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The Organization of Mass Production of Terra Sigillata in the Roman Empire

Problems of Evidence and Interpretation

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Doctor of Philosophy

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Abstract

Results of research on the production and distribution of *terra sigillata* are frequently used as weighty arguments in the discussion of the character of the Roman economy as a whole. Still, many substantial problems remain under discussion, among them the important question of how the mass production of this ware was organized.

By re-examining and combining evidence from various production centres, the present thesis aims to develop a comprehensive model for the organization of *terra sigillata* production. It employs comparative and complementary approaches to interpret the archaeological and epigraphical material, and also analyzes the underlying social and legal structures. Theoretical conceptions of the organization of pottery production are dealt with, and the role of *terra sigillata* production in models of ancient economy is discussed.

The principal focus of the study is on some of the most important centres of *terra sigillata* production in Italy, Gaul, Germany, Spain, and Africa. Although each production centre has its own individual features, common ones prevail.

The application of producers' signatures can be explained by the joint use of production facilities, especially drying sheds, and the exchange of moulds. Similarities in the use of signatures are interpreted as indicating similarities in the organization of production, whereas irregularities in their application are looked upon as the result of varying production conditions.

The interpretation of the potters' graffiti enables us to postulate the existence of a leasehold system in which the lessor entered into contracts with lessee workshop managers to deliver set numbers of vessels. Firing masters, who were potters themselves and responsible for the operation of the kilns, acted as middlemen or directly on behalf of the lessor, approving and controlling the potters' work.

The mode of production in all centres appears to have been a nucleated workshop industry rather than a manufactory, based on a leasehold system and regulated by large-scale traders, with the producers' social status being of little relevance. Thus all arguments founded upon the distinction of Italian slave manufactories and cooperative production of free men in the western provinces are no longer plausible.

Table of contents

Abbreviations

CIL = Corpus Inscriptionum Latinarum

CVArr = Corpus Vasorum Arretinorum (Oxé/Comfort 1968)

Mar. = Marichal (1988), catalogue

RE = Paulys Realencyclopädie der classischen Altertumswissenschaft

TLL = Thesaurus Linguae Latinae

Preface

If the field of ancient economy is a battle field, arguments based on archaeological research certainly belong with the best of the weapons. Among the various kinds of archaeological remains serving ancient historians as sources, clay artefacts play an outstanding role. Their material enabled them to survive the millennia, whereas most organic remains of ancient economic life have vanished.

Fragments of ancient clay artefacts are not only ubiquitous, but also often offer epigraphic information. They can bear inscriptions in the form of stamps, graffiti, or painted inscriptions referring to certain phases of their production and distribution. In the Roman Empire this is the case with bricks and tiles, amphorae, terracotta lamps, and *terra sigillata*. In combination with the archaeological contexts of finds, such as excavated sites of production, transportation, storage, and consumption, these inscriptions enable us to gain an insight into the structures of production and distribution. Another reason why this is of special interest for students of the ancient economy is that these clay products were at times mass-produced, and some of them exported to all parts of the Empire. Results of research in this field are therefore frequently used as weighty arguments in the discussion of the character of Roman economy as a whole.

Of all mass-produced clay artefacts, *terra sigillata* has aroused the greatest interest among ancient historians. With this ware the body of evidence is much more comprehensive than with any other kind of mass-produced artefacts. We have not only producer stamps and a chronology based on datable contexts, but also a number of excavated production sites, results of the application of scientific provenancing methods, and the evidence of graffiti concerning the production organization.

Due to the nature of this evidence, the mode of production of *terra sigillata* has always been the principal focus of attention (cf. Section 1.1.). However, many substantial problems in this field of research are under discussion. This applies to questions of the organization of production and selling, the social structure related to manufacture and trade, and reasons for the rise and fall of entire production areas. The vast amount of literature dealing with this field of research could not be more dispersed. This makes it difficult for interested ancient historians to get an idea of what research has been done, what methodological approaches have been employed, and what interpretations are available. It follows that it is worth re-examining the

material available with the aim of producing a comprehensive study of *terra sigillata* mass production.

The core of this thesis will therefore be the analysis of evidence concerning the organization of the production of this ware. Since not all production sites can be included in the investigation, a selection must be made, following the availability of sufficient material likely to shed light on the respective questions, and the significance of the production sites. The study will concentrate, therefore, on some of the most important production centres in Italy, Gaul, Germany, Spain, and Africa.

A set of methodological approaches is necessary to reach optimum exploitation of the evidence. To gain a basis for evaluation, in the first chapter the role of *terra sigillata* production in models of ancient economy will be discussed, and theoretical models of the organization of pottery production introduced. The evidence available is not so abundant that the application of comparative and complementary approaches becomes unnecessary. For this reason, the first chapter also provides a closer look at the evidence of other kinds of mass-produced pottery.

In the main part, consisting of four chapters, evidence concerning the organization of the production at some of the most important workshop centres in Italy, Gaul and Germany, Spain, and Africa will be discussed in detail. For the reconstruction of the organization of production, the content of the various inscriptions offers essential information. This evidence will be analyzed and related to additional data, such as the results of scientific provenancing and typological dating methods, and the archaeological contexts in which the finds were made. The connections between the production centres, such as potters common to various centres, transfer of tools, and use of identical technology, will also be examined. The technology of production itself, with the supply of raw materials, plays an important role, as these affect the internal organization. The same applies to underlying social and legal structures. These aspects will be treated in the individual chapters where appropriate. Organizational structures, which can be uncovered only partially, will be related to each other to fill in the gaps in explanatory models. It will be critically asked and discussed to what extent such complementary methods can be used.

In the final chapter, the influence of the results on models of the Roman economy will be discussed. For instance, questions to be asked are: What can this model add to our understanding of the way the Romans responded to economic

opportunities? Who made the decision to use economic opportunities? How did these decision-makers learn that there were such opportunities? What was the influence of the use of slave labour in this sector of production? How was slave labour used? Was a certain kind of 'slave mode of production' developed? Were there any qualitative innovations in the organization of production, and how are these to be addressed?

Using this set of methodological approaches, the present study aims to develop a comprehensive model for the mass production of *terra sigillata*. Readers should be aware, however, that this research is based on incomplete archaeological and epigraphic material; this kind of evidence is circumstantial, tending to establish conclusions by inference. Thus the explanations and interpretations produced in this thesis often must be limited to the hypothetical and provisional. The nature of interpretation, however, is inevitably provisional within any living intellectual discipline. It is to be hoped, therefore, that further historical and archaeological research will contribute to the supersession of the arguments and conclusions of this thesis.

1. Models of production organization

1.1. The organization of *terra sigillata* production in models of ancient economy

On the basis of excavations in, and especially towards the end of, the last century,[1] when in Arezzo vessels and hundreds of stamped and unstamped sherds were unearthed as well as a large clay-processing installation, the ancient potteries were thought of as having been large factories. Due to the obvious lack of mechanization in this ancient period, they were also called manufactories.[2] At this time the Bücher-Meyer controversy stirred ancient historians' feelings: the matter of dispute was whether the ancient economy was primitive or rather more comparable to modern ones – a question which is still under discussion.[3] The existence of such an admittedly impressive centre of mass production in early imperial Rome has therefore always been a welcome argument, used to reinforce the theories of the so-called 'modernists'. One of the main works with this background, which is still of importance, dealing with questions of ancient economics on a broader scale, will serve as an example.

In his famous *Social and Economic History of the Roman Empire* of 1926, M. Rostovtzeff described the economic situation of the first century B.C. as 'the same kind of capitalism which had existed in the East before and during the Hellenistic period'[4], a 'commercial capitalism ... near to the stage of industrial capitalism that characterizes the economic history of Europe in the nineteenth and twentieth centuries.'[5] According to him, the entrepreneurs 'employed ... in industry the methods of pure capitalistic economy based on slave-labour.'[6] 'Among the large industrial centres of the ancient world some Italian cities began to play a prominent part, such as ... Arretium for a special kind of red varnished pottery.'[7] On the other hand, he mentions 'the rather slow growth of industry, an arrest both of the development of industrial technique and of the transition from the workshop to the true factory. The

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1 Cf. the bibliographies in Comfort (1940b) and Pucci (1985).
2 E.g. Gummerus (1916, 1491).
3 Cf. Finley (1979).
4 Rostovtzeff (1956, 35–6).
5 Ibid. 3.
6 Ibid.
7 Ibid. 36.

workshop persisted in being the leading method of production, and even the fact that many shops of the same kind belonged to one man did not transfer them into a factory in the modern sense of the word. We must, however, bear in mind that the work in the workshops was highly differentiated' and produced 'for an indefinite market'.[8] Under the reign of Augustus, in Rostovtzeff's opinion, things changed in favour of Italy, which played a 'more prominent part than in the 1st cent. B.C.', and 'Arretine pottery ... dominated for a while the world market."[9] Rostovtzeff took his information about Arezzo particularly from T. Frank and H. Gummerus.[10] The two of them took different sides concerning the Bücher-Meyer controversy. Gummerus called Arretine potteries large enterprises ('Großbetriebe'), estimating the size of the workforce at 100 plus, and regarding these firms as further examples supporting his modernistic view of ancient economy.[11] Frank was of the opinion that 'the processes [in the potteries; G. F.] were those of mass production in a factory...' and 'the extensive proportions of some of the factories are proved beyond a doubt."[12] As support, he used the supposed large number of workmen engaged, the wide-spread exports, and the large production installations. Frank looked at the theme explicitly in view of the Bücher-Meyer controversy,[13] and, in contrast to Gummerus and Rostovtzeff, regarded the assumed factories rather as exceptions than as rules. Some decades later H. Comfort's important article on *terra sigillata* in Pauly-Wissowa's Realencyclopädie still simply refers the reader to Gummerus, concerning the economic side of *terra sigillata* production.[14]

On another tack, we encounter the application of modern management theories to Arretine *terra sigillata* production. In the 1960s, F. Kiechle applied J. von Klaveren's theory of 'spontaneous manufactories' to Arezzo, claiming that the manufactory was in that case the only possible production-form, so that manufactories developed

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8 Ibid.

9 Ibid. 69–70.

10 Frank (1920) and Gummerus (1916); cf. Rostovtzeff (1926, 490 n. 8 and 498 n. 33). Despite the title of Frank's book, it covers some industries of the time of the early principate. In the German edition of his work, Rostovtzeff referred to the successor of Frank's book, An Economic History of Rome, which is in this part identical with its predecessor; cf. Rostovtzeff (1931, 241 n. 13 and 251 n. 33) and Frank (1927, 219–22).

11 Gummerus (1916, 1487–8).

12 Frank (1920, 167–8).

13 Ibid. 165–6.

14 Comfort (1940b, 1296). In the same decade, Westermann (1942) also took his information from Gummerus (1916).

automatically.[15] Moreover, he calls Arezzo the best example of the existence of this 'capitalistic form of production' in antiquity, using this as an argument against the Marxist theory of the law-governed course of history. Kiechle took it as read that the production-form in Arezzo was a manufactory. In later works, the outcome of scholarship was similar, and the manufactory became the assumed mode of production. G. Pucci attempted to estimate the size of the enterprises by counting the number of slaves associated with their master, and argued for the existence of bigger firms, to fit into a Marxist definition of a manufactory.[16] D. P. S. Peacock drew the same conclusion on the basis of the number of slaves in bigger firms, the existence of large clay-processing basins, and considerations on the presumed division of labour. He regarded manufactories as a well attested fact.[17] Even M. I. Finley, who tried to show that the ancient economy is scarcely comparable to the modern, and that models developed to explain modern phenomena are not applicable,[18] took for granted that more than 50 slaves were employed in some of the large firms working in Arezzo.[19] A. Carandini, writing about the 'sistema della manifattura urbana schiavistica', refers to Arretine ceramic production as a main source for his theoretical approach.[20] So the idea that Arretine *terra sigillata* manufacture partly took place in large manufactories with a high degree of subdivision of labour still flourishes, although today's historians are more discriminating in their judgement, and usually regard large firms as rare exceptions.[21]

During recent decades, the discovery that persons referred to on stamped signatures from Arezzo were also involved in *terra sigillata* manufacture elsewhere has led to the assumption that some Arretine producers were organized as main firms with branch workshops. Since then, the discovery of quite a number of such workshops – especially through the use of scientific provenancing methods – has shown the frequency of that phenomenon. It has been suggested that the producers

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15 Kiechle (1969, 70–2), quoting von Klaveren (1964, 145–6).
16 Pucci (1973), Peacock (1982, 121–2).
17 Peacock (1982, 121–2).
18 Finley (1984, 26–7).
19 Ibid. 137.
20 Carandini (1981, 256–7; 1988, 333–4).
21 Cf. e.g. Pekáry (1979, 94), Greene (1986, 160), De Martino (1991, 339), Kloft (1992, 172–3), Aubert (1994, 296).

in question established branch workshops to make export easier and to conquer new markets.[22]

As another facet of interpretation, the manufacture of *terra sigillata* has been understood so far as an urban industry, often explicitly in contrast to the mass rural production of other kinds of pottery, such as bricks, tiles, and amphorae.[23]

As far as the organization of production is concerned, ancient historians have devoted less attention to production sites in Gaul and Germany. The large sites of La Graufesenque, Lezoux, and Rheinzabern are of special importance, for they offer opportunities for comparison. Several kilns and other production installations have been excavated at these sites. At La Graufesenque, hundreds of potters' graffiti with notes were found, giving a unique insight into the internal organization of production. Since the majority of these graffiti have been published and analyzed only recently,[24] ancient historians have not been able to use them extensively,[25] and many interpretations of this evidence are still a matter of debate.[26]

The hypothesis that Gaulish producers formed a cartel or a cooperative, based on the interpretation of the graffiti and archaeological evidence,[27] has been given up in favour of their interpretation as independent small- and medium-sized workshops cooperating at times only.[28] Although it has been suggested that some of these workshops were manufactories comparable to the supposed ones of Arezzo,[29] ancient historians have been mainly interested in the hypothesis that the majority of producers in Gaul and Germany were not large manufactories working with slave labour, but small independent workshops run by free provincials.[30] This has been

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22 For details and literature on branch workshops and related problems, cf. below Section 2.6.

23 Cf. e.g. Jones (1974, 38), Carandini (1981, 256–7; 1988, 333–4), Aubert (1994, 217).

24 Marichal (1988) with more than 200 graffiti. Hermet (1923) already had published 43 graffiti.

25 With one notable exception, namely Strobel (1987; 1992).

26 Cf. below Section 3.2.4.

27 Grenier (1938), Vernhet (1979, 20–1).

28 Jacob/Leredde (1982), Peacock (1982, 122–8), Strobel (1987; 1992), Aubert (1994, 208–11).

29 Kiechle (1968, 80–1, 89). Although the model of a nucleated workshop industry is the prevailing view, some researchers still favour the idea of a manufactory as the form of organization. This applies especially to German archaeologists, who tend to call all production centres 'Manufaktur'. This is partly an imprecise use of the term, but occasionally it emerges that indeed the mode of production characterized above is meant, e.g. Rau (1977b, 49) referring to Rheinzabern: 'arbeitsteilige Manufakturordnung'; Schulz/Schellenberger (1996, 17): 'Die vielschichtige, komplizierte Herstellungstechnik setzt nämlich eine Spezialisierung und bei den produzierten Massen auch ein arbeitsteiliges Verfahren voraus, weshalb auch von Manufakturen gesprochen wird'.

30 E.g. Pekáry (1979, 94), Alföldy (1984, 116–7), Finley (1984, 137), DeMartino (1991, 340–2), Jacques/Scheid (1998, 419–21).

seen as their decisive advantage over Italian producers, who are thought to have been out-competed by the Gauls.[31] The example of La Graufesenque has been used to support the hypothesis that in Gaul a non-Roman type of economic organization prevailed.[32] As another facet of interpretation, the theory that slave labour could be used very efficiently in the production of high-quality goods has been supported with the claim that the slaves of Arezzo made better quality ware than the free potters in Gaul.[33] A thorough comparison of the organization of production at Arezzo with the one of Gaulish centres, and the latter with each other, however, is still outstanding.

Concerning the organization of production of *terra sigillata* in Spain and Africa, too little is known to be of much interest for analysts of the Roman economy. In both cases it has been very cautiously and vaguely hypothesized that the organization of production was similar to the one at La Graufesenque (independent small and medium-sized workshops, cooperating only infrequently).[34]

1.2. Modes of pottery production

An interesting contribution to the topic of modes of production, especially with regard to Roman pottery-production, is without doubt Peacock's classification.[35] He provides a combination of Marxist and ethno-archaeological approaches. Eight modes of pottery production have been distinguished by him. Two of them, household production and household industry, concerning small-scale activities run to supplement a household's main income, are scarcely relevant for an investigation of mass production. The difference between them is that household industry produces not only for one's own consumption, but also for the market. The mode of factory production, characterized by the use of mechanical power, can also be precluded from these considerations, for the use of machines was unknown in Roman pottery production. The relevant modes are:

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31 Pekáry (1979, 94), Finley (1984, 137), Jacques/Scheid (1998, 419–21).
32 Kneißl (1988, 240–1).
33 Finley (1984, 159).
34 Spain: Mayet (1984), Africa: Peacock/Bejaoui/Ben Lazreg (1990).
35 Peacock (1982, 9–10, 43–6).

1.2.1. Individual workshop production

The mode of individual workshop production is defined by pottery making as a main source of subsistence, even if supplemental sources, such as garden cultivation, play a role. Production is clearly orientated towards the market and practised by men rather than women because of its economic importance. The craftsman may work for himself, but he is liable to employ some assistants – often members of his own family.

1.2.2. Nucleated workshop production

In this mode a number of individual workshops form a clustered complex. This may be favoured by availability of raw materials, labour, markets, or any combination of the three. Pottery-making is a major acitivity, with other means of income being only subsidiary. If the climate precludes round-the-year production, every effort will be made to extend the season, for example erecting special drying sheds. Competition will elevate technology to the highest level, the industry usually being characterized by a fairly standardized range of high-quality products. Cooperation is the most important advantage of nucleation. The scale of production will attract middlemen, so that the community as a whole benefits from large sales without the trouble of individual distribution.

1.2.3. Manufactory

A generally binding definition of this term does not exist. In economic history, it usually describes the condition immediately preceding the factory system of late eighteenth-century Britain.[36] Indeed, it is easy to point to the lack of machines as the main difference between a true factory and a manufactory.[37] It is more difficult to draw a dividing line between workshop and manufactory. Following Marx, Peacock regards the main point as being the cooperation of a large number of artisans working in one establishment and producing a single complex artefact. Moreover, he points out that there should be a clear tendency for the job to be split into ever more specialized tasks. Using a comparative approach, he suggests considering a pottery employing more than twelve employees as a manufactory, since this is about the

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[36] Cf. Peacock (1982, 9).

[37] E.g. Gummerus (1916, 1491).

maximum number of employees in modern workshops still using traditional techniques. According to Peacock, the manufactory can be archaeologically distinguished by the number of employees, the size of premises, the degree of specialization of the products, the scale of output, and by evidence of the division of labour.

As we have seen, the existence of large manufactories is understandably of much greater interest to most scholars than are small workshops. Three main points are stressed when it is claimed that *terra sigillata* production took place in manufactories similar to those preceding modern factories: first, the large number of employees attached to bigger firms; second, the minute subdivision of labour; third, as a conclusion drawn from the first argument in combination with the evidence of large production installations, the considerable size of a single production unit.

1.2.4. Estate production

This mode is akin to household production or household industry, the household being an agricultural estate. The making of goods needed for the running of the property and expensive to import, such as bricks, tiles, and heavy transport and storage containers, are typical of estate production. Once established, production can also assume a commercial role. This concept focuses rather on the economical context of production than on production organization.

1.2.5. Military and other official production

This is a very vague notion, for it does not only include pottery production by military workshops themselves, but also pottery supplies for the military by civilian producers. Production by official – municipal and state – authorities might also be very variable, the works being strictly monitored, or leased to an independent artisan.

Peacock stresses that the situation in practice may be almost infinitely variable, with many examples falling between rather than within the modes of production defined by him.[38] It must be asked, therefore, not only whether one or some of these modes can be applied to the mass production of *terra sigillata*, but also whether they are useful categories for the analysis of pottery production at all.

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[38] Peacock (1982, 8).

1.3. Organization of production of other kinds of mass-produced pottery

1.3.1. Amphora production in Roman Egypt

We know some details of leasing contracts of Egyptian potteries of Oxyrhynchus from three leases that have survived on papyri from the mid-third century A.D.[39] The potters leased a workshop or a part of it for a certain length of time.[40] The workshops belonged to the owner of the land where they were situated. The lessor provided the workshop, including all necessary tools, plus all requisite raw material such as clay, water, pitch, and fuel; the lessee provided potters, assistants, and stokers. He undertook to produce an agreed number of various types of wine-jars. The work was paid for in cash as well as in kind, set amounts for set numbers of vessels. These pottery yards did not necessarily consist of a single production unit, but could be a complex of production installations with several kilns.[41] They were very often leased in parts, from one third up to one fourteenth of a pottery are found as objects of leases in the papyri, thus suggesting that these pottery yards were divided into independently working sub-units.[42] In one lease, the potter was allowed to produce more than the agreed number, provided the lessor supplied the necessary raw material.[43] After the termination of the lease the lessee had to return the pottery or part thereof in good condition. The lessee in two of the leases was a slave of the pottery's owner.[44]

Papyri from the second century A.D. show that this kind of lease contract was not the only one. We learn from a contract from a village in the Hermopolite nome that two partners leased a pottery for seven months and three years.[45] Unlike the third-century leases from Oxyrhynchus, here the lessees had to supply the raw material themselves. The necessary clay pits were part of the leased means of

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[39] *P.Oxy.* L 3595–7. Cf. for L 3595 Cockle (1981), for all three papyri Hengstl (1983, 663–73), Strobel (1987; 1992), Drexhage (1991, 98), Aubert (1994, 253–6).

[40] In *P.Oxy.* L 3595 a whole pottery was leased for two years. In *P.Oxy.* L 3596 ¼ of the pottery in question was leased for one year, in *P.Oxy.* L 3597 $^1/_3$ for the same period. From a later papyrus, *P.Lond.* II 944 (A.D. 517), we learn that up to $^1/_{14}$ of a pottery could be a subject of a contract; *P.Cairo Masp.* I 67110 (A.D. 565) shows that a lease could be concluded for life.

[41] *P.Oxy.* L 3597. For details, see Strobel (1987, 94).

[42] Cf. n. 40.

[43] *P.Oxy.* L 3595.

[44] *P.Oxy.* L 3596–7. See for details Strobel (1987, 94).

[45] *P. Tebt.* II 342. Cf. for details Strobel (1987, 96), Drexhage (1991, 91–2).

production. The rent consisted of an unknown number of amphorae. Another variant is found in a fragmentary second-century papyrus from the Oxyrhynchite nome, in which an unknown part of a pottery workshop was leased against monthly payment in cash.[46] The lessee was responsible for the payment of the tax for brick production, which shows that he was in full charge of the running of the workshop, so that we can assume that the workshop itself was the subject of the lease.[47]

These leases present in fact different types of contracts, which were dealt with by the Roman jurists as one single type, the *locatio conductio*.[48] Modern jurists distinguish between three different subtypes. In the case of a labour contract, a *locatio conductio operarum*, the owner of the means of production hired as the *conductor* the labour, as well as the technical and managerial skills offered by the *locator*. All raw materials and tools were provided by the former, the finished product also belonging to him. The object of the contract was only the labour, which was paid for by a rent, a *merces*, in cash and/or kind. The objects of a lease contract, a *locatio conductio rei*, were things such as production facilities. Here, the products were the property of the *conductor*, who had to pay a rent to the owner of the facilities, the *locator*, in which the latter had no say in the running of the production. A third possibility is that the means of production were owned by the contractor himself, whereas the raw material was provided by the client, to whom in the end the finished products belonged. The latter as *locator* placed out the work to be done and paid the *conductor* for the undertaking. Such a contract of work, a *locatio conductio operis faciendi*, could be combined with a *locatio conductio rei*, insofar as the means of production provided by the contractor could be leased.

The second-century contracts are evidently lease contracts; the object of them being the means of production. As to the three third-century contracts, it is debatable which kind of *locatio conductio* is used.[49] The idea of a *locatio conductio operis faciendi* is

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46 *P. Mert.* II 76. Cf. for details Strobel (1987, 96).

47 Ibid.

48 Cf. the comprehensive treatises on the *locatio conductio* by Kaser (1971, 562–72) and Zimmermann (1996, 338–412).

49 Strobel (1987, 95), follows Hengstl (1983, 665–8), in considering the contracts in question as a 'handwerksspezifische Variante der hellenistisch-römischen Werkverträge'. By contrast, Drexhage (1991, 98) pleads for contracts of labour, because the subject of the contract is according to him 'eine festgelegte Arbeitsleistung in einer festumrissenen Zeit'. Aubert (1994, 254) excludes this option, on the ground that the potter was allowed to work for his own profit.

disputable, because in all cases the pottery did not belong to the contractor but to the client. The set number of certain types of vessels as a subject of the contract must be remembered. It has been argued that the contract which allowed the potter to produce more than the agreed number of vessels, should not be considered a contract of labour, because the potter was, according to Aubert's interpretation, allowed to work for his own profit.[50] This would constitute the difference between a *locatio conductio rei* and a *locatio conductio operarum*. In the former, the potter as *conductor* would have rented the workshop and could have produced as much as he wanted. In that case we should have to consider the set number of vessels to be produced as a kind of rent. However, the question arises, why did the *conductor* receive payment for these products? In addition, it is doubtful if the passage in question really allowed the potter to produce as much as he wanted, because obviously he depended on the lessor for his supply of raw materials. The other two contracts do not mention the possibility of production for the potter's own profit; these contracts can therefore be seen as labour contracts.

Locatio conductio contracts, which contain elements of different subtypes, are not at all exceptional and occur in various fields of legal action.[51] Consequently, we must expect all three kinds of *locatio conductio* contracts; separate, combined with each other, and mixed variants, in the area of pottery production.

The mode of production encountered here was obviously a nucleated workshop industry very much in the context of estate production.

1.3.2. Amphora production in Roman Spain

Spanish oil amphorae of the type Dressel 20 – produced in vast quantities from Augustan times to the late third century in the Baetica – offer epigraphic information in the form of stamps, graffiti, and painted inscriptions (*tituli picti*).[52] Stamps on the amphorae themselves were applied before firing and must be seen therefore in the context of production, whereas stamps on the stopper and *tituli picti* refer to the phase of distribution. Graffiti were applied *ante cocturam* and *post cocturam*, and could contain names, numbers, and symbols. Those graffiti which were applied *ante cocturam* might

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50 Aubert (1994, 254).

51 Kaser (1971, 564), Hengstl (1983, 668–70).

52 For a recent critical reassessment of various interpretions of these inscriptions, cf. Liou/Tchernia (1994, 133–56).

refer to the internal organization of production, and were most likely used by foremen or supervisory personnel.[53] Amphorae stamps show mainly more or less abbreviated personal names, often in combination with the name of the *figlinae* (pottery yard).[54] However, the role of the persons who are represented on stamps is still a matter of contention. The majority of amphorae researchers tend towards an interpretation of the persons represented on stamps as owners of the *figlinae*.[55] Since these persons often belong to the highest social strata including the emperor and his *familia*, it is certain that they themselves were not normally involved in the process of production. This means it is impossible to gain an insight into the internal organization of production on the basis of this evidence. However, there are some exceptions worth discussing.

In a few cases, on stamps from the second and third centuries additional personal names are to be found besides the name of the *figlinae* and its owner. These names are combined with the abbreviation COL, which has been convincingly interpreted as *colonus*.[56] The *coloni* have been explained as 'fermiers qui avaient pris à leur compte ... l'exploitation des *figlinae*'.[57] From other stamps we learn that a sub-unit of a *figlinae* could be an *officina*.[58] This has led to the suggestion that the model known from the interpretation of Roman brick stamps – i.e. the subdivision of a pottery yard into several workshops – should also be applied to Spanish amphora production.[59]

The use of stamps has been explained as being necessary for the separation of the products of several workshops.[60] This explanation is based on the assumption that a number of amphora workshops shared one firing and storage installation.[61] The fact that at some production places quite a number of different producer stamps were found supports this hypothesis. The most impressive example is the locality of La

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53 Rodríguez-Almeida (1993).

54 On the content of the stamps, cf. Callender (1965, xxvi-xxvii), Manacorda/Panella (1993), Aubert (1994, 246–8), Liou/Tchernia (1994). On the meaning of the term *figlinae*, cf. Helen (1975, 33–88): clay district; against this interpretation Steinby (1986, 156–7; 1993, 141): 'le *figlinae* non sono semplici cave di argilla..., bensì organizzazioni produttive'. Cf. also Aubert (1994, 236–8).

55 Peacock/Williams (1986, 9–10), Manacorda (1989, 150–5), Aubert (1994, 247–9) , Liou/Tchernia (1994).

56 On these stamps and their interpretation Liou/Tchernia (1994, 147–8), with literature and a critical reassessment of other suggestions.

57 Liou/Tchernia (1994, 147).

58 Cf. C.I.N. EX OF / L. LIC. MAG (*CIL* XV, 2972, 3471).

59 Liou/Tchernia (1994, 145). On brick production cf. below Section 1.3.4.

60 Rodríguez-Almeida (1993, 99).

61 Rodríguez-Almeida (1993, 98).

Catria, where on a site of 20 ha c. 600 stamped Dressel 20 handles with 80 different texts were discovered. Even if one takes into consideration that these stamps represent a production activity of more than two centuries, the interpretation of this area as a concentration of pottery workshops is convincing, especially since a kiln has been discovered.[62]

Locatio conductio contracts, such as in Egypt, would nicely meet this situation,[63] as does the model of nucleated workshop industry.

1.3.3. Amphora production in Italy and Istria

Italian amphorae also bear stamps of free and unfree persons, who have been interpreted as owners or lessees of a pottery yard, or as slave *officinatores*.[64] Again we encounter the situation that several *officinatores* were attached to the same pottery yard. In the first century A.D., 29 persons, who have been looked upon by modern researchers as *vilici* or *officinatores*, were associated with the amphora production of one C. Laecanius Bassus in the region of Pola in Istria.[65] Stamps bearing their names are combined with stamps of Laecanius Bassus.[66] If one considers a period of production of three or four decades,[67] not all known persons would have been active all the time. This evidence suggests that the persons in question were active in several workshops belonging to C. Laecanius Bassus, perhaps half a dozen or even fewer simultaneously at the main site near Fasana, where stamps of 14 persons were found. Some of the stamps are not encountered together with stamps of Laecanius at all; here only the fact that these stamps were found at Fasana indicate that the persons referred to may have been connected with Laecanius. It is also conceivable that they worked independently.[68] In any case, the use of *locatio conductio* contracts is very likely, perhaps with C. Laecanius Bassus being the lessor and the other persons lessee *officinatores*.

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62 On La Catria and the interpretation of the finds, cf. Liou/Tchernia (1994, 145–7), referring to Remesal-Rodríguez (1977/78).

63 This has already been pointed out by Strobel (1987, 97–100).

64 Manacorda (1989, 150–5).

65 Tassaux (1982, 254–7). Aubert (1994, 257–8) has obviously misunderstood the table of persons given by Tassaux, for he misinterprets all persons as slaves attached to the workshop near Fasana. Tassaux, however, says that some of them were more probably freedmen, and only fourteen were active at the site near Fasana.

66 Tassaux (1982, 255–6).

67 Cf. Aubert (1994, 257).

68 Ibid.

A similar case is the amphora producer Visellius, active near Giancola in the *ager Brundisinus* during the second half of the first century B.C Apart from Visellius some 25 persons are attested on stamps at the site in question.[69] Only a few of them were clearly related to Visellius – their stamps occur combined with those of Visellius – while for others a relationship is only hypothetical.[70] The excavator, D. Manacorda, considers all persons in question as slaves of Visellius,[71] but this interpretation is not conclusive.

Manacorda looks upon the production site of Giancola as a 'vera e propria manifattura'.[72] This assumption rests on the size of the two kilns and on the architectonic typology of the establishment. The latter means that the firing chambers of the two excavated kilns were accessible only from a court which had no passage to the area at the rearside of the kilns, from where the combustion chambers were fired. Manacorda considers this as proof of a remarkable organization of space, which enabled the independent activity of two different parts of the workforce, namely the potters and the firing specialists. From this he infers a form of subdivision of work typical of the production mode of manufactories.[73]

However, the filling and the firing of a pottery kiln are of course successive processes. The firing of a kiln of that size including the slow cooling-down of the amphorae after the firing process must have taken one to two weeks.[74] While the amphorae cooled down, the next firing could have been prepared. In the court in question, no installations for pottery production were found, so it was most likely used as a storage area for amphorae ready for firing, as Manacorda suggests for a sheltered part of it.[75]

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69 Manacorda (1994, 4). The identification of Visellius as the owner of the *fundus* on which the kiln site was located is valueless as long as it rests exclusively on the amphora stamps. As it stands, Visellius could have been merely the owner or lessee of the kiln site itself, or a contractor. The same applies to attempts to identify Visellius as a member of the urban elite. As long as we do not know his *cognomen* we cannot be sure that he was more than a freedman, or even a descendant of a freedman of a forefather of the Visellii we know from other sources.

70 Manacorda (1994, 5). The connection with Visellius is epigraphically attested for only four persons, cf. Manacorda (1990, 381 n. 21).

71 Manacorda (1994, 5).

72 Manacorda (1990, 384).

73 Ibid. 380–4.

74 The firing of a kiln filled with 160 amphora-like oil jars on the isle of Djerba, which were considerably larger than the amphorae produced at Giancola, took about 10–15 days (Peacock 1982, 42).

75 Manacorda (1990, 380).

Taking these facts into consideration, the place offers no space for potters at all. The entire area in question seems to have been nothing but the firing installation itself. Its division into two parts, firing area with storage place, and combustion place, is easy to explain by the organization of the firing itself. The surroundings of the combustion chambers were surely polluted and needed in any case for the storage of a large amount of fuel. In most potteries this area is separated from the throwing and production storage area for these very reasons.[76]

Kilns of comparable size were used by workshops forming a typical example of nucleated workshop industries on the isle of Djerba. These kilns could contain up to 160 amphora-like oil jars, which were considerably larger than the amphorae produced at Giancola.[77] Each of the two kilns of Giancola must have had room for 120–180 amphorae, depending on how they were stored in the firing chamber.[78]

The kilns of Giancola could have been shared by a number of independently working workshops, thus making up a nucleated workshop production. Indeed, the presence of quite a number of *officinatores* suggests a vertical splitting of the workforce, not a horizontal one, which would be typical of a manufactory. Each *officinator* obviously had the same responsibility: the completion of the vessel before the firing, and possibly the internal coating of the fired vessel. The existence of two groups of four potters with a comparable above-average share of the overall production suggests that this was the normal number of units. The rest could have been made up by seasonally employed *officinatores*, e.g. in peak times.

Interestingly, a second production site has been discovered near Marmorelle where persons related to Visellius were active, some of them also being encountered in Giancola.[79] This commuting of personnel between the two sites – possibly there are even more yet undiscovered ones – could be another reason for the comparatively high number of *officinatores* encountered at Giancola.

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[76] Cf. the plans of modern potteries in Peacock (1982, 30, Fig. 11), esp. the plan of a pottery in Orei, Euboea, Greece (ibid. Fig. 11,2) with two wheels, where the arrangement of the firing area is very similar to the installations at Giancola.

[77] Ibid. 41–3.

[78] 120, if the amphorae were fired standing upright; 180, if they were fired in three layers (it is likely that more layers would have led to breakages among the unfired heavy vessels). On the size of the kilns Manacorda (1990, 378 n. 11), for the size of the amphorae, cf. ibid. figs. 8 and 9.

[79] Manacorda (1994, 8–9).

Manacorda's interpretation of all names at Giancola which are not evidently names of free persons as slaves of Visellius is not only inconclusive, but also scarcely likely. The combination of Visellius' stamps with those showing other names is proved only in a very small number of cases, and in all these cases it must be left open whether the relationship was one between master and slave, or one between contractors.[80]

Moreover, at Marmorelle, the ratio of Visellius' stamps to those bearing other names is almost exactly 1:1,[81] thus suggesting that Visellius' name was stamped on one handle of each amphora, while the name of the other person was on the other handle. This was indeed the practice at the sites where Visellius was active, as finds of amphorae with the stamp of Visellius and of another person demonstrate.[82] In Giancola, however, the ratio of Visellius' stamps to those with other names is c. 1:3, which can be seen as an indication that most persons attested there were active independently of Visellius. Nearly all above-average producers are among those whose stamps were not encountered together with those of Visellius.

All these considerations lead to the conclusion that the Giancola installations are likely to have been part of a nucleated workshop industry, and not that of a manufactory. Visellius as owner or lessee of a part of the *figlinae* near Giancola, and of the entire *figlinae* near Marmorelle, let or sub-let parts of it, with the firing installations being used jointly. The combination of stamps with Visellius' name with those bearing other names should be interpreted as indicating the owner or lessee of the *figlinae*, namely Visellius, and the lessee of an *officina*, a system which we have already encountered in Spanish amphora production.

Again, *locatio conductio* contracts similar to those known from the Egyptian papyri would have been highly applicable to this situation. The use of stamps could easily be explained as being necessary for the separation of the products of each *officina* after firing, as was suggested for Spanish amphora production.

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80 Cf. Manacorda (1990, 381 n. 21).
81 Manacorda (1994, 7).
82 *CIL* III 6634, 17.

1.3.4. Roman brick production

In research on Roman brick production the subdivision of *figlinae* into *officinae* has been well known for more than a century.[83] It is documented to as early as the first century B.C.[84] M. Steinby suggests binominal brick stamps be considered as referring back to a contract of work, a *locatio conductio operis faciendi*. Since brick stamps often offer more information than names alone, other elements of a *locatio conductio operis faciendi* are also to be found on them; namely references to the object of the contract, the *opus* (in this case *opus doliare* or *figlinum*), and to the place where the *opus* was to be undertaken, the *figlinae*. The two persons mentioned on the stamp are the contracting parties. The *dominus*, owner of the raw materials and of the finished product, acted as a *locator*, while the contractor, who provided and operated the means of production, acted as a *conductor*.[85] Taking up Steinby's suggestion, Aubert points out that other forms of the *locatio conductio* are also conceivable in brick and tile production, namely contracts of lease and of labour, *locatio conductio rei* and *operarum*.[86]

To sum up, traces of the organization of pottery mass production as a nucleated workshop industry legally based on lease-contracts and partly sharing facilities, such as kilns, can be found as early as in the first century B.C. in Italy, as well as slightly later in the provinces.

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[83] Dressel (*CIL* XV, p.4), Helen (1975), Steinby (1982, 232–3; 1986, 100, 106–7, 149–50; 1993), Aubert (1994, 222–38).

[84] Aubert (1994, 227 n. 81).

[85] Steinby (1982, 232–3; 1986, 100, 106–7, 149–50; 1993).

[86] Aubert (1994, 232–5).

2. Arezzo

2.1. Introduction[87]

In Italy, the first and also the main centre of *terra sigillata* production was at the old Etruscan town of Arretium, today called Arezzo. Arretine potters started producing the fine red-slip tableware, which was to become renowned in antiquity as *Arretina vasa*,[88] in the second half of the first century B.C. Prior to that they had gained technical experience in making black-slip fine ware. Arretine *terra sigillata* began to be exported from about 20 B.C. onwards, at first to supply the Roman troops in Gaul and the Rhineland, and by the end of the Augustan reign it was known throughout the Empire.[89] Soon after this heyday export declined, with Italian *terra sigillata* becoming rare in the north-western provinces, where local productions developed. The period of Arezzo's mass production for export came to an end in the Tiberian period.

The principal source for research on *terra sigillata* from this place is producers' stamps. Therefore a discussion of the stamps, and of connected problems, is essential as a basis for further investigation. The more or less standardized Roman system of personal names often enables us to establish the social status of the person referred to. Many finds can be dated on the basis of the stamp's or the vessel's shape, according to typologies developed from the archaeological contexts of such finds. In addition, excavations have brought to light large production installations. From this it seems to be possible to learn much about the structure of the producing firms, and the production process. However, in view of the enthusiasm that has led some scholars to far-reaching conclusions about the structure of Arretine *terra sigillata* production, it does seem to be worth considering what conclusions can be drawn on the basis of the actual sources. In this chapter some of those far-reaching conclusions will be examined. It will be asked whether the conclusions that have been drawn are justifiably based on evidence, and whether the prevailing views need to be altered. As a result, alternative possibilities for the interpretation of this material will be raised.[90]

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[87] My article in the *JRS* (1997) is a preliminary version of this chapter.

[88] For references, see Křížek (1961).

[89] For a short summary of the development of the Italian *terra sigillata* industry, see Ettlinger *et al.* (1990, 3–6).

[90] The following considerations take necessary data from Prachner (1980), who analyzed stamps of 29 selected Arretine firms and produced detailed tables containing potters' stamps and information about the amount and sorts of vessels made by each of them, as well as the places where the remains were found. Including new finds,

(continued on next page)

2.2. Stamps on *terra sigillata* from Arezzo

More than 600 potters' names have been attributed to Arezzo.[91] However, this does not mean that of all these persons products have been found there. Many potters are looked upon as Arretine without being represented by finds at Arezzo, because the names on their stamps suggest that they were dependants of one of the Arretine producers. As we shall see below, such dependants were also active at places other than Arezzo. The group of Cn. Ateius, for instance, includes more than 20 dependants, of whom at most four are represented in Arezzo.[92] More such examples will be discussed below. The number of potters actually working at Arezzo was thus most likely considerably fewer than 600.

Information given by stamps on Arretine ware is very scant. Mostly it consists only of a more or less abbreviated name with no hint as to the function of the person behind it. It follows that stamps cannot be interpreted without taking note of the contexts of names on other stamps, and comparable forms of names in other fields, e.g. on bricks and tiles, or stone inscriptions. In addition, archaeological evidence, such as places and contexts of finds, must be included.

2.2.1. Place of stamps in the production process[93]

The majority of vessels was wheel-made plain ware. Some forms were decorated by slip trailing (*à la barbotine*), applying ready-made stick-on ornaments, rouletting, or 'glass-cutting' (patterns cut with a U- or V-shaped tool). Moulds were produced on the wheel and decorated internally while the clay was still wet.

For the impressing of the decoration ornamental and motif punches were required. How these punches were made is still unclear. Various methods seem to

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his data is more comprehensive than that of the *Corpus Vasorum Arretinorum* (Oxé/Comfort 1968; the entries of this catalogue are in the following referred to as *CVArr* + catalogue number). He was also able to include the as yet unpublished substantial finds made in Neuß, later published in Ettlinger (1983), in Haltern, later published in von Schnurbein (1982), and Dangstetten, meanwhile partly published in Fingerlin (1986). See also Prachner (1980, vii and 3 with n. 14).

91 Prachner (1980, 1).

92 Ibid. 26–39.

93 Questions of technology cannot be discussed in detail here. Most research on technology is based on Gaulish material. However, the best Gaulish products are of the same quality as their Italian models, and as a result of the immigration of Italian potters without a doubt Italian technology was imported. Introductory literature on the technology of *terra sigillata* production: Picon (1973), Vertet (1976), Peacock (1982), Hoffmann (1983), Hoffmann/Juranek (1982; 1993), Hofmann (1986).

have been employed. The top-quality original master punches were possibly carved out of wax, then impressed into clay to produce a master mould. With these moulds clay punches could be formed. It is also possible that moulds for the making of punches were obtained by casting from silver vessels. Once moulds for relief-decorated vessels were available, punches were also made by casting from these. With all these methods several identical punches could be made.[94] The copying of punches from moulds for vessels led to a number of generations of one and the same motif. Each generation was of lower quality, and smaller because of the shrinkage of clay. Sometimes original and copy were used in the same period, so that dating on this basis can be deceptive.[95]

The fired moulds were centred on the wheel, and many identical, elaborately decorated vessels thrown in them. Before the potters could remove the vessels from the moulds, they had to wait until they had dried and shrunk.

Plain vessels from Arezzo bear name stamps on their inside base (internal bottom stamps). Such stamps are very rare on moulded ware. Moulded vessels often show so-called external stamps. However, these stamps were not applied to the vessel, but to the mould, normally integrated into the decoration (intra-decorative mould stamps, mould marks). Thus these stamps do not name the maker of the vessel but of the mould in which the vessel was thrown. Only a small proportion of the production output was moulded ware. The analysis of a waste pit at Arezzo suggests that only 5–10 per cent of the production was made up by moulded vessels.[96]

Producers' signatures such as stamps or hand-written names were applied immediately after the forming of the vessel or the mould. The next step was the drying of the vessels. It was important to make sure that they were drying evenly, for if one part of such a thin-sided vessel is drying faster than the remainder, it is prone to crack. Once the vessels were leather-hard, the potters dipped them into the slip responsible for the shining red surface typical of this kind of pottery. The slip was made in levigation basins used to clean the clay by mixing it with water and allowing the coarser fraction to settle out. Often a number of such basins were combined in a

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[94] In some cases it is possible to show that on the basis of impressions of damaged punches, e.g. in the case of Rheinzabern (Gimber 1993, 262).

[95] See e.g. Ricken/Fischer (1963, 1–2).

[96] Kenrick (1997, 179).

cascade, in order to decant the suspension step by step. In the final basin the mixture was concentrated, perhaps by evaporation or chemical methods of precipitating the fine clay particles. The result of this process was an extremely fine clay sludge to which other ingredients such as salt were added. Once the slip was dry, the vessels could be fired at a temperature of c. 950 °C, the red colour being the result of oxidizing firing. In the firing chamber it was important to protect the vessels against exhaust fume. This could be reached by the use of saggars, clay boxes in which fragile vessels are placed for protection during firing, or clay tubes through which the hot fumes streamed. The twofold drying of the delicate vessels made it very likely that special drying shelters were used.

It is difficult to ascertain what proportion of plain *terra sigillata* vessels from Arezzo was stamped. This is due to many researchers having been interested only in stamped and decorated vessels. It seems that vessels of all plain forms were stamped,[97] but apparently not all specimens. In a waste pit of the producer Ateius, which was analyzed in part, only twelve definitely unsigned bases were recorded, in comparison to 1,200 stamped ones.[98] The report on plain *terra sigillata* from Arezzo found at Bolsena, however, mentions that the majority of vessels was unstamped.[99]

development.[101] In the second half of the first century B.C., however, name stamps recurred on Arretine black-gloss vessels, the predecessors of red *terra sigillata*.[102] Typical stamps on black ware originally showed ornaments only, whereas name stamps were customary on later red ware. In the period of transition, initials were included in ornamentation; purely ornamental stamps, simple name stamps (i.e. mostly abbreviated forms such as initials), and mixed stamps were used at the same time on both black and red vessels. Although names became the main content of *terra sigillata* stamps, some of them show additional ornamentation.[103] The time of the change from ornamental to name stamps is not exactly datable, but several indications lead to the conclusion that it took place around 30 B.C.[104]

The manner of stamping plain ware changed over time.[105] In the earliest period, smaller vessels have a single, centrally-placed stamp, whilst platters of larger dimensions bear multiple radially arranged stamps, sometimes with an additional central one. The shape of these small stamps is more or less square. About 15–10 B.C. the exclusive use of a single centrally placed stamp with a rectangular shape replaced the former method.[106] The larger stamp allowed space for two lines of text. Soon after A.D. 9 a further change occurred, when the frame took the shape of a human footprint (*in planta pedis*).[107]

The shape and size of the stamps influenced the content in the sense that we find longer and less abbreviated name forms in the larger stamps, whereas in the smaller rectangular ones and especially *in planta pedis* stamps the name forms tend to be short and very abbreviated.

This tendency is not the only cause of problems of interpretation. More difficulties arise from the occurrence of round stamps with a circular inscription; from stamps on moulded ware, which are integrated into the decoration; and from rectangular stamps, which are written in reversed line order. Interestingly, in the latter

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101 For stamps on black-glazed ware and related theories, cf. Pucci (1993, 73–4).
102 Gamurrini (1890, 68–70). Cf. also Prachner (1980, 213 with n. 119).
103 E.g. *CVArr.* 2360, 2333, 2346.
104 Peacock (1982, 115).
105 Cf. on these questions P. M. Kenrick in Ettlinger *et al.* (1990, 147–8).
106 Cf. Prachner (1980, 2–3).
107 Kenrick (1990, 147).

case the words are written as usual from left to right.[108] This makes it impossible to conclude from the direction of writing whether the inscription is to be read from the top to the bottom or vice versa. On relief-decorated ware, often two intra-decorative mould stamps are encountered, each bearing one part of the full name (normally one stamp with *praenomen* and *nomen gentile* and another one with the *cognomen*). This makes it impossible to decide which word-order is intended. The same problem occurs in the reading of circular stamps with circular inscriptions, where we often have no clue as to which word or abbreviation is to be the first one. These ambiguities in reading cause difficulties, because the order of parts of a name is crucial for its interpretation, as we shall see below.

2.2.3. Reasons for stamping terra sigillata

Although it is agreed that in the research on marked products (*instrumentum domesticum*) objects must be classified by kind of product, chronology, provenance, and typology,[109] it can be helpful to look for parallels in the custom of marking different products mainly during the early and middle Empire.[110] For containers, e.g. amphorae and wooden barrels, there are two different places for stamped marking: the vessel itself, and its stopper, the former being agreed to refer to manufacturing, the latter to transportation; occasionally on amphorae there are additional painted inscriptions (*tituli picti*) referring to the marketing of the content.[111] Clay jars (*dolia*) were stamped before firing, and legal sources report that occasionally they were also signed in the context of trade (*dolium signatum ab emptore*).[112] Lead and other metal bars received a first mark integrated in the mould when being cast, and a punched one, possibly impressed when merchandised.[113] Bricks and tiles bear only stamps applied during the production process, although in a few cases a *negotiator* is mentioned.[114] Terracotta lamps have stamped signatures related to manufacture alone.[115] The same

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[108] Retrograde writing is rare, but not unknown on stamps from Arezzo, cf. the stamps EROS AVILI and LIVA/EROS (*CVArr* 241).

[109] Manacorda (1993, 37).

[110] Siebert (1978), Manacorda (1993, 37), Aubert (1994, 201–318).

[111] Cf. for transport and storage vessels in general Manacorda (1993, 37–8). On details esp. about amphorae recently Liou/Tchernia (1994), for *dolia*, cf. also Aubert (1994, 246–56, 265–7, 269–74), Manacorda/Panella (1993), on wooden barrels now Baratta (1994).

[112] *Dig.* 18.6.1.2. Manacorda (1993, 38).

[113] Colls *et al.* (1986, 69–70), Manacorda (1993, 38), Domergue (1994, 62–4, 71–3).

[114] Steinby (1982, 232–3; 1986, 100, 106–7, 149–50; 1993), Manacorda (1993, 38).

[115] Harris (1980), Aubert (1994, 303–18).

applies to *terra sigillata*, where stamps were applied during the production process only. There are, however, a few examples of graffiti carved on *terra sigillata* which could have been applied during distribution, but these are so sporadic that no definite conclusions can be drawn on that basis.[116] When considering *terra sigillata* we are, therefore, confined to marks related to manufacture.

Nevertheless the question arises why marks were applied in the course of production on commodities such as *terra sigillata* at all. There are five main reasons for marking goods: to indicate the owner of an item; to guarantee compliance with certain standards or expectations of quality or measure; to facilitate public control of the producer and/or the production for whatever purpose; to promote the product; to give information which is needed for the organization of production and/or sale.[117]

In the case of vessels used for the transportation of various goods the advantage of standards of both quality and measure is obvious: stability was a crucial condition for loading, transporting, and unloading without damage, and the purchaser of the goods had to rely on the correspondence of the actual volume of a container with the declared one. Especially for amphorae it has been argued with good reason that marks on them should be seen as part of a system of guarantees of intactness, stability, and correct measures for commercial and customs purposes.[118] Legal sources show that these very qualities could be expected by any purchaser not only of amphorae, but also of bricks, tiles, and other containers.[119] As to bricks and tiles as building material even public interests could be affected, so that the statement of origin could have served for public control of the production and quality.[120] On the other hand, it has been suggested that certain stamps on bricks reflect the contract between the landowner and the actual producer, so that here internal organization of production was the actual reason for the use of stamps.[121] The use of stamps on

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116 Zabehlicky-Scheffenegger (1985) describes the ligated abbrevation 'TK' incised on *terra sigillata* vessels from Arezzo and the plain of the river Po, on an amphora-fragment, and on a stone-weight,occasionally also in connection with numerals. She suggests that these marks were applied by an Aquileia-based wholesaler, possibly belonging to the prominent *gens Kania* from Aquileia.

117 Cf. Manacorda (1993, 44–5).

118 Manarcorda (1989, 449–50).

119 Manacorda (1993, 39).

120 Ibid. 41–4.

121 Steinby (1993) stresses that the interpretation of brick stamps as abbreviated *locatio conductio* contracts excludes their use as part of a guarantee system. She supports her view by pointing out that bricks of very good and of very bad quality were stamped equally. In addition, the user would have had difficulties in deciphering badly applied

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Spanish oil amphorae can also been explained first and foremost in the context of production.[122]

It has in any case become a widely held opinion that marks on *instrumentum domesticum* were mainly used as labels of guarantee, enabling a dissatisfied customer to bring a lawsuit against the person responsible for the quality of the products.[123]

One has to ask, however, on what level of distribution this was really possible. Is it in the case of goods which were distributed all over the Roman Empire – as was *terra sigillata* – conceivable that a dissatisfied customer, e.g. somewhere in the Rhineland, could have brought a lawsuit against a producer in Italy? Such an attempt could have run into difficulties since in antiquity there was no protection of trademarks, and no way of preventing forgery.[124] Nobody could have proved with the help of a stamp alone whether or not a poor-quality product was original. Therefore after some steps of intermediate trade it would have been impossible to sue a producer. On the other hand, most commodities in question were either not normally traded long distances (e.g. bricks and tiles) or were used only within a few stages of distribution (e.g. amphorae).[125] Thus a mark could have been used as an indication of the producer, and as a piece of evidence that could be backed up by the testimony of witnesses, e.g. traders involved in the trade of this very item.

In the case of Arretine ware the stamps could hardly have been regarded as more than a general proof of quality. This is shown by stamps which originate from Campania, but claim themselves as being Arretine.[126] Such stamps would have been from a legal point of view proof of fraud unless the attribute 'Arretine' had become synonymous with 'quality red-slip tableware'. Here stamps serve for a function which is very close to advertizing. It is even conceivable that the very occurrence of stamps

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stamps, abbreviated names, and stamps showing symbols. Thus Steinby suggests that the stamps were used in the context of production and distribution only.

[122] Cf. above Section 1.3.2.

[123] Manacorda (1993, 43), Aubert (1994, 264, 275, 300 and *passim*). Against the application of this assumption to *terra sigillata* Pucci (1993, 74).

[124] This problem occurs especially when products with identical stamps come from different places, as is the case in the trade of terracotta lamps. It is not possible to decide, if e.g. a provincial producer was a representative of the Italian main manufacturer whose name occurs on provincial products, or simply made unauthorised imitations. Cf. on this problem Aubert (1994, 317). Cf. also Marino (1988).

[125] On the use of amphorae Aubert (1994, 259–62).

[126] Pucci (1993, 75). SCOTTIVS FECIT ARETINVM, RVTENVS FEC(it) ARETINVM (Bémont/Vernhet/Beck 1987, 24 and Vernhet 1986, 100, respectively); ARRETINVM or even ARRET(inum) VERV(m) (*CVArr* 132); on the origin Morel (1988).

was seen as a sign of quality.[127] However, functions of this kind are in any case secondary ones, for they presuppose that stamped Arretine ware was already renowned for its quality. That is why stamps on *terra sigillata* from Arezzo cannot have been introduced for such purposes.

A stamp-based guarantee system for tableware in general is unlikely for another reason. There is a fundamental difference between containers and building material on the one hand, and tableware on the other. Stability, intactness, and volume in amphorae, and material quality in bricks and tiles must be taken on trust. These commodities can look heavy-duty at first sight, and turn out to be defective when in use, so that a guarantee system could have been a real advantage. This does not apply to tableware, whose qualities such as thickness of material, colour, smoothness and gloss, and fineness of relief are readily apparent. It is unlikely that anyone would purchase a large amount of reject tableware without realising it, neither wholesale nor retail. A few low-quality vessels in a load are not likely to have led to legal action. Taking this into consideration, a stamp-based guarantee system for tableware would have been superfluous. The fact that not all vessels were stamped also militates against the existence of a guarantee system.

It has been maintained that the involvement of members of the senatorial order in pottery manufacture led to the rule that all manufacturers must apply stamps to their products to reveal their identity.[128] Since 218 B.C. members of the senatorial order were not allowed to participate in wholesale trade, with the exception of agricultural produce. In 59 B.C. Caesar renewed and modernized this plebiscite. This has been seen as the reason for the beginning of the use of producers' stamps about the middle of the first century B.C. on Arretine black-glazed ware and its immediate successor, *terra sigillata*.[129] However, this interesting explanation does face the problem that the names on the stamps do not prove the supposed involvement of the élite.[130]

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127 This is suggested by stamps which have no sense and show a kind of imitation of alphabetical characters (Pucci 1993, 75).

128 Cf. Pucci (1993, 73–9).

129 Pedroni (1988).

130 Pucci (1993, 73–4). According to another suggestion by Pedroni (1988) the plebiscite of 218 B.C. had the opposite effect, namely the disappearance of stamps that were applied on black-glazed ware from Campania in the third century B.C. The manufacturers are suspected of having dropped the use of stamps in order to conceal certain commercial activities that had been forbidden by the law. There is, however, no evidence for this assumption, which could in any case not explain why stamps were used in this period (Pucci ibid.).

Regarding tableware, we have seen that the use of stamps as a supposed part of a system of guarantee or public control is either unlikely or does not match the evidence. Sales promotion is doubtless one idea behind some stamps, but in any case this is a secondary effect based on the success of Arretine ware marked for some other reason. Indication of ownership is applicable only insofar as a product belongs to its producer or to someone related to him until it is sold. This leaves us with the organization of production and distribution as a likely reason for the employment of stamps on *terra sigillata*.

As we have seen, the use of stamps was a common practice in the manufacture of *terra sigillata* in Italy. Various explanations have been offered for this. The stamps have been considered as a means of controlling the production of subordinates, e.g. of slaves and/or freedmen working for one master or patron, respectively.[131] The waste pit of Ateius at Arezzo suggests that this is most unlikely.[132] Thousands of stamped sherds have been found in three waste pits. The plain ware has yielded only stamps reading ATEI or CN.ATEI. The same applies to the decorated ware, with the exception of a few stamps with other names, which can be regarded as sporadic intrusions. The reading ATEI is to be found on 79 *different* stamp-types (dies). That means that 79 name punches were used (perhaps the number was somewhat smaller, for finds at Rheinzabern show that sometimes name punches had two dies, one on each end[133]). Of the variant CN.ATEI, 37 different dies were found. A die cut from a sherd, reading ATE, bears the graffito MARINI, and a person called Clitus wrote his name by hand on the underside of an unstamped cup. All this indicates that a number of workmen were active in the workshop of Ateius, all using stamps with his name. In this case the stamps were clearly not a means of controlling the production of subordinates. This is not to say that each die equals one individual potter. Name stamps underwent a process of wear, were damaged, or lost. Some were used for the making of so large a number of vessels that it seems that they were made of metal, while others, made of clay, are found on only a small number of vessels.[134] In other words, name punches were replaced, and a potter who must have made several thousand vessels certainly used many specimens during his career. As we do not

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131 Ibid. 74–5.
132 Material published by Kenrick (1997).
133 Ludowici (1904, v).
134 Kenrick (1997, 183).

know precisely what period of production is represented by the waste pits in question, we cannot say how many potters are behind this large number of dies.

