



Material Culture in Medieval Europe

Papers of the 'Medieval Europe Brugge 1997' Conference
Volume 7

edited by
Guy De Boe & Frans Verhaeghe

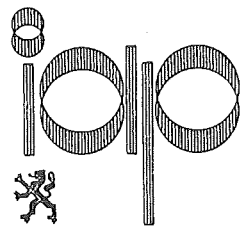
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Prof. Dr. Guy De Boe



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Preface

Material culture is of course a central issue to any form of archaeological endeavour as 'material things' and the 'history of things' manufactured, fashioned or at least influenced by humans constitute both the main sources and the direct subject of archaeological studies. The concept is not limited to smaller or moveable objects or classes of objects such as ceramics, jewellery, dress accessories, tools, glass vessels, combs in bone or ivory and many others. Castles, monasteries, villages and towns and even landscapes and the environments as a whole can be considered as 'objects' or even as 'artefacts' totally or in part 'created' by humans and therefore integral parts of material culture. The same is of course also valid for works of art, food, material living standards and many other aspects of the worlds past and present.

In addition, material culture is not a passive but an active component of these past and present worlds. More particularly, it is active in several major ways. It is all too often forgotten that artefacts of any kind always influence the later development both of the same type of artefacts and of other classes of objects. In this sense, all components of material culture are interactive with one another. Furthermore, they also influence human behaviour and human perception of the world and of society. In addition, artefacts are used in strategies of social reproduction and manipulation of the world and of society. And finally, the meanings of artefacts change depending on the context, *i.e.* through time, space and social context. It is through interpretation – whatever ideological approach is used or whatever subject is focused on – that archaeologists can try and decode the human behaviour and perceptions that are reflected in all possible remains and traces of the material past.

All this means that it can reasonably be argued that any conference on medieval and early modern archaeology concerns the totality of the material world because no part of that past (and present)

material culture can hardly be divorced and isolated from the totality of that material culture or for that matter from the individuals or the society that created and manipulated it.

In practice, however, many archaeologists of medieval and early modern times tend to limit the application of the concept of material culture to the smaller, moveable objects, often also denoted as 'finds'. Material culture then encompasses mainly smaller artefacts of every kind, generally grouped in main classes such as ceramics, metal, glass, skeletal materials, wood, textiles, etc. The organisers of the MEDIEVAL EUROPE BRUGGE 1997 and the editors of the present volume have adhered to this approach mainly because of sheer practical reasons and because no other and better terminology is yet available.

The archaeological study of medieval and later material culture in the restricted sense of the term already has a fairly long tradition. It developed very much along lines set by the approaches used in other and older branches of archaeology. Not in the least because of the basic need to identify and group the objects in manageable units and to assess their chronological development, typology and chronological sequencing have always played a major part in this kind of work and they continue to do so. This is not all too surprising as ever more and ever new collections of finds come to light. Another topic which has nearly always been in the limelight in this context is that of technological features and developments. And as the present collection of papers demonstrates, this too remains a subject of interest, though the emphasis has now moved from the analysis and description of the technical features of the finds to the study and discussion of technical production processes. At the same time, the natural science work – particularly in terms of analysis work – has grown more prominent, providing absolutely essential information which in

turn helps with the identification of resources and technical production processes as well as with other issues such as chronology, provenancing and trade. Finally, other 'historical' sources – in the broadest possible meaning of the term and including ethnographical and iconographic sources as well as experimental archaeology – have equally been called in to help not only with chronology (particularly for the later Middle Ages and Early Modern Times) but also with production technologies, uses and functions of the objects and even – be it to a much more limited extent – their social context.

On the whole, however, much of the work on finds remains of a somewhat descriptive nature, at least in Europe (and notwithstanding a few notable exceptions). The large offer of papers related to material culture – in the sense used here – for the MEDIEVAL EUROPE BRUGGE 1997 conference does illustrate the vitality of the subject and the continuing interest in finds of all kinds and in the issues they raise. They also illustrate the continuing emphasis on technological problems and production processes.

But this vitality should not blind us to some apparent trends and problems which seem to affect the field in more recent years. The already mentioned emphasis on descriptive work is to some extent understandable as the need for basic data and for the adequate management and use of the information concealed in the rapidly growing mass of finds remains of the utmost importance. In quite a few cases, however, there is little opportunity for work beyond that descriptive phase. The most notorious example in this respect is the simple typological or techno-typological classification of ceramics, with a comment on the possible or probable origins of the groups and a deliberate emphasis on chronology, basically reducing the pottery to an indicator of a chronological nature and disregarding the potential of these – and other – finds as sources for more complex questions related to behavioural and social patterns. In addition, the increasing pressures of rescue work and managing the archaeological heritage often leave little time for more sophisticated discussion of the finds in terms of issues above and beyond typology and chronology. A related and equally dangerous trend is that it seems to become increasingly difficult to keep up with the growing mass of finds: the backlog remains a major problem, particularly as the costs of storing the finds raise the delicate issue of curation of the collections. Equally dangerous is that most of the work on finds does not lead to a structural consolidation of the knowledge thus built up, which in turn leads to recurrent losses of expertise and sometimes even to reinventing the wheel. Finally, the lack of interest in any form of

theoretical work which seems to affect large segments of mainly European – particularly medieval and early modern – archaeology does not help either as it may – together with external pressures of a financial and practical nature which constrict much of present-day archaeological work – strengthen the trend towards simpler descriptive work. This means that the huge potential of archaeological finds is not fully realized and that (medieval and early modern) archaeology is not fully responding to the justified expectations of historians, anthropologists and other human or social scientists. It may be argued that the more sophisticated interpretative work will eventually be carried out – in the near or far future. But it remains to be seen how valid this reasoning really is. Indeed, it remains to be demonstrated that this will really happen in the future. Furthermore, it should not be forgotten that files and collections are often subject to subtle or sometimes even less subtle forms of erosion, leading to a loss of potential information. And in addition, relegating the more sophisticated work to an – at best uncertain – future also hinders progress: it does not help with the identification of the kinds of information needed or with the many interpretative questions still open or indeed yet to be recognized, thus at the same time leaving little room for suitable collecting and sampling strategies in the field.

The situation may not be as dramatic as this paragraph suggests, but the editors of the present volume feel that the dangers are very real and should be kept in mind.

Still, the interest in finds and in material culture (even in the restricted sense in which the notion is used here) is not flagging, judging from the large number of papers offered for presentation in the section 07 under the general heading *Material culture: production and consumption - Culture matérielle : production and consommation - Materielle Kultur: Produktion and Verbrauch - Materiële cultuur: productie en consumptie* at the MEDIEVAL EUROPE BRUGGE 1997 international conference on medieval and later archaeology which took place in Brugge, Belgium, on 1 through 4 October 1997. The section has been organized by Alan Vince (Lincoln, United Kingdom) and Frans Verhaeghe (F.W.O. and Free University of Brussels, Belgium). For sheer practical reasons, the section grouped a number of contributions related to different kinds of finds, their production and technological production processes and developments, and their consumption.

The present volume offers a collection of pre-printed papers, a number of which were presented orally and debated during the sessions of section 07.

Unfortunately, a number of contributors to this section did not submit a text in time for inclusion in the present volume while other colleagues could not attend and present their contribution. In a few cases, texts were graciously made available for inclusion in the present volume but could not be presented orally due to the large offer of papers or because the colleagues could not attend the conference. All this explains why the general structure and the contents of the present volume do not conform in all details to the programme of the conference. Nevertheless, the volume has been organized keeping in mind both the complexity of the subject and the general lines of the structure of section 07 of the conference as originally proposed by the organizers. The texts available for the present volume have therefore been grouped in three main sections, which at the same time largely reflect the current concerns and state of research in the archaeological study of the medieval and later finds:

- the first section groups a substantial number of papers under the general heading *Production: technology, production processes, organisation, workshops and artisans*. These papers concern a whole range of aspects directly related to the production of goods, drawing on whole range of evidence – archaeological, historical, ethnographical, natural sciences. Because of the very different accents and/or the intertwining of a wide range of topics, it proved next to impossible to order them in terms of specific subjects such as the role of the artisan, the organisation and functioning of workshops, etc. Within this section, the contributions have been therefore been ordered according to the kind of materials discussed, *i.e.* metal, ceramics, glass, bone, wood and textiles
- Aspects of consumption are discussed in a series of contributions brought together under the heading *Consumption: patterning the use of objects*. These contributions generally raise broader issues related to patterns of consumption, ethnicity, social strategies in the use and manipulation of objects, the relations between different kinds of objects, etc.
- The section called Basic data gathering groups a series of contributions which discuss or asses the present state of primary research on specific categories or assemblages of finds, either on a regional or supra-regional level or on the level of specific sites. They have been grouped on the basis of the kind of material concerned: ceramics, glass, and metal.
- Two special workshops were organized and focused on specific categories of objects, the first one being *toys and games* and the second one being *architectural ceramics* (including tiles, bricks, stove-tiles, etc.).

Of necessity, the papers are rather short and the volume of course does not do total justice to the many studies and the wealth of other types of research work concerning material culture and finds. Thus, for instance, quite a few specific categories of finds or components of material culture as it is used here are absent from the picture. Furniture other than ceramics is but one example. Similarly, jewellery, textiles, dress accessories, wooden household utensils, food and many others are – if not totally absent – strongly under-represented. Nor does the volume provide a complete overview of the results attained and knowledge acquired. Nevertheless, the 50-odd papers included in the present volume emphasize the continuing importance and vitality of the study of medieval and later material culture while at the same time providing a good idea of the potential and of the present state of the work in this particular field of research. They also reflect both the complexity of the subject, the present trends and the recent developments in terms of approaches. This is even more true when the volume is considered within the context of the other volumes in the present series of volumes linked with the MEDIEVAL EUROPE BRUGGE 1997 conference and when the reader takes into account that the world of material culture is also very much present – directly or indirectly – in these other volumes. Indeed, as said earlier – and as with the other themes discussed at the Brugge conference – the subject of material culture cannot and should not be divorced from the many other concerns of medieval and later archaeology. The sheer complexity of the subject entails inevitable links with many other topics presented and discussed within the context of the other sections of the, among them trade and exchange (section 03) and environment and subsistence (section 09). Nor should the issues raised within the context of sections 10 (Method and Theory in Historical Archaeology), 05 (Art and Symbolism) or 08 (Travel Technology and Organization) be forgotten. At the same time, all the objects discussed in the present volume were part of life in the different types of settlement discussed in the other volumes of the present series. Taking into account the sheer mass of evidence and the potential information – including not only the data concerning technological developments and innovations but also those related to the social and spatial patterning and the behavioural interpretation of often though not always somewhat humbler objects – material culture (even in the restricted sense used here) deserves the effort.

Frans Verhaeghe & Guy De Boe



Metal Analysis in the Middle Ages

Introduction

The determination of the metal content of ores is a need as old as man's encounter with extractive metallurgy. The development of a structured system of chemical methods to this end is, however, a rather recent achievement, probably not older than half a millennium. This system served in a fundamental way the development of modern scientific chemistry, together with technical expertise gathered mainly by the alchemists. The most comprehensive and non-obscure of the early sources on this subject is book VII of Georgius Agricola's opus magnum *'De re metallica libri XII'*. Here, Agricola provides us with a highly developed system, which is clearly rooted in older knowledge. What are these roots, and how deep do they reach?

While much has been written about the alchemists as inventors of analytical procedures, the role of mining and metallurgy in this context is less well studied. The aim of this paper is to point to some promising avenues of research into this field rather than to give ready-made answers. In this paper, 'analysis' is understood as any chemical method that allows the analyst to determine the metal content of a given material by treating a fraction only of the total, in a manner that is reproducible, rational and reliable. Hence, fundamentally inherent features of analysis are principles of physics, statistics and mathematics, of weighing, sampling and calculating, as developed e.g. by Nicolaus von Kues, known as Cusanus, in the middle of the 15th century. These non-chemical aspects are not, however, dealt with here.

The aim of this paper is to set the frame within which metals analysis developed in response to individual needs during the Middle Ages, eventually merging to a complex system of general coverage and validity. I would like to emphasize, however, that the following is very generalised and in part oversimplified. Both the economic and the technological aspects of mining history are much more complex than it may appear here.

The early need for analysis in metallurgy

Ancient metallurgy has many different facets, from smelting to alloying, casting and working to recycling and refining, with accordingly many different needs and skills. Analytical knowledge is particularly essential for mining and extractive metallurgy, *i.e.* the production and smelting of ore, for monetary metallurgy, for alloy control, and for the metals trade. Analysis becomes, very generally speaking, more important with an increasing variability of supply, *e.g.* through complex trade networks or changing metal sources, when experience and tradition alone are no longer a sufficient base on which to make decisions.

Mining and Extractive metallurgy: The concept of fire assay

One may think of the dawn of metallurgy as a period when rich ores were plentiful, readily available and easily accessible to early man. This golden age will not, however, have lasted for long, since we have evidence for tedious underground mining of poor ores from as early as the Chalcolithic period (Weisgerber & Pernicka 1995), and continuously since then. The quality of the ores of most metals could, however, probably be judged by eyesight alone, which will thus have been the first 'analytical' tool. Based on the experience that a mineral of a particular appearance (colour, cleavage, density, etc.) is bound to transform into copper, lead or other metal when smelted properly, the basic question in early mining was that of the richness of an ore, *i.e.* the content of rich mineral relative to waste rock, the effort necessary to get it out of the ground, moved to the smelter and complemented with charcoal.

In cases where the economically important metal was not obvious, like in argentiferous lead ores, simple experience with a particular deposit may have told whether the ore was worth mining and the additional desilverizing treatment or not. Many galena-

dominated deposits have irregular silver values, varying by orders of magnitude from one patch to the next (see for instance Bartels 1992). Even in such cases however, large scale, in particular state-controlled, mining operations, as with some Roman mines in Spain or Britain, may possibly have been run profitably in the long term, with rich and poor ores being mined and smelted altogether without analytical control. One has to be cautious however with this statement, since we have no indication as to what sort of quality control of the ore was done in the lead mining areas of classical Antiquity. The possibility that analytical procedures in the above-mentioned sense were used cannot be excluded, for we cannot prove the absence of something ('absence of evidence is not evidence of absence'). It seems plausible to assume that such quality control was conducted by test or trial smelts. With no clear reduction in size however this is not considered 'analysis' in the sense used here. Mining and metallurgy in Central and Western Europe apparently faded away with the decline of the Roman empire with but little continuity in north-eastern areas of Europe (Bartels 1996). This hiatus will have affected specialised techniques even more than common knowledge, and as a result we have no means to extrapolate from later periods to earlier ones.

In medieval mining, we face a very different economic situation, with predominantly small scale operations by independent miners (Bartels 1994) often without the resources to cover periods of failing income. Under such conditions, an irregular deposit could be mined only if the silver content of the ore was closely controlled, enabling the selective winning of the rich parts only and avoiding ore below the cut-off. Here at least, there clearly exists a need for some sort of analysis, but still the traditional, macroscopic methods will have been suitable to detect the rich mineral. The small size of operational units and their restricted economic possibilities will have limited the actual application of sophisticated analytical methods; analysis however developed mainly as a means to control and predict the subsequent smelting operations (Bartels, pers. comm.).

The period of mining by small groups or even by individual miners came more or less to an end in Central Europe in the late Middle Ages, marked by a widespread crisis in the mining areas like the Harz mountains, the *Erzgebirge*, etc. in the mid-14th century. The traditional system comprised self-employed miners, carrying their individual ore to the smelter and being rewarded with their individual metal. This was generally followed by a system of employed miners being paid for their work irrespective of the actual ore mined. This of course required highly

organised, capital-intensive investment groups, controlling the entire system from the supply of the mining and smelting areas with consumables and auxiliary materials up to the distribution of the metal throughout Europe, often based on long-term contracts, loans and debts (Stromer 1984, 51). These entrepreneurs, often with first-hand knowledge of and experience in mining and metallurgy, of course needed reliable data on which to base their decisions on invested capital. In the course of these developments, but particularly with the decrease of rich mineral and the necessity to mine low-grade ores (Bartels 1992), analysis became more and more important also to characterise and evaluate this ore, beside its continuing role in controlling the smelting operations.

In the heyday of this system, by the time of Georgius Agricola and Lazarus Ercker in the middle of the 16th century, fire assay was obviously common practise for a wide range of minerals and rocks. L. Ercker (1580, 70) informs us that at Kuttenberg (Kutna Hora) at his time more than 200 tests for silver were done every week. Agricola devotes the entire book VII of his *'De re metallica XII libri'* to fire assay and analysis, apparently based on a bundle of somewhat earlier, but poorly organised and less comprehensive booklets (*Berg- und Probierebüchlein*) on the same topic. By then, every known substance could be analysed in any raw, intermediate or finished material. The sophisticated and elaborate level of the recipes given and the chemical methods available suggest a rich tradition and long-lasting practice. It should be mentioned, however, that Agricola deems it necessary to state explicitly that 'The method of assaying ore used by the mining people, differs from smelting only by the small amount of material used. Inasmuch as, by smelting a small quantity, they learn whether the smelting of a large quantity will compensate them for their expenditure ... Both processes, however, are carried out in the same way, for just as we assay ore in a little furnace, so do we smelt it in the large furnace. Also in both cases charcoal and not wood is burned. Moreover, in the crucible when metals are tested, be they gold, silver, copper, or lead, they are mixed in precisely the same way as they are mixed in the blast furnace when they are smelted.' (Hoover & Hoover 1912, 220-2). This virtual identity of reduced and full scale processes apparently needs repetitive explanation and stating. Shall we take it as an indication that the idea was not too old in Agricola's time but still needed to be spread, or does it just reflect the non-specialist readership aimed for by Agricola?

In terms of cognition theory, we have here a situation in which innovation was achieved by down-

scaling an industrial process to the laboratory, *i.e.* the analysis mimics the process.

Monetary metallurgy: The analysis of silver in copper and the liquation process

During the early stages of coinage, in the first millennium BC, the need for analysis was restricted to the determination of the silver and copper content of gold and silver alloys. For gold, a perfect method for this was found in the touchstone (Oddy 1993), in regular use until today. Later, with the debasement of silver coinage in Imperial Rome, methods were developed to extract the silver content from such alloys: not only cupellation (Bayley & Eckstein 1996), in use since the Early Bronze Age, but also a slag-forming initial refining step to condition the scrap metal (Rehren 1997a). It would be interesting to see how commonly this refining and refining was done by the Roman mints, and how the debasement of coinage was controlled. Did they just add more base metal when remelting old coinage, or had they to refine the silver first to produce a new alloy by fusing weight amounts of pure silver and copper/bronze? The variability in composition and fineness of 3rd and 4th century debased coinage (see for instance King & Northover 1993) points to the first solution rather than to a closely controlled procedure.

During the late 15th and early 16th century, the liquation process was developed to extract small amounts of silver (below the one percent level) from raw copper metal (Suhling 1976). Stromer (1995) relates the development of this highly sophisticated process to the ability of late medieval (mid-15th century?) mint masters, experienced in the analysis of coins for precious metals. While Stromer shows this by demonstrating that the first liquation factories were established and run by mint masters, and by the introduction of legal regulations trying to suppress the extraction of copper coins from the circulating currency for liquation, there is also a reasonable metallurgical link.

The method to analyse coins for silver could only be by cupellation, *i.e.* by melting of the metal with an excess of lead which takes up all silver present, followed by a hot oxidation of this cupriferous lead to lead and copper oxide, 'litharge', which takes all the impurities with it, leaving only the noble silver (and gold) in the metallic state. With major copper contents in the metal however, this millennia-old, highly effective - even for modern standards - quantitative method suffers from serious problems due to the loss of silver, dissolved into copper oxide, into the litharge (Bayley & Eckstein 1996). Therefore, even silver-

rich copper ore or metal cannot be satisfactorily worked for silver. In fire assay, a huge excess of lead (about four to five times as much lead as copper metal) is used to obtain reliable results: an impossible strategy in the case of mass production. In the liquation process, this problem is overcome by separating the argentiferous lead from the copper in the metallic state while simultaneously all the silver is transferred from the copper to the lead phase, before the lead only is subjected to cupellation.

To transfer this process from the individual coin scale to the massive, raw copper scale, it is necessary to realise the general identity of small-scale and large-scale processes. Who is more liable to develop this concept than mint masters, used to splitting huge metal charges into small individual pieces of identical composition, *i.e.* coins? With a certain coin composition required, only a few coins of each issue had to be tested by analyses to check for quality and homogeneity of the entire series. Rethinking this principle from the other end automatically leads to the idea of a 'sample' as being representative of the whole, one of the basics of analysis as outlined above. When melting copper coins in a crucible with added lead metal, the mutual immiscibility of the two metals in the solid state one day must have become obvious: either by accident or by experimentation. Who was the first to draw the crucial conclusions from this?

