mode 3 implied the existence of rural *societates*, while Mode 2 suggested relatively wealthy individuals; the trends in the different modes over time suggests that a watershed was reached in the mid-second century after which the ownership of land began to consolidate. While that observation was always suspected based on information in the stamps themselves, here it was observed in the patterning of fabrics in brick assemblages in sites throughout the Tiber Valley.

While the output of the local brick producer in the Tiber Valley may only have been a ‘drop in the ocean’ at Rome, his position in the local market could have been profound. If it is correct to argue for tenancy as the framework for brick production, then this situation would have stimulated over-production. The tenant not only had to produce enough brick to meet the land rent, he also had to produce enough to sell to meet his own basic needs. The paucity of sites in the Tiber Valley where stamped brick was found compared to the overwhelming majority of sites with unstamped brick and tile, combined with the arguments concerning the nature and purpose of stamps, suggests that much of their produce was locally consumed while their land rent (a proportional number of bricks annually, consignments where a certain number of bricks were stamped) went to build Rome. That many of these *officinatores* are known to have produced brick for several years suggests that their strategies were by and large successful. They were able to pay their land rent and yet still generate enough income to meet their own needs. It is argued that they did indeed profit significantly in their dealings with their fellow rural dwellers, whether paid in money or in kind, and therefore the Tiber valley economy was a *productive* economy. This is not at odds with asserting that the city was primarily a consumer city, or that the Roman economy as a whole was a consumer economy, for we are dealing with different levels of complexity, where different interrelated levels can be characterised independently, yet together create another dynamic entirely. What happens at one level of complexity is no indicator of what may happen at another.

#### 4. Selected bibliography

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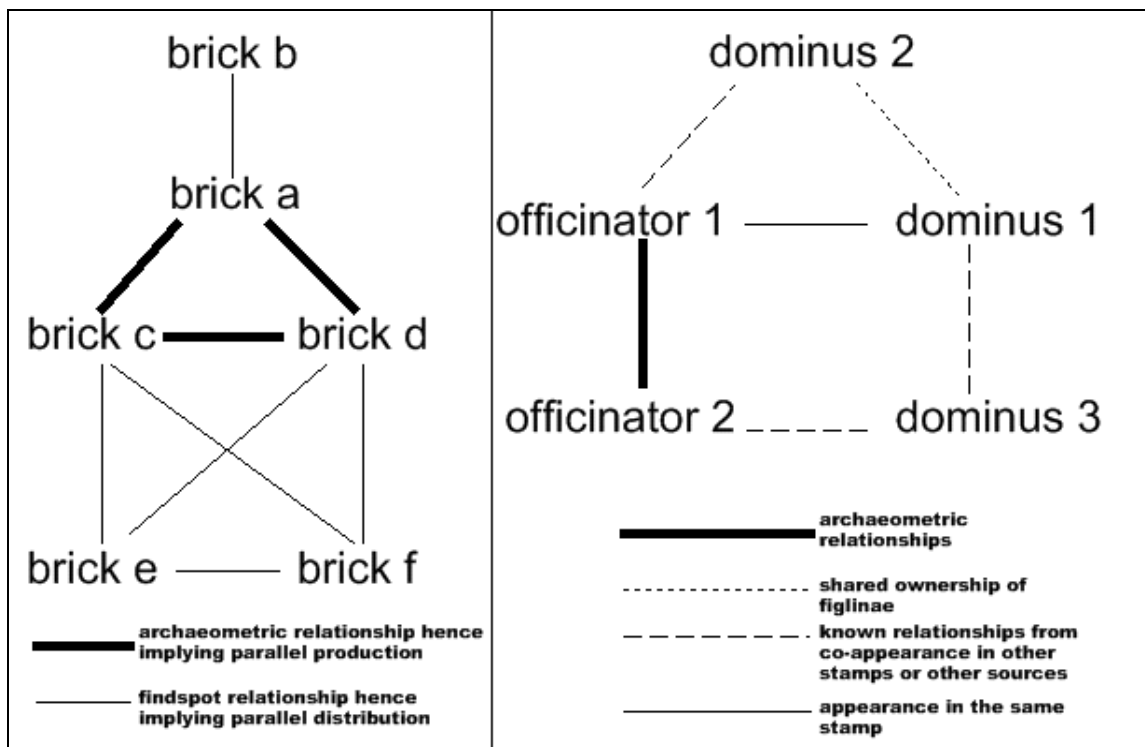
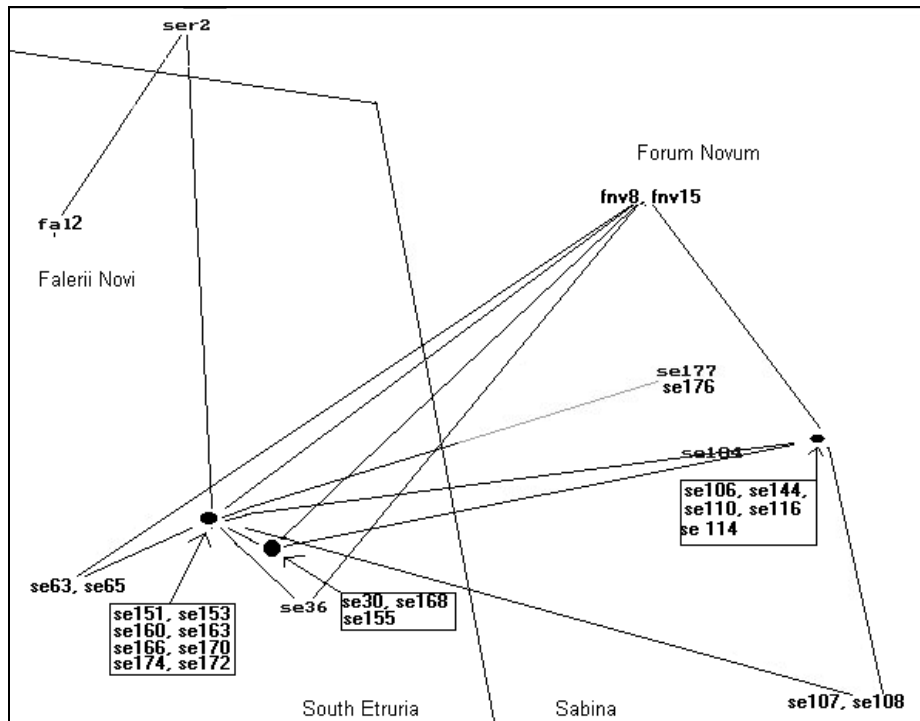