Identifying stamps might have been useful in the organization of related activities beyond the workshop. Firing, for instance, could have been organized independently of throwing. This happened at various production sites in Gaul,[135] as well as in Torrita di Siena in Etruria, where products of various potters were fired all in one kiln.[136] In the case of Ateius, this model would work only if we assume that the stamps reading ATEI or CN.ATEI refer to two different persons running two different workshops. This hypothesis is supported by the evidence of stamped kiln furniture (stacking rings).[137] On the other hand, one vessel bears stamps of both ATEI and CN.ATEI.[138] It has been suggested that here one workman might have had two different dies at hand.[139] However, perhaps a workman wanted to play a trick on a colleague, visiting him in a neighbouring workshop.

To sum up, in some cases we have unambiguous evidence for common use of facilities in the production of *terra sigillata*. Thus it is plausible to assume – for the time being – that this is behind the use of stamps at Arezzo as well.

2.2.4. Names on stamps and social status

Generally we can distinguish name forms which clearly relate to either freeborn or freedmen; those where it is debatable whether they represent freedmen or slaves; and those which definitely belong to slaves. Names occur on the stamps in different grades of abbreviation, from simple initials to text in full, i.e. in the case of freeborn or freedmen *tria nomina*, including specification of social status (filiation, or abbreviated mentioning of the former master's name in freedmen's cases). The latter occurs rarely, and the interpretation of very abbreviated forms is always a matter of the individual case.

The slaves' name forms consist of the slave's given name[140] plus the name of the slave's owner[141], sometimes followed by the abbreviation 'S' for *servus*. On the basis

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135 Peacock (1982, 125–6). Cf. also Chapter 3 below.
136 Pucci (1990; 1992).
137 Kenrick (1997, 183).
138 Ibid.
139 Ibid.
140 The neutral 'slave name' means in this context the full form including the master's name. The term 'given name' reflects the fact that a slave was called by a name of his master's choosing. I have decided to use this term,

(continued on next page)

of both literary and epigraphic evidence A. Oxé worked out how typical abbreviations and combinations of names should be interpreted.[142] So we are able in most cases to infer social status from the combination of name parts. Only some forms are still a matter of contention, it being unclear whether they represent slaves or freedmen. In some of these uncertain cases the presumed slaves used not only the forms in question, but also name forms referring to freedmen.[143] However, we do not know if they used the name forms in question while still slaves, or after liberation. In the case of another doubtful name form, the evidence of stone inscriptions with freedmen using this form militates against the interpretation of just one stamp bearing the name form in question combined with the abbreviation 'STA', perhaps referring to a *statuliber*, a conditionally manumitted slave.[144] The evidence available is not sufficient

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since alternative ones such as 'forename', 'first name' or 'Christian name' depend for their meaning on modern name systems, whereas the terms *praenomen* or *cognomen* refer to the *tria nomina* system used for free Roman citizens. In some cases the slave's given name precedes the master's *duo nomina* (cf. Oxé 1904, name forms II–V); the term *cognomen* would be inappropriate here. The use of the term *cognomen* or *praenomen* (depending on the position) for a slave's given name would lead to the existence of name forms with two *cognomina* or *praenomina*, for a slave's name can contain the master's *tria nomina* (cf. Oxé's form VI, for instance *CIL* IX 1456: *Tricunda Ti. Claudi Neronis ser(vus) vilic(us)*). Cf. the terminological confusion in Aubert (1994, 220–2), where 'slave name', 'personal name', and '*cognomen*' are all used when referring to a slave's given name.

[141] I.e. either *nomen gentile* alone, *cognomen* alone, *nomen gentile* with *cognomen*, *duo nomina*, or *tria nomina*.

[142] Oxé (1904).

[143] The name forms in question are: master's *nomen gentile* in the genitive + the slave's given name, e.g. Aureli Eros, and master's *duo nomina* in the genitive + the slave's given name, e.g. L. Aureli Eros. Oxé (1904, 135–40) tentatively considered that these forms refer to freedmen stressing there were no indications that they represent slaves or refer to two persons. He backed his interpretation by the fact that some persons, whose names appear in these forms, are also encountered in forms which positively show that freedmen are meant, e.g. L.TITI/THYRSI and L.TITI L.L/THYRSI. The stamp P.MESEINV/AMPHIO.S (= P. MESEINVS AMPHIO) suggests that the usually abbreviated second name is not always in the genitive, and that therefore an interpretation like *(ex figlinis) Cn. Atei, Hilarus (fecit)* can be discounted (ibid. 136). Recently Aubert (1994, 288) revived the interpretation of these name forms as *(ex officina) Cn. Atei, Hilarus (fecit)*, but without convincing arguments. The point that in the stamp A.TITI/FIGVL/ARRET the last abbreviation should be read as the name Arretius, who would have been an employee of the *figulus* A. Titius is not conclusive. FIGVL(us) could have been a job title, or the *cognomen* of A. Titius (cf. also Salomies/Solin 1994, 322; Kajanto 1965, 322). On job titles as *cognomina*, cf. ibid. 82–4. See also here, Section 2.3.2. Furthermore, other interpretations of ARRET are equally plausible, e.g. as a reference to the place of origin of the ware. Aubert's second example, the exceptional stamp L.SEMPR/L.GELLI has nothing to do with the forms in question and should, therefore, be discussed separately. Anyhow, the occurrence of stamps with additions like *ex officina* or *fecit* in brick production, or in the Gaulish *terra sigillata* trade, cannot be used as a basis for the reading of stamps of producers from Arezzo without having additional clues.

[144] Master's *tria nomina* in the genitive + the slave's given name, e.g. L. Aureli Cottae Eros. Oxé (1904, 139–40) mentions stone inscriptions proving that freedmen did indeed use this form, sometimes with additional indication of status. In one of these inscriptions (*CIL* II 2093) we find L. VALERI LAETI (et) M. VALERI VETVSTI LIBERTVS VERNA (et) M. VALERI VETVSTI PRIMA VERNAE VX(or). Verna and Prima, both typical slave names (also encountered on Arretine stamps, cf. Prachner 1980, 230) are evidently given names of two freedmen, who used their patrons' *tria nomina* in the genitive, and before their given names, although they were freed. Prachner (1980, 168–9, 207–8, 211) explained the very obscure stamp LVMSC/NOSTA (*CVArr* 2412) as L. Um(brici) Sc(auri) No(thus) Sta(tuliber). However, the solution of STA as *statuliber* is not at all certain – the abbreviation does not appear in stone inscriptions, but only on Arretine *terra sigillata* stamps. In three other cases

(continued on next page)

to make a clear decision as to whether freedmen or slaves are referred to in these cases.

Another problem in this context is that – as we have seen above – it is often impossible to find out the word-order intended. This often foils unambiguous assignment of a name to a particular formula.

On the other hand, single-name[145] stamps offer much less information and are therefore especially problematic. We can distinguish single-name stamps with a *nomen gentile* from stamps with a *cognomen* or a slave's given name. In the former case we can be sure that the mentioned person is free, i.e. freeborn or freed. When a *cognomen* or a slave's given name occurs alone on a stamp, it is impossible to determine the social status of the person referred to, unless we have other stamps with the name in question as part of a more complex name form. If additional hints support the assumption that the same person is referred to by both name forms, a chronology of that person's production in relation to the use of different name forms would help.[146]

Sometimes additions to the names, such as abbreviations of various kinds, occur on stamps. In an especially interesting case such additions have led to the attempt at establishing a slave's career. The abbreviation 'PR' on the stamp DIOMED(es)/VIBI.PR[147] was considered as referring to a *procurator*, and Diomedes consequently regarded as a slave *procurator* of Vibius.[148] However, this reading is not cogent. Diomedes could also have been owned by another person referred to by VIBI. PR. We know for example a slave named Primus L. Vibi.[149] He could have been the owner in question, possibly at a later stage in his life, after liberation. The

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(*CVArr* 2040, 2042, 2044) the abbreviation STA or ST follows the *nomen gentile* of the master and could be read as an abbreviation of the master's *cognomen* (on the large number of *cognomina* beginning with 'Sta', see Salomies/Solin 1994, 407 and 504). The objection that this is not very likely, since we do not have an independent stamp with such a master's name on its own, which is the usual case, is based on the premise that the master of a slave working in pottery production must have been also involved in it (cf. Prachner 1980, 151 with n. 1). This was not necessarily so, because slaves could act independently from their master, e.g. for third parties for payment to their master, as is shown below in Section 2.3.1. We do not know, for instance, a single master's stamp of the large group of dependants of Publius (*CVArr* 1414–45).

[145] The term 'single-name' here means stamps containing a single component of a complete name form only, e.g. given name on its own, or *cognomen* alone, or *nomen gentile* alone, etc.

[146] This suggestion was made by Prachner (1980, 205), who adds that such unequivocal and datable sets of stamps are not yet available.

[147] *CVArr* 2343.

[148] Prachner (1980, 157).

[149] *CVArr* 2360b.

occurrence of the stamps DIOMEDES/VIBI.<[150] and DIOMEDES/VIBI Ↄ[151] led to the assumption that Diomedes could have been a *contrascriba*, the obscure additions being interpreted as an inverted 'C'.[152] However, there are no examples in stone-inscriptions of 'C' as an abbreviation of *contrascriba*. Possibly < and Ↄ are not abbreviations at all, but ornaments.[153] On the stamps of Diomedes and of Primus ornaments often occur, mostly at the end of the stamp.[154] Therefore, the reconstruction of the shadowy career of Diomedes is so questionable that one should dispense with it.

To sum up, since we often cannot decide conclusively whether a person referred to is slave or freedman, I use the term 'dependant's stamp' for slaves' stamps, freedmen's stamps, and for those whose social status is debatable, when this is of no significance for the theme being dealt with.

2.3. Function of persons referred to on stamps

As we have seen above, stamps do not give direct indications as to the function which the persons referred to performed in the production process. We can therefore draw conclusions only on the basis of further analyses. The occurrence of groups of stamps, in which various stamps have the *duo nomina* or the *nomen gentile* in common, has led to the construction of so-called 'firms'. A typical stamp group of such a 'firm' consists of a number of stamps with names of different dependent persons, namely slaves and/or freedmen, having at least the *nomen gentile* of the master or patron in common, plus stamps which bear only the name of the master or patron, from mere initials to *tria nomina*. Normally, the latter kind of stamp, which is mostly called 'firm's stamp', is much more frequent than the former one, the so-called 'potter's stamp'.

To give a typical example, the stamp C.ANNI occurs more than 33 times in five variants,[155] whereas the 37 dependants' names, which include the same *duo nomina*, are less frequent. Examples of these stamps are ARCHILAVS/C.ANNI,

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150 *CVArr* 2344.

151 *CVArr* 4345.

152 Prachner (1980, 157–8).

153 This interpretation was suggested by M. Steinby (oral communication).

154 E.g. *CVArr* 2360a and b, 2333, 2346.

155 Some of the C.ANNI stamps in Oxé/Comfort (*CVArr* 82)

APOLLO/C.ANNI, CERDO/C.ANNI, CISSVS/C.ANNI, and so on.[156] Thirteen of them are found only once, twice, or three times, in one or two variants. Eighteen out of 37 occur more than five times[157], the most frequent CERDO/C.ANNI and ONESIM(us)/C.ANNI twenty times in four variants.[158] The stamps with *duo nomina* alone and 32 of the dependants' stamps were found in Arezzo. Of the five which did not appear there, we have only one specimen each, so that we can consider their non-appearance in Arezzo as merely accidental.

The usual interpretation, which has prevailed since it was established by Italian excavators in the last century, considers the master as the owner of the pottery workshop and operating authority, while the dependants work as potters in their master's workshop. At least with the larger 'firms', the stamps with the master's name alone are not regarded as being made by himself, but by his dependants, since the comparatively high frequency of these stamps would make it improbable that they were produced by only one person. The 'firms' are considered to have been run as large establishments, a claim supported by archaeological finds such as production installations. However, all parts of this interpretation can be critically queried.

2.3.1. Independently working dependants

We can ask the question, if slaves and freedmen working in pottery production necessarily worked in their master's 'firm'. This is not necessarily the case. A master always had the option to give a certain degree of independence to his dependants. One way was to transfer a *peculium* to the slave, which could consist of any kind of property, credit, land, and movables, or *vicarii*.[159] It also included the holder's personal savings, and all profits not claimed by the master.[160] In addition, the principal could entrust the *peculium* together with the right to administer it freely, with the *concessio*

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156 All stamps are collected under *CVArr* 83. C.AN(n)I/CHRESI(mus?) (*CVArr* 83i), C.AN(ni)/EROS (*CVArr* 83r), C.ANNI/FELIX (*CVArr* 83s) and C.ANNI/OPILLI(o) (*CVArr* 83z) used the doubtful form 'master's *duo nomina* in the genitive + the slave's given name' (cf. above n. 143), if these stamps are not to be read from the bottom to the top line; this is a fundamental problem, which is discussed in detail above in Section 2.2.2.

157 *CVArr* 83b, c, d, e, f, h, k, l, m, r, t, u, w, x, y, aa+bb, hh, ii.

158 *CVArr* 83h and y. We have to distinguish between the number of stamps and the number of variants. Variants are stamps which bear the same name, but are not identical in form. Since each variant points towards a certain number of vessels stamped with it, the number of different variants is more meaningful for a comparison of the output than the total number of stamps. Unfortunately, we do not know how many vessels could be stamped with one punch.

159 Ulpianus (29 *ad ed.*) *Dig.* 15.1.7.4.

160 Florentinus (11 *inst.*) *Dig.* 15.1.39.

liberae administrationis.[161] By this permission, the slave was given the capacity to make valid legal transactions.

Consequently, even slaves could run potteries independently from their masters. The pottery, or, as we shall see below, a part of it, could have been either the *peculium* itself or be bought or leased with a *peculium* in the form of a credit.

Another possibility was to employ dependants of any social status as *institores*, for, as we know from Ulpian, males and females, free persons or slaves could act as *institores*, the last for their own master as well as for third persons.[162] According to Ulpian, an *institor* was so called because he carried on a trade (*quod negotio gerendo instet*), not a big one, but of any kind.[163] Quoting late Republican or Augustan *iurisconsulti* (Servius Sulpicius and Labeo), he presents a list of occupations in which *institores* usually engaged, e.g. superintendents of various types of buildings, food dealers, bankers, traders, tailors, bakers, shopkeepers etc.[164] This list shows that *institores* could be involved in businesses in which they were enforced to enter into various types of contracts with their customers. Consequently, even a slave as an *institor* was entitled to do all kinds of business and transactions, which his master engaged him to do either for himself or for a third person. Therefore, nothing is against the assumption that slaves and/or freedmen as *institores* ran potteries, either workshops owned by their master, or ones leased, or even for a third contracting party.

Taking the evidence from other cases of pottery mass production into consideration, it is conceivable that owners of property outside the ancient city boundaries of Arezzo rented out facilities for pottery production. This could have been land, clay pits, or entire potteries. The kind of contract would have been a *locatio conductio rei*, its object being production facilities. The vessels would have been the property of the potter, who as *conductor* had to pay rent to the owner of the facilities, the *locator*, who would have had no say in the running of the pottery. Each known

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161 Ulpianus (29 *ad ed.*) *Dig.* 15.1.7.1. The *libera administratio* was first mentioned by Proculus (7 *epist.*) *Dig.* 46.3.84, and gave the right of free disposal of the *peculium* to the holder.
162 (28 *ad ed.*) *Dig.* 14.3.7.1.
163 (28 *ad ed.*) *Dig.* 14.3.3.
164 (28 *ad ed.*) *Dig.* 14.3.5.1–15. Cf. for details Aubert (1994, 6–9).

dependant could have leased a pottery or a part of it on his own behalf, be it as an *institor* or as a slave *cum peculio et concessione liberae administrationis*.

However, other possibilities should also be looked at. K. Strobel suggested for the Gaulish *terra sigillata* production in La Graufesenque that both the supply of raw materials and the selling were in the hands of the land and pottery owners.[165] He presumed that expenditure for raw materials, tools, specialists, etc., would have overtaxed a contractor's means, including the organization of selling. According to his hypothesis the landowners would also have fixed the number and forms of vessels to be produced. We do not know how the selling was organized in Arezzo, but a similar scenario cannot be excluded.

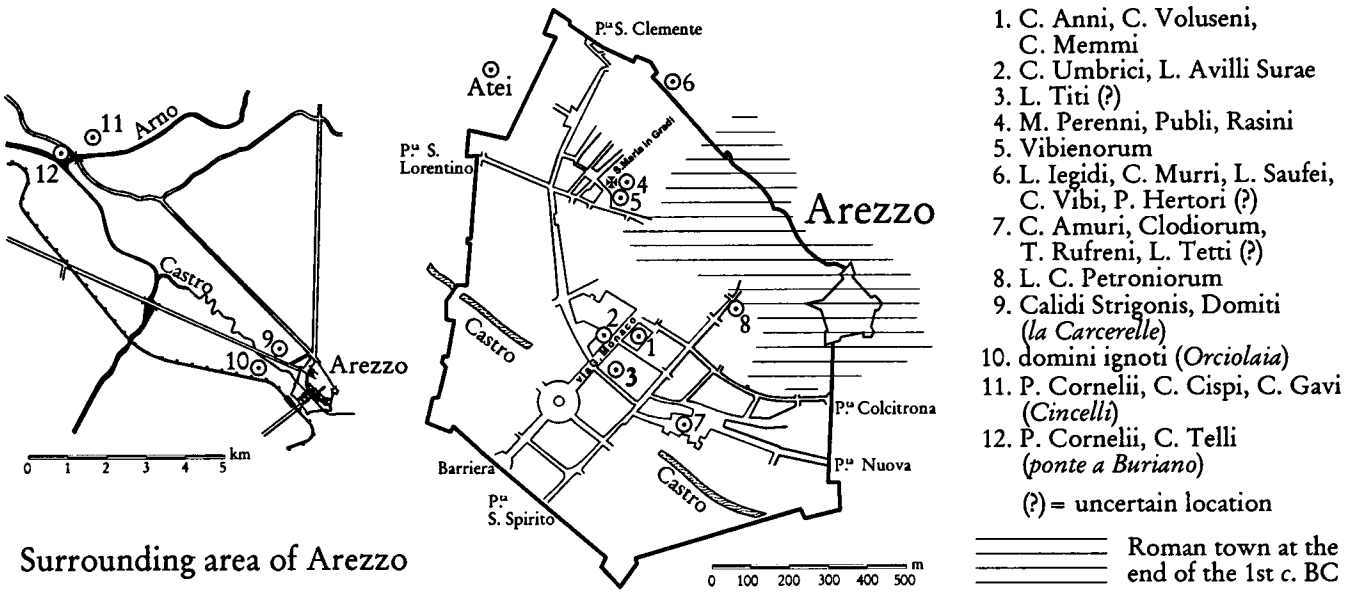

Figure 1.

The distribution of production sites in and especially outside Arezzo also points towards the use of leasehold systems. The map printed in the *CIL* shows twelve places where the main finds were made (Fig. 1).[166] All are situated outside the ancient town boundaries, obviously on *praedia suburbana*. These spots were thought to have been

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165 Strobel (1987, 110–11). To reinforce the parallel between amphora production in Oxyrhynchus and *terra sigillata* manufacture in La Graufesenque, he argues against Cockle (1981, 96) that the large number of amphorae made in the Oxyrhynchite potteries would indicate that not all vessels were used by the owner of the pottery himself, but were also sold to smaller neighbouring estates, the owners of which could not afford to run their own potteries (ibid. 93 and 95). For a discussion of Strobel's suggestion, see Section 3.2.

166 M. Ihm, *CIL* XI 2.1, p.1082. Cf. the map shown on Fig. 1. (redrawn and improved version). The locations are numbered as in the *CIL*, the assignment of the workshops to the locations shown on the map is that of Ihm. I have added the location of the workshop of Cn. Ateius, which makes up the only new findspot. The extension of the ancient town at the end of the first century B.C. is shown according to Maetzke (1958, 617–18, fig. 798). For the redrawing the *Atlante dei siti archeologici della Toscana*, Biblioteca di studi e materiali 1 (Firenze 1992), Tav. 114, and the *Guida d'Italia del Touring Club Italiano* 11 (Toscana), Quarta Edizione (Milano 1974), city map of Arezzo p. 837, were used as correctives.

the locations of the ancient potteries. At many places members of more than one group were active, sometimes of three or even four.[167] It is scarcely likely that each of the potters working there owned all means of production including the raw materials. We can, therefore, assume that interdependence between landowners and pottery producers led to the use of *locatio conductio* contracts. The fact that finds belonging to different groups were encountered together argues for the supposition that members of these groups cooperated with the same landowner. He was also the one who could make the investments for setting up large production installations.

The assumption that each signing person did produce independently would explain why each 'firm' used simultaneously with the 'potters' stamps' the so-called 'firms' stamps'. Various explanations have been proposed, but none has answered this question satisfactorily. G. Prachner, for example, suggested that in very small 'firms' the master worked as a potter himself, whereas in larger ones either the same slaves and freedmen used for some vessels their own stamps and for other vessels the 'firm's stamp', or perhaps not all potters were allowed to use their own stamps. These obvious differences in stamping by potters who threw the same product are not easy to explain, if one maintains the assumption that all worked in one and the same workshop and 'firm'.[168]

A likely conclusion therefore would be that there were no 'firms' consisting of master and dependants known from the stamps: each name stands for an autonomously working production unit. The difference between a master's stamp and a dependant's stamp lies only in the frequency of occurrence, not in the function: both name the person responsible for the production of the vessel in one way or another.

The higher frequency of masters' stamps is perhaps due to the master running a larger production unit himself. It is conceivable that he employed more potters than his independently working slaves and/or freedmen. On the other hand, part of the

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[167] Cf. Fig. 1. At eight locations, more than one group was present (nos. 1, 2, 4, 6, 7, 9, 11, 12), at six of these three or four groups (nos. 1, 4, 6, 7, 9, 11).

[168] Cf. Prachner (1980, 66 and 198). Prachner emphasizes rightly that it is very difficult to explain why vessels with 'Firmenstempeln' are in the majority. However, his cautiously formulated suggestion that potters had to stamp their own name on production above target only, and were allowed to sell this over-production on their own behalf when the production with 'Firmenstempeln' was sold out, is debatable. On the contrary, one can much more easily imagine that slaves' stamps could have been used to control whether or not a potter had already reached a production target.

difference could be the result of longer overall activity by the master as an *officinator*. It is also possible that freedmen working at places other than Arezzo stamped with their *duo nomina* or *nomen gentile* alone, so that part of the supposed master's stamps refer in fact to them. This was clearly so in the case of the Atei working at various places in Italy and Gaul.[169]

The autonomously working production unit is very likely to correspond to the unit '*officina*', which we know from other fields of pottery mass production. The existence of large production sites in the surroundings of Arezzo suggests that these autonomously working units were mere sub-units forming larger units, the pottery yards or *figlinae*.

2.3.2. Function of persons referred to by masters' stamps

The assumption that the persons referred to by masters' stamps ran a workshop on their own behalf is also supported by the occurrence of the abbreviated addition *figulus* on such stamps. In four cases out of the 29 larger 'firms' analyzed by Prachner, this addition is used.[170]

At first glance, this addition could refer to the *cognomen* Figulus or even a slave's name. It is not very probable, however, that every seventh person in a group of 29, whose dependants were evidently involved in pottery production, bore by chance the *cognomen* Figulus. Quite the reverse, it suggests itself that these persons were involved in pottery production, documenting this by the addition *figulus*.

Against the interpretation of the addition as the name of a slave called Figulus is the fact that in two of these stamps the term in question stands neither at the beginning nor at the end of the stamp, which one would expect for a slave's given name, but in the penultimate position before another element.[171] This last element is in neither case a typical addition for a slave name, such as an abbreviation for *servus*. In addition, three of these stamps occur in a frequency much higher than those of the evidently slaves' stamps of the 'firms' in question.[172] They share this characteristic with evident masters' stamps.

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169 Cf. below p. 62.
170 A.VIBI/FIGVLI (*CVArr* 2324); SENTI/FIGVL (*CVArr* 1731); SESTI/FIGVL/OPT (*CVArr* 1794); A.TITI/FIGVLI and A.TITI/FIGVL/ARRET (*CVArr* 2002).
171 SESTI/FIGVL/OPT (*CVArr* 1794); A.TITI/FIGVL/ARRET (*CVArr* 2002).
172 A.VIBI/FIGVLI (*CVArr* 2324); A.TITI/FIGVLI and A.TITI/FIGVL/ARRET (*CVArr* 2002).

All this suggests that persons referred to by stamps with a *figulus*-addition were actively involved in pottery production. We have no reason to assume that these stamps are in this regard exceptional. Therefore, masters' stamps can be regarded as hinting at persons involved in manufacture.

The next question to settle is what position this was. Certainly, the stamps refer to producers, and not landowners. Recently it has been suggested that the persons usually regarded as masters should be understood as the lessors of the workshops, with the dependants being not slaves or freedmen, but lessees.[173] This interpretation faces a number of difficulties. Several Arretine potters were active also at places other than Arezzo, as we will see in the section on the so-called branch-workshops (Section 2.6). If e.g. Cn. Ateius was referred to as a lessor and landowner, he would have owned land at Arezzo, Pisa, Lyon, and La Graufesenque, i.e. the *terra sigillata* production centres where potters with his name in their stamps were active.[174] Master's stamps reading ATEI prevail not only in Arezzo, but also in production elsewhere.[175] These Atei were most likely freedmen of the 'original' Ateius, or freedmen of his freedmen. Clearly, some of his freedmen had their own slaves.[176] This is not to say that Cn. Ateius was definitely not a landowner, but that he is not referred to as such in the stamps. There is quite a number of persons referred to by Arretine masters' stamps whose names also occur on vessels made at places other than Arezzo, including sites in Gaul and Asia Minor.[177]

Stamps unambiguously denoting freedmen such as L.TITI L.L./THYRSI, A.VIBI.A.L/SCENICI, C.MEMMI.C.L./MAHES, and A.VIBI.A.L.VENICI cannot be explained as primarily referring to lessor and lessee.[178] The same is true of stamps referring to dependants of slaves or freedmen, such as MAHETIS STABILIO - Mahes being a *libertus* of C. Memmius, which is shown by the stamp C.MEMMI.C.L./MAHES[179] - unless one assumes that personally dependent lessees such as Mahes became lessors (which seems scarcely likely).

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173 Mees (1997).
174 For references see p.62.
175 Prachner (1980, 26-39).
176 Ibid. 32.
177 Zabehlicky-Scheffenegger (1995, 219-21).
178 Prachner (1982, 211).
179 Ibid. 86-7. Another example is A.VIBI.A.L/SCENICI and ROMANI/A.VIBI.SC (ibid. 154-5; 210 with other examples).

2.3.3. Function of persons referred to by stamps of dependants

Discussing the function of the persons behind the stamps, Aubert stresses with Pucci that figures based on producers' stamps 'are meaningless, since we do not know whether the signatures represent potters, foremen, workshop managers, or factory owners.'[180] As far as Arezzo is concerned, it is scarcely likely that the slaves and freedmen referred to on the stamps were 'factory owners'. If the persons in question had run large production units, they would each have been involved with the production of several potters. This assumption does not fit with the quantity of finds of slaves' and freedmen's stamps in Arezzo itself, of which we have mostly only one or two specimens; many names are known only from one or two finds made at Arezzo.[181] If these persons had been owners or managers of large production units, we would expect a higher number of stamps and stamp's variants of them. That the output to a certain degree equals the frequency of finds is to be seen in the case of masters' stamps, which are normally much more frequent than the dependants' stamps in the same group. However, as we have seen above, with masters' stamps factors other than size of workshop are likely to also have played a role. There are only a few dependants who are known from a number of stamps and stamp's variants comparable to that of their masters. For instance, of A. Sestius, 41 stamps from seventeen dies are known; of his slave Hilarus (HILAR/A.SES/SER) we have 21 stamps from fifteen dies.[182] Thirty-three master's stamps from 20 dies are known of Calidius Strigo; his dependant Iucundus Calidi is referred to on 21 stamps from 20 dies, and Protus Calidi on 20 stamps from thirteen dies; the name Protus alone appears on 38 stamps from 24 dies.[183] Such very productive dependants are rare exceptions, but their existence supports the assumption that the number of finds to a certain degree relates to the size of the workshops. Although it can be deceptive to infer the exact size of a workshop from the number of stamps, the evidence of Arezzo gives the overall impression that the majority of slaves or freedmen were merely potters, or 'foremen' insofar as they needed some auxiliary hands. It seems that only some of them were responsible for workshops with more than one potter;

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180 Aubert (1994, 295).

181 A look into the tables in Prachner (1980) makes this perfectly clear.

182 See Prachner (1980, 124).

183 See Prachner (1980,49–50).

the typical Arretine dependant did certainly not run a large establishment. Detailed analyses of individual potters' groups might lead to more precise results in future.

Another objection cannot be accepted for Arezzo either. Aubert suggests that 'stamped signatures may refer to specialized part makers instead of workshop owners or managers'.[184] This might be possible in other cases; in Arezzo, however, it is entirely out of the question as the same names appear frequently on different kinds of pottery, moulded as well as plain.[185] Names occurring on products which require different production processes, scarcely represent specialized part makers.

To sum up, stamps on *terra sigillata* from Arezzo contain names of persons responsible for the production of the vessels. These persons could be free, freed, or slaves. They could work as potters themselves and/or function as small-scale workshop managers. A proper term for these persons would be *officinator*. This term occurs on brick stamps, and is on this basis defined by Aubert as follows: 'The term *officinator* indifferently applies to a small potter working alone or with a few assistants, as well as to the director of one or several factories employing scores of workers'.[186] On brick stamps slaves and freedmen of *officinatores* are encountered as *officinatores* themselves.[187] Both this fact and Aubert's definition fit in perfectly with what we know of the persons referred to by *terra sigillata* stamps from Arezzo.

2.3.4. Identity of persons

The problem discussed in this section is whether or not one and the same name occurring on different dies, especially on dies of different periods of production, referred to one and the same person. As we have seen, a patron and his freedman would have used the same *duo nomina*. It is not possible to say if two variants of the same stamp were possibly used by two different persons, either contemporarily or one after the other. Some slave names are extremely common, and we cannot exclude the possibility that a master owned two slaves of the same name, either at the same time or successively. But would they have used different stamps?

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184 Aubert (1994, 295).
185 Cf. below Section 2.5.
186 Aubert (1994, 220). Cf. also his argumentation against Helen (1975) in the question of whether or not *officinatores* could work as potters themselves (ibid. 224–5).
187 Steinby (1993, 142).

The only way to answer this question is via the function of the stamps. As we have seen above, the most likely explanation of the employment of stamps on *terra sigillata* is as an aid to the organization of production. Stamps are a means of distinguishing products one from another, and, therefore, one producer from another.

What we have to ask is at what stage of production this distinction was of importance. The master's stamps of bigger groups were definitely not applied by the master alone, but also by potters stamping on his behalf. It follows that it was not necessary to have these potters distinguished by stamps. Hence the purpose of the stamps was not to control the output of every single potter.

Here, as already mentioned above, different explanations are possible. In the light of the evidence of the organization of other kinds of pottery mass production, however, it seems to be possible to make some more specific assumptions. If the potteries were leased, and each lessee was committed to deliver a set number of vessels, it would have been in the interest of both the lessor and the lessee to be able to control the output and quality of each *officinator* separately. This could have been managed by the use of stamps, which in this case would have reflected the *locatio conductio* contract. Stamps could also have been used for the control of other activities outside the workshop. As we have seen above, the firing could have been organized independently from the throwing of the vessels. In this case, a kiln was shared by different *officinatores*. It is also possible that storage facilities were used jointly.

Considering this, it seems to be meaningful to assume that the stamps were applied at least to distinguish *officinatores* from each other in Arezzo itself. Thus they would have failed their function, if more than one person was referred to by one stamp and its variants at one time. Consequently, we have to consider contemporary stamps on vessels from Arezzo bearing the same name as referring to only one person. By contrast, it is impossible say whether or not identical stamps referred to different persons in succession. To identify finds from outside Arezzo as belonging to a certain producer there, it would be necessary to confirm the place of origin and exclude imitations by scientific methods such as chemical or mineralogical analysis of

the material.[188] This applies especially to vessels and fragments bearing versions of stamps which have not yet turned up in Arezzo.

2.4. Size and number of production-units

After having established what function the persons referred to by stamps performed, it is of great importance to settle the question of the size of groups to be reckoned with, and whether large groups made up large single production establishments, or were divided into small separate units. Just as the fact that quite a large number of potters belonged to one entrepreneur does not necessarily mean that they worked at the same time, and under their master or patron, neither does it necessarily mean that they worked in one *figlina* or in one *officina*. In either case, the above discussed model of manufactory production would become questionable. The proof of multi-unit production would not only question the idea of manufactories, but also reinforce the hypothesis of dependants as independently working *officinatores* and leasehold systems in Arezzo. These are much more likely to result in dispersed structures than concentrated ones. By contrast, if the larger groups in question had been made up of large single production units, and a high grade of subdivision of labour was applied, one could legitimately call them manufactories, according to the definition suggested by Peacock.

2.4.1. Number of contemporary members per group

A basic problem in this context is the question of how many dependants of a single master stamped at the same time with their own name, a problem which typically involves such terms as 'size and importance of firms'.[189] The highest assumed number of employees in bigger 'firms' is more than 100, while more recently the number has been estimated to be closer to 60–70.[190] We know about 110 groups with personnel and producers without personnel who were active in Arezzo.[191] In fact, just four groups include more than 30 slaves or freedmen using their own names on

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[188] On these methods and on problems occurring in their application, see below Section 2.6.

[189] Aubert (1994, 295).

[190] Gummerus (1916, 1488) reckons with more than 100 simultaneous potters in P. Cornelius' 'firm'. DeMartino (1991, 339) mentions only the total number of potters of the biggest 'firms' and the necessity of auxiliary staff. He seems to assume that the number cited as belonging to any single pottery owner represents the number he owned at a given time. Kloft (1992, 172–3) claims the production of *terra sigillata* in Arretium 'kannte bereits Betriebsgrößen, die sich der neuzeitlichen Manufaktur (60–70 Arbeiter) nähern.'

[191] Prachner (1980, 1).

stamps. One must ask whether all these persons belonged to the group in question for the whole time of its existence, or if, at a given time, the size of the actual group of persons was smaller than the group of stamps which has come down to us. To answer this question it seems to be useful to look at those groups, where the proportion of the total number of members to the number of those simultaneously stamping is known. This applies to the group of C. Annius with 36 dependants signing with their own names over a period of c. 20 years.[192] Since one L. Annius in all probability took over eleven of them at once, this can be regarded as the number of contemporaries.[193] As a result, we can reckon that only one third to one fourth of the known 36 dependants stamped at that time with their own name.

Another example is the group of L. Titius with 55 to 60 dependants working in a period of c. 30 years. Thirty-nine of these dependants appear only on rectangular stamps typical of the time from c. 10 B.C. to c. A.D. 10.[194] About eighteen dependants used rectangular as well as *in planta pedis* stamps, and about fifteen *in planta pedis* stamps only. Of course, these are maximum numbers of all members over a certain period of production, and it is possible that the numbers of contemporarily active members were even smaller. Therefore these numbers should not be used as a basis for far-reaching calculations. Nevertheless, they show clearly enough that again only a fraction - no more than one third to one fourth - of the whole number of stamping dependants were active simultaneously.

The relatively small number of contemporaries - small in comparison to the total number - has an interesting implication. It means that the period in which a dependant stamped with his own name was often - if not normally - comparatively short. The suggestion that the stamps refer to *officinatores* could offer an explanation of this phenomenon: a potter did not stamp all the time he was working as such, but only when he acted as an *officinator*. This could have been for a short period of his life, or several periods, not necessarily in succession. The rest of the time he could have worked as a 'simple' potter either in his own master's production unit, or for other

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192 Ibid. 9–13, 19.

193 Ibid. 21. Prachner knew eight of them; we have to add three new finds: APOLLO/L.ANNI, ACH(oristus?)/L.ANNI, HIL[arus]/L.AN[ni]. Information by courtesy of P. M. Kenrick.

194 Prachner (1980, 139–46) lists 53 persons. We have to add four new finds: OR.L.T. - perhaps referring to the same person as *CVArr* 2122: L.T.O - , DIOMII/D(es).L.TIT(i), PHILADII/LT ITI, L.TITI.R[?]. - perhaps referring to the same person as *CVArr* 2134: ROMA/N.L.TITI . Information by courtesy of P. M. Kenrick.

officinatores. Unfortunately, where, how long, and for whom he did so remains obscure.

2.4.2. Evidence for single-unit production

For the existence of large single production units two arguments arise. First, the existence of two interconnected basins, one of which contained more than 40,000 litres; both are thought to have belonged to Perennius.[195] Aubert maintains, following Peacock, that 'the size of the levigation tanks of the potter Perennius, which could hold some 10,000 gallons, points towards very large units of production that imply some degree of division of labour and of specialization.'[196] However, various interpretations of these tanks are possible, and there is no cogent argument to necessitate such conclusions. The purpose of this equipment is disputed. The tanks could have been levigation tanks used to clean the clay by mixing it with water, and allowing the coarser fraction to settle out. In this case the tanks would indeed be the largest known.[197] Another possibility is to look upon them as clay storage tanks, which would also support the model of large units. Peacock suggests considering the basins rather as mixing tanks, because they are very close in size and shape to those used for instance on the isle of Djerba.[198] The modern potteries on Djerba, however, were not manufactories[199] but workshops employing no more than three potters and an overall personnel of twelve persons.[200] Finally, B. Hoffmann and H. Juranek consider the tanks in question as evaporation basins.[201] To produce very fine slip for red gloss after levigation, fine mud is conducted into large basins where the water evaporates slowly. This method is still used in traditional potteries, e.g. in France.[202] In that case we can think of the smaller basin being used as a levigation tank, and the larger as an evaporation basin; both were connected, so that the levigated clay fraction could flow from the smaller into the larger basin.[203] That this method was used to

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195 Published by Pasqui (1896). Used as an argument by e.g. Comfort (1940a, 190), Kiechle (1969, 73), DeMartino (1991, 339), Peacock (1982, 121), Aubert (1994, 296).
196 Aubert (1994, 296).
197 Peacock (1982, 54).
198 Ibid.
199 Ibid. 38–40.
200 Ibid. 9.
201 Hoffmann/Juranek (1993, 32).
202 Ibid.
203 Cf. the sketch and the description by Pasqui (1896, 455–6).

produce finely washed clay as raw material for the red slip has already been proved.[204] Due to the time needed for evaporation, the output would not have been very great.

In addition, we do not know whether the tanks were used by Perennius and his dependants alone. He could have shared them with others, or have supplied other workshops situated in another place. High-quality clay powder was also an object of trade.[205] It is indeed conceivable that the finely washed clay, raw material for the surface slip, was exported to places where it was not available. To sum up, the existence of the two basins does not necessarily point towards large units of production.

Second, as Prachner assumes, the find of a not easily datable Pompeian wall painting, showing four men sitting at round tables and working, could be regarded as evidence for the existence of manufactories in Arezzo.[206] Taking the presence of several potters' wheels in one room as proved, he concludes that small, middle, and large firms were distinguished by varying numbers of potters' wheels per production-unit.[207] However, various interpretations of the wall painting are possible. A. Maiuri interpreted the picture as a *taberna vasaria*, A. Rieth as an *officina vasaria*.[208] Moreover, another interpretation should be taken into consideration. Provided a pottery workshop is shown, one could regard the four potters forming a vessel, whose shape gets more and more complete on each potter's wheel, as each depicting a different stage of the throwing process, and not four potters working simultaneously. This interpretation is also reinforced by the fact that the last potter's products are being taken away by a maid.

To sum up, there does not exist any strong or even cogent indication or evidence for large single-unit production in Arezzo.

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[204] Cf. Winter (1978, 7–11), Ettlinger *et al.* (1990, 34), with more bibliographical references.

[205] Callender (1965, 41) mentions a find of a large number of amphorae 'full of very finely washed and levigated clay' (referring to H. Dressel, 'Di un grande deposito di anfore rinvenuto nel nuovo quartiere del Castro Pretorio', *BCAR* 7 (1879), 143–96, esp. 193).

[206] Prachner (1980, 191).

[207] Ibid. 245.

[208] Maiuri (1953/54, 90–1, tab. 31.2) explicitly excludes the possibility of regarding the picture as depicting an *officina vasaria*; by contrast, Rieth (1965, 155) interprets the picture as a pottery employing four stick-driven potters' wheels. However, the construction of the more than 40 centimetres high feet of the depicted round tables looks quite unstable, so that it is doubtful if they could bear a potter's wheel heavy enough to function as a stick-driven fly-wheel.

2.4.3. Evidence for multiple-unit production

It is, however, not very probable that e.g. C. Annius and his dependants ran eleven single potteries, or more. That is why we must assume some concentration and cooperation of producers. We can expect this also from the fact that pottery yards producing bricks or amphorae could be run by more than one *officinator*, and that such yards could form production complexes consisting of several *officinae*.[209]

Archaeological evidence also reinforces this hypothesis. First, finds made in Arezzo show clearly that stamps referring to members of the larger groups were not scattered all over the area in question, but concentrated in a few places. This applies not only to single groups; at some places members of more than one group was active, sometimes of three or even four.[210] Second, a graffito on which the names of four dependants of C. Annius are noted in the genitive case shows that we can expect a certain degree of cooperation.[211] Finally, V. Funghini describes a *terra sigillata* kiln belonging to installations in Cincelli near Arezzo – close to which vessels of P. Cornelius and his dependants were found – whose firing chamber measured 2.84 metres square, which makes a surface area of 8.06 square metres.[212] For comparison, a small kiln's round firing chamber reported by G. F. Gamurrini from Arezzo as Augustan measured 1.20 metres in diameter, which makes a surface area of 1.13 square metres;[213] this was perhaps the size of kiln typical for a single potter. It is very difficult to say how many potters would have made the use of the bigger kiln effective, because we do not know the height of these kilns to compare their capacity, and additional important facts, such as the possible frequency of firing, remain unknown. Nevertheless, the size of the large kiln also points towards a certain degree of cooperation.

The model of multiple-unit production gets backing from the finds of sherds with stamps in and around Arezzo. One or mostly several names of alleged 'firms' are

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209 Cf. above Section 1.3.

210 Cf. n. 166.

211 *CIL* XI 6702; Oxé (1925, 51). Some very fragmentary graffiti from Arezzo are preserved. The best example is this vessel stamped by Rufus C. Anni, in which the names Archilaus, Epapra, Onesimus, and Ampio are engraved. With the exception of Ampio all these persons are known from stamps as slaves of C. Annius. Unfortunately, the graffiti from Arezzo are fragmentary, so that the kind of cooperation remains obscure.

212 Funghini (1893, 18).

213 Gamurrini (1887).

assigned to each findspot shown on the map in the *CIL* (Fig. 1).[214] However, these places are not proved locations of the 'firms', as e.g. Prachner assumes.[215] In the introductory text, M. Ihm uses phrases such as 'artem exercuisse videntur' or 'sedem habuisse videtur.'[216] The reason for Ihm's cautious formulations has its roots in the fact that stamped sherds of most groups were not found just in one place, and this applies especially to large ones. Furthermore the question arises of what can be regarded as a reliable indication of a production site. Since unambiguous evidence such as pottery equipment, kilns, clay-processing basins, moulds used for the production of decorated vessels, or waste pits are extremely rare or not reported, a relatively high density of sherds belonging to a group in a small area is usually regarded as an indication of a production site.[217] Thus it seems to be worth investigating if there are any other concentrations of sherd finds from the four largest groups discussed above. In addition, the proposal above that all persons referred to by stamps – masters as well as dependants – acted equally as independently working *officinatores* can also be tested against this kind of evidence. If more than one possible production site for each of the firms in question can be located, not all of them should show a considerable concentration of masters' stamps indicating his activity as an *officinator*. This would be against the assumption of economic independence of dependants. Although it may well be that in the end the lack of unambiguous sources will prevent a decisive conclusion, one should none the less try to find at least some helpful hints.

The group of P. Cornelius is the largest one; 69 slaves and freedmen belonging to it used their own names on stamps over a period of c. 20 years.[218] For this group, two main provenances are noted on the map, the village of Cincelli and a place near the bridge known as ponte a Buriano.[219] Fragments of moulds were discovered at Cincelli,

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214 *CIL* XI 2.1, p.1082. See p. 43 with n. 166 here.
215 Prachner (1980, 191).
216 *CIL* XI 2.1, p.1082.
217 Cf. Ihm (1898). Unfortunately neither the Italian excavators, nor the *Corpus Vasorum Arretinorum* by Oxé/Comfort (1968), nor the *Revisione critica delle pubblicazioni sulla ceramica arretina* by Stenico (1960b), give any usable information on the state of the sherds bearing stamps. Therefore, it is virtually impossible to say if they were in a good state, or production waste.
218 Prachner (1980, 59–68). We have to add four new finds to Prachner's list of 65 names, namely FELIX/P.CORNELI, OLVM(pus)/P.COR(neli), P.CORN(eli)/PILADI, and P.CORNE/PRIMIG(geni?); all in rectangular frames; (information by courtesy of P. M. Kenrick).
219 Cf. Fig. 1, locations 11 and 12.

so we can be quite sure that this was a production site.[220] A second site seems to have been located at ponte a Buriano, where a kiln was seen by Gamurrini.[221]

For Cincelli, we find 24 names of dependants, for ponte a Buriano 20.[222] Eighteen potters from Cincelli do not appear at the site near ponte a Buriano,[223] fifteen from there are not found in Cincelli.[224] Only five potters' names occur in both places, but with different stamps.[225] In other words, nearly all potters were confined to one place or the other, and not one stamp is found in both places.[226] It follows that the finds near ponte a Buriano strongly suggest the existence of a second production site.

The fact that the stamps of ten dependants of P. Cornelius appear only in the city of Rome and that the master's stamp with the *nomen gentile* only is very rare in Arezzo, but not in Rome, was interpreted by Prachner as an indication that P. Cornelius possibly ran a branch near Rome.[227] Indeed, this suggests that none of these ten potters worked at one of the two known locations in Arezzo, and we can assume the existence of at least a third place of production. The same applies to eleven other potters who are not represented in Arezzo, but elsewhere. We have, therefore, to reckon with at least three different sites where members of P. Cornelius' group worked.

A large number of master's stamps with the *duo nomina* of P. Cornelius were found in Cincelli,[228] whereas at ponte a Buriano only two of them appeared,[229] plus

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220 *CIL* XI 6700 204, 209, 220, 244.

221 Gamurrini (1893).

222 *CIL* XI 6700 205–59.

223 *CIL* XI 6700 205, 208a, 209a+c, 213a–c, 215, 216a–c, 220a–d, 221a+b, 227, 234, 235a, 237, 238, 242, 244b–d, 245b, 247a–c, 249a+b, 56, 59b (these data are collected in the table *CIL* XI 6700 204).

224 *CIL* XI 6700 207a+b, 210a+b, 212, 214, 217, 218a+b, 219, 222, 223a+b, 226a, 229, 230, 232, 233, 239, 248a+b, 252–4 (these data are collected in the table *CIL* XI 6700 204). The conclusion already drawn there by Ihm was: 'Itaque dubium non est, quin his fere locis, prope Cincelli et pontem vicinum *a Buriano*, officinae P. Corneli fuerint' (my underlining).

225 *CIL* XI 6700 204, 228, 231, 240, 243.

226 Even if this were the case, it would not be against the existence of different sites, for P. Cornelius could have moved some of his dependants from site to site.

227 Prachner (1980, 66).

228 *CIL* XI 6700 204i–z, aa–dd.

229 Three finds are reported (*CIL* XI 6700 204f–h), but the reading of 204f as a stamp of P. Cornelius is in my opinion very questionable. Cf. also the report of Gamurrini (1893, 41).

three stamps near the church of S. Maria in Gradi.[230] We can, therefore, consider Cincelli as the place where Cornelius himself ran his own workshop.

It is questionable whether the master's stamps with the *nomen gentile* Cornelius alone refer to P. Cornelius. All of them are *in planta pedis*, and only three were found in Arezzo, but in contexts which point towards consumption and not production. Two were found in a grave, and one on a complete vessel.[231] Prachner suggests considering them as belonging to P. Cornelius, because the two other known producers with the same *nomen gentile*, L. and M. Cornelius, are neither encountered in Arezzo nor on *in planta pedis* stamps.[232] Two explanations are feasible. First, that the Cornelius mentioned on the *in planta pedis* stamps is not identical with P. Cornelius, and did not produce in Arezzo, but elsewhere. Second, the persons referred to are identical. In that case we must assume that P. Cornelius moved to a place outside Arezzo soon after A.D. 9, shortly after the appearance of the first *in planta pedis* stamps. At that time, his dependants had already finished their independent production, for we do not have stamps *in planta pedis* from them. Possibly he wanted to be closer to the place where the greater part of his products in this period could be sold: the city of Rome.

The group of Rasinius consists of c. 64 persons, who signed over a period of c. 25–30 years.[233] For this group, we can find two main locations. At one of them, near S. Maria in Gradi, many fragments of moulds were found.[234] However, if we take a look at the finds published in the *CIL*, we can count at least 20 stamped sherds unearthed near the via Guido Monaco, quite a distance from S. Maria in Gradi.[235] In fact, there were many more than 20, as for some specimens *multa exempla* is noted. Not one of the thirteen dependants, whose names appear on these sherds, is encountered at the site near S. Maria in Gradi.[236] This argues for the existence of a further production place. Moreover, in the alleged production place of Rasinius not

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230 *CIL* XI 6700 204a–c. Cf. Fig. 1, location 5.
231 *CIL* XI 6700 259a, b.
232 Prachner (1980, 64).
233 Ibid. 107–14. We have to add four new finds to Prachner's list of 60 names, namely AMAN(dus)/L.RASIN(i), ARISTO/RASINI, RASINI/ATTIS(?), IVRATV(s)/RASIN(i); (information by courtesy of P. M. Kenrick).
234 *CIL* XI 2.1, p.1082.
235 *CIL* XI 6700 520–2. Cf. Fig. 1.
236 *CIL* XI 6700 521, 523–5, 527, 534, 537, 540, 541, 543, 547–9.

one stamp of the master was found.[237] Where he himself was active remains obscure; the four sherds with his stamp found in the via Guido Monaco are not enough evidence to prove that he worked there.[238] More than 20 finds of this kind were scattered all over the town.[239] Regarding manufacture outside Arezzo, we know that a Rasinius produced in Lyon, where a few stamps with the *nomen gentile* alone were found at a production site.[240] Perhaps a Rasinius was also active at Puteoli.[241]

For the group of C. Annius, one site is marked on the map. It is a large area lying between the church of S. Francesco and the via Guido Monaco.[242] Further stamped sherds of members of this group were unearthed in Cincelli and near S. Maria in Gradi, both far from the principal location.[243] Stamps referring to C. Annius alone were found at neither of the two latter locations. This evidence, however, is not sufficient to locate the actual site, nor do the scattered finds indicate that there was only one establishment.

Finally, for the group of L. Titius and his dependants at least two separate locations with a concentration of stamp finds can be identified. However, as Ihm had already pointed out when he was preparing the finds from Arezzo for publication in the *CIL*, the finds are not sufficient to claim one particular site to be the production place.[244]

Considering this evidence, we can assume that the members of these larger groups were most likely not active at one central place, but on various discrete production sites. This shows clearly that the assumption of large single-unit

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237 The discovery of fragments of forms with the master's name (*CIL* XI 6700 520b; cf. also Stenico 1960a, nos. 1, 25, 101, 114, 126, 151, 188, 213) does not count, since such fragments of moulds or moulded ware normally show only a part of a full name form of a dependant (cf. Section 2.2.2. and the commentary on such finds in *CVArr* 1486).

238 *CIL* XI 6700 520i–m. Cf. Fig. 1 for the location.

239 Cf. *CIL* XI 6700 520.

240 Lasfargues/Vertet (1976).

241 Comfort (1973).

242 Cf. Fig. 1, location 1.

243 *CIL* XI 6700 31–61. Cf. Fig. 1, locations 11 and 5.

244 Ihm (1898, 118). One site is noted on the map as the principal place, but with a query. Apart from sherd finds in this area, mentioned on the map as situated *inter viam Guido Monaco et viam Tolleta* (cf. Fig. 1, location 3), stamped sherds were unearthed near a place called Fonte Pozzolo, a long way from the principal provenance, with only three of them being master's stamps (*CIL* XI 6700 696a^{1}, f + h. Cf. Fig. 1, location 6). Moreover, some sherds were also found near S. Maria in Gradi and *ad fluvium Castro*, only one of them with a master's stamp (*CIL* XI 6700 696a^{2}. Cf. Fig. 1, location 5 (S. Maria in Gradi)).

production units is not backed by the evidence available. In addition, the hypothesis that stamps equally refer to independently working *officinatores* has been strengthened.

2.5. Degree of subdivision of work and specialization in the products

Most scholars take it for granted that the degree of subdivision of work in the larger *terra sigillata* 'firms' was higher than in the smaller ones.[245] This view is usually substantiated with quite general arguments regarding the optimization of the operational organization aiming at maximized productivity.

The claims of minute subdivision of work are sometimes made under the premise that the alleged large number of workers led automatically to a rise in the division of work.[246] Another argument – mostly combined with the previous one – is based on the complexity of the production process required for the manufacture of moulded *terra sigillata* vessels. It concludes that the number of stages in this process equalled the number of different workers or teams required to carry it out.[247] All these assumptions rest on the premise that the products, especially moulded ware, were in such demand that a pottery's operator would have been interested in maximum productivity, and therefore in the optimization of the operational organization. This premise is often combined with the consideration that a presumably expensive slave potter, who had been trained in mould making, was an investment that must have paid for itself. This alleged fact is claimed to have caused an interest in optimizing the operational organization around this specialist.[248]

Various objections can be raised against these hypotheses. First, as we have seen, the size of the workforce has usually been overestimated. Moreover, it is questionable whether a large workforce necessarily equals minute subdivision of labour. Second,

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[245] Gummerus (1916, 1485), Oxé (1933, 8), Rostovtzeff (1956, 36), Kiechle (1969, 70), Prachner (1980, 194), Peacock (1982, 122), Aubert (1994, 296).

[246] Prachner (1980, 192), Peacock (1982, 122), Aubert (1994, 296).

[247] Kiechle (1969, 70). While Oxé (1933, 8) assumed that the manufacturing of moulded *terra sigillata* was done by at least three hands, namely of the punch maker, the mould producer, and the moulded-vessel potter, Prachner (1980, 194 n. 30) tries to show that e.g. the vessels' bases could have been added by a fourth hand.

[248] E.g. Aubert (1994, 204): 'It would have been economically senseless to waste the talent and expertise of a specialized mould designer by employing him in other unrelated activities.' Von Klaveren (1964, 145) wrote: 'Meistens hat in diesen Fällen einer der Produktionsfaktoren eine so große Eigenkapazität, daß ihm die anderen Faktoren kleinerer Eigenkapazität mehrfach zugeordnet werden müssen, um das kleinste gemeinsame Vielfache der individuellen Kapazitäten zu erreichen und so Leerlaufkosten zu vermeiden. Bei voller Auslastung wird dann die Manufaktur die Minimalkosten-Kombination für diese Erzeugungsmenge darstellen. Zuweilen ist der größte Faktor eine spezialisierte, wertvolle Arbeitskraft wie z. B. der antike Sklave, der die Keramikmuster entwarf.'

the vast part of the production was plain ware, which does not need complicated processing. The main part of the production did therefore not require an organization different from ordinary pottery workshops, apart from the making of the red slip, which, however, did not necessarily call for costly installations or time-consuming work.[249]

The idea of entire large manufactories organized around a few mould making specialists is incorrect from the outset. Members of just fourteen groups were producing moulded *terra sigillata*.[250] Three hundred and eighty-six persons belonged to these groups, and only 65 of them are referred to on mould stamps on relief-decotated vessels.[251] Twenty-nine of them are not only to be found on mould stamps, but also on plain ware.[252] The manufacture of decorated vessels did not necessarily lead to any extensive subdivision of labour, since the engagement even of 'specialists' in various parts of the production process, and in the manufacture of various products, was evidently usual. In addition, it follows that mould makers were often not fully occupied by producing moulds and relief-decorated vessels.

The relatively subordinate position of the manufacture of moulded ware could have had internal or external reasons. It is likely that this part of the production represented the most profitable one. The transport costs were the same as for plain ware, while the retail price must have been considerably higher. That makes moulded ware most suitable for long-distance export, so that we can assume that each producer must have been interested in raising the output of this kind of product. However, the finds show that decorated *terra sigillata* was evidently sold only in limited amounts. A higher output was possibly not marketable. Perhaps the reason lies in the process of the production of moulded ware: since the vessels had to dry in the mould before they could be removed, a potter could not make more vessels than the number of moulds available.

The possibility that punches and/or moulds were produced by external specialists is scarcely probable, for the moulds are stamped with names of persons who also made plain ware and/or were members of Arretine potters' groups. Mould makers

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249 Winter (1978, 7–11).
250 Prachner (1980, 221).
251 Ibid. 223.
252 *CVArr* 83k, 83r, 155, 157–60, 164, 166/167, 168, 170, 172, 176/177, 180/181, 500, 532, 1280, 1498, 1521, 1534, 1988, 2061, 2082/2084, 2086 plus one new find (all data according to the tables in Prachner 1980).

belonging to the same group often used the same motif punches (or specimens with identical dies).[253] For Arezzo, evidence for exchange of punches between the groups is missing so far. However, this might be a gap in our knowledge, for the study of Arretine decorative motifs is still in its infancy. A catalogue of these punches is currently being prepared by F. P. Porten (Römisch-Germanisches Zentralmuseum).[254] At Pisa, where Arretine producers and their dependants worked, identical motifs were used by potters of different groups.[255]

In Gaulish production centres, exchange of moulds was typical. Exchange of moulds can be ascertained only on the basis of vessels bearing mould *and* producers' stamps. The latter, however, are rare on Arretine moulded ware, so that exchange of moulds could not be established for Arezzo yet.

Both the exchange of motif punches and of moulds are likely to be due to technological and organizational requirements. For the making of varied moulds a variety of motif punches was necessary. When potters planned to make new moulds they could augment their own stock of motif punches temporarily by borrowing from others. In exchange for this they would lend some of their punches. The same pattern is likely to apply to moulds, for a potter could make no more moulded vessels at once than he had moulds. It is conceivable that potters did not make moulded bowls every day. So they could lend their own moulds to others and borrow from them. The systematic study of the decoration of moulded ware will perhaps lead to new insights into the organization of production at Arezzo.

Specialization in one type of plain ware was extremely rare in Arretine production, if it occured at all. Evidence suggesting specialization in only one type of vessel is available for only two potters from Arezzo, namely Firmus Corneli and Priamus A. Sesti; yet the evidence is such that one may only cautiously posit this specialization.[256]

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253 Dragendorff/Watzinger (1948, 168). Mees (1997, 668–71) suggests that the jointly used punches belonged to the lessors, according to his interpretation the persons referred to by masters' stamps. This interpretation is discussed and questioned below in this thesis (Section 3.4.4).