In terms of epistemology, it is noteworthy that in this case we have innovation by upgrading a laboratory method to an industrial process, *i.e.* exactly the other way around when compared to the previous example.

Metals trade: cupellation of lead

One of the most important auxiliary materials in extractive silver metallurgy has been lead; the Phoenicians already imported lead to smelt lead-deficient silver ores on the Iberian Peninsula, as probably did the Romans when they took over the mines in southern Spain. During the Middle Ages, the rich silver ores mined in Central Europe also required tremendous amounts of lead to be smelted and refined, often beyond the natural lead content of the mineral itself. We are well informed on the late medieval and early modern lead trade, with ten of thousands of hundred-weights of lead per year being transported from Poland, Goslar, Westfalia and even England to the mining centres in Saxony, Bohemia and Hungary (see the cumulative work of Molenda, Kraschewski, Blanchard, Bartels and others). Usually, this imported lead came from deposits low in silver,

like in Westfalia, or even virtually silver free (Karinthia for example). Other lead mines, however, produced metal that in itself contained almost economically extractable amounts of silver, and this silver was regularly included in the price calculations for the lead: beside taxes, tariffs, etc. (Kraschewski 1990, 15). The metal price was usually fixed in long-term contracts. Was the supposed silver content just fixed once, or to which extent was it regularly controlled over the duration of the contract? The silver content may initially have been known from experience, or it could have been determined by 'trial smelts', *i.e.* smelting operations on a scale of 1:1. During the 16th century at the latest, certainly small scale samples were taken and analysed on the 'test' or cupel. In any case, the figure had to be determined on a regular, reliable and reproducible basis, trustworthy for both the buyer and the seller. How far can this price factor, evident from contracts, tax registers, etc., be traced back to the Middle Ages?

Alloy control: The analysis of lead and zinc in brass making

A situation very different from the above-mentioned one prevails in the case of brass. This predominant copper alloy of the Middle Ages is essentially composed of copper and zinc, the latter being unknown as a metal in Europe prior to the 16th century and not frequently available prior to the 18th century. Accordingly, brass could not be produced by fusing the metals together like in the case of bronze, but was made by treating copper metal with galmei, a pale, earthy ore rich in zinc carbonate. Through much of history, brass making was hence understood as colouring the copper, rather than as alloying. This misconception finds its early expression in the – false – Roman interpretation of the originally Greek work 'ορει-χαλκος' (copper of the mountain) as 'aurichalcum' (golden copper), and is later followed also by the medieval metallurgists. Alloy control must have been difficult: how to analyse for an unknown substance?

Here, medieval analysis clearly reached its limit. None of the contemporary sources provides us with any means to determine the zinc content in brass, and it is probably only Lazarus Ercker in the mid-16th century who realises the relation between 'Ofengalmey', condensed fumes of zinc and lead oxides in the upper parts of copper smelting furnaces, and a strange metallic substance (called 'Contrafeht' by him) dripping from some furnaces, which can be used for making brass! Though the increase of weight in brass production was recognised soon afterwards

(Löhneyß 1617), we have no indication whether this was used to control the quality of the brass making process, or to analyse the zinc content of given brass, *e.g.* by determining the loss in weight when melting the alloy under slightly oxidising conditions.

An early example of medieval methods for the determination of the composition of copper is given by Theophilus, who not only describes how to produce brass, but also informs us that lead-rich brass is less suitable for gilding, and hence suggests that the copper should be refined before it is used in brass making. Though the 'analytical' technique used is not based on chemical methods, but on the working behaviour of the metal, the refining procedure is a proper chemical process. He advises to melt the copper in an open clay-clad iron pan and to direct a blast of air over the liquid metal. When the lead starts burning, wood ash is to be added to bind the lead oxide and to facilitate its mechanical removal. The refined copper then had to be tested again, and the refining repeated if necessary (Hawthorne & Smith 1963, 144-5). It is certainly easier for Theophilus to judge the quality of a metal by cold working than by melting it and to observe the formation of a slag or dross. The fundamental experience and insight into metal chemistry, necessary for the development of chemical analysis during later centuries, is, however, apparently present already at the turn of the millennium. The description given by Theophilus finds its precise archaeological confirmation in slags and crucibles from two sites at Dortmund (Rehren *et al.* 1993) and Soest (Rehren in prep.), both dated to the late first millennium AD.

It is not only the particular process that is of importance in our context, but the very different concept here as opposed to the Roman view of materials. The different degrees of suitability of various kinds of copper for brass making has been known already to Pliny. His copper types, named after the mining company where the copper was derived from, are in a clear order of quality, which indicates good observation. However, no means are given to manipulate the quality, and such means were apparently not only not known, but almost inconceivable: the best types of copper are long since exhausted, and one has to cope with the material presently available (Plinius 1985, 9). The medieval concept is significantly different: the material is not chosen passively, but consciously conditioned for the intended purpose!

A juxtaposition of alchemy and metallurgy

The development of a complex and versatile system like analytical chemistry with all its inherent new principles and concepts is not the achievement of one

man, and not even possible within just one generation or faculty. Beside metallurgy, fundamental input came from other applied crafts and fields like early pharmacy, but also the arts and even from the much different, theory-based world of alchemy. Though an adequate discussion of the role of alchemy for the development of analytical chemistry (Lazarus Ercker [1580, 42] for instance states: '*Das Probieren ist eine gar herrliche, alte und nützliche Kunst, erfunden vor langen Zeiten ... von den Alchimisten*') is far beyond the aim of this paper, its position in relation to early metallurgy shall be considered here briefly.

The determination of the presence of a particular metal (qualitative analysis) and its relative concentration (quantitative analysis) are fundamental issues in alchemy, when the quality and 'quintessence' of a metal has to be judged, and the results of attempted transmutations have to be checked. This analytical approach closely matched the profane metallurgical needs, and much of the practical methods and recipes later used widely in metallurgy were originally developed and refined by alchemists. Major discrepancies however remained insurmountable. Alchemical work usually was deeply based in a theory fundamentally different from our present understanding of the material world, and in unconscious controversy to the methods used to prove its attempted working. Accordingly, theoretical considerations and practical observations were rarely compatible. In contrast, the metallurgist followed a mere practical approach, much less concerned with philosophical issues. Accordingly, he was much more bound first to realise and later to rely on the reproducibility of his work. Hence, it is no surprise that the principles of modern experimental and analytical chemistry owe much more to the early people involved in the applied crafts than is often assumed. The relation between the alchemist and the metallurgist was not, however, always free of controversy. Agricola, one of the foremost representatives of the Renaissance scholars, clearly expresses his low opinion of the alchemists:

'These masters teach their disciples that the base metals, when smelted, are broken up; they also teach the methods by which they reduce them to the primary parts and remove whatever is superfluous in them, and by supplying what is wanted make out of them the precious metals – that is, gold and silver, – all of which they carry out in a crucible. Whether they can do these things or not I cannot decide; but, seeing that so many writers assure us with all earnestness that they have reached that goal for which they aimed, it would seem that faith might be placed in them; yet also seeing that we do not read of any of them ever having become rich by this art, nor do we now see them growing rich, although so many nations

everywhere have produced, and are producing, alchemists, and all of them are straining every nerve night and day to the end that they may heap a great quantity of gold and silver, I should say the matter is dubious' (Hoover & Hoover 1912, xxviii).

There were however also fruitful links between alchemy and metallurgy, particularly when both interests met in one person. An example of this is Wolfgang II of Hohenlohe, who's biography is given by Weyer (1992). Wolfgang possessed his own laboratory in the basement of his castle, where he found distraction from his daily duties in alchemical work. Though the idea of making gold by transmutation was not his main concern, he did not entirely ignore it either. Accordingly, Wolfgang was well experienced in cupellation techniques, and was asked at several occasions by a relative of his to test ore samples for gold and silver.

The archaeological evidence

The examples given above are mainly based on written sources, which are often – at least since the late Middle Ages – much more precise than archaeological material. On the other hand, written sources provide us only with a limited, if not selective fraction of the full evidence. Archaeological excavations can add significantly new information to this, particularly if supplemental material becomes available. Probably one of the best examples for this is the excavation by Sigrid von Osten (1992) of the Renaissance manor house Oberstockstall in Lower Austria. In the basement of the main building, a pit was discovered containing almost an entire inventory of an alchemists laboratory, apparently dumped there in one traumatic act. The material includes about 100 cupels, more than 300 crucibles of various types, plus abundant glass and ceramic vessels for wet chemical preparations, and various minerals and materials used in the lab. Though the full wealth of this material still needs to be explored by comprehensive scientific studies, it is already evident that it covers a good deal of the recipes given by Agricola and Ercker, contemporary to the date of deposition of the material within some twenty years (von Osten 1992). A preliminary survey of some cupels (Rehren 1997b) allowed to find out where the practice matched the recipes, and where discrepancies were obvious. Size and function of the cupels for example follow closely the system suggested by Ercker (1580), while the quality of the material used to make these cupels does not reach the high standards recommended.

Another potential of archaeological material lies in the discovery of crucibles and cupels from places

and times not covered by written sources. Urban archaeology in particular can thus provide information above and beyond the documentary evidence. Nothing was known about metallurgical activity in medieval Dortmund until huge layers tremendously rich in slag and brass making crucible fragments (Rehren *et al.* 1993) were uncovered, dating from the late first millennium AD. Other finds of possible significance for early analysis (particularly cupels, predating the Renaissance by one or two centuries) are known for example from Pymont in France (Jeanjacquot 1993).

Conclusion

The 16th century knows a highly developed analytical system for mining and metallurgy, culminating in the works by Agricola and Ercker, and lasting for centuries. The information given by these sources is closely paralleled by archaeological evidence from contemporary sites, demonstrating the use of the full range of methods, tools and materials given by Agricola. This highly developed state of the art cannot possibly be the work of one generation, but most certainly owes much to earlier developments. The interpretation of documentary evidence, mostly of legal and economic character, but also archaeological finds, indicate that already during the 15th century there had been a regular use of analytical methods, integrated into the dawn of the age of rationalism. It will be a future collaborative and interdisciplinary task to further locate and characterise these early roots, by natural science, archaeological and historical means.

Acknowledgement

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Archaeological Investigations to the Beginning of Blast Furnace-Technology in Central Europe

A preliminary report

The first steps of the pig iron-technology still constitute one of the great miracles in the long 3000 year-tradition of iron-making. It is not yet clear when, where and how the transition from the bloomery iron- to the pig iron-technology was made for the first time. We know, that pig iron was occasionally produced in the Ancient World and on a larger scale in Old China. However, it has still to be explored whether this knowledge was handed down through technological experience or whether it was reinvented in medieval Europe.

The early blast furnaces are rooted in the times of the bloomery-furnaces. In these small furnaces ('Rennöfen') and in the larger 'Stücköfen', iron was produced in a direct, reduced, discontinuous process as low-carbon bloom ('steel'), 'soft-' or wrought-iron. In the 'Floßöfen' and 'Hochöfen' (both a specific type of blast furnaces, *i.e.* high furnaces), iron was produced in an indirect process as high-carbon, hard- or pig-iron, later as cast iron. Pig-iron had to be transformed into wrought iron by a separate process ('Frischen'), which required some additional technical installations ('Frischherde') and buildings.

Making pig-iron demands a very high temperature (more than ca. 1300° C) to smelt the iron ores with charcoal into iron. It is impossible to produce this temperature with the traditional hand- or foot-powered bellows. The new pig-iron technology is based on the use of water-power. Big wooden wheels, powered by water, moved great wooden or leather bellows, mostly a pair of bellows, which pressed the air through a hole into the smelting room of the furnace. Therefore the pig-iron industry is embedded in a major system of land-use, *i.e.* the building of mill-ponds, mill-dams, mill-races and mill-trenches.

In Central Europe water-powered mills became essential elements of the landscape from the Carolingian period onwards. The application of this system in the smelting process represents a younger development in the Middle Ages. It started some centuries later, according to some rare written records in the early 13th century AD.

It is not yet clear at which time the spread of the use of hydraulic technologies in smelting started and in which regions of Europe the oldest water-powered blast-furnaces were situated. In the earlier 1990s, only two regions were known where the invention of the indirect iron-making process could have started: the 'Märkische Sauerland', a mountainous region in the West of Germany, and the 'Norland', a region north of Uppsala in the Middle of Sweden. In the middle of 1990, a new region was added: the 'Schwäbische Alb' in southern Germany. The dating of the archaeological remains in these three regions ranges from the 11th/12th to the 15th century AD.

The present paper will report on our newest investigations in the region of the 'Märkische Sauerland', a historical iron-working landscape of Germany, the forerunner of the well-known 'Ruhrgebiet', the major region of iron-making based on the use of the coal.

The 'Märkische Sauerland' is a very mountainous region with large forests, high plateaus and deep valleys. It is an eastern part of the variscisc 'Rheinische Schiefergebirge'. In the Middle Ages, most of it was part of the 'Grafschaft Mark'. The political power of this dynasty was based mainly on the exploitation of the natural resources, especially iron and iron-making. In the region, we can distinguish two main periods of iron-making. The first one is the time of direct iron-making, the period of the 'Rennöfen' (bloomeries) from the 7th-12th/13th centuries AD. All sites were situated on the upper reaches of small rivers, near and on springs and on high plateaus. The second period – the period of the 'Massenhütten', a local name for the first blast furnaces – has to be dated to the late Middle Ages and the early Modern Age. It is characterized by the removal of the older sites of iron production to the middle and lower reaches of the rivers and the use of water-power. As a consequence, this form of iron-making – the water-powered process – was possible only in the form of the manorial system (lords of the manor, monasteries, etc.)

Based on extensive investigations in the last two decades (M. Sönneken), an interdisciplinary project

has been developed and supported by a major grant of the *Volkswagen-Stiftung Hannover*. Members of this project are the *Seminar für Ur- und Frühgeschichte* of the *Westfälische Wilhelms-Universität Münster* (Albrecht Jockenhövel), the *Westfälisches Museum für Archäologie, Amt für Bodendenkmalpflege* (Bendix Trier, Christoph Willms) and the *Max Planck-Institut für Eisenforschung Düsseldorf* (the late Dietrich Horstmann) The project is titled 'Eisen- und Stahlerzeugung im märkischen Sauerland. Eine Produktionskette von der Rennfeuerverhüttung bis zum Beginn des Osemundfrischens (ca. 800-1600 n.Chr.)'.

Our report is a preliminary review of our latest excavations of two blast-furnaces in the valley of the Kerspe river, south-west of the town of Kierspe, near Meinerzhagen/Lüdenscheld.

During the restauration of the dam on the Kerspe river, the water was let out. On the surface and at a distance of ca. 25 m from one another, two sites of iron smelting appeared. Based on geophysical measurements, it was possible to locate the remains of two furnaces and some surrounding equipment. The excavation was done in summer 1996. The investigated area covered 325 square meters. We found indeed two very well-preserved blast furnaces.

Both 'high' furnaces had been erected with their backside towards the slope. They were intact up to a height of 1.25 and 1.75 m. The main building material was loam, found on the spot. Only a few stones had been incorporated in these buildings. The outer diameter of the two furnaces is ca. 3 m. On one side of the 'high' furnace No. 1, the hole for the water-powered bellows was totally intact. Another stroke of luck was the fact that the hearth ('Gestell') of both blast furnaces was in a very good condition. Unfortunately, the front of the breast had been damaged. Therefore, we cannot say whether the breast had been 'open' or 'closed' ('Blauofen'). But in front of the furnaces, we found the hollow for the tapping of the slags and the pig-iron.

Around and underneath the furnaces, some small trenches for the drainage built of stones were situated. Beside the furnaces, we found the remains of the 'Radstube', the place of the wooden wheel, presumably an overshot wheel. The mill race was also located over a distance of some hundred metres. Above the top of the furnaces, we found the charging-plate ('Gichtplattform') from which the crushed iron ores and the charcoal were fed into the hearth. Some heavy post-holes are the remains of some wooden structures build to protect the furnaces and other working places.

Since any small finds are lacking, we cannot date this very important find place by archaeological

means. The age of the two furnaces has to be dated back to the 13th century AD, based on radio-carbon-dating (Beta Analytic Inc. Miami: Beta 103851-103853).

Taking together another blast-furnace (which we partly excavated in 1995 on the river Wipper), the older excavation of 'Haus Rhade' from the 1960s, with the Jubach-Dam and the two blast-furnaces of the Kerspe-Dam, we now know five blast-furnaces dating from the 13th-16th centuries AD. Outside the 'Märkische Sauerland', only the well-known site of Lapphyttan (Middle of Sweden) gave us another preserved 'high' furnace. Unfortunately, we do not know the type of the furnace from the 'Schwäbische Alb' near Metzingen,; we have only the slags of the pig iron-process.

In the present state of research, it is too early to say that only these three regions may have had the priority of the invention and use of the pig-iron process. Unfortunately, the written records of the High and Late Middle Ages do not give any information on these subjects. However, we think new archaeological investigations have to be started in more 'innovative' regions of Europe, like Upper Italy, Burgundy or France, to find comparable sites. And we have to look at the mobility of the late medieval society which favoured the spread of new technologies in an international network of dynastic alliances, the spread of monasteries, warfare, crusades, pilgrimages, international fairs, etc. We will not exclude the possibility of an as yet unknown influence from outside of Europe, perhaps of the much older technology of Old China, transferred during the 12th/13th centuries in the course of migrations from East to West (*i.e.* the 'Golden Horde', etc).

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The bronze industry of medieval Scandinavia – the evidence and the social position of the artisan

The lack of socio-economic studies

Thanks to the last forty years of archaeological research, many production sites and waste products have enriched our source-material related to the medieval bronze industry. This has not, however, led to a very wide-ranging knowledge of either the artisans or the role of the craftsmen in medieval society. Up to now research concerning the high and late medieval period has focused on technical topics concerning metallurgy and on chronological questions.

The archaeological evidence

Representativity

Broadly speaking, the medieval foundry sites can be divided in three categories: *sites for the production of jewellery and other small objects*; *cauldron-foundries* and *bell casting-pits*. The casting technique used for the production of small objects was more or less the logical sequence of an uninterrupted tradition of crafts tradition since the prehistoric period. The larger objects such as cauldrons, jugs, mortars and candlesticks, which in part required a new technology, were to a very large extent produced in separate urban foundries. The written sources allow us to make an estimate of the average number of metal-casters per town. A medium-sized medieval Swedish town would have had only one cauldron-founder (potter), one or two pewterers and a few girdlers, the latter making buckles and mounts. Considering that most towns at any point of time must have had at least one or two workshops of metal-casters, it is perhaps a little surprising that only a few sites have been identified archaeologically. In some cases, the often massive residual deposits from the workshops, fired clay, ash and charcoal, have possibly been wrongly interpreted as destruction layers and may therefore have been machined away. To the third category – that of the bell casting-pits – belong a relatively large number of excavated sites. These remains have been ob-

served and documented partly because of their locations, although these have also led to most of the structures being badly preserved. The majority of the church bells were cast at the site of their intended use, probably for practical as well as ritual reasons. Since the bell-pits are usually situated within the churchyard or even inside the church walls, they have often been identified and interpreted correctly. Unfortunately, often only one – the mould-pit – of the two parts of the casting structures is preserved. The other part, the furnace, was built at a higher level and was as a consequence usually destroyed shortly after it had been used.

A brief compilation of excavated Scandinavian bronze-founding sites (fig. 2) follows below.