Figure 1. Hypothetical physical and social relationships between bricks in assemblages from two different sites, represented in pure network terms. Representing archaeometric or social data in this fashion makes the relationships readily apparent. This data can then be plotted against the

geographic map, to understand the spatial relationships, as in Figure 2, the archaeometric relationships in Julio-Claudian stamped brick from the SES collection.



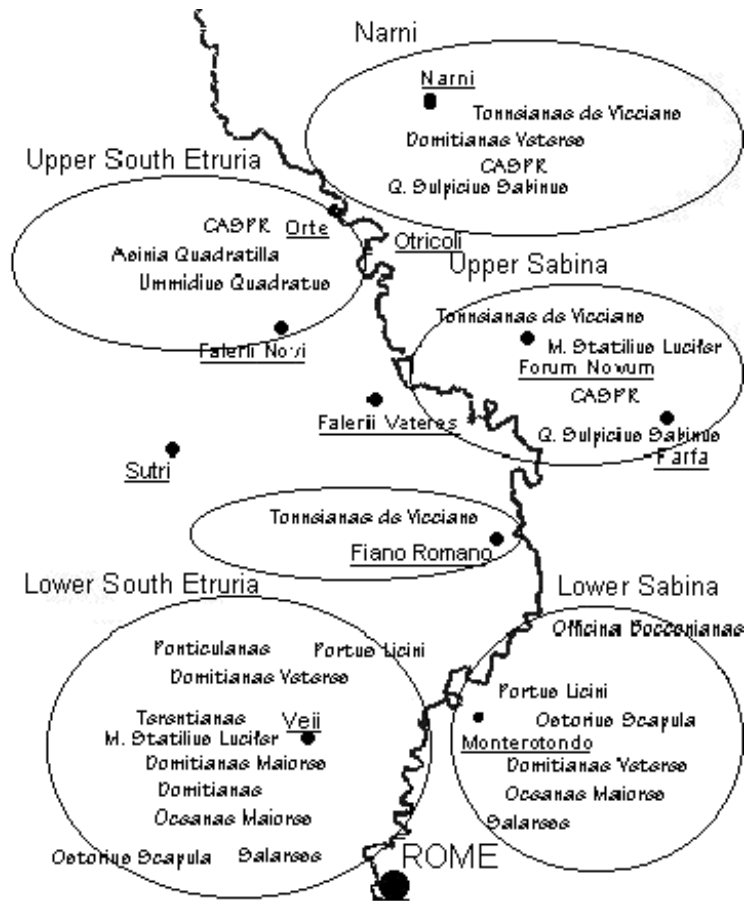


Figure 3. Generalised location of some *figlinae* and *domini/officinares* production sites in the Tiber Valley. The ovals correspond with the six largest groupings of similar clays; position within any particular oval does not imply location at that *exact* position, the positioning should only be considered as exact as 'lower south Etruria' or 'upper Sabina'.