254 Porten (1996).

255 Pucci (1981, 115).

256 Firmus Corneli (*CVArr* 502, ten finds of cups), Priamus A. Sesti (*CVArr* 1815, thirteen finds of platters). Information by courtesy of P. M. Kenrick.

Three potters were perhaps makers of primarily one type of vessel. Especially interesting is here the case of M. Perennius Sat(urninus?) of whom we have 53 finds of stamped vessels. Forty-nine out of these are cups, only two plates, and two chalices.[257] This shows that even potters for whom large numbers of only one type of vessel are attested might turn out to have produced other types as well. Finally, there are Philomusus Saufei of whom fourteen plates and platters have been found as well as two cups, and L. Titi Suavis with ten finds of cups and one plate.[258]

Generally, specialization in the products was rare in Italian *terra sigillata* production. Out of 1,029 Italian potters (including the Po Valley and the Italian potters working at Lyon) with at least four finds with details of the vessel's shape, 173 are attested on only one type of vessel (16.8 per cent).[259] Out of 472 potters with at least ten finds, 58 are attested on only one type of vessel (12.3 per cent); and out of 229 potters with at least twenty finds, seventeen are attested on only one type of vessel (7.4 per cent). These calculations show that the higher the number of finds with information on the vessels' shape, the smaller the number of potentially specialized potters.

Despite thousands of finds, our knowledge of the potters' production is still very limited. During the revision of the *Corpus Vasorum Arretinorum*, almost 400 new potters were added.[260] In the case of 1,229 potters, just three or fewer finds with information on the vessels' shape are recorded. Among the stamps found in large quantitities in waste pits at Arezzo, many are still totally unknown elsewhere, while the finds at the sites of consumption give only a limited impression of the actual activities.[261] All this combines to suggest that our idea of specialization amongst potters is in fact due to a gap in our knowledge of their range of production.

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257 *CVArr* 1284. Information by courtesy of P. M. Kenrick.

258 Philomusus Saufei: *CVArr* 1700. L. Titi Suavis (*CVArr* 2137 and 2138). Information by courtesy of P. M. Kenrick.

259 Information by courtesy of P. M. Kenrick.

260 The original *Corpus Vasorum Arretinorum* (Oxé/Comfort 1968, representing the state of research of 1943) lists c. 2,200 potters (the approximate number is due to the fact that many entry numbers are not used whereas others are used for more than one potter). The number of entries in the new edition is 2,584. Information by courtesy of P. M. Kenrick.

261 Kenrick (1997, 183–4).

To sum up, the evidence available in any case argues against the wide-spread conjecture of a production structure mainly based on division of labour, aiming at optimum productivity of moulded-ware manufacture.

As we have seen, specialization in the products makes up one part of the definition of the term 'manufactory'. *Terra sigillata* included many different kinds of pottery of widely varying sizes, shapes, surface qualities, and production techniques. Specialization in the products, therefore, cannot be regarded as unusually high. At least it is not a basis for classifying the potteries in question as manufactories. By contrast, most smaller workshops, which were in no way manufactories, did not produce decorated ware, so that their 'specialization' was higher than in the alleged manufactories. In addition, we cannot exclude that *terra sigillata* potters also made unstamped pottery, such as coarse ware.[262]

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[262] Cf. the example of Torrita di Siena, p.35.

2.6. 'Branch workshops' and organization of production

In several cases persons known from stamped signatures on *terra sigillata* from Arezzo were also involved in *terra sigillata* manufacture elsewhere. Usually this is dealt with under such headings as 'branch workshops' or 'subsidiary factories'. Such distant and separate production sites can be determined either by finds of stamped material in a context related to manufacture, such as kiln sites or dumps, or the discovery of marked tools or moulds; by comparison of the mineral or chemical composition of the finds in question with finds of known origin (reference groups); or by inference from differing distribution patterns of products made by members of one and the same group.

Two main methods have been applied in revealing the provenance of the raw material of ceramics, which in antiquity is normally identical with the area of manufacture: first, mineralogical-petrological analysis, i.e. visual examination of the texture of the material under a microscope, revealing the sample's mineral composition; second, chemical analysis, either by X-ray fluorescence (XRF), or by neutron activation analysis (NAA), i.e. the measure of the share of up to fifty elements in the material.[263]

Chemical analysis is the most reliable method, with NAA giving more precise results than XRF.[264] The application of these methods to stamped *terra sigillata* fragments of unknown or debatable origin is followed by the comparison of their composition with that of reference groups.

The most prominent instances of the application of such methods are the groups of Cn. Ateius and C. Sentius. Products bearing master's and dependants' stamps of the Ateius group have been assigned to Pisa[265], Lyon[266] and La Graufesenque[267]. Vessels from Ateius' workshop at Arezzo, of which a refuse dump was found,[268] were distributed mainly in Italy. Products from Pisa were exported overseas, whereas the Gaulish vessels can be found mostly in the Rhine area.[269] It has thus been suggested

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263 On scientific provenancing of pottery in general Schneider/Hoffmann (1990).
264 Peña (1993), Schneider (1993).
265 Taponeco Marchini (1974). The workshop was located outside the actual town, cf. *Atlante dei siti archeologici della Toscana*, Biblioteca di studi e materiali 1 (Firenze 1992), Tav. 104.
266 Picon *et al.* (1972/73), Wiedemann *et al.* (1975).
267 Hoffmann/Picon (1990/91).
268 Maetzke (1959).
269 Aubert (1994, 282).

that Ateius established these workshops to conquer new markets.[270] The existence of additional workshops in Italy as well as in the provinces has been assumed on the basis of the unequal distribution of products of members of the Ateius group.[271]

The appearance of stamps with names of dependants of an Ateius and/or his name alone in connection with distant production does not necessarily mean that the Arretine master named Cn. Ateius himself was involved in any way. Freedmen bore the *praenomen* and *nomen gentile* of their former masters. As we have seen, the use of stamps can be explained best in the context of actual production, i. e. on a local level. If production sites were distant from each other, distinction of freedmen and their patrons by different stamps would no longer have been necessary. Freedmen therefore could have used their *nomen gentile* alone, if they so wished and confusion could be excluded, with the result that their stamps are not distinguishable from those of their former masters. For the same reason, namely identity of *praenomen* and *nomen gentile* of master and freedmen, the slaves encountered in the context of distant production could have belonged to freedmen active far from their patron's site, and not to the patron himself.

Master's stamps of C. Sentius (or 'Sentius' only) were found on *terra sigillata* made in Arezzo, Lyon, the Po Valley, and Asia minor.[272] Again it is likely that behind these stamps was not always the same Sentius, but rather his freedmen. Six dependants of C. Sentius are known.[273] Two of them are represented so far only in Gaul and Germany, which might indicate provincial production.[274] A M. Sentius is known from vessels made in the Po Valley.[275]

These two groups are the most impressive examples, but they are not the only ones.[276]

To sum up, the use of methods such as scientific provenancing has led to the discovery that several *terra sigillata* producers with connections to Arretine potters' groups also worked at places other than Arezzo. This is much easier to explain if the

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270 Picon *et al.* (1972/73).
271 Ettlinger (1962), Prachner (1980, 32–5).
272 Zabehlicky-Scheffenegger (1991, 1995a, 1995b).
273 Prachner (1980, 121).
274 Ibid. 122.
275 The same is true of other Arretine producers (Zabehlicky-Scheffenegger 1991, 98).
276 For more examples, see Zabehlicky-Scheffenegger (1995a, 219–21) with references.

persons named on stamps were *officinatores*, and, therefore, very mobile. It is hard to imagine that each person we encounter in the context of distant production established a new workshop. We know from the shop of C. Umbricius Cordus in Torrita di Siena that *terra sigillata* production could be combined with the manufacture of bricks, tiles, coarse ware, and even amphorae,[277] products typical of a rural pottery workshop.[278] Indeed, near the kilns a *villa* was located.[279] As we have seen, the workshops of Arezzo were most likely located on sub-urban estates. It seems reasonable, therefore, to infer that the manufacture of *terra sigillata* in Italy took place in a rural context, possibly as part of pottery production supplying larger estates. The following chapters will show that the same applies to provincial production. Landowners were likely to have been interested in the extension of the range of their pottery output by the introduction of a new product very suitable for sale, especially when a geographically advantageous situation made transport easy, e.g. the nearby water transport facilities in the case of Torrita di Siena.[280]

The best way to take part in the *terra sigillata* business would have been to engage specialists who had already gained some experience elsewhere, e.g. in Arezzo, to establish and to undertake production while using existing pottery facilities. This is likely to have been arranged on the landowner's initiative. However, the economic interests of landowner and craftsman coincide, and the establishment of *terra sigallata* manufacture on the initiative of the landowner is only one possible scenario. The common opinion has been so far that the actual producers themselves established 'branch workshops' to make export easier. To qualify this opinion, it is necessary to point out that it is at least equally likely that a landowner took the initiative to establish the manufacture of *terra sigillata* on his estate, rather than a socially inferior craftsman, or even his freedmen or slaves.

Since we do often not know whether the activities of members of a certain group at various sites very remote from each other took place at the same time or successively, it is possible that the evidence which has come down to us is not the outcome of the establishment of additional workshops, but the result of migration of

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277 Pucci (1990, 19).
278 On the production of clay artefacts in the context of the so-called *villa* economy in general, cf. Peacock (1982, 129–35).
279 Pucci (1990, 19).
280 Ibid. 23.

dependent *officinatores* belonging to the group in question, or even of the master with dependants.

It is well known that in the second century A.D. *terra sigillata* producers moved around in the east-Gaulish trans-Rhenish zone, migrating from one production place to another.[281] The possibility of similar migration should also be taken into consideration for Italian *terra sigillata* production. This suggestion gains support from a recent study arguing that Cn. Ateius finished his activity in Arezzo before he moved to Pisa.[282] Clearly, the workshop at Pisa was not a subsidiary of the Arretine one, but its successor.

We should now revise the use of such terms as 'establishment of branch workshops', 'expansion of major firms' or 'major firms' with 'branch workshops',[283] since behind these terms lies the idea of the organization of the production and trade which is the least probable one.

The very term 'firm' conveys the idea of a business enterprise with some kind of central book-keeping, whose members are first and foremost connected by business links. In the case of the so-called firms consisting of presumed main and branch workshops, we do not know if there were any economical and business links at all between them, let alone some kind of central book-keeping.

It is reasonable to assume that business links were much closer between a freedman of an Arretine *officinator* who worked at a distant site, and the owner of the land, the clay, the fuel, and most probably of some of the pottery facilities, than those were between the freed *officinator* and his patron. Even if economic links, which were determined mainly by the social relationship between freedman and patron, had indeed existed, I would still be reluctant to call this a business partnership which could constitute a firm.

For quite a number of reasons the actual structure of distant production is likely to elude us. Since the evidence from other fields of pottery production strongly suggests that we have to reckon with *officinatores* who worked as foremen in shops

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281 A summary of this is given by Peacock (1982, 118–19).
282 Kenrick (1997, 186).
283 Cf. e.g. recently Aubert (1994, 277–84).

belonging to their respective landowners, the probability is slight that the workshops in question meet the idea envisaged by a term such as 'branch workshop'.

As long as we have no clearer evidence for economic links between distant sites of production, we are confined to the construction of models which are more or less likely to match reality. Therefore our terminology should be an open one, describing the reality of finds with minimum interpretation. Where possible we can adopt ancient terms by way of comparison with other fields of pottery production about which we are better informed. The general application of modern terms and their underlying ideas without sufficient backing from the sources is much more likely to obscure our view than to open fruitful perspectives.

2.7. Summary and conclusions

I have attempted to show that stamps on *terra sigillata* from Arezzo contain names of single persons responsible for the production of the vessels. These persons could be free, freedmen, or slaves. They could work as potters themselves, or function as workshop managers. The proper term for their function is *officinator*.

It follows that the use of the term 'firm' for groups of stamps bearing the name of a free slave-master or patron plus stamps with names of his dependants should be abandoned. Dependants could have worked as *officinatores* separate from their master's or patron's own production activity. The distribution of finds around Arezzo itself suggests that this was the case in Arretine *terra sigillata* production. Therefore, the traditional interpretation of dependants as potters working under their masters, to whom the potteries belonged should not be maintained.

As in other areas of pottery mass production, we must expect in the *terra sigillata* manufacture near Arezzo the use of complex *locatio conductio* contracts. It is most probable that the *officinatores* did not own all requisite means of production, and all raw materials themselves, but were forced into cooperation with both the lessor and each other. The landowner as owner of the raw materials, especially of the clay pits and the fuel, was in a strong position. He was also the one who could find the means for setting up the necessary production installations, which could then be run by a few *officinatores* – as was usual in the manufacture of amphorae, and bricks and tiles.

The locations of production sites outside the ancient town boundaries of Arezzo suggest that the Arretine *terra sigillata* industry was sub-urban. As the discovery of

other production sites in Etruria shows, *terra sigillata* manufacture could also take place in a truly rural context. It is, therefore, more appropriate to consider the production of *terra sigillata* as sub-urban and rural.

The model of multiple-unit production is backed by more evidence than the single-unit model. The usual arguments for the idea of manufactory production such as the large number of employees in larger 'firms'; the existence of large clay-processing installations; minute subdivision of labour; or specialization in the products are not cogent at all. They can either be proved questionable, or explained by other facts. Since the term 'manufactory' has a certain meaning in pottery research, especially since Peacock's contribution, it should no longer be used in connection with *terra sigillata* production in Arezzo.

The archaeological evidence suggests that the Arretine *terra sigillata* industry fits nicely into the picture drawn of the production of amphorae, bricks and tiles, and Gaulish *terra sigillata*. It should be seen, therefore, as another example of the commonness of nucleated workshop industry as the organizational frame of pottery mass production in Roman antiquity.

3. Production centres in Gaul and Germany

3.1. Lyon

3.1.1. Development and relationship to Arezzo

In c. 10 B.C., a medium-sized *terra sigillata* production centre was established on the banks of the river Saône, in the area of the modern district of Lyon La Muette. It reached its full capacity very soon if not immediately after its foundation.[284] The site was ideally situated for export because of its vicinity to the river Rhône, the main traffic artery of Roman Gaul. The area of distribution was therefore northbound, comprising the three Gauls with the area of the later German provinces, northern Raetia, and southern Britain.[285] About fifty potters worked at La Muette. A number of them came directly from Italy, among them members of Arretine potters' groups.[286] In addition, tools such as moulds were transferred from Arezzo to Lyon.[287] The quality of Lyon *terra sigillata* is comparable with Arretine ware.[288] The Gaulish activities of Arretine potters have been looked upon as 'branch workshops' of Arretine 'manufactories', but as we have seen above, they are better explained in terms of migrating potters.[289]

3.1.2. Relationship to other Gaulish production centres

Products of Lyon clearly influenced the style of Gaulish *terra sigillata*.[290] Soon after the closure of the Lyon workshops in c. A.D. 10,[291] La Graufesenque, the most important south-Gaulish pottery production centre, started making real *terra sigillata* instead of so-called proto-*sigillata*.[292] It is likely, therefore, that the technical experience needed for this transition was imported from Lyon.[293]

On the other hand, there is no definite proof that potters moved from Lyon to La Graufesenque. Only very few homonymies might be interpreted in terms of

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284 von Schnurbein (1982, 124).
285 Ettlinger *et al.* (1990, 20).
286 Lasfargues/Vertet (1976).
287 Picon/Lasfargues (1974).
288 Ettlinger *et al.* (1990, 19).
289 Cf. above Section 2.6.
290 Cf. below p. 147.
291 von Schnurbein (1982, 121–6), Ettlinger *et al.* (1990, 18).
292 Cf. below p.76.
293 On the technical experience necessary for making *terra sigillata*, cf. below Section 3.3.5.

migrating potters.[294] However, such evidence is treacherous.[295] Therefore the conclusion has been drawn that Lyon should not be understood as a real predecessor of the large Gaulish production centres.[296]

Yet this seems to be playing down the case. Although it cannot be substantiated, it is very likely that some potters moved or were moved to La Graufesenque. The presence of at least one member of the Arretine group of Ateius at La Graufesenque is proved beyond doubt (chemical analysis of products), although it must be left open if this person came from Lyon or directly from Italy.[297] In any case, the activities of members of Ateius' *familia* at Lyon[298] are very likely to have been the basis of this move. Just one Lyon or Arretine potter would have been enough to introduce the original *terra sigillata* technology to La Graufesenque. Therefore the role of Lyon should not be underestimated.

3.1.3. Potters and landowners

No prior production of ceramics is attested at Lyon La Muette. However, a large building had occupied the site, and this was destroyed prior to the construction of the potters' workshops.[299] This shows that the plot was by no means part of unoccupied common land, but sited on an estate and previously used for other purposes. The installation of the potters' workshops was thus preceded by the decision of the landowner either to re-use the plot by establishing a *terra sigillata* production, or to sell or lease it to somebody who wished to do so.

It is most unlikely that it was the potters themselves who bought the plot and built the workshops. Early in the second decade A.D., the potters suddenly ceased working. Indeed, the making of plain ware, the main product, was halted even earlier.[300] Thus the period of full productivity spans less than two decades. Potters buying land and building their workshops at such an appropriate place for export production would presumably not have given up the investment of a lifetime so quickly.

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[294] E.g. Ateius, Fronto.
[295] Cf. the discussion below p. 147.
[296] von Schnurbein (1982, 126).
[297] Hoffmann/Picon (1990/91).
[298] Picon *et al.* (1972/73), Wiedemann *et al.* (1975).
[299] Vertet (1991, 186).
[300] von Schnurbein (1982, 121–6), Ettlinger *et al.* (1990, 18).

This puts an important question on the agenda, namely who initiated the establishment of a new production centre, or indeed the migration of potters from one centre to another? Perhaps the centres of trade, the cities, played a decisive role. Trade-routes crossed here, facilitating the formation of associations between traders and wholesalers.[301] Moreover, wealthy landowners often had a place in town as well as a *villa* on their estates.[302] In the case of Lugdunum, members of the provincial administration responsible for military supplies also were present. All this must have favoured the exchange of information on consumer taste and demand, military supply requirements, transport capacities, landowners with estates appropriate for pottery production at locations favourable for transport, and persons who knew where to recruit specialist potters.

This has nothing to do with central organization. The awareness of business opportunities which was built on the availability of such information might have been enough to make landowners resolve to establish a *terra sigillata* production unit, or to make traders lease land to do so. As these ways of exchange of information were readily available, it is less likely that *terra sigillata* production centres came into being through potters roaming about in order to find a landowner who could be persuaded to enter the *sigillata* business.

3.1.4. Reasons for the closure of the centre

The reasons for the sudden halt of the *terra sigillata* production at Lyon after only about fifteen years of full activity are as obscure as the reasons for the foundation of the production centre are obvious. A few years after the output of plain ware had ceased, all production was stopped. Nothing was transferred to any other place in the Lyon area. It has been suggested, therefore, that administrative decisions caused the stop.[303] The period of *terra sigillata* production coincides with the period in which the mint at Lyon was the main supplier of coins to the Army in the north-western provinces.[304] In addition, it has been argued that the legions in Gaul and

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301 Formal *collegia* in the Augustan era and the first century A.D. are not attested for Gaul, but it is very likely that other associations of craftsmen and traders existed instead (Kneißl 1998).
302 Woolf (1998, esp. 163–8).
303 von Schnurbein (1982, 127).
304 Ibid.

Germany were the main customer of the Lyon *terra sigillata* production centre, perhaps by long-term arrangement with the *annona*.[305]

A further detail is worth examining more thouroughly. The clay used at La Muette was not extracted locally, but obtained from Saint-Germain-au-Mont-d'Or.[306] Although La Muette was ideally situated for the export of goods, it was perhaps less suitable for pottery production. This is an additional argument against the possibility that the potters chose the site themselves. It is conceivable, then, that the additional costs of bringing clay from a distance contributed to the decision to close down the site. This would also explain why the production of plain ware was stopped first, whereas the making of moulded ware continued for some years on a small scale. For this activity less clay was needed, and the rise in value must have been much higher.

3.1.5. Specialization in the products

Eight Lyon potters seem to have made only one type of vessel.[307] For three of them the evidence for specialization is quite strong, with more than 50 finds with determinable shape for each. However, these cases are exceptions, normally a potter *officinator* produced a variety of vessels.

On the other hand, even if complete specialization in one type of vessel was exceptional, some potters do seem to have been specialized to a certain degree, i.e. made primarily one type of vessel. From this two conclusions can be drawn. First, specialization in the products was an exception and cannot be seen as a characteristic. Second, although not typical, specialization in the products was possible, which means that the selling was organized in a way which encouraged some potters to specialize.

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305 Ibid.; Menchelli (1997, 193).

306 Vertet (1991, 186).

307 According to von Schnurbein (1982, 117–8), Fonteius, Fronto, and Xantus made cups only, Hilarus Atti platters only, and Clarus, Diomedes, and Acastus Rasini plates only. Von Schnurbein included not only the material from Haltern, but also from other places. An enquiry with the *CVArr* database (by courtesy of P. M. Kenrick) led to the result that for eight potters from Lyon such a specialization is likely: Hilarus Atti (*CVArr* 212, 11 finds with determinable shape of vessel), Clarus (*CVArr* 445, 26 finds), Felix (*CVArr* 682, 22 finds), Font(eianus ?) (*CVArr* 703, 53 finds), Fronto (*CVArr* 713, 50 finds), T. Manlius Fortunatus (*CVArr* 942, 96 finds), Acastus Rasini (*CVArr* 1487, 12 finds), Rusticus (*CVArr* 1619, 27 finds). Potters with fewer than 10 entries with details of the vessel's shape have been excluded.

How such a relative specialization looked may be inferred from the evidence of potters' graffiti from La Graufesenque, which will be discussed in the next chapter.[308]

As for organization of trade, this specialization means that the potters did not sell their products individually to the wholesalers in the form of services, but produced certain types on order, which were only later combined to services. This required some coordination of the work of the individual potters by the traders, be it directly or via a mediator such as the lessor. It also means that the entire organization of production and sale was designed for export production.

3.2. La Graufesenque (Millau)

3.2.1. The archaeological site of La Graufesenque

The large potters' settlement *Condatomagos* in the Roman province of Aquitania (today Millau, in the Département of Aveyron, Midi-Pyrénées) was not only the most important production centre of *terra sigillata* in first-century Gaul,[309] but also offers the most comprehensive body of evidence of production activities. It includes excavated installations, production waste, graffiti with texts concerning the organization of production, and finds of products at places of storage and consumption.

Condatomagos was situated on a plateau on both banks of the river Tarn, at the point where it meets the river Dourbie.[310] Today a part of the ancient *vicus* is buried under the modern city of Millau, while another one is in agricultural use and therefore more easily accessible for archaeological work. This area is called La Graufesenque. First archaeological excavations were carried out between 1862 and 1885. Unfortunately we have no detailed records of them; the excavators' collections have been lost or dispersed.[311] Between 1901 and 1906, after a break of almost 20 years, a number of archaeologists excavated at La Graufesenque.[312] Forty-three potters'

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[308] See below p.95.

[309] Vernhet (1979, 20).

[310] Ibid. 13.

[311] Cf. Hermet (1934, vii–viii), Balsan (1965b), Vernhet (1991a, 7), Mees (1995, 49).

[312] Hermet (1902a; 1902b; 1904; 1923; 1934), Déchelette (1903; 1904), cf. also Albenque (1947, 86), Balsan (1981), Vernhet (1979, 14), Marichal (1988, 4), Mees (1995, 47). Only the collection of F. Hermet was published, the

(continued on next page)

graffiti were among their finds. The edition of stamped vessels from La Graufesenque found elsewhere in Europe led to the establishment of typologies and chronologies of south-Gaulish *terra sigillata*.[313] Publications on the organization of production, mainly based on the evidence of the graffiti, appeared in the following decades.[314] After a break of about half a century, between 1950 and 1954, trial excavations added more product finds, mainly from waste pits, plus a number of plates with graffiti.[315] In 1965 excavations were taken up on a larger and more regular basis.[316] Not only were waste pits with tens of thousands of sherds found, but also a large number of structures unearthed, such as lodgings, workshops with production installations, two small sanctuaries, streets, and a drainage system.[317] Some of the buildings were decorated with painted interior plaster.[318] The area was so densely built-up that it has been described as 'urbain ou péri-urbain'.[319] In 1981 the excavations ceased, and only in 1988 and 1991 have rescue excavations brought new material to light.[320]

Unfortunately, of all the production structures, only details of one kiln have been published.[321] For the remainder, only brief preliminary reports are available. The kiln in question is a most impressive structure. Built of various kinds of stone (one coming from a quarry 10 kilometres away) and bricks, it has a total size of 11.30 by 6.80 metres. The firing chamber measures approximately 4 by 4 metres. From a collapsed section of the wall, it has been inferred that the original height of the kiln was approximately 7 metres. According to the evidence of potters' stamps in the adjoining waste pit, the kiln was in use between A.D. 80 and 120. In this waste pit many appurtenances were found, among them stacking aids of various forms, exhaust

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unpublished collections of D. Rey, J. Artières and A. de Carlshausen – as far as extant – are in the course of being registered (Dannell 1990/91; Mees 1995, 47 n. 212).

313 Dragendorff (1895), Déchelette (1904), Ritterling (1904; 1913), Knorr (1919), Oswald/Pryce (1920), Stanfield (1929), Oswald (1964), Hermet (1934), to list only the most important contributions.

314 Oxé (1925; 1936), Gummerus (1930).

315 Balsan (1950; 1954a; 1954b; 1959a; 1959b; 1963), Albenque/Balsan (1951), Albenque (1951), Marichal (1988).

316 Carried out from 1965 to 1976 under the direction of L. Balsan and L. Soonckindt, since 1977 of A. Vernhet, who is until now head of archaeological activities at La Graufesenque (Chargé de recherche au C.N.R.S.). Preliminary excavation reports until 1972: Balsan (1965a; 1966, 25; 1967; 1969; 1970b), Labrousse (1966; 1968; 1970; 1972).

317 Labrousse (1974; 1976; 1978; 1980), Vernhet (1981a; 1981b; 1986; 1987; 1988b; 1990; 1991a; 1991b; 1995; 1996), Lequément (1983), Sabrié/Vernhet (1986) Bémont (1987), Bémont/Vernhet/Beck (1987), Bémont/Vernhet (1989), Haalebos/Mees/Polak (1991), Pons/Pretre (1992), Dannell (1990/91).

318 Sabrié/Vernhet (1986).

319 Ibid. 125.

320 Bémont/Vernhet (1990/91; 1992/93), Vernhet (1995), Bémont (1996).

321 For all details of the kiln cited in this paragraph, see Vernhet (1981a).

tubes (*tubuli*), and floor support rings. Although only the kiln's foundations with the kiln flue and furnace still exist, the design of the kiln could be reconstructed by comparison with better preserved specimens excavated elsewhere in Gaul. The most significant parts were the *tubuli.* They were fixed in the holes of the firing chamber's floor, and then stacked on top of each other. Some of these tubes were tapered to one end, so that they could be stuck into each other. At La Graufesenque two sizes of tubes were used. The external diameter of one type equals the internal diameter of the other, so that the tubes – having the same length – could be stuck into each other alternately. Through these chimney-stacks the hot gases were conducted, so that the vessels could not get into contact with exhaust fumes and fire. At the same time, this construction made oxydizing firing – responsible for the vessels' red colour – possible. In addition, the tubes served as a support of clay-boards. The boards were put on clay rings integrated into the chimney-stacks, dividing the firing chamber in a number of floors. This multi-storey technology made it possible to build the kiln much higher than a pile of vessels. As a result, more than 30,000 vessels could be fired at once. For one firing cycle, lasting at least a fortnight, a minimum of six tonnes of wood was required.

An interesting find was made at Le Rozier, a small production centre not far from La Graufesenque.[322] At Le Rozier only *terra sigillata* was made in the second half of the first century A.D. Eighteen out of the 21 potters working there are also known from La Graufesenque. The products of Le Rozier can be distinguished from the ones of La Graufesenque on the basis of scientific provenancing only. In addition, finds of graffiti comparable to the ones of La Graufesenque have been reported. Thus it is likely that the organization of production also was similar. The find in question is a large workshop building of a length of at least 17 metres (part of the building had been destroyed prior to the excavation) and a width of 7 metres. In this building, eleven small clay storage tubs of a size of approximately 1.10–1.20 metres square each are arranged in a row alongside the wall. Between the wall and the tubs, a water supply channel was installed. The installation as a whole has been considered to be a large common workshop. It is indeed possible that the building had this function. As only part of the structure is extant, one might speculate that the original

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[322] Peyre (1971), Thuault/Vernhet (1986), Thuault (1996).

number of tubs was higher. Indeed, we cannot exclude that all *terra sigillata* potters of Le Rozier worked in the building in question (not all 21 were active simultaneously). However, to infer from this structure that a manufactory existed at Le Rozier would be jumping to conclusions. As for the organization of production, various interpretations are possible. Even if several potters worked in this structure simultaneously, they did not necessarily belong to one workshop in the organizational sense of the term. It is also conceivable that each had leased a part of the structure. However, it is not even certain that vessels were made in the building in question, for there are no remains of the bases of potters' wheels. In addition, as only the foundations of the tubs still exist, we cannot exclude the possibility that they were connected by the channel. In this case they would have formed a levigation installation. Whatever its function was, the very size of the building shows that somebody must have invested considerable capital to establish a large *terra sigillata* workshop designed for mass production.

3.2.2. The development of the terra sigillata production

There is no simple explanation of why the *terra sigillata* production at La Graufesenque became such a success story. The natural requirements of raw material and fuel are well met at the site, but this was the case at many other places, too.[323] The location of La Graufesenque is not at all advantageous to a production site of more than regional importance. Situated about hundred kilometres away from the Mediterranean in a height of 450 metres, it is surrounded by mountains; the two rivers on the banks of which it lies are not navigable there and are more obstacles to than ways of transportation; the road from Luteva (today Lodève) to Segodunum, the main *oppidum* of the Ruteni (today Rodez), was the only traffic connection worth mentioning.[324] This road is supposed to have been hazardous and changeable due to the unstable ground and precipitous slopes. To our knowledge, the place never played an outstanding political or administrative role, which would had given it an advantage. Factors not directly inferrable from the conditions known to us must have played a decisive role. It has been suggested that local landowners or tribal chiefs took the initiative to make use of the area's natural raw materials to establish a pottery industry

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[323] For this paragraph, see Labrousse (1981).
[324] On the road Vernhet (1996, 32).

on the model of Italian *terra sigillata* production.[325] From the time and area in question, we know a local chief who was, according to the coins issued by him, very much inclined towards Roman culture.[326] In the first century B.C., Italian wine and ceramics were imported to Condatomagos, therefore some people who could afford these luxuries must have lived there.[327] The existence of agricultural estates with adjoined *terra sigillata* production has been proved for southern Gaul in Tiberian times.[328] At La Graufesenque, too, somebody must have had the means required for the building of the large production installations (using stone from a remote quarry!).[329] In addition, the graffiti strongly suggest some organization on a level superior to individual workshops.[330] Indications of a professional association of the potters responsible for these activites are missing.[331] All in all, the hypothesis that local landowners played an important role is the most likely explanation.

The beginning of the production of so-called proto-*sigillata*, i.e. low-quality *terra sigillata* imitation, in c. 10 B.C. was at the same time the beginning of pottery production at La Graufesenque.[332] After this so-called experimental phase with a distribution on a local scale, real *terra sigillata* began to be made in the second decade A.D.[333] It cannot be a mere coincidence that in the Tiberian period not only were vessels from Arezzo imported to La Graufesenque, but also that potters from Italy are encountered there.[334] The products of this early period were so much lookalikes of their Italian models that in some cases scientific provenancing is necessary to ascertain the vessels' origin.[335] Not only were the Italian vessels' shapes copied, but

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325 Labrousse (1981, 8).

326 Ibid.

327 Vernhet (1979, 15).

328 At Aspiran amphorae and *terra sigillata* were made at the same site and by the same potters (Bémont/Jacob 1986, 116; Haalebos 1997, 23–5).

329 Strobel (1992, 51).

330 Cf. below Section 3.2.4.

331 Cf. below Section 3.2.4.6.

332 Vernhet (1986, 96), Labrousse (1972, 471), Mees (1995, 51 with n. 226).

333 For the developement of the production, see Vernhet (1981c, 12–3; 1986, 96–100).

334 Hoffmann/Picon (1990/91). Ateius from Arezzo and/or his dependants (slaves and above all freedmen) were active also at Pisa and Lyon. In waste pits at La Graufesenque from the Tiberian period stamps referring to some Ateius were found, with scientific provenancing proving their local origin. In addition, vessels made by the Ateius *familia* were imported from Italy. On Ateius, cf. above Section 2.6.

335 Hoffmann/Schneider/Vernhet (1989), Hoffmann/Vernhet (1990), Hoffmann/Picon (1990/91).

also the decorations of moulded ware.[336] Products from La Graufesenque were now exported to the whole of ancient Gaul.[337]

In the time of Claudius quality went on improving, with Gaulish mould makers creating their own decorations.[338] In the following decades Italian shapes were simplified and new forms developed.[339] Now the products were exported to all western provinces of the Roman Empire, including Italy and North Africa.[340] In this period mass production seems to have reached its peak. This is reflected in the frequency of finds at consumption sites. According to analyses at major places of consumption, the supply of *terra sigillata* from La Graufesenque increased rapidly from the twenties A.D. with the fastest growth in the forties, fifties, and sixties.[341] Towards the end of this period, the vessels' quality was beginning to decline, perhaps as a result of increasing mass production.[342] After the peak in the sixties and seventies, the supply remained on a very high but slowly falling level, until a precipitous drop set in in the eighties. During the following forty years, the range of distribution went down to the level from which it had started. In the final phase, from c. A.D. 120 to 250, *terra sigillata* of increasingly deteriorating quality was produced for local distribution.

The exact reasons for this rapid decline are unknown. Various explanations have been proposed: competition with other production centres; shortage of high-quality clay or fuel; shrinkage of the region's volume of traffic on which the industry may have depended, *terra sigillata* being a typical supplementary cargo.[343] A variation of the competition hypothesis is the assumption that the merchants (*negotiatores*), being most affected by the cost of transport, switched to other production centres closer to their

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336 Vernhet (1986, 100).
337 Vernhet (1981c, 12).
338 Ibid.
339 Hartley (1977, 252).
340 Cf. e.g. the distribution map in Bémont/Jacob (1986, 102).
341 Marsh (1981, 184–218), researching London's supply suggests that the peak was in the early Vespasian period; Polak (1995, 36–41), suggests for Vechten the last years of Nero. Narbonne was supplied with *terra sigillata* from La Graufesenque mainly in Claudian-Neronian times, Solothurn and Avenches had peaks in the time of Nero, Vindonissa in the early Vespasian, Vertault and Langres in the early-Flavian period, whereas other consumption sites had later peak such as Istres and Toulon in the late-Domitian period, cf. Mees (1995, 54 with n. 260), Rhodes (1989, 46), Strobel (1987, 83).
342 Mees (1995, 53).
343 Fiches/Guy/Poncin (1978), Middleton (1980), Haalebos (1997, 25–7), Vernhet (1991a, 52–5).

respective sales areas.[344] Ceramics merchants, some of them specialized in certain sales areas (e.g. *negotiator cretarius Britannicianus*[345]) are only known from the second and third centuries,[346] but the volume of the production at La Graufesenque makes it very likely that such *negotiatores*, perhaps less specialized, were involved in the trade earlier than that. However, research on consumption sites suggests that normally the supply from one production area went down long before new producers began to fill the gap.[347] This militates against explanations based on competition. Another possible explanation is that the wide distribution of the mass production reflects secondary markets, with the main demand always being local.[348] A large local demand may have caused production to increase, becoming able to supply distant markets as well. As soon as local markets were saturated, production would have collapsed, even if in the secondary market areas local production had not yet been established. Only further research on the patterns of distribution will enable us to decide which of the many suggested explanations is most tenable.[349]

3.2.3. The evidence of the signatures

3.2.3.1. Types of signatures

The majority of the potters' signatures at La Graufesenque are internal bottom stamps on plain ware. Moulded vessels often bear intra- or infra-decorative mould signatures in stamped or handwritten form.[350] Only to one form of moulded vessels, namely the bowl Drag. 29, were internal bottom stamps applied.[351] These bowls, therefore, often bear two signatures, a mould signature and an internal bottom stamp. Another characteristic in the application of producers' signatures is that some forms of plain ware are virtually always stamped, others never.[352] Handwritten signatures are to be found on tools as well.

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344 This has been suggested for the end of the Spanish *terra sigillata* supply from La Graufesenque, where Spanish products replaced the Gaulish ones quite suddenly (Mayet 1984, 235).
345 *CIL* XIII 8793.
346 Schlippschuh (1974, 61–4), Middleton (1979, 81–97), Raepsaet-Charlier (1988, 53–4), Aubert (1994, 213).
347 Marsh (1981, 181 and 212).
348 Woolf (1998, 201).
349 An outline of recent research on the distribution of south-Gaulish *terra sigillata* is given by Mees (1995, 39–46) and Demarolle (1996). To discuss all relevant problems in detail is far beyond the scope of this thesis.
350 Mees (1995, 30–5).
351 Bémont (1981, 20); Vernhet (1986, 100–2); Mees (1995, 31).
352 Vernhet (1986a, 100–2).

Almost all signed decorations on south-Gaulish *terra sigillata* known up to 1995 were published in the form of photographs.[353] The state of editing of internal bottom stamps is much less favourable. According to the excavators, 600 names are known from stamps so far.[354] However, there is no up-to-date catalogue available. Oswald's *Index of Potter's Stamps* was first published in 1931; more recent catalogues are mere listings of potters' names without any relevant details, far from complete.[355] However, the *New Index of Potter's Stamps on Terra Sigillata (Samian Ware),* prepared by B. R. Hartley and B. M. Dickinson from 1963 onwards, is soon to be published in printed and digital form.[356] Containing data from hundreds of excavations and roughly 30,000 finds from La Graufesenque itself, it will be an excellent basis for further research. For the time being, however, reports on excavations of places of consumption must be consulted in order to form an analysis of producers' signatures.[357]

3.2.3.2. Function of internal bottom stamps

To solve the problem of the function of internal bottom stamps, various hypotheses have been produced. Perhaps the least satisfactory suggestion is that the potters at La Graufesenque merely copied an Italian habit.[358] If so, the stamps did not have any practical function in the organization of production. This hypothesis is based on the observation that Gaulish potters tended to stamp Italian forms, while forms developed in Gaul often remained unsigned. The use of stamps is looked upon as part of the potters' efforts to copy Italian-style vessels as true to the original as possible.

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353 Mees (1995).
354 Vernhet (1995, 227).
355 Oswald (1964). Vernhet (1979, 23–7) lists 373 potters' names without any comment; Hofmann's (1971) catalogue contains drawings of merely 247 potters' stamps with dating.
356 Hartley (1990/91), Wittkamp (1992/93).
357 This sub-chapter is mainly based on the evidence of internal bottom stamps on plain ware found at Vechten (Polak 1995). Although the number of potters from La Graufesenque represented there on more than 4,000 stamps is as low as 274, for the time being this material is the best basis for an interpretation of this type of producers' signatures. In Polak's catalogue, to each die a commentary with details cited from the archives of Hartley and Dickinson has been added, giving valuable information on finds at places other than Vechten and the dating of each producer. I had the opportunity of examining the unpublished Dutch original thesis, and made notes. In addition, Dr. Polak was kind enough to let me have a digital copy of the yet uncorrected English version of his catalogue. My references to chapters, pages, and tables relate to the Dutch original print. Comments on individual potters from the catalogue's digital version are cited by the potter's name, for individual dies I refer to the catalogue number. Dr. Polak's thesis is to be published in English soon.
358 Polak (1995, ch. 3).

Even if we cannot exclude that such 'decorative' name stamps give some information on their users, there is no longer a connection between characteristics in the use of stamps and the organization of production.

However, various objections can be raised against this hypothesis. First, the observation that Gaulish potters tended to stamp Italian forms only is not correct for all forms. There are some Italian forms which were stamped in Italy, but not at La Graufesenque[359], and some Gaulish forms to which stamps were applied.[360] In addition, not all stamp types used in Gaul are identical with their Italian counterparts. *In planta pedis* stamps, typical of Italian *terra sigillata* made after A.D. 15, were not used in Gaul, whereas additions such as *officina* or *manus*, very frequent in Gaul, are unknown on Italian ware.[361] Second, even though there is some inconsistency in the use of stamps, insofar as not all forms of vessels were stamped, there is consistency in the stamping of the forms concerned. If a form was stamped, virtually all vessels of this form were stamped. The same pattern is true of unstamped forms. All this leads to the conclusion that there was more than mere imitation behind the use of stamps at La Graufesenque.

Alternative suggestions are that the potters' marks were labels of guarantee or used to promote the product.[362] As far as La Graufesenque is concerned, these functions can be excluded, for they cannot explain the characteristics in the use of stamps. Labels of guarantee or advertizing inscriptions would not have been applied only to some forms of vessels. Moreover, as we shall see below, most potters did not fire their products themselves.[363] Thus they were not responsible for the quality of the finished products. Quality marks with their names would not make any sense. Finally, ornamental stamps, which were used occasionally at La Graufesenque, cannot function as labels of guarantee or advertizing inscriptions.[364] Only some large intra-

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359 Moulded forms Drag. 11 and Hermet 5, plain forms Halt. 14 and 16. For Italian forms in Gaul, cf. von Schnurbein (1990), in La Graufesenque Vernhet (1986a), on the origin and developement of plain forms with internal bottom stamps from La Graufesenque Polak (1995, ch. 6).

360 E.g. the frequent stamping of vessels belonging to the service Vernhet E with name stamps, and F partly with ornamental, partly name, and partly combined (i.e. name plus ornament) bottom stamps (Vernhet 1976; Polak 1995 cat. no. S134 und V36).

361 Cf. below p.88.

362 E.g. Goudineau (1968, 352–4) ('appellation controllée') and Prachner (1980, 213–4).

363 Cf. below Section 3.2.4.9.

364 The services Vernhet E und F (Vernhet 1976) often bear ornamental stamps. Name stamps are also to be found on them (Polak 1995 cat. no. S134, V36).

decorative name graffiti in a prominent position might be interpreted as advertizing inscriptions of the mould maker.[365] However, these are exceptions which cannot constitute a rule.

Another hypothesis looks upon the signatures as a means of separating the vessels of various producers after joint firing.[366] However, since not all forms of vessels were stamped it would have been impossible to separate them by this means.

Finally, the possibility that the stamps were used as a means of controlling the output of individual potters must be considered. It has been suggested that some potters contracted work out to others, controlling the fulfillment of these contracts with the help of the stamps.[367] If so, some forms of vessels were never contracted out, namely those which are never stamped, while others were made by sub-contractors only. This appears most unlikely. As for the persons referred to in the potters' graffiti, most were producers using their own stamps. Thus we can be certain that they were not in a superior position, controlling for their part the individual producers' output with the aid of stamps.

We can also exclude the possibility that the stamps were needed to compile the graffiti, for among the forms of vessels listed there many were unstamped.[368]

Therefore, it must have been the stage of production between the actual making of the vessels on the potter's wheel, and their firing, at which point the potters' signatures were relevant. The drying of the vessels, the application of the slip, and the drying of the latter fall in this stage. As we have seen in the discussion of the process of production, in this stage shelters were required to protect the vessels against wind, rain, direct sunlight, and raised dust. From the graffiti and the excavation of the enormous kiln, we learn that the potters jointly used large production facilities. Thus it suggests itself that they also used drying shelters jointly. If so, it must have been important to separate various producers' vessels from one another. Here marks would have been very helpful.

However, this hypothesis is valid only if it also explains why just some forms of vessels were stamped on a regular basis, but others never. Here an additional

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[365] Cf. below p.86.
[366] Vernhet (1979, 21).
[367] Strobel (1992, 47).
[368] E.g. Ritt. 12, Herm. 2, Drag. 37 (Marichal 1988, 81-2).

difficulty comes into play. Among the moulded forms, only the carinated bowl Drag. 29 was stamped, whereas its successor, the hemispherical bowl Drag. 37, virtually never bears internal bottom stamps.

If one analyzes the differences between stamped and unstamped forms, it soon becomes clear that the stamped ones were made in much greater numbers. This observation is partly based on the numbers cited in the potters' lists, partly on archaeological finds. All four types of vessels which are represented in the potters' lists by a total of more than 100,000 specimens each, were stamped on a regular basis.[369] In the potters' lists, the forms Drag. 29 and Drag. 37 are equally referred to by the term *pannae*, of which more than 40,000 specimens are listed.[370] For comparison, all unstamped forms – except for *mortaria* with 16,000 vessels – are represented each by a total of fewer than 10,000 specimens.

It is conceivable that the individual workshops had only limited storage space, sufficient for vessels made in small numbers. For the storage of products valuable because of their form, such as bottles or jugs, or their decoration, such as moulded bowls, the workshop must have been the best place. However, the production of very large numbers of some forms may have forced the potters to share drying facilities, and thus mark the vessels for identification purposes. The only moulded forms which were really mass-produced are Drag. 29 and Drag. 37.

However, why was only Drag. 29 stamped? Within the framework of the model suggested here, two explanations are possible. First, the output declined, so that Drag. 37 could be stored in the individual workshops' storage facilities. Second, the workshops grew larger, which would have led to the same result. It is clear that only a new workshop design would have led to this effect. If all parts of the workshop were enlarged equally, the storage problems would have remained the same. We can

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369 Cups (*acitabli* Drag. 24/25 and *paraxidi* Drag. 27?), plates and platters (*catili* – various, mostly stamped forms), and conical bowls (*licuias* Drag. 33). Together these vessels made up 88.94 per cent of the total output (Marichal 1988, 80–92, 259). For the identification of vessels listed in the graffiti with certain forms, see Hilgers (1969), Hofmann (1969), Marichal (1988, 80–102), Binsfeld (1997). *Pannae* are also the most frequent decorated form in archaeological contexts (cf. e.g. Vernhet 1986a, 100; Mees 1995, 56).

370 *Pannae triantales*, small plain bowls of the form Ritt. 8, were made in small numbers only. They have not been included in the number cited above. The identification of *pannae* without indication of size with *pannae triantales* – suggested by Marichal (1988, 89) – cannot be right. If this identification were correct, 32 per cent of all *pannae* would have been Ritt. 8 (cf. the list ibid., 82). In archaeological contexts, we would find half as many Ritt. 8 as Drag. 29 (Drag. 37 was introduced only after the end of the production of Ritt. 8; cf. Polak 1995, 66). However, Ritt. 8 is much rarer (e.g. 36 Ritt. 8 in comparison to 382 Drag. 29 at Vechten, see ibid., 52, tab. 6.5).

assume that the potters preferred not to store the valuable moulded vessels in common facilities. To solve this problem in the course of re-designing the workshops, storage facilities needed to be enlarged accordingly.

The transition from Drag. 29 to 37 falls into the period between A.D. 65 and 85,[371] equalling the heyday of export production.[372] Archaeological finds show that not only Drag. 29, but also its successor Drag. 37 were by far the most numerous moulded forms in circulation.[373] Thus we can exclude the possibility that the output of Drag. 37 was considerably smaller than that of Drag. 29.

This leaves us with the other alternative. Because of the lack of internal bottom stamps, we cannot say which producers made Drag. 37. Only the mould makers' names can be ascertained, for Drag. 37 vessels very often bear mould signatures. Often mould makers who made Drag. 37 moulds had already made moulds for Drag. 29.[374] Some of them also made Drag. 29 vessels.[375] One can argue that these potters made moulds *and* vessels of both forms equally. At first sight, this would be contrary to the suggestion that the size of the workshops influenced the application of stamps. However, it is conceivable that the potters in question made Drag. 37 moulds after their workshops had been enlarged, or for others working in larger shops. Indeed, it seems unlikely that someone made two variations of bowls very similar to each other in form and size, and stamped only one of them. If so, we would need to hypothesize that some kind of superior or collective authority issued a decree that no-one was allowed to stamp the new form. It is much more plausible, however, to assume that the producers of Drag. 29 and 37 were not identical, but that they worked under different conditions. This is not to say that their shops were large enough to allow the storage of the whole of production. As we have seen, moulded bowls were made in medium quantities. Thus an enlargement of the workshops might have affected the

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371 Drag. 29 was made from c. 10 to c. 85 A.D. (Mees 1995, 55–6), Drag. 37 from c. 65 to c. 120 A.D. (Mees 1995, 58–9).

372 Mees (1995, 53–4 with n. 260).

373 Vernhet (1986a, 100), Mees (1995, 56). The potters' graffiti are not helpful in this matter. Only a small number can be dated in the period after A.D. 85. (*Mar.* 68, 75–7, 81–3, 99, 104, 162). Unfortunately, they are in a very fragmentary state. All we can infer from them is that *pannae* went on being made, but they do not give any numbers.

374 Cf. Mees' (1995) commentaries on C. Valerius Albanus, Calvinus, Censor i, Censorinus, Frontinus i, Germanus ii, Germanus iii, Iustus, M.Crestio, Mas– i, Meðillus, Memor, Mercator, Momo, Passienus, Pontius, C.I.Sa–, Severus ii, Vitalis, 'Anepigraphiker'.

375 E.g. Mercator, Pontius, and Vitalis (Mees 1995, 33–4 with n. 114).

storage of moulded bowls only, and with it the application of stamps to these vessels. This hypothesis gains support from archaeology, for it seems that in the sixties of the first century A.D. small building structures at La Graufesenque were replaced by larger ones.[376] The start of production of Drag. 37 coincides with this redevelopement.

The hypothesis that the producers of Drag. 29 and 37 were not identical can also explain why a number of suppliers of *pannae* mentioned in the graffiti never occur on stamps.[377] If these persons made only unstamped Drag. 37, this is only natural.

It seems that not only the stamping of mass-produced moulded ware was affected by the redevelopement of workshops; a small number of unstamped plain forms, cups and plates, were also made in the period in question.[378] This is against the rule, for normally these types of vessels bear internal bottom stamps. In the potters' lists some suppliers of plain ware are mentioned who are not known from stamps.[379] Some of them also supplied *pannae*. In the light of the hypothesis proposed here, it seems plausible to suggest that some of the new workshops were large enough to provide storage capacities for moulded and plain vessels. These producers did not need to stamp their products at all.

Improvement of technology supports the hypothesis of discontinuity of producers. The introduction of Drag. 37 led to alterations in the process of production. The cross-section of Drag. 37 is hemispheric, whereas Drag. 29 is carinated. The new hemispheric form facilitated the making of moulds and vessels. Now, larger decorative punches with combinations of motifs could be used, making the decoration of the moulds easier.[380] Moulds for Drag. 29 bowls had a hollow in their inside bottom, so that the semi-finished vessels got an extremely thick bottom. After the vessels had been put upside-down on the potter's wheel, the footring was shaped out of this thick clay layer.[381] Moulds for Drag. 37, however, do not have such a hollow. From this we can infer that the footring of Drag. 37 vessels was made

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376 Balsan/Vernhet (1981, 12).
377 Cf. the list in Mees (1995, 34, tab. 3).
378 Vernhet (1976).
379 Marichal (1988, 245–9), Mees (1995, 34).
380 Mees (1995, 54).
381 Ibid. 24

separately.[382] In addition, from the Neronian period onwards the standardization of the vessels' size was increasing.[383] This made a new method of stacking possible. The standardized vessels were now put directly into each other. Prior to that the use of distance rings was necessary. The new stacking method was much more space-saving, so that far more vessels could be piled up in the same kiln.

These alterations have been interpreted as efficiency measures, especially suited to larger workshops with a subdivision of labour.[384] However, a single potter would also have gained advantage from the alteration of shape: while the vessels were drying and shrinking in the mould, he could prepare the footrings.

In the period in question the quality of the products started to decline in every respect. Various explanations of this development have been suggested. Exhaustion of high-quality clay resources is not a very strong candidate, for the production of *terra sigillata* continued for decades. In addition, the quality of the clay paste very much depended on the care taken over its preparation. Exhaustion of fuel may be responsible for the rapid decline in the output somewhat later, but not for the decline in quality. Another approach is to explain the decline as a result of increasing mass production.[385] This seems to be a plausible suggestion, for it was clearly of some importance to the potters (or at least some of them) to improve the effectiveness of their labour. It is very likely that these endeavours affected all stages of production at the cost of quality.

3.2.3.3. Function of mould signatures

Various kinds of signatures were applied to moulds. Stamps and hand-written signatures are to be found integrated into the decoration (intra-decorative signatures). The latter type is in a number of cases situated below the decoration in a position where on the vessel the footring was placed, so that the signature was invisible on the finished vessel (infra-decorative signatures).[386]

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382 Mees (1995, 24 and 52; 1994a, 19–21). This affected the outside bottom only, so that the change in technology alone cannot be have been the reason for the giving up of the application of internal bottom stamps.
383 Mees (1995, 25–8).
384 Mees (1994).
385 Mees (1995, 53) with references to other explanations.
386 Ibid. 36.

Pseudo-epigraphical and ornamental stamps were of use for insiders only, as were signatures consisting of a single letter.[387] Here any function outside the production itself is out of the question. The same is true of infra-decorative signatures. What could have been the function of such signatures in the organization of production? One possibility is the making of the moulds themselves. Moulds were fired separately, because they required another course of heating temperature.[388] It is possible that mould makers shared common firing facilities and fired a load of moulds jointly. In this case, it would have been useful to identify the products of each individual mould maker with the aid of signatures. The fact that only part of all moulds was signed can be explained by changing conditions: sometimes firing facilities were shared, sometimes not. If just two mould makers shared one kiln, it would have sufficed that one of them marked his products.

Some signatures strongly suggest that they served as advertisements. Many stamps from the Domitian period onwards are placed centrally in the decoration, often repeatedly. In addition, there is a tendency for intra-decorative stamps to be a little larger than internal bottom stamps.[389] Sometimes the mould maker placed his name in large hand-written letters in a prominent position in the mould, so that it attracts attention on the vessel.[390]

However, if promotion was intended, it was certainly not promotion of the end-product – the vessels. Many bowls of the form Drag. 29 bear both an internal bottom stamp and a mould signature, each referring to a different person.[391] From this we can infer that the potter and the mould maker were not the same person. The potter Albus, for instance, used moulds which were also used by Ardacus, Gallicanus, Genialis, Germanus, Macer, and Vapuso.[392] Niger obtained his moulds from various sources, e.g. Modestus and Mommo, with other suppliers' names remaining unknown.[393] There are no hints that Niger himself made moulds.[394] Therefore the possibility must be taken into consideration that moulds were hired out.[395]

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387 Cf. ibid. 100–1.

388 Ibid. 39.

389 Ibid. 32.

390 E.g. SABINI MANVS on jug Hermet 15a, a very rare and beautiful vessel, which was very difficult to make (Mees 1995, Fig. 172; on the making of this vessel, cf. also Balsan/Vernhet 1971).

391 Mees (1995, 212).

392 Ibid. 211–12.

393 Ibid. Fig. 140, 3, and 145, 11.

In three cases, the original signature was crossed out or a second signature added *post cocturam*.[396] This strongly suggests that these marks indicate ownership. If a potter had borrowed moulds from various mould makers, or a quarrel about the ownership of a mould emerged, signatures would have facilitated the identification of the mould's origin.

Moulds were exchanged not only in the main export period, but also in earlier and even in the earliest times.[397] Some mould makers used identical motifs, which might indicate an exchange of motif punches.[398]

Far more moulds of the form Drag. 37 than Drag. 29 were signed. Seventy-six makers of moulds for Drag. 37 signed their vessels in comparison with 45 makers of moulds for Drag. 29.[399] The vast majority of those potters who made both types of moulds signed far more Drag. 37 than Drag. 29.[400] In the case that potters who made moulds and vessels of the shape Drag. 29 in addition produced Drag. 37 moulds for others, it seems plausible that they wanted to show that these moulds were their products. Therefore, the habit of stamping moulds can also be explained as a kind of promotion inside the production centre.

It has been argued that mould makers commissioned others to make vessels from their moulds.[401] This hypothesis is based on finds from the so-called ceramics' store (*Keramiklager*) of Oberwinterthur. Among these finds are a number of Drag. 29 bowls made by Aeveius out of moulds of Passienus. The majority of vessels at Oberwinterthur are products of Passienus, whereas only these few bowls of Aeveius were found. This has led to the conclusion that Aeveius had made the bowls in question for Passienus.[402] However, among the vessels from Oberwinterthur is a moulded bowl with the internal bottom stamp of Passienus made in a mould of

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394 Polak (1995, cat. entry Niger).
395 Mees (1995, 125).
396 Ibid. 28.
397 Ibid. 36–7.
398 Ibid. 23.
399 Ibid. 209–19 (Beilage II).
400 Numbers of Drag. 29/37 for each mould maker (data taken from catalogue entries in Mees 1995): C. Valerius Albanus 1/17, Calvinus 2/11, Censor i 3/12, Censorinus 3/8, Frontinus i 16/35, Germanus ii 1/16, Germanus iii 4/63, Iustus 42/4, M.Crestio 5/81, Mas– i 11/7, Meðillus 8/4, Memor 1/21, Mercator some/79, Momo 14/11, Passienus 9/1, Pontius, C.I.Sa– 5/3, Severus ii 3/10, Vitalis 2/3, 'Anepigraphiker' 17/1.
401 Mees (1994, 21).
402 Ibid.

Secundinus.[403] It is scarcely possible that Passienus commissioned others to make vessels for him, and was at the same time commissioned by others to make vessels for them. The evidence from Oberwinterthur, therefore, suggests exchange of moulds on the basis of lending, rather than commissioning.

3.2.3.4. Size of production units

Personal names on potters' signatures often follow - or are followed by - additions, normally abbreviations, relating the person named to the process or place of production. Seven types of signatures can be distinguished according to their formulae (Table 1).[404]

Table 1.