Casting of small objects

The *Helgö*-excavations yielded a vast amount of evidence including workshop structures and thousands of artefacts dated from the fifth to the eighth century (Holmqvist 1972; Arrhenius 1973a; Lamm 1977; Waller 1996). Migration period casting activities were recorded on the rural site *Gene*, as well as on several other late Iron Age sites (Rahmqvist 1983, with references). The non-permanent as well as the (semi-)permanent phases of the trading place close to *Åhus* included bronze-founding (Callmer 1991). The same is valid for the trading site at *Lundeborg* (Thomsen 1991). Excavations in *Ribe* have produced important information regarding Viking Age casting (Brinch Madsen 1984) as did the investigations in *Birka*. The casting waste and workshops in *Birka* have been dated to the eighth and ninth century (Arrhenius 1973b; Jakobsson 1996). Several decades of archaeology in *Sigtuna* have resulted in a number of findings related to bronze-casting (Nordin 1993) mainly from the pre-1200 period and almost exclusively deriving from the casting of small objects. The material from *Lund* includes thirteenth-century tools and several workshop-findings: jewellery workshops (c 1100-1400), multi-occupational foundries (1000-

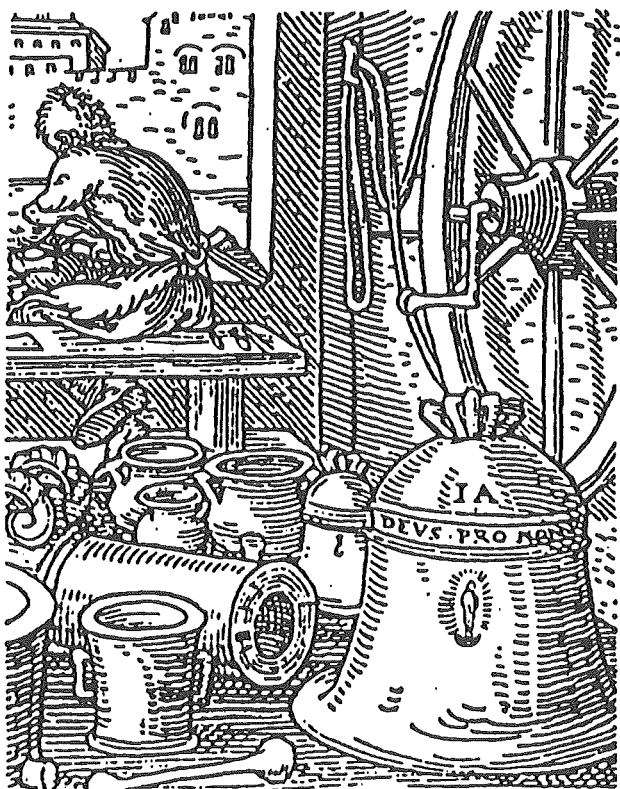


Fig. 1. - Indoor picture of a sixteenth-century(?) bronze-foundry. The counter-window in front of the founder could be symbolic of one of the main issues of this paper – the interplay of artisans and society (Jost Amman, *Das Ständebuch*, Insel-Bücherei nr 133, Leipzig).

1200) and twelfth-century buckle-production (Mårtensson 1972; Bergman & Billberg 1976; 1978; Johansson 1993). *Trondheim* is also represented with a relatively large amount of material; five workshop areas dated 1025-1175 have been published (Bergquist 1989; Nordeide 1994). The extensive excavations in *Oslo* have so far only revealed little evidence for casting, dated c 1100-1150 (Faerden 1990; Schia 1990, 8). A non-permanent, possibly pre-urban eleventh-century workshop has been excavated in *Västerås* (Annuswer *et al.* 1990).

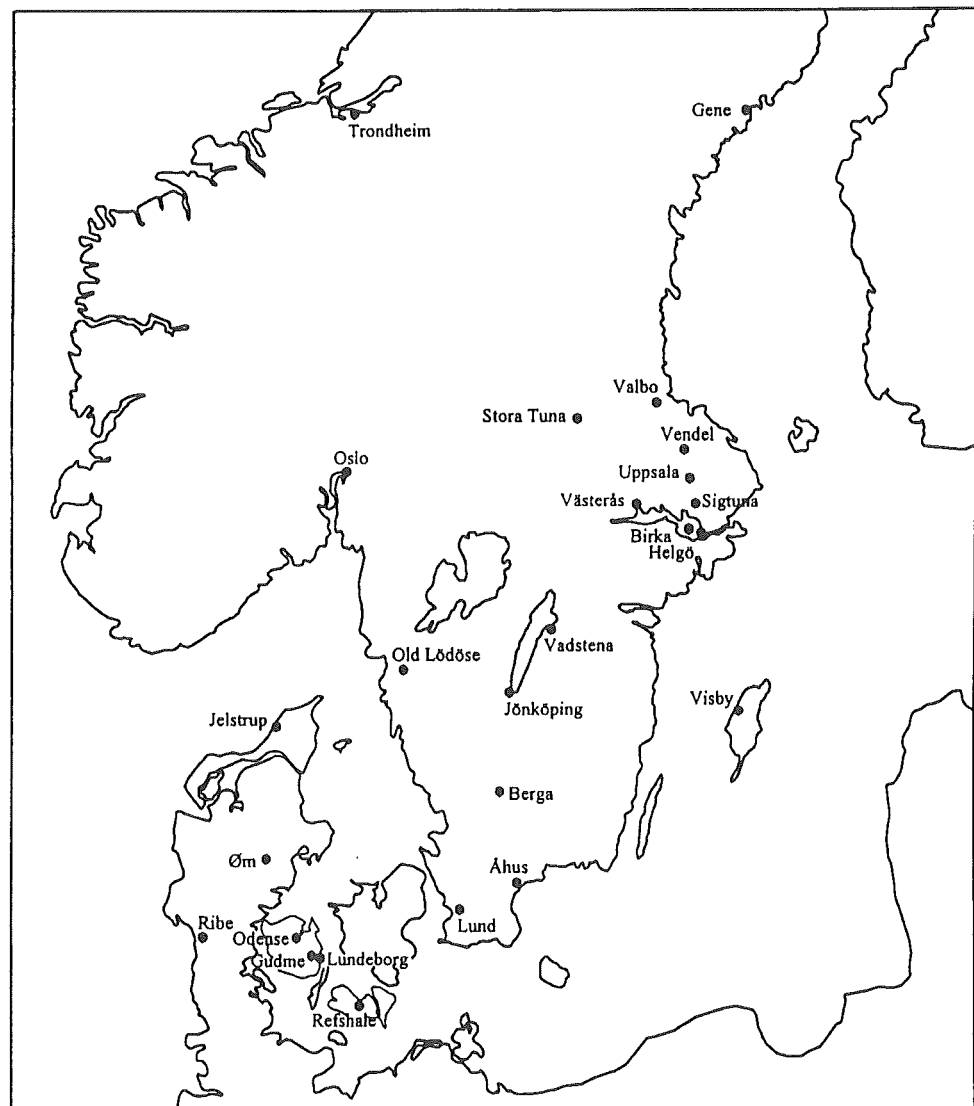
Unavoidably, we have to comment on the fact that almost every finding relates to production before c 1250. Why are later workshops for the production of jewellery, buckles, mounts and pins missing? It is true that the way of dressing changed drastically after the early medieval period and that the earlier jewellery and types of dress accessories went out of use – but new types replaced these. The demand for buckles and mounts etc. grew during the Middle Ages. Perhaps the discrepancy can be partly explained by the fact that a relatively large number of the published excavations happens to concern towns which have been established at an early date, but other factors must probably be considered too. It is

also true that the Scandinavian archaeology of the 1960s and 70s focused on high medieval deposits, rather than on later strata which were often machined away. On the other hand a considerable number of more recent excavations concerning late medieval and post-medieval contexts have not changed the picture. There have to be other explanations. Did a change towards a more stationary crafts production lead to fewer and more concentrated residue deposits? During the high medieval period a category of simple jewellery, often cast with inexpensive lead-tin alloys, became increasingly common (*e.g.* Egan & Pritchard 1991). Were these objects mass-produced by casting in metal or stone moulds? If this was the case the chances of identifying workshops would be dramatically reduced since the method does not entail the same large amount of waste material as the fired clay-mould method does. This could explain why so few workshops have been located, and it would perhaps imply that inter-regional and/or international trade in this field was more important than previously believed.

Cauldron foundries

Although a wide range of objects were cast, the tripod cauldron appears to have been the main product of the high medieval urban bronze-foundries. For this reason the term *cauldron foundry* will be used for those excavated workshops specialized in the manufacturing of larger objects. In 1972, a deposit including c 5000 cauldron moulds was excavated in *Visby*. The site is probably the first published cauldron-foundry in Europe (Engeström 1973, 1974). The casting has been dated to the late thirteenth century. The second substantial workshop was uncovered in *Odense* in 1979. The foundry, adjacent to a Dominican friary, apparently had a production including cauldrons, church bells and other objects, and was probably run by the friary during the second half of the thirteenth century (Velle 1983, 1988). In 1980 a multi-occupational crafts area was revealed in *Uppsala*, at the *Sandbacken* site. The bronze-working remains consist mainly of early-sixteenth-century mould deposits (Ersgård & Svedberg 1984). The best preserved cauldron foundry uncovered so far in Scandinavia is the workshop excavated in 1990 at the *Pantern* site in *Uppsala* (Anund *et al.* 1992; cf. discussion in Richards 1993, 193-198). This foundry preceded the *Sandbacken* workshop. The *Pantern* foundry is remarkable for several reasons. The structures and the artefacts were very well preserved, the grounds for dating are favorable, and we probably know the names of some of the craftsmen and own-

Fig. 2. - Southern Scandinavia and archaeological sites mentioned in the text.



ers of the workshop. The activities have been dated to the fourteenth and fifteenth century. Analyses have been carried out, regarding the function (Anund 1992) and the structure of the moulds. The mineralogical analysis indicates a very high standard in terms of handicraft (Hulthén 1992). This result concurs with the outcome of the metallographical analysis which points out that the raw material as well as the castings rare of an almost perfect quality (Kresten & Larsson 1995; Hjærthner-Holdar & Kresten 1995).

In addition to the sites mentioned above, substantial foundry materials from several late medieval workshops have been excavated in *Jönköping* (Enbäck 1997). The archaeological evidence from *Old Lödöse* appears to have a high potential (Ekre 1980, 91) although it has not been published in detail. Related but quantitatively more limited material from *Lund*, *Västerås* (two sites), *Valbo* and *Vadstena* (two sites) should be mentioned (Kulturen 1986, 187;

Bergquist 1991; Bergquist & Anund 1996; Tagesson, pers. comm.). The Valbo finding is interesting since Valbo is a rural site. The casting debris possibly indicates itinerant craftsmen working at an upper-class farmstead, a deanery (Broberg 1987).

Bell casting-pits

At least fourteen bell-casting sites have been excavated in Scandinavia, six in Denmark and eight in Sweden. The locations are: *Visby*, *Øm*, *Jelstrup*, *Lund* (three sites), *Berga*, *Odense* (two sites), *Refshale*, *Gudme*, *Sigtuna*, *Vendel* and *Stora Tuna* (Swanström 1977; Velle 1977; Blomqvist 1951; Roslund 1987; Rönn 1996; Åhman 1987; Arentoft *et al.* 1985; Velle 1988; Engberg, pers. comm.; Liebgott 1993; Bäck & Carlsson 1994; Anund 1996; Nordin & Sandberg 1996). Three of the sites might be of special interest: the early (eleventh century) construction

in Lund, the Odense workshop which had a diversified production, and the unusually well preserved late medieval site in Vendel. In Vendel not only the lower section, the mould pit, was preserved but also the furnace. The furnace was a rectangular brick structure on a stone foundation (fig. 3).

Technical reconstructions

Medieval casting technique has been the subject of a considerable amount of discussion, and some of it has been based on the Scandinavian material. Lønborg's combination of theory and practice can be emphasized, together with Engeström's reconstruction of the complicated technique used for cauldron moulds. More comprehensive references regarding early medieval jewellery casting are available in Lønborg 1994. Different types of evidence for bell-casting are summarized in Vellew 1977 (Engeström 1973; Lønborg 1985, 1988, 1994; Vellew 1977, 1988; Anund 1992).

Changing organisation, changing position?

The 3rd-7th century: craftsmen of the petty kings

For several reasons, it is difficult to analyse the position of late Iron Age and early medieval artisans. The organization of crafts was probably closely linked to the organization of society. One basic question regarding the metal-workers concerns the degree of dependence. This is a matter in dispute, and some scholars emphasize the picture of craftsmen being – on the whole – rather free (Lund Hansen 1970, 93; 1975, 115; Straume 1986, 55). Others stress factors indicating a strong dependence upon the aristocracy, the chieftains and the kings (Rahmqvist 1990, 60). Andersson (1995) wants to broaden the scope of the analysis and points out that dependent as well as free metal-workers existed simultaneously. In several of the previous studies, grave material and written sources regarding blacksmiths, goldsmiths and founders are used together. The method could be dubious since these artisan groups could have had different positions in society. The crafts handling precious metals were probably closely connected to the political elite, according to the evidence from several parts of continental Europe (Näsman 1988) and Scandinavian central places of *Gudme/Lundeborg*, *Sorte Muld*, *Helgö*, *Högom*, *Bejsebakken* and *Slöinge* (Andersson 1995, 117 with references). This fact does not, however, necessarily explain the social position of the artisans.

The question of the craftsmen's position in society is probably even more difficult to answer than the separate one regarding their degree of freedom. Several researchers put forward arguments for highly respected artisans (Kjær 1900, 129; Müller-Wille 1977, 193; Arrhenius 1979, 1994, 104; Wicker 1990, 144). Arrhenius points out that the working of precious metals was linked to kings and chieftains, that the goldsmiths possibly were members of these, the ruling families of that society. Arrhenius also stresses the international contacts and influences which are strongly indicated in the results from studies of goldsmith's works (Arrhenius 1994). Rahmqvist (1990) argues that artisans of the Roman and Migration periods were at the disposal of regional petty kings and local magnates, but that the artisans nevertheless had a relatively high status and an important role as the producers of the social and political insignia in metal. In such a system, there would have existed in every petty kingdom workshops in at least two strata. A workshop situated at a site with certain central functions – though not necessarily the political or judicial central place – would have functioned as a 'school' for the regional artisans and possibly also as an innovation centre for the specifically regional object-types. The local workshops, on the other hand, would have been situated at the farms of the lower stratum of magnates (*ibid.*). Free metal workers might have had varying degrees of status depending on that of the group or individuals for whom they produced (Wicker 1990, 160; Andersson 1995, 116). This was perhaps true even in the case of unfree craftsmen. Wicker has suggested that different types of products might have led to different degrees of status for the artisan (Wicker 1994, 146).

The 8th-11th century: craftsmen during the state formation period

As compared to the research carried out regarding earlier periods, studies of the Viking Age and high medieval period have rarely investigated the position of the artisan classes. One of the very few archaeological studies of the artisans' role in society is Christophersen's investigation of antler- and bone-crafts and the urbanization (1980, 1982). The general changes in society during the Viking Age (c 800-1050) and the early Scandinavian medieval period (c 1050-1200) are of vital importance for the understanding of the role of the crafts. The structures are far from clear but the period has been described as an unstable era during which increasingly important private and royal estates were being built up, which in turn created the necessary prerequisites for a kind of

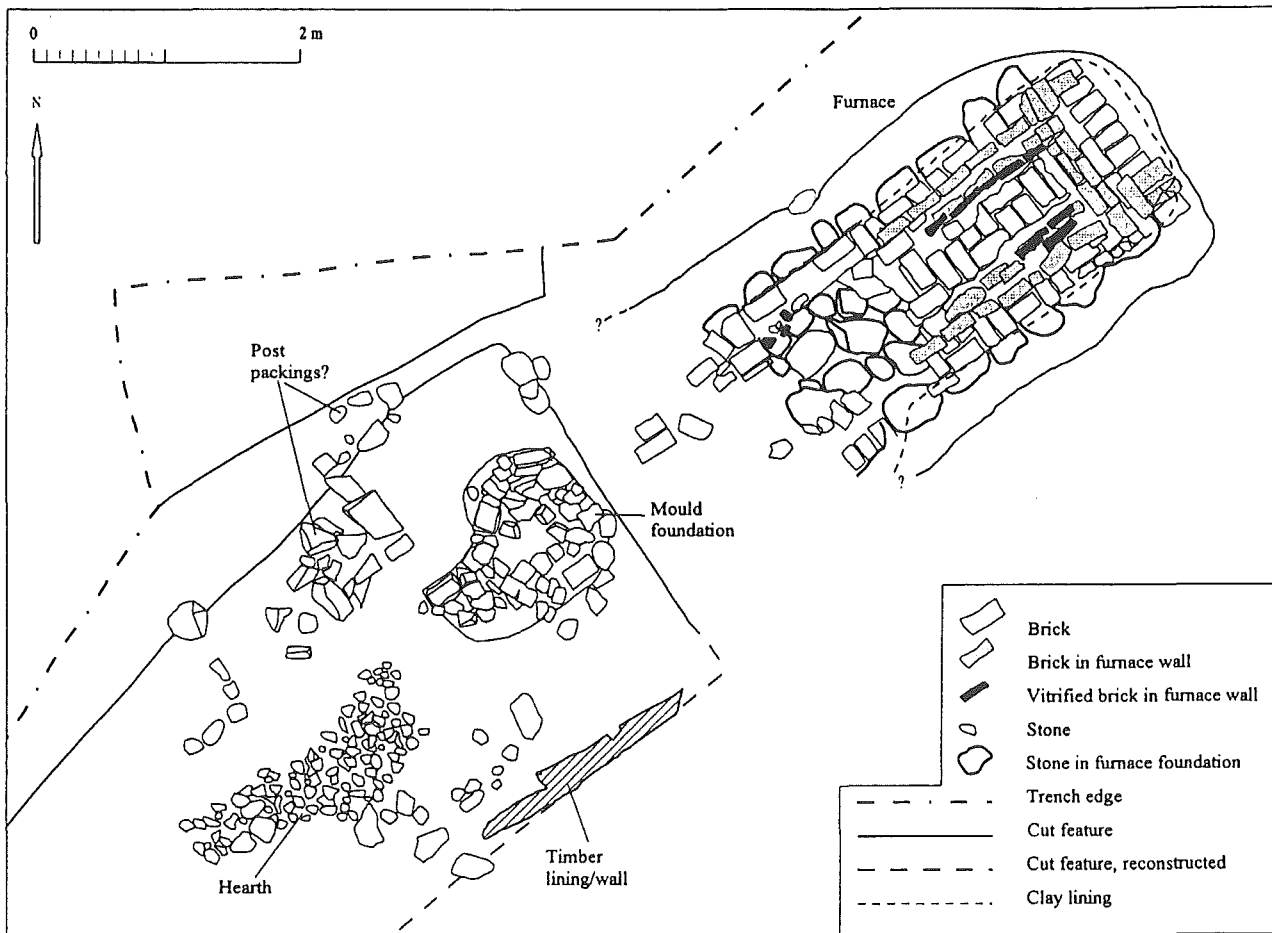


Fig. 3. - Well-preserved late-medieval bell-casting structure in Vendel, Sweden. The site is located only thirty-five kilometres from Uppsala, and the casting was probably carried out by founders from one of the two workshops excavated in Uppsala.

feudalism. The social and economic structures which emerged together with feudalism replaced the horizontal lines of dependence of earlier periods with vertical ties and hierarchies (e.g. Bloch 1978; Gurevitj 1979). The resources of the political elite in Sweden was based on external appropriation, and on control of the flow of valuables by controlling the central places (Lindkvist 1988; Svensson 1996).

The earliest towns were founded and bronze-foundries were obviously important parts of the concept of towns, as seen in the evidence from the new points-of-control in Birka, Ribe and Hedeby – and somewhat later in Sigtuna, Lund, Trondheim and Västerås. There is almost no evidence for bronze-casting in rural contexts during this period. The basic agrarian production was carried out partly by an important class of freeholders, partly by farmers who for varying reasons and in varying degrees were dependent on the magnates (Christophersen 1982a). Clean-cut lord-vassal relationships did probably exist only between the king and the members of his guard (Swedish *hird*) and between the magnates and

their armed men. The growing agrarian surplus and the urge, on the part of the institutions and magnates, to control the surplus by means of taxes and land rents has been put forward as a possible indication of feudal structures in Scandinavia during the late Viking Age. The probably quite large class of freeholders was not, in Christophersen's (1982b, 134) opinion, a dynamically influencing factor in society. The artisans could have been free itinerant craftsmen producing for a more or less free market (Christophersen 1980) or, in a feudal context, occasionally or permanently contracted to the land-owning or political elite, e.g. the king (Brumfiel & Earle 1987; Christophersen 1989). Trade and crafts have traditionally been considered as primary factors in the urbanisation process. This opinion is often questioned and focusing on politics at the highest level reduces the artisans to a secondary phenomenon in the history of early Scandinavian towns (e.g. Christophersen 1982b). This, however, is a generalization and the internal socio-economic variation within the artisan group has not yet been studied

The 12th-17th century: the feudal period and the early centralistic state

Before dealing with the socio-political questions a few words about technical change in the field of bronze-working could be useful. During the beginning of this period a growing demand for large bronze objects (e.g. church-bells and cauldrons, led to the appearance of a new artisan class (*bell-founders, cauldron-founders, potters*). The traditional technique used for small objects was practised by goldsmiths and girdlers. Later on, the pewterers added to the group of metal-workers producing castings. In other words – one can expect a growing social struggle within the professional group (e.g. Swanson 1989, 75; Egan & Pritchard 1991, ix, 18 f), as well as source-critical problems regarding the written evidence.

In Sweden, the guild system emerged at a late date, during the last decades of the fourteenth century. The known guilds are to a very large extent concentrated at Stockholm (Lindström 1991, 71). The possibilities for hypothetically earlier and more wide-spread guilds has been a matter of much dispute (Löfgren 1925; Schück 1940; Lindberg 1947; Ahnlund 1953; Lindström 1991). The earliest hints at guild-like structures in written sources are dated to the mid-fourteenth century. The organisation is described as a feudal corporate body, and not only the master craftsman but also his family, his employees and servants were connected to the guild (Lindström 1991, 229). The Scandinavian guild-system resembled the general European system in terms of feudal communities, such as social and material reproduction, internal peace, internal rules and internal judicial rights (Lindström 1991, 230). During the Middle Ages, the guilds in Stockholm and Malmö were never autonomous – the relationship to the town was regulated. The German fraternities (*Amt*) in Bergen, however, appear to have been more or less independent of the civic authorities (Lindström 1991, 231). The founding of guilds is concentrated in certain periods and according to Lindström (1991, 231), this fact does indicate that the artisans' need for support as well as the tendency of towns and kings trying to aggrandize their influence varied. The guild rules could not be changed without the participation of the town council; the town usually appointed the masters of the guilds and often had some control over the election of new members. As for judicial matters, the town had regulated rights to collect fines, but it was presupposed that the cases were settled internally within the guilds. It has been stressed that the economic and social conditions of Scandinavian guilds were to a very low degree regulated from the outside (Lindström 1991, 232).

The civic authorities in Stockholm were dominated by merchants and the limits between crafts and trade were distinctly regulated. The town also controlled the prices of the products through tariffs. Apart from these conditions the civic claims in the relation to the guilds appear to have been restricted to issues of supply, public cleansing and defence of the town, rather than dealing with economic-political control. Royal centralist guild policies did not appear until the sixteenth century. The lack of guilds in medieval Swedish towns is probably not a central issue when it comes to investigating the status of the artisans. The purpose behind the guilds might have been administrative, rather than economic (cf. Swanson 1988).

The medieval society model with its three estates presupposed that the lower class supported the upper two classes (e.g. DUBY 1981, 179). However, merchants came to dominate parts of society in a way that in practice excluded the producing class from the concept of the system. With its system of four estates, Sweden was an exception to the rule in this respect (Watts 1987, 25). The peasantry formed the fourth class and their regulated status suggests a different and less oppressive view of the producing people, compared to the continental situation. The privileges given during the fourteenth century by the Crown to Stockholm, Malmö and Bergen, respectively, differ in character (Lindström 1991, 234) and make it clear that the centralist authority assented to, or at least accepted, different *degrees* of external regularization of the guilds in different countries. A study of the relation between the guilds and the town authority in Stockholm and in Malmö makes it clear that the hierarchic structure, as well as the subordinated position of the guilds, was more pronounced in Malmö (Lindström 1991, 234). Was the feudal element in the pre-conditions of the artisans generally less important in Sweden than it was in Denmark and the rest of Northern Europe?

During the late sixteenth century and the seventeenth century, a totally new kind of royal tactic changed the situation of the guilds and the craftsmen. An overall policy was introduced, aiming at securing the interests of the Crown. During this period, there are still obvious differences between the lines of development in the Scandinavian states. In Denmark the king tried to put aside the artisans organisations, whereas the Swedish Crown forged links with the guilds and was therefore able to use them for its own purposes. The result was two types of feudal character. The Danish line of development came to be marked by conflict whereas in Sweden the mutual dependence was stressed (Lindström 1991, 237-238).

Since medieval Sweden had few guilds, relatively few towns and in some areas a relatively large measure of rural craftsmanship, it later became necessary – from the centralistic point of view – to create a system of organisations to make it possible to control and to impose taxes on the crafts. This, combined with fact that the Swedish Crown was weak during the Middle Ages (at least when compared with the situation abroad), forced the early post-medieval kings to impose an overall strategy on the crafts and on other sectors, in a way quite different from the line of development in the other Scandinavian states where the changes were less dramatic (Lindström 1991, 240). It seems as if – for different reasons – the social position of the Swedish craftsmen was comparatively good during this period of time.

Craftsmen in the urban elite?

What evidence for well-to-do – or at least well-to-do to a certain degree – bronze-founders do we find in documents and in archaeological sources? The conditions of the towns in Central Sweden appear to have been quite different from those of for instance Denmark and of certain German towns where the councils were open only to a patriarchy from the major merchants families. The social gap between artisans and merchants was narrower in the towns of Central Sweden than it was in large continental towns (Ljung 1963, 348). Stockholm was an exception in this respect. Artisans were never councillors in Stockholm during the Middle Ages (Dahlbäck 1988, 57). In the urban councils of the more important – apart from Stockholm – towns of Visby, Åbo, Kalmar, Söderköping and Lödöse craftsmen were relatively few. It is interesting, however, that in those cases when craftsmen *do* appear, the professions represented are usually those of the bronze founders, goldsmiths and tanners (Ljung 1981, 218).

Artisans had access to all levels of the civic government in medieval Västerås (Kumlien 1971, 429). In Uppsala, Enköping and Arboga, for instance, artisans frequently appear in the records as civic officials, sometimes as mayors and often as councillors or in less important positions. The records from Vimmerby show that the town rules of 1604 established that the council should be composed of one merchant, one peasant, one innkeeper and *three* craftsmen. Goldsmiths appear frequently in the higher positions. Thus, for instance, bronze-founders are recorded as mayor in Jönköping and as councillors in Uppsala. It is also plausible that in some cases even mayors and councillors without recorded artisan

names actually were craftsmen. The records often omitted the title (Ljung 1981, 218).

The economic standing of bronze-founders in Stockholm is illustrated by a taxation list from 1460. Among a total of 68 groups of professionals, they belong to the 10 groups that paid the highest taxes. In this small group of better-off craftsmen we also find other metal-workers – the goldsmiths, the copper-smiths and the blacksmiths (Dahlbäck 1988, 85). Evidence from York tells about the changing prosperity of the bronze-founders (Swanson 1989, 151-158). They were doing very well during the fourteenth century, being more prosperous than most artisans. In the following century they appear to have lost much of their economic power to the pewterers. Only a few groups of Swedish artisans, such as goldsmiths, could compete financially with the merchant class (Ljung 1981). In this matter Swedish conditions were not different from those in northern Europe in general (cf. Swanson 1989, 170). In fact the social position of Swedish artisans can be compared to that of the English ones: a considerable number of the latter were perhaps not rich but made a rather comfortable living (cf. Swanson 1989, 164).

In its fifteenth-century version, the Pantern foundry mentioned earlier was a highly specialized workshop including a brick building. The archaeological results show that the site was not a dwelling place. The master of the foundry, and his relatives must have lived elsewhere. From the records we can identify probable owners of the foundry: *Olof Cauldron-founder* bought land in 1410, probably to enlarge the Pantern plot, judging from the topographical references in the records. Olof bought another plot with a different location in Uppsala – most likely his home – in 1413. Thus the master founder owned two plots and at least one brick building. The brick buildings were signs of wealth in medieval Uppsala and even as late as during the eighteenth century, there were only few of them. Another record, dated 1416, tells about *Olof Jug-caster* (pewterer). It is not clear whether he was the same person as the Olof mentioned earlier. Olof Jug-caster was a member of the gentry (Ljung 1954). If he was Olof Cauldron-founder who was a nobleman it is remarkable; if we are dealing with two different persons it is even a small sensation. Two metal-casters in the early fifteenth-century Uppsala – one of them quite well-to-do and the other one a nobleman.

It is obvious that money did not automatically buy social status. The acceptability varied within each artisan class and between crafts. The metal-working in itself was possibly connected with status. Gimpel has pointed out the high status of miners – not only were they freemen, they also had a range of special

rights. This is explained as a reflection of the high regard given to the metal products (Gimpel 1992, 93-99). Heather Swanson has shown that English bronze-founders acquired considerable status. Founders became mayors in Nottingham and Leicester and there is even evidence to prove that a founder became a member of the parliament in the fourteenth century. (Swanson 1989, 75). Structurally, Swedish towns seem to have had more in common with English towns than with those in northern Germany where artisans were not allowed in the civic authorities (e.g. Dahlbäck 1987, 57). Even the neighbouring country of Denmark applied more strict rules working against the artisans in this respect. A royal Danish ordinance of 1442 proclaimed that no craftsmen should be taken into the urban judiciary (Lindberg 1947, 55).

R H Hilton has studied English and French urban culture and stresses a number of important aspects (Hilton 1995) such as the differences between smaller and larger towns. Hilton modulates general views on economy and social structures: '... *these small towns were not so structured as were the bigger urban centres. Although the borough court and borough officialdom tended to be dominated by representatives of the better-off families, there was less of a social gap between them and the rest of the borough population than one finds between the mercantile elites of the big towns and the craft producers.*'

The municipal control over the artisans could be seigniorial, royal or mercantile. In the thirteenth century relatively autonomous rule by councils with mercantile interests became common in English and French towns. Some differences are noted such as a higher degree of royal authority in England and of feudal authority through lords in France (Hilton 1995, 77). Many towns in Hilton's study had no craft organisations at all or did not get them until the late medieval period, and the craftsmen's households appear to have been multi-occupational rather than specialized (Hilton 1995, 68, 78; cf. Swanson 1988).

Conclusions

An overall conclusion from this survey is that the research regarding the early medieval Scandinavian bronze-founders has led to results which appear to be well in line with international opinions. For the later Middle Ages and the early post-medieval period, however, a divergent line of development is discernible in Sweden.

Recent investigations of smaller medieval towns in England and France make it easier to understand urban social structures in medieval Sweden than do the models presented in many earlier studies which

are based on and transferred from conditions in large trading centres such as London, Lübeck and Paris. The representation of artisans in the civic authorities in Sweden has earlier been explained as caused by a lack of more suitable persons in very small towns and as an illusion – for instance, persons registered with artisan names were assumed to have inherited that name. It would probably be fruitful to discuss a more complex urban structure with in some cases rather indistinct internal boundaries. Archaeological results should be used to throw light upon specific conditions, as the written sources are deficient. The status of individual artisans and professional groups of artisans must have varied. As a consequence we must accept the thought that artisans sometimes received high civic positions in their own right.

It is obvious that research on medieval artisans must be resumed. The future investigations should try to modulate our knowledge – attention must be paid to regional differences, as well as to differences within professional and social groups.

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Early Medieval Iron Production and its Organisation in the Veluwe Area, the Netherlands

Abstract

From the early 7th to the 9th centuries AD iron production on a supra-regional scale took place in the Veluwe area, the Netherlands. The production was controlled from outside the area while the smelting itself was organised locally. The end of the production is thought to be connected to social changes and feudal influence.

Introduction

In 1990, a project started on ‘The Early Historical Iron Production in the Central and Eastern Netherlands’. In the project, granted for four years by the Dutch Organisation for Scientific Research (NWO), an archaeologist and a geochemist/mineralogist co-operate. The main objectives are to study the technology, socio-economic conditions and impact on the environment of the iron production. The research focuses on three areas, the Veluwe, the Montferland and the Vecht area, where iron was produced on different scales using different techniques and in different periods (van Nie 1995).

The first one to draw attention to the importance of the iron production in the Veluwe area (Fig. 1) was the amateur archaeologist Moerman (Apeldoorn) who published on the subject as early as 1928 and continued to do so until his death in 1970 (Moerman 1928, 1957, 1960, 1968-9, 1970). Moerman made an inventory of the remains – slagheaps as well as open-cast mining pits – of the iron production many of which have disappeared today.

The basic needs for the production of iron are ore, wood for charcoal and clay for the building of the furnaces. In the Veluwe area, iron was produced in slagtapping furnaces, leaving characteristic tapslag and a spongy mass of iron, known as the bloom. Before the iron could be smithed, the bloom was reheated to squeeze out slag and other contaminations and to compress the metal. The process also leaves slag, known as the reheating slag. Finally objects could be smithed leaving smithing slag.

In his ‘Medieval Settlement and Economy North of the Lower Rhine’, Heidinga (1987a) reserved one chapter for iron production. Based on the work of Moerman (1957, 1960, 1968-9, 1970), the results of the ‘Veluwe-project’ (Blommesteijn *et al.* 1977) and historical sources, he concludes that large scale iron production took place in a limited area of the Veluwe during the 7th to 12th centuries AD. The limits of the production area are defined by the presence of slagheaps. The spread of slagheaps is restricted to the ice-pushed ridge of Apeldoorn roughly between

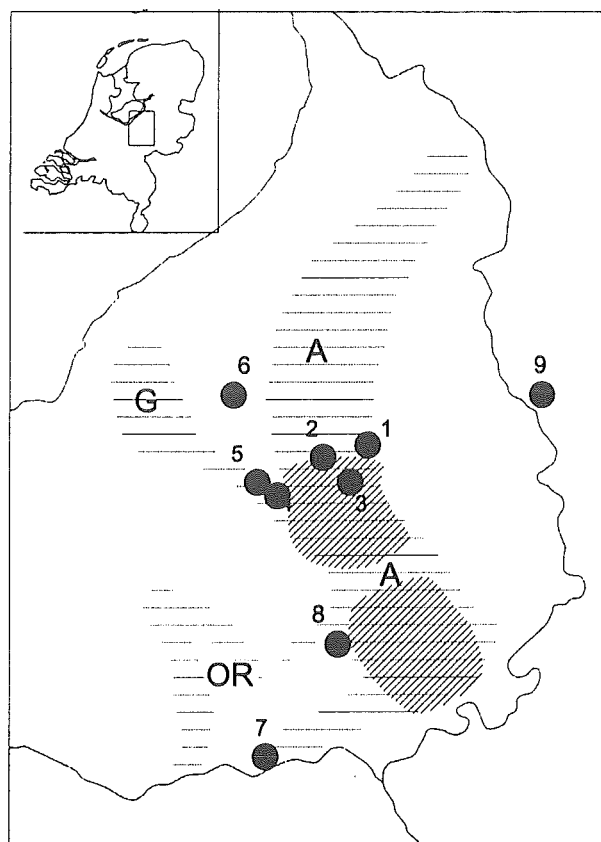


Fig. 1. - Research area. Hatched: ice-pushed ridges; A) Apeldoorn, G) Garderen, OR) Oud Reemst. Double hatching: Ironproduction Areas. 1) Apeldoorn, 2) Asselse Veld, 3) Spelderholt, 4) Hoog Buurlo, 5) Kootwijk, 6) Hune-schans, 7) Duno, 8) Deelerwoud, 9) Deventer. Scale ca 1:850,000

Apeldoorn and the valley of the river IJssel in the south (Fig. 2).

The earliest evidence for iron production is found at Hoog Buurlo where, in the 7th century AD, blooms have been worked on a considerable scale (Heidinga 1987a). Slagheaps and mining pits are also present nearby. The youngest date is based on sherds found by Moerman in and near a few slagheaps. Written sources dating to the 9th century AD specifically mention stretches of forest without accompanying *mansiones* (i.e. farmsteads) in the same area as the slagheaps. In the same texts *mansiones* with the accompanying rights on the use of parts of the forests are mentioned in the Veluwe, outside the area where slagheaps occur. The forests belonged to people related to the *Reichsaristokratie*. Heidinga strongly suggests that the two (semi-)circular fortresses on the Veluwe - the Huneschans (built around 900 AD) (Heidinga 1987b) and the Duno (date unknown) - played an important part in the distribution of the iron. Both fortresses are strategically situated at traffic junctions in the north-west and south-west respectively of the iron production area. The trade in iron could have been controlled by these strongholds. The importance of the iron production is not only stressed by the number of remaining slagheaps but also by the high amount of imported ceramics in the village of

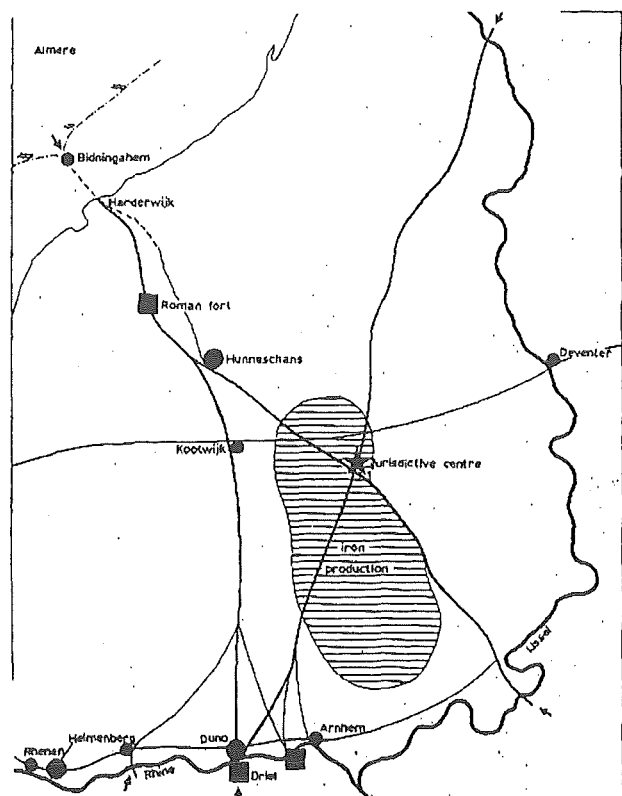


Fig. 2. - The iron production area after Heidinga (1987, Fig. 82).

Kootwijk (8-10th centuries AD) and Hoog Buurlo (7th century AD) which is comparable to that of the *port of trade* Dorestad (Heidinga 1987a). Compared to contemporaneous settlements in the well-studied Drenthe area, the village of Kootwijk is considered to be rather large (Heidinga 1987a; Waterbolk 1982). The end of the production is thought to be a result of exhaustion of wood for charcoal which also would have initiated the enormous sand-drifts on the Veluwe (Heidinga 1987a). A second cause is sought in the start of large-scale iron production in the Siegerland, the Lahn/Dill, the Westerwald and the Sauerland areas (van Nie 1990). This production started in the 10th century AD and developed fully in the 12th century AD.

Slagheaps and iron ore mining

The most prominent remains of the medieval iron production are the slagheaps and iron ore quarries on the ice-pushed ridge of Apeldoorn. Over 82 kilometres of mining pits and 57 slagheaps are still present or could be located. Most of them are no longer clearly visible in the landscape. Sixteen of the 37 slagheaps mentioned by Moerman (1968-9) could not, or not with certainty, be identified. Mining pits were refilled during reforestation and most of the slagheaps were removed for metalling roads and used as ore for the 19th-century blast-furnaces, for example in nearby Deventer. Both the heaps and the pits are also frequently covered by windblown-sands which makes them hard to discover. Detailed investigations show that within the area defined by Heidinga a division can be made between a northern and a southern production area (Fig. 3) (van Nie 1995). The northern area is characterised by a great density of slagheaps as well as of open-cast mining pits. The strings of pits occur generally as twins and incidentally they appear as triplets. This results from the natural occurrence of the ore. From the mining pits, a very characteristic kind of ore was quarried: the so-called *klapperstenen* (literally rattlestones), a box-stone like envelope of lepidocrocite and goethite generally around a clay core. When the core remains intact and the *klappersteen* is shaken, a rattling sound is heard. The ore was quarried in continuous trenches that nowadays appear as strings of pits with continuous banks on both sides. In all, 32 km of double strings have been mapped which gives a total length of circa 70 km including the triple parts. The 42 slagheaps in the area are generally found within 500 metres from the mining pits.

The slagheaps are more or less evenly distributed in the area. They are generally found in small groups of

three or four heaps. Occasionally, like in the Spelderholt (Fig. 4), more heaps are lying close to each other. The general impression is that when more than four heaps cluster together, they are relatively small (van Nie forthcoming).

The largest remaining slagheap in the area was the subject of an extensive study (van Nie 1990). The heap turned out to consist of at least four smaller heaps partly covered with a loosely packed blanket of slag (Fig. 5). One side of the heap, adjacent to the *OrdenEnk* (i.e. the arable land of Orden) also had a cover of till-soil. The heap contains 642.6 tons of slag which equals a minimum of 257 tons of iron. The production required a minimum of 694-1156.7 tons of charcoal (Joosten *et al.* 1997). The heap accounts for less than one percent of the slag once present in the whole Veluwe area (van Nie forthcoming). Only one charcoal burning site, a so-called *Grubenmeiler*, has been discovered so far but charcoal must have been burnt on an enormous scale. Extensive coppicing of oak must have taken place (van Nie forthcoming; Musch 1993). The surveys in the Spelderholt show that after the iron production, occasionally a coppice wood was cleared from stubs and brought under cultivation (see Fig. 4).