1) *officina*-type	OFIC.BILICATI	*(ex) of(f)ic(ina) Bilicati*	from the workshop of B.
2) *fecit*-type	VIRTHVSFECIT	*Virthus fecit*	Virthus made this vessel/had it made
3) *manus*-type	SABINI.MANVS	*Sabini manus*	product of Sabinus
4) nominative-type	BASSVS	*Bassus (fecit)*	Bassus (made this vessel/had it made)
5) genitive-type	AQVITANI	*(ex officina/manus) Aquitani*	(from the workshop/product) of A.
6) *figulus*-type	AQVITANI FI	*(ex officina/manus) Aquitani fi(guli)/Fi(guli)*	(from the workshop/ product) of A., potter, or A. Figulus
7) other stamps which do not fit into one of the six other categories, e.g. abbreviated names			

Only part of these formulae are also known from Italy, namely *fecit*-type, nominative-type, genitive-type, and *figulus*-type.[405]

It is a widespread opinion that *officina*-stamps indicate a large production unit consisting of more than one potter, whereas *fecit*-, *manu(s)*-, or nominative stamps imply that the person referred to was the vessel's actual maker, working in a small shop.[406] However, it is impossible to infer from the stamp formulae themselves the type of production unit behind them. *Officina* means any workshop, independently of its size.[407] *Fecit*-type stamps have so far been interpreted as referring to the actual act of making, and thus to the actual maker.[408] However, as is well known from stone inscriptions, *fecit* does in many contexts stand for *fieri iussit* or *faciendum curavit*,

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403 Mees (1995, 62).
404 Polak (1995, ch. 3.2; 1989, 146).
405 All information on the use of stamp formulae from *CVArr* II.
406 Polak (1989, 150) with references to more examples.
407 Cf. the examples in *TLL* s.v. *officina*.
408 Cf. Polak (1989, 150).

meaning 'have something made'.[409] This also applies to Roman brick-stamps where persons working as *officinatores* used the term *fecit* to refer to products made in their *officina*.[410] Here the formula *fecit* clearly refers not to the actual producer, but to the *officinator* who held a supervisory, organizational position. The *manus*-formula – *manus* normally abbreviated by M, MA, or MAN – has so far been interpreted as *alicuius manu* 'from the hand of x', referring to the vessels' actual maker. However, new finds with the text MANVS suggest that the full formula was *alicuius manus*.[411] Unlike *alicuius manu*, meaning in classical texts 'personally made by', *alicuius manus* is in need of interpretation. It could be an equivalent of the *nominative*-type, meaning *alicuius manus fecit*. However, the redundancy of words weighs against this interpretation. *Manus* can also be used as an equivalent of *opus* in the formula *alicuius manus,* namely in cases where products of artists are referred to.[412] Even if it may seem far-fetched, we cannot exclude that *manus*-stamps on *terra sigillata* are the equivalent of the formula *opus (doliare) alicuius* on Roman brick-stamps from the second and early third centuries. The persons referred to on these brick-stamps were not the actual makers of the bricks, but the *officinatores* supervising the production.[413] Therefore *manus*-stamps do not necessarily express that someone made something personally. Signatures consisting of the potter's name only in the nominative case may be seen as abbreviations of *fecit*-stamps, whereas those in the genitive case are likely to be abbreviations of *officina*- or *manus*-stamps. As for *figulus*-stamps, it must be left open whether they refer to a job title or rather to a *cognomen*. In Gaul these stamps are very rare, and in Italy only a handful of producers from Arezzo used them. As we have seen in the discussion of Arretine *figulus*-stamps, the interpretation as a job title appears to be more plausible.[414]

In a recent study, M. Polak sought 'hard' evidence for the correctness of the traditional interpretation of the stamps' formulae.[415] Based on the statistical analysis of stamped plain vessels found at Vechten (Netherlands), his study aims at finding a

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409 *TLL* s.v. *facio*.
410 Steinby (1978, 1516–7).
411 Polak (1995, cat. no. G7) GALLI.MANVS, and graffito SABINI MANVS on a mould Hermet 15 (Mees 1995, Fig. 172, 3).
412 *TLL* s.v. *manus*.
413 Steinby (1978, 1501, 1516–7).
414 Cf. above p.43.
415 Polak (1995). For a preliminary analysis, see Polak (1989).

regular relation between the various stamps' formulae and the size of the workshops. Most producers represented at Vechten did not use a single formula only, but several. Polak asks, therefore, whether a relation can be ascertained between the total number of finds of individual producers and the proportions of the various formulae in their output. Most producers with a high total number of finds show a high proportion of *officina*-stamps, whereas those with fewer finds tend to have used more *manus-*, *fecit-*, or nominative-type stamps.[416] Genitive-type stamps appear to be neutral, thus their interpretation as an abbreviated version of both *officina-* and *manus*-type seems to be correct. From this result Polak has drawn the conclusion that the term *officina* refers to a larger production unit with several potters.[417] This is, however, a logical mistake, for a logical abduction is presented as an induction. A closer look at the evidence from the opposite point of view shows that this conclusion is not only logically incorrect, but also factually. The question to be asked should be whether producers with an above-average proportion of *officina*-stamps are represented by an above-average number of finds. In numbers derived from the data used in the study in question, producers with more than 46.51 per cent *officina*-stamps should be represented by more than 43.41 finds.[418] In Table 2 (next page), all 34 producers in question are listed. The list shows that only eighteen of them meet the requirement – definitely not enough to constitute a rule.

Another objection must be added. Eighteen producers are represented by a single stamp formula only. In the study in question, they were totally excluded from the calculations as well as the considerations. The reason for this is that the statistical method used cannot cope with data referring to only one type.[419] Thirteen of the excluded eighteen are producers with *officina*-stamps only, each represented by a comparatively small number of finds. If these producers are included, the result is much clearer (Table 3; page after next). Only fifteen of the then 46 producers with an above-average proportion of *officina*-stamps (now 51.89 per cent) also show an above-average number of finds (now 38.34).

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416 Polak (1995, 84–7).

417 Ibid.

418 Average numbers derived from the 68 potters used by Polak (1995) in his calculations.

419 In Polak's preliminary article (1989), where a more simple method was applied, these producers were included (without being listed individually). On request, the author wrote to me that the limitations of the statistical method are indeed the reason for this exclusion of evidence.

Table 2. 34 potters with an above-average proportion of officina-stamps (potters with officina-stamps only not included); comparative figures: average proportion of officina-stamps of all producers with more than 10 finds (potters with officina-stamps only not included): 46,51 per cent; average total no. of finds of all producers with more than 10 finds (potters with officina-stamps only not included): 43,4.

Name	Total number of finds	Number of *officina*-stamps	Proportion of *officina*-stamps in per cent
Acutus	24	16	66,67
Albinus	14	11	78,57
Aquitanus	173	111	64,16
Ardacus	27	17	62,96
Bassus I	156	100	64,1
Bassus I - Coelus	46	45	97,83
Bilicatus	27	25	92,59
Calvus	146	129	88,36
Castus	28	16	57,14
Censor	87	86	98,85
Crestio	88	80	90,91
Firmo I	15	7	46,67
Frontinus	66	53	80,3
Germanus, Flavius	24	24	100
Ingenuus	19	11	57,89
Iucundus	98	86	87,76
Iucundus, Cosius	12	7	58,33
Iustus	20	12	60
Labio	27	26	96,3
Licinus	27	22	81,48
Maccarus	49	35	71,43
Modestus	52	43	82,69
Murranus	36	30	83,33
Passienus	54	33	61,11
Patricius	107	67	62,62
Pontius	38	34	89,47
Primus	113	81	71,68
Rufinus II	89	82	92,13
Sabinus	37	33	89,19
Secundus III	50	40	80
Severus II	46	44	95,65
Silvinus II	28	19	67,86
Virilis, L. Cosius	55	50	90,91
Vitalis II	211	141	66,82

Table 3. 46 potters with an above-average proportion of officina-stamps (potters with officina-stamps only included); comparative figures: average proportion of officina-stamps of all producers with more than 10 finds: 51.89 per cent; average total no. of finds of all producers with more than 10 finds: 38.34.

Name	Total number of finds	Number of *officina*-stamps	Proportion of *officina*-stamps in per cent
Acutus	24	16	66,67
Albanus	14	14	100
Albinus	14	11	78,57
Aper	12	12	100
Aquitanus	173	111	64,16
Ardacus	27	17	62,96
Bassus I	156	100	64,1
Bassus I - Coelus	46	45	97,83
Bilicatus	27	25	92,59
Calvus	146	129	88,36
Cantus	19	19	100
Castus	28	16	57,14
Censor	87	86	98,85
Coelus	19	19	100
Crestio	88	80	90,91
Dontio	27	27	100
Frontinus	66	53	80,3
Germanus, Flavius	24	24	100
Ingenuus	19	11	57,89
Iucundus	98	86	87,76
Iucundus, Cosius	12	7	58,33
Iustus	20	12	60
Labio	27	26	96,3
Licinus	27	22	81,48
Lucceius	11	11	100
Maccarus	49	35	71,43
Masculus ii	13	13	100
Modestus	52	43	82,69
Mont- - Cres-	18	18	100
Murranus	36	30	83,33
Niger	32	32	100
Passienus	54	33	61,11
Patricius	107	67	62,62
Ponteius	16	16	100
Pontius	38	34	89,47
Primus	113	81	71,68
Rufinus II	89	82	92,13
Sabinus	37	33	89,19
Sarrutus	12	12	100
Secundus III	50	40	80
Severus II	46	44	95,65
Sex- - Can-	13	13	100
Silvinus II	28	19	67,86
Virilis	36	36	100
Virilis, L. Cosius	55	50	90,91
Vitalis II	211	141	66,82

In addition, 70 out of the 86 producers with more than ten finds used *officina*-stamps among others. The use of this stamp type was obviously too widespread to have been confined to workshops of a certain size.

The proportion of *officina*-stamps in the production at La Graufesenque grew throughout the time between A.D. 30 and 110. It went from approximately 20 per cent up to 70 per cent, with the proportion of all other stamp types dwindling accordingly (except for *manus*-stamps which became slightly more popular). Only in the decade prior to this period the opposite tendency prevailed. The growth was especially rapid in the 60s. This development has been interpreted as the result of *officinae* – large workshops – becoming prevalent and replacing 'small independent producers'.[420] As we have seen, it seems indeed reasonable to infer from various hints a growth in size of a part of the workshops in the period in question. That some of these workshops preferred to use *officina*-stamps may have had the reason that this formula refers not to a person as the maker or as being responsible for the making of a vessel, but to the workshop run by the person mentioned on the stamp. This preference might have prompted other potters to also choose this stamp formula. The possibility that the development of the *officina*-formula was merely a phenomenon of fashion cannot be excluded. For the time being, one cannot infer from the use of the term *officina* alone that the workshop referred to was larger than others. And vice versa, the use of formulae other than *officina* cannot alone be used as sufficient indication of small size. Further research based on more material is required to come to more reliable conclusions in this field.

3.2.3.5. Social status

In contrast to Arezzo, most researchers look upon the potters of La Graufesenque as free men.[421] Of a small number of producers, we do indeed know their full *tria nomina*, of others their *duo nomina* or *nomen gentile*, but the vast majority of signatures contain *cognomina* only.[422] The assumption that the potters in general were

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420 Polak (1995, 87).

421 For a summary, see Bémont (1981, 19).

422 We have only one stamp with *tria nomina* in full and in the nominative case, namely C.IVLIVS.CLEMENS, of which the abbreviated version G.IVL.CLE is also known (Polak 1995, cat. no. C131). If more than a single name is mentioned, normally the *cognomen* only is written in full, all other names occuring in abbreviated form. This corresponds with the Gaulish epigraphical habit of the late first century to abbreviate on stone inscriptions all parts of the name with the exception of the *cognomen* (cf. Bémont 1981, 19). *Gentilicia* were also abbreviated, e.g.

(continued on next page)

free is, therefore, not based on evidence for their free status, but on the absence of evidence for slave status.

The exceptions are as few as they are vague. One producer stamped with LIBERTVS, another used the stamp L.SENI.S.[423] While the former name is indeed likely to indicate the social status of its bearer,[424] the latter cannot only be interpreted as L. Seni S(ervus), but also as L. Senis,[425] or L. Seni plus *cognomen* with initial S.[426] As for moulds, the stamp GERMANIF is often combined with another one reading SER, or with a hand-written S.[427] GERMANIF, of which a variant reading GERMANI.FI is known, means most likely Germani Figuli.[428] It is thus possible to interpret the abbreviation SER as *servus*, but other solutions are possible as well – there are many names beginning with Ser–.[429]

However, two of the potters' graffiti clearly show that slave labour was used at least for unskilled work.[430] It seems worthwhile, therefore, to look closer at those signatures which cannot be explained as *duo* or *tria nomina.* A full discussion of all potential cases would be too extensive, therefore only the most interesting cases shall be discussed in this section.

Stamps containing a combination of two names, one in the nominative case and the other in the genitive case, clearly indicate dependency. Such stamps are

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Iul. for Iulius, Fl. for Flavius. Thus it is plausible to interprete abbreviated names, such as C.VAL.ALBAN, Q.IVL.HABI, SEX.IVL.IVCVND, C.AN.PATR, C.IVL.PRIM, L.TER.SECVN, and CIVLIVASI (Polak 1995, cat. nos. A27 and 28, H1, I27, P38, P79, S105, and V9) as *tria nomina*. *Duo nomina* are most likely TAVDACII, OF.L.FABV, CLA.GEMM, OFFLAVI.GER, and ORTI.PAVLLI (ibid. cat. nos. A98, F2, G12, G37, and P56). Oswald (1964) lists most of the stamps in question as joint ventures. More recently, they are seen as referring to a single person wherever possible. This tendency can perhaps be explained by our growing onomastic knowledge, which facilitates the identification of names as *gentilicia* or *cognomina* respectively.

[423] Polak (1995) cat. nos. L12–13 and S117 respectively.

[424] Cf. e.g. Solin (1996, 131): Peticia M. et C.l. Liberta.

[425] Cf. e.g. the stamp OF.SENIS, which belongs to a manufacturer from Chémery-Faulquemont (Polak 1995, cat. no. S117 with n. 9). Dots are often found right in the middle of names of La Graufesenque producers, cf. e.g. OFARDACI and OF.ARDAC.I (Hofmann 1971, cat. nos. 12.3 and 12.4), or L.C.CELSI O and L.C.C.ELS.I.OF (Hofmann 1971, cat. nos. 34.4 and 34.5).

[426] Polak (1995, commentary on cat. no. S117): 'Seni' can refer to any *nomen gentile* beginning with these letters, e.g. Senicius, Senilius or Senius, or, if the dot is not meant to be an abbreviation mark, to *gentilicia* and *cognomina* beginning with Senis, e.g. Senissius and Seniserus' (names known as potters' names).

[427] Mees (1995, 79–80).

[428] Germani Filii is less likely, for the stamp was seemingly already used at the beginning of Germanus' career (Mees 1995, 78).

[429] E.g. Seranus, Serenus, Servandus, Servatus, Serverus; cf. Mees (1995, 79).

[430] Cf. below p.105.

CASSTVS.CANTI[431], MASCLI.BALBVS[432], COTTOIVLI[433] and SCOTTIVS/ DAMONI.A[434]. All persons concerned are also known separately from their own individual stamps. The relationship between them has been described in various terms, such as employer and employee, master craftsman and apprentice, or more vaguely as master and dependant.[435] Although more ambiguous, stamps with two names in the genitive case, or with unknown endings, such as SENISERI/ARDACI[436], ACVTI/BILI.AR, ACVTI/COMA[437], and MACCAR/ VRVOF[438], have been interpreted within the same framework. The dependency in question is normally seen as being located inside a workshop. The reason for this is perhaps the existence of another type of dependants' stamps, namely *officina*-stamps with an additional name. The dependant Scottius (SCOTTIVS/ DAMONI.A), for example, also appears as a master in the stamp OF.SCOTTI. COTV.[439] The name Cotutus, or Cotulos, also occurs independantly, so it is most unlikely that this was the *cognomen* of Scottius.[440] Another example is OFBASSICOELI (with the variants OFBASSI.CO and OFBASSIC).[441] This combination can also be interpreted as *gentilicium* plus *cognomen*, Bassius Coelus, but this is scarcely likely, for the two names also appear independently. Oswald considered the combination of these names as referring to a partnership,[442] whereas Polak believes that Coelus worked in Bassus' workshop, because Coelus' name is often abbreviated.[443] Other examples of such stamps are OFMONTI.CR and OFMONTCRES.[444] Very rare stamps with four elements, such as C.IVL.PRI.SVR, suggest that the person named by the first three

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431 Oswald (1931, 64 and 368) under 'Cassius & Camius (?)', and 'Casstus & Cavannus'; Hermet (1934, pl. 110, 28), Polak (1995) under 'Cantus' and 'Castus'.

432 Polak (1995 cat. no. M47).

433 Oswald (1931, 92).

434 Polak (1995, cat. entry Scottius).

435 E.g. ibid. cat. entries Acutus, Aper, Ardacus, and *passim*: 'employees'; cat. entries Castus, Coelus, Cotto, and *passim* : 'learned his trade in the workshop of ...', cat. entry Balbus: 'somehow dependent'.

436 Ibid. cat. entry Ardacus.

437 Ibid. cat. entry Acutus.

438 Ibid. cat. entry Maccarus.

439 'Employer', ibid. cat. entry Scottius.

440 Ibid. cat. entry Scottius.

441 Ibid. cat. nos. B45, B46 and B49.

442 Oswald (1964, ix).

443 Polak (1995, cat. entry Bassus i - Coelus).

444 Ibid. cat. no. M111 with n. 3.

elements - interpreted as *tria nomina* - had a dependant denoted by the fourth element.[445]

The rarity of all these combinations militates against the interpretation of the relationship documented by them as being located inside a workshop. If sub-ordinate personnel such as secondary potters or apprentices were as rare as these stamps, neither the continuation of the industry as such, nor the making of more than 10,000 vessels for one firing load by one workshop - as documented by potters' lists[446] - could be explained. In other words, why should subordinate personnel use their own stamps, and if so, why did this happen so rarely? There is no plausible explanation of this.

In two cases we have evidence for relationships not documented by stamps. A clay-tool found at La Graufesenque bears the graffito ROSIRVNI ADRONICO.[447] Neither of the two persons is known from other sources. Oswald reports a plate Drag. 18 from Trier, with a stamp of Regenus and an *ante cocturam* graffito reading COTTO in the external base.[448] Both potters are also known from individual stamps. Cotto was also the name of a dependant of a certain Julius (stamp COTTOIVLI[449]). Whether both Regenus and Iulius had dependants named Cotto, or the *nomen gentile* of Regenus was Iulius, cannot be ascertained as yet. In any case, no stamp referring to this relationship is known. Therefore, we can assume that potters had dependants who did not use their own stamps.

To sum up, it seems more likely that the persons referred to by dependants' stamps were in the same position as all other persons mentioned on stamps: as *officinatores*, responsible for their own (i.e. leased) workshop or a leased part of a workshop. One might hypothesize that *officinatores* bought slaves and trained them. Later these dependants may have worked as *officinatores* on their own. If so, most of them apparently worked independently only after manumission, so that we cannot identify them as *liberti*. Only a few seem to have become *officinatores* while still slaves. It is also possible that only some named their masters on their stamps, whereas others used their given-name only.

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445 Plumier (1986, 26, Fig. 10, 4).
446 Cf. below p.95.
447 *Mar.* 176.
448 Oswald (1931, 260 and 377).
449 Ibid. 92.

Although the number of *tria nomina* from La Graufesenque is comparatively small, two groups can be identified, the members of which having *praenomen* and/or *nomen gentile* in common: first, the C. Iulii with the *officinatores* C. Iulius Vasi-[450], C. Iulius Celer[451], C. Iulius Clemens[452], C. Iulius Primigenius[453], and C. Iulius Primigenius Sur-[454] (Iulii with *nomen gentile* + *cognomen* only have not been included, because these names might refer to one of the potters T. Iulius, Q. Iulius and Sex. Iulius). Second, the (L.) Cosii: L. Cosius Virilis[455], Cosius Iucundus[456], Cosius Rufinus[457], Cosius Urap-[458], L. C. Celsus[459]. It is possible that behind these groups are *familiae* of *officinatores*.

3.2.3.6. Specialization in the products

Comparing the range of production of individual potters suggested by the graffiti on the one hand and finds of stamped products on the other, makes clear that neither of them reflects the full range.[460] Finds of stamped products show that no producer made only one type of vessel, e.g. cups only or plates only.[461] Most mould makers also made plain vessels.[462]

On the other hand, in the potters' graffiti two producers are cited with more than 10,000 cups, and many more numbers run into thousands.[463] As for plates, the highest number is 6,600 delivered by one producer, whereas an association of three *officinatores* produced 10,300 plates for one load.[464] Producing such a number of vessels must have led to temporary specialization in one type of vessel, especially if a workshop got such orders on a regular basis.

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450 Polak (1995 cat. no. V9): CIVLIVASI(ssili?).
451 Ibid. cat. no. C97: OFCICELRS, interpretation as C. Iulius Celer by Polak.
452 Ibid. cat. no. C131: G.IVL.CLE. more complete version: C.IVLIVS.CLEMENS.
453 Ibid. cat. no. P79: C.IVL.PRIM, more complete version: C.IVL.PRMIC.
454 Ibid. cat. no. P80: PRIMIGSV, more complete version: C.IVL.PRI.SVR..
455 Ibid. cat. no. V32: OF.L.COS.VIRIL.
456 Ibid. cat. no. I23: OFCO.IV<C>.
457 Ibid. cat. no. R31: COSIRVFINI.
458 Ibid. cat. no. U1: COSIVS.VR AP.
459 Ibid. cat. no. C108: L.C.CEL.SI.OF.
460 For details, cf. below Section 3.2.4.10.
461 Polak (1995, 88).
462 57 of the 81 mould makers dealt with by Mees (1995) are listed as plain ware potters in Polak (1995). Polak, however, lists only 274 of c. 600 potters from La Graufesenque (cf. n. 354).
463 *Mar.* 8,12: Privatos with 10,000 *acitabli*, *Mar.* 21,14: unknown with 10,500 *acitabli*.
464 *Mar.* 20,11: Felix with 6,600 *catili*, *Mar.* 4,7: Felix, Scota, and Summacos with 10,300 *catili*.

In some workshops some stamps were used mainly (not exclusively) for the marking of one type of vessel.[465] This has been interpreted as indicating a subdivision of labour inside the workshops.[466] However, we cannot look behind the stamps. Whether a stamp was attached to a person, or confined to being applied to a certain type of vessel, remains unknown.

There is another interesting rule in the application of stamps.[467] On moulded vessels, ordinarily intact stamps are found, whereas to cups very often damaged ones were applied. Plates seem to be intermediate in this regard. To explain this, it has been suggested that apprentices, making simple forms such as cups, had to use old and damaged dies, whereas the master potter, making more complicated forms, especially moulded vessels, used new and undamaged dies.[468] However, it is also possible that the best dies were used for the most beautiful and expensive vessels, regardless of who made them. When cups are in use, their stamps are not to be seen, so that here damaged dies could be used with little drawback. This applies less to plates, which must have been less expensive than moulded vessels; hence their intermediate position.

3.2.3.7. Migration of potters

Many potters active at La Graufesenque have, or seem to have, also worked at other Gaulish production centres such as Banassac, Montans, Le Rozier, and Espalion.[469] For some migration is proved by finds of identical dies used at various production centres. In other cases migration only is hypothetical, for identical names at various places can also be the result of homonymy. Especially in the case of mould makers, the transfer of their moulds is an alternative to the migration of the craftsmen themselves. However, for some of them migration could be ascertained by scientific provenancing.

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[465] Polak (1995, 90).
[466] Ibid.
[467] Ibid.
[468] Ibid.
[469] It would be beyond the scope of this thesis to discuss the evidence from all these production centres in detail. For a short overview of recent research results including the problem of the connections between these centres, and many examples of migrating potters, see Mees (1995) and Polak (1995).

3.2.4. The evidence of the graffiti

Graffiti written *ante cocturam* on intact *terra sigillata* plates play a central role in our understanding of the organization of production at La Graufesenque.[470] These graffiti, unique in the entire field of Roman pottery research,[471] enable us to gain direct insight into the process of manufacture. However, the interpretation of these graffiti is not free of difficulties, and various hypotheses have been suggested.[472]

All graffiti known by 1980 were published by R. Marichal in 1988.[473] The 213 entries of his catalogue include all graffiti written in the Latin alphabet, while six specimens written in Gaulish have yet to be published.[474] Since then, about 50 new graffiti have come to light, most of them small fragments.[475] Only two better extant specimens of them have been published.[476]

Most graffiti are so-called firing lists (*comptes/borderaux d'enfournement*). They were written on plates, and then fired. This and the occurrence of the Latin term *furnus* clearly show that their contents must be understood as relating in some way to the process of firing.[477] Another group of graffiti contains personal names written *ante cocturam* on tools and vessels.[478] Further graffiti comprise texts with various contents,

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[470] For a long time it was the *communis opinio* that the graffiti were written on spoiled vessels chosen at random after firing (Héron de Villefosse 1882; 1884; Bohn 1901, no. 10017, 47; Déchelette 1904, vol. 2, 85; Hermet 1923, v; 1934, vol. 2, 291). Both assumptions have been disproved by Marichal (1971, 206; 1974, 88; 1988, 13). The existence of complete vessels with graffiti, and fragments suggesting that originally the intact vessel was inscribed, indicate clearly enough the use of complete vessels. For longer texts only plates and dishes were chosen, and their diameter very often meets the writers' need for space, corresponding to their personal style of writing and structuring the text.

[471] Graffiti like the ones from La Graufesenque are also known from other places, but only in very few cases and normally very fragmentary. They will be discussed below.

[472] It would be beyond the scope of this thesis to offer detailed discussion of all interpretations suggested hitherto. I will refer to other positions where appropriate. For a short overview of recent interpretations, see Bémont (1996). Older positions are summarized by Strobel (1992, 46 with n. 124). Important recent contributions on the graffiti are (in addition to the edition by Marichal 1988): Bémont (1981); Bémont/Vernhet (1989), Strobel (1987; 1992), Polak (1998).

[473] Marichal (1988).

[474] To my knowledge, *RIG* volume II,2, Textes gallo-latins sur terre cuite et métal (Gallia suppl. 45), has not yet been published.

[475] Bémont (1996, 127).

[476] Bémont/Vernhet (1990/91; 1992/93).

[477] This has been already suggested by Hermet (1924) and Oxé (1925); the publication of lists with *furnus* by Duval/Marichal (1966), and the analysis of the writing with the result that they were written on before being fired (Marichal 1988, 13; 1971, 206; 1974, 88) have shown that this assumption is correct.

[478] *Mar.* 172–210.

among them two fragmentary lists of slaves' work done for potters,[479] a fragmentary invoice[480], and a contract for the purchase of a slave.[481]

The dating of the graffiti is based mainly on our knowledge of the potters referred to by them.[482] Further clues are provided by the plates used as writing material, which can be dated roughly with the aid of typological characteristics. In addition, it is possible to date graffiti by comparison with others, for in many cases common characteristics enable the formation of groups, each attributable to one 'hand', i.e. one scribe. The combination of the various data leads to more precise results. Nevertheless, the dating is so rough that the graffiti are at best grouped by the emperor under whose reign they were made, and in many cases the possible period of origin comprises several emperors' reigns. Almost all graffiti date from the first century A.D. Only a handful are likely to be later; a single one is Augustan. The vast majority – at least 138 specimens – date from the period between Claudius and Vespasian, with the Neronian reign represented best with at least 86 graffiti. In other words, almost all graffiti are from the period of mass production for export. A few of them bear a calendar date, such as *idus maias* on *Mar.* 74, which enables us to get an idea of the period of pottery activity during a calendar year. This activity lasted at least from March to mid-October.[483]

Very few graffiti are known from sites other than La Graufesenque.[484] A small number of fragmentary lists was found at Arezzo and Pisa in Italy; at Bavay, Chémery, and Lezoux in Gaul; and at Rheinzabern in Upper Germany.[485] Unfortunately, all these graffiti are too fragmentary to shed any light on the organization of firing at the respective production sites. However, their contents and structure show some similarities to the lists of La Graufesenque. Three better-preserved graffiti very similar to those found at La Graufesenque are known from Montans and Blickweiler,[486] indicating an organization of firing comparable with that of La Graufesenque.

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479 *Mar.* 169 and 170

480 *Mar.* 171.

481 *Mar.* 211.

482 See Marichal (1988, 282–3) for a full coverage of details.

483 Ibid. 99; Bémont/Vernhet (1992/93).

484 Cf. Marichal (1988, 16–7).

485 Ibid.; on Lezoux Bet/Delage (1993, 324–6 with Fig. 12.)

486 Marichal (1988, 260–2).

Reducing the contents of the firing lists to as short as possible a formula, they record who delivered how many vessels, and of what kind, for firing. As we have seen, the potters' stamps are unlikely to have been used to ascertain the individual producers' output. Thus it is highly probable that the firing lists had this function. If one takes into consideration that many vessels were not stamped, it follows that it was impossible to return them to their producers after firing.

This is a most important point, for it shows that the potters' duty was done once they had delivered their vessels for firing. The fired vessels must have been sold together.[487] The potters may have sold them as a community, in which case the lists would have been useful to ascertain each potters' profit share.[488] Alternatively, the potters may have had contracts with a landowner or trader who sold the vessels wholesale. In this case the lists would have been useful to control each potters' fulfilment of contract.[489] Which suggestion constitutes the better hypothesis shall be worked out in this sub-chapter.

3.2.4.1. Structure of the firing lists

The lists are written in Latin cursive writing.[490] Marichal divided them into Latin lists, containing Latin words with the exception of some Gaulish personal names, and Gaulish lists, containing mainly Gaulish words with the exception of some Latin personal names and technical terms for vessels and measures.[491] The following considerations are illustrated by a Latin and a Gaulish specimen list (Table 4, list A Gaulish, B Latin).

Some lists have a short head section with dating and other details (list A, lines 1–3; list B, 1–4), with the sum total (*summa*) of all vessels put at the end (list B, 22). As there is no individual Gaulish list containing all relevant elements, I have compiled one. No list contains all three elements equalling lines 1–3 of list A. Lines such as line 2 and 3, however, are often combined, and the type of data in line 1 is followed by a

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[487] In the case of finds made in contexts of transportation (ship-wrecks) or storage, it has been assumed that the vessels in question were part of such a firing load. This assumption is to a certain degree plausible. Indeed, we can assume that the vessels concerned were made within a short period, even if not fired together. A summary about such finds is given by Mees (1995, 59–66).

[488] Pucci (1993, 75).

[489] Strobel (1992, 45).

[490] On the writing Marichal (1988, 21–56).

[491] Cf. ibid. 57–102.

line such as line 2.[492] The Latin list is a new find.[493] The interpretation of the data in the head section is very difficult (except for the Latin calendar date of some lists, cf. list B 3), and will be discussed in detail below.

Table 4.

	List A, Gaulish	List B, Latin
1	*Avtagis cintvx XXI*	*Flamine P[*
	Tvðos decometos lvxtos	*Sabino Flamine*
	casidani Tri(tos) Mon[tanos	*XVII K Avgvstas oneratvs*
	canastri S= CXXX	*est fvrnvs sextvs*
5	*mortari S= CCC*	*Vrbanvs S= ΘL*
	mortari == CCC	*== CCCC*
	canastr - == CCL	*pedales L*
	Albanos - panna S= ~CCL	*Primvlvs pannas MMΘ*
	Masvetos - panna S= CLL	*Candidvs acitabla ///ΘC*
10	*Felix - catili - ~D*	*Calvvs catilla MΘCCCCLXXV*
	Cotvtos - ~CCC - catili	*Callistvs parapsides //ΘCCCCL*
	Masvetos - catili DCC	*Privatvs vinaria CC*
	Deprosagi - paraxidi - ~~DL	*atramentari CL*
	Tritos - dvci - Vindvlvs - licvias - X̄~C~[	*pvltari ΘC*
15	*Masveto - acitabli - V̄//D*	*calices CCC*
		Pavlinvs catilla MMMCC
		Tiberivs catilla MΘL
		imbractariae CC
		Qvartio calices ΘCCCC
20		*Secvndinvs catilla ΘC*
		Saciratvs pannas == CC
		Svmma vxxedia X̄X̄XCCLLLV
	producer's stamp: OF CASTI	producer's stamp: OF.RVFI

Lines 8–15 of specimen list A are typical of the lists' main section. For instance, in line 8 Albanus is the name of the producer. He delivered *panna*, bowls, of the diameter *S=* (i.e. *bessalis*, two thirds of a Roman foot[494]), namely 1,250 specimens.[495]

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[492] Lines 1 and 2 are taken from *Mar.* 1, line 3 from *Mar.* 2, the remaining lines are from *Mar.* 13.

[493] Bémont/Vernhet (1990/91).

[494] These measures and their respective abbreviations are based on the duodecimal system: = = is four, namely four ounces, 4/12, or one *triens* made up by two *sextantes*; *S=* is *semis* + *sextans* equalling two *trientes*, two third (*bes*). Cf. Marichal (1988, 47–8) with references.

Sometimes two manufacturers are mentioned together such as *Tritos - dvci - Vindvlvs* in line 14; *dvci* being a Gaulish conjunction. These potters seem to have cooperated, perhaps by jointly leasing a workshop. In any case, such cooperations were rather temporary than permanent, for eight out of the fifteen potters listed together with a colleague occur in different combinations.[496] Many lists have some entries without a producer's name, e.g. lines 4–7 of list A, normally on the top or bottom of the main section.

The entries are arranged by shape and size of vessels. Soup-plates (*canastri*), mortars (*mortari*), and bowls (*pannae*) are in general to be found at the top of the listing, followed by plates and platters (*catilli/catini*), and beakers and cups (*acitabli*, *paraxidi/parapsides*); special forms could be stored at various positions. Large vessels of one form precede smaller ones. The producers are normally of little importance in this regard. Archaeological finds of reject vessels melted together during firing also show that the products were sorted primarily by form and size, not by producer.[497] Masuetos, for instance, is mentioned in lines 9, 12, and 15 of list A. The purpose of this sorting system is simple: it is the most effective way of piling vessels (the ones on top of the lists being the first ones loaded). Sometimes this rule is broken by a list-in-the-list such as lines 4–7: one would expect the *panna bessales* (lines 8+9) to come before the much smaller *mortari trientales* and *canastri trientales* (line 6+7). Nonetheless, these come first as belonging to the unnamed producer of the vessels listed in lines 4–7.

Apart from spelling mistakes and variants, irregularities occur which seem to be more than simple oversights. In the specimen list A, this seems to be the case with line 11 where the number comes before the name of the vessels, or with line 13 where the producer is named in the genitive case.

3.2.4.2. Language of the firing lists and organization of production

The head section of the most complete lists is linguistically 'pure', i.e. written completely either in Latin or Gaulish. There is only one exception, namely a list with

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[495] The numerical symbol ~ means 1,000 and is a form of the old Gaulish character for this number, ∞, a modification of the Greek character Θ.

[496] Polak (1998, 121).

[497] Marichal (1988, 104), Polak (1998, 120–1), with further references.

a Gaulish head containing a Roman date.[498] The head section can contain three elements.[499] Not all heads show all of them, and the order of the elements varies. The only element which does not need interpretation is the Roman calendar date. With the one exception mentioned above, it occurs in Latin lists only. It seems that there is no Gaulish equivalent of it, unless line 1 of list A is interpreted as such.[500] Many lists contain the combination *furnus* + ordinal number, sometimes in the formula *furnus oneratus* (list B, 3–4) or *furnum oneravi*.[501] The Gaulish equivalent of this is *tuðos* + ordinal number, sometimes in the formula *tuðos luxtos* (list A, 2) or *tuðos luxtodos*.[502] The third element is the combination *flamine* + personal name in the ablative case. Sometimes two *flamines* are mentioned (list B, 1–2). The Gaulish equivalent of this is *casidano* + personal name or *casidani* + two personal names (list A, 3). The distinguishing function of personal names is served by the endings of the second declination: *-us* in Latin, *-os* in Gaulish lists. On this basis, 45 graffiti have been defined by Marichal as Latin,[503] and 58 as Gaulish.[504] A large number of graffiti cannot be attributed to one of these groups because of their fragmentary state.[505]

In a few cases, Latin and Gaulish elements are mixed, e.g. Gaulish words going together with Latin endings of personal names.[506] Where *-us* and *-os* endings occur mixed in one list, this is likely to be the result of compiling the list from Latin and Gaulish notes.[507] Where terms are mixed which cannot be copied from notes, we can assume that the scribe used a language mixing Latin and Gaulish terms. The best

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498 *Mar.* 28,1.

499 In three lists the term *legitum* or *legitumu* occurs in the head lines (*Mar.* 4,2; 6,1; 8,2). It has been suggested to interpret these letters as *legitumum* – as a controller's mark (Marichal 1988, 95 with references to earlier contributions). However, due to the scattered publications of potters' stamps it was unknown to the interpreters of the graffiti that a potter called Legitumus existed. Of Legitumus only few stamps are known. He is likely to have worked in the Claudio-Neronian period (Polak 1995 cat. entry Legitumus). The scarcity of evidence makes it uncertain whether he is identical with the Legitumus who produced moulds for Drag. 29 under Vespasian (Vernhet 1993, 55; Mees 1995, 156). In the lists in question, Legitumus is not referred to as a producer, but as a *casidanos*.

500 Fülle (forthcoming).

501 *Mar.* 47,1; 48,1; 70,1.

502 *Mar.* 4,1–2. The exact meaning and grammatical form of these Gaulish phrases is unknown. Cf. the discussion of various interpretations in Marichal (1988, 99). For us it is sufficient to see that they clearly had the same function as their Latin counterparts.

503 *Mar.* 47–72, 74–83, 87, 97, 99, 112, 118, 124, 161, 164, 169 (this one is not a firing list) plus the two new finds (Bémont/Vernhet 1990/91; 1992/93).

504 *Mar.* 1–46, 85, 86, 88–93, 94–96, and *Mar.* 168 and 212, which are not firing lists.

505 *Mar.* 73, 84, 98, 100–11, 113–17, 119–23, 125–63, 165–7 (total 56).

506 E.g. *Mar.* 17, 30, 93.

507 E.g. *Mar.* 4; 7 and 12. For examples of notes and partial lists, see below p.120. Cf. also Marichal (1988, 104).

example of this is the list *Mar.* 30 with a Gaulish head, but with frequent use of the Latin term *idem* wherever a person is referred to more than once in a row. It is, however, not necessarily so that the scribe spoke such a mixed language. In the case of *Mar.* 30 it is also conceivable that a Latin speaking person was working in a shop where Gaulish dominated (be it that most workmen spoke Gaulish, or – more likely – the *officinator* was Gaulish). Therefore, the head of the list was written in Gaulish. When compiling the list, the Latin speaking scribe could have used the term *idem* inadvertently.

The usage of two languages indicates that two groups of potters existed. However, the 'mixed' lists show that these groups do not equal two clearly divided groups of producers.[508] The best explanation may be that persons with a different linguistic background worked together. Nevertheless, the lists' headings suggest that in each workshop one language dominated.

A further linguistic subdivision of the lists, and at the same time of the workshops, can be determined on the basis of the use of technical terms. Out of 27 terms for vessels 21 are Latin, be it literary, vulgar, or of Greek origin; three more are of unknown, probably Latin, origin, while another three are perhaps Gaulish.[509] The predominance of terms of Latin and Greek origin is not surprising, for most forms of vessels are based on Hellenistic models.[510] Of 21 adjectives describing vessels, only eleven are clearly or probably of Latin or Greek origin. They specify either the form of the vessel such as *ansatus*, *rostratus*, and *ovatus*,[511] or refer to the vessels' red colour, such as *aematinus,*[512] *burrus,*[513] and *miniatus*.[514] The origin of ten adjectives is unknown; they are most likely Gaulish. All measurements are stated in Latin. The total number of terms for the vessels' form and colour (i.e. nouns, and nouns plus adjectives) used in the lists (61) is higher than the one of archaeologically known forms (38).[515] We can

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508 Strobel (1992, 38–9 with n. 69) contra Marichal (1988, 70), who considers all lists as containing a vulgar-Latin on a Gaulish basis.

509 Marichal (1988, 83–92).

510 Vickers/Ippey/Allen (1986); Vickers (1994).

511 *Mar.* 16,10; 85,6.7; 165.3.

512 *Mar.* 154,6; 165,2.

513 *bur[* (*Mar.* 74,10).

514 *]niati* (*Mar.* 163,3).

515 Marichal (1988, 80) lists 60 different designations. We have to add one (*calices*; cf. Bémont/Vernhet 1990/91). If a form of vessel was made in various sizes, it is nevertheless counted as one form only.

assume, therefore, that not all workshops used all terms; the vocabulary of the various workshops is likely to have differed.

Analyzing layout and hand-writing, Marichal divided 99 out of 168 firing lists up into 35 groups, each group written by a certain 'hand'.[516] In a further step, he arranged these groups into larger ones by common characteristics, such as language, technical terms describing vessels, findspot, and named manufacturers. As a result, he proposed the existence of at least five so-called clienteles. The products of the members of each clientele were fired in common. According to the findspots of the graffiti, the clienteles were active a few hundred metres apart from each other.[517] The continuity and unity of the clienteles with regard to the persons belonging to them are, however, limited. In addition to the core of each clientele, consisting of potters referred to in all or most lists concerned, 'outsiders' are mentioned only in some lists. A small number of potters seem to have changed the clientele, for they are encountered in two or three of them.[518]

All this, combined with the fact that La Graufesenque was not the only place on the territory of ancient Condatomagus where *terra sigillata* was made,[519] leads to the conclusion that the production of this ware in the area in question took place in a number of separate potters' quarters. The cooperation between these quarters seems to have been limited, for with a high degree of cooperation or centralization the technical terms would inevitably have become identical. On the other hand, the producers do not seem to have been indissolubly attached to a certain quarter.

The names occuring in the lists are Latin and Gaulish one-piece names, many known as *cognomina*.[520] Out of 141 names 130 can be assigned to linguistic groups: 63 are Latin, 44 Gaulish, eleven Celto-Latin, three Graeco-Latin, and nine Greek. It is, however, questionable whether all Latin names represent persons with an Italian

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516 Marichal (1988, 107–8). Some of these groups comprise only one list, and the largest consists of ten. The remaining 69 lists are too fragmentary to be analyzed in that manner.

517 Oxé (1925, 40–1) divided the graffiti found by Hermet into two groups. Marichal's division gets support from recent research. Polak (1995, 79–81) grouped forty-seven firing lists, each containing at least two personal names, with the help of a correspondence analysis. Although this is a limited approach, for characteristics other than the producers' names are not taken into consideration, it can be used as a means of controlling the correctness of the division suggested by Marichal.

518 Cf. the table 'Clientèle flottante' in Marichal (1988, 108).

519 It seems that *terra sigillata* was made at five other places during the period of activity of La Graufesenque. A sixth place was active in the third and fourth centuries. Cf. Bet/Delage/Vernhet (1994, 44).

520 Cf. Marichal (1988, 93–4).

background. Even if quite a number of such 'Romans' were active in Gaulish *terra sigillata* production, it seems unlikely that they made up nearly 50 per cent of the workforce. We can assume that some natives used Latin names. In a number of cases the Latin and Gaulish version of one and the same name is known: Latin Primus or Primulus is Gaulish Cintusmus; Secundus is Allos; Tertius is Tritus; Quartus is Petrecus; Amandus Carilus; Primigenius Cintugenus; Felix Matugenos; Albus Vindulus; in other cases it is possible that a Gaul used a Latin alias with a similar sound, e.g. Scota – Scottios, or Magio – Magnus.[521] This assumption is backed by a comparison of names in the graffiti and on producer stamps. Stamps seem to be more Latinized, all Latin and Celto-Latin names having the ending *-us*. A large number of indigenous names do not appear on stamps at all. Perhaps the potters thought it more appropriate to stamp Italian-style ceramics with Latin names. However, there are also Latin names known from the graffiti, but unknown on stamps. In this regard differences between Latin and Celto-Latin on the one hand, and indigenous names on the other are obvious. Of the Latin and Celto-Latin names 74 per cent are known from lists and stamps, whereas only 36 per cent of non-Latin names are represented on both. As we have seen above, the reason for the non-appearance of some Latin names on stamps may be that the persons in question did not produce stamped forms.

3.2.4.3. Social status

The firing lists offer no clue to the problem of the potters' social status, for neither the names themselves nor any additions to them reveal the social status of the persons referred to.[522]

However, the use of slave labour in *terra sigillata* production at La Graufesenque is proved by two graffiti, namely the so-called 'memorandum' of Atelia[523] and a contract of purchase of a slave.[524] The time of origin of the memorandum is A.D. 70–100. In this fragmentarily preserved graffito a number of at least six slaves of a certain Atelia, *Ateliae pueri*, is named. In addition, it is noted which slave did what kind of

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521 Ibid. 94 and 267.

522 The reading of *Mar.* 76,1–2, as a slave's name by Marichal (1974, 92–3), used as an argument by Strobel (1987, 100), has been corrected by Marichal (1988, no. 76 with n. 2 and 3). The new reading excludes that the two lines in question form a slave's name.

523 *Mar.* 169, Marichal (1988, 106).

524 *Mar.* 211.

work for what period, e.g. *Agileius dies XIIII s(emis) ar[gilam*, Agileius for 14 ½ days to the clay processing/extraction. Other activities were the preparation of fuel, *mat]eriem erigenda* (*sic*), the preparation, or application, of the slip, *ad samiandum*, and activities at the market, *mercatu.* All these tasks did not require special skills. The total period of the slaves' employment was from the 22nd of July to the 23rd of August. On the other side of the same plate the lease of a mule is noted: *mulio Candidi Uri d(ies) XXV*. Unfortunately the graffito is very fragmentary, thus we do not learn who made use of the slave labour and of the mule. The legal basis of this use of slave labour provided by an outsider is unknown: Was it part of a more comprehensive, long-term arrangement between the producer and Atelia, or a short-term contract concluded only for this occasion?

It seems that the *Ateliae pueri* were not agricultural slaves hired to the potters in a period of agricultural inactivity, for July and August are a period full of work in the country.[525] Thus we can assume that the slaves were purchased by Atelia for the very purpose of being hired to the potters. Given the volume of pottery activities at La Graufesenque, the demand for temporary auxiliary work force must have been sufficient a basis for a specialized business of this kind. Although the assumption that Atelia was a landowner[526] is not backed by the evidence, it is a plausible hypothesis.

The contract of purchase of a slave is written in correct Latin and dates from A.D. 80–120. This graffito also proves the application of Roman law and typical legal formulae in the context of *terra sigillata* production at La Graufesenque.[527]

3.2.4.4. Interpretation of the terms *tuðos/furnus*

The word *tuðos* followed by an ordinal number or numerical symbol is very frequent in Gaulish lists' heads.[528] This also applies to its equivalent *furnus* in Latin lists.[529] The ordinal number following these terms obviously refers to the number of the *tuðos* or *furnus* concerned.

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525 Observed by Strobel (1987, 109–10).

526 Strobel (1987, 105–7).

527 It reads: *]. uanto oppa[/]emit hominem [nomine / s]iue is quo alio no[mine est.* Cf. Arangio-Ruiz (1943) no. 88 (A.D. 142): *Dasius Breucus emit mancipioque accepit puerum Apalaustum siue is quo alio nomine est*, cf. also no. 89: *emptio ancillae* (A.D. 160).

528 It appears in 32 lists, cf. the index 'Vocabulaire' in Marichal (1988, 277–8).

529 It appears in nine lists. The number is smaller, because the Latin lists are in general much more fragmentary than the Gaulish ones.

Furnus means 'domestic oven', but also 'oven/kiln' in general.[530] A graffito on a brick from Thoranne-Haute, Basses-Alpes (c. A.D. 200), reads *supposuit furno III Idus Iulias / die Solis / abuit tegulas / imbrices*.[531] Here *furnus* means clearly 'kiln'. At first sight, this seems to be the case at La Graufesenque, too.

However, this interpretation faces a number of difficulties. The Gaulish equivalent of *furnus*, *tuðos*, has seemingly nothing to do with ovens, kilns, and fire; Celticists have suggested that it stems from the root **tus* meaning 'group, mass, total, pile'.[532] Here another interpretation comes into play. If *tuðos* equals *furnus*, it could mean 'load, firing load', namely the total of vessels fired in one kiln. Then the lists would each refer to a certain firing round. Marichal supports this interpretation by a line of graffito *Mar.* 83 reading *incepit furnus primus*.[533]

On the other hand, it has been suggested that *tuðos* 'group, mass, total, pile' refers to the kiln itself, which is made by piling up building material such as stones and bricks.[534] The line *incepit furnus primus* does not militate against this interpretation, for it can also be translated as 'the first kiln starts' (firing).

The phrases *furnus oneratus est* and *furnum oneravi* also cannot be used as decisive hints.[535] *Onerare* does not only mean 'to load something with something', but also 'to put something into something'.[536]

As for the numbers combined with the terms in question, all ordinals and numbers between one and ten are found. Only two graffiti seem to have a number higher than ten: *Mar.* 30 has LV, and *Mar.* 66 has XVI. Can we assume that 55 kilns were used simultaneously? This seems scarcely likely, for if so, the total output of the production centre would have been improbably high. The better preserved lists have an incomplete total of 25–30,000; in some cases a sum (*summa*) between 28,500 and 34,625 is mentioned at the end of the lists.[537] Kilns with a capacity of about 30,000 vessels were certainly not made for occasional use. If one allows one month for a

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530 Marichal (1988, 95), Strobel (1992, 43).
531 Marichal (1988, 18 and 95).
532 Ibid. 96–7 with references.
533 Ibid. 97.
534 Strobel (1992, 44).
535 As far as I can see, this argument has not been used so far.
536 Although this meaning is known to us from poetic texts only (*vina cadis* Vergil *Aeneid* 1.199; *dona Cereris canistris* Vergil *Aeneid* 8.180), we cannot exclude the possibility that it was used in everyday language as well.
537 *Mar.* 17,6: 30,100; *Mar.* 18b: 34,625; *Mar.* 20,18: >30,250; *Mar.* 22,15: 33,500; *Mar.* 23,18: 28,500.

complete firing round – Atelia's slaves were hired for about one month – and reckons with a period of pottery making activity from March to October, 55 kilns would have produced more than 12 million vessels per year, and 120 million in ten years. Other researchers come to even higher results.[538] The main distribution area of La Graufesenque, however, did not even cover the whole of Gaul and the two German provinces.[539] The total population of these provinces has been estimated to be between nine and sixteen million.[540] In view of the fact that neither *terra sigillata* was the only kind of ceramics nor La Graufesenque the only *terra sigillata* production place, it seems most unlikely that so large an output could be sold.

However, the reading of the line in question (*tuδos - lv* .[) as *tuδos 55* is not conclusive.[541] In fact, it depends on the interpretation of the dot after *lv*. Dividing dots on this graffito are mainly written as a hyphen such as the one before *lv*. This is not so with the crucial one. There is a large number of dots on the plate in question, looking exactly like the one in question, but without any relation to the text. Thus it seems to be more reasonable to understand the dot in question as an accidental one. As a result, *lv* may be interpreted as belonging to a word beginning with these characters, e.g. *lvxtos* or *lvxtodos*.[542] Alternatively, *lv* can well be an abbreviation of *lvxtos*. Abbreviations of this kind are often encountered in the lists, e.g. *pe* for *pedalis* or *ux* for *uxedi*.[543] Marichal's objection against this interpretation, namely that in all other cases *tuδos* is followed by a numeral and only then by *lvxtos*, is not convincing.[544] The line in question is exceptional anyway, it contains after the lacuna a number of words which have not found an interpretation so far and do not turn up elsewhere in the graffiti.[545] Thus, a sentence construction different from the heads of all other lists would not be surprising.

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538 Vernhet (1991a, 37) reckons with a minimum output of 600 millions in a period of 40 years ('hypothèse basse'; 50 kilns holding 25,000 vessels on average fired at fortnightly intervals from April to September).

539 Cf. the map in Woolf (1998, 196, fig. 7.3).

540 Ibid. 138 with n. 106 (with references).

541 Strobel (1992, 39 with n. 77).

542 Ibid. Cf. *tuδos decometos - lvxtos* (1,2) and *tuδo]s - alos - lvxtos* (8,1). For the interpretation of *tuδos lvxtos* as equivalent of *fvrnvs oneratvs*, see Marichal (1988, 99) and here p.102 with n. 498. In the graffiti known to Marichal only the formulae *oneravi fvrnvm* (47,1) and *fvrnvm oneravit* (72,1) occur for certain. The new find (Bémont/Vernhet 1990/91; specimen list B here) has the formula *oneratvs est fvrnvs*.

543 *pe*: *Mar.* 2,6.7 and 11,6, *vx*: *Mar.* 16,14–18.

544 Marichal (1988, 158).

545 Line 1 reads in full *tuδos - lv.[. . . .].pe argant[. . .]ebi* - Marichal (1988, 157–8) suggests to interpret *argant* as the name Arganthonius, a name, however, which does turn up neither on other graffiti nor on producers' stamps.

The second case of a *tuðos/furnus* number above ten is also debatable. The Latin graffito *Mar.* 66 consists of a fragmented vessel of which not all extant sherds can be put together to form *one* body. As it happens, the decisive line 1 in Marichal's reconstruction of the graffito is written on three sherds which do not verge on each other. Hints indicating how these sherds should be positioned are the direction of the handwriting and in the case of one piece the vessel's edge. Depending on how these separate pieces are positioned, the first line of all three equals line 1 of the graffito, or partly line 1 and partly line 2 of it. In Marichal's reconstruction each of the sherds contains a part of line 1. Then this line would read *XI[. . .]asfurnus on[. . .]s XVI*, the eleven being part of the calendar date, the sixteen the number of the *furnus* referred to and the word after *furnus* reading *oneratus*.[546] Even if this interpretation were correct, the position of the sherd in the suggested reconstruction does not really fit. If one fills the lacuna with letters from this graffito in the way suggested by Marichal, it turns out that there is at least one letter too less. It seems that the middle fragment had better be moved a few millimetres towards the right one. However, it is equally possible to move it a few millimetres upwards and then to interpret the first letters of fragment no. 3 as belonging to line 2. Then the XVI would refer to vessels listed in line 2. Sixteen is a quite small number in this context, but there are examples of similarly small quantities of vessels.[547]

The result of this somewhat complicated and lengthily discussion is that all arguments hitherto posited to solve the question of what *furnus/tuðos* means are not conclusive.

However, there is another way of approaching this problem. The last two lines of graffito *Mar.* 14 form an entire phrase reading *sioxti Albanos / panna . extra tuð ccc.* Albanos is a potter's name, *panna* means bowls, *tuð* can be completed to *tuðos*, *extra* does not need to be explained, *ccc* is 300, and *sioxti* is completely unknown. As we have seen above, Latin and Gaulish terms are very often mixed in the graffiti. Sometimes Latin words such as *idem* or *summa* occur in otherwise Gaulish lists.[548] Thus it is not surprising to encounter a phrase written in a Gallo-Latin mixed idiom.[549] This

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[546] Marichal (1988, 178).

[547] *Mar.* 30, line 4: *pannae sattla [...] XVII*; *Mar.* 32,4: *pedalos . lv*; *Mar.* 10,3: *mortari xxx*; *Mar.* 2,6: *regenos . pe(dalis) xxxv*; *Mar. 2,7: eti . mortari . pe(dales) . xiix.*

[548] *idem*: *Mar.* 30, *summa*: *Mar.* 17; 20; 22; 23.

[549] Meid (1980) speaks of a 'gallisch-lateinisches Mischidiom.'

phrase has been translated as 'Albanos has delivered 300 bowls outside the bill', and explained with the hypothesis that after the kiln had been loaded some space left free was filled with Albanos' 300 bowls.[550] But why should the technical term for this be 'outside the bill, outside the firing cycle'? Why did the scribe not put the entry in question just in the normal way in the last line, noting down the name of the producer, type and number of vessels? That Albanos had already delivered 1,300 *pannas* according to line 4 of the same graffito cannot be the reason, for it is not unusual that a producer is recorded with the same type and size of vessel more than once in a list.[551] The position of the lines in question is also exceptional: they are written on the right margin from top to bottom, although there was enough space left at the list's end. The unusual position of the text stresses its unusual content.

All this can be explained in two ways. First, let us assume that Marichal is right, *tuðos/furnus* means firing cycle, and the 300 *pannae* were loaded into the kiln already filled with all the items listed in the normal way. This interpretation has an interesting implication, namely that the list was not closed when the kiln was full, but rather when other criteria had been met. After the closure of the list, additional vessels could be fired *extra tuðos*. Therefore, *tuðos* means not only firing cycle, but also 'contract, agreement' or 'number of contracts or agreements made to fill the kiln.'

This explanation seems to be very plausible, but it might be not the only possible one. Alternatively, let us assume that *tuðos* means kiln. Then it is conceivable that Albanos delivered for firing the 1,300 *pannae* mentioned in line 4, but for some reason the firing master did not manage to pile all vessels into the kiln. In this case, 300 out of Albanos' 1,300 vessels were left outside the kiln, *extra tuðos*. The phrase in question would then mean 'Albanos left 300 *pannae* outside the kiln'.

However, the total number of vessels in this load strongly suggests that the first interpretation is correct. On the graffito in question 25,070 vessels are listed plus the 300 *pannae extra tuðos*. Only two lines are fragmentary;[552] they are on the top of the list where normally large vessels in small quantities are recorded. Therefore we cannot expect the total number to be much higher; certainly there are fewer than 1,000 vessels to add. This makes the load in question one of the smallest. There is only one

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[550] Marichal (1988, 137).

[551] Cf. e.g. *Mar.* 6,12 and 14; 7,12.13; 10,13.14; 23,5.6; 46,6.7; 90,6–8.

[552] Plus two others, belonging to the list's head.

list which is definitely smaller, *Mar.* 12 with 25,380 vessels. All other lists with less vessels are much more fragmentary, especially towards the bottom where small vessels in large quantities were recorded, so that their total is in fact unknown.[553] The majority of the lists contained more than 30,000 vessels.[554] Thus the very small total number of vessels in the graffito in question suggests that there was some space left in which Albanos' 300 *pannae* were put. In addition, *pannae* are always found in the upper part of the lists, suggesting that they belonged to the forms put into the kiln first. This does also apply to the 1,300 *pannae* of Albanos mentioned in line 4 of the list. Thus it is most unlikely that 300 out of the 1,300 were left over when the kiln was full.

To sum up, the evidence supports the interpretation of *tuðos* as firing load. Linguistic problems can be solved by understanding the object of the terms as 'firing load (*tuðos*) on order fitting into one kiln (*furnus*)'.

If *tuðos* means not only 'firing cycle', but also 'contract,' 'agreement,' or 'number of contracts or agreements made to fill the kiln', this would require two contracting parties, one of them financially responsible for the firing, the other one for the production of the vessels.

We can exclude the possibility that the potters made contracts with the firing master to have their products fired. In this case Albanos would have entered into a contract to have his additional 300 *pannae* fired (*locatio conductio operis faciendi*). His vessels would have become part of the *tuðos*. This, however, did not happen.

We can also exclude the possibility that the person responsible for the firing was working for the potters on the basis of a *locatio conductio operarum*. Albanos is mentioned with 1,300 *pannae* in the customary manner. Thus he would have belonged to the group paying the firing master for his labour. This labour would have been the firing of the kiln, independently of how many vessels each potter supplied. One may assume, however, that the list was used to figure out each potter's share of the firing

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553 *Mar.* 9; 11; 15; 19; 46; 47; 83.

554 Most of the better-preserved dockets list nearly 30,000 vessels, although they are fragmentary and thus incomplete. Very often the last lines, normally listing large numbers of small vessels, are missing. Thus we can assume that the complete lists contained approximately 30,000 vessels or more. Cf. *Mar.* 2: 28,693 (incomplete); *Mar.* 3: 29,825 (incomplete); *Mar.* 4: 31,010; *Mar.* 5: 28,420 (incomplete); *Mar.* 6: 29,110 (incomplete); *Mar.* 7: 29,915 (incomplete); *Mar.* 8: 29,195 (incomplete); *Mar.* 10: 30,350; *Mar.* 16: 29,855 (incomplete); *Mar.* 17: *summa* 30,100; *Mar.* 18: *summa* 34,625; *Mar.* 20: *summa* > 30,250; *Mar.* 21: 27,990 (incomplete); *Mar.* 22: *summa* 33,500; *Mar.* 23: *summa* 28,500; *Mar.* 85: 29,740 (incomplete); Vernhet/Bémont (1993): *summa* 30,355.

costs. Still, in this case too it would have been superfluous to note down Albanos' 300 *pannae* separately.

Graffito *Mar.* 14 shows, therefore, that it must have been the person financially responsible for the firing who made contracts with the producers. Once the producers had fulfilled their individual supply contracts, the *tuðos* was closed. If there was space left in the kiln, potters could have some vessels fired '*extra tuðos*'. Whether the potter had to pay for this service or received special payment for additional vessels, and how and to whom these vessels were passed on, remain open questions. In any case, the graffiti were in the first place a means of recording who had fulfilled his supply contract.