In the southern area, the spread of iron production remains is less even. Mining pits only occur in the north-eastern and south-western periphery of the area

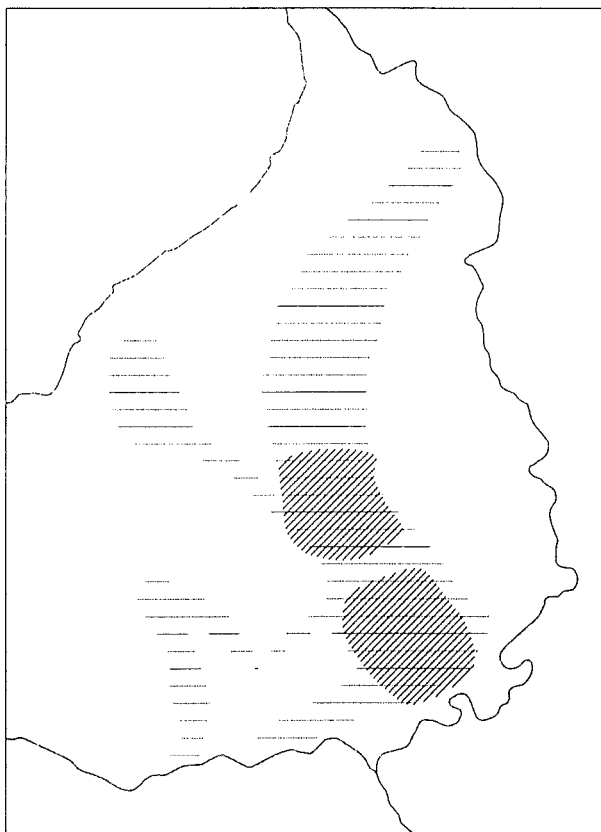


Fig. 3. - Iron production in the Veluwe Area. See Fig. 1.

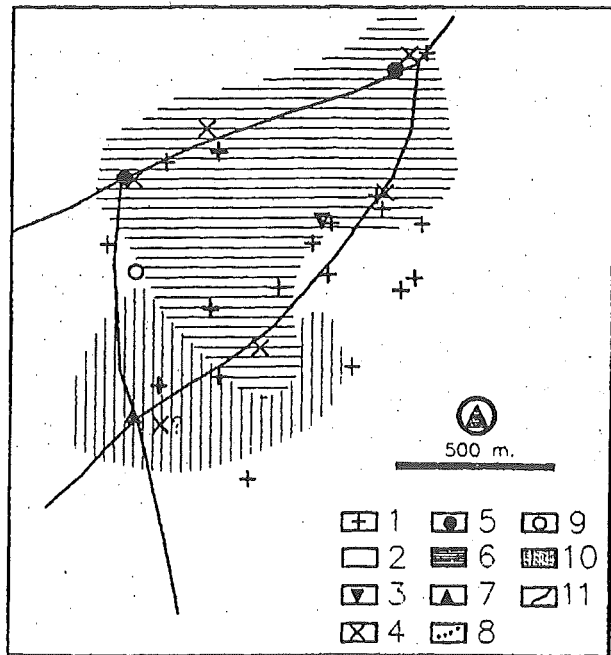


Fig. 4. - Results of the surveys in the Spelderholt area. 1) Slagheap. 2) Blown-out sands. 3) Grubenmeiler. 4) Settlement traces. 5) Open water. 6) Arable soil. 7) Merovingian cemetery. 8) Limits of the survey. 9) In situ iron ore. 10) Old podzolic soil. 11) Reconstructed ancient roads.

with a total length of 12 kilometres and only as double rows; triple rows are lacking. The pits are barely recognisable because of dense vegetation and levelling during reforestation. The 15 slagheaps are more evenly spread over the area than the mining pits; distances of up to three kilometres from the nearest mining pit have been noticed five times. (van Nie forthcoming)

North versus south?

It is hard to provide an explanation for the differences between the two areas. The environmental conditions are comparable although a much larger part of the southern area borders on the valley of the river IJssel. The borderland is more hospitable for habitation than the northern area which is further away from the river valley from which it is separated by marshlands. The differences in the distribution of slagheaps and mining-pits might be explained by the differences in vegetation and availability and possibilities for prospection. In general, the southern area is more accidented than the northern one. This makes it more difficult to locate iron production remains that are covered by wind-blown sands. Especially the reconnaissance of the mining pits becomes very difficult which might account for the low number of pits compared to the northern area. The history of refor-

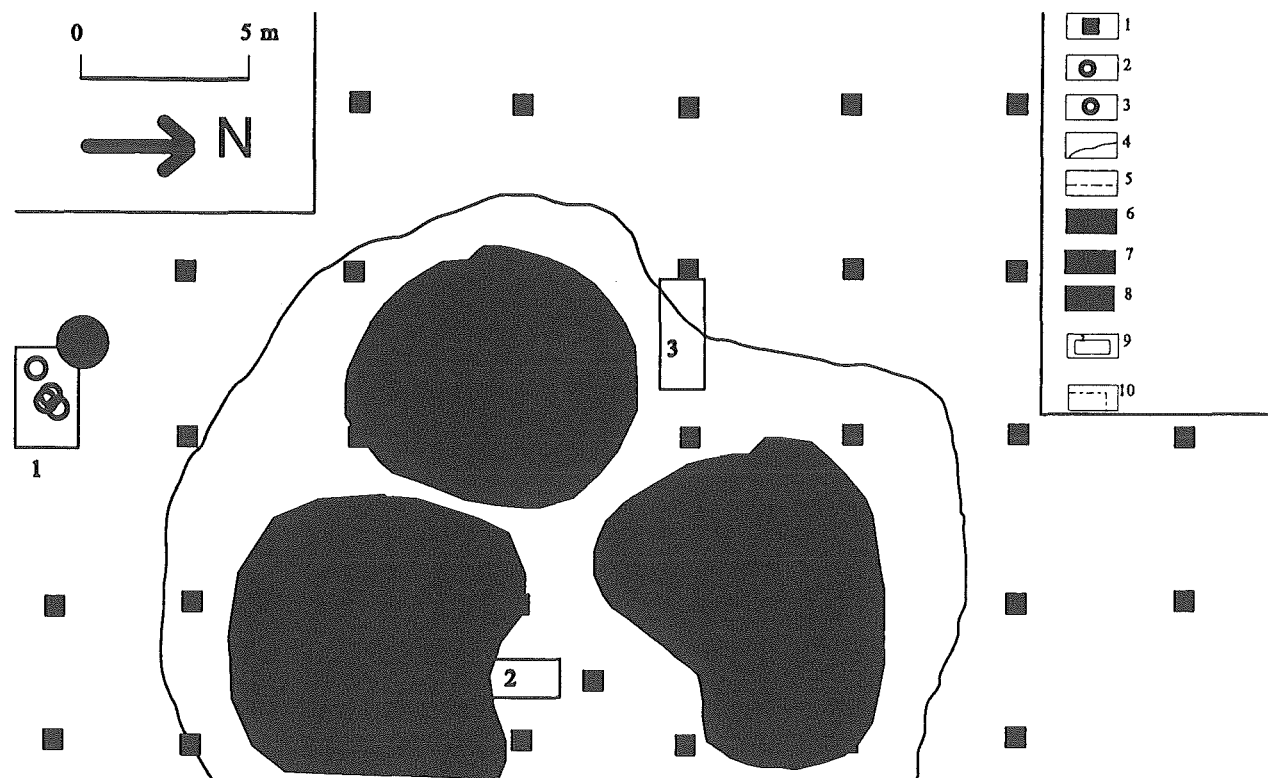


Fig. 5. - Schematised plan of the Orderbos slagheap. 1) Shovel test. 2) Furnace. 3) Possible furnace. 4) Slag limits. 5) Fence. 6) Recent pit. 7) Concentration of slag. 8) Charcoal storage?. 9) Excavation 1988. 10) *idem* 1990.

estation of the two areas is also distinct. The northern area is dominated by production forest, whereas the southern area is partly covered by a more park-like landscape. The latter is a result of the reforestation by owners of large manors and castles in the nearby valley of the river IJssel. Especially the edge of the ice-pushed ridge overseeing the IJssel-valley was reforested before attention for the iron production remains took hold. Finally it must be noted that the aforesaid Moerman, on whose observations the identification of a number of vanished remains are based, had his dwelling in Apeldoorn in the vicinity of which most of the remains are found. He probably was more familiar with the northern area than with the southern one. All of the heaps in the southern area were known to him before 1928 (Moerman 1928). In the northern area the number of known sites increased at least up to 1965 (Moerman 1968-9, 1970).

Settlements and historical sources

Early Medieval settlements are known in the Veluwe area from archaeological and historical records. Nearly all the settlements are located on the border of the ice-pushed ridges of Apeldoorn, Garderen and Oud Reemst or along (small) rivers (Figs. 6 and 7). Settlements on the ice-pushed ridge are gen-

erally located on considerably lower sites than the iron production remains. The majority of the latter are found above 45 m +NAP (NAP = Ordnance Datum) while the altitude of the settlements seldomly exceeds the 40 m isohypse. The settlement near Hoog Buurlo, at an altitude of nearly 80 m +NAP is an exception. Apart from the known settlement locations, the spread of single finds also follows this pattern. Exceptions to this are nearly always located along long distance tracks which were in use from pre-historic times onwards.

The stretches of forest mentioned in the historical texts are all located in the northern area, concentrated in the north-east (Fig. 8). Only twice a reference to stretches of forest is found for the southern area; in both cases the forests are located near the mining pits in the north-east. The latter are not, however, restricted to forest zones but also include the regular *mansiones*. (Heidinga 1987a; van Nie 1995).

The historical sources can be interpreted in two ways. On the one hand they fit in with the well-known habit of donating properties to monasteries or other ecclesiastical institutions, a practice which is common from the early Merovingian period on. On the other hand, the practice is a profitable way of disposing of properties which are no longer of primary interest. One fulfils one's religious obligations and will not have to bother about the property any longer.

The latter seems to hold true especially for outlying properties. In the process of feudalisation, widespread and fragmented landownership is no longer preferred and landowners tend to concentrate their properties in the vicinity of the court, city or stronghold where they actually reside.

North versus south?

The difference shown by the historical texts can of course be ascribed to the fact that only a very limited number of written sources survived. It is also striking that all of the references are concentrated around the so-called *Herenhul*, the jurisdictional centre of the Veluwe in late and even post-medieval times which probably has roots going further back (and perhaps even into prehistoric times). It can be assumed that especially people non-resident to the area were interested in properties nearby such a centre which will also have had some influence outside the region. One can imagine that independent authorities from outside the region arbitrated in local disputes.

The start of the production, the Hoog Buurlo site

The first traces of iron production on the Veluwe date from the Roman Iron Age. Adjacent to settlements, remains of slagpit furnaces occur occasionally. Production took place on a household scale. (van Nie 1997).

The settlement on the Braamberg at Hoog Buurlo provides the first proof of iron production on a considerable scale on the ice-pushed ridge. The settlement, which has been excavated only in part, consists of a house, another building (possibly a shed) and two sunken huts. The sunken huts produced over 26 kgs of reheating slag and some six kilograms of bloomery iron. A partly worked bloom was excavated in a posthole(?) near the entrance of the house. The settlement is dated to the 7th century AD (Heidinga 1987a). Magnetometer research was carried out which revealed the presence of probably another sunken hut. The physical conditions were very unfavourable for detailed research (Odé & Verhagen 1992). The settlement can be interpreted as a special purpose site where blooms from smelting sites in the vicinity were worked. It functioned only for a short period, supposedly a generation, after which it was deserted as a result of sand drifts (Heidinga 1987a).

The interpretation of the Hoog Buurlo site in the perspective of the large scale production is quite difficult. One can argue for the start of the production as well as for a change in the production. Large-scale

Fig. 6. - Archaeologically known settlements (dots) and stray finds (open circles). (Adjusted after Blommesteijn *et al.* 1977)

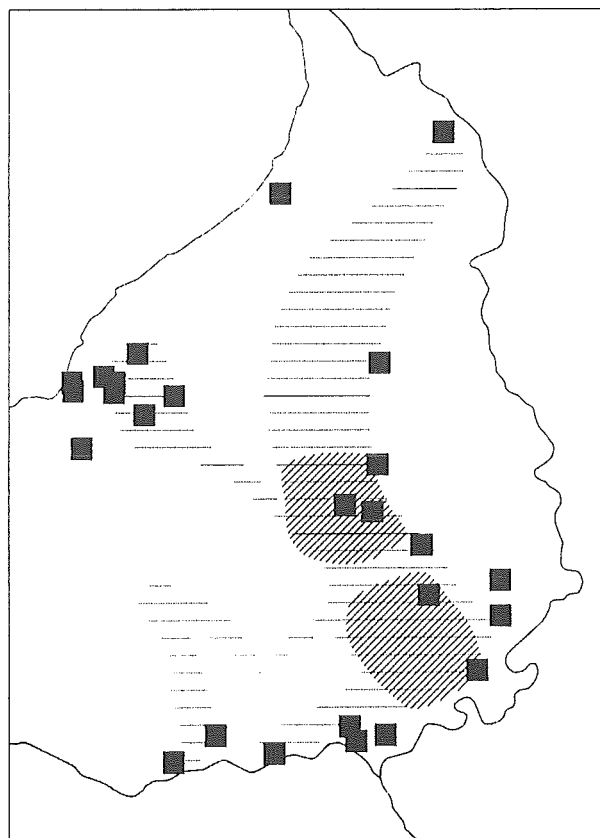
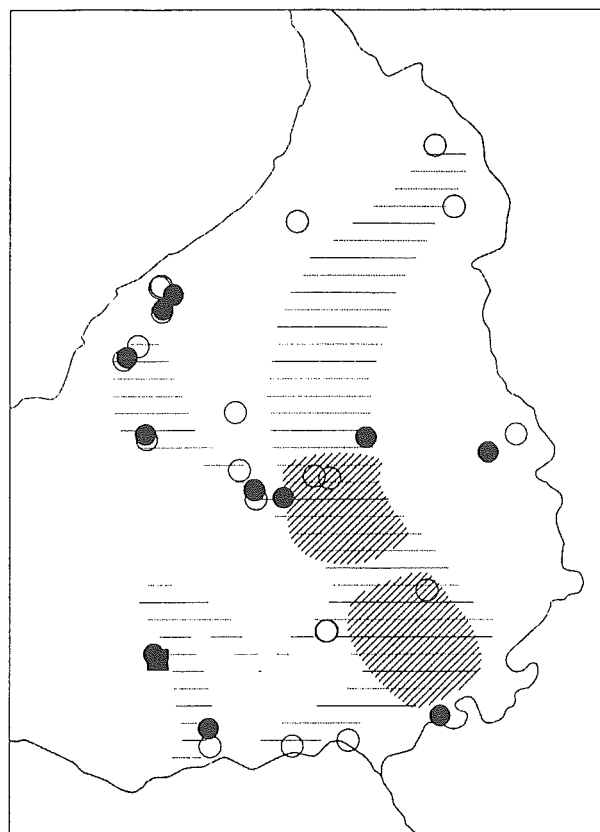
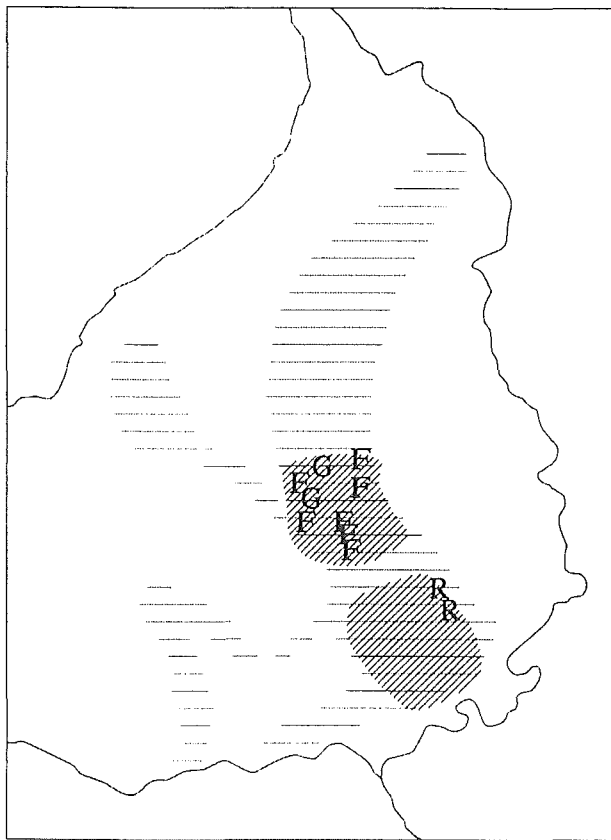


Fig. 7. - Settlements mentioned in historical texts. (After Blommesteijn *et al.* 1977)

Fig. 8. - Specific forests and its owners from historic sources within the iron production area. G) Gerward. F) Folker. R) Rodgar.



production implies some kind of organisation, which can apply to Hoog Buurlo. Likewise, one might say that after a period of exploration, the production increased and the need for a more concentrated working of the blooms was felt. Unlike the production, the working of iron is not tied spatially to the sources needed. This does not, however, agree with the short duration of the settlement. One could expect that a special purpose site would be situated on a location on which it can function as long and as efficiently as possible and would not be abandoned easily. Presumably the Hoog Buurlo site represents an early phase in the large-scale iron production. If the Hoog Buurlo site marked a change in the organisation during the production, it can be assumed that the site would have functioned longer and/or that more sites comparable to the one at Hoog Buurlo would have been discovered.

Despite extensive surveys, other settlements with the same function as Hoog Buurlo have not been found. Judging from the expected amount of reheating slag, it is highly unlikely that all of the traces that could have existed have been missed. It can be argued that the settlement traces excavated in the Deelerwoud in 1950 (Moerman 1970; Modderman 1951) belong to such a settlement. It is also situated

on the border of the production area and slagheaps are nearby. Reheating slags were not, however, found or not collected. Among the finds from the excavation (collection *Gelderse Archeologische Stichting*) and in the collection Moerman (collected previous to the excavation; kept in the *Historisch Museum Apeldoorn*) only tapslag is present. Apart from a very few pieces in the excavation of the Orderbos slagheap (van Nie 1990), reheating slags are absent on the smelting sites. Probably small quantities are present but have never been recovered elsewhere; during the two excavations at the Orderbos slagheap over 18 m³ was examined (van Nie 1990). It is quite surprising that nearly no traces of reheating activities have been found in the Veluwe area, for a substantial amount of reheating slag could be expected. Crew (1991) suggests a production to reheating slag ratio of 4:1. An amount like that cannot have been overlooked when searched for. To illustrate this, we may mention that the slagheap in the Orderbos which contains at least 642.6 tons of tapslag, would account for 160.75 tons of reheating slag.

The end of the production

As with the start of the production, it is hard to pinpoint the its end. Most of the remains are no longer available for research or will not produce reliable data because they have been heavily disturbed. Of the majority of the datable finds, the origin and exact circumstances of recovery are no longer known or reproducible.

The youngest material associated with the slagheap has been thought to date back to the 12th century AD (Heidinga 1987a; Moerman 1956-70). The six slagheaps concerned are located in or adjacent to late medieval arable land. The sherds found in association with these heaps come from layers partly covering the heaps and which contain slags, stones and till-soil. The sherds most likely were discarded on the slagheaps while cleaning the arable land from stones, slags and stubs during ploughing. Therefore, the sherds must be of a later date than the iron production. The youngest sherds from the within the heaps themselves belong to pottery of the *Mayen* and *Badorf* types, dating from the 9th century AD.

Interpretation and reconstruction of the organisation

The scale of production indicates a certain degree of organisation. Judging from the owners of the stretches of forest in the area, influences from outside

the Veluwe area could be assumed. Following Heidinga (1987a), I interpret these belongings as a way of controlling the production without being directly involved. If the production was not only controlled but also organised from outside the Veluwe, one would expect traces of such a firm grip. Heidinga proposes the ringforts Huneschans and Duno as *foci* where the iron could have been collected before leaving the area. The Huneschans, however, was constructed after the production had ceased which makes it impossible to have been of importance for the (control of) the production. The settlement at Hoog Buurlo clearly indicates influence from outside the production area for the location of the settlement makes it unlikely that it was fully self-supporting (Heidinga 1987a). The short duration of the occupation, however, makes it highly unlikely that the influence originated from outside the Veluwe, particularly because there is no evidence for more than one sites of this nature. If the abandonment of the settlement was caused only by the occurrence of sand-drifts (Heidinga 1987a), more settlements of this type would have been expected. Large-scale forestry also demands a high degree of organisation which can be supervised from the outside but which essentially requires a backup from inside the area. It must be concluded that extraction of ore, forestry, charcoal burning and smelting must be organised locally.