It needs to be stressed that this interpretation does not totally depend on the understanding of *tuðos/furnus* as 'firing load'. Even if these terms mean 'kiln', the lists still should be seen in the way suggest here. The *extra tuðos*-entry shows in any case that the primary purpose of the lists cannot have been to count the vessels piled into the kiln. If Albanos' 300 *pannae* were left outside the kiln, we must ask why they were listed none the less. The answer may be that he had made a contract to supply 1,600 *pannae*, but delivered 300 of them late: the firing master accepted this late delivery, noting down that the vessels in question were not piled into the kiln.

As for the type of contract made by the firing master or a third person and the potters, we cannot exclude that it was an *emptio venditio* or a *locatio conductio operis faciendi*. However, the potters' mobility suggests that they did not own their workshops but leased them. Thus it is possible that the production of a certain number of vessels was part of the lease contract. The papyri discussed above in Section 1.3.1. show how such contracts could look.

In any case, once the potters had handed over the vessels to the firing master, their contract was fulfilled. They did not bear the risk of damages occuring during firing, such as overheating. If the firing master became the owner of the vessels, the full risk fell on him. However, what happened if he acted for a third party, e.g. the landowner or a trader? The characteristics of the firing process suggest that the firing master cannot have borne the risk. The reject rate has been estimated to be between 10 and 30 per cent.[555] Even if it was as low as 5 per cent, this would mean in the case

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[555] Vernhet (1981, 43).

of a kiln filled with 30,000 vessels that 1,500 vessels were damaged. If the firing master was liable for this damage, he would have been ruined soon.

The allocation of liability depends on the type of contract.[556] If the firing master was working as a wage earner, i.e. as a *locator* in a *locatio conductio operarum*, he was liable only for *culpa* and *dolus*, the ordinary *periculum* being borne by the owner of the goods. The problem here is whether unavoidable reject was looked upon as the result of *culpa.* It must have been impossible to draw a dividing line between an unavoidable reject rate and damage caused by faulty operation of the kiln. In addition, the reject rate depended to a certain degree on the quality of the unfired vessels.

The legal position of the firing master was even worse if he was working as a *conductor* in a *locatio conductio operis faciendi*. In this case he was not only liable for *culpa* and *dolus*, but also for *imperitia*, *custodia*, the fault of his assistants, and even accidential damage (*vis minor*). Only after approval and acceptance of the work by the *locator* (*adprobatio operis*) did the risk of accidental damage or destruction fall on him.

We can exclude that the *officinator* responsible for the firing process could avoid ruin under such rules. Thus we must assume that his contract included a disclaimer of liability. Such a disclaimer was used by glass cutters making diatreta ('cage-cups,' *Netzgläser*). Their situation was very similar to that of the firing masters: the nature of the material and the production process made damage very likely. *Et ideo plerumque artifices convenire solent, cum eiusmodi materiae dantur, non periculo suo se facere, quae res ex locato tollit actionem et Aquiliae* (Dig. 9.2.27.29).

3.2.4.5. Numbers recorded in the lists

The numbers recorded in the lists also support the hypothesis of the existence of some central management. The system of counting the vessels is based on the figures 1,000 and 100 and their most simple fractions (halves, quarters). Numbers such as 10,000, 7,500, 2,500, 1,000, 500, 250,[557] and so on, cannot be the result of potters

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556 For the allocation of liability, cf. Molnár (1977) and Zimmermann (1996, 385–7 and 397–406).

557 This can be inferred from the numbers listed in the tables 'Vases figurant sur les bordereaux' in Marichal (1988, 250–9). Fifty-five out of the 184 numbers higher than 1,000 are figures in the thousands, 25 in the five-hundreds, seven are two-hundred- or seven-hundredfifties. As to the 388 numbers smaller than 1,000, we encounter seventeen five-hundreds and seven two-hundred- and seven-hundredfifties. All these numbers are clearly based on the figure 1,000. The remainder is based on the figure 100. Sixty-six out of the numbers higher than 1,000 are figures in the hundreds, 27 in the fifties. As for the numbers smaller than 1,000, we encounter 155 figures in the hundreds, 52 in the fifties and nine in the twenty-fivers. Numbers not based on 1,000 or 100 are either extremely

(continued on next page)

piling up their products in piles of twenty, ten, or five beside the next kiln until the firing master decided that it was enough to fill the kiln.[558] It is scarcely likely that these numbers are the result of rounding, for at times large numbers which are far from round are listed (e.g. specimen list B line 10: *Calvvs catilla MΘCCCCLXXV*, and line 11: *Callistvs parapsides ΙΙΘCCCCL*).

All this suggests a different scenario: the person financially responsible for the firing (not necessarily identical with the one actually organizing the firing), made contracts with the potters for the supply of set numbers of vessels. Most potters were able to meet their contracts, some were not. The latter are the odd cases in which the numbers suggest that this was just the amount of vessels finished when the firing started. Calvus seems to have had a contract of 2,000 vessels, but for some reason delivered only 1,975. The same applies to Callistus, who delivered 2,950 vessels instead of 3,000.

3.2.4.6. A *collegium funeraticium* at La Graufesenque?

R. Marichal suggested that in the sixties of the first century A.D. a *collegium funeraticium* was founded at La Graufesenque, which played an important role in the organization of the production. Many terms in the firing lists have been interpreted by him in the light of this assumption. The term *casidanos* and its Latin equivalent, *flamen,* are understood as the title of the eponymous magistrates of the *collegium*.[559] Their occurrence in the graffiti is seen as a means of dating, and line 1 of graffito *Mar.* 1 (cf. Table 4, list A, 1: *autagis cintux XXI*), is interpreted as a way of counting firing cycles on the basis on the Roman five-year period, the *lustrum* (suggested translation: 'twenty-first firing load of the first *lustrum*'). The questionable fifty-fifth firing load discussed above is used as prove of the existence of a five-year cycle.[560]

According to this hypothesis, existing social and organizational structures were cast into the mould of a Roman-type *collegium* as soon as this became legal. The supposed *collegium* is looked upon as the organizational framework of major common

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rare, namely in the group of numbers above 1,000 where we encounter only five of them, or comparatively small. Among the numbers smaller than 1,000 are 97 such numbers, 48 out of them are smaller than 100, and seventeen smaller than 200.

[558] Marichal (1988, 103).

[559] Ibid. 98 with references, 109.

[560] Ibid. 97–8.

activities, such as the building of sanctuaries, streets, and drainage installations. In addition, it is thought to have played an important role in the organization of production.

However, the traditional assumption that after the ban of *collegia* under Caesar and Augustus *collegia tenuiorum* were generally permitted by a *senatus consultum* between A.D. 41 and 55 has been disproved meanwhile.[561] The inscriptions in question do not allow to assume the existence of a general permit of *collegia tenuiorum* in this period; they refer to single cases only.[562] In addition, economic matters did not belong to the range of activities of *collegia tenuiorum*.[563] As for Gaul in particular, neither *collegia* nor *corpora* turn up on stone inscriptions before the second century A.D.[564] However, in the first century a number of inscriptions were set by craftsmen acting together without making up a formal *collegium*.[565] This indicates the existence of informal associations of craftsmen based on Gaulish traditions. Unfortunately, we do neither know whether such associations were permanent, nor how they were organized, nor what their area of responsibility was (apart from setting tombstones for members and honorary inscriptions for the Emperor and municipal magistrates). One might argue that these associations were in fact true *collegia*, though without using the term *collegium*.[566] However, this remains speculative, for in a historical situation in which *collegia* needed an imperial privilege, it would seem somewhat incomprehensible why this privilege should not be expressed.

3.2.4.7. Interpretation of the terms *flamen/casidanos*

The meaning of *flamen* in classical Latin is priest. Of *casidanos* the second part, *dan, dannum* or *dannus* is more or less clear, it means *iudex, curator, magister*.[567] Unfortunately, the meaning of the first, and decisive, part of the term, *casi-*, is obscure and has various possible meanings. It has been suggested that it stems from the root **kad* like the Old-Irish *cais* 'to shine, to distinguish oneself' and thus means 'well placed', 'pleasant', and 'superior, senior', or, alternatively, after the Old-Irish *cà(i)d*

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561 Ausbüttel (1982).
562 Ibid. 28–9.
563 Ibid. 99–100.
564 Kneißl (1998, 431–2).
565 Ibid. 432–3.
566 Ausbüttel (1982, 20).
567 Marichal (1988, 98) with bibliographical references.

'venerable, pure, holy'.[568] That the Latin equivalent of *casidanos* was *flamen* strongly supports the interpretation of *casi-* as 'venerable, pure, holy,' for then a direct translation of *casidanos* as *flamen* with the meaning 'priest' becomes possible.

The translation of *casi-* as 'superior, senior' has led to interpretations of *casidanos* as *magister figulorum*, inspector, superintendent, or director.[569] After the discovery of the Latin equivalent of *casidanos*, *flamen*, these interpretations have been modified on the one hand to 'eponymous magistrate of the local *collegium funeraticium/ tenuiorum*',[570] and on the other hand to 'master of the flames', 'firing master'.[571]

General arguments against the assumption of a local *collegium tenuiorum* have already been produced. But even if there was a *collegium* or a similar informal association, the use of the term *flamen* would remain unsuitable. The association in question would have been undoubtedly a professional one, its magistrates being active as pottery producers.[572] In a professional context, the title of senior magistrates was never *flamen*; professional associations were always led by *magistri*, *magistri quinquennales*, or *quinquennales*, the latter being an abbreviation of *magistri quinquennales*.[573] *Flamines* turn up only in inscriptions of religious *collegia*, but even there very rarely.[574] In addition, dating by eponymous magistrates was entirely unusual; instead, professional associations used to date their inscriptions by their *lustra* numbered since the association's establishment.[575]

Among the many etymological theories on the original meaning of *flamen,* one suggests that the term stems from *flamma* and has something to do with the fire of the sacrifices.[576] This meaning would be rendered roughly as 'person responsible for the fire', 'firing master'.[577] Following this theory, it has been maintained that the original meaning of *flamen* was perpetuated in the language of craftsmen, and is for the first time encountered in the firing lists. *Casidanos* is thus interpreted as 'the person who

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568 Ibid.
569 Ibid.
570 Marichal (1988, 110).
571 Strobel (1992, 42–3 with n. 91 and 96).
572 For details, see (Marichal 1988, 109).
573 Royden (1988, 12–17).
574 Ausbüttel (1982, 51–2).
575 Royden (1988, 15).
576 On the etymologies of *flamen*, see Vanggaard (1988, 32–9).
577 Strobel (1992, 42 with n. 91).

correctly gives the flames (or the vessels) their shine'.[578] This is, of course, a highly speculative hypothesis.

On the other hand, we have quite a number of hints that the most obvious interpretation of *flamen/casidanos* as priest in an eponymous function is correct. The provincial *flamines* who are often mentioned as a possible model of the *flamines* at La Graufesenque[579] are unlikely to have played such a role. These provincial *flamines*, normally Roman citizens, were elected for one year *ex consensu provinciae*.[580] It is much more likely that municipal priests were the role models in question. Municipal priests of various gods and cults were often called *flamines*; especially in Gaul where they are not only encountered as priests of the imperial cult, but also of various gods.[581] Municipal *flamines* were elected for one year and could hold the priesthood more than once; *flamines bis* and *iterum* are mentioned on inscriptions.[582] The fact that these municipal *flamines* were elected shows that they were not professional priests, but had another occupation. The *flamines* at La Graufesenque were also active as *terra sigillata* producers; their names are found as potters' names in various graffiti and on producers' signatures.[583] In addition, the graffito *Mar.* 74 has after the title and name of a *flamen* the numeral III, which can be interpreted as *tertium*.[584] That references to *flamines* are often found in connection with a calendar date supports the interpretation of their being a means of dating.[585] The best example is the head of the Latin specimen list (Table 4, list B). Both the ablative case and the position of the reference to the *flamines* clearly show that this reference is part of the dating. To suggest a different interpretation would be to tendentiously lead the evidence. The sanctuaries excavated at La Graufesenque could have been the place of activity of these priests.[586]

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578 Ibid. 43 with n. 96.
579 E.g. Marichal (1988, 98), Vernhet/Bemont (1993, 13).
580 Riewald (1920, 1653).
581 Ibid. 1652.
582 Ibid.
583 For details, see Marichal (1988, 109).
584 *Mar.* 74, 1.2. Alternatively, the numeral III can be understood as part of the calendar date, for the line in question is fragmentary.
585 *Mar.* 74,18–9; *Mar.* 32,2; specimen list B.
586 *Fanum* I mid-first century (c. A.D. 60), *fanum* II Augustan. Vernhet (1987, 122–4), Marichal (1988, 110), Pons/Pretre (1992, 27).

The problem ultimately could be solved if we find a graffito combining such a dating with the phrase *oneravi furnum*, such as in graffito *Mar.* 47,1. This would show conclusively that the person who filled the kiln was not identical with the *flamines*.

3.2.4.8. The firing masters

If it was not the *flamines/casidani*, who organized the firing? One possible answer is that it was the producer whose name is stamped on the plate used as writing material. These persons are never mentioned in the firing lists written on their vessels (see e.g. the two specimen lists, Table 4). In addition, on the top of some lists we encounter a number of anonymous entries giving details of vessels and their respective numbers, but not the producer's name (e.g. specimen list A, 4–7). These facts have led to the suggestion that the anonymous entries refer to the producer to whom the plate belonged.[587] According to this interpretation, the producer in question was at the same time the person responsible for the firing. He and his aides would use his plates as writing material for notes and lists.

Recently an alternative explanation of the anonymous entries has been produced. The new graffito M.57.2 (Table 4, list B) has its *svmma* noted down: *svmma vxxedia* $\overline{XXX}CCLLLV$. However, the total number of vessels is not 30,355 but rather 19,925. In addition, the first three entries of this list mention the name of the producer, the diameter of the vessels, and their number, but not the type of vessel. Both facts have been explained by assuming that the graffito in question is the second page of the complete list, with the missing 10,000 vessels and the unknown type of vessel being listed on page one.[588]

However, this explanation is not satisfactory. In some cases anonymous entries are to be found on complete lists, the *svmma* and the actual number of vessels being identical.[589] This clearly demonstrates that anonymous entries are not (or at least not always) the result of the lists being divided into two 'pages'. The assumption that 10,000 vessels were listed on a lost first page is implausible anyway, for why should this page list only so small a number? And why should page two have its own head?

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[587] Marichal (1988, 105–6) with references to earlier accounts.
[588] Bémont/Vernhet (1990/91), Polak (1998, 119).
[589] Cf. n. 591.

The stamps on the vessels serving as writing material cause further problems. How can it be explained that the persons referred to on them never turn up on the respective lists, even if these lists do not contain anonymous entries?[590] Can we suppose the firing master used his own plates as writing material, but did not fire his own products in the load in question? It seems more plausible to assume that in these cases the firing masters' vessels were not included in the list, but were registered separately. This hypothesis would also solve the problem of why the *svmma* sometimes differs considerably from the number of vessels listed. The answer is that the *svmma* comprehends all vessels of the firing load, including those of the firing master – even if the latter are not listed. This hypothesis is proved by the fact that lists in which the *svmma* and the actual number of vessels differ considerably have no anonymous entries, whereas in lists with anonymous entries the *svmma* and the actual number of vessels are identical.[591] Clearly, the production of the firing master was either listed 'anonymously' (in fact, everybody knew who was meant), or separately.

In the case of two potters referred to by stamps on lists, Castus and Germanus, kiln furniture stamped with their names supports their identification as firing masters.[592]

That firing masters did not hold this position permanently is shown by graffiti which record persons known as firing masters from other graffiti as normal

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590 *Mar.* 1, 3, 4, 5, 6, 7, 9, 11, 12, 14, 16, 19, 20.

591 Lists without anonymous entries: *Mar.* 20: *svmma* 30,250, total number of vessels 25,120; M.57.2: *svmma* 30,355, total number of vessels 19,925. Lists with anonymous entries *Mar.* 17: *svmma* 30,100, total number of vessels 29,790 (the difference of 310 vessels is easy to explain: the last letters of line 11 are crossed out, if this happened deliberately or accidentally is of no importance for the question dealt with here); *Mar.* 22: *svmma* 33,500, total number of vessels 33,845; *Mar.* 23: *svmma* 28,500, total number of vessels 27,400 with two fragmentary lines (2 and 4), so that the original total must have been somewhat higher. (In the case of *Mar.* 20 it depends from a single fragmentary line whether there is a difference of approximately 5,000 vessels between the *summa* of 30,250 vessels in line 18 and the real total of vessels. The decisive line is line 17 where the last – already fragmentary – letter is at the same time the first letter of a Roman numeral. The question is if this letter was a 'V' or an 'X' (with a line on top denoting a figure in the thousands). All interpreters except Marichal suggest that the letter in a question is a 'V', and this with good reason (Hermet, Loth, Oxé, Whatmough; cf. the critical apparatus of Marichal 1988, 146). The second diagonal line (written from top left to bottom right) of the 'X' is in all cases on this graffito straight, and the second diagonal line (written from top right to bottom left) ends more on the left side than the first line. The letter in question does not have a straight line from top left to bottom right, it is crooked exactly like the first line of the letter 'V' in this graffito (written from top left to bottom right). Nor is there a trace of the second line of an 'X'. So the interpretation of the half letter in question as a 'V' is epigraphically better founded. Marichal suggests nevertheless to read 'X', because he wants the *svmma* to be correct.)

592 Hermet (1934, plate 116, figs. 13 and 15), Vernhet (1981, 36, fig. 9,1).

producers.[593] It is conceivable that only potters with a long experience became firing masters.

As for the entries without specification of the form of vessel, the explanation is that in all lists containing *canastri* these vessels are listed at the top (additional entries can also be listed further below). Thus we can assume that the lines 5-7 of the graffito M.57.2 also refer to this type of vessel.[594] Moreover, other lists show that *canastri* were made in all three sizes mentioned in the lines in question (*bes, triens, pes*). Entries without specification of the form of vessel further below in the lists obviously refer to the last form mentioned above them.

3.2.4.9. The firing procedure

Marichal interpreted some very short graffiti as constituting notes and labels.[595] According to his view, the potters transported their vessels to the kiln where they stacked the vessels in piles of five, ten, or twenty. They arranged these piles in lines by type of vessel, and a plate with a short note giving the number of vessels was put on top of one of the piles, e.g. *Mar.* 166 reading *catili boletari ~~CC[* and *Mar.* 167 reading *catili boletari ~D*. On the basis of these labels, the firing master or his aides made a note such as *Mar.* 164:

Privatvs dat ca[/Reginvs dat ca[

In addition we know so-called partial lists, e.g. *Mar.* 163, listing the products of one potter only:

Secvndini
catili boletari ~DC[
magedes S= CL == CL
sattla LXX
sattla LX - VIII
parasides [...]niati ~~DC[

Perhaps Secundinus had placed his vessels separately, or perhaps this is a list of the firing master.

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[593] Castus as producer on lists of Martialis: *Mar.* 12,3–5; 14,3.
[594] This was already suggested by Oxé (1925, 68).
[595] Marichal (1986, 18–9), Marichal (1988, 104–5).

The kiln being full, these notes and partial lists were put together, and the final list compiled. This explains the many irregularities in the lists mentioned above, the many spelling variants of potters' and vessels' names: the notes and partial lists were made by different persons. This is no wonder, for filling a kiln with tens of thousands of vessels certainly required several days and several hands. The person who finally put together the total list copied the notes and partial lists as they stood.

As for the procedures of piling up the vessels and compiling the lists from notes and partial lists, this interpretation is without a doubt acceptable. However, the general idea of potters piling up their products first, and the filling of the kiln being organized afterwards, cannot be correct.

The filling of a kiln containing 30,000 vessels needed a central management, fixing the amount of vessels to be delivered by each individual potter in advance. As we have seen, the consequence to be drawn from the phrase *extra tuðos* is that the numbers were not only set in advance, but depended upon agreements which took first place before practical needs such as the complete filling of the kiln. In this light, the notes and partial lists may have had an additional function. They were perhaps not only a means of compiling the final firing list, but also – and this in first place – receipts for the producers. This would explain why they were fired: it would have been superfluous to fire notes and partial lists, if they were nothing more than that, but it was important for the potters to get receipts for their vessels as proof that they had fulfilled their contracts.

3.2.4.10. Specialization in the products

Often the degree of product specialization, i.e. the number of different vessels made by one manufacturer, has been determined on the basis of data taken from the graffiti.[596] However, comparison of the range of vessels named on the graffiti and the range of vessels actually found, proves this approach to be useless. Indeed, the degree of specialization of a certain producer can be inferred neither from the graffiti nor from finds of vessels with name stamps. Each type of evidence represents often only a small part of the range. For instance, of Albinos' production only *vinaria* (wine-jugs) are mentioned in the graffiti.[597] He was, however, no specialist in this kind of vessel.

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[596] E.g. Oxé (1925, 90–1), Strobel (1987, 107; 1992, 47).

[597] All data in this paragraph are taken from Marichal's index 'Production des différentes potiers' (1988, 244–9).

Archaeological finds show that he made at least nine other forms. The same applies to his colleague Albus who threw according to the graffiti *mortaria* only, but is known from archaeological finds to have made thirteen forms. In the case of Primos, archaeologists found nineteen forms of ceramics manufactured by him, although only three types of vessel are named in the firing lists. The opposite case, i.e. more types of vessels mentioned in the graffiti than are archaeologically verifiable, also occurs. Privatos, for instance, made according to the graffiti at least five different types, but only one form of vessel has been found so far.

3.2.4.11. Interpretation of the term *autagis*

The term *autagis* in *Mar.* 1,1 (Table 4, list A, 1), a *hapax legomenon*, has been interpreted by Celticists as equivalent of the Greek διάταξις (distribution, disposition); in the context of the graffito, it has been explained as 'une division supérieur au *tuðos*'.[598] Marichal suggests interpreting *autagis* as the Gaulish translation of *lustrum*, with graffito *Mar.* 1,1 referring to the very first *lustrum* of the newly founded *collegium.*[599] According to this hypothesis, the dating on the basis of *lustra* was used to count the number of firing cycles in the five-year period; thus the load in question would have been the twenty-first. The interpretation of *Mar.* 30 as a firing load with the number 55 is an essential part of this interpretation.

To solve the problem that only a single graffito has the term *autagis*, Marichal claims that the firing lists are nothing but copies for the potters who had a share in the respective firing load; only the original list is thought to have had a complete head.[600] The exceptional occurrence of the line in question is explained as a scribe's slip. According to this interpretation, once the fired vessels had been returned, the lists lost their importance as evidence for the potters' share of the load. Thus it was not necessary to provide them with long-period dating.

From what has been said so far in this chapter, it is evident that this interpretation cannot be maintained. Moreover, it is obvious that the line in question itself has no explanatory value. Neither the meaning of *autagis* nor the one of the numbers is known. All this offers no clue to any relevant question. All interpretations

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[598] Vendryes (1924, 36), Billy (1991, s.v. *autagis*), Lambert (1995, 132).
[599] Marichal (1988, 96–8, 106).
[600] Ibid. 105. Strobel (1992, 45 with n. 121) suggests that the differences in the arrangement of the lists' heads are due to the varying habits of the various workshops.

of this line are therefore inevitably based on preconceived assumptions on the organization of production. We cannot ask what we are to learn from this line; we can only examine if it can somehow be integrated into explanatory models available. Thus I refrain from discussing possible hypotheses in detail.[601]

3.2.5. Summary and Conclusions

The very size of the production installations from the main export period suggests that somebody must have invested considerable capital to establish a large *terra sigillata* production centre designed for mass production. As we have seen for the building of the large kiln, even stones from a distant quarry were procured. It seems unlikely that a community of migrating potters was in a position to finance and organize such work. We have no justifiable grounds to assume the existence of a professional *collegium*. Neither the members of the clienteles, nor the firing masters, nor the book-keepers (the 'hands') were constant, there being a fluctuation everywhere. Producers do not seem to have been attached to a certain workshop, kiln, firing master, or quarter.

All this leads to the conclusion that the potters (including the firing masters) were not the owners of their workshops. On the other hand, the frequent use of the stamp formula *ex officina alicuius* indicates that the persons referred to were not mere employees. Clearly, they had the position of *officinatores*. It is scarcely likely that the enormous number of vessels registered under the name of a single person in some of the potters' lists had been made by one potter. Thus at least some of the *officinatores* must have supervised several workmen.

Taking all these aspects into consideration, a leasehold system such as the one discussed above in Section 1.3. is likely to have been the legal and organizational basis of the potters' activities. The firing lists are evidence of a structure stable in itself, but flexible as for the positions of individuals in it. In the context of a leasehold system, this means that potters changed workshops when lease contracts expired.

If the basis of the organization of production was a leasehold system, the lessors financed the building of the production installations. Thus the question arises, who were the lessors? The gigantic volume of production in the heyday of the centre must

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601 For a detailed discussion, see Fülle (forthcoming).

have required the involvement of large-scale traders. Finds dating from the first century B.C. show that Italian luxuries had found their way to Condatomagos early, so that the local elite could develop a taste for them.[602] Local potters, inspired by the imports, started copying Italian vessels, until some decades later Italian specialists introduced the original technology. In view of the fact that landowners and traders must have played a decisive role in the main export period, we can hypothesize that they also did so in the initial phase. The traders are likely to have made arrangements for hiring or acquiring Italian specialists. Whether it was they or the landowners who initiated this project does not matter, for it could in any case be realized in cooperation only. In view of the fact that the making of *terra sigillata* at La Graufesenque does not seem to have been related to farming activities, it is conceivable that the landowners were not directly involved in the organization of production. Perhaps they leased the land to traders who then erected workshops and subleased them to the individual *officinatores*. It is also possible that landowners and traders formed a *societas*, with the landowners providing land and raw material, and the traders bringing in specialists and organizing production and selling. Taking the enormous volume of production into consideration, the traders are likely to have had representatives at La Graufesenque.

The interpretation of the firing lists enables us to infer the existence of a system in which the person financially responsible for the firing concluded contracts with the producers to deliver set numbers of vessels. It is possible that the firing master, a potter himself, entered into a contract with the landowner or a trader. Acting as a kind of middleman, he would then have contacted his colleagues who, acting as sub-contractors, produced a part of the load on order. Alternatively, it is conceivable that the firing master was acting on behalf of a third party. This party would have entered into contracts with the individual potters. It is possible that the production of set numbers of vessels was part of the potters' lease contracts. The firing master would have had the task of approving and accepting the potters' work (*adprobatio operis*). The firing master himself was in a special position; his products were listed either 'anonymously' or separately. In any case, the firing lists were primarily a means of recording who had fulfilled his supply contract and to what degree.

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602 On these processes, see Woolf (1998).

Although it is clear that *terra sigillata* potters were specialists in so far they made primarily or only this one kind of pottery, it does not seem that they each specialized in the making of a few forms of *terra sigillata* only. In addition, it is doubtful whether there was any specialization within the workshops. Almost all mould makers also made moulded and plain vessels. The use of temporarily-hired auxiliary labourers shows that the organization of tasks not immediately related to the shaping of the vessels was not characterized by strict subdivision of labour. The labourers were each occupied with various tasks, doing some days this and some that. Undoubtedly, these workshops were not organized as manufactories: the mode of production was a nucleated workshop industry.

The person availing himself of the temporarily-hired labourers was involved in the preparation of clay, the making of vessels, and the firing. These characteristics are best met by the firing masters. That the *officinator* in question hired six or more[603] slaves as auxiliary labourers suggests that his workshop must have been at least medium-sized. In this shop the entire process of pottery making, including the preparation of the clay and the firing, was in one hand. This weighs against the possibility that specialists were responsible for the preparation of the raw material.

There is no doubt that the vessels of various producers were fired jointly. Since we can exclude the possibility that the potters' stamps were of any use for the compilation of firing lists, the loading of the kiln, or the controlling of individual potters' output, a joint use of drying shelters for the most frequent forms of vessels appears to be the best explanation for the application of stamps. As far as mould signatures are concerned, for ornamental, abbreviated, and infra-decorative ones any function outside the production itself is out of the question. We can assume that they played a role in the exchange of moulds on the basis of lending. In addition, intra-decorative signatures can be explained as a kind of promotion within the production centre.

In the sixties and seventies of the first century A.D., some producers – be it the potters themselves and/or decision-makers in the background – were strongly interested in increasing productivity. To reach this aim they enlarged the workshops, developed new forms of vessels which were easier to make, and lowered quality

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[603] It is possible that the fragmentarily preserved graffito listed more slaves.

standards. As a result, vessels made in medium quantities, such as Drag. 37, no longer needed to be stamped.

We do not not know the social status of the majority of potters. Some appear to have been free men. On the other hand, a few potters' stamps suggest that at least some of the *officinatores* had dependants. It is conceivable that they bought slaves and trained them. Some of these dependants worked as *officinatores* on their own. Groups of potters with identical *praenomen* and/or *nomen gentile* may be interpreted as *familiae* of *officinatores*. In addition, slaves were employed as unskilled labourers, temporarily hired from external slave owners. That the potters bought and sold slaves is shown by a graffito with a contract of purchase of a slave, written in correct Latin. This contract proves the application of Roman law in the context of *terra sigillata* production at La Graufesenque. Latin appears to have had the status of an official language used for business transactions.

3.3. Lezoux

The pottery workshops situated in the area of the modern town of Lezoux and its environs (département du Puy-de-Dome) were the main source of *terra sigillata* in second-century Gaul. The evidence from this centre consists of potters' marks, graffiti, and excavated production facilities. The potters' marks used at Lezoux are by no means as informative as the ones from Arezzo, and the graffiti are two little fragments only. A large excavated area such as at La Graufesenque is also lacking. However, in recent years a considerable number of small but well documented excavations have been conducted. They supply us with information which is not available from other important production centres. A number of separate and distant potters' quarters could be located. Several kilns and other installations from various periods have been excavated, so that it is possible to trace the development of technology, and define its relation to mass production. Other finds tell us about the role of landowners in the establishment of pottery production. Characteristics of the various potters' quarters show how varied the development at one centre could be. These aspects will be the main focus of this chapter, preceded by an outline on the production of *terra sigillata* in central Gaul, and a discussion of producers' marks and graffiti from Lezoux.

3.3.1. Lezoux and the production of terra sigillata in central Gaul[604]

The production of *terra sigillata* in central Gaul developed in five steps, and in this development Lezoux always played the role of trend-setter.

The first central-Gaulish proto-*sigillata* emerged in the early first century A.D., when at various places indigenous potters started copying Italian products. At many production places no trace of prior pottery production has been ascertained. This has been explained by the prerequisite of high-quality clay not being available at traditional pottery production sites, so that the potters who wanted to make *sigillata* had to move to areas with better clay.[605] On the other hand, this might be a gap in our knowledge; in Lezoux, for instance, only in recent years have traces of pottery making activities in the La Tène period been found.[606]

After a few years the production of proto-*sigillata* in central Gaul was almost totally abandoned, only Lezoux going on producing plain and moulded ware. Potters at other sites switched over to various other types of table and coarse ware. This development coincided with the start of the production of high-quality *terra sigillata* at La Graufesenque. Perhaps the availability of this indigenously made tableware of Italian quality attracted potential buyers far more than the then comparatively poor central-Gaulish ware, so that the making of the latter became unprofitable. On the other hand, the number of 187 potters attested for first-century Lezoux suggests considerable activity at this place.[607] Unfortunately the vague dating of first-century potters does not offer us a clue in the question of how many of them were active in which period.[608] In this period, the distribution of the products was merely regional.

It needed a long time until central-Gaulish potters took up the production of proto-*sigillata* on a larger scale. In period of the decline of La Graufesenque they still had not acquired the skills for making the fine slip typical of genuine *terra sigillata*. However, vessels with decorations more elaborate than before were made at Lezoux during this period, and other places also started throwing proto-*sigillata*. It was only under Hadrian that the technology of the making of real *terra sigillata* became available

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[604] In this section I follow Vertet (1986, 123), except where otherwise stated.
[605] Vertet (1986, 123).
[606] Bet/Wittman (1995, 205).
[607] Cf. below.
[608] Bet/Delage (1993, 325 with n. 46).

to the central-Gaulish potters, with Lezoux leading the way. This period and the decades to come were an era of enormous increase of output and exportation.[609] Central-Gaulish products became available to the whole of central and northern Gaul, including the two Germanies and southern Britain, with central Gaul being the core area of distribution. This development reached its peak in the second half of the second century. However, Lezoux never approached the level of the output and distribution of La Graufesenque.[610]

The end of the second century already saw the decline of exportation, and in the early third century central-Gaulish *terra sigillata* production had fallen back to mere regional importance.[611] The quality of the products soon declined to the level of so-called proto-*sigillata*.[612] The discovery of buildings which were destroyed by fire in the mid-third century has led to the suggestion that Lezoux was burnt down in the course of Alemannic invasions.[613] In any case, only a few workshops struggled on, making *terra sigillata* of poor quality until the first half of the fourth century.[614]

3.3.2. The archaeological site of Lezoux[615]

Due to lack of archaeological information it is impossible to say if in antiquity a settlement existed at the place of the castle hill and the medieval town centre. The area of pottery production belonged to the district of the Averni in the Roman province of Gallia Aquitania, and was 30 kilometres away from the capital of ancient Auvergne, Augustonemetum (Clermont-Ferrant). Lezoux is likely to have been close to the Roman trunk-road from Lugdunum to Burdigala via Augustonemetum, although its route is not yet fully known. The river Allier runs at a distance of 7–8 kilometres from the workshops. Two finds of ship-wrecks show that the river was used for the transport of *terra sigillata*.[616]

The workshops of Lezoux do not form a single agglomeration, but several. First excavations in the area of Lezoux were carried out as far back as the second half of

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609 Goudineau (1981), Marsh (1981).
610 Marsh (1981), Polak (1995).
611 King (1981; 1984).
612 Picon (1989b, 31–2).
613 Bet/Gangloff (1987, 156) with reference to Plicque and Déchelette.
614 Bet/Wittman (1995, 205).
615 See Bet/Vertet (1986, 138–9), Bet (1988, 221–2), Bet/Delage/Vernhet (1994, 43–4), and Provost/Mennessier-Jouannet (1994, 113–6) for this section.
616 Unfortunately no details of these finds are available.

the eighteenth century by N. de Blanval; while a hundred years later A. Plicque undertook excavation work at various places. Unfortunately, there is no detailed documentation of these activities, but only vague reports, part of them being lost meanwhile. In the first half of the twentieth century, a number of amateur researchers of local history undertook excavations and collected vessels. The period of professionally documented excavations undertaken by archaeologists began in 1958. Since then a large number of explorations and excavations of varying extent have been undertaken. Unfavourable to archaeological work, the modern commune of Lezoux is densely populated, so that excavations have always been cramped for space.[617]

The fertile plain of the Limagne borders on the area of pottery production which is characterized by sandy soil. Large clay layers of very homogeneous quality were available. In the northern and south-eastern part of the modern commune of Lezoux, vast areas appear not to have been inhabited in antiquity; they are looked upon as having been thickly wooded. Various construction elements of marble were found in Lezoux, which has led to the suggestion that a temple or a *villa* was located there. In neighbouring communes, traces of mosaics, marble construction elements, and *tubuli* of hypocaust heating have been unearthed at a number of places; in two cases aerial photographs have revealed the existence of large *villae*.[618] The pottery associated with these finds suggests that the sites in question were already inhabited in the first or second centuries A.D.

3.3.3. Potters' marks and graffiti

At Lezoux, we encounter a variety of potters' marks. On plain *terra sigillata* and moulded bowls of the form Drag. 29, internal bottom name stamps are to be found. Moulded vessels sometimes bear infra- or intra-decorative mould stamps, as well as hand-written mould signatures. Instead of internal bottom stamps, moulded vessels of the form Drag. 37 from the second half of the second century often bear external stamps applied to the actual vessel. They were normally placed in the zone above the decoration, but can also be infra- and intra-decorative, or be applied to the outside

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[617] Bet/Gangloff (1987, 158).

[618] Provost/Mennessier-Jouannet (1994, 88, 106–7, 190, 318–9, and index 352).

bottom. Finally, marks are encountered on tools, especially moulds where they were applied externally. Apart from name stamps, ornamental stamps were used.

The evidence of potters' marks from Lezoux is difficult to handle. In most respects the difficulties are the same as with marks from La Graufesenque. Because of the lack of an up-to-date catalogue the researcher is compelled to use works with dated entries.[619] Another difficulty is the simplicity of marks which normally contain only a single name, mostly a *cognomen* and sometimes a *nomen gentile*. The formulae of stamps and signatures are the same as at La Graufesenque.[620]

The number of potters' names on plain ware found at the production centre itself is for the first century 187, whereas 484 names are attested for the second and early third centuries.[621] The highest number of potters' and mould makers' names cited for Lezoux in recent publications is 1,200.[622] However, in the absence of a comprehensive and up-to-date catalogue such numbers are merely rough guesses. For the main period of activity, the second century, the number of potters is likely to have been more or less in the same region as La Graufesenque with its 600 potters.

Plain *terra sigillata* from the first, second, and early third centuries is normally stamped – exceptions will be discussed below, whereas vessels from the second half of the third and the fourth century bear no stamps at all.[623]

3.3.3.1. Potters' marks and the organization of production

As with the *terra sigillata* from La Graufesenque, the application of internal bottom stamps is confined to certain forms of vessels. It has been suggested that the stamps had a decorative function rather than denoting the 'piece-worker' (*tacheron*)

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[619] Until the New Index of Potters' Stamps is published, the catalogues by Oswald (1964) and Hofmann (1971) are the best available. On the limits of these works, cf. n. 355.

[620] On formulae used at Lezoux, see Bet/Delage (1991, 195). They interprete the stamp MAMMIF as perhaps referring to a *figlina*. However, Mammi Figuli is much more likely. Cf. the Arretine stamps A.VIBI/FIGVLI (*CVArr* 2324); SENTI/FIGVL (*CVArr* 1731); SESTI/FIGVL/OPT (*CVArr* 1794); A.TITI/FIGVLI and A.TITI/FIGVL/ARRET (*CVArr* 2002).

[621] Bet (1988, 227).

[622] According to Bet (1988, 227), the number of potters' names found on plain *terra sigillata* at Lezoux plus those which have been attributed to Lezoux because of their pattern of distribution is as high as 950. About 100 unreadable stamps have to be added. For the total number of 1,200 potters and mould makers known from, and attributed to, Lezoux, cf. Bet/Delage/Vernhet (1994, 44) and Provost/Mennessier-Jouannet (1994, 120). The number of 3,000 potters' names, 70 workshops with a total of 160 kilns, 40 of them in a good state of conservation, which have allegedly been found by de Plicque in the last decades of the the 19th century could never be verified; even his notes are untraceable (Provost/Mennessier-Jouannet 1994, 114 and 135).

[623] Bet (1988, 236).

who made the vessel.[624] Yet the assumption that the stamps had no practical function could be rejected in the case of La Graufesenque. At first sight this seems to be more difficult with Lezoux. The lack of data about the quantity in which the individual forms of vessels were thrown makes it impossible to come to a final decision as to whether or not there is a relationship between production output and stamping. However, there are very clear hints that exactly such a link existed. In the absence of numerical data a look into survey publications makes it sufficiently clear which are the 'principaux types de céramique sigillée non décorée' from Lezoux.[625] Fortunately, there is more or less complete information available as to whether or not certain forms were normally stamped.[626] The result of the comparison of data is unambiguous: with the exception of one form, all cups, plates, and platters cited as main forms are normally stamped.[627] As for large bowls, which were without a doubt made in smaller, i.e. medium, quantities, the result is also as to be expected: three of these forms are occasionally stamped, two never, while for one no information is available.

The internal bottom stamps on Drag. 29 and the equivalent external stamps on Drag. 37 provide another argument against the assumption that stamps at Lezoux were merely decorative. Drag. 29 and 37 are the only moulded forms bearing producers' stamps.[628] At the same time they are by far the most frequent forms of moulded vessels made at Lezoux. This also shows that a relationship exists between the frequency of a vessel and the use of stamps.

As in La Graufesenque, Drag. 37 gradually replaced Drag. 29 in the last quarter of the first century.[629] Unlike in the Rutenian production centre where Drag. 37 vessels were never fitted with stamps, at Lezoux some producers marked their Drag. 37 on a regular basis.[630] Drag. 29 bowls seem to have been stamped by all producers making this form. This suggests that an alteration of the production conditions

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624 Bet/Fenet/Montineri (1989, 37–8).
625 Bet/Vertet (1986, 140).
626 Bet/Fenet/Montineri (1989). In most cases the authors say whether or not a form is normally stamped. Sometimes, however, this information is lacking (e.g. for Drag. 43 and Drag. 15/17).
627 The exception is Drag. 35/36.
628 Bet/Delage (1991, 194–5)
629 Provost/Mennessier-Jouannet (1994, 120) ('vers les années 70'), Stanfield/Simpson/ Birley (1958, xxxvi and pl. 170) on second-century producers of Drag. 29.
630 Bet/Delage (1991, 195), Stanfield/Simpson/Birley (1958, pl. 164 with seven bowls Drag. 37 stamped by Cintusmus).

similar to the ones at La Graufesenque took place, namely an enlargement of existing workshops or the building of larger ones. Indeed this happened, as we shall see below in the discussion of the development of production installations.

There are two possible reasons that Drag. 37 was nevertheless stamped by some producers. First, the fact is important that the stamping of Drag. 37 seems to have been confined to the short period of massive export production after A.D. 140.[631] Thus it is possible that the extreme increase in output forced some producers to use shared drying facilities for their Drag. 37, which procedure they would normally avoid. Alternatively, some smaller producers may have continued stamping their decorated bowls after switching to Drag. 37. However, the state of research and publication of signed decorated vessels from Lezoux, esp. Drag. 29, is not yet advanced enough to come to final conclusions here.[632]

All in all, these arguments should be sufficient to put forward the claim that it was not the wish to decorate the vessels which made the potters stamp them, but the need to distinguish vessels stored in shared facilities.

On the other hand, it seems that the use of stamps at Lezoux was much more inconsistent than at La Graufesenque. There are, for example, some plain forms which were mass-produced, but never stamped.[633] Others may alternatively be stamped with name stamps, ornamental stamps, or remain unstamped.[634] Yet others are stamped only very rarely.[635] The varying use of stamps is likely to be the result of varying production conditions.

Archaeological evidence is available for the shared use of production facilities. In some potters quarters at Lezoux – especially in the second half of the second century A.D. – very large kilns were used to fire the vessels collectively of a number of potters.[636] In waste pits reject vessels of a large number of potters were found together. Since not all vessels were stamped, it is unlikely that the stamps' purpose was to separate the products after firing. This suggests an organization of firing

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631 Mees (1994, 21).

632 Bet/Delage (1991) give in the catalogue section of their publication on potters' marks on decorated bowls from Lezoux only data on external potters' stamps, although they briefly discuss the fact that Drag. 29 was stamped internally on a regular basis.

633 E.g. the shallow cups and bowls Drag. 35, 36, 38 and 42.

634 E.g. the cup Drag. 27 and the large bowl Drag. 33.

635 E.g. the bowls Drag. 44, Walters 81, and the mortar Drag. 45.

636 Cf. below Sections 3.3.4 and 3.3.5.

similar to that at La Graufesenque. However, obviously less hard-wearing writing-material was used for the potters' lists.

Names inscribed on firing tubes, which are also known from potters' stamps, suggest that the potters themselves charged and fired the kilns.[637] These marks do not necessarily indicate the potters' ownership of the kilns. In fact, quite the opposite is the case. If a potter owned a kiln and used it specifically for his own pots, it would have been superfluous to mark the kiln furniture. Perhaps the kiln was used by a number of potters one after the other, each using his own kiln furniture. In any case, the use of marks on kiln furniture once more suggests shared use of resources.

Shared facilities must also have played a role in other Lezoux quarters, where smaller kilns were the norm.[638] Often these kilns were arranged in batteries, the clay procession areas being far too large to have belonged to individual workshops. This organization of space is against a neat subdivision in individual workshops, each with its own clay-processing area, drying facility, kiln, and store. Part of the pattern encountered at Lezoux fits in far better with the system of hiring out shares of a production centre, such as reported in the Oxyrhynchos papyri.

On the other hand, Lezoux was not entirely dominated by this pattern. Smaller first century installations were not always replaced by larger ones, but redesigned to produce higher quality in larger quantities.[639] The production took place in a number of separate, distant quarters with varying characteristics.[640] All this combines to suggest that it was indeed this diversity of production conditions that led to the diversity in the use of stamps.

The phenomenon of late Lezoux *terra sigillata* not being stamped anymore can also be explained with the use of shared facilities as the reason for the stamping of vessels. In comparison to the heyday, the production output of this late period was tiny; its distribution merely local. Thus the number of potters and production installations needed must have been considerably smaller. Production installations of earlier periods must have been available in abundant supply. For this reason the sharing of facilities was no longer necessary, and with it the marking of vessels.

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[637] Bet/Delage (1993, 314–5), Desbat (1993, 363).
[638] Cf. below Section 3.3.4
[639] Cf. below Section 3.3.5.
[640] Cf. below Section 3.3.4.

A wide-spread notion in the interpretation of potters' marks from Lezoux is that *fecit*- and *manu/s*-stamps refer to the actual maker of the vessel in question, whereas *officina*-stamps are thought to name the owner of a larger workshop.[641] This interpretation must be rejected on the grounds discussed in detail in the chapter on La Graufesenque.[642]

3.3.3.2. Social status

Duo or *tria nomina* of free Roman citizens are extremely rare on signatures from Lezoux,[643] as are marks possibly denoting dependants. In fact, unlike at La Graufesenque, there is no stamp that proves the latter for certain by the grammatical case of the personal names. The only stamp which would do so reads BVTVRO GERMANI and was found at Langres.[644] It could be related to the stamp BVTVRO, which has been attributed to Lezoux because of the distribution of this potters' products.

We do know a few stamps where two persons might be referred to, such as NAMIL.CROESI[645] and METTI MASCVLI.[646] These marks can refer to dependent persons; but the interpretation as *gentilicium* plus *cognomen* is also possible.[647] On moulds from Lezoux hand-written signatures are very common.[648] Situated on the moulds' outside, they are not to be seen on the vessels. One *ante cocturam* signature on a Drag. 37 mould reads SEVE/SIRI MAN, which has been interpreted as referring to an association of two persons, Severus and Sirus, or denoting dependence.[649] As

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641 E.g. Bet (1988, 227–8).

642 Cf. above Section 3.2.3.4.

643 Stamps denoting *duo* or *tria nomina* for sure or almost certainly are BELSA. ARV (Hoffmann 1971 no. 24), C.ALBINIOF (Bet/Delage 1991 no. 1), GAI IVL (*sic*) (Oswald 1965, 130), IVL.NVMID (Hoffmann 1971 no. 98), IVL VIB (Oswald 1965, 333), C.PI (Hoffmann 1971 no. 56), C.A.RVSSA (Hoffmann 1971 no. 40), FV.IC/NATT (Hoffmann 1971 no. 196) = C. Iulius Ufnatt? [G.F.], L.ADN.ADGENVS (Hoffmann 1971 no. 27), QIBALBINIOF (Bet/Delage 1991 no. 170), Q.VAL.AT (Bet/Vertet 1986,143), Q.V.C. (Oswald 1965, 256), R.D.L. (Hoffmann 1971 no. 146).

644 Oswald (1965, 50).

645 Hoffmann (1971) no. 131, cf. no. 139: NAMILIANI.

646 Oswald (1965, 204).

647 See Solin/Salomies (1994, 118) for Mettius as *gentilicium* (= *CIL* XIII 2214). The stamp NAMIL.CROESI is used as the one example of the existence of a *gentilicium* beginning with Namil by Solin/Salomies (1994, 124) with reference to W. Schulze, *Zur Geschichte lateinischer Eigennamen* (Berlin 1933), 442, and *CIL* XII 5686, 625, whereas the stamp NAMILIANI is used as evidence for the existence of a *cognomen* Namilianus (Kajanto 1965, 151, with reference to *CIL* VII 1336, 746). As other examples do not exist, it must be left open whether Namilianus is a *gentilicium* or a *cognomen*.

648 Bet/Delage (1993, 308–15).

649 Ibid. 310, Fig. 13, dating: late second century.

Severus and Sirus are also known as individual potters, the explanation of this mark as containing *gentilicium* plus *cognomen* of one person is not convincing.[650] This signature can also be the result of cooperation in the making of the mould in question.

Among Lezoux mould makers four different potters had stamps such as SERV or SERVI.M, thus being called Servus I–IV.[651] One of them used a stamp which reads SERVI:MA:C, with the colons actually consisting of three little dots.[652] It is most unlikely that this is a *manus*-stamp. Possibly it represents a *servus* of a person referred to by the abbreviation of *duo nomina* MA.C. Alternatively, one could suggest that a dependant of Servus is meant. However, in view of the very 'name' Servus this seems rather unlikely. The high frequency of the 'name' Servus is also an interesting fact. Indeed, it is the most frequent potters' 'name' at Lezoux. This might indicate the servile origin of this name.

However, the usual interpretation of these stamps as referring to persons named 'Servus' has already been questioned in 1923 by Keune, who in his article on this name in the Realencyclopädie suggests reading 'Servius' rather than 'Servus'.[653] Servius occurs as a *gentilicium* as well as a *cognomen*.[654] In contrast, Servus is nowhere attested as a proper name in a way which makes unequivocally clear that there was such a name at all.[655] Moreover, one stamp from Lezoux reads SIIRVII, which can be read as 'Servii', and another stamp from London reads SERVIVS.[656] Therefore, Servius is certainly the better interpretation of these stamps, unless we assume that not a person called Servus is referred to, but a slave. The latter is in any case scarcely likely, for with the potential exception of SERVI:MA:C there is no information in the stamps indicating the owner. Yet without this information the reference to a slave is incomplete.

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650 Severus was a *gentilicium* as well as a *cognomen*, cf. Solin/Salomies (1994, 170 and 402).

651 Bet/Delage (1991).

652 Ibid. no. 187 with n. 200. The authors give no details as to which Servus is referred to here.

653 Keune (1923a; 1923b).

654 Keune (1923a).

655 In Solin (1996) there is no entry for Servus; Kajanto (1982) refers to *CIL* II 1451 AP. L. F. SERVA, which can be interpreted as referring to a *serva* of an AP. L. F., and *CIL* VI 7435 CAECILIA SERVA, who can be a *serva* called Caecilia, and *CIL* VIII 23 583, a Christian tombstone for somebody referred to as SERVVS without any other parts of his name. Full *tria nomina* in the nominative case with the *cognomen* Servus are not known.

656 Oswald (1964, 295).

The 'name' Libertus is also known from Lezoux stamps, e.g. LIBERTI and OFLIBERTI.[657] It occurs on moulds with quite different styles of decoration, which has led to the suggestion that two persons are referred to.[658] However, there is no proof for the assumption that Libertus was used as a name. Only one inscription is known where perhaps Liberta is used as a *cognomen*: PETICIA M. ET C. L. LIBERTA.[659] One can argue, though, that the abbreviation L. and the term *liberta* actually mean the same, the identical information being given twice by a mistake of the stonemason. However, even if in this inscription Liberta is a name, it was so because its bearer was a *liberta*. Therefore, the name as such indicates the social status. Thus the existence of a Libertus or *libertus* at Lezoux clearly shows that persons of unfree origin were active in the *terra sigillata* production at this place.

3.3.3.3. Marks on moulds, exchange of moulds, and potters' associations

Mould signatures from Lezoux suggest that potters working temporarily as partners went on using their individual stamps: occasionally two different mould marks can be found in one and the same decoration, e.g. CLEMENS and PRISCI.M[660], IVSTIM and ANTISTIORVM[661], BVTRIO and IANVARI[662], OSBLM. and ALBVCI, or NAMIL.CROESI and SECVNDINIM.[663] These stamps also occur separately. Combinations of stamps with graffiti signatures, and of graffiti signatures with each other are also common. The stamps' formulae and the fact that the combined stamps also occur separately indicate that these combinations do not denote dependence, but some kind of cooperation in mould making. They show at the same time that partners used their individual stamps.[664] These mould stamps – and many others applied to moulds individually – were also used on plain ware.[665] It follows that moulds were not made by specialists.

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657 E.g. Bet/Delage (1991, 211) nos. 125–32.
658 Bémont/Rogers (1978; 1979).
659 Solin (1996, 131).
660 Bet/Delage (1991) nos. 89 & 161 with n. 102 & 174.
661 Ibid. no. 220 with n. 50.
662 Ibid. no. 220 n. 77.
663 Ibid. nos. 148 and 149 with n. 161 and 162. More examples in ibid. *passim*. Stanfield/Simpson/Birley (1958) plate 55, no. 646 report a stamp LIBERTIM/SECVNDINI. However, as no drawing of the context is provided, this case remains obscure.
664 As I did not know these combinations when I developed this hypothesis for La Graufesenque, I was pleased when they came to my knowledge.
665 Bet/Delage (1991, 195–6).

At Lezoux moulds and motif punches were frequently exchanged.[666] Many excavated motif punches are stamped or signed with graffiti containing potters' names.[667] This suggests that the exchange and the marking of tools went together. The use of products of one mould maker by various potters and the use of moulds of various makers by one potter were common at Lezoux.[668]

For many decades the makers of moulds used by other potters have been looked upon as the owners of large firms with the potters being merely so-called 'bowl-finishers'.[669] Only recently this interpretation has been given up as it became clear that the moulds were exchanged between the various potters' quarters at Lezoux, and transferred to other production centres.[670]

Future studies of the details of the exchange of motif punches and moulds are likely to deepen our knowledge of inter-relationships among the potters. However, the essential basis of such studies, a comprehensive catalogue of motif punches, is not yet available for Lezoux.[671]

Returning to the combination of two different mould marks, it is conceivable that the producers referred to cooperated in making moulds by combining their motif punches and skills. Intra-decorative mould stamps are sometimes very large, so that an advertizing function has been suggested.[672] The detailed discussion of this problem in the chapter on Graufesenque has led to the conclusion that this advertizing function must have been limited to the production centre, the addressees being the potters who bought or hired the moulds.

Finally, the exchange of moulds may be seen as an indication of lack of competition in the production of moulded vessels.

3.3.3.4. Graffiti

At Lezoux not only stamps and hand-written signatures, but also notes on graffiti have been found. H. Comfort mentioned potters' accounts on graffiti in 1940, but

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666 Stanfield/Simpson/Birley (1958, xxiv), Mees (1994, 37 with table 2). Stanfield/Simpson/Birley (1958) cite for each potter his 'associates', other potters with whom he has punches in common.
667 Bet/Delage (1991), Stanfield/Simpson/Birley (1958) plate 53 nos. 615–7.
668 Mees (1994, 37 with table 2).
669 Stanfield/Simpson/Birley (1958, xxiv).
670 Picon (1989a), Bet/Delage (1991, 94–5), Bet/Delage/Vernhet (1994, 45).
671 The announced catalogue on signed decorations on central-Gaulish ware by G.B. Rogers has not yet appeared.
672 E.g. Stanfield/Simpson/Birley (1958, xxiv), Bet/Delage (1991, 196).

they have never been published and seem to have been lost.[673] Recently two sherds were unearthed which are obviously part of notes or lists containing at least terms for vessels and numbers, and possibly personal names.[674] However, due to the fragmentary state of the finds it remains open to what degree the structure of these notes was similar to the firing lists of La Graufesenque.

A clear difference is that the Lezoux graffiti are written *post cocturam*. As for dating, the Lezoux graffiti are earlier, for according to the quality and shape of the vessels they were made in the Tiberian period.[675] However, the very existence of kilns as large as the *grand four* of La Graufesenque[676] and the practice of not stamping all types of vessels suggest the use of a book-keeping system similar to the one of La Graufesenque.

3.3.4. The topography of pottery production at Lezoux

For a long time, Lezoux had been understood as one single production centre. Not until the 1980s did it become clear that at least seven, perhaps up to a dozen independent groups of workshops existed in the area of the modern town.[677] 'Independent' means that archaeological excavations and prospections in the areas between these concentrations of workshops have revealed an absence of pottery making activity. These groups are not only spatially distant from each other, they also differ in the chronology, the range and quality of production, and the potters belonging to them. A potter's place of work is defined by finds of his signature either on reject vessels or on a large number of sherds at a given findspot. Potters of whom only few stamps were found are not counted as having been attached to the group in question.[678]

About ten per cent of the potters switched around between the workshop groups.[679] This shows that they were not irrevocably tied to one single shop. Still, the overwhelming majority did not change their place of work – or at least their group – during their entire time of activity.

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673 Comfort (1940b, 66), Marichal (1988, 16).
674 Bet/Delage (1993, 324–6 with Fig. 12.)
675 Ibid. 324: 'grâce à des critères techniques'.
676 Cf. below p. 143.
677 Bet (1988).
678 Ibid. 240 with n. 6.
679 Ibid. 227.

So far no traces of any trade other than pottery production have been found at Lezoux.[680] As we shall see below, this was not always the case with central-Gaulish *terra sigillata* production sites.[681]

3.3.4.1. The group at Ligonnes[682]

The approximate size of this pottery making area, situated in the north of the modern commune of Lezoux, comprises approximately ten hectares. The period of activity of the *terra sigillata* potters falls in the second century. At least 38 potters were attached to this group. According to finds made in the 18th and 19th centuries, the agglomeration at Ligonnes seems to have been an entire potters' village including a temple of Apollo and a cemetery. The most recent excavations were carried out between 1963 and 1968. The discovery of agricultural buildings and installations shows that the area was originally used for farming purposes. However, in the second century these constructions were destroyed, and a pottery production centre with a number of kilns, clay-processing installations, ditches, water reservoir, and a water supply established instead. A marble facing (*un placage de marbre*), discovered in a well together with kiln furniture and a moulded clay facing was among the finds of these excavations. Even a small building with hypocaust heating was excavated, which has been interpreted as a drying-room for ceramics. This assumption, however, is not very plausible, taking into account the amount of vessels produced. In addition, parallel ways indicate the existence of a centuriation grid, traces of which have been found at several spots in the entire commune.

3.3.4.2. The group at the Route de Maringues[683]

The area at the Route de Maringues is also situated in the northern part of the modern commune, c. 750 metres south-east of the group of Ligonnes. As for spatial extent, this group is the largest one; the area belonging to it comprises approximately fifteen hectares. Here potters were already active in the La Tène period and in the first century A.D.; they did not cease from their trade until the third century. Coarse ware was produced in comparatively large quantities during the entire period of

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680 Ibid. 240 n. 3.

681 Cf. below p.149.

682 See Bet (1988, 229–30) and Provost/Mennessier-Jouannet (1994, 142–4) for this section.

683 See Bet (1988, 230–3) for this section, except where otherwise stated.

pottery making, as finds of production waste suggest. Seven first century kilns are reported to have been combined in a single structure.[684] The second century was the main period of this quarter, with a large number of kilns dating from it.[685] Only ten per cent of the forty *terra sigillata* potters were active in the first century, the remainder in the second and early third centuries. A building from the first half of the second century was found, as well as a statue of Mercury and a cemetery. In 1882, two other buildings were discovered near to a complex of twelve kilns; the two buildings had been destroyed by fire in mid-third century, a period in which the potters were still active.[686] In the larger building, motif punches and coins were found, with the dating based on the latter. Unfortunately no detailed record of these excavations is available.

3.3.4.3. The group at the Rue Saint-Taurin[687]

The group at the Rue Saint-Taurin is the largest one as far as the number of potters is concerned: ninety potters are likely to have worked there. Their shops were situated in the northern part of the town centre, being about one and a half kilometres distant from the group of Ligonnes. The area used for pottery making and related activities comprises four hectares. In this group, the longest period of continual pottery production is encountered, extending from the beginning of the first until the end of the fourth century. Not only a large number of kilns, clay-processing installations, and waste pits have been found all over the area, but also buildings from the Gallo-Roman period.