Calculations of the manpower needed for all of the steps in the process of producing iron are in progress. The first indications are that much more people than the 2000 accounted for by Slicher van Bath (1944) must have been present in the Veluwe area, not only to produce the iron but also to replace those involved in the iron production in their everyday tasks. Extra mouths had to be fed and less hands would have been available to produce the food that was needed. Since the bottleneck in the size and speed of production is the availability of wood, it is most likely that the iron production was not a year-round activity. The people producing the charcoal and iron were probably also involved in the most labour intensive agricultural activities such as harvesting and processing crops.

The size of the Kootwijk settlement in the Phases 2 and 3A (late 8th to mid-9th centuries AD), when up to 20 farmsteads were in use at the same time (Heidinga 1987a), might be an indication for integrated activities. When a settlement like Kootwijk only provided for the extra amounts of food and such, one would expect only an increase in storage facilities, not in complete farmsteads. A doubling in settlement size from period 1B to 2A (from 7 or 8 to 17 farmhouses) in the late 8th century AD can not be a result of normal population growth or of nucleation of settlements.

The iron production itself also had to be strictly organised in order to prevent exhaustion of the forests and to secure a steady output of iron. The most time-consuming part of iron production is the burning of the charcoal. Trees have to be felled and cut to size and the wood has to be coaled which can take up to two weeks depending on the amount of wood. This might have been - but is not necessarily - a year-round activity. Mining the ore also must have been quite labour intensive, judging from the depth (up to four metres) of some of the mining pits. The most labour intensive part of the actual production is working the bellows which can take up to 48 hours (Biehn *et al.* 1991). The men working the bellows must be relieved regularly in order to keep the airflow stable and efficient.

Voss (1995 and pers. comm. 31-1-1997) has estimated the manpower to produce 0.5 tons of iron a year on the basis of 150-175 days per year. The Orderbos slagheap would have taken 900-1050 mandays a year (cf. Joosten *et al.* 1997). This would mean a year-round production. Since wood will no longer be available after a few years there must have been a shift in production from one location to another. The fact that the Orderbos heap consists of four or five smaller ones and that most of the slagheaps appear as groups might indicate that from time to time, the iron smelters revisited locations used earlier. Assuming a time-span for the Orderbos slagheap of 150 years, the Orderbos heap would have been revisited about every 20 years. This will give the coppice wood enough time to generate a volume of wood comparable to the trees felled originally (Oosterbaan 1988a,b). This kind of shifting cultivation also prevents too large stretches of open forest to develop. As long as the balance is not disturbed by natural causes like storms, severe droughts during longer periods or overcropping, this system is practically inexhaustible.

Most likely the northern production area can be divided into three zones in which production took place, following a shifting-cultivation-like pattern. The zones are defined by the three ore veins combined with enough forest to ensure continuous production. The zones are probably also reflected in the distribution of the properties of the two major landowners in the production area, Gerward and Folker (see Fig. 8). Within the zones, clusters of slagheaps can be recognised which will have been used one after another. The slagheaps probably were located economically near the mining sites and centrally within the area where the charcoal was burned.

The interpretation of a supposed direct relation, as proposed by Heidinga (1987a), between the production of iron and the extensive sand drifts that domi-

nated the Veluwe in Late and Post Medieval times cannot be maintained. Small sand-drifts will have occurred during the period of production as is shown by Koster (1978). Large sand-drifts are known from the 12th century AD onwards. The continuous enlargement of the sand-drifts is of 14th century AD and later date (Lascaris 1993), centuries after the production of iron had ceased. This would have given the forest enough time to recuperate as it did between the Roman and Merovingian periods (van Geel & Groenman-van Waateringe 1987). It is reasonable to assume that the severe drought during the 10th century AD (Heidinga 1987) has hindered the natural regeneration of the forests after the production had ceased. This probably resulted in a more or less open landscape which is very favourable for sheep herding.

Conclusion

From the early 7th to 9th centuries AD, large scale iron production took place in the Veluwe area, the Netherlands. Though the production was controlled from the outside, the actual smelting most likely was organised from within the area. To cope with the demand for charcoal coppiced oakwood was used, requiring extensive forestry.

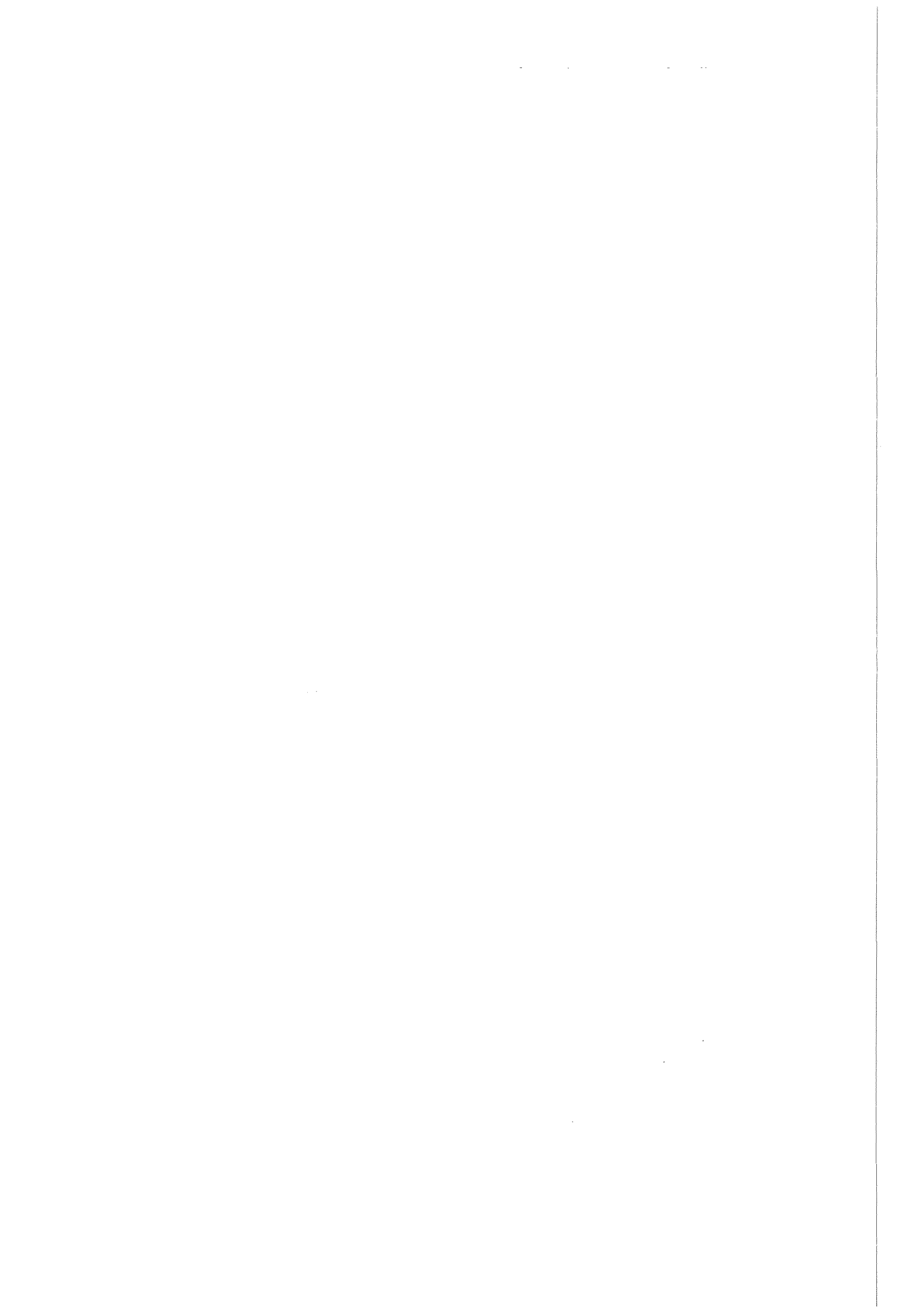
In the course of the 9th century AD, the production seems to have ceased. The few historical sources available for the area in the 9th century AD can be interpreted as diminished concern for the area and its iron. The first can be seen as a result of feudal changes, the latter also in the beginning iron production along branches of the river Rhine. The immense sand-drifts in the Veluwe area are not a direct result of deforestation for the iron production

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Calculation of the output of an early historical iron production site in the Veluwe Area, the Netherlands

Abstract

A large slagheap in the Orderbos in the Veluwe area in the Netherlands dated to the 9th century AD has been excavated and extensively studied. The ore:slag:iron ratio of the production process is calculated by the SiO_2 , Al_2O_3 and MnO content of the slag and ore. The most conservative ratio is calculated to be 1.8:1:0.4 (by weight). The slagheap, which contains an estimated amount of about 642.6 tons of slag, thus would represent at least 257 tons of metallic iron. The fuel to ore during smelting is estimated by the chemistry of slag and charcoal at about 1 (by weight).

Introduction

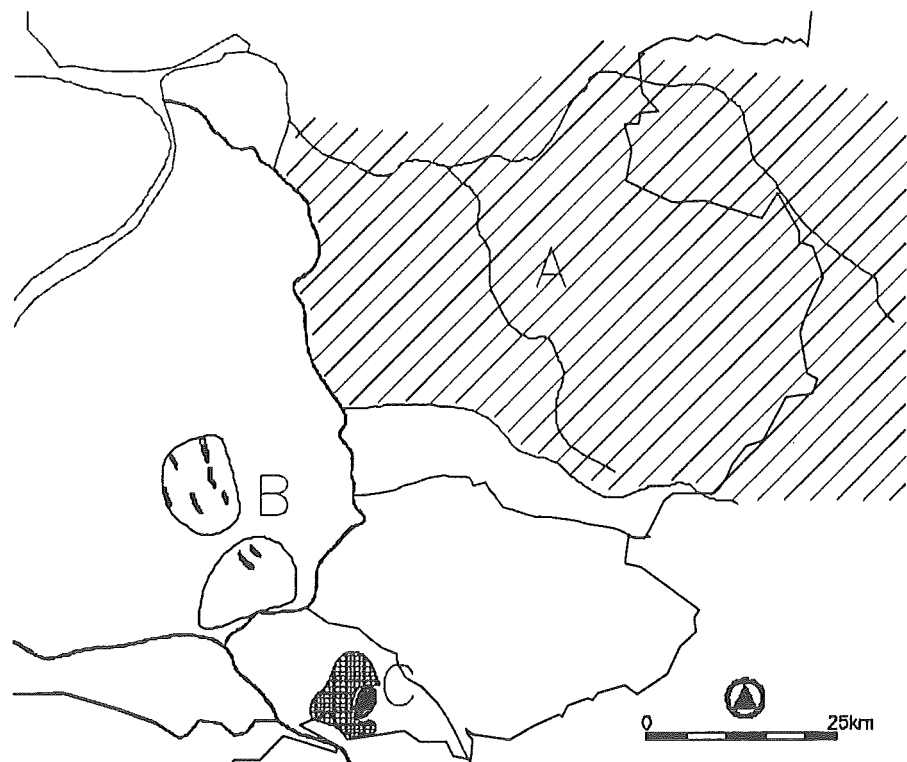
This contribution focuses on the prospects of the chemistry of the remains of an early medieval smelting site in the Veluwe area in the Netherlands. Due to the recent development of a model which allows us

to quantify the activities in terms of ore:slag:iron- and fuel to ore ratio (Joosten, Jansen & Kars 1997b), we focus on this part of the technological aspect of the NWO-project ‘The technology, organisation and socio-economic conditions of early historical iron production in the central and eastern parts of the Netherlands’ that started in 1990. The organisational and socio-economic part of this project will be dealt with elsewhere (Van Nie 1995). Before presenting and discussing the model an overview of the early historical iron production in the Netherlands is given:

In the Netherlands three major early historical iron production areas, encompassing several sites each, have been recognised (Van Nie 1995); see Fig. 1:

- A) Romano Barbarian sites in the Vecht Area,
- B) Sites in the Veluwe area dated from the 7th to the 10th centuries AD; and
- C) Sites in the Montferland area, dated from the 9th to the 11th centuries AD.

Fig. 1. - Iron production areas in the Netherlands. Legend: hatched: slagheaps/furnaces; black: opencast mining pits; A: Vecht area; B: Veluwe area; C: Montferland area.



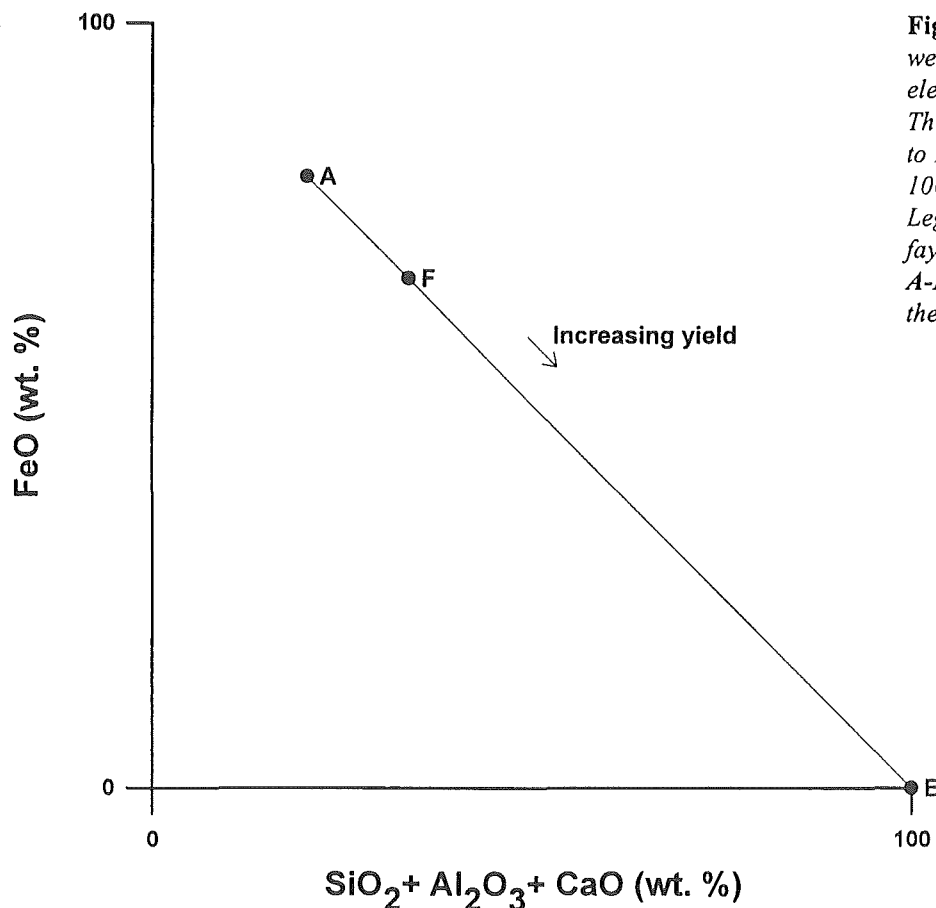


Fig. 2: Chemical relationship between ore and slag: FeO vs. gangue elements, i.e. SiO_2 , Al_2O_3 and CaO. The iron in the ore is recalculated to FeO and the total normalised to 100 wt %.

Legend: A: ore, F: theoretical fayalite composition ($2\text{FeO} \cdot \text{SiO}_2$), A-B: trend the slag derived from the ore will follow.

The production areas are different in terms both in type of furnaces and application of ore type. The iron in the areas of the Veluwe and the Montferland was produced with slag-tapping furnaces from rattlestones; for the production in the Vecht area bog iron ore was employed in slag-pit furnaces. Bog iron ore is locally developed in stream-valleys and a certain type of iron oxide concretions, so-called rattlestones, occurs in the ice-pushed ridges in the Veluwe, Montferland and Nijmegen.

During the production process iron oxide in the iron ore has to be reduced to metallic iron and the gangue elements, mainly quartz (SiO_2), have to be separated from the iron. The reduction of iron oxide takes predominantly place by a reaction with carbon monoxide gas. This gas is generated by the incomplete combustion of carbon (charcoal). When the silica reacts with divalent iron oxide, a fayalitic melt is formed, the slag, with an approximate formula of $2\text{FeO} \cdot \text{SiO}_2$. The liquidus temperature of slag of about this composition is approximately 1175°C . When the production takes place in a slag-tapping furnace the melt can be tapped and forms the tap-slag. If a slag-pit furnace is used, the slag can collect into a pit beneath the furnace and solidify over there forming the characteristic slag-blocks. It must be noted that the early historical production process was different from the

blast-furnace process in use nowadays, since iron was produced in the solid state and the slag liquefied (Tylecote *et al.* 1971). Most non-metallic chemical elements from the ore become concentrated in the slag phase, whereas some metallic elements are gathered in the iron phase. The chemical composition of the slag is – with the exception of the siderophile elements – mainly characterised by the original chemistry of the ore. Addition of special fluxes to the slag, and the contamination with fuel ash and furnace lining will complicate its chemistry; however, chemical relations in a data-set with sufficient analyses will illustrate mixture trends between the additions and slag-composition.

The reduction of iron ore can also be represented as the removal of iron (as a metal) leaving a residue of silica, alumina, lime, etc., the slag (Kresten 1987). Consider an ore with the theoretical composition A of 80 wt % FeO and 20 wt % of the gangue elements SiO_2 , Al_2O_3 and CaO (Fig. 2). Reduction of the ore will yield a slag phase with a composition somewhere along A-B, and metallic iron. The position of the composition of the slag along A-B will depend on the efficiency of the production process. The closer the chemistry of the slag is to B, the more iron has been reduced to metal. The composition, however, will also be determined by the temperature in the

bloomery furnace and in the order that low-melting slags might form, it would need to be in the region of fayalite (Morton & Wingrove 1969). If the slag is fayalitic its composition will be close to F (Fig. 2). It must be kept in mind that the iron in the ore will be mainly present as Fe_2O_3 , and in the slag as FeO. The iron in the ore is recalculated to FeO and the total normalised to 100 wt %.

Next to the original chemistry of the ore, the composition of the slag is also determined by the efficiency of the process. To calculate the amount of ore needed to produce the slag – the ore/slag ratio (Tylecote *et al.* 1971; Bielenin & Wojda 1978; Serning 1979; Espelund 1995; Joosten *et al.* 1997b) – the chemical elements that originate exclusively from the ore must be determined. In that case a linear relationship between the elements in the ore and slag through the origin is expected when plotted in a variation diagram. The ratio is calculated by dividing the sum of the chemical elements, for example SiO_2 and Al_2O_3 , of the slag by that of the ore (Equation 1). When the volatiles are also taken into account, the ratio describes the amount of ore used to produce the slags by weight.

$$\frac{(\text{SiO}_2 + \text{Al}_2\text{O}_3)_{\text{slag}}}{(\text{SiO}_2 + \text{Al}_2\text{O}_3)_{\text{ore}}} = \text{ore/slag ratio} \quad (1)$$

The yield of the production process is defined by Tylecote *et al.* (1971) as the amount of produced iron divided by the amount of iron in the ore (Equation 2). The amount of iron in the ore is recalculated as FeO. The quantity of produced iron is calculated by the amount of FeO in the slag from the product of the ore/slag ratio and the amount of FeO in the ore.

$$\frac{(\text{FeO}_{\text{ore}} * \text{ratio}_{\text{ore/slag}}) - \text{FeO}_{\text{slag}}}{(\text{FeO}_{\text{ore}} * \text{ratio}_{\text{ore/slag}})} = \text{yield} \quad (2)$$

The model has been tested for the results of several experiments with reconstructions of both slagpit- and slagtapping furnaces and seems to describe the results adequately (Joosten *et al.* 1997a-b).

The aim of this study is to characterise the chemistry of the ore and slags from an early medieval smelting site in the Veluwe area. With this chemical 'fingerprint', it should be possible to certify a genetic relationship between the ore and slags; to calculate the ore:slag:iron ratio, and to establish to what extent furnace lining and fuel ash have contributed to the chemistry of the slag.