In 1986 and 1987, two houses were unearthed, the larger one of them resembling the earlier discovery at the Route de Maringues.[688] This house with approximately 50 square metres floor area was situated 25 metres from the actual kiln-site. It had a stone-built semi-basement covered with floor-tiles and contained a filled-in well. It is likely that the basement was used as a workshop. The ground floor – and perhaps

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[684] Desbat (1997, 146).

[685] It is very difficult to give an exact number, for in many cases only the discovery of 'many kilns' is reported. The minimum total number of kilns in this area is 40, with the majority of dated kilns being from the second century (n = 15).

[686] Bet (1988, 225).

[687] See Bet (1988, 234–6) and Provost/Mennessier-Jouannet (1994, 151–62) for this section, except where otherwise stated.

[688] Bet/Gangloff (1987).

another storey - was built in wattle and daub with modestly painted interior walls. This house underwent three building phases: a small clay building of the first century was used as the basis for the larger second-century construction, and the tiled basement floor was added later. Among other things, a dozen *terra sigillata* moulds and some mid-third century coins were found in the burnt rubble. The second house, with a floor area of c. 22 square metres, was constructed in the first half of the second century. A third house was found in 1988.[689] Among the finds in these buildings, a small mirror and a silver-plated fibula show that the potters lived in modest, but not impoverished circumstances.[690] Remains of painted interior plaster indicate the existence of Gallo-Roman residential buildings in other parts of the area in question. The road grid suggests the existence of a centuriation. In the foundations of the church Saint-Pierre, architectonical elements of marble (capital and cornices) have been found. It has been suggested that this indicates the location of an ancient temple.[691]

In this area, large clay-processing installations dating from the second century have been excavated, such as two basins with a surface of 120 square metres each, combined with a number of smaller basins (1–3 square metres).[692] These installations were well provided with water by ditches, the water supply being based on wells and facilitated by a high ground-water level. Water was not only conducted through ditches, as a network of pipes was also available. In the immediate vicinity of the basins other large clay-processing installations were located, but no kilns have been found so far. It seems, therefore, that this part of the area was used for the preparation of clay only. Very large rectangular kilns dating from the second half of the second century appear to have been a speciality of this group. Three of them have been found so far, the largest one resembling the *grand four* of La Graufesenque.

3.3.4.4. The group at Saint-Jean[693]

This small group in the south-western district of the town was active only in the heyday of *terra sigillata* production at Lezoux. Three rectangular kilns have been found

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689 Bet (1988, 225) without details.
690 Ibid.
691 Ibid. 221, against this interpretation.
692 Bet/Vertet (1980).
693 Bet (1988, 236–7), Provost/Mennessier-Jouannet (1994, 147–9)

with their adjacent waste pits. Twelve potters seem to have worked at this place. Again, finds of marble fragments are reported.[694]

3.3.4.5. Other groups and individual workshops[695]

In addition to these four groups, there are six further separate workshops and workshop clusters, but it is an open question whether they were workshop groups or produced *terra sigillata* at all.

3.3.5. Technology and mass production

In the case of Lezoux, we can see how technology influenced the quality and quantity of production. Unlike La Graufesenque where we cannot trace the development of kiln technology, in Lezoux a number of kilns have been unearthed which shed light on how the mass production of *terra sigillata* depended on technological details.

The availability of kilns with tubes, which make oxydizing firing possible, belongs to the most important prerequisites for the production of *terra sigillata*. As the height of a pile of vessels is limited, multi-storey technology made it possible to build the kiln much higher.[696] For this purpose the tubes had to be mechanically sturdier than those used simply as flue pipes.

Kilns with tubes were used by Lezoux potters as early as the mid first century, in this period their products being far from the quality of their south-Gaulish counterparts.[697] The shape of some of their kilns was rectangular, as was the *grand four* of La Graufesenque.[698] The tubes of these kilns had an internal diameter of 7–10 centimetres and a thickness of 5–8 millimetres. Floor support elements have not been found in or nearby the kilns in question.

The use of these kilns has been explained as part of the potters' copying of south-Gaulish technology.[699] However, their efforts were obviously not thorough enough, as they did not succeed in making genuine *terra sigillata*. This shows that a

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694 These are classed by Provost/Mennessier-Jouannet (1994, 352) as '*villa* avec marbre'.
695 Bet (1988, 233, 237–40).
696 Cf. above p.86.
697 Desbat (1993, 364–5).
698 Bet (1985).
699 Desbat (1993, 364).

technical expertise was required which was not easy to obtain. How difficult it is to reach the desired results by copying is also illustrated by the experiments of modern archaeologists who needed many decades to succeed in producing real *terra sigillata* – using modern kiln technology.[700]

In the first quarter of the second century, nevertheless, the potters of Lezoux did not only learn how to make *terra sigillata* with the shining red slip, they also learned how to make large quantities of it. This development can be observed in the growing size of kilns as well as in the development of kiln furniture.

Some kilns of the second century were much larger than any first-century specimens. They can be compared with the *grand four* of La Graufesenque.[701] Second-century kiln tubes are larger and much more solid (side thickness 20 millimetres; internal diameter 10 centimetres). In this period, floor support elements were used.[702] In addition, the kiln furniture became standardized, the variations in diameter and material thickness being much lower than they were in the first century.[703]

Not only new kilns were built, but also old circular kilns adapted to the new conditions. The kiln basis was left as it was, and in each of the holes in the floor of the firing chamber, in which the exhaust tubes were fixed, a single tube element with the original smaller diameter was put and a large new one stuck upon it.[704] In such redesigned kilns floor support elements were used. This means that the kiln must have been made higher to allow sufficient space for multi-storey charging. This was indeed possible, for new research has shown that circular kilns were often not covered by a vault, but had a cylindrical shape with a tiled roof.[705] It was, however, not only the size of kilns and the manner of storing the vessels in them, but also the temperature which had to be altered; the maximum firing temperature was increased from 900–950 °C to 1000–1050 °C.[706]

A number of other crucial operations, not concerning the firing process but the preparation of the raw material, had also to be altered: the clay was mixed in a

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700 Cf. e.g. Winter (1978).
701 Bet/Gangloff (1987, 148–51).
702 Desbat (1993, 365–7).
703 Ibid. 367.
704 Ibid.
705 Bet (1988, 224).
706 Picon (1989b).

different way, becoming more calcareous and steady in proportion to its ingredients, and the composition of the slip was improved.[707] As a result, the porous and orange gloss of the vessels became shining and red.

As the building of large new kilns and the redesigning of and storey-adding to existing ones in the second century was clearly intended to increase the production output, all other installations had to be readjusted accordingly. An example of this are the basins of the group at Rue Saint-Turin. The production installations of the first century were, with a maximum surface of 20 square metres, at least six times smaller than the basins of the second century with a surface area of 120 square metres. After the construction of the new basins, the former were used as waste pits.[708]

It is obvious that storage facilities also had to be enlarged in order to allow enough space for the vast amount of vessels to be produced. The number of stamped sherds found at all potters' quarters combined shows the increase of the output very clearly: whereas 757 stamps originate from the first century, the number for the second century is 3,235.[709]

Furthermore, as we have seen above, the number of potters' names known from the second and early third centuries is nearly three times larger in comparison to the first century. A part of that number might include potters who switched from coarse ware to *terra sigillata*, but most of them must have been new arrivals, as the enlargement of the installations suggest. That means that new housing was needed for the additional workforce. Examples of these activities are the second-century residential buildings and the enlargement of earlier dwellings.

After the end of export production the technological development made an U-turn, with the quality of the fourth century's products equalling those from the first.[710] This means that the production of high-quality *terra sigillata* required a deal of work which was only rewarding under the conditions of mass production. It is possible that it was the guidelines of traders imposed on the producers which had kept the quality superior.

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[707] Ibid.
[708] Bet/Gangloff (1987).
[709] Bet (1988, 227).
[710] Picon (1989b).

3.3.6. Landowners and potters

The characteristics of the various pottery production quarters at Lezoux show a remarkable diversification in many respects. This diversification makes clear that there is no such thing as a single typical development of a *terra sigillata* production centre. Various ways existed to make use of economic opportunities. In this section these ways will be discussed in detail.

As for the question of land ownership, the existence of a centuriation at the site of Ligonnes is an important fact. Even if it is scarcely likely to prove Roman ownership, it certainly suggests a Roman style of land ownership.[711] Remains of *villae* found in neighbouring communes at a distance of c. 3–4 kilometres indicate ownership of large estates.[712] Perhaps such a building with a *pars urbana* was located in the immediate vicinity of the workshops, as the finds of marble building elements suggest.

However, having no additional clue as to who was the actual owner, it is impossible to say whether a plot was assigned to the commune or to private persons, whether it was a small allotment or part of a large estate. How varied a Gaulish landscape under Roman rule could look is shown by the example of the lower Rhône Valley, where all these ways of land ownership occured.[713] It is also possible that the centuriation grid of Lezoux – dubbed by modern researchers 'une cadastration fossile' – was a 'Romano-indigenous' land division, only roughly rectangular in form and not the result of an actual Roman centuriation.[714] Whether or not the Lezoux pottery production was sub-urban must also be left open, for at the present state of research it is impossible to say if there was anything resembling a town or an *oppidum* in the area in question.[715]

As for the group of Ligonnes, the prior agricultural use and the existence of some centuriation combine to suggest that this site was not common land, free for everybody to use. The demolishing of agricultural buildings in order to erect pottery workshops with all required installations, is thus a remarkable example of deliberate

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711 Woolf (1998, 43).
712 Cf. above p.129.
713 For a general account, see Woolf (1998, 144–5).
714 Woolf (1998, 161).
715 Bet (1988, 221–2).

reorganization of space for economic reasons. This decision shows that it was economically attractive to give up agricultural use in favour of pottery production. The low fertility of the sandy ground on which the site was situated is another point in favour of this assumption. Far more fertile soil was available in the surroundings of Lezoux.

It is, however, scarcely likely that the landowner decided to become a potter. There are no traces of prior pottery production at this site which would indicate prior experience. Making more money out of this not very fertile piece of land by having a large pottery workshop erected and leasing it out to a number of potters, or leasing it to a main tenant who did so, seems to be a more likely reason for this development.

The group at Saint-Jean appears to have undergone a similar developement.

The groups at the Route de Maringues and at the Rue Saint-Taurin were not products of the *sigillata* boom of the second century.[716] Here pottery making activities had a long-standing tradition and were much more diversified. The production of pottery other than *terra sigillata* was not abandoned. These groups are examples of the gradual development of *terra sigillata* production alongside the making of other pottery. First attempts to enter mass production date from the first century. However, these attempts were successful only in the second century. Mass production called for the erection of much larger constructions such as kilns, clay-processing basins, and buildings. Indeed, the entire production process needed to be adapted technologically to the new requirements.

The mobility of potters is a general argument in favour of a lease system. An even stronger one is the reorganization of space in the second century. The construction of houses with tiled basements, and huge production installations including a subterranean network of water pipes, required specialist work and could hardly have been done by the potters themselves. These constructions must have required large-scale planning and considerable capital investment. Moreover, the organization of production which included the sharing of kilns as large as the one at La Graufesenque needed some kind of central coordination.

All this could only be provided either by an institution such as a potters' cooperative or by a landowner or main tenant. The existence of the former would be

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[716] Cf. ibid. 230–3 for what follows.

without a parallel case in the production of *terra sigillata*. Therefore, all this combines to suggest that at these sites the production installations were leased to the potters, with the lease contracts at the same time functioning as a means of coordination of the individual potters' activities.

3.3.7. Relationship to other production centres

Many vessels from other production sites such as Arezzo and La Graufesenque have been found at Lezoux. This is to be expected at a place where potters copied these products and thus needed them as models. Relief decorations of Arretine, Lyon, and La Graufesenque vessels were used as moulds for the making of motif punches.[717] As a result, the quality and size of these copied motifs is inferior to their models. In a few cases, however, quality, size, and style of decoration are comparable to La Graufesenque models, so that a migration of potters from there to Lezoux has been suggested. An example is the name Rutenos, which is also known from La Graufesenque products (with the spelling Rutaenus).[718] Here the probability of a potter's migration is very high. If so, it would have taken place in the Tiberian-Claudian period.

Some names known from Arezzo and La Graufesenque are also encountered at Lezoux, and it has been cautiously suggested that this indicates potters' migration.[719] However, stamps fully identical with those on La Graufesenque vessels have not been encountered on Lezoux products, and no tools such as moulds or motif punches from Arezzo and La Graufesenque have been found there.[720] Homonymy among potters was a wide-spread phenomenon. For instance, potters bearing the rare name Criciro were active at La Graufesenque, Lezoux, and Trier within a period spanning the Neronian-Flavian times to the beginning of the third century.[721] This shows that even activity in the same or in consecutive periods cannot be taken as a unequivocal sign of identity.

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[717] Vertet (1971).
[718] Bet/Montineri (1989, 69), Polak (1995, cat. entry Rutaenus).
[719] Bet/Delage/Vernhet (1994, 47).
[720] Ibid. 45 with n. 15.
[721] Polak (1995, cat. entry Criciro).

Curiously, a motif punch from Lezoux (chemical analysis) has been found at La Graufesenque.[722] This motif punch proves the existence of links between the two production centres on the producers' level.

More important than the transfer of tools was without a doubt the transfer of knowledge. As we have seen in this chapter, without technical and practical expertise the mass production of high-quality *terra sigillata* was impossible. In this respect the many similarities between Lezoux and La Graufesenque discussed in this chapter clearly suggest that the know-how was transferred from the latter to the former.

The question why this happened only when the export production at Millau had reached its end is hard to answer. If potters such as Rutenos had already moved from La Graufesenque to Lezoux in the first century, it would not have been the availability of knowledge which was lacking, but the will to make the alterations needed for taking up top-quality mass production. It is conceivable that the landowners at Lezoux decided to do so only when the lack of high-quality *sigillata* from La Graufesenque became obvious. Central Gaul must have belonged to the last areas which were affected by the decline of the not too distant La Graufesenque. On the other hand, first attempts at improving quality date from the end of the first and the beginning of the second centuries, a period in which the so-called satellites of Lezoux also started working.[723] This suggests that the reaction on the decline of La Graufesenque was not very much delayed. Perhaps the very limited success of their grandfathers' involvement in proto-*sigillata* production in the early first century had made central-Gaulish landowners cautious, so that they decided to wait and see how things developed before making the investments necessary for high-quality mass production.

The influence of Lezoux on other central- and east-Gaulish production centres can be traced more easily. In a number of cases moulds have been transferred to other central-Gaulish sites.[724] These sites, all situated in the Auvergne near the banks of the river Allier or its tributary Dore, are called the 'group of Lezoux' (Courpière, Les Martres-de-Veyre, Lubié, Terre-Franche, Toulon-sur-Allier, Vichy-Gare).[725] They

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[722] Hoffmann/Juranek (1982).

[723] See next paragraph.

[724] Picon (1989a).

[725] Cf. Bémont/Jacob (1986, 137–74) for details of the centres discussed in what follows.

have been interpreted as branch workshops, but in fact only the use of moulds from Lezoux in the shops in question is certain. The potters' marks reported from these sites as being identical to stamps from Lezoux are mould stamps on moulds transferred from Lezoux. The development of these sites seems to have been linked to the development of Lezoux. They were established at the earliest in the late first and were active mainly in the second century. Their dating is often based only on finds of vessels made with Lezoux moulds. Very few details are known about most of them.

An exception is Les Martres-de-Veyre, where *terra sigillata* was produced between A.D. 70/80 and the late second century.[726] At this site not only pottery was made, but also iron, bronze and lead metalwork, as well as bone carvings. Remains of a second-century water-mill were also found. Again, first-century constructions were turned into a *sigillata* workshop in the second-century. Various types of ceramics were made at the same site simultaneously, as deposits with waste *terra sigillata* and different kinds of coarse ware show. However, the main pottery product was *terra sigillata*. It was distributed to central and northern Gaul, the German provinces and southern Britain, especially in the first half of the second century. Products from Les Martres-de-Veyre and Lezoux cannot be distinguished without chemical analysis; this method also enables us to trace the transfer of moulds.[727] In many regards Les Martres-de-Veyre shared the fate of the larger production centre of Lezoux, it flourished and declined in the same periods, and it had a similar pattern of distribution.

At first sight, these parallels suggest that external factors were decisive for the rise and fall of these production sites, for it is scarcely likely that internal problems of whatever kind occurred at the same time at sites distant from each other. Alternatively, the decline of Lezoux could have moved the traders to retreat, which – as a secondary effect – would also have affected neighbouring workshop centres.

The stamping of Drag. 37 vessels, rare at Lezoux itself, was common at the other ateliers in the vale of the river Allier.[728] This might indicate either a higher output of these vessels or – more likely – the use of smaller workshops at these sites.

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[726] Cf. Romeuf (1986, 149) and Provost/Mennessier-Jouannet (1994, 172–87) for what follows.
[727] Romeuf (1986, 147).
[728] Bet/Delage (1991, 194).

Moulds from Lezoux have also been found at Blickweiler and Chémery in eastern Gaul.[729] Morevover, all potters' names belonging to the starting period of Chémery and the nearby workshops at Boucheporn (c. A.D. 60) are also known from Lezoux.[730] This strongly suggests that entire groups of potters moved from Lezoux to eastern Gaul.

3.3.8. Summary and conclusions

Many aspects of production organization at Lezoux are strikingly reminiscent of Arezzo and La Graufesenque. Separate potters' quarters with a certain degree of migration between them are attested for all of these centres. Remains of residence buildings at La Graufesenque and Lezoux suggest a modest, but not poor standard of living for at least some of the persons involved in pottery mass production. In Lezoux as well as at La Graufesenque, centres of cult worship belonged to the potters' quarters.

The application of potters' marks to certain forms of vessels shows the same basic pattern at Lezoux and La Graufesenque. Thus the reasons for the use of stamps are likely to have been the same, namely the sharing of drying storage facilities for the most frequent types of vessel. The very size of other production facitilities, such as enormous clay-processing basins and kilns comparable to the *grand four* of La Graufesenque, suggests that the shared use of production installations at Lezoux was not confined to storage. The use of kilns too large to be filled by one single producer, and a pattern of stamping which was useless for separating the individual producers' vessels after firing, indicate the existence of a book-keeping system similar to the one of La Graufesenque. On the other hand, the use of stamps was more inconsistent at Lezoux, which can be explained as the result of varying production conditions. Finally, marks on moulded vessels from Lezoux strengthen the hypothesis of associated potters using their own individual stamps.

There is very little evidence for the use of slave labour at Lezoux. This does, however, not mean that no or only few slaves and freedmen worked there. All we can say is that they did not leave many traces. Future studies based on more up-to-date and comprehensive evidence may shed more light on this problem.

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729 Bet/Vertet (1986, 143).
730 Hoerner (1998).

The differences between the various potters' quarters at Lezoux make clear that the development of *terra sigillata* production was not uniform, even if the workshops were situated in the same small region and related to each other. The introduction of mass production of high-quality *terra sigillata* was in some cases based on an existing local production of proto-*sigillata* and other ceramics, and in others set up from scratch as a specialized production. On the other hand, even if a history of pottery making existed, the introduction of high-quality mass production required the construction of huge production installations and a reorganization of space. For this, considerable capital must have been available. The existence of agricultural buildings, a centuriation grid, and *villae* in the vicinity indicate well-ordered land ownership in the area in question. This and the mobility of potters make the use of a leasehold system the most likely legal basis for the organization of production. Perhaps the production installations of the individual potters' quarters were set up by, and the property of, the owner of the land on which they were situated. It is also conceivable that main tenants, e.g. traders, built the workshops, and then subleased them.

All this, combined with the massive introduction to Lezoux of technologies already used at La Graufesenque, strongly suggests that the legal, technological and organizational basis of high-quality mass production of *terra sigillata* was to a very high degree identical at both centres. Parallels in the development of production and the identical distribution area of Lezoux and its so-called satellites suggest that external reasons caused their rise and decline. The landowners in question used the same business opportunities when they decided to enter *terra sigillata* production and improve its standards. They also used the same channels of distribution. This shows that there was an exchange of information on business opportunities and successes. The transfer of moulds from Lezoux to other production centres in the same region indicates that there must have been not only a network of exchange of information, but also of tools, and most likely personnel. This and the exchange of other tools such as motif punches leads to the conclusion that the persons involved in *terra sigillata* mass production in this region did not act as competitors, but cooperated in the installation and improvement of production.

3.4. Rheinzabern

3.4.1. Topographical situation[731]

In the second and third centuries A.D., Rheinzabern (Kreis Germersheim, Südpfalz) was the largest and most prolific production centre of *terra sigillata* north of the Alps. Situated in the province of Germania Superior on the banks of the river Rhine,[732] and verging on the trunk road to the North Sea half way between the legionary camps of Mogontiacum and Argentorate, the location of the Roman Tabernae was advantageous for export production.[733] The surroundings of the settlement are wooded, and were even more so in antiquity.[734] Small opencast and underground clay mines were situated approximately one and a half kilometre south of the potters' quarter.[735] Draw-wells secured the water supply. The excellent conditions for the production of ceramics must have been the reason for the extension of the original roadside inn to the production settlement Tabernae. During its entire existence, pottery production was the main economic activity, although in the first century iron smelting works, and bronze and glass foundries also existed.[736]

3.4.2. Period of activity, range of production, and distribution

Traces of a pre-Roman settlement have not been discovered as yet. The earliest pottery making activities can be dated to the Tiberian period.[737] In the time from Claudius' reign to Domitian's successful campaigns against the Germani, bricks, tiles, and other ceramic building material was made in large quantities for the nearby legionary camps.[738] It is not yet clear whether the legions had their own detachments and brickyards at Rheinzabern or only some representatives supervising the

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731 For this section, cf. Schulz/Schellenberger (1996), except where otherwise stated.

732 Today the settlement is situated at a distance of approximately four kilometres from the banks. In antiquity, however, the distance was shorter. The exact course of the river in the Roman period and the location of the port of Tabernae are unknown. Cf. also Bernhard (1990).

733 Tab. peut. 3, Itin. Anton. 355, Not. dign. occ. 41,16. The name Tabernae Rhenanae, often used by modern authors, was not known in antiquity (Sprater 1948, 9).

734 Ibid. 9–10.

735 Sprater (1948, 8, 72–3). Pottery production was taken up again in the 12th century, since 1884 the layers have been exploited industrially.

736 Rau (1977a, 56; 1977b, 49, 71). They were situated in the northern part of the settlement, whereas the potters' quarter occupied the southern area.

737 Reutti (1983, 40).

738 Stamps of the legions IIII Macedonica, XXII Primigenia, I Adiutrix, XIIII Gemina, XXI Rapax, VII Gemina and VIII Augusta were found (Ritterling 1927a; Sprater 1948, 80, fig. 59; Schulz/Schellenberger 1996, 10–13).

production of civilian workshops.[739] The making of pottery vessels accompanied the production of building material. In the Claudian period, unslipped vessels of various forms - including lamps and large storage vessels, *dolia* - were made; somewhat later the production of fine ware (*terra nigra*, white- and red-slip ware), including imitations of *terra sigillata*, began.[740] Vessels imported from Gaul were available as models. As a result of Domitian's campaigns, the border was moved forward, and with it the main customer of the brickyards, the legions; this loss led to a slump in the production of ceramics. In the middle of the second century potters from central and eastern Gaul migrated to Rheinzabern.[741] Four-hundred to six-hundred potters made *terra sigillata* at Tabernae in the following one-hundred years.[742]

The end of mass production is clearly connected with the Alemanic invasion of the *Decumates agri* in 260, and the following moving back of the frontier to the Rhine line.[743] What was an impulse for the brickyards meant the loss of their eastern sales territory for the fine ware potters. Whether Tabernae itself was affected by destructions of war is not yet entirely clear.[744] Yet in any case, the production of *terra sigillata* deteriorated rapidly. The making of moulded ware was given up, but plain ware went on being made on a smaller scale in the late third and first half of the fourth centuries.[745] It cannot yet be ascertained when exactly the settlement was abandoned, but finds of coins suggest the turn of the fourth to the fifth century.[746]

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739 Schulz/Schellenberger (1996, 11).

740 Bernhard (1981a, 131–5), Reutti (1983, 40–42).

741 Simon (1968), Mees (1993, 227 n. 4), Bernhard (1990, 534), Schulz/Schellenberger (1996, 17).

742 To give an exact number is impossible. Schulz/Schellenberger (1996, 18) mention 600 potters. Bernhard (1990, 536) cites 300 potters for the time between 150 and 260 A.D. (the period of production of *terra sigillata*). Ludowici (V, 207–36) lists approximately 500 names and ornamental stamps on plain ware. It is possible that some of these potters did not work at Rheinzabern. In addition, some of the fragmentary names listed possibly refer to one and the same person (e.g., how many persons are behind the three stamps VICT, VICTOR, and VICTORINVS?). Almost all mould makers also made plain ware, so that their number is already included. Often the number of mould makers is given as 90 (e.g. Bernhard 1990, 536, without stating whether or not in his calculation these 90 must be added to the number of 300 potters already cited). However, this number does not refer to names known from signatures, but to series of decorations. The potter Cerialis, for example, produced six series of moulds, called Cerialis I - VI. Thus he is often counted as six potters. Sometimes it is not clear whether series of moulds stamped with the same name were made by the same potter, e.g. in the case of Ianu- I and II. On the these problems, cf. below Section 3.4.4.3. Forty-eight names are known from mould marks, but the number of mould makers was probably somewhat higher. On the number of mould makers known by name, cf. below note 796. All in all, the number of potters is likely to be somewhere between 400 and 600.

743 Cf. for this section Schulz/Schellenberger (1996, 25).

744 Bernhard (1990, 537).

745 Ibid.

746 Ibid. 538.

Export was very much determined by fluvial transport routes. *Terra sigillata* from Rheinzabern is found in large quantities in the area of the two Germanies, the Danubian provinces, and Britannia.[747] In addition, the non-Roman east and north imported *terra sigillata* from Rheinzabern. Only few specimens reached Gaul, where central-Gaulish producers prevailed.

The dating of individual producers is not very advanced. Only recently the activity of some mould makers was approximately dated.[748] A catalogue with detailed data on the production and distribution of all potters of Rheinzabern is not yet available. Only the finds made at the centre of production between 1901 and 1914 have been catalogued.[749] The production of Rheinzabern will be included, however, in the *New Index of Potters' Stamps*.[750]

3.4.3. Potters' marks

3.4.3.1. Types of marks, stamp-formulae, and social status of potters

At Rheinzabern, stamps containing personal names and sometimes ornaments were applied to the internal bottom of plain and moulded ware.[751] Alternatively, potters of relief-decorated *terra sigillata* of the first generation occasionally applied their stamps to the vessels' external upper rim.[752] Mould makers often stamped or wrote their names into the decoration or the internal bottom of the moulds.[753] The former mould marks are reproduced on the end-product, whereas the latter were destroyed when the footring of the vessel was formed. Occasionally fired moulds were marked internally, and in some cases externally.[754] The potters also stamped kiln parts such as *tubuli*.[755]

Nominative case-stamps and *fecit*-stamps (with all possible abbreviations of *fecit*) are by far in the majority; most potters used both formulae equally. Names in the

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747 Schulz/Schellenberger (1996, 23).
748 Kortüm/Mees (1998).
749 The finds made at Rheinzabern between 1901 and 1914 are listed in Ludowici (I–V).
750 Cf. p.79.
751 Ludowici (I, iii–v).
752 Ibid. v; Mees (1993, 234; 1994, 23–4).
753 Ludowici (V, 15).
754 For examples, see Ludowici (I, 106–8; V, 157–71).
755 Ludowici (V, 226).

genitive case occur occasionally,[756] and *manus*- and *officina*-stamps are extremely rare.[757]

On most marks, one-piece personal names in full are to be found. Many names are well known Roman *cognomina*, others of Celtic or Germanic origin.[758] *Tria* or *duo nomina* of free Roman citizens are very rare; they appear in abbreviated form only. In fact, the interpretation of the marks in question as *tria* or *duo nomina* is hypothetical, for their first elements are usually abbreviated. Examples are B.F.ATTONI[759] and C.S.RVFO[760].

Only a few stamps can be interpreted as referring to dependants. The stamp SECVNDINAVI[761] is known as an intra-decorative mould stamp only. Its equivalent on plain ware is SECVNDAVI.[762] Since it is obvious that two names are behind these stamps, they have been interpreted as a combination of SECVNDINVS[763] and AVITVS[764], potters known from their individual stamps on plain ware.[765] However, it is also possible that SECVNDINAVI does not refer to two persons, but to one: Secundini Avitus or Secundinus Aviti. It has been suggested that Secundinus was the son of Avitus, because he appears to have worked somewhat later.[766] A more plausible explanation is that he was his slave, and used his own individual stamp only after manumission. Another stamp which might refer to more than one person is the bottom stamp MAI.NL.LVS with the variants MAI.IVLLVS and MA.I.IVL.LVS.[767] It has been interpreted as referring to two potters, namely Maianus and Iullus.[768] Maianus is attested on stamps, but a potter named Iullus is not known from

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756 AVGVSTINI (Ludowici V, 210); COBNERTI (Hofmann 1972, no. 69.3), ICOVICI (Ludowici V, 216); LOGIRNI (ibid. 219); MARCELLINI (ibid. 220); MARTINI (ibid. 221); TEMPORINI (ibid. 231); VALENTINI (ibid. 231); as intra formam stamps B.F.ATTONI (ibid. 239); IOVENTI (ibid. 241); LATINNI (ibid. 242); PEREGRINI (ibid. 243).

757 *manus*-stamps e.g. ALBINI.M. (Hofmann 1972, no. 7.3) MATVGENI.M (ibid. no. 175), PATERN.M (Ludowici V, 225), PATRVITI.M (ibid. 225), mould graffito IVLIANI.MA (ibid. 169); *officina*-stamps APRIOF (Hofmann 1972, no. 15.2; Ludowici V, 208, reads *Aprio f(ecit)*, but cf. APERF and OF.APRI (ibid. 223), FLORI.OF (clay name punch, Rau 1977b, 57).

758 Wiegels (1989, 58–64).

759 Ludowici (V, 239).

760 Ibid. 228.

761 Ibid. 245.

762 Ibid. 229.

763 Ibid. 229.

764 Ibid. 210.

765 Reubel (1912, 54).

766 Ibid.

767 Ludowici (V, 220).

768 Hofmann (1972, 34) with the spelling MAIAMVS. This must be a misprint, for the potter's name is clearly MAIANVS (cf. Ludowici V, 220).

Rheinzabern. Thus it is more plausible to read the stamps in question as Mai.Iul.Lus, MAI referring to Maianus, IVL to IVLIVS[769], and LVS to one of the potters' names beginning with LVS.[770] This is not to say that three persons are referred to. IVL.LVS is likely to be the *gentilicium* plus *cognomen* of one person. MAIANVS is not a Roman *praenomen*, so that the names are not *tria nomina.* Therefore this stamp can be interpreted as referring to Maianus, slave of Iulius Lus-. Another dependant is possibly behind the stamp COSTIOPRFE.[771] He is also known from the stamp COSTIOFE.[772] Costio is not a Roman *praenomen*, so that PR cannot refer to his *nomen gentile*. Thus it is conceivable that PR refers to another person, perhaps the owner of the slave Costio.[773]

Cooperation seems to have been behind the stamp CONSTAENI, used as a mould stamp and on plain ware. The names referred to are probably Constans and Nivalis, both known from internal bottom stamps on plain and rim stamps on decorated ware.[774] The letter E in this stamp is a ligature, which has been read as ET or FE; even ANTI (in combination with the preceding A) has been suggested, so that the name would be CONSTANTINI.[775] Accordingly, the stamp has been interpreted as CONSTA(NS) ET NI(VALIS) or CONSTA(NS) FE(CIT) NI(VALI).[776] The ligature of E and T seems to be the best solution, for the E in question has at mid-height an additional horizontal line to the left. For comparison, the ligature of E and F for *fecit* – very often occurring at the end of stamps from Rheinzabern – looks like a normal E. However, the reading CONSTANTINI cannot be excluded completely, although this name does not occur on other stamps.

3.4.3.2. Types and forms of vessels marked

As a rule, internal bottom stamps were applied only to mass-produced plain forms such as plates and cups.[777] Series-produced moulded vessels, without a doubt made in much smaller quantities, only occasionally bear stamps of their actual makers,

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769 Ludowici (V, 217).
770 LVSCERVN or LVSE[, ibid. 219.
771 Ibid. 213.
772 Ibid.
773 Several potters' names begin with PR, cf. ibid. 226–7.
774 Ludowici (I, 114; V, 212–3, 222, 241).
775 Reubel (1912, 22).
776 Ibid.; Gimber (1993, 259–60).
777 Ludowici (I, ix).

be it in the rim-zone or internally.[778] Individual pieces, such as jugs and mortars decorated lavishly by hand *à la barbotine* or with carved patterns ('glass-cut' decoration), are never stamped.[779] More than 100 forms of *terra sigillata* made at Rheinzabern are known,[780] but only 24 of them bear stamps.[781] These facts already suggest that the application of stamps has something to do with the frequency of the forms of vessels. To arrive at a more precise inference, however, is difficult. The reports available so far give details of stamped vessels only.[782] Thus the ratio between stamped and unstamped vessels cannot be ascertained exactly.

A vague idea may be inferred from the large numbers of fragments of various forms of reject ware used for the building of an ancient draw-well at Rheinzabern.[783] Plain ware of 28 potters was found there. This strongly suggests that the pit contained the waste of a number of firing loads.[784] Not only have stamped vessels been published, but also the fragments not attributable to individual producers. Even though we cannot be certain that these fragments belong to unstamped vessels, the material in question gives us an impression of the relative frequency of stamps applied to the forms in question. In Table 5, the forms concerned are arranged by their frequency.

Table 5. Proportion of stamped fragments in the so-called waste pit of Ianu- at Rheinzabern (findspot no. 9)

Form of vessels	No. of fragments	Percentage in relation to total	No. of stamped fragments	Percentage of stamped fragments
Drag. 18/31 and 31	292	54,27	43	14.73
Drag. 33	112	20,82	12	10.71
Drag. 27	42	7,81	4	9.52
Drag. 38	29	5,39	0	0
Drag. 32	24	4,46	2	8,33
Drag. 40 and Drag. 27 or 40	19	3,53	4	21.05
Curle 15	16	2,97	0	0
Curle 23	3	0,56	0	0
Drag. 46	1	0,19	1	100
all forms	538	100	66	12,27

778 Gimber (1993, 241).
779 Ludowici (I, ix).
780 Ludowici (III, 271–86).
781 Ludowici (I, 89–92).
782 This is due to the large amount of material not publishable in preliminary papers. Unfortunately, not even the total numbers of stamped and unstamped vessels are given.
783 Rau (1977b, 59–60), Gimber (1993, 176–220), Bittner (1996, 163–5). The waste was used to fill up the pit after the shaft had been built.
784 Bittner (1996, 164).

There is a tendency for the more frequent forms to have a higher percentage of stamped vessels. In the case of Drag. 40, which seems to conflict with this tendency, we have three fragments of which it is inconclusive whether they are of this form or of the form Drag. 27. Therefore the number of Drag. 27 fragments might be by up to three pieces higher, and thus in accordance with the general tendency. Forms made in low quantities were occasionally stamped (Drag. 32). Some stamped specimens of the form Drag. 38 are known from other findspots.[785] It seems that rare forms were also occasionally stamped (Drag. 46). The data basis of this analysis, however, is very thin. It is open to what degree the material is representative of the whole production of Rheinzabern, so that the result needs to be tested against more material in future.[786] Moreover, it would be better to include finds from consumption sites.[787]

3.4.3.3. Specialization in the products

On the basis of the finds from two waste pits it has been suggested that some makers of plain ware were specialized in the making of one form.[788] However, this conclusion needs to be relativized. The waste pits in question are thought each to be the result of one misfired load only, because they are dominated by a comparatively small number of potters.[789]

As we have seen in the case of La Graufesenque, sometimes potters specialized in a single form of vessel temporarily, namely when they contributed to a certain firing load.[790] This is exactly the case here. A look in the catalogues of stamps found at

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785 E.g. Ludovici (I, 91; form Sd, find no. 1518).

786 This becomes clear if one looks for instance into the lists of stamped plain vessels (*Boden-Stempel*) in Ludowici (I, 1–83; II, 1–88; III,1–78; IV,1–70). The most frequent form in the waste pit of Ianu-, Drag. 18/31 + 31 (= Lud. Sa and Sb), is also the most frequent one in these lists. The second most frequent form in the pits, Drag 33. (= Lud. Ba), however, is quite rare in the lists. This applies even more to Drag. 27 (= Lud. Sb). Vice versa, the most frequent form in the lists, Drag. 32 (= Lud. Ta), is no more than an also-run in the waste pits. Even in view of the fact that the lists contain stamped vessels only, the discrepancies are very wide. In Ludowici's lists the number of drinking-vessels is conspicuously small in comparison to plates and dishes. At other production sites – and in the waste pits discussed above – their number is more or less even, so that drinking-vessels are among the most frequent forms. Could it be possible that Ludowici's unfortunate decision to use the abbreviation S for dishes and small cups equally (in roman print – S – for *Schüsseln*, dishes, and Fraktur print – S – for *Schälchen*, small cups) has led to a number of misprints and confusions in his catalogues, so that many small cups are listed as dishes?

787 This will become possible as soon as the *New Index of Potters' Stamps* (cf. above p. 79) is published.

788 Rau (1977b, 64); Reutti (1983, 54–5).

789 Rau (1976, 144; 1977b, 64); Reutti (1983, 54–5).

790 Cf. above p.95.

Rheinzabern shows that the potters concerned threw more forms and types of vessels than were found in the waste pits in question.[791]

Most producers at Rheinzabern are represented by more than one form or type of vessel.[792] Very often the potters used the same die on various types and forms. Just few of the dies occur on a single form only.[793] In these cases, the number of vessels is normally smaller than ten, whereas those dies of which we have several dozen imprints were always applied to various forms. This suggests that the hypothesis of specialization in the products is in fact due to a gap in our knowledge of the potters' range of production.

An interesting find is the name punch REGINVS FEC bearing the graffito GENIALIS SCRIB.[794] Reginus was a mould maker and potter of both plain and relief-decorated ware, and Genialis is known as a maker of plain ware.[795] This find indicates that name punches were sometimes commissioned from external makers. These persons appear to have been potters with a gift for making such tools; the normally very primitive name stamps cannot be the result of specialization in this product.

Almost all names of mould makers are also known from plain ware.[796] Some used the same dies on plain and moulded ware.[797] Identical names on internal bottom and

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791 Cf. the entries in Ludowici (I,1–83; II,1–88; III,1–78; IIII,1–70).

792 Cf. ibid.

793 Dies of which only one imprint is known are excluded from this consideration.

794 Reutti (1983, 57).

795 Ludowici (V, 216). For Reginus, cf. next note.

796 Forty-eight names are known from mould stamps; cf. the list 'Alphabetisches Töpferverzeichnis' in Ricken/Fischer (1963, 346–7). To the 44 names listed there, five names must be added, namely IOVENTI (only combined with Comitialis, cf. Reubel 1912, 28–31; Ludowici I, 116 and V, 241), LATINNI (only combined with Comitialis, cf. Reubel 1912, 28–31; Ludowici I, 116 and V, 242), and REP (only combined with Comitialis, cf. Ludowici I, 117 and V, 244), CONSTAENI (only combined with Cerialis. cf. Rau 1977, 52, 58; Reubel 1912, 19–25; Ludowici I, 114 and V, 212 and 241), and SECVNDINAVI (Ludowici V, 245). Thirty-eight out of the 48 names are known from stamps on moulds and moulded vessels individually. The remaining ten seem to occur only in combination with stamps of others. Of the first category just Peregrinus is known so far as a mould maker only (for the following details, cf. Ludowici I,130–1; V,207–234 and 239–45, Rau 1976; 1977, and Bittner 1996). The stamps BFATTONI and IANVF have been found on moulds and moulded vessels only, but it is a matter of contention whether the persons behind them are identical with Atto and Ianuarius respectively, both producers of plain ware. Stamps of the mould makers Helenius and Mammilianus have not been found on plain ware yet, but on the rims of moulded ware. The names of the remainder occur on plain ware and moulds and/or moulded vessels equally. As for those, whose stamps turn up only together with others, Gemellus, Lutaevus, Virilis, and Constaeni (CONSTAENI perhaps for *Constans et Nivalis* or *Constantini*, cf. above p.156) also made plain ware. For the stamps IOVENTI, LATINNI, REP, and IANVCO, see the discussion on p.162. The stamp SECVNDINAVI on moulds and moulded vessels corresponds to the bottom stamp on plain ware SECVNDAVI (for the interpretation of this stamp, see above p. 155).

rim stamps show that many potters of plain ware also made moulded vessels.[798] Sometimes all three kinds of stamps were applied by one and the same potter.[799] Indeed, all mould makers who threw plain ware are likely to have produced moulded vessels as well, even if their names are not known from rim stamps.

We should not forget that out of the more than 100 forms of *terra sigillata* made at Rheinzabern, only a quarter were stamped at all. In addition, finds of clay theatre masks and moulds for the making of figurines with traces of *sigillata* slip suggest that not only *sigillata* was made in the workshops in question.[800]

To sum up, there are no indications that specialization in a single type or even form of vessel was typical of the production of *terra sigillata* at Rheinzabern.

3.4.4. Interpretation of moulded ware

3.4.4.1. Cooperation of mould makers and exchange of moulds

Moulded vessels often bear marks referring to different persons. In many cases the names on a vessel's intra-decorative mould stamp and rim stamp are not identical.[801] This indicates that the actual maker of the vessel used a mould made by another potter. Exchange of, or perhaps trade in, moulds was the order of the day. The moulds of Ianu-, for example, were used by at least six potters.[802] These potters used not only moulds of Ianu-, but also of other mould makers.[803] Even mould makers used moulds made by their colleagues for the production of relief-decorated vessels.[804] Possible explanations for this exchange of moulds have already been discussed elsewhere in this thesis.[805]

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[797] Abbo, Atto, Attillus, Belsus, Comitialis, Firmus, Florentinus, and Reginus.

[798] Ludowici (V, 236); Gimber (1993, 241).

[799] The mould makers Atto, Augustinus, Avitus, Verecundus, and Virilis are also known from bottom stamps on plain ware and rim stamps on moulded vessels (cf. the entries in Ludowici V, 209–34, and note 796 above).

[800] Reutti (1983, 58).

[801] Cf. Mees (1993, 240–1, Liste 1).

[802] Gimber (1993, 241–2).

[803] Cf. Mees (1993, 240–1, Liste 1).

[804] Reginus used moulds of Cerialis, Cobnertus, and Comitialis. His moulds were used by Avitus, Lutaeus, and Mammilianus. Mammilianus for his part used moulds of Cobnertus, Ianu-, and Reginus. One of his moulds was used by Lucanus. Lutaeus used moulds of Cerialis, Ianu-, Comitialis, and Reginus. Other mould makers, who used moulds of their colleagues, are Helenius, Lucanus, Avitus, and Augustinus (cf. for all potters cited in this note, Mees 1993, 240–1; Liste 1).

[805] Cf. above Sections 2.5. and 3.2.3.3.

Mould marks of two different persons on one vessel are likely to indicate cooperation in the making of the mould. This applies especially to cases in which these persons are also known as individual mould makers.[806] That cooperation of mould makers played a role is shown by a mould with the graffito SEVERIANVS . GEMELLVS . FECERVNT . AMBO.[807] Severianus is also known from a graffito on another mould (SEVERIANVS FECIT FORMAS).[808] These graffiti also suggest that persons named in internal bottom graffiti were the actual makers of the moulds. This assumption gets backing from a mould of Primitius, bearing his name twice: as an intra-decorative stamp and written in the mould's internal bottom.[809]

However, it is not necessarily always the case that mould stamps and internal bottom graffiti name the actual maker of the mould. A mould with an intra-decorative stamp of the well-known mould maker Comitialis (the first two letters of COMITIALISFE) bears the internal bottom graffito VIRILI.[810] There are three possible interpretations: first, the two cooperated; second, Virilis made the mould for Comitialis; third, Comitialis made the mould for Virilis. Virilis clearly was a potter; he is also known from internal bottom stamps on plain ware[811] and rim stamps on relief-decorated vessels made from moulds of Cobnertus.[812] In addition, intra-decorative mould stamps with his name occur combined with mould stamps of Reginus.[813] At first sight, Virilis cooperated with at least three mould makers, with each in a different way. However, it is possible to see behind these combinations of marks only one kind of transaction. Let us assume that Virilis was not a mould maker at all – he never occurs on a mould alone. In this case, it is possible that he ordered his moulds from colleages capable of making them. He might have asked Comitialis to write his name into the mould, and was perhaps present when Reginus had finished the mould made for him in order to press his own stamp into it. Another example is the mould stamp CONSTAENI. This stamp, also known from plain ware, seems to be combined

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806 Iulius and Iulianus, and Iuvenis and Pupus (Ricken/Fischer 1963, 346–7, Ludowici V, 217–27).
807 Ludowici (I, 107). The words are arranged in the shape of a cross. Stamps of the two occur on plain ware only (Ludowici V, 216, 229).
808 Ludowici (I, 106). The graffiti were not transferred to moulded vessels, because their impression was destroyed when the footring of the vessels was made.
809 Ludowici (I, vii).
810 Ibid.
811 Ludowici (V, 233–4).
812 Mees (1993, 240).
813 Ricken-Fischer (1963, 347).

always with stamps of the well-known potter and mould maker Cerialis (CERIALISF).[814]

In all cases discussed so far, signatures occuring in combination with others are also attested to separately. However, some names are encountered exclusively on moulds which are also signed by well-known mould makers. The signature of Ianuco, for example, occurs only together with the well attested mould maker Victor.[815] The mould stamps IOVENTI, LATINNI, and REP are known only from moulds also stamped by Comitialis.[816] It has been suggested that IOVENTI and LATINNI were the consecutive owners of Comitialis.[817] If this was the case, we would have a parallel to Arezzo. However, Arretine masters' stamps are combined each with quite a number of dependants, and also attested to separately. At Rheinzabern each of the supposed masters would have owned only one slave. That Comitialis was the owner of the persons in question seems at first sight also unlikely, for his mould stamps are not in the genitive case, but *fecit*-stamps.[818] Products of Comitialis from Westerndorf, where he also was active, may help to solve that question.[819] Many stamps from this production centre begin with the abbreviation CSS (CSSER, CSSEROT, CSSIASSVSF, CSSMAIANVSF, CSSBELATVLLVSF, CSS MARCELLIN, CSS VOLOGESVSF, CSSSEDATVS). Without a doubt, these letters have something to do with Comitialis, for all the stamps concerned appear on his moulds, partly together with his stamps, partly alone. They also turn up as rim stamps on vessels made with his moulds. Comitialis for his part never applied rim stamps to vessels made from moulds of one of these persons. This suggests at first sight that Comitialis made moulds for the potters in question. But why the abbreviation CSS? A number of facts show that cooperation with Comitialis alone cannot have been the reason for the use of this abbreviation. First, members of the circle of 'CSS-potters' also used moulds

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814 Ludowici (I, ix; V, 212, 240).
815 Ricken/Fischer (1963, 346).
816 Ludowici (I, ix).
817 Reubel (1912, 28–31)
818 Ludowici (V, 240–1).
819 Westerndorf was a small *terra sigillata* production centre, working in the second half of the second and the first half of the third centuries (Kellner 1973, 20–1). Due to our very limited knowledge of Comitialis' time of production at Rheinzabern – Kortüm/Mees (1998, 162) suggest the time between A.D. 170/80 and 230/40 – and Westerndorf, it has not been ascertained yet whether he worked first at Rheinzabern and later at Westerndorf, or vice versa.

signed by their colleagues.[820] Second, potters without the abbreviation CSS on their stamps also used moulds of Comitialis and persons related to him.[821] Third, mould stamps of persons without 'CSS' before their name turn up on moulds made with punches used mainly by Comitialis.[822] Fourth, many fragmentary vessels without extant mould stamps, but clearly made with punches of Comitialis, bear rim stamps of such persons.[823] Finally, the potter and mould maker Iassus (CSSIASSVSF) must have worked to a large degree independently of Comitialis, for many of his decorative elements were not used by Comitialis or members of his group.[824] The very fact that the potters used stamps beginning with CSS indicates that the relationship between them and the person behind this abbreviation was not just for a short period. It suggests itself that these potters made up a *familia* of *officinatores*, with CSS referring to their owner, namely Comitialis; CSS might stand for '*Comitialis servus*'.[825] With the exception of Erot- and Vologesus, all Westerndorf potters with CSS in their name are also known from Rheinzabern.[826] Although this abbreviation was not used there, it is conceivable that the relationship between Comitialis and the potters concerned was the same as at Westerndorf. In the light of this evidence we can assume that the stamps IOVENTI, LATINNI, and REP also refer to dependants of Comitialis. Perhaps his dependants marked the moulds in question with their names in the hope that they might get employed as *officinatores* later on.

3.4.4.2. Exchange of motif punches

Identical motifs and ornaments used by a number of mould makers can help to reconstruct the connections between them.

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820 E.g. mould stamp CSSER combined with rim-stamp CSSMAIANVSF (Kellner 1981, 127); mould stamp CSSER and rim-stamp CSSSEDATVSF (Kellner 1981, 139). The rim stamp CSSSEDATVS appears on vessels from moulds clearly attributable to Iassus (Kellner 1981, 177).

821 E.g. mould stamp COMITIALIS F and rim-stamp CARMANVS F (Kellner 1981, 132); mould stamp CSSER and rim-stamp HELENIVS (Kellner 1981, 140).

822 For examples, see Kellner (1981).

823 For examples, see ibid.

824 Ibid.

825 That the potters in question were slaves of Comitialis was already cautiously suggested by Kellner (1981, 124). The potter Helenius might have been another slave working at Westerndorf. He often appears on rim stamps on vessels from moulds of Comitialis and his circle. One of his stamps reads ELENIVS CORS F Kellner (1981, 143). The abbreviation CORS might stand for '*Cor(...) servus*'. Alternatively, COR could stand for *tria nomina*.

826 Cf. Ludowici (V, 205, list 1).

A correspondence analysis of mould makers based on motifs used by several of them made it possible to divide these potters into groups, each defined by the motifs exclusive to it.[827] This analysis has also shown that the potters had their own individual motifs, too. Some potters were members of more than one group, using their individual motifs in each of them. It is difficult to say what these groups represent.

As some of them were active simultaneously, they are possibly some kind of organizational units.[828] The next question to settle is, what type of organization underlays this structure. It has been suggested that this was the leasehold system.[829] The idea behind this suggestion is that common motif punches were part of the equipment of a leased workshop. When a new lessee took over the workshop, he would use the same punches as his predecessor. All lessees of this workshop would form a group. In addition, they would have had some punches of their own. However, this is not the only possible explanation. It is also conceivable that the source of the punches was the master of a *familia* of *officinatores,* who organized the exchange of these tools. If a slave *officinator* was sold to another master, he would turn up in another group. In this scenario he could keep those punches that he had made on his own. The individual members of such a *familia* could have entered into individual contracts with various lessors. This model combines features of personal dependency and leasehold systems. The exchange of punches without a central authority is also conceivable, in which case each group would have been active in a different area of the production centre. If a potter moved from one area to another, he would take only his own punches with him, and borrow others from his new neighbours.

Another approach is based on the assumption that the punches were passed on from potter to potter, be it after a potter finished his career or decided to give away his punches once he had made enough moulds with them. This idea is compatible with the model of *familiae* of *officinatores* and/or physical proximity of the potters, but incompatible with the one of punches belonging to the lessor. Supporters of this approach try to trace the passage of the punches from potter to potter. This is an

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827 Bernhard (1981b), Bittner (1986), Mees (1993; 1994; 1996; 1997).
828 Zanier (1994, 61), Bittner (1996, 41), Mees (1996, 663–4; 1997, 665–71).
829 Mees (1997, 665–6).

extremely complex task, for each potter had motifs in common with many others, and most motifs were used by quite a number of potters. The lack of a reliable chronological framework makes this approach even more complicated.

3.4.4.3. The case of Ianu-

The case of the mould maker Ianu- is an instructive example.[830] This potter, having been active at La Madeleine and Heiligenberg before[831], was one of the first producers of *terra sigillata* at Rheinzabern.[832] None of his moulds were transferred from La Madeleine to Heiligenberg, or from there to Rheinzabern – quite in contrast to his decorative punches, of which he took a large number with him. 132 out of the 231 punches used by Ianu- at Rheinzabern are already known from his production at La Madeleine or Heiligenberg.[833] The fact that his moulds were not transferred suggests that this was not the transfer of a whole workshop, but the migration of an individual potter. We must assume, therefore, that the 132 punches used at these separate sites were the property of Ianu-.

Ianu- has many motif punches in common with other producers. Saturninus and Satto are the earliest of them. The two appear to have worked between A.D. 80/90

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830 The stamp in question can be read as IANVSF or IANVF alternatively. The last character can be interpreted as either a ligature of S and F, or an F with a slightly curved vertical line. Whether one calls this potter Ianus, or leaves the ending of his name open depends on the reading of this letter. The vertical line of the character in question is only to some extent S-shaped, only its outside edge is slightly bent (this description is based especially on the drawing in Ludowici V, 241, but the characteristics cited are also clearly identifiable elsewhere). The maker of the stamp tried to write the letters with serifs (as is clearly to be seen with the I and the V). In addition, the lines of the V are bent like the vertical line of the F. The F of the stamps AVGVSTINVSFE (Ludowici V, 209, die h) AMANDVSF (Ludowici V, 207, die b) MELAVSVSF (Ludowici V, 222, dies a and f) and VICTORF (Ludowici V, 233, die p) look like the one in IANVF, or even more like a ligature of S and F, *without* being it. All in all, the shape of the F in question is most likely the result of the carver's writing with serifs and slightly bent lines. Thus the potter in question is referred to as Ianu- here.

831 Gimber (1993, xi).

832 Gimber (1993, 226, 231–2), Kortüm/Mees (1998, 162). Whether Ianu- was a potter or a specialized mould maker is a matter of contention. His stamp IANVF is known as a mould stamp only. It has been suggested that IANV stands for Ianuarius, a potter known from Heiligenberg and Rheinzabern as a maker of moulded and plain ware (cf. Gimber 1993, 239 with references). However, Ianuarius' stamp (IANVARIVSF) was never used as a mould stamp. In addition, plain vessels with this stamp are missing in waste pits containing vessels of IANVF. Ianu-'s contemporary Comitialis, for comparison, used the same stamps on moulds and plain ware (Ludowici V, 212; Gimber 1993, 238–9). These facts have led to the suggestion that Ianu- and Ianuarius are two different persons (Gimber 1993, 238). On the other hand, as a specialized mould maker Ianu- would have been an exception, for most mould makers made moulds and plain ware (cf. n. 796). In any case, it is most unlikely that Ianu- made moulds only. However great the demand for moulds at Rheinzabern might have been, it was certainly not so great that mould making alone sufficed to provide a living.

833 Data taken from the table in Gimber (1993, 245–58).

and 150/60, mainly in eastern Gaul.[834] Saturninus came originally from southern Gaul; Satto is seen as his companion and later his successor.[835] Except for their joint motifs, we have no evidence that they and Ianu- were ever active at one site. Nevertheless, Ianu- must have had personal contact with these producers early in his life, most likely being in an inferior position as a non-signing potter. He might have learned his trade from Saturninus and Satto, perhaps being their slave and later on freedman. At Heiligenberg, Ianu- must have had a close relationship with the potter Ciriuna with whom he shares many decorative elements.[836] At Rheinzabern, Ianu- has many motif punches in common with a number of producers, especially with Cerialis and Cobnertus. Cerialis used 136 punches of Ianu-, Cobnertus 56. Seventy-five out of the former and 30 out of the latter had already been used by Ianu- at La Madeleine and/or Heiligenberg. In other words, the majority of punches common to these potters was originally the property of Ianu-. This is against the hypothesis that punches common to various potters belonged to a lessor. As an explanation of the existence of common motifs, it has been suggested that Cerialis and Cobnertus took over the equipment of Ianu-.[837] However, 30 out of the 56 punches common to Ianu- and Cobnertus were also used by Cerialis. This indicates at first sight that first Cerialis took over 136 punches from Ianu- and only later did Cobnertus take 30 out of these from Cerialis. However, there are also indications that punches were transferred from Ianu- to Cerialis via Cobnertus.[838] The moulds of Cobnertus can be divided into three so-called series, each sharing a number of typical motifs. The series Cobnertus I has 44 motifs in common with Ianu-, series II seven and series III fourteen.[839] Thus only series I is thought to have been made after Ianu-'s giving away his punches.[840] Of Cerialis six series are known, with nos. I – V having a high percentage of motifs in common with Ianu-. Thus these series, too, are dated after the transfer of Ianu-'s moulds. On moulds of these series, decorative elements also used by Ianu- and Cobnertus I are combined with those belonging to Cobnertus' series II and III. If the latter series are really older than the ones of Cerialis, the transfer must have taken

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834 Lutz (1970, 332–3).
835 Lutz (1969/1970; 1970, 233–42; 1986, 180).
836 Gimber (1993, 259)
837 Ibid. 236–7, 259.
838 Bittner (1996, 146–51).
839 Ibid. 150, table 2.
840 Ibid. 149.

place from Cobnertus to Cerialis. However, to infer from this that all motifs common to Ianu- and Cerialis came to the latter via Cobnertus seems to be exaggerated, for – as we have seen above – only 30 out of the 136 motifs in question are to be found on Cobnertus' moulds. In addition, the methodological basis of the dating of Cobnertus' series is quite unreliable, for an explanation is needed for those motifs common to Ianu- and Cobnertus II and III. If the dating is to be correct, this can only be explained by Ianu-'s lending moulds to Cobnertus, or by the existence of duplicates of the punches in question.[841]

If these possibilities existed, the question arises whether they are behind all 'common' punches. Another problem is the existence of a second series of Ianu-, the series Ianu- II.[842] This series has only seven motifs in common with Ianu- I (so far referred to as 'Ianu-' without numbering). The dating of Ianu- II is a matter of contention, but it seems clear that he was active after Ianu- I. It is also a matter of contention whether or not Ianu- I and II are identical. Whatever the answer, it has implications difficult to explain. If the persons are identical, the question arises of why Ianu- at once gave away nearly all his punches which he had brought with him from Heiligenberg and La Madeleine. If they are not identical, one wonders why somebody else used the name stamp of Ianu-. If Ianu- II was the son of Ianu- I, one would expect him to have inherited the tools of his father. One might speculate that Ianu- II was a freedman of Ianu- I, thus having the same *nomen gentile* (e.g. Ianuarianus). He might have been testamentarily manumitted, but inherited only a small number of tools. As Ianu- I was deceased, his former slave could use now his master's stamp as his own.

3.4.5. Excavations and archaeological finds

That stamped Roman pottery is to be found at Rheinzabern was already known to Beatus Rhenanus in the 16th century.[843] With the beginning of the 19th century, the first finds of *terra sigillata* from Rheinzabern were published in the 'Intelligenzblätter des Rheinkreises'.[844] This caused an interest in these objects with museums and private collectors. At Rheinzabern, Roman brick constructions, especially kilns, were

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841 Ibid. For the technology of punch production, see above Section 2.2.1.