Veluwe area

On two of the ice-pushed ridges in the central parts of the Netherlands, traces of early medieval iron production are found: slag heaps and open-cast mining pits. The iron ore, so-called rattlestones, is present in certain strata in the ice-pushed ridges. Rattlestones are ellipsoidal envelopes of iron hydroxide containing a loose-fitting core of clay or silt, that make a rattling noise when shaken. The visible remains of mining activities consist of several tenths of kilometres of rows of pits from which the rattlestones have been extracted. So far the presence of over seventy slagheaps could be established in the Veluwe area. The tap slag demonstrates that furnaces with a slag-tapping device were used. In 1988 and 1990 the largest slag heap of this area – situated near Apeldoorn (Orderbos) – was excavated (van Nie 1990). The smelting site was dated to the 9th century AD and provided enough material for an extensive analysis.

The following material has been collected from the Orderbos: rattlestone ore, slag (tap slag and furnace bottom, i.e. slag that has accumulated at the bottom of the smelting furnace (McDonnell 1983)), furnace lining and charcoal. Samples of rattlestone ore are also derived from open-cast mining pits situated 3350 m (the shortest distance) or 3600 m from the smelting site (Asselse Veld) on the other side of an old road, the so-called 'Hessenweg' (Van Nie pers. comm.), and some are surface finds from other parts of the Veluwe. To compare the chemistry of excavated charcoal with that of fresh ones, two pieces of birch (*Betula*) were also selected for analysis. Thin sections are made of most of the slag samples and furnace lining and studied by transmitted and reflected light microscopy.

Method

The rattlestones, slags and furnace lining were crushed in a tungsten carbide swing mill and the charcoal samples in an agate mortar. The volatile fraction (LOI) was determined by drying the samples in a furnace at 1000° C for twelve hours. This figure has been corrected for the oxidation of divalent to trivalent iron. The major elements Al, Ca, Fe, K, Mg, Mn, Na, P, Si were analysed with X-ray fluorescence (XRF). The FeO content was determined by a titration of the samples with $\text{K}_2\text{Cr}_2\text{O}_7$ in the presence of an indicator (sodium diphenylamin sulphonate). After dissolution of the samples in a mixture of 40 % HF, and 70 % HClO_4 and 65 % HNO_3 (2:3 parts by volume), the trace element Sr was measured with

Table 1:

Chemical composition of rattlestone ore in the Veluwe area. The total given is from the XRF, i.e. the sum of the dry oxides, with all iron as Fe O₂. Legend: A: magnetic pieces of burnt rattlestone from the Orderbos; B: Apeldoorn; C: smooth rattlestone from 'grindgat Klopman Ugchelen'; D: magnetic pieces of burnt rattlestone from the Spelderholt; E-G: Asselse Veld; np: not present, LOI: volatiles.

Sample	A	B	C	D	E	F	G
wt %							
SiO ₂	8.1	9.9	13.9	11.1	12.0	23.9	18.3
TiO ₂	0.4	0.1	0.1	0.1	0.1	0.1	0.1
Al ₂ O ₃	2.0	3.1	2.8	3.2	2.5	2.5	2.4
FeO	np	np	np	np	np	np	np
Fe ₂ O ₃	87.9	83.3	77.9	82.6	85.9	73.4	79.1
FeO _t	79.1	75.0	70.1	74.33	77.3	66.0	71.1
MnO	2.6	2.7	4.2	2.9	1.8	1.9	1.7
MgO	0.3	0.1	0.3	0.2	0.2	0.2	0.2
CaO	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Na ₂ O	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
K ₂ O	0.3	0.4	0.6	0.4	0.4	0.4	0.4
P ₂ O ₅	0.4	0.9	0.6	0.8	0.6	0.6	0.6
Total	102.0	100.3	100.1	101.1	103.5	102.9	102.7
LOI	11.1	16.0	11.1	4.8	13.0	11.4	12.2
ppm							
Sr	13	10	24	16	13	15	11

Inductive Coupled Plasma Atomic Emission Spectrometry (ICP-AES). The charcoal samples were dissolved in a mixture of 70% HClO₄ and 65 % HNO₃ (2:3 parts by volume) and also analysed with ICP-AES. International standards with high iron contents (FER-1 and FER-4) were analysed together with the samples to check the accuracy of the analyses. The accuracy was better than 10 % for all elements and oxides. The mineralogy of the rattlestone ore is studied by means of X-ray diffraction (XRD).

Results

The main constituent of the rattlestones is the mineral lepidocrocite, an iron hydroxide with the formula γ -FeOOH. The tap slags from the Orderbos have a homogeneous texture of acicular fayalite, few specks of metallic iron and fine-grained dendritic wüstite in a glass matrix. Fayalite in the furnace bottoms is more equidimensional in shape. The furnace bottoms often contains sand or silt. The bottom of tap slags OR5 and 6 also contains sandy material. The furnace lining consists of rounded quartz grains embedded in a clay or glass matrix. Mica, feldspar and epidote are present in trace amounts in the clay part (Elburg 1992).

The result of the chemical analysis of the ores and slags are listed in Table 1 and 2, respectively. The rattlestones contain up to 88 wt % Fe₂O₃ and quartz is the most important gangue mineral. The samples from the Asselse Veld contain on average less MnO than the other rattlestones, respectively 1.8 and 2.6 to 4.2 wt %. The slags contain 3 to 6 wt % MnO. SiO₂ and Al₂O₃ are clearly correlated from the ore to the slags and range from 8 to 25 wt % and 2 to 4.5 wt %, respectively. The furnace bottoms and two slags (OR5 and 6) are enriched in SiO₂ when compared to the ore. Calcium is present in trace amounts in the ore (up to 0.1 %), whereas most tap slags contain up to 1.3 wt % CaO.

The charcoal from the Orderbos is exclusively derived from oak, *Quercus* sp. (Musch 1991). They contain up to 10 % dry weight. This consists mainly of CaO (up to 9 wt %) or Al₂O₃ (3 wt %); see Table 4. The pieces with CaO also contain up to 500 ppm Sr. The fresh charcoal, derived from Birch (*Betula*), contains 0.45 to 0.75 wt % dry weight and this consists mainly of CaO, K₂O and MgO, respectively, up to 0.21, 0.27 and 0.15 wt %. The amount of Sr is below the detection limit.

Table 2:

Chemical composition of slags and furnace lining from the Orderbos. The total given is from the XRF, i.e. the sum of the dry oxides, with all iron as Fe_2O_3 . Legend: OR4-6, OR8-9, OR21-25: tap slag; OR10, OR33, OR39: furnace bottom; OR12: furnace lining.

Sample	OR4	OR5	OR6	OR8	OR9	OR21	OR22	OR24	OR25	OR10	OR33	OR39	OR12
wt %													
SiO_2	19.3	24.8	16.8	18.2	22.6	12.3	18.0	15.7	14.0	31.2	16.3	25.1	78.4
TiO_2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.3	0.2	0.2	0.6
Al_2O_3	4.4	4.5	3.4	4.6	5.3	3.8	4.1	3.8	3.7	5.9	3.1	3.8	8.0
FeO	57.8	51.0	56.6	53.8	47.7	64.3	56.2	62.7	60.6	39.0	58.6	57.7	1.7
Fe_2O_3	5.5	6.5	12.3	10.2	10.4	9.0	6.2	4.6	8.1	10.7	12.4	3.4	5.3
FeO_t	62.7	56.8	67.7	62.9	57.1	72.3	61.8	66.8	67.9	48.6	69.0	60.8	6.4
MnO	5.7	4.4	4.2	5.5	6.0	4.8	6.7	4.9	5.2	5.6	4.2	3.0	0.1
MgO	0.5	0.4	0.3	0.4	0.5	0.3	0.4	0.4	0.4	0.5	0.4	0.4	0.6
CaO	1.3	0.9	0.4	0.8	1.0	0.2	1.0	0.7	0.8	1.0	0.5	0.4	0.2
Na_2O	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4
K_2O	0.9	0.9	0.3	0.4	1.2	0.7	1.3	1.0	1.0	1.0	0.3	0.7	1.7
P_2O_5	0.8	0.8	0.8	0.8	0.8	0.7	0.9	0.8	0.8	0.7	0.7	0.6	0.1
Total	102.8	100.1	101.6	101	101	103.1	101.2	101.7	101.4	100.2	103.2	101.7	97.3
LOI	-0.5	0.5	0.3	0.7	0.2	0.7	1.1	0.6	0.5	0.3	1.3	1.2	0.9
ppm													
Sr	36	40	20	26	43	44	104	80	82	45	42	40	53

Ore/slag ratio and yield

The percentage of iron present in the slags from the Orderbos is still quite high (Fig. 3), as could be expected from the mineralogical composition of the main component (fayalite contains 70 wt % FeO). The iron content of the rattlestones is only somewhat higher than that of the slag. This means that careful

selection of the most iron-rich pieces of ore was necessary to have any iron oxide left over for the reduction to metallic iron. Traces of selection and ore dressing, a thin layer of crushed rattlestones mostly with gravel and coarse sand adhering and cores of rattlestones, have been found adjacent to one of the mining pits excavated in 1988 (van Nie 1990).

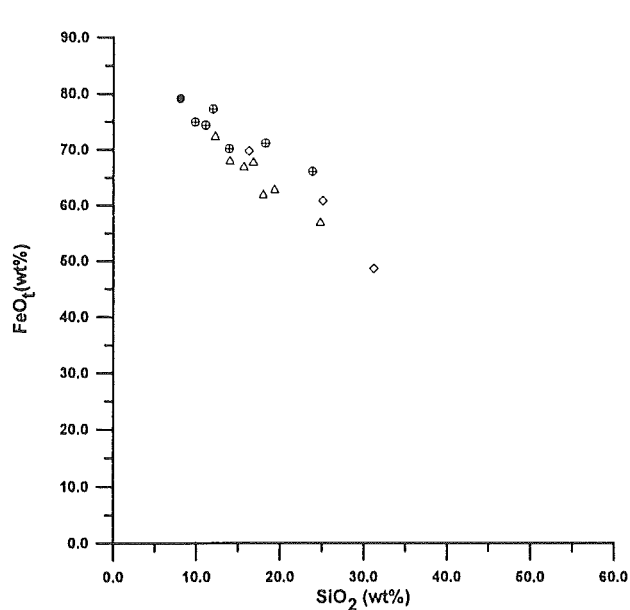


Fig. 3. - Chemical relationship between ore and slags from the Orderbos: FeO_t vs. SiO_2 .

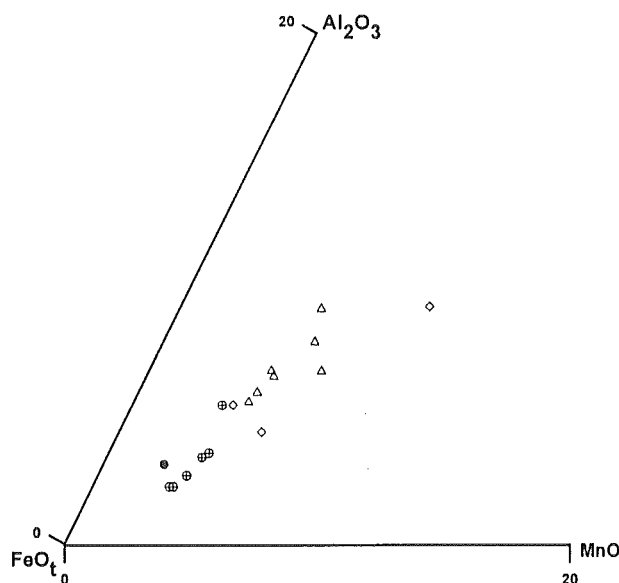


Fig. 4. - Triangular variation diagram of FeO_t , Al_2O_3 and MnO. Legend: filled circle: rattlestone A found in the slag heap of the Orderbos; cross in circle: rattlestones B to G; triangles: tap slags; diamonds: furnace bottoms

The oxides FeO , Al_2O_3 and MnO have been normalised and plotted in a triangle diagram in figure 4. Both Al_2O_3 and MnO enter the slag phase, whereas FeO enters the slag as well as the metallic iron. Therefore, related slags and ore should plot on one line originating from the FeO -corner, with the ores plotting nearest to the corner. The rattlestones and the slags approximately plot on the same line in the right order.

The ores and slags show a linear relationship between Al_2O_3 and SiO_2 through the origin (Fig. 5A). Tap slag OR5 and 6 and the furnace bottoms are enriched in SiO_2 , most probably due to adhering sand. Also MnO is positively correlated with both Al_2O_3 and SiO_2 (Fig. 5B). The three samples of rattlestone ore from the Asselse Veld contain on average too little MnO to be related with the Orderbos slags (Fig. 5B). Rattlestone A, found in the slag heap at the Orderbos, seems to be the most promising candidate for a representative ore analysis because of its high FeO content and ratio of gangue elements that is comparable to those of the slags (black dot in Fig. 3, 4 and 5A, B).

The slags are enriched in CaO compared to the ore (Fig. 6). The elements Mg , K and P also do not show a relationship from the ore to the slags through the origin. Therefore only SiO_2 , Al_2O_3 and MnO can be used to calculate the ore/slag ratio.

Taking a rather average slag analysis like OR25 we get an ore:slag:iron ratio of 2:1:0.6 (by weight); see Table 3. The loss of weight during smelting is caused by both the volatile content of the ore and the

difference in weight between Fe^0 and Fe_2O_3 . The yield of the process is calculated to be 52 %. When other slags are used in this calculation (both lower and higher in FeO), we get an idea of the variations possible in the yield: 44 to 68 % (Table 3). This agrees with the figure of 30 to 50 % which was calculated by Tylecote (1971). Other literature values for the ratios are 1:0.3-0.5 for slag:iron (Serning 1979), 2:1:0.3 for ore:slag:iron (Bielenin & Woyda 1978, Bielenin 1995) and 1.4:1:0.3 also for ore:slag:iron (Voss 1995).

The slag heap in the Orderbos consists of several (at least 4) densely packed smaller heaps and looser packed material covering the sides and rim of the heap. The total calculated volume of the dense material is 277.6 m^3 and that of the less dense packed material 55 m^3 . The packing factors for loose and dense areas of the heap are determined by weighing the amount of roughly washed slag from a known volume of sample and dividing this by the average specific gravity of the slags which was determined as 3.5. The packing factors are 0.6 for the dense and 0.34 for the loose packed material. The minimum amount of slag in the heap in the Orderbos is estimated to be about 642.6 tons. (van Nie 1990) The most conservative estimation of the amount of iron produced is made by using the ore:slag:iron ratio for OR21: 1.8:1:0.4. In that case, it is concluded that the slagheap represents at least 257 tons of metallic iron. The smelting site has proven to be in use during (part of) the 9th century AD; presumably, it dates from the early 8th to the second half of the 9th centuries AD (Van Nie, pers. comm.).

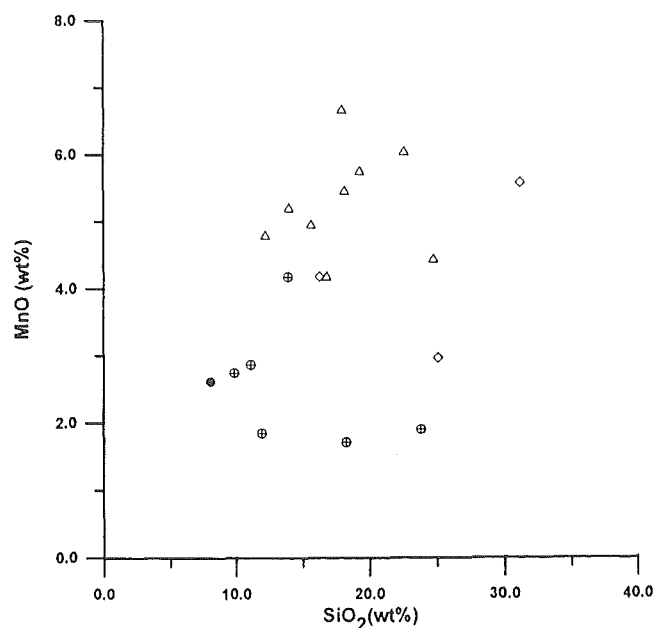
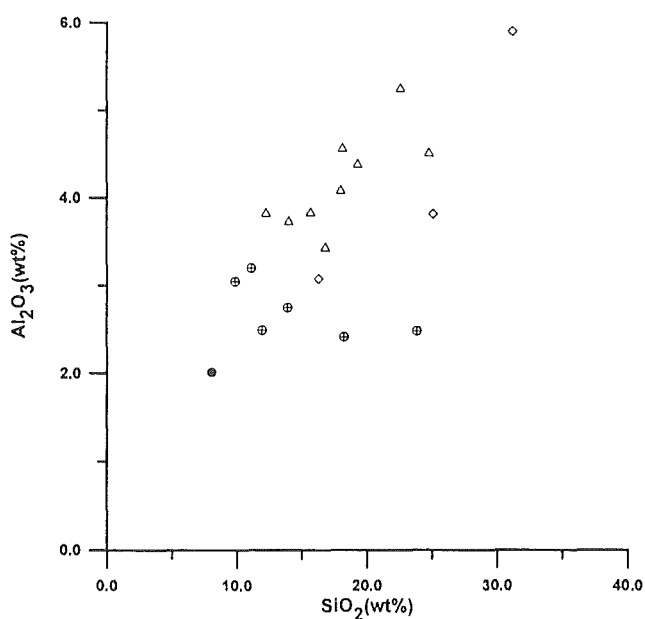


Fig. 5A and B. - Chemical relationship between ore and slags from the Orderbos: Al_2O_3 and MnO vs. SiO_2 . Legend: filled circle: rattlestones A; cross in circle: rattlestones B to G, triangles: tap slags; diamonds: furnace bottoms.

Table 3.

Calculated figures. Legend as in Table 1 and 2. The fuel/ore ratio is calculated with the fresh charcoal (h-j in Table 4).

Slag	FeO _t (wt %)	Ore	FeO _t (wt %)	Ore:Slag:Iron	Yield (%)	Fuel/ore ratio
OR25	67.9	A	79.1	2.0:1:0.6	52	1.7-2.8
OR5	56.8	A	79.1	2.5:1:1.0	68	1.6-2.6
OR21	72.3	A	79.1	1.8:1:0.4	44	0.6-1.0
OR39	60.8	A	79.1	2.0:1:0.6	58	0.8-1.3

For comparison purposes, the output of the Orderbos smelting site is set next to that of other sites. It must be noted that only figures from smelting sites have been taken into account and not the output of whole regions. Sunnanäng, the largest excavated smelting site in the Dalarna region (Sweden), dating from the 9th to the 11th century AD, yielded 21 tons of iron produced in slag tapping furnaces (Serning 1979). The calculations are based on the iron content of related ore and slag and also take into account the influence of the charcoal on the slag composition. During the 2th to 7th centuries AD, a calculated amount of 150 tons of iron, based on the iron content of the roasted ore and slag, has been produced in slagpit furnaces in Snorup, Denmark (Voss 1995). The iron production from the 3 hectare complex of the Bardown site in the Weald (Britain), dating from 120 to 240 AD, yielded a calculated amount of 4,500 tons of iron (Cleere 1976). The weight of the slag, 13,500 tons, is calculated by estimating the

packing factor and specific gravity of the slag as 0.5 and 3, respectively. The iron production was arrived at using a slag to metal ratio of 1:0.3 based on figures of Bielenin (1974). So far it seems that the large scale of the iron production in the Orderbos was unique for the period in western Europe. The discussion about the destination of such large amounts of iron is beyond the scope of this study and will be presented elsewhere.

Fuel to ore ratio

Calcium oxide is present in trace amounts in the ore (up to 0.1 wt %), whereas the tap slags contain up to 1.3 wt %. In the triangle diagram with Al₂O₃, MnO and CaO (Fig. 6), related ore and slags should plot in the same area (all three oxides enter the slag phase) unless any of the oxides have been added to the slag from another source, as furnace lining or fuel ash.

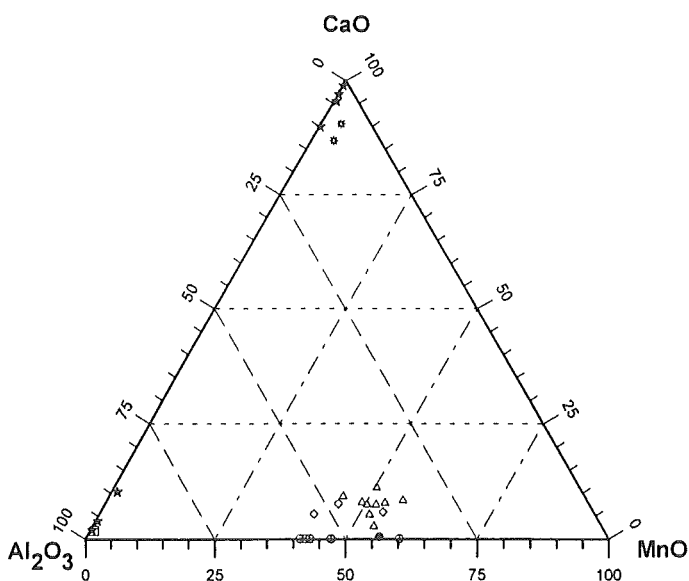


Fig. 6. - Triangular variation diagram of Al₂O₃, MnO and CaO.