842 Gimber (1993, 1108–18).

843 Beati Rhenani Selestadiensis *Rerum Germanicarum libri tres*, Strasbourg 1531.

844 Sprater (1948, 7–20) and Bernhard (1990, 533) give an overview over early accounts on Rheinzabern.

traditionally exploited as a source of building material. The selling of *sigillata* vessels found in the course of digging out the kilns became a welcome supplementary income of the locals. A side effect was forgery of ancient clay and metal objects.[845] The first excavations in the archaeological sense of the term were carried out between 1901 and 1914 by W. Ludowici. Fascinated by the quality of the ancient ceramics, the entrepreneur moved his brickyards from Ludwigshafen to Jockgrim, a neighbouring village of Rheinzabern. He published the results of his research in five volumes of excavation reports; another volume was edited posthumously.[846] Not only a number of overview publications is based on this material,[847] but also the still lively discussion on the analysis of moulded ware.[848] After the Second World War more details became known as a result of building work.[849] However, these finds have not been published so far. Systematic excavation work began in 1975. In the following twenty years large parts of the potters' quarter were unearthed.[850] Unfortunately, these more recent excavations have also not yet been published in detail. Only a small number of preliminary articles and a D.Phil. thesis on the so-called 'workshop of Ianus' are available.[851]

3.4.5.1. Constructions of the pre-*sigillata* phase[852]

The Roman settlement was erected in a length of approximately one kilometre alongside the trunk-road in the Claudian period. The potters' quarter was situated in the southern part, whereas in the northern part other trades were active.[853] Along both sides of the road a strip of land was divided into plots of a width of 7 to 12 metres and a depth of 70 to 120 metres. Wooden fences and ditches formed the boundaries between the plots. In the area east of the trunk-road, at a distance of c.

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845 Sprater (1948, 16–7) and Garbsch (1966, 108–11) with details.

846 Ludowici (I–V). The sixth volume (Ricken/Ludowici 1942) was published post-mortem by H. Ricken, and completely revised by Ch. Fischer (Ricken/Fischer 1963).

847 Reubel (1912), Sprater (1948), Roller (1965).

848 Cf. below Section 3.4.4.

849 Schulz/Schellenberger (1996, 8).

850 Ibid.

851 Bernhard (1981a), Rau (1976; 1977a; 1977b), Reutti (1981a; 1981b; 1983). Guides to the Rheinzabern local museum partly based on the yet unpublished excavations are also of importance as a source of information (Rau 1979, Reutti 1984, Schulz/Schellenberger 1996). D.Phil. thesis on Ianu-: Gimber (1993). Another D.Phil. thesis – yet unpublished – is Trimpert (1994) on the brickyards in the street Fidelisstraße.

852 For all data in this section, cf. Reutti (1983, 37–44) and Schulz/Schellenberger (1996, 10–16), except where otherwise stated.

853 Rau (1977a, 56; 1977b, 49, 71).

150 metres, a narrower parallel road existed. This road was connected with the trunk-road by a passage placed more or less at right angles to it. Another way gave access to the area behind the plots. This area was much less densely developed. Only a few constructions were situated there. The plots along the trunk-road had on their street side post constructions built on them. Being as broad as the plots themselves, they had a length of 18–23 metres. The internal functions of these comparatively large buildings cannot be ascertained in detail. Remains of domestic stoves show that they were used as dwellings.[854] Remains of military equipment found in some of the houses suggest that here persons concerned with the making of building material for the legions were accommodated.[855] In some cases cellars and small outbuildings belonged to the houses. Plots with pottery kilns, but without any outbuildings, indicate that the houses in question were used as combined living and workshop buildings. On a number of plots potters' kilns were situated in the zone immediately behind the residence buildings. Interestingly, there are no traces of clay-processing installations. The comparatively small kilns differ in size and construction. Various kinds of pottery were fired in them. The remaining part of the plots (one half to two-thirds of the area) was often free of any buildings and production installations. It has been suggested that this area was used for horticulture and the keeping of small livestock. On two of the plots, kilns for bricks were situated. It is an open question whether they had something to do with the making of bricks for the legions. The borderlines of the first-century plots are crossed by second-century structures. This shows that these plots had been abandoned before the *terra sigillata* workshops were erected.

To sum up, small workshops dominated the production of pottery other than building material. Pottery production certainly played an important role in the life of the inhabitants, although it does not seem to have been their only occupation. The potters are likely to have also produced food on small scale, perhaps for their own consumption only. They also seem to have been dependent on the brickyards. We can assume that they worked there, because it is questionable whether they could sustain themselves on their small-scale pottery production and farming alone. In addition, they did not have their own clay-processing installations; thus they were dependent on external sources. The end of the production of building material for the legionary

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[854] Reutti (1983, 38).
[855] Bernhard (1990, 533).

camps seems to have led to the abandonment of their plots. These considerations support the hypothesis that the first-century potters were tenants of the Roman administration. That they were not able to lease the resources available after the end of large-scale brick production is possibly due to the small profit from their making of 'ordinary' pottery.

Half-way between the potters' quarter and the clay pits a Roman bath with hypocaust heating was situated.[856] Many bricks with first-century stamps have been found there, giving a *terminus post quem* for its construction. It has been suggested that this bath belonged to a large *villa*, but no additional details have been published so far.[857]

3.4.5.2. *Terra sigillata* workshops

Reports from the first half of the nineteenth century speak of more than 100 known kilns (without any details).[858] If one takes into consideration that this includes kilns for various kinds of ceramics from a period of more than 200 years, this number does not seem to be exaggerated.

It is an open question whether there was a continuity of pottery production between the first century and the beginning of the production of *terra sigillata* in the mid-second century. In some areas it appears as if there was a discontinuity of settlement in the first half of the second century, for finds from that period are missing.[859] Indeed, it is a general characteristic of the later structures to be built on and overlapping those of the first century.[860] The first *terra sigillata* workshops were erected in the area behind the roadside settlement.[861] However, from the turn of the century onwards, workshops were also built close to the road.

In 1975/76, *terra sigillata* workshops of the second half of the second century were unearthed.[862] These workshops comprised all necessary production installations: basins for the processing and storage of clay, draw-wells, wooden post buildings, kilns, and waste pits. Typical finds in the workshop area are tools such as moulds for

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856 Ludowici (II, iii-vi), Sprater (1948, 32–4), Bernhard (1990, 533).
857 Bernhard (1990, 538) speaks of a 'Teil einer großen Gutsanlage'.
858 Sprater (1948, 73–4).
859 Rau (1977b, 69).
860 Reutti (1983, 44–6), Schulz/Schellenberger (1996, 19–20).
861 Bernhard (1990, 534).
862 For these workshops, cf. Rau (1977b, 49–68). They were dated on the basis of stamped vessels found there.

the making of relief-decorated *sigillata*, and vessels. There are no indications that the workshops functioned also as accommodation. Some of the workshop sheds and production installations are of considerable size. One of the clay-processing installations had a length of 17 metres and a width of 6 metres. The largest shed (shed I) measures 30 x 8 metres. This shed was subdivided into four sections by internal posts. Additional posts in two of the sections suggest that they were equipped with large shelves. Finds of support elements for the stapling of vessels indicate that the function of this construction must have been the drying of vessels. Inside the shed two smaller clay storage containers were found. Traces of pivots of potter's wheels are not reported. Moulds and vessels made by various producers were found in the shed and its immediate surroundings. Unfortunately we cannot be certain that these vessels were made and/or stored in this shed, for most of them are rejecta. In a nearby shed (shed III) the name punch ATTIANVS and reject vessels with impressions of this punch were found. Perhaps reject vessels were used as production appurtenances. However, even though this example suggests that the potters used their own reject vessels for that purpose, one cannot exclude the possibility that they also used rejecta of others who worked elsewhere, but had their vessels fired in the same kiln.

At a few metres' distance of shed I, a smaller one was situated (shed II, 8 x 8 metres). It is likely to belong to an earlier period, for shed I was in parts erected on clay and waste pits apparently related to shed II. Another shed, shed III, could not be excavated completely. It was also erected on filled-in clay pits. The three sheds seem to have been related to a large kiln, of which only a small section could be excavated. Thus its actual size remains unknown. The variety of producers' marks found in the area of this workshop complex makes it impossible to assign it to an individual producer. In some cases moulds of the same makers were found in two or all three sheds. Among the moulds, products of Cobnertus, Ianu-, Reginus, B.F.Attoni and Comitialis prevail. Only the former three are represented in the layers below shed I and III, so that they must have been the earliest producers. However, moulds of them were also found in the new sheds.[863] Other mould makers represented in the complex

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[863] Rau (1976, 147) suggests the sequence Ianu- – Reginus – Cobnertus – Comitialis. He does not repeat this claim in his later publications on the same material. The evidence allows only the conclusion that Ianu-, Reginus, and Cobnertus were already active before Comitialis and others joined them.

are Atillus, Belsus, Cerialis/Constaeni, Firmus, Florentinus, Mammilianus, and Primitius.

These mould makers belong to various of the groups defined by the joint use of motif punches.[864] At first sight, the fact that their products were found in one workshop complex seems to militate against explanations of the exchange of punches by spatial proximity of the potters concerned. However, the presence of so many mould makers' products in one workshop complex can in part be the result of exchange of moulds.

Another workshop (shed IV, 10.5 x 6 metres) was situated at a distance of about 20 metres from shed I.[865] It does not seem to belong to the complex discussed above. Clay-processing installations, a well, and a kiln in its immediate vicinity suggest that it was working independently. Moulds of Cerialis/Constaeni, Lupus, and Reginus; relief-decorated ware from moulds of Cerialis/Constaeni, Belsus, Primitius, and Verecundus; and plain vessels of various producers were found there. The kiln belonging to this shed has a circular firing chamber with a diameter of 3 metres.[866] Reject vessels suggest that it was used for the firing of *sigillata*.

At a distance of about 250 metres west of the second-century installations, a workshop of the early third century was excavated in 1978/79.[867] It comprises two kilns, basins for the processing and storage of clay, draw-wells, and waste pits. The two kilns attached to this workshop were of the same size and type as the one belonging to shed IV.[868] A large number of *tubuli*, floor support disks, and other appurtenances typical of the firing of *terra sigillata* were found in their surroundings. In the immediate vicinity of this workshop, a broad range of pottery other than *sigillata* was produced. It was fired in two small kilns unsuitable for the making of *terra sigillata*.[869] Remains of buildings are not reported. Products of at least 22 potters of plain *sigillata* and of the same number of mould makers were found there. Among the finds are a mould of Comitialis and relief-decorated vessels from moulds made by him, Primitius, Belsus, Firmus, Cerialis, and Lupus - mould makers already known

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[864] Cf. the list in Mees (1993, 235).
[865] Rau (1977a, 57-8).
[866] Kiln III, findspot 20; Rau (1977b, 62).
[867] Reutti (1983, 46-61).
[868] Ibid. 46-52.
[869] Ibid. 61.

from the workshops dealt with above. Because of the possibility of exchange of, or trade in, moulds, this does not necessarily mean that the potters in question were active there. Reject plain ware is a more reliable indicator. Although in the preliminary reports details of plain ware potters are mentioned only sporadically, some cases suggest that these potters worked in various shops. Stamps of five potters were found on reject plain ware from both the large workshop complex dealt with above and the one discussed here.[870] However, it cannot be totally excluded that vessels were transported to and fired in the nearby workshop (perhaps because the kiln of one of the workshops was being repaired).[871]

Another workshop consisting of draw-wells, levigation basins, waste pit, and five kilns was situated 150 metres north-west of the second-century installations.[872] Although the production waste suggests that this was a *terra sigillata* workshop of the late first and early second centuries,[873] it must be left open whether *sigillata* was fired in the kilns concerned. One kiln is rectangular; two very small oval kilns were in a very bad state, and a circular one (internal diameter 2.20 metres) with 64 firing holes was certainly not used for the firing of *terra sigillata*. If it had been equipped with *tubuli* the pipes would have stood too close together to leave room for vessels. Finds of appurtenances such as *tubuli* are not mentioned.

The number of potters encountered here is enormous: 84 names on plain ware, one name on a rim stamp on a moulded vessel, twelve names on mould stamps on moulded vessels, and two on moulds were found there. Some potters are represented on plain and decorated ware, or decorated ware and moulds, so that the total number of potters' names encountered there is 93. Unfortunately, the preliminary excavation report does not say explicitly that all vessels were reject, but this suggests itself. Many of the relief-decorated vessels were made with moulds of Comitialis. He is also represented on plain ware and a mould. Thus Ludowici attributed the workshop to him[874] – an hypothesis which cannot be maintained in the light of new finds. Quite a number of potters' names on bottom or rim stamps found there are also known from

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870 Martinus, Reginus, Victorinus, Catullus, Constans (Rau 1977, 52–9; Reutti 1983, 56).
871 Cf. Reutti (1983, 58).
872 Ludowici (II, 159–67).
873 Many moulded bowls of Comitialis were found there. Kortüm/Mees (1998, 162) suggest for Comitialis a period of activity between 170/180 and 230/240.
874 Ludowici (II, 164).

the large workshop complex of the second century,[875] and of the one of the early third century.[876] In view of the distance between the workshops, these finds suggest that the potters concerned were active in two or even three workshops. Although the possibility cannot be excluded that vessels were transported to and fired in another workshop, the fact that many potters were itinerant craftsmen supports the hypothesis that they also were itinerant inside the production centre. A detailed publication of all finds of reject vessels would certainly uncover more such cases.

Rectangular kilns, too, were excavated in the vicinity of the *terra sigillata* workshops, but there is no evidence that they were used for the firing of this kind of ceramics. These kilns possibly belonged to third-century brickyards working in the neighbourhood.[877]

It needs to be stressed that much more workshops must have existed. Some more have been excavated subsequently, but not published as yet.[878]

3.4.5.3. Potters' lists

At Rheinzabern three graffiti vaguely reminiscent of the firing lists of La Graufesenque were found.[879] Only fragmentarily extant, they contain numbers and words arranged in lines. In two cases neither a line nor a word is complete, so that no further analysis is possible. The third graffito, however, clearly consists of four lines, each containing a vessel's name and a number. These finds suggest that a book-keeping system similar to the one of La Graufesenque existed at Rheinzabern. This interpretation is backed by a graffito found at Blickweiler.[880] It has exactly the same structure as the ones of La Graufesenque: personal names, names of vessels, and numbers arranged in columns and lines. There is no doubt that at Blickweiler a book-keeping system was used which must have been very similar to the one of La Graufesenque. The relationship between the two German sites was very close: more than 30 potters migrated from Blickweiler to Rheinzabern.[881] It suggests itself that

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875 E.g. Attianus, Atto, Avitus, Constans, Maianus, Martinus, Melausus, Nivalis, Reginus, Venicarus, Victorinus.

876 Avetedo, Constans, Impetratus, Lucius, Martinus, Potentinus, Reginus, Taurus, Verecundus, Verus, Victorinus, Urbanus.

877 Schulz/Schellenberger (1996, 20).

878 The map in Schulz/Schellenberger (1996, 13, Abb. 3) shows far more kilns marked '*terra sigillata* kilns' than have been published so far.

879 Ludowici (I, x; II, 138 no. 3700), Oxé (1925, 52), Reutti (1984, 25–6), Wiegels 1989 (15–6).

880 Oxé (1925, 52), Marichal (1988, 260–2).

881 Sprater (1948, 95–6), Lutz (1969/70).

they used their book-keeping system also at their new place of work. On the other hand, the fact that at Rheinzabern only three fragmentary lists have been found as yet shows that either only few potters used this system or – which seems more likely – a different writing-material was used.

3.4.5.4. Other finds

Many items of everyday use such as coins, jewellery, toiletry, kitchen utensils, glass and bronze vessels were found in the potters' quarter, especially as burial objects.[882] They are indicative of a modest, but not poor, standard of living. Some of the potters could afford to put up inscribed tombstones for their relatives.[883] A building complex, of which plaster fragments with fresco-painting and a terrazzo floor were found in 1902, must be dated in the first century, as suggested by Gaulish *sigillata* sherds of that period.[884]

Numerous finds of small and large cult objects suggest that the craftsmen's settlement had one or several centres of cult worship.[885] Some inscribed votive objects (stones and vessels) bear names also known from potters' stamps.[886] Their identification with each other is, however, hypothetical.[887] Among the religious objects are two specimens of a stone relief of the five gods Apollo, Minerva, Fortuna, Vulcan, and Mercury. They have been found in 1829 and 1979, respectively.[888] It is likely that the reliefs were part of a sanctuary, or two of them, of the craftsmen's community. Other finds suggest the existence of sanctuaries of Jupiter and Minerva, and Mithras.[889] In the northern part of the settlement, remains of massive buildings with cellars were found, perhaps residence buildings.[890] Whether they were inhabited by persons concerned with the production of *terra sigillata* is open to speculation.

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882 Sprater (1948, 34–52).
883 For examples, see Sprater (1948, 49–52) and Wiegels (1989, 35–7).
884 Ludowici (II, 153–4).
885 Sprater (1948, 53–70), Wiegels (1989, 17–33).
886 Wiegels (1989, 56–7).
887 Ibid.
888 Bauchhenß (1981), Reutti (1981a).
889 Sprater (1948, 60–4), Wiegels (1989, 32–3, 47–8).
890 Bernhard (1990, 536).

3.4.5.5. 'Branch workshops'

It has been suggested that a number of producers from Rheinzabern had subsidiaries elsewhere.[891] However, as we have seen, many potters active at Rheinzabern were itinerant craftsmen. Part of the supposed branch workshops are thus likely to be the result of the potters' migration (for example the activity of Comitialis at Westerndorf).[892] In other cases, moulds with marks or motifs typical of Rheinzabern potters were found elsewhere, which can be explained by a trade in moulds.[893]

3.4.6. Summary and conclusions

The question of who owned the land, the raw material, and the workshops cannot be answered conclusively. Some consider the potters' workshops as private, others as state-owned.[894] A combination of both elements is perhaps the best explanation.

In the first century, the potters' main task was the production of building material for the nearby legionary camps. In this period, army members seem to have lived on some of the plots. Thus it is plausible to assume that the Roman military administration initiated the large-scale production of clay artefacts at Rheinzabern.

However, to hypothesize that the *terra sigillata* workshops themselves were state-controlled firms[895] seems to be exaggerated. The evidence of the pre-*sigillata* phase shows that in the area of the later *terra sigillata* workshops small plots were situated, apparently leased by tenant-potters.

On the abandoned first-century plots, workshops for the making of *terra sigillata* were built. It is most likely that the potters working in them were not their owners. As we have seen, many of these potters were itinerant craftsmen, with Tabernae being only one station on their way. Moreover, at Rheinzabern apparently a number of potters were active each in various workshops. And vice versa: in each workshop various potters were active. This makes the leasehold system the most likely

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[891] E.g. Roller (1969, 10).

background of the organization of production. It is unlikely, however, that the potters only leased the land and built their own workshops on it. Their changes of workshop support the hypothesis that they leased a pottery workshop or a part of it. In addition, the building of large production sheds was certainly beyond the skills and the means of a potter. Thus it seems plausible to assume that a main tenant leased the land from the state, had some basic production installations erected, and subleased the workshops to the potters. We cannot exclude the possibility that part of the area, especially the clay pits, was privately owned. This could be the case if the Roman bath near the clay pits belonged to a Roman *villa*. If so, one might speculate whether the *villa*'s owner also owned or had leased the land in question.

Finds of floor support discs suggest that the kilns were filled like the *grand four* of La Graufesenque.[896] The fact that the potters also stamped kiln parts such as *tubuli* shows that they were responsible for the maintenance of production installations, and also suggests the shared use of kilns.[897]

The persons referred to on mould marks from Rheinzabern have often been looked upon as grand entrepreneurs and owners of big firms, engaging potters who stamped their products with the name of their employer.[898] However, the evidence discussed in this chapter clearly shows that the mould makers cannot have been financially powerful businessmen. The important mould maker Ianu-, for instance, was unable to transfer his moulds from one station of his wanderings to another. The example of Severianus' graffiti suggests that the persons referred to on mould marks made the moulds personally. The distribution of moulds of individual mould makers at the production centre is against the theory of their use in one workshop only, and in favour of the idea of an exchange of, or trade in, moulds. All this leads to the

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[896] The reconstruction of a Rheinzabern *terra sigillata* kiln in Schulz/Schellenberger (1996, 18) shows several floors. Bernhard (1990, 536) also follows this interpretation. Rau (1977b, 50–1) suggests that the discs were used to hold the tiles of the temporary roof construction.

[897] Cf. above p.133.

[898] Ludowici (I, ix) suggests that mould makers were workshops owners, whereas makers of moulded ware – known from rim stamps – are seen as the actual potters. The same idea is behind Huld-Zetsche's (1972, 86–90) interpretation of the very prolific mould maker and potter Comitialis as a grand entrepreneur (*Großunternehmer*). Gimber (1993, 268–9), too, looks on the persons named on mould marks as big businessmen (*Großunternehmer*) and factory owners (*Fabrikanten*). He considers them as financially powerful tenants, leasing clay pits and land to build workshops and production installations on it. These tenants would then engage potters for the making of fine and moulded ware. Gimber does not explain whether he still considers the persons named on mould marks as the actual makers of the moulds. The stamps on plain ware are not seen by him as referring to the vessels' maker, but to the entrepreneur.

conclusion that the mould makers at Rheinzabern were nothing more but potters with special skills.

The fact that the majority of jointly used punches were the property of mould makers militates against the hypothesis that these punches belonged to the lessors. It seems more likely that partly the hiring out, partly the passing on, and partly the existence of several identical specimens of a punch are the reason for many identical motifs being encountered on moulds of various producers. Perhaps *familiae* of *officinatores* also played a role. However, we are still far from understanding the details of the reproduction and the exchange of motif stamps.

That the use of rim stamps was confined to the first generation of potters is reminiscent of the abandonment of the application of bottom stamps to moulded ware at La Graufesenque. There the reason for this development was most likely the replacement of small workshops by larger ones in the heyday of production.[899] As we have seen, at Rheinzabern, too, the workshops became larger over time. Perhaps this development finally led to the giving up of the rim stamps.

Recently it has been claimed that the production-form in Rheinzabern was a manufactory.[900] Mass production, specialization in one kind of tableware, and large workshop sheds are without a doubt impressive characteristics. However, the main point of the definition of a manufactory is the cooperation of a large number of artisans working in one establishment and producing a single complex artefact. Above all, in a manufactory there should be a clear tendency for the job to be split into ever more specialized tasks. For these main points no evidence is available. The evidence discussed in this chapter rather suggests that the organizational form at Rheinzabern was a nucleated workshop industry with intensive cooperation of the craftsmen. Although we have only very few and indirect hints that dependants and *familiae* of *officinatores* played a role at Rheinzabern, the case of Comitialis strongly suggests that this was the case.

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899 Cf. above p.84.

900 Rau (1977b, 49): 'arbeitsteilige Manufakturordnung'; Schulz/Schellenberger (1996, 17): 'Die vielschichtige, komplizierte Herstellungstechnik setzt nämlich eine Spezialisierung und bei den produzierten Massen auch ein arbeitsteiliges Verfahren voraus, weshalb auch von Manufakturen gesprochen wird'.

The potters seem to have lived in modest, but not poor, circumstances. Finds of cult objects suggest that one or several centres of cult worship were situated at Rheinzabern.

To sum up, many characteristics of the production of *terra sigillata* at Rheinzabern are reminiscent of Gaulish centres: the stamping of mass-produced forms only, the exchange of, or trade in, moulds and decorative punches, the cooperation of potters in the making of their products, especially moulds, the joint use of production facilities, the use of potters' lists, most likely also the existence of *familiae* of *officinatores*. This is not surprising, because many potters came from central and eastern Gaul, where colleagues from southern Gaul had influenced them. As a result, it is very likely that the production organization of Rheinzabern was based on the model of La Graufesenque.

4. Iberian production centres

4.1. Introduction

4.1.1. Period of production, production centres

The beginning of the production of *terra sigillata* on the Iberian Peninsula (Terra Sigillata Hispanica, TSH) can be dated to the period between A.D. 40 and 50.[901] Soon this kind of pottery was made at a large number of places. About 30 production sites are known from the first and second centuries; another dozen might be added for the later periods.[902] This number is constantly growing, as new sites become known. Iberian *terra sigillata* continued to be produced until the beginning of the fifth century, with the latter productions being of poor quality.[903] Most of the production centres, however, were very small and merely of local significance. Only in two cases, Andújar in the Baetica and Tritium Magallum in the northern Tarraconensis, did larger production centres with export production develop.

4.1.2. Evidence for the production organization

Many specimens of Iberian *sigillata* bear producers' stamps. In addition, production installations and waste pits have been excavated. However, it needs to be said at the outset of this chapter that the evidence is not rich and its analysis not advanced enough to enable new insights into the organization of production. Nevertheless, it is important to analyze if there are any hints indicating whether a different form of organization developed on the Iberian Peninsula or if structures comparable to other mass productions prevailed.

4.1.3. Italian and Gaulish influence

It has been suggested that Italian or Gaulish potters played a role in the foundation of the first Iberian workshops.[904] The influence of Gaulish *sigillata* is especially strong, as Gaulish forms of vessels dominated the Iberian production.[905] Products of Italian potters were also present, and the Italian influence is conspicuous. An epigraphic characteristic of the producers' stamps of *terra sigillata* workshops in

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[901] Mezquíriz (1985, 109-10).
[902] Ibid. 111-6.
[903] Ibid. 110.
[904] Sotomayor (1979b), Roca Roumens (1980), Mezquíriz (1985, 109).
[905] Mayet (1984, 205).

the Baetica is the prevalence of *tria nomina* abbreviated to its initials. Such stamps were also very common in the late *terra sigillata* production in the Po Valley. Thus it has been suggested that connections between the latter and the workshops in the Baetica existed.[906] However, definite proof for activities of Gaulish or Italian potters on the Iberian Peninsula is lacking.[907]

Nevertheless, it must be asked how the Iberian potters gained the technical expertise necessary for the making of *terra sigillata*. As we have seen in the case of Lezoux, it can be excluded that high-quality *sigillata* could be made only by copying the products. Thus immigration of potters from Italy and/or Gaul is very likely, even if the actual activities of potters from there did not leave visible traces for us. Alternatively, traces of the activities of these potters in their region of origin might have not yet been discovered. Of a vast number of Italian potters there is only one find recorded so far,[908] so that the missing of definite proof for relationships to other regions might be a mere gap in our knowledge. In any case, *sigillata* vessels from Italy and Gaul were available as models. Whether the influence of these regions was restricted to the technology and the forms of vessels, or also affected the organization of production, will be a main focus of this chapter.

4.2. The centre of production of Andújar

4.2.1. Topographical situation

The pottery workshops referred to as the centre of production of Andújar or Los Villares del Caudillo are situated near the banks of the river Guadalquivir, five kilometres from the modern town of Andújar, and in the immediate vicinity of the hamlet Los Villares del Caudillo (province of Jaén).[909] Los Villares del Caudillo is considered as having been the location of the ancient Municipium Triumphale, the capital of the *civitas* of the Isturgi. If this assumption is correct, the related production centre can be characterized as sub-urban. The ancient Baetis, as the main traffic

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[906] Roca Roumens (1980).

[907] It is a subject of discussion whether the products of the legionary potter with the stamp L. TERENT/IIII MAC found in the northern province of Palencia at Herrera de Pisuerga (active around the turn of the era), were made locally or imported from Italy. For import, see Mayet (1984, 16); for local production, Roca Roumens (1991/92, 396), following Perez Gonzalez, C., *Cerámica romana de Herrera de Pisuerga (Palencia, España). La terra sigillata* (Santiago de Chile 1989) [non vidi].

[908] A look into Oxé/Comfort (1968) makes this perfectly clear.

[909] For a brief overview, see Mayet (1984, 34–5); for greater detail, Sotomayor (1972, 263–5).

artery of the Baetica, was the ideal route for the exportation of goods.[910] *Sigillata* from Andújar was not only distributed in the Baetica, but also exported to North Africa, especially Mauretania Tingitana.[911]

4.2.2. Period of activity, range of production and distribution

At Andújar, *terra sigillata* was made from the second quarter of the first to the mid-second centuries,[912] perhaps with some trial production involving copying Italian forms in the early Tiberian-Claudian period.[913] Three phases of production can be defined.[914]

In the first phase, covering roughly the Tiberian-Claudian era, the variety of products was very large. Not only were many forms of *terra sigillata* made, but also lamps, *pompeianisch-rote Platten*, Iberian ware (*cerámica Ibérica*), fine ware other than *sigillata* (*paredes finas*) as well as coarse ware.[915] The scale of production of coarse ware was much larger than that of *sigillata.* Indeed, *terra sigillata* seems to have had the status of a by-product.[916] Six to eight producers of *sigillata* belong to this phase. The first area of distribution was Mauretania Tingitana, to which already in the pre-Flavian period products were exported, whereas simultaneously the local and regional markets were supplied with Iberian ceramics only.[917]

The second phase, covering roughly the Flavian era, was the heyday of the centre. Only a limited number of forms, all of them Gaulish in origin, were produced in large quantities (Drag. 15/17, 27, 29, 37). Coarse ware continued to be thrown in quantities

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910 According to Strab. 3,2,3, the Baetis was navigable only as far as Corduba, c. 70 kilometres downstream from Andújar. However, the distribution clearly shows that the river played an important role for the transportation.

911 Serrano Ramos (1983).

912 Roca Roumens (1994, 413), Mayet (1984, 37).

913 Roca Roumens (1991/92). The argument that trial production existed at Andújar is based on the analysis of forms of vessels reminiscent of Arretine production before the turn of the era: 'Evidencias claras de tales producciónes [i.e. producciónes precoces en el S. de Galia y valle del Ródano; G.F.] faltan por ahora en la Bética si bien la presencia de formas como las que aquí presentamos, procedentes de Andújar, cuyos prototipos se rastrean en el repertorio itálico proto y medioaugusteo, difícilmente puede explicarse como no sea por fosilización de dichos prototipos' (p.399). It remains unclear, however, why the author in a later survey article (1994, 421) says that 'no se constata claramente una fase de tanteos asimilable a las producciones precoques tipo Bram, Narbona o las igualmente identificadas en La Graufesenque y en Montans'. It appears that the latter article was written *before* the former, although it was published later, for which another hint is that there is no reference to the article of 1991/92.

914 Roca Roumens (1990, 394), Roca Roumens (1991, 230–1).

915 Sotomayor Muro *et al.* (1984, 254–5).

916 Ibid.

917 Roca Roumens (1991, 232–4), Roca Roumens (1994, 422).

somewhat larger than that of *terra sigillata.* The output of ceramics other than *terra sigillata* and coarse ware declined to a very low level. Approximately forty potters were active in this period. Because of the lack of data, it has been impossible to date individual producers more precisely.[918] In addition to Mauretania, the Baetica was supplied with *terra sigillata*, the main area of distribution comprising the vale of the Baetis and the region between the latter and the southern coastline.[919] There seems to have been no significant export to other areas.

The third phase, which cannot yet be dated with precision, started not before the end of the first century and is likely to have lasted until the middle of the second century.[920] Name stamps were no longer in use. They were replaced by stamps with mythological motifs; nine such motifs are known so far.[921] The quality declined in every regard, the repertory of forms became even more confined, and the variety and quality of decorations deteriorated. In this phase the distribution was only regional.

The decline of the centre of Andújar has been explained by the success of the African *sigillata clara A*.[922] It remains an open question, however, whether Spanish *terra sigillata* was outcompeted by the African products or the decline of the Spanish production only made the African success possible – if the category of competition can be applied at all.

There are some indications that producers of *terra sigillata* also made other types of ceramics. Lamps with *terra sigillata* slip and the mark M.C.S have been found.[923] Even though M.C.S is not known from *terra sigillata*, the marks M.C and M.C.F have been found on it.[924] It is conceivable that a connection between these producers existed. In any case, various types of ceramics were made at the same site, as the use of common waste pits demonstrates.[925]

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[918] Roca Roumens (1994, 415).
[919] Roca Roumens (1991, 232–4), Mayet (1984, 226).
[920] Roca Roumens (1991, 231), Mayet (1984, 55).
[921] Mayet (1984, 44).
[922] Roca Roumens (1991, 234–5).
[923] Roca Roumens/Sotomayor Muro (1983, 276).
[924] Mayet (1984, 151–2).
[925] Sotomayor Muro *et al.* (1984, 254–5).

4.2.3. Related distant workshops and mobility of producers

Apart from Andújar, smaller workshops existed in the Baetica, which have been interpreted as branch workshops ('sucursales') of Andújar: Cartuja and the Albaicín in Granada, Castillón and Alameda in the province of Málaga.[926] These places are connected with Andújar insofar as they have some motif punches and producers' names in common; moulds of potters of Andújar were used there.[927] This suggests an exchange of tools, perhaps connected with migration of potters. The period of activity of these small workshops coincides with the main export period of Andújar. However, they made mainly pottery other than *terra sigillata*, and evidence for export production is lacking.

4.2.4. Excavations and archaeological finds

In the 1960s, a number of vessels and moulds were found near Los Villares del Caudillo, which led to the conclusion that a workshop had been placed here.[928] Since 1972 excavations have been conducted by M. Sotomayor on a regular basis, with the last series carried out in 1982.[929] The excavations brought to light kilns and a large number of vessels and moulds from waste pits. Buildings were not excavated, except for some sections of walls, tiled floors, and building and decoration elements.

4.2.4.1. Kilns and waste pits

Four circular kilns have been unearthed.[930] Three of them have a firing chamber with a diameter of approximately two metres. The fourth kiln is of considerable size; its firing chamber has an internal diameter of 3.80 metres.[931] However, although normally referred to as *terra sigillata* kilns,[932] it is far from clear that these kilns really were used for the making of this kind of ceramics. Finds of *tubuli* or other kiln furniture typical of the firing of *sigillata* in direct connection with the kilns are not

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926 For this section, cf. Roca Roumens (1991, 231–2) with references.
927 A mould of TITI OPPI at El Castillon in Serrano Ramos (1991, 45).
928 Sotomayor (1973).
929 Sotomayor Muro *et al.* (1984).
930 On the kilns Roca Roumens *et al.* (1976, 111–40). The diametre of kiln 1's firing chamber is 1.90 metres, kiln 2's 2.20 metres. In both cases the firing chamber's floor is extant. Of kiln 3 only the combustion chamber with the central support has survived; the chamber's diameter is approximately 1.80 metres.
931 Sotomayor *et al.* (1981, 357–8), Mayet (1984, 38).
932 E.g. Mezquíriz (1985, 117–8), Mayet (1984, 38).

reported;[933] only waste – including *sigillata* sherds – was found within the firing chamber of the large kiln. Among the waste fragments, moulds were identified, showing that production of *sigillata* is certain. But even if the large kiln in question was used for the firing of *terra sigillata*, it could not be filled in several storeys, as was the *grand four* of La Graufesenque. This is because the 55 openings of the firing chamber's floor are arranged irregularly. To make it possible for floor boards to be fixed on the *tubuli*, the latter must be arranged regularly.[934] Thus the technology of this kiln, if at all suitable for the making of *sigillata*, cannot be compared with the advanced methods of the Gaulish producers.

At the supposed 'branch workshop' at Granada, eight rectangular kilns were discovered, one of them with a firing chamber of c. 5.20 x 5.60 metres.[935] In the vicinity of these kilns, only production waste of *dolia*, bricks and tiles, and Iberian coarse and fine ware was found; the *sigillata* unearthed there was not reject.[936] That it was made at Granada at all is inferred from the fact that its fabric seems to be identical with the one of the Iberian fine ware made there.[937] There is no report of kiln furniture typical of the firing of *terra sigillata*. As a result, it is most unlikely that *sigillata* was fired in the kilns in question. The large kiln was obviously designed for firing bricks and tiles, and *dolia*.

The waste pits at Andújar each consists of a number of reject vessels made by various producers.[938] It is a characteristic of these waste pits that vessels of one producer are predominant in each of them.

4.2.4.2. Other finds

Buildings and production installations other than kilns are not known. Due to the very limited extent of the excavations, in the layers relevant to *terra sigillata* production only short sections of stone walls, a small part of a stone-tiled floor, and remains of a

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933 In a waste pit, finds of fragments of tubular support elements (*soportes de tubos*) are reported (Sotomayor *et al.* 1981, 352). Unfortunately, these fragments are not depicted or described in detail, so it remains an open question whether they are *tubuli* such as used for reducing firing, or just supports (or elements of drainage pipes?).

934 For this technology, see above p.74.

935 Gamer (1971, 159), Mezquíriz (1985, 117 and plate LII, C2).

936 Gamer (1971, 163).

937 Ibid.

938 See Mayet (1984, 39) for the waste pits found until 1979; Roca Roumens/Sotomayor Muro (1983, 275), Sotomayor Muro *et al.* (1984, 255) on later finds.

canalization system have been unearthed.[939] All that we may conclude from this is that the installations were not primitive and provisional, but rather complex and of durable construction. Perhaps the most interesting find consists of fragments of stucco painted in various colours, which were found together with local *sigillata* of the late first century.[940] Fragments of *dolia* were used as building material; remains of Iberian amphorae were also found in constructions in the area of the potters' workshops.[941]

4.2.5. Potters' marks

4.2.5.1. Types of marks and vessels marked, specialization of producers

At Andújar, name stamps were applied to both the internal bottom and the decorated zone of moulds, as well as to the internal bottom of plain ware.[942] On the former, not only stamps, but also name graffiti are found. Moulded vessels were not signed directly; they bear mould marks only. Just two of several plain forms were signed on a more or less regular basis: the forms Drag. 15/17 and 27, whereas among the moulded forms only the bowls Drag. 29 and 37 show mould marks.[943] These vessels are at the same time the most frequent ones.[944] In the last phase of

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939 For all finds referred to in this paragraph, except where otherwise stated, cf. Sotomayor/Pérez Casas/Roca Roumens (1976, 111–40) and Sotomayor/Roca/Sotomayor (1979).

940 Sotomayor/Pérez Casas/Roca Roumens (1976, 130).

941 Ibid. 123–5.

942 Intra-decorative marks on vessels are often not described in a way which makes unambiguously clear how these marks were applied. Normally they are referred to as intra-decorative marks only, without specifying whether these marks were applied to the final product or had already been applied to the mould. M. Roca Roumens wrote recently (1994, 415)that 'en relación con la producción decorada, se observa que se trata siempre de marcas intradecorativas, no contando hasta al momento con evidencias de marcas de molde, a excepción de TITVS OPPIVS cuya producción decorada ofrece marcas intradecorativas y marcas de molde coincidentes'. The problem of this statement is that it neither sufficiently specifies what is meant by 'marcas intradecorativas' nor 'marcas de molde'. A look into the excavation report in question makes clear what is meant. There Drag. 29 moulds are mentioned which bear the intra-decorative stamp TITI OPPI and the internal bottom stamp, 'en el fondo del molde en cuestión' (Sotomayor Muro *et al.* 1984, 257). This shows first that 'marcas de molde' refers to the rare case of bottom stamps in moulds, and second that intra-decorative marks on vessels are indeed the result of stamps in the relief-zone of the moulds, as was to be expected.

943 Roca Roumens (1994, 415).

944 Mayet (1984, 44) writes that it is difficult to explain why Drag. 24/25 was virtually never stamped although it was at least as frequent as Drag. 27, which latter fact she stresses on p. 54 against Roca Roumens (1976, 37–9). She claims that the latest excavations had shown this fact, but without any reference. Elsewhere (p. 37) she refers to a single sondage for which exact numbers are cited in the report this once, with the number of Drag. 24/25 being higher than the one of Drag. 27. Contradicting these passages, she cites on page 205 Drag. 15/17, 27, 29, and 37 as the main forms of Spanish *sigillata*. Roca Roumens (1991, 225–6) stresses the 'predominio aplastante' of Drag. 15/17 and 27, with Drag. 24/25 being an also-ran. As the Andújar excavation reports do not give exact numbers or other unequivocal clues as to this problem, I consider it best to follow the more up-to-date statement of Roca Roumens, the member of the Andújar excavation team responsible for the *terra sigillata*.

production, name stamps were no longer in use. They were replaced by stamps with mythological motifs, which were applied to the vessels' internal bottom with an engraved punch, producing an imprint with embossed motif.[945]

The *officina*-type formula predominates at Andújar, with the abbreviation of *officina* (O, OF, OFI, OFICIN) often preceded by an 'EX'. In very few cases the genitive-case formula was used, but it is clear that it is only short for *officina alicuius*, as those producers who used it also used *officina*-stamps.[946]

Forty-six potters' marks are known so far epigraphically,[947] plus nine motif bottom stamps.[948] From intra-decorative marks, only eight names are known, plus ten fragments which are too short to be identified as names, but are not part of the aforesaid eight.[949] It is not known how many workshops are behind these 46 marks, for some of them may be variants of one and the same mark, for example EXOFCA and EXOFCAH or EXOFMS and EX.OF.M.S.M. Fifteen of the 46 epigraphic potters' marks are known from the place of production only, 21 from the production centre and other sites, and the remaining ten only from places other than the production centre. The latter have been attributed to Andújar because of their distribution.

The information provided by the potters' marks is very scant. Twenty-one consist of three initials usually separated by dots, such as C.A.H, C.I.C, M.S.M, and combined with abbreviations of *ex officina*. Sixteen are even shorter, consisting of one or two letters only in the *officina*-formula. In merely five cases the potters' names are known, namely CVDAS, OPTATI,[950] QVARTIO (= QVARTI O(*fficina*)[951]), TITI OPPI, and

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945 Mayet (1984, 44).

946 All marks cited here are to be found in alphabetical order in Mayet's list of marks (1984, 114–91). TITIOPPI and TITIOPPIOF; C.A.H. and EXOFCAH; M.S.M and EX.OF.M.S.M; QVARTIO is most likely short for *Qvarti o(fficina)*, cf. TITIOPPIO, which is clearly short for TITIOPPIOF; exceptions for which no *officina*-stamp is known: Q.S.P, M.T.F, C.P.F, GITR, ICAD (=DACI?). An interesting case is CVDAS and EXOCVDAS, which suggests that even a name seemingly in the nominative case might refer to an *officina*, though it cannot be excluded that CVDAS was equally used for the nominative and genitive case. A similar case is F.ATTO, for which it has been suggested that it should be read OF.ATTO (a stamp OFI[CIN]A *palmette* ATTO is known). However, Atto could be short for Attonis.

947 For a still complete list, cf. Mayet (1984, 43). For the completeness of this list, Roca Roumens (1994, 413).

948 Mayet (1984, 44).

949 Roca Roumens (1983b), fragments nos. 14, 15, 16, 21, 24, 27, 28, 33, 34+36.

950 Mayet (1984, 43) has the name OPTATI in her list, but not in her catalogue. It is also missing in Mezquíriz's list of potters' marks. The stamp on Drag. 15/17 found at Andújar reads in full OF. OPTATI (Sotomayor *et al.* 1981, 341).

951 Cf. above n. 946 for CVDAS and QVARTIO.

– reconstructed based on a number of fragments of intra-decorative mould marks – M. SATRI MONTANI, who used the internal stamp M.S.M.[952]

The fact that most producers whose names occur on moulded ware and/or moulds also stamped plain ware, shows that they were not specialized in the making of these vessels.[953]

4.2.5.2. Groups of producers

Some of the initials have letters in common, which might indicate identical *praenomen* and *gentilicium*, for instance CA, CAA, C.A.B, and C.A.H; C.C.L and C.C.N; T.I.F, T.I.L, and T.I.S.[954] On this basis, one might hypothesize that small *familiae* of *officinatores* played a role at Andújar.

4.2.5.3. Status of persons referred to

The predominance of the *officina*-formula suggests that the persons behind the stamps were *officinatores*. The lack of any indications of status and the abbreviated form of their marks make it difficult to say anything about the social status of these persons. The general interpretation of their initials as *tria* and *duo nomina*[955] might be correct, but is as yet unproved. It cannot be excluded that some of the persons in question did not bear the *tria* or *duo nomina* of a free Roman citizen, but a name formula of a slave with two or three elements. Even if we knew for sure that *tria* or *duo nomina* of free Roman citizens are referred to, we could not say whether these persons were freeborn or *liberti* who had been active as slave workers before liberation.

4.2.5.4. Cooperation and subordination in the light of the signatures

Combinations of different names in marks are unknown. The only exception is a decorated bowl with the three intra-decorative graffiti EX.OF.M.S.M., C.P.F. and M.T.F, each in a separate metope.[956] This inscription has been combined with the fragments of intra-decorative graffiti]ANI.C.P.F.M.[,]P.M.F.T[,]CIN[.]M.SAT[, SATRI, MONT (combined with the stamp M.S.M), and]TAN[to the full formula

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952 For details, see p. 188.
953 For details, see below Section 4.2.5.5.
954 Cf. list of marks in Mayet (1984, 114–91).
955 E.g. Roca Roumens (1994, 422) and Mayet (1984, 44).
956 Sotomayor (1977, 17).

EX.OFICINA.M.SATRI.MONTANI.C.P.F.M.T.F.[957] M.T.F is known only from this combination,[958] whereas C.P.F is also found on internal bottom stamps on plain ware.[959] The mould signed with all three names can be explained either as an indication of some cooperation, having a connotation of subordination of the two latter producers under the former,[960] or as proof of the existence of dependent workmen in a larger workshop, C.P.F and M.T.F being the workmen.[961] Cooperation as the reason for these combined signatures does not only suggest itself, but is also suggested by the exchange of motif punches between M.S.M and other producers.[962] Subordination might be indicated by the fact that only M.S.M is preceded by the addition EX.OF and that his name is not abbreviated in the fragment]ANI.C.P.F.M.[. However, these two arguments are not very strong, for the EX.OF might refer to all three producers mentioned, and the reading of the latter fragment is not unequivocal, for it was originally read as]MNI.C.P.F.M.[.[963] Whether this fragment really can be combined with signatures of M.S.M therefore remains unclear. Another argument is that M.S.M was one of the most prolific producers, which has been interpreted as indicator of the size of the workshop.[964] However, as we will see in the next section, M.S.M is likely to have been active longer than other producers, which at least in part explains why he appears to have been so prolific. To sum up, the only fact that can be inferred is that in exceptional cases producers at Andújar cooperated in the making of moulds.

Other fragments of intra-decorative graffiti do not offer much information, for they each contain only a few letters, which cannot be identified with potters' names known from other signatures.[965] They only suggest that more potters produced moulds than so far known.

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957 Roca Roumens (1983, 434–5, 441).
958 Roca Roumens (1994, 414).
959 Mayet (1984, 130).
960 Roca Roumens (1994, 422).
961 Sotomayor (1977, 17).
962 Ibid. 22. Roca Roumens (1994, 422) presents the hypothesis that M.S.M as the producer with the highest frequency of finds was head of a large workshop, holding a higher position in a hierarchy of producers. The exchange of punches is thus interpreted as one-sided: M.S.M is seen as the allocating party only. For this interpretation no arguments are cited. However, identical motif punches were used equally by all three producers (Sotomayor 1977, 44–5; Fernández García 1990, 126); therefore the origin of the punches cannot be ascertained.
963 Roca Roumens (1983, 441).
964 Roca Roumens (1994, 422).
965 Roca Roumens (1983b), fragments nos. 14, 15, 16, 21, 24, 27, 28, 33, 34+36.

4.2.5.5. Mould makers and exchange of motif stamps

In the first phase of *terra sigillata* production, six producers were active, all of them occur on moulded ware: the above-mentioned M.S.M, C.P.F, and M.T.F, plus CVDAS, QVARTIO, and TITI OPPI.[966] In waste pits products of M.S.M, CVDAS, and QVARTIO occur together; in addition, they have motif punches together.[967] As we have seen above, M.S.M, C.P.F, and M.T.F are found on one and the same vessel. Products of TITI OPPI were found together with those of M.S.M only. Thus M.S.M must have had a longer period of activity than C.P.F, M.T.F, CVDAS, and QVARTIO, with TITI OPPI having been active late in this period.[968] Two other potters perhaps active at Andújar in this phase are ATTO, who is, however, not yet known from Andújar itself, but only from three North African finds, and Q.S.P, of whom so far only two intra-decorative signatures are known.[969] ATTO, C.P.F, CVDAS, M.S.M, QVARTIO, and TITI OPPI are referred to on plain and moulded ware.[970]

These persons are normally seen as producers of the moulded vessels bearing their name. However, whether they made relief-decorated vessels cannot be said with certainty, for as we have seen in the Gaulish production, the person named in intra- or infra-decorative mould marks is not automatically identical with the actual maker of the vessel. Consequently, we do not know one single producer of moulded vessels from Andújar for certain, but only the mould makers. That the persons in question really must have been mould makers is shown by moulds of TITI OPPI with marks on the internal bottom, which are not to be seen on the final product.[971] Some of these moulds also bear intra-decorative marks. On the other hand, Gaulish examples

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966 Roca Roumens (1994, 413–14).

967 Ibid.

968 Sotomayor (1977, 21), Sotomayor Muro *et al.* (1984, 254–60), Roca Roumens (1994, 414). The latter puts TITI OPPI 'en un momento avanzado de esta primera fase'. Fernández García (1991/92) counts him towards the early second period, as did Roca Roumens somewhat earlier (1991, 430). Except for the fact that he was active in the late period of M.S.M, who without a doubt belongs to the earliest potters, he shows characteristics typical of potters of the first period (non-abbreviated name, intra-decorative marks), so that I would rather count him towards this group. It must be stressed that he seems to have belonged to a transitional phase, for the quality of his products is already somewhat lower compared to those of the first producers, which is a characteristic of the second phase (Fernández García 1991/92, 402).

969 Roca Roumens (1994, 414–5).

970 Ibid.: 'Todas estas officinas se caracterizan por presentar tanto produccíon lisa como decorada, a excepcíon de M.T.F ... y de C.S.P.'

971 Sotomayor Muro *et al.* (1984, 257): 'en el fondo del molde en cuestión'. No specification regarding the type of mark (stamp or graffito) is given.

show that the person referred to in an intra- or infra-decorative mould mark can be identical with the vessel's maker. Thus it is a reasonable hypothesis that this also was the case in the production of Andújar. Whether the moulds were also used by potters other than the mould makers, remains an open question.

In the following phase of production, the intra-decorative signing of moulds was abandoned completely.[972] Thus it is much more difficult, if not impossible, to find traces of cooperation and subordination.[973] In a few cases, moulds with bottom marks were found.[974] Interestingly, these marks are not known from vessels; and thus it has been suggested that the producers referred to were mould makers only.[975] However, in the light of the fact that in the period in question only two plain forms were stamped, it is impossible to say who made the remaining vessels, especially the moulded ones. If one assumes that the persons who are mentioned on the intra-decorative marks made the vessels in question, there is no reason to assume that those who marked their moulds outside the zone reproduced on the vessels did not do so. That potters marked their moulds in both ways is shown by the example of TITI OPPI in the preceding period. As far as plain ware is concerned, there is no reason to assume that the potters in question did not throw plain ware. First, we know of most producers only by a handful of finds of stamped vessels, so that we are far from having enough material to venture arguments *ex silentio*; second, it is impossible to say whether the persons in question made unstamped plain ware (be it unstamped forms or unstamped specimens of normally stamped forms). As a result, there are no conclusive indications of specialization.

4.2.5.6. Size of workshops

The archaeological evidence is insufficient to extrapolate the size of workshops from it. On the other hand, a small number of producers are represented by far more dies and finds of vessels than are others.[976] If one assumes that a potter used only one

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[972] Roca Roumens (1994, 416).

[973] When Roca Roumens (1994, 422–3) writes that 'los indicios de tal jerarquización desaparacen en una fase más avanzada, aproximadamente a partir de comienzos de época flavia' that means that we cannot trace relationships between workshops anymore. However, finds of signed moulds have already been made (cf. next note for references), and perhaps more such finds will enable us to say more about this problem in future.

[974] Roca Roumens (1994, 416), Sotomayor Muro *et al.* (1984, 257–9), Roca Roumens (1976, 144).

[975] Sotomayor Muro *et al.* (1984, 257–9), Roca Roumens (1994, 422).

[976] Cf. Mayet (1984, 215–7).

die at one time, a higher number of dies refers at first sight to a workshop with more potters. Thus it has been suggested that workshops represented by more dies were larger than those with fewer dies, only the larger ones being considered as able to perform all stages of production.[977] Accordingly, smaller workshops are considered as dependant of the larger ones. However, the total output of a workshop and its number of dies does not only depend on its size, but also on its period of activity. Without having enough data as to the latter, it is impossible to say to what extent each of these factors influenced the number of finds. Indeed, the example of M.S.M, with fifteen dies the second 'largest' producer (after P.T with sixteen dies),[978] shows that the time factor must have played an important role. In addition, the formula 'one die is equal to one potter' is not necessarily correct, as we have seen above.[979]

4.2.6. Summary and conclusions

If the localisation of Municipium Triumphale is correct, the related production centre can be called sub-urban. *Dolia* and amphorae are vessels typical of the storage of agricultural produce at the place of production and the transportation from it. Even if it is not clear where exactly these vessels were made, they indicate that the pottery workshops at Andújar were related to agricultural production. It suggests itself that the building materials used for the constructions at the production centre were not purchased from elsewhere, but also made at the site. All this supports the hypothesis that the pottery workshops of Andújar were situated on a sub-urban estate yielding agricultural produce for export. In this case, the leasehold system would be the most likely legal basis for the organization of production.

The relationship between Andújar and its so-called 'sucursales' is reminiscent of the group of Lezoux.[980] The conclusions discussed there also apply to the situation encountered at Andújar, with the difference that the 'sucursales' of the latter apparently did not play a role in the export.[981] However, in view of the facts that, first, we have only a few finds of most producers of Andújar, and, second, that the

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977 Ibid.

978 Numbers cited from ibid.

979 Cf. p.34.

980 On the 'group de Lezoux', cf. above Section 3.3.7, esp. p. 148.

981 Raco Roumens (1991, 232): 'La difusión de los productos de estos talleres menores es prácticamente nula...' For the conclusions, see Section 3.3.8.

products of the 'sucursales' are very similar to the ones of Andújar,[982] this assumption may be due to a gap in our knowledge. In fact, only scientific provenancing – if at all – can decide whether a product comes from Andújar or from one of its 'sucursales'. In addition, quite a number of producers have been attributed to Andújar only because of their distribution.[983] They can have worked also at the 'sucursales'. All in all, I am inclined to assume that the 'sucursales' also played a role in the export. In any case, their existence is indicative of the limited capacity of Andújar, which was not able to satisfy the demand of the region once it had emerged.

Right from the beginning, the making of *sigillata* was aimed at an export market, namely Mauretania. It seems quite clear, therefore, that traders played a role in the introduction, and perhaps also the organization, of *terra sigillata* production.[984] The possible role of traders has already been discussed in the chapter on the Gaulish production centres.[985]

Within each waste pit at Andújar, vessels of one producer are predominant. This characteristic may be cautiously interpreted as indicative of an organizational structure such as encountered at La Graufesenque, with a master potter organizing the production on the spot.

We have a number of hints that the circumstances at Andújar were comparable to Gaulish production centres: only the four most frequent forms of plain and moulded vessels bear potters' marks; stamps and signatures were also applied to moulds; mould makers cooperated and exchanged motif punches. Whether moulds were exchanged cannot be said with certainty because of the lack of potters' stamps on relief-decorated ware. However, the fact that moulds made by mould makers from Andújar were used at the so-called 'sucursales' might indicate exchange of, or trade in, these tools. There are also indications that *familiae* of *officinatores* might have played a

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982 See e.g. Mato Bruño/Pastor Montoro/Pérez Plaza (1989/90).

983 Cf. above p.187.

984 Mayet (1984, 218) suggested that it was the traders who organized not only the distribution, but also the production of *terra sigillata* in Spain. They are thought to have purchased the raw material or leased the respective resources from the landowner(s), passing on the material to the actual producers who then made the vessels to the traders' order. This would have made all producers completely dependent on the traders. Accordingly, the dispersed manufactory (*Verlagssystem*) is seen as the form of organization used in the production of *sigillata*. These speculations are compatible with the model suggested for La Graufesenque in the present thesis.

985 Especially in Section 3.5.2.

role at Andújar. The potters were seemingly not specialized in the making of one kind of vessels.

The taste of potential customers must have played a role in the development of distribution. Selling ceramics to the locals did not require long-distance transportation and must have been attractive to producers even if the price they could get elsewhere may have been higher. That the locals did not buy *terra sigillata* although it was readily available is a clear sign of lacking interest. It was not until the Flavian period that the local inhabitants acquired the taste for this Roman-style ceramic in sufficient number to form a market for the producers at Andújar.

The finds of decorative building elements can be interpreted in two different ways. Either the potters' business was profitable enough to enable them to live in such comparatively comfortable circumstances, or in their immediate vicinity others did so. The latter may be interpreted as an indication that pottery production at Andújar took place in the context of medium- or large-scale rural production – so-called *villa* economy. However, at Lezoux the excavation of a building with painted interior plaster, in the rubble of which *terra sigillata* moulds were found, suggests that it was possible for at least some of the persons involved in the production to reach a considerable standard of living. This was perhaps the case at Andújar, too.

All in all, one gets the impression that the organization of production might have been comparable to the one inferred from Gaulish evidence. Although the parallels are many, some distinguishing features exist. The cooperation between the workshops seems to have been more limited. This is suggested by the more restricted use of producers' marks on vessels and moulds, and the rarity of exchange of motif stamps (of the latter more cases might be discovered in future). In addition, the use of stamps at Andújar was more inconsistent than at La Graufesenque, and more comparable to that at Lezoux, suggesting varying production conditions. Furthermore, there are no indications of large production installations, which might be, however, due to our very limited knowledge of the centre.

4.3. The centre of production of Tritium Magallum

4.3.1. Topographical situation

The *oppidum* of the Berones, Tritium Magallum,[986] situated in the Roman province of Hispania Citerior (today Tricio, province of Logroño), gained municipal status in the second half of the first century A.D.[987] The ancient production centre within its *territorium* is today referred to as the production centre of Tritium Magallum, and alternatively as that of Tricio, Rioja, the Ebro or the Najerilla Valley.

The river Najerilla, a southern tributary of the middle Ebro, is one and a half kilometres away from Tritium, the Ebro itself c. 12 kilometres. The vicinity of this main traffic artery was very advantageous for export production.[988] The river Najerilla has its own net of small tributaries, some of which run through the territory of Tritium Magallum. In addition, brooks and springs are frequent in the area, so that the water supply was excellent.[989] Quality clay was and is available in abundance. The pottery workshops were not centred in a single place, but formed small agglomerations, scattered within a radius of 5 kilometres from Tricio and often lying on the banks of one of the tributaries.[990] The number of these workshops and workshop agglomerations known so far is approximately 20.[991]

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986 As for details of Tritium Magallum, I follow Passini (1984, 340–1).

987 Espinosa Ruiz/Pérez Rodríguez (1982).

988 According to Pliny *naturalis historia* 3.21, the Iberus was navigable only as far as Vereia (today Varea near Logroño), not far eastward from Tritium. However, the distribution clearly shows that the river played an important role for the transport.

989 Mayet (1984, 60).

990 Cf. the map in Mayet (1984, 61). Only one workshop lies outside this radius: the site of Bañuelos, approximately 8 kilometres away from Tritium Magallum.

991 None of the publications available contains data on the exact number of workshops and workshop agglomerations. Mayet (1984, 61) provides a map with 'les divers ateliers du centre de production de Tritium Magallum', for which not even a legend is given. This map records 17 triangular marks, most of them with a related name. These marks seemingly mark the workshops, for some of the names are referred to as locations of workshops or workshop agglomerations in Spanish publications (e.g. Garabito/Solovera 1990). Unfortunately, Mayet does not use these names in her text, but the names of the three larger modern towns in the area of which the workshops are situated. In addition, in the map in question modern settlements are marked with a circular mark, but without any hint indicating whether these settlements are marked because workshops were also found there – which is, for example, the case with Tricio (Garabito/Solovera 1990, 75) – or just as aids to orientation. In addition, Garabito/Solovera (1990, 76–8) mention two locations which are not marked on Mayet's map. This makes at least 20 workshops and workshop agglomerations.

4.3.2. Period of activity, range of production and distribution

In the first half of the first century A.D., the production of *terra sigillata* started on a very small scale; only few potters seem to have worked in this period.[992] The distribution was restricted to the middle Ebro Valley, with some isolated finds further apart such as at Conímbriga and Mérida. Large-scale production was taken up in the middle of the first century, with the copying of a broad range of forms typical of the Gaulish production centres.[993] In the first century, not only the forms, but also the decorations were copied from Gaulish models, whereas in the second century the potters developed their own styles.[994] These Spanish forms, however, were made in smaller quantities and never replaced the classic Gaulish repertoire.

The heyday of export coincided with the decline of La Graufesenque in the last decades of the first and the beginning of the second centuries.[995] The zone of distribution now comprised the whole of the Iberian peninsula and Mauritania.[996] Not every producer covered the entire area, though, most having only part of it as their export region.[997] This suggests that either various ways of export – and that also means various middlemen – existed, or the demand for *sigillata* developed unevenly. These large zones of distribution, however, should be called secondary, because the region around the production centre remained the actual main area of sale.[998]

The end of production is difficult to ascertain, but as far as mass production for export is concerned, it ceased in the middle of the second century. Whether there was any production in the third century is not yet clear.[999] The later productions of the fourth and fifth centuries reached only the northern part of the peninsula, and the export to North Africa ceased.[1000] These productions are not to be dealt with here, for the lack of producers' marks[1001] makes it impossible to say anything about the

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992 Garabito/Solovera (1990, 70).
993 Mayet (1984, 69–86, 97). About twenty forms of vessels were copied.
994 Garabito/Solovera (1990, 83).
995 Mayet (1984, 94).
996 Ibid. 62.
997 Garabito/Solovera (1990, 82).
998 Ibid.
999 Mayet (1984, 96).
1000 Garabito/Solovera (1990, 82–3).
1001 Ibid. 79–80. There is one exception, namely Crescens, whose products have been found only at their place of production so far.

organization of production apart from the assumption that they are unlikely to have shared installations, because they did not need to distinguish between their products.

The quality of the vessels is generally somewhat lower than that of Italian and Gaulish *terra sigillata*. Vessels of the earlier period are of somewhat higher quality, and this applies also to the decorations, with the motifs becoming larger and coarser in time.[1002] In the workshops around Tritium Magallum, not only was *sigillata* made, but also coarse ware, cooking ware, as well storage vessels, lamps, building material such as bricks and tiles, and decorative clay statuettes.[1003]

4.3.3. Excavations and archaeological finds

4.3.3.1. Kilns and waste pits

Although moulds had been found at Tricio and the existence of a production place published as early as the first decades of the twentieth century, it was only in 1948 that the centre of Tritium Magallum was 'rediscovered'.[1004] In the following decades a large amount of material was collected during prospections, and published in a number of monographs.[1005] In 1975, excavation work started, and the latest excavation to my knowledge took place in 1988.[1006] Detailed reports are not available for any of the excavations, and there have only been a small number of preliminary publications.[1007]

a. Bezares

In 1975, 1977, and 1979 five kilns of three different types, a small clay preparation basin and a slab where the processed clay was laid out ready for the potter were unearthed at the workshop agglomeration of Bezares.[1008] Two of the kilns are large and of rectangular form with a size of 3 x 3.30 metres; two are circular with a diameter of 2 metres.[1009] The fifth kiln has an irregular, roughly trapeziform ground-

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1002 Mayet (1984, 94–6).
1003 Garabito/Solovera (1990, 70).
1004 For the history of the excavations at Tricio, cf. Mayet (1984, 62–5).
1005 Garabito/Solovera (1975/76), Garabito Gómez (1978).
1006 Garabito/Solovera (1990).
1007 Garabito/Solovera/Pradales (1985), Cancela Ramírez de Arellano (1986), Garabito/Solovera (1990), Mezquíriz (1993).
1008 Mezquíriz (1982).
1009 The publication of this excavation is very preliminary. Neither measurements nor drawings of the production installations are given, but only some photographs. Measurements given here are inferred from the photographs and thus are only approximate.

plan with a length of 1.90 metres and a width between 50 and 70 centimetres. The large rectangular kilns are thought by the excavator to have been used for bricks and tiles, which implies that only the small ones are considered as potential kilns for the production of *sigillata*.[1010] The reasons for this opinion are not mentioned, but most likely stem from the fact that kilns for bricks and tiles are often large and rectangular. Any other hints concerning the kind of ceramics made in these kilns are missing. *Tubuli* are also not mentioned, so that it cannot be said whether the kilns in question were used for the firing of *sigillata* at all. An interesting detail is the existence of a clay pipe between the two circular kilns, which is thought by the excavator to have functioned as a flue.[1011] If this assumption is correct, it is possible that the kilns were used alternately, using the waste heat of one to pre-heat the other. In any case, this installation shows that the operators of these kilns were either identical or cooperated in some way.

According to finds of stamped vessels, at the site of Bezares eleven potters made *terra sigillata* of medium quality compared to that of other workshops in the area of Tritium.[1012] The potters of Bezares produced plain ware, moulded vessels, moulds, and motif punches. All these items were seemingly made of the same clay mixture, with the exception of some moulds. These moulds, therefore, must have been imported from outside. The fabric and the quality of the decor of these imported moulds are much higher than that of the moulds made at Bezares. Five moulds have graffiti on their internal bottom, of which two cannot refer to producers known from stamps. Unfortunately it is not specified whether these graffiti were found on local or imported moulds. This would be a most valuable piece of information. However, even without this the evidence is sufficient to prove the existence of trade in, or exchange of, moulds, suggesting that the marks on moulds had something to do with this.

b. La Puebla (Arenzana de Arriba)

The most instructive excavation results published hitherto are those of the farm La Puebla near Arenzana de Arriba. In 1978 and 1979, three kilns with their adjacent

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[1010] Mezquíriz (1982, 26), cf. also Mayet (1984, 65 with n. 33).
[1011] Mezquíriz (1982, 26).
[1012] See ibid. 27 for the details given in this paragraph.

waste pits were excavated.[1013] The producers' marks from La Puebla consist of internal bottom stamps on plain ware as well as graffiti on moulds which were applied to the internal and external bottom, or to the external side of the mould. All these mould marks were not transferred to the end-product.

The overwhelming majority of marked fragments in one of the three waste pits have the letters SEG or SE in common. This waste pit and the adjoining facilities have been viewed as belonging to the workshop of Segius Tritiensis.[1014] Indeed, the stamp OF SEGI TRITI, with further abbreviated versions, suggests the presence of a potter of this name. However, graffiti on the internal bottom of moulds reading SEG SEMP PI and SEG ALLONIS imply that more than one person is referred to. Either two potters with these very names were active there, or Segius cooperated in the making of moulds with two potters named Sempronius Pi- and Allo. Still, there are no stamped products of these potters reported from the site in question; moreover, there is no potter named Allo known from Tritium at all.[1015] Thus the first interpretation is more plausible.

In this light, the graffito SEG SEMP PI strongly suggests that Segius was a dependant of SEMP PI, for Segius is not a Roman *praenomen*, and SEMP most likely refers to the *gentilicium* Sempronius. The graffito also shows that Segius was not a *nomen gentile*. Segius must have been a slave's given name, perhaps later becoming a freedman's *cognomen*.[1016] It cannot be established without further analysis whether Segius is referred to in the graffito SEG ALLONIS as a dependant of Allo, or vice versa.

Another person might be behind a stamp for which three different readings have been suggested: SEG.AVI[1017], ANI, and ALL, with ALL being completed to Allonis.[1018] The first two readings are equally possible, for the AV or AN is in fact a ligature which may stand for either combination. The latter reading is less likely and has been suggested only under the influence of the existence of the graffito SEG

1013 Garabito/Solovera (1990, 72). Details of the production installations are, unfortunately, not reported.
1014 Ibid.
1015 The suggestion to identify Allo with Vllo (Garabito/Solovera 1990) seems a bit bold.
1016 For the term 'given name', cf. above n. 140.
1017 Mayet (1984) cat. nos. 562 and 563.
1018 Garabito/Solovera (1990, 73).

ALLONIS. Finally, there are stamps of Segius with and without the addition TRITI, TRIT, or TRI.

It is difficult to say how many persons are behind all these marks, because it is equally possible that Segi(us), Segi(us) Semp(ronius), and Segi(us) Triti(iensis *or* Tritus) are three different people or one and the same person. The minimum number of persons is two (SEG SEMP PI and SEG ALLONIS), three is very probable (SEG SEMP PI, SEG ALLONIS and SEG.AVI), four possible (OF SEGI TRITI, SEG SEMP PI, SEG ALLONIS and SEG.AVI) and five the maximum (with EX OF SEG being interpreted as referring to a fifth person, which is, however, not very likely). Two potential members of the SEGI group are F.SEGI.PR[1019] and BVC.SEG[1020]; these stamps have not yet been found at Tricio.

Taking these names into consideration, it seems scarcely likely that Segius was a slave of so many masters – at least three, perhaps four of them (SEG SEMP PI, SEG ALLONIS, F.SEGI.PR, SEG.AVI). In the graffito SEG SEMP PI he cannot be the master himself. Considering the hypothesis of the existence of *familiae* of *officinatores,* the idea suggests itself that we consider Segius as a slave – and later perhaps a freedman – of SEMP PI, having himself *vicarii* referred to by signatures such as SEG ALLONIS and SEG.AVI, F.SEGI.PR (the F perhaps for *figuli* or *fecit*) and BVC.SEG. The three latter seem to have become *officinatores* themselves, for they used their own stamps. If we assume that graffiti on moulds such as these refer to the owner of the mould rather than to its maker (even if this person was normally the same), Segius and Allo must be considered as the owners of the moulds. This leads to the question of why Allo, of whom no stamp is known (if one does not read SEG.AVI as SEG.ALL) and who thus is unlikely to have been an *officinator* himself, could be the owner of a mould. Various speculations are possible. First, stamps of his may turn up in future. If not, he may have produced only moulded vessels. Or, working as a slave in the workshop of his master, he may have had the special permission to mark the moulds made by him with his own name, because he was to keep them after manumission, but never reached that ultimate aim.

[1019] Mayet (1984) cat. no. 567.
[1020] Ibid. cat. no. 76.

The SEGI were not the only producers at La Puebla. C. Annius and Saturninus were also active there.[1021] According to the excavators, on an area of no more than 60 square metres, parts of three workshops with three kilns and waste pits were unearthed, each belonging to one of the three producers (all stamps with SEG found at the site being considered as referring to one producer).[1022] At first sight, this seems to suggest entirely separate activities of these producers. However, the three workshops were interconnected by means of corridors.[1023] Although the waste pits were dominated by one producer each, they also contained reject vessels of the others. This might indicate common firing, although only vessels made by various producers and melted together in production contexts are reliable proof of this. The cramped space and structural connection in which the workshops and kilns were arranged makes it very likely that these workshops had a common drying shelter which would explain the use of stamps in the same way as it has been done for other centres. The fact that moulds were marked externally is indicative of exchange of these tools.

c. Prado Alto (Tricio)

At the farm of Prado Alto near Tricio two producers were active, C. Frontonius and C. Luc-.[1024] Both made plain and decorated ware. Their waste pits were situated one immediately after the other, with the area excavated comprising only ten square metres. Unfortunately it is not detailed whether each pit contained rejects of both potters equally or if each potter had his own pit, or used one predominantly.[1025] However, as the latter situation is treated as a general feature of the workshops

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1021 Garabito/Solovera (1990, 75 and 78) unfortunately do not cite an actual stamp of Saturninus, and of C. Annius they quote only the most frequent one: G.AN.TR. The fullest version of this is G.ANNI.TR (Mayet 1984, cat. no. 220).

1022 Garabito/Solovera (1990, 78).

1023 What exactly is meant by 'unidos entre sí por medio de passillos' (Garabito/Solovera 1990, 78) cannot be said exactly without having seen the actual drawings.

1024 Of C. Frontonius various dies from CA.FRO to C.FRONTONII are reported from Prado Alto (Garabito/Solovera (1990, 74), of C. Luc(...) only the die CALVO is cited as the most frequent one, cf. CA.LV.O, [C]AI.LV.OFI and CAILVCOFI (Mayet 1984, nos. 106, 105 and 103).

1025 Although this is an essential piece of information, the excavators are not very precise about it. In the introduction of their survey report (Garabito/Solovera 1990) they write that a certain potter's workshop can be defined *inter alia* by a waste pit dominated by his products. In the main part where various potters' characteristics are discussed, concerning none of them it is said whether 'his' waste pit also contained reject vessels of others. This is mentioned only later for some producers in a way which implies that these potters are just examples of a general characteristic.

around Tritium Magallum,[1026] it is certainly the case here as well. What makes the group of Prado Alto so interesting is the fact that the two producers used motif punches in common. This is proof for the exchange of these tools, a feature well known from other production centres. In addition, the area of distribution of these seemingly contemporary producers is to a large extent identical.

d. Other sites

The characteristics of the workshops of La Puebla are not exceptional, but reportedly typical of production sites in the *territorium* of Tritium Magallum.[1027]

4.3.3.2. Other finds in the area

Tritium Magallum was not a poor *municipium*, as the building of a monumental temple in the second century and remains of *villae* with luxurious fittings such as mosaics and stone columns in its surroundings suggest.[1028] Large Roman-style town houses with open inner courtyards were situated in the *municipium* itself.[1029] It has been proposed that this wealth was based on pottery production, and that a considerable proportion of the town's inhabitants were active in this.[1030] However, this is perhaps somewhat exaggerated, for even in the much larger production centres of La Graufesenque and Lezoux the lifestyle of the actual pottery producers seems to have been comparatively modest. Thus the indications of civic and private wealth are far more likely to be the result of other economic activities. The role of agriculture can be inferred to a certain extent from the existence of a centuriation grid in the area in question, which suggests that the *territorium* of Tritium Magallum was farmed Roman-style.[1031] This, in combination with the remains of luxurious fittings in the town's surroundings, is indicative of large-style farming, in the context of which the making of pottery may be seen. It is wholly possible that pottery production for export contributed to the accumulation of wealth, especially of the landowners who are likely to have played an important role as lessors.

1026 Garabito/Solovera (1990, 70 and 78).
1027 Ibid. 78.
1028 As to details of the development of Tritium Magallum, I follow Passini (1984, 340–1).
1029 Ibid. 341.
1030 Ibid. 340., quoting Espinosa Ruiz, U., Pérez Rodríguez, A., 'Tritium Magallum. De ciudad peregrina a municipio romano', *Archivo español de arqueología* 55 (1982) 65–87 [non vidi].
1031 Passini (1984).

4.3.4. Potters' marks

4.3.4.1. Types of marks and vessels marked, specialization of producers

Most marks are internal bottom stamps on plain ware.[1032] The most frequent forms, Drag. 15/17 and 27, are at the same time the most frequently stamped ones, but other forms such as Drag. 33, 35, and 36 are also occasionally stamped. Internal bottom stamps on moulded ware are extremely rare.[1033] The same applies to intra-decorative mould stamps;[1034] mould graffiti are also not frequent.[1035] Some marks are found on moulds internally as well as externally.[1036] The fact that several producers of moulded ware and moulds, of whom more than one die is known, also stamped plain ware, shows that such potters were not specialized in the making of moulded vessels.[1037]

Stamps on *terra sigillata* from Tritium Magallum are often as abbreviated as those from Andújar, consisting only of initials of *duo* or *tria nomina*, respectively. Abbreviations of *officina* and *ex officina* such as O, OF, OFI, OFIC, OFICI, and EX, EX O, and EX OF are frequent. Apart from the *officina*-formula, only the genitive-

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1032 For this paragraph, cf. Mayet (1984, 67–9).

1033 Mayet (1984) has only two specimens, namely stamp cat. no. 659: EXOTITISEM (internal bottom stamp on Drag. 37 from Tritium Magallum; this potter also made plain ware) and 760:]ERO (internal bottom stamp on Drag. 37; place of production unknown, but Mayet suggests that the stamp belongs perhaps to the potter who used the stamp PETEROOFI, which she has putatively attributed to Tritium Magallum. If this is correct, this potter would also have made plain ware.)

1034 Mayet (1984), stamps cat. no. 38: ANI VS (intra-decorative stamp, embossed frame on Drag. 37, Tritium Magallum, open whether potter also made plain ware; cf. no. 755, fragmentary intra-decorative stamp on Drag. 37 from Tritium Magallum:]AN[or]NV[); no. 320: LV.IVN (intra-decorative stamp with embossed frame on Drag. 37 from Tritium Magallum, open whether potter also made plain ware); no. 380: OF.MICCIONIS (intra-decorative stamp on Drag. 37 with embossed frame from Tritium Magallum, 3 times repeated, cf. no. 379, potter also made plain ware); no. 474: PATRICIAE (intra-decorative stamp on Drag. 37 with embossed frame from Tritium Magallum, potter seems also to have made plain ware; cf. no. 473: internal bottom stamp on indeterminable form); no. 687: [E]XOFVA.PAT (intra-decorative stamp with embossed frame on Drag. 37 from Tritium Magallum, potter also made plain ware); no. 705: OFVAPA (cf. no. 687); no. 712: VP (cf. no. 687); no. 205: FLAVO (intra-decorative stamp, embossed frame on Drag. 37, Tritium Magallum (?), open whether potter also made plain ware).

1035 Mayet (1984) lists the following stamps, all exept one attributed to Tritium Magallum only speculatively: Cat. no. 379: MICCIONIS (intra-decorative embossed name graffito on Drag. 37 from Tritium Magallum, potter also made plain ware); no. 352: MAS[(intra-decorative embossed name graffito on Drag. 37, Tritium Magallum (?), open whether potter also made plain ware); no. 37: OF.AST[(intra-decorative embossed name graffito on Drag. 37, Tritium Magallum (?), open whether potter also made plain ware); no. 657: TITI *hedera* SANCENI (intra-decorative embossed name graffito on Drag. 37, Tritium Magallum (?), open whether potter also made plain ware).

1036 Garabito/Solovera (1990, 69 n. 1).

1037 For the data, see above n. 1033–1035.

formula occurs on stamps from Tritium.[1038] The non-existence of the addition *manus* suggests that the genitive-formula is an abbreviation of the *officina*-formula. Many stamps contain more than mere initials, namely somewhat longer abbreviations such as EXOF.VAL.PAT[1039] or O.L.SEM.VALE[1040], fully spelled *cognomina* or *gentilicia* such as AGILIANI[1041] or ALBINI,[1042] and complete *duo nomina* consisting of *praenomen* and *nomen gentile* such as C.FRONTONI[1043], LVCI.ANNI,[1044] and G.ANNI.TRI[1045] (the latter also may be *tria nomina* depending on whether TRI refers to the potter's *cognomen* or to the place of production). Combinations of *gentilicium* and *cognomen* are also frequent, although it is often impossible to say whether the supposed *gentilicium* is such or another *cognomen*. This is due to either the abbreviated state of most marks or the fact that the genitive case of *gentilicia* which stem from *cognomina* and these very *cognomina* is identical: MATERNI.T[1046] can refer to a Maternus or to a Maternius equally.

The additions T, TR, TRI or TRIT on the end of the stamps are a characteristic of the potters of Tritium Magallum. They have been interpreted as abbreviations of *Tritiensis,* indicating the place of production or origin of the producer.[1047]

The very small number of intra-decorative mould marks with producers' names, all on fragments of Drag. 37, provides insufficient evidence for the identification of various mould makers' styles and of relationships between mould makers.[1048] Other mould marks consist of single letters only, which makes them difficult to interpret.[1049] As a result, the study of moulded vessels is not as advanced as with other production centres.

1038 Two exceptions are known, namely first the nominative-case stamp ANIVS from Arenzana de Arriba (Mayet 1984, cat. no. 38) and second F.SEGI.PR (no. 567), which might be a *figulus*-stamp or defective for OF.SEGI.PR, cf. OF.SEGI.TRI (no. 568).

1039 Ibid. cat. no. 675.

1040 Ibid. cat. no. 340.

1041 Ibid. cat. no. 22.

1042 Ibid. cat. no. 36.

1043 Ibid. cat. no. 131.

1044 Ibid. cat. no. 306.

1045 *Sic*. ibid. cat. no. 220.

1046 Ibid. cat. no. 363.

1047 Mayet (1984, 69).

1048 Cf. above n. 1033–1035. There is only on possible exception, namely VLLO of whom many Drag. 29 with external marks was found. The attribution of VLLO to Tritium is, however, only hypothetical (Mayet 1984, 185; Garabito/Solovera 1990, 69 n. 1). On the production of VLLO, see Romero Carnicero (1978).

1049 Mayet (1984, 67–9).

The number of *terra sigillata* potters active in the area of Tritium Magallum cannot be given exactly, for a full publication of the finds made there has not yet appeared.[1050] The minimum number is 54, comprising those of whom marks were found in the zone of Tritium; the real number is likely to be much higher, for if we add those finds that are supposed to have been produced at Tricio because of their distribution, appearance, or clay composition, the total number of potters increases to about 150.[1051] More finds from other places attributable to Tritium by scientific provenancing are to be expected in future. Its number of producers makes the region of Tricio the largest *terra sigillata* production centre in ancient Spain.

4.3.4.2. Groups of producers

Some producers have an element of their names in common (normally their *nomen gentile*), which makes it possible to group them.[1052] Behind these groups are possibly *familiae* of *officinatores* such as encountered in the Italian and Gaulish *terra sigillata* production. Such groups are the ATTI (marks: ATTIBRITTONI[1053], ATTI.FLACCI[1054], ATTI.PATERNI.OF[1055], ATTI.PRI[1056]), the SEGI (SEG SEMP PI[1057], SEGIAVI[1058], F.SEGI.PR[1059], OF.SEGITRITØ[1060], SEG.ALLONIS[1061], BVC.SEG[1062]), and the MATERNI (MATE.ACC[1063], OF.MAT.BLAN[1064], OMATECAP[1065], MATERNI.T[1066], MALLI or MANLI.MAT.T.[1067]). Apart from these groups that clearly belong to Tritium and consist each of a number of different

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1050 Preliminary publications: Garabito/Solovera/Pradales (1985), Cancela Ramírez de Arellano (1986), Garabito/Solovera (1990), Mezquíriz (1993).

1051 Mayet (1984, 67–8).

1052 In some cases it is also possible that the *gentilicium* is a *cognomen* (Mayet 1984, 69, favoures this interpretation). This alternative interpretation, however, does not affect the considerations made in this section.

1053 Ibid. cat. no. 49.

1054 Ibid. cat. no. 57.

1055 Ibid. cat. no. 58.

1056 Ibid. cat. no. 66. Attributed to Tritium by Mayet.

1057 Garabito/Solovera (1990, 72). For problems of the interpretation of these stamps, cf. above p.199.

1058 Mayet (1984) cat. no. 562.

1059 Ibid. cat. no. 567.

1060 *Sic*. Ibid. cat. no. 572. The final letter might be a *hedera* or an I.

1061 Garabito/Solovera (1990, 73).

1062 Mayet (1984) cat. no. 76. Not yet found at Tricio.

1063 Ibid. cat. no. 354.

1064 Ibid. cat. no. 355.

1065 Ibid. cat. no. 361.

1066 Ibid. cat. no. 363. Not yet found at Tricio. Mayet suggests the reading MATERNI.T(ritiensis?).

1067 Ibid. cat. no. 344. Not yet found at Tricio. Mayet suggests the reading MALLI or MANLI.MAT.T(ritiensis?).

persons, there are others, not all of whose marks have been encountered at Tritium so far, but only attributed to it hypothetically. It is also not always clear whether a specified group is actually behind the marks in question. To these potential groups belong the PATERNI, with the stamps OFICPATERNI[1068], EXOF.VAL.PAT[1069], and PATER.ALE[1070], which were found in the zone of Tritium; and PAT.LV.O[1071], FVLV.PAT[1072], and OFVL.PAT.FESTI[1073], which are assumed to come from this zone. Another stamp which would fit into this group but cannot yet be attributed to a place of production, is PAT *hedera* ENTRI[1074]. The TITI are a further potential group of *officinatores,* if this name in the genitive case refers to the *nomen gentile* Titius and not the *praenomen* Titus. The stamp EXOFTITISEM[1075] was found in the zone of Tritium at Bezares, whereas TITI.OF[1076], TITI *hedera* SANCENI[1077], TIT.LAG.OF[1078] and EX.OF.TITI.AIO[1079] have been attributed to Tritium so far only hypothetically.[1080] These characteristics are shared by the VALE(rii) (EXOFVALE[1081], VALE.FIRM[1082], EX.OF.VAL.M[1083], EXOF.VAL.PAT[1084], and IIXOFVALS[1085]). Another candidate is the AE(M)-group, with the marks EXOFAEME, AE.FLA (or FA).OFF, AE.FRO, AEM.MAT, AE.M.TR[1086] being only hypothetically attributed to Tritium. The latter also applies to the OCTA(vii) (OCTAES, OCTA.FRON, OCT.MA.OF, OC.MFRON[1087]), with the possibility that the three last marks refer to one and the same person, and that Octavius refers to the *praenomen* rather than to the identical *nomen gentile*. Finally, there is the potential group of the LVCI with the stamps

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1068 Ibid. cat. no. 452.
1069 Ibid. cat. no. 675.
1070 Ibid. cat. no. 464.
1071 Ibid. cat. no. 470.
1072 Ibid. cat. no. 212
1073 Ibid. cat. no. 215.
1074 Ibid. cat. no. 462.
1075 Ibid. cat. no. 658.
1076 Ibid. cat. no. 648.
1077 Ibid. cat. no. 657.
1078 Ibid. cat. no. 650.
1079 Ibid. cat. no. 649.
1080 TI.M.ACT (ibid. cat. no. 644) and OF.TI.FV.PA (ibid. cat. no. 641) are less likely to belong to this group, for they are most probably abbreviations of *tria nomina* with TI referring to the *praenomen* Titus or Tiberius.
1081 Ibid. cat. no. 669 (Tritium?).
1082 Ibid. cat. no. 670 (Tritium?).
1083 Ibid. cat. no. 673 (Tritium?).
1084 Ibid. cat. no. 675 (Tritium).
1085 Ibid. cat. no. 713 (Tritium?).
1086 Ibid. nos. 11–16.
1087 Ibid. nos. 434, 435, 438, 447.

LV.IVN[1088] and LV.SEM[1089] from Tricio and LVCIANNI[1090], OFLVBER[1091], OF.LVCIPI[1092], EXOLV.MA[1093], for which origin from Tritium Magallum has been suggested. However, here, too, the name in question can be a *nomen gentile* or a *cognomen* equally.

4.3.4.3. Function and social status of persons referred to

The predominance of the *officina*-formula and its abbreviations clearly suggests that *officinatores* are referred to. There are no indications of the social and legal status of these persons. In only two cases it is quite clear that a dependant is behind a stamp. The case of the Segi has already been discussed above in Section 4.3.3.1.b. The stamp OFVL.PAT.FESTI[1094], the short version of which seems to be EXO.FVL.PAT.F[1095], cannot contain abbreviated *duo nomina*, for FVL.PAT, also known from the stamp FVLV.PAT[1096], is clearly a combination of *gentilicium* and *cognomen*. Festus is thus likely to have been a dependant of Fulvius Pat(-ernus or -erninus). The only blemish on this case is that all the stamps concerned have not yet been found at their place of production; they have been attributed to Tritium Magallum only hypothetically. As far as the *familiae* of *officinatores* are concerned, we can assume that the persons referred to by the *cognomina* were dependants of the person whose *gentilicium* they have in common, i.e. slaves or freedmen.

It has been suggested that members of the municipal aristocracy played a role in the production of *terra sigillata* at Tritium Magallum.[1097] The stamps MAMILI.P.OF and EXOSILONI, found at Tarragona, have been interpreted as referring to T. Mamilius Praesens and T. Mamilius Silo of Tritium Magallum.[1098] The two are known from an honorary inscription in Tarragona where Praesens held the office of a *flamen provincialis* after passing through the *cursus honorum* of his hometown, Tritium

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1088 Ibid. cat. no. 320 (Tritium).
1089 Ibid. cat. no. 327 (Tritium).
1090 Ibid. cat. no. 306 (Tritium?).
1091 Ibid. cat. no. 305 (Tritium?).
1092 Ibid. cat. no. 308 (Tritium?).
1093 Ibid. cat. no. 321 (Tritium?).
1094 Ibid. cat. no. 215 (Tritium?).
1095 Ibid. cat. no. 216 (Tritium?).
1096 Ibid. cat. no. 212 (Tritium?).
1097 Espinosa (1988, 266–8).
1098 Mayet (1984) nos. 345 and 608. No. 345 has been attributed hypothetically to Tritium by Mayet, cat. no. 608 by Espinosa (1988, 267).

Magallum.[1099] Silo is only known as Praesens' father from the *filiatio* of this inscription, but in view of his son's position it is most likely that he too was a member of the *ordo decurionum.*

As for the stamp MAMILI.P.OF, it cannot be denied that the connection with the Mamili suggests itself. However, the theory that Praesens is referred to as personal owner of the workshop is not cogent. A man in his position must have owned quite a number of slaves and given his *praenomen* and *gentilicium* to some freedmen. MAMILI.P may be one of them, with the P referring to a *cognomen* other than Praesens.

As to EXOSILONI, homonymy is a possible explanation. In addition, the stamp in question is known from Tarragona only and, unlike other finds, was not attributed to Tritium Magallum by F. Mayet. If this stamp originates from Tritium, and the *sigillata* producer Silo and the *decurio* Silo are identical, the stamp would refer to T. Mamilius Silo as the owner of the workshop rather than to its *officinator*. A *decurio* is scarcely likely to have been present in the workshop himself. In this case we would have an example of direct management in the *sigillata* business. One might speculate as to whether Silo, as one of the richest men of Tritium Magallum, owned a number of workshops on his land, with one run in direct management and the others leased to *officinatores.*

4.3.4.4. Mobility of producers

When published, the potters' marks are attributed as a rule to three main sub-zones of production, namely Arenzana de Arriba, Bezares, and Tricio.[1100] With two exceptions, each mark was found in only one of these areas, which suggests that the potters normally spent their working life in one workshop without being tied down indissolubly to it. To gain more reliable knowledge concerning this point, it would be helpful to have more detailed information on the find-spots of the individual marks, especially if found in the very context of production.

1099 Espinosa (1988, 264).
1100 Mayet (1984, 67–8).

4.3.4.5. Size of workshops

The archaeological evidence suggests the prevalence of small workshops. As with Andújar, a small number of producers are represented by far more dies and finds of vessels than those of other producers.[1101] The problems of the interpretation of this fact have already been discussed above: without having enough data on the chronology of the individual workshops it is impossible to say to what extent the two factors size of workshop and time of its activity influenced the number of finds. However, it seems likely that in some extreme cases time was not the only factor responsible for the comparatively large number of dies.[1102] Thus the assumption that smaller and larger workshops existed appears reasonable. To what degree they differed, though, cannot be ascertained.

This, and the fact that with a very small number of exceptions all workshops used the *officina*-formula, is not compatible with the assumption that the term *officina* refers to a large workshop. Thus the use of the *officina*-formula at Andújar supports the hypothesis that this formula is not indicative of the size of a workshop.

4.3.5. Summary and conclusions

The characteristics of the centre of Tritium Magallum seem in many points very similar to other centres of production. Situated in the surroundings of the town, the workshops of Tritium Magallum can be called sub-urban. The existence of a centuriation grid and large *villae* in the vicinity indicate well-ordered land ownership in the area. Some stamps suggest the involvement of the municipal aristocracy in the production. All this combines to form the hypothesis that the production installations of the individual potters' quarters were situated on agricultural estates. This would make the use of a leasehold system the most likely legal basis for the organization of production. The fact that the area of distribution of potters contemporaneously active in one agglomeration was identical means that the distribution for these workshops was in one hand. Perhaps the landowner did play a role here, too.

[1101] E.g. Valerius Paternus with 38 dies (Mayet 1984, cat. nos. 674–712) and Lapillus (or L.Apillus) with 22 dies (Mayet 1984, cat. nos. 262–284) in comparison to C. Frontonius with 4 dies (Mayet 1984, cat. nos. 131 and 132 plus the dies CA.FRO and C.FRONTONII cited by Garabito/Solovera 1990, 74) or C. Luc(...) with 11 dies (Mayet 1984, cat. nos. 103–112, plus the die CALVO cited by Garabito/Solovera 1990, 74). Cf. also Mayet (1984, 215–17).

[1102] For examples, see n.1101.

The application of potters' marks to certain forms of vessels shows the same basic pattern as at Lezoux, La Graufesenque, Rheinzabern, and Andújar. The use of stamps at Tritium Magallum was more inconsistent than at La Graufesenque, more comparable to Lezoux and Andújar. This might be explained as resulting from varying production conditions. Evidence for a specialization among the potters in the making of certain types of vessels is lacking.

Familiae of *officinatores* seem to have played a role at Tritium, too. Although only very few signatures indicate the existence of slaves and freedmen in the *terra sigillata* production at Tritium Magallum, we can assume that as far as the *familiae* of *officinatores* are concerned the persons referred to by the *cognomina* in question were dependants of the person whose *gentilicium* they have in common.

The existence of commonly used waste pits which were dominated each by one producer suggests that common firing was practised at least occasionally. The fact that one producer dominated the production of a group during a period of time is perhaps indicative of a system of organization with the firing master as the key figure: the potter who had leased the kiln and was responsible for the coordination of the production of a group of workshops.

The cramped space and structural connection in which the workshops and kilns were arranged makes it very likely that they had a common drying shelter, which would explain the use of stamps in the same way as with other production centres.

Exchange of moulds between workshop agglomerations and exchange of motif punches within them are features well known from other production centres and have been discussed in the respective chapters.

Evidence for the mobility of potters is scarce, but this is perhaps a methodological problem. If the stamps were not attributed to regions but rather to the their actual place of production, one could say more about the degree of migration within the area of production. Further analysis of the existing material and new finds may shed more light on this question.

However, there are not only parallels, but also differences. Large production facilities such as encountered at Lezoux and La Graufesenque have not been found in the area of Tritium Magallum yet.

All in all, as far as the organization of production is concerned, the centre of Tritium Magallum looks like a somewhat smaller copy of Lezoux. Thus it is not

necessary to discuss in detail all the implications already dealt with in the chapter on this centre of production. It seems clear that not only the products, but also the technology and organization of production was copied to a certain degree.

This strongly suggests the migration of potters from Gaul to Spain, in spite of the fact that there is no unequivocal evidence for this. It is likely that only very few persons brought the know-how from Gaul to Spain. Whether the initiative was taken by the potters, the traders, or the landowners cannot be said; but I would favour a combination of the two latter, the reasons for which have been discussed elsewere in this thesis.[1103]

[1103] Cf. Sections 3.1.3, 3.2.5 and 3.3.6.

5. North-African production

5.1. African red-slip ware – an outline

African red-slip ware was produced in several areas of Africa Proconsularis and Mauretania, from modern Algeria to Lybia, with the nucleus in Tunisia.[1104] It belonged to a single craft tradition which developed between the first and seventh centuries A.D.[1105] Based on sea transport, the distribution covered from the mid-second century onwards the western, and from the mid-third to the mid-seventh century also the eastern Mediterranean world.[1106] African red-slip ware was, therefore, 'the most widely distributed pottery of the Mediterranean in the whole of classical antiquity.'[1107]

The earliest African red-slip ware was produced in the Flavian period.[1108] Italian and Gaulish *terra sigillata* influenced this ware in the first and second centuries, but it never reached the quality of these models.[1109] Forms recalling African local productions were made from the beginning. Subsequently, African red-slip ware developed independently of European *terra sigillata*.[1110] Moulded vessels were not produced.[1111] Instead, plain ware was often decorated with pre-fabricated moulded ornaments, ornamental stamps, or *à la barbotine*. Comparatively simple techniques such as 'glass-cut' and roulette decoration were also used. The suggestion of some modern researchers that plain ware was made with moulds[1112] seems to be nothing but a myth.[1113] It is debatable whether this pottery can be called *terra sigillata* at all. An alternative term is African red-slip ware.[1114] As we will see, neither the products nor the production can be placed in the direct tradition of Italian *terra sigillata*. Therefore, I shall call this pottery 'African red-slip ware' rather than *terra sigillata.*

1104 Carandini (1983, 145).
1105 Ibid.
1106 Ibid. 147, Mackensen (1993, 17).
1107 Carandini (1983, 146).
1108 Ibid. 147.
1109 Carandini (ibid.) speaks of 'crude imitations'.
1110 On the many typologies of African red-slip ware and their developement, cf. the critical contribution of Mackensen (1993, 174–288).
1111 Some rare forms (*Sonderformen*) and lamps were made with plaster moulds (Mackensen 1993, 106–7, 175). This cannot be compared with the making of moulded vessels in the European *terra sigillata* tradition.
1112 E.g. Carandini (1983, 150; following Hayes).
1113 Mackensen (1993, 174–5, 184–5).
1114 Carandini (1983, 207, n. 2). The Italian terms are *terra sigillata chiara* (Lamboglia) and *ceramica Africana* (S.Tortorella).

5.2. Economical context

African red-slip ware is looked upon as a 'simple accompanying product' of African olive oil, transported probably in space left free between the amphorae.[1115] Most of the production sites in central Tunisia appear to have belonged to agricultural estates, though there is little direct evidence of the nature of their economies.[1116] Only some production centres also made amphorae. However, as the main agricultural product of this region seems to have been olive oil, one might hypothesize that the sites with production of red-slip ware belonged to estates concerned with the cultivation of this fruit.[1117] It has been suggested that pottery production was one of a range of subsidiary activities during the ten-year gestation period between the planting of the olive trees and the first harvest.[1118] Once an estate had acquired the means of ceramic production, it might have been convenient to continue with it after this period, especially in view of the fact that not all of the agricultural workforce was needed all the time, and that the means of distributing the olive oil could also be used for the ceramics.[1119] As firing material, off-cuts of the olive trees and pressed-out olives were available.[1120] However, pottery production as a subsidiary activity during the gestation period is certainly only one possibility of many. Indeed, this scenario faces special difficulties, for firing material other than off-cuts and pressed-out olives would have been required during this long period.[1121] For this reason, large-scale production on this basis is unlikely.

5.3. Organization of production

It is difficult to analyze the internal organization of production, for African red-slip ware virtually never bears name stamps.[1122] This makes it problematic to say how many potters were active at a site, what their social status was, and how they were

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1115 Carandini (1983, 151).
1116 Peacock/Bejaoui/Ben Lazreg (1990, 83).
1117 Ibid.
1118 Ibid.
1119 Ibid.
1120 Mackensen (1993, 484).
1121 Cf. Mackensen (1993, 486 n. 115).
1122 Mackensen (1993, 469). The one exception is Navigius, who made moulded lamps and relief-decorated vessels. His place of production has not been ascertained yet (perhaps Henchir es Srira), cf. Mackensen (1993, 36). The so-called Tripolitanian ware, made in the first half of the first century A.D. and often marked with name stamps, was most probably not produced in Africa, but in the area of the Gulf of Naples (Soricelli 1987). Mattingly/Hitchner (1995, 201) stress that the evidence for the organization of production of African red-slip ware is thin.

related to each other. To a very limited degree, the lack of name stamps is compensated for by name graffiti on tools found at a number of sites.[1123] In addition, in the case of stamp-decorated ware some conclusions can be drawn from the analysis of decorative stamps. Excavations of production centres are lacking (with one, yet unpublished, exception).[1124] At many sites, however, surface surveys have been conducted.

At a number of production sites saggars – clay containers in which vessels were placed for protection during firing – were used.[1125] Sometimes these saggars bear inscriptions or stamps on the rim, presumably potters' marks used to identify the saggars belonging to various potters after firing.[1126] The saggars were of cylindrical form, without top or bottom, designed to be stacked.[1127] Therefore, only the top of a saggar pile would have needed marking. It has been suggested that the need to identify individual potters' work could imply communal firings as at La Graufesenque.[1128] Various marks on saggars at Djilma – at least eight different combinations of letters and ornaments were found on fourteen saggars[1129] – support this hypothesis. Unfortunately, the graffiti in question consist of only a few letters, which makes it impossible to learn more about the producers.

Graffiti on tools were found at various sites.[1130] Sometimes they are in the form *ex officina alicuius*, e.g. *(e)x oficina Felicis,*[1131] *ex oficina Proculi,*[1132] *[ex] oficina T(iti).*[1133] Such *officina*-signatures are known from a number of production places.[1134] Thus they can be considered as typical. At Oudna, tools of the same type (*pugillum*) with inscriptions of two persons were found. Some were inscribed *ex of Abis*, others *Renati.*[1135] These inscriptions appear to have been a means of distinguishing between tools of various

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1123 Cf. below.

1124 According to Mackensen (1993, 24), Tiddis is the only centre in North Africa where kilns and other production installations were excaveted. However, they have not been published in detail as yet.

1125 Peacock/Bejaoui/Ben Lazreg (1990, 68, 74, 76, 79).

1126 Ibid. 68, 76, 79.

1127 Ibid. 68; Mackensen (1993, 87–94).

1128 Peacock/Bejaoui/Ben Lazreg (1990, 79).

1129 Ibid.

1130 E.g. Tiddis, Bordj el Djerbi, Oudna, Djilma, El Jem, El Mahrine (Mackensen (1993, 24–39, 71).

1131 Tiddis, cf. ibid. 24.

1132 El Jem, place of production uncertain, cf. ibid. 39.

1133 Bordj el Djerbi, cf. ibid. 27.

1134 Ibid. 24–39.

1135 Ibid. 77.

producers working in the same workshop. Thus it has been assumed that these signatures refer to *officinatores* who had leased their workshops, or a part of a workshop.[1136] Possibly the tools in question were not made by the persons referred to. A graffito on a tool of unknown origin reads *ex oficina Quod/vultdei Tzacunis/Cresce(n)s pugi/l(l)um fecit*.[1137] Crescens seems to have worked in the workshop of Quodvultdeus Tzacunis, perhaps being his dependant. Another graffito reads *pugillu(m)/Victoris/Magni*.[1138] Possibly the same Magnus is referred to on the graffito *ex ofici/na Magni*.[1139] If so, it is conceivable that Victor was a dependant of Magnus. In any case, these examples suggest that subordinate potters were working in the shops of the *officinatores* referred to.[1140] Unfortunately, the graffiti cannot be dated with exact precision, but we do know that they were made somewhere in the period between the third and sixth centuries.[1141]

The workshop centre of El Mahrine in Tunisia consisted of four places of production, working simultaneously at least during some of the time of their activity.[1142] The distance between the two main findspots is approximately 400 metres; the third one was situated at a distance of c. 1,500 metres; and a fourth concentration of pottery sherds was located at a distance of c. 2,800 metres. At one of these findspots, far more sherds were found than at the others; it has been suggested that at this place several workshops were situated.[1143]

There are no traces of pottery making activities prior to the foundation of the centre of El Mahrine in the first third of the fourth century.[1144] Connections with other production centres of red-slip ware could not be ascertained.[1145] A number of fragments with impressions of identical decorative punches were found at the two main findspots.[1146] Three explanations are possible: exchange of tools; migration of

potters; and/or firing of a number of vessels from one workshop in the kiln(s) of the other.

At Tiddis (*Castellum Tidditanorum*, Algeria), a large red-slip ware production centre was excavated, but this excavation has not yet been published in detail.[1147] Twenty kilns, clay-processing installations, ten stone bearings of pivots of potter's wheels, approximately 250 tools – some of them with graffiti – show that Tiddis must have been a very large production centre with a number of workshops. The publication of this material is one of the biggest *desiderata* of the research on the production of African red-slip ware.

We can infer from all this evidence that at many African production sites several potters were working in several workshops, at some of them each potter having his own place of activity where he could make his own tools and vessels. Combined with the hypothesis that most pottery production sites were situated on agricultural estates, this suggests that the basis of the organization of production was tenancy. It has been proposed that the organization of production at El Mahrine was similar to that of the amphorae workshops in Oxyrhynchos.[1148] Indeed, this could have been the case at several African production sites.

In one workshop, clay tubes were found which have been interpreted as *tubuli* typical of the making of *terra sigillata*.[1149] At the same site saggars were found. It is not certain, therefore, that the tubes in question were used for the purpose suggested. On the other hand, kiln furniture likely to have had the function of saggars was found at La Graufesenque together with *tubuli*.[1150] In any case, saggars – not kilns fitted with tubes – were typical of the production of African red-slip ware.

5.4. Summary and conclusions

In summary, African red-slip ware was produced in the context of large-scale olive-growing. It was exported together with olive-oil. Not only were the products, but also the firing technology different from that of the European production centres. The same applies to the use of producers' signatures. In contrast to *terra sigillata*

1147 Ibid. 21–4, with references.
1148 Ibid. 485.
1149 Henchir el Gallal, Chougafiya, Peacock/Bejaoui/Ben Lazreg (1990, 65–8).
1150 Vernhet (1981a, 35).

production centres in Gaul, Spain, and Germany, the production of African red-slip ware seems to have been influenced only by model products, but not by model producers. Therefore, it cannot be placed directly in the tradition of Italian, Gaulish, and Spanish *terra sigillata* production. Nevertheless there appear to be a number of parallels as to the organization of production. The mode of production was a nucleated workshop production, the shops being run by *officinatores* with sub-ordinate personnel. The centres of production differ in size. Some of them seem to have been quite large, comprising a large number of workshops with the potters working to a certain degree independently of each other. At the same time, cooperation appears to have played a role, which made the marking of saggars necessary. Joint firing seems to have been frequent. Graffiti suggest that the workshops were run by *officinatores* with subordinate potters. The most likely background of the production organization is tenancy.

6. Final summary and conclusions

Having discussed the internal organization of the most important centres of *terra sigillata* production, the question arises if it is possible to develop a comprehensive model for the mass production of this kind of pottery. Although each production centre has its own individual features, this appears to be possible. The aim of this chapter is to discuss the common features of the centres.

For the majority of production centres, the evidence is insufficient to arrive at an independent reconstruction of the production organization. For this reason, comparative and complementary methods have been employed. The organization of other kinds of mass-produced pottery and Roman law have been used as a basis of comparison and an explanatory framework.

The use of producers' signatures at all production centres, and the many similarities in the application of the signatures, suggest similarities in the organization of production.[1151] The similarities are especially strong within Gaul and Germany. In addition, the potters' migration from centre to centre is well attested for these provinces, which explains how one particular system of organizing mass production became so widespread.[1152] The organization of production at Arezzo could be explained within the same framework.[1153] Although there are some minor differences between Arezzo and the Gaulish centres as to the content and application of producers' signatures, we can assume that the organization of production was based on the same principles. Moreover, Arretine potters were active in Gaulish production centres, so that we might hypothesize that they introduced not only the style of the products and the technology, but also the system of production organization.[1154] Thus all arguments based on the distinction of alleged Italian slave-manufactories and Gaulish cooperative production of free men are scarcely acceptable. The characteristics of the application of stamps, and the technology used at Spanish sites, suggest that the organization of production was similar to that in Gaul and Italy, which makes the migration of potters from there to Spain very likely.[1155]

[1151] Cf. Sections 2.2; 3.2.3; 3.3.3; 3.4.3; 4.2.5; 4.3.4; 5.3.
[1152] Cf. Sections 3.1.1; 3.1.2.; 3.2.3.4; 3.3.7; 3.4.5.5.
[1153] Cf. Section 2.7.
[1154] Cf. esp. Sections 2.6; 3.1.1.
[1155] Cf. Sections 4.1.3; 4.3.5.

African red-slip ware is an exception, insofar as no stamps were applied to the vessels.[1156] This ware cannot be placed directly in the tradition of European *terra sigillata*. Nevertheless there appears to have been a number of parallels as to the organization of production.

The mode of production was in all cases a nucleated workshop industry, the social status of the producers being of no relevance. As we have seen, free persons, freedmen, and slaves are all represented on Arretine *terra sigillata* stamps.[1157] Although the evidence is often thin, slaves and freedmen seem to have played a role at all production centres, especially in the form of *familiae* of *officinatores*.[1158] At La Graufesenque, slaves were temporarily hired as unskilled workers.[1159] Even if it seems as if in Italy more slaves were used than in Gaul, Germany, and Spain, this does not constitute a fundamental difference, for the mode of production appears to have been the same. The use of slave labour in small- to medium-sized workshops is a domestic and traditional use of this kind of labour which did not change the mode of production at all.[1160]

The use of producers' stamps can be explained by the joint use of facilities, especially storage facilities such as drying shelters.[1161] The stamps were not used to control the potters' output or to facilitate the return of the vessels to the individual potters after common firing.[1162] Inconsistencies in the application of stamps can be explained as the result of varying production conditions.[1163] Mould signatures name the maker and/or owner of the mould and may have been useful when the mould was hired out to other potters, which happened frequently.[1164] Some signatures suggest that they also served as advertizements for the mould maker within the production centre.[1165]

In Gaul, Germany, and Spain, the frequent use of the stamp formula *ex officina alicuius* indicates that the persons referred to were not mere employees.[1166]

1156 Cf. Section 5.3.
1157 Cf. Section 2.2.4.
1158 Cf. Sections 3.2.3.5; 3.3.3.2; 3.4.4.1; 4.2.5.2; 4.3.4.2.
1159 Cf. Section 3.2.4.3.
1160 For the concept of 'domestic' and 'traditional' use of slave labour as opposed to its qualitatively innovative use, see Carandini (1981, 259-3) and Rathbone (1983, 167).
1161 Cf. Sections 2.2.1; 3.2.3.2; 3.3.3.1; 3.4.5.2; 4.3.3.1.
1162 Cf. esp. Section 3.2.3.2.
1163 Cf. esp. Sections 3.2.3.2; 3.3.3.1.
1164 Cf. Sections 3.2.3.3; 3.3.3.3; 3.4.4.1; 4.2.3; 4.2.6.
1165 Cf. Sections 3.2.3.2; 3.2.3.3.
1166 Cf. Sections 3.2; 3.3; 3.4.3; 4.2.5.1; 4.3.4.1.

Clearly, they had the position of *officinatores*, persons each responsible for a workshop independently of its size. The same applies to Arretine producers, masters and dependants equally.[1167] In Africa the formula in question is to be found on tools.[1168]

Although many *terra sigillata* potters worked for several years at one production site, it is also typical that they migrated from one production centre to another.[1169] Often slaves and/or freedmen of *officinatores* moved to other production sites.[1170] This explains the existence of so-called branch-workshops. In some cases potters appear to have migrated as a group. Frequently they also changed their place of work within the production centres.

The fact that the potters were very mobile, and that considerable capital was required for the building of the production installations, leads to the conclusion that the *officinatores* were not the owners of their workshops. Therefore, a leasehold system such as the one discussed in Chapter 1 is likely to have been the legal and organizational basis of the potters' activities. We have no grounds to assume the existence of professional *collegia* at the centres of production.[1171]

Specialization in the products was the exception and cannot be seen as a characteristic of *terra sigillata* production.[1172] However, although not typical, specialization in the products was possible, which means that the production and the selling were organized in a way which encouraged some potters to specialize. How such a relative specialization looked can be inferred from the evidence of the firing lists from La Graufesenque: producers, sometimes forming associations, temporarily specialized in one type of vessel in order to supply large numbers to a specific firing load.[1173]

Temporary specialization in the products implicates that the potters did not sell their products individually to the wholesalers in the form of services, but produced certain types on order, which were only later combined. This required some coordination of the work of the individual potters by the traders, be it

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1167 Cf. Section 2.3.
1168 Cf. Section 5.3.
1169 Cf. Sections 2.5; 3.1.1; 3.1.2.; 3.2.3.4; 3.3.7; 3.4.5.5; 4.1.3; 4.2.3; 4.3.4.4.
1170 Cf. Section 2.6.
1171 Cf. Section 3.2.4.6.
1172 Cf. Sections 2.5; 3.1.5; 3.2.3.6; 3.2.4.10; 3.3.3.3; 3.4.3.3; 4.2.5.1; 4.3.4.1.
1173 Cf. Section 3.2.3.6.

directly or via a mediator such as the lessor. It also means that the entire organization of production and sale was designed for export production.

There is little evidence for a specialization in the making of tools such as moulds. Almost all mould makers also made both moulded and plain vessels.[1174] At most production sites not only *terra sigillata*, but also other types of ceramics were made. It is likely, therefore, that *terra sigillata* potters also made other types of ceramics, but the extent to which they did so remains an open question. In the heyday of production of the individual centres, *terra sigillata* potters presumably made only this ware.

The development of *terra sigillata* production sites was not uniform. The introduction of the mass production of high-quality *terra sigillata* was in some cases based on an existing local production of proto-*sigillata* and other ceramics, and in others established from scratch as a specialized export production.[1175] If a history of pottery making existed, the introduction of high-quality mass production nevertheless required the construction of large installations and a reorganization of space.

The volume of production in the heyday of the centres must have required the involvement of large-scale traders. We can hypothesize that traders also played a role in the initial phase, for they had access to information on consumer taste and demand, military supply requirements, transport capacities, landowners with estates appropriate for pottery production at locations favourable to transport, and persons who knew where to recruit specialist potters. The traders are likely to have made arrangements for hiring or acquiring specialist potters. Perhaps the landowners even leased the land to traders who then erected workshops and subleased them to the individual *officinatores*; or landowners and traders formed a *societas*, with the landowners providing land and raw material, and the traders bringing in specialists and organizing production and trade.

At La Graufesenque, the interpretation of the firing lists enables us to postulate the existence of a system in which the lessor concluded contracts with the producers to deliver set numbers of vessels.[1176] It is conceivable that this

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[1174] Cf. Sections 2.5; 3.2.3.6; 3.3.3.3; 3.4.3.3.
[1175] Cf. esp. Section 3.3.4.
[1176] Cf. Section 3.2.4.

point was part of the potters' lease contracts. The firing masters, potters themselves and responsible for the operation of the kilns, acted either as middlemen or directly on behalf of the lessor.[1177] In the latter case, they would have had the task of approving and accepting the potters' work (*adprobatio operis*), controlling the fulfilment of the potters' contracts with the aid of the lists. In the former case, they themselves would have entered into contracts with several of their colleagues who would have produced each a part of the load on order. It is likely that this system was also used in other production centres.

Separate potters' quarters with a certain degree of migration between them are attested to for several centres.[1178] The transfer of moulds between these quarters and production sites in the same region indicates that there must have been not only a network of exchange of information, but also of tools and personnel.[1179] This and the exchange of other tools such as motif punches leads to the conclusion that the persons involved in *terra sigillata* mass production did not act as competitors, but cooperated in the installation and improvement of production.

Often the pottery workshops were related to agricultural production.[1180] The locations of production sites suggest that the *terra sigillata* industry was sub-urban or rural rather than urban.

Remains of residence buildings and items of everyday use suggest a modest, but not poor, standard of living for at least some of the persons involved in mass production.[1181] At Lezoux, La Graufesenque, and Rheinzabern, centres of cult worship were attached to the potters' quarters.[1182]

Large-scale production of fine tableware required an organization which to a certain extent was different from normal workshop production. However, the difference is not as striking as one might expect. There is no conclusive evidence for the existence of manufactories. The mode of production prevailing in the mass production of *terra sigillata* appears to have been the same as in the field of

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1177 Cf. Section 3.2.4.8.
1178 Cf. Sections 2.4.3; 3.2.4.2; 3.3.4; 4.3.1.
1179 Cf. above n. 1164.
1180 Cf. Sections 2.6; 3.2.2; 3.3.4.1; 3.3.6; 4.2.6; 4.3.3.2; 4.3.5; 5.2.
1181 Cf. Sections 3.2.1; 3.3.4.3; 3.4.5.4; 4.2.4.2.
1182 Cf. Sections 3.2.4.7; 3.3.8; 3.4.5.

amphorae and brick and tile manufacture, namely a nucleated workshop production. In the centre of the organizational structure stood a comparatively small- to medium-sized unit of production – the workshop (*officina*). Quite a number of *officinae* could be grouped together in a larger organizational unit – the pottery yard (*figlinae*). There is a tendency for many – perhaps most – producers not to perform all stages of production on their own. This applies especially to the firing, and perhaps also to the extraction and processing of the clay. This could be organized either by the *officinatores* themselves, or by a central authority such as the lessor for whom the artefacts were produced. In the case of La Graufesenque, such tasks do not seem to have been carried out by specialists not involved in pottery making, but by some of the potters, namely the firing masters.

The commonness of the mode of nucleated workshop production raises the question of its advantages. To begin with, however, one has to ask if there was at all a rational choice to be made between the establishment of a nucleated workshop industry and a manufactory. The formation of a nucleated workshop industry seems to be a more spontaneous, evolutionary process of economic development, as against the establishment of a highly organized manufactory, which needs the deliberate decision of an investor to come to life. When demand for a specific product rose, the answer could simply be the establishment of another production unit, be it at the instigation of a landowner who needed more containers for the transportation of his growing agricultural produce, or as an attempt to take advantage of the surge in demand for a certain kind of tableware. The economic interests of landowner and craftsman could coincide. In addition, from the landowner's point of view, it would have been advantageous that current contracts were not affected when a new production unit was installed independently of existing ones, as running activities would not have been interrupted. This was also the case when production was to be scaled down for some reason. In addition, small groups of workers must have been easier to control. It is conceivable that the responsibility which could be given to slave *officinatores*, perhaps combined with giving them a share in the profits, was a most effective way of increasing their interest in the quality and quantity of their products.

In the case of *terra sigillata*, the process of production is not very suitable for a manufactory. As we have seen, the main point of the definition of this mode of production is the cooperation of a large number of artisans working in one

establishment and producing a single complex artefact.[1183] In addition, there should be a clear tendency for the job to be split into ever more specialized tasks. However, a clay vessel is not a very complex artefact, not even a moulded *terra sigillata* vessel. The making of the moulds cannot be seen as belonging to the actual process of production. The same applies to motif punches. The making of a plain vessel required merely one step plus the application of the slip. The same is true of moulded vessels, perhaps with the exception of bowls of the form Drag. 37, the footring of which was made separately.[1184] Forms of vessels requiring more steps of work, e.g. decorated jugs, were made in very small numbers. Clearly, a product such as *terra sigillata* is not well-suited for assembly-line production. The same applies for the preparation of the clay and the firing of the vessels. The preparation of clay is a process which takes months, and the loading, firing, and unloading of a very large kiln must have taken several days, if not weeks. To organize continuous production with minute subdivision of work under such circumstances would have been a very complicated task.

Nucleated workshop production undoubtedly brought some advantages such as the use of production facilities in common. But can we call this development a qualitative innovation? What we meet here is economic evolution by way of adaption to new economic opportunities through optimization of known structures with minimum qualitative innovation; not economic revolution by the employment of a qualitatively new mode of production. All this is not to say that the formation of an industry such as the Arretine or Gaulish *terra sigillata* production was not exeptional. Although innovation was minimal, and the mode of production not specifically 'slave mode', it is clear that this special kind of production organization must have been more effective than simple workshop manufacture. Thus the model presented here of *terra sigillata* production suggests – at least for the sector of pottery mass production – a notable flexibility of the Roman economy and shows at the same time the narrow limits of its innovational capacity.

1183 Cf. Section 1.2.3.

1184 Cf. Section 3.2.3.2.

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