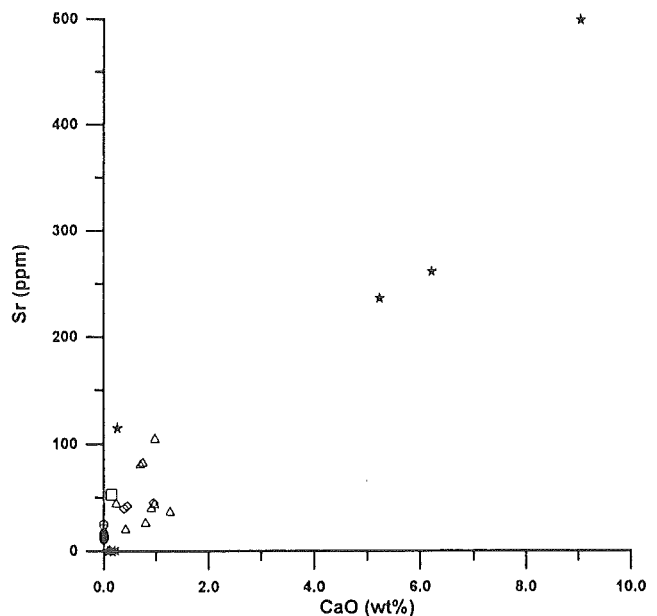


Fig. 7. - Chemical relationship between ore and slags from the Orderbos: Sr vs. CaO.

Legend: filled circles: rattlestone ore A; cross in circle: rattlestone ore (B to G); triangles: tap slags; diamonds:

Table 4: Chemical composition of charcoal. Legend: **a-g:** early medieval charcoal from Oak (*Quercus*) from the Orderbos; **h-j:** fresh charcoal from Birch (*Betula*), **k:** Oakwood ash from Lower Saxony (Hartmann 1994), **NA:** Not Analysed.

Sample	a	b	c	d	e	f	g	h	j	k
wt %										
SiO ₂	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.90
TiO ₂	0.01	<0.001	<0.001	<0.001	0.01	0.01	<0.001	<0.001	<0.001	0.11
Al ₂ O ₃	0.69	3.23	0.10	0.22	2.47	2.28	0.17	0.02	0.01	0.30
FeO	0.31	0.07	0.05	0.16	0.29	0.26	0.10	0.01	<0.001	0.69
MnO	0.01	0.01	<0.001	0.02	0.01	0.03	0.01	0.01	0.01	3.53
MgO	0.62	<0.001	0.44	0.25	<0.001	<0.001	0.53	0.15	0.07	5.40
CaO	6.22	0.07	9.05	5.23	0.10	0.26	5.86	0.21	0.13	43.1
Na ₂ O	0.03	0.01	0.04	0.02	0.03	0.02	0.04	0.01	<0.001	0.49
K ₂ O	0.13	0.02	0.15	0.07	0.04	0.06	0.09	0.27	0.18	29.6
P ₂ O ₅	0.02	<0.001	0.01	<0.001	0.01	<0.001	0.01	0.06	0.05	11.40
Total	8.04	3.43	9.84	5.97	2.96	2.92	6.64	0.73	0.45	98.60
ppm										
Sr	262	<0.03	499	237	<0.03	115	377	<0.03	<0.03	1069

The slags are displaced from the rattlestone onwards to the CaO corner. This cannot result from contamination with the furnace lining, as it plots in the Al₂O₃ corner. The CaO presumably originates from the charcoal, which can contain up to 9 wt % of CaO (Table 4). There is also a strong correlation between Sr and CaO in the slags from the ore to the charcoal (Fig. 7). The presence of Sr in the pieces of fresh charcoal could not be detected, but the ashes which are much more concentrated might contain some as illustrated by the analyses of oakwood ash (*Quercus*) by Hartmann (1994) which contains 1069 ppm of Sr (sample k in Table 4).

The contribution of the charcoal to the chemistry of the slag is reflected by its enrichment in calcium with respect to the ore. The ore/slag ratio can be used to calculate the surplus CaO in the slag (Equation 3).

$$\left(CaO_{slag} / ratio_{ore/slag} \right) - CaO_{ore} \quad (3)$$

The fuel to ore ratio is estimated by dividing the surplus of CaO in the slag by the amount of CaO in the charcoal. The chemistry of the excavated pieces of charcoal, however, might have been altered during their stay in the soil since it is well known for its adsorbance qualities. Small particles of clay could have been adhering to the surface of the charcoal, despite extensive cleaning by ultrasonic vibration, also contributing to the dry weight. The pieces of fresh charcoal contain more than ten times less dry weight and may reflect the original chemical compo-

sition of the used charcoal somewhat better. Therefore, the CaO-content of the fresh charcoal – 0.13 and 0.21 wt % respectively – is used to calculate the fuel to ore ratio. The ratio ranges from 0.6 to 2.8:1 (by weight); see Table 3. Since the exact amount of CaO in the used charcoal is not known, this can only be a rough estimation. Presumably only the charcoal which is in close contact with the slag can be re-sorbed, therefore the calculated amount of charcoal will represent the fuel to ore ratio during smelting. The amount of charcoal used to pre- and after-heat the furnace is not included in the figure. Calculated figures from an experiment with a slagpit furnace range from 0.7 to 1.2 which agrees well with the ratio as charged, i.e. 1:1 (Joosten *et al.* 1997b). An experiment with a slag-tapping furnace yielded a calculated ratio ranging from 0.8 to 1.5:1 which was a little lower than the ratio as charged, i.e. 1.5:1 (Joosten *et al.* 1997a). The most conservative fuel to ore ratio during smelting, estimated by the slag with the lowest ore:slag ratio: OR21, ranges from 0.6 to 1:1 (by weight). It can be concluded that the slagheap of the Orderbos represents the consumption of at least 694 to 1156.7 tons of charcoal.

The amount of charcoal that could be produced per hectare of coppice forest can be estimated to be 10 ton +/- 50 % per hectare (Voss 1995). The estimation is partly based upon accounts written around 1800 for the blast furnace in Port-Brillet, France; they got 12 tons of charcoal from each hectare of coppiced oakwood. Accordingly, the iron production in the Orderbos would have consumed at least 69.4 to 115.7 hectares of coppice wood.

Conclusions

The output and charcoal consumption of an early medieval smelting site in the Orderbos in the Veluwe area have been calculated by the chemistry of related slags and ore, and charcoal. The most conservative ore:slag:iron ratio is 1.8:1:0.4 (by weight). Therefore the slagheap in the Orderbos, containing an estimated minimum amount of 642.6 tons of slag, represents at least 257 tons of metallic iron. The fuel to ore ratio during smelting was roughly estimated to range from 0.6 to 1.0 (by weight). The iron production would in that case have consumed at least 694 to 1156.7 tons of charcoal. The proposed figures represent minimum amounts based upon the most conservative ratio's.

Acknowledgements

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Early Medieval Metal-working at the *Terp* Tjitsma (Frisia, The Netherlands)

The *terp*¹ Tjitsma is situated near Wijnaldum in the north of the Netherlands (fig. 1). It was excavated from 1991 until 1993. The excavation was carried out under direction of J.C. Besteman, J.M. Bos and H.A. Heidinga (University of Amsterdam and State University of Groningen).

The *terp* Tjitsma is only one of a whole series of *terpen* near Wijnaldum. Because of a shortage of funding, it has not been excavated completely. This was the first time a part of a Dutch *terp* has been excavated so systematically. Even the smallest pieces of metal were retrieved by the use of metal-detectors and the contents of features were sieved to retrieve finds as small as seeds and beads.

One of the reasons for the excavation was the great amount of metal objects that were discovered by amateur-archaeologists with metal-detectors. The finds made it clear that the top part of the *terp* had been eroded and what was left of the features and finds needed to be studied. At the same time an excavation could also give more information about the erosion of this type of monument.

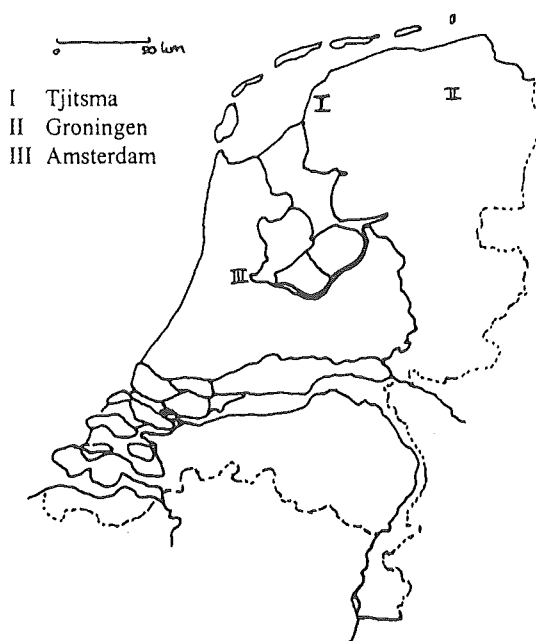


Fig. 1. - Map of the Netherlands with the location of the *terp* Tjitsma (from: Besteman & Bos & Heidinga 1993, 10).

During the excavation it became clear that many different craftsmen have worked at the *terp*. Traces have been found of glass-blowing, deerhorn- and bone-working, amber-working, sewing, weaving, spinning, and metal-working. The present paper is about the metal-working that took place at the *terp* between the 2nd and the 10th century AD. The majority of finds related to metal-working are the iron-slugs and the hearth-material. Other categories are fragments of crucibles, moulds, scrap metal, touchstones, semi-manufactured objects and ingots.

Evidence for Metal-working

Gold-working

The evidence for gold- and silver-working was not discovered in the same amount as traces of copper-working or iron-working. Small pieces of waste metal and failed castings were not easily discarded, but remelted and then made into new objects. Another reason is that gold and silver were not as often used as the other metals.

There are no gold ingots known from the *terp*. Gold was probably obtained in the form of objects and then remelted. It is a fact that gold was melted at Tjitsma: two golddrops and a fragment of a crucible with tiny drops of gold were found. The crucible fragment is dated 650-750 AD and was found in the vicinity of two fragments of goldwire from the same period. The goldwire consisted of a thin, flat strip of gold that was twisted into a round wire. These wire fragments could be used for filigrain-work². One of the two golddrops cannot be dated, because it was

¹ A *terp* is a man-made mound in the Dutch coastal area. It protected the people living on it from the sea.

² Andersson (1995, 125) calls this type 'strip-twisted'. The wire can not only be used for filigrain-work, but can also be used as decoration on clothes as is the case in a Frankish cemetery (Janssen 1991, 78). The wire-fragments at Tjitsma, however, do not have a grave-context.

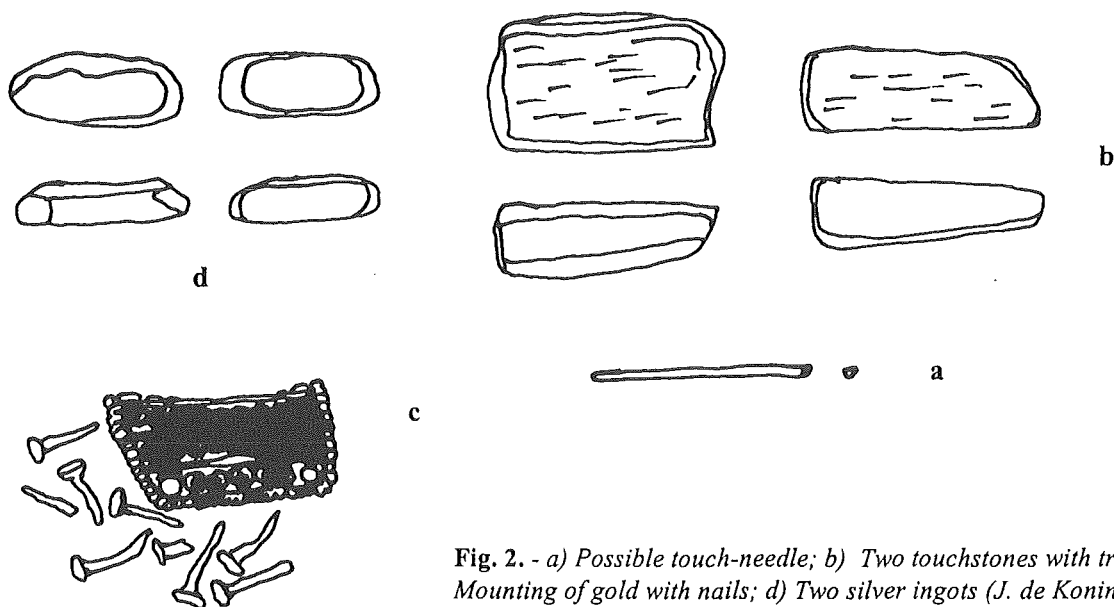


Fig. 2. - a) Possible touch-needle; b) Two touchstones with traces of gold; c) Mounting of gold with nails; d) Two silver ingots (J. de Koning).

found on the surface. The other is dated 850-950 AD and was in a context with two silverdrops and an golden object that could be a touch-needle (fig. 2, a).

Two touchstones (fig. 2, b) were discovered during the excavation. One is black and rectangular and has traces of gold on two sides. It was found in a layer of sods and is dated 550-650. The second stone has a smaller width and has traces of gold on one side. The stone is grey/blue and is not as smooth as the other one. This touchstone came out of a well (which has been dated to the 9th century AD). A decorated gold mount (fig. 2, c) is one of the nicer finds. It is folded and had a secondary use of holding a few golden nails. It is not known whether the mounting was made locally or elsewhere.

During the excavation, a few thin gold pieces were found that turned out to be parts of the golden brooch (with almandine) that had already been discovered in 1954. The precise context of the brooch is unknown. The brooch has been analysed and among the scratches on the back are some cutting marks. It has been suggested that the brooch was in the possession of a goldsmith so it could be repaired³.

Three years after the excavation, a matrix of copper was found among some scrap copper-fragments. This type of matrix was used to provide a sheet of gold with a waffle pattern (such sheet-gold was used as a background beneath the almandine and made it shinier and brighter). The pattern of the matrix consists of 10 times 14 squares of one millimetre. Each of these squares is divided in 16 smaller squares.

Silver-working

A piece of pottery was found at the *terp* that could be a cupel-fragment (cupellation can be used to separate silver from lead or to purify gold⁴). The surface is purple and porous. The pottery sherd still needs to be analysed to be able to determine whether it actually is a cupel-fragment.

Other evidence for silver-working consists of four silver ingots. Two have more or less the same measurements (fig. 2, d). One other ingot is of the same type, but is cut in half. These ingots are probably formed in open moulds, because one side is flat (the flat side would have been the upper side of the open mould). They are dated 475-550 AD⁵. The fourth ingot is long and thin.

Two silverdrops were found in a context with a golddrop and the touch-needle and date from 850-950. The third silverdrop is earlier (475-550) and was found in the vicinity of one of the silver ingots.

Copper-working

During the excavation many fragments of copper-alloys and pieces of lead were found. Lead and copper were in the same contexts, often together with fragments of crucibles and moulds. The lead could have been used for an alloy with copper or for making models for moulds.

³ See A.J. Nijboer & J. van Reekum (in print).

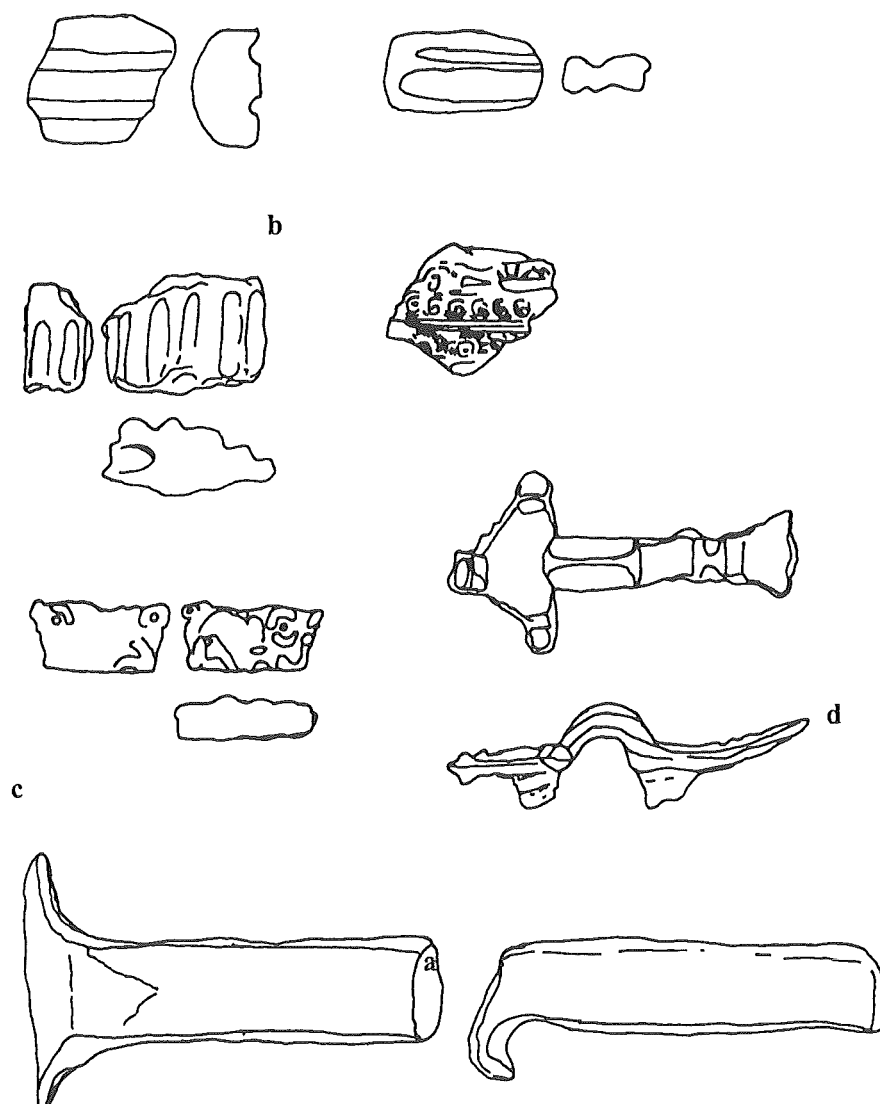
⁴ The lead oxidises to a litharge that can be taken off the melted metal or gets absorbed in the crucible. The silver is left in the form of a small lump at the bottom of the crucible (Tylecote 1992, 89;

Bayley 1988, 194).

⁵ The form of these ingots can be compared to that of the one from Easingwold in York, although that one was dated in the Viking Age (Blackburn & Bonser 1990, 149).

Fig. 3. -

- a) Copper ingots (J. de Koning);
 b) Four moulds, one of which is decorated (J. de Koning, C. Tulp);
 c) A model;
 d) A semi-manufactured brooch (J. de Koning).



Copper objects were made by melting ingots, scrap metal or objects like Roman coins. There are a few copper ingots from Tjitsma, which have different shapes (for example fig. 3, a). Roman coins and fragments of coins were in some cases discovered among other copper fragments and lead. The same goes for some fragments of copper objects that were found in abundance at the *terp*. A lot of scrap metal was in the form of copper sheets. Sometimes these sheets were folded and some of them have cutting marks.

No complete crucibles were found, often only very small fragments. Because of this it is difficult to say anything about the size and form of the crucibles used at the *terp*. About half of the fragments were found in contexts with other evidence for metal-working. On some of the fragments traces of copper are visible.

Most of the moulds from Tjitsma have one or more grooves in the surface for making small bars (fig. 3, b). Many of these moulds are found in contexts with copper, lead and fragments of crucibles. There is only one fragment of a decorated mould. At

Tjitsma one object was found that may have been a model (fig. 3, c). It is an object of lead and is decorated on both sides.

There are three semi-manufactured objects from the *terp*: two keys and one brooch. The brooch (fig. 3, d) still has the casting seams.

Iron-working

The iron ingots from Tjitsma are of several different forms. Two ingots consist of a folded sheet of iron (fig. 4, a). Two others (fig. 4, b) are flat (one has two folded edges and is called a ploughshare⁶). Another ingot is long and is round in cross-section. It is possible that this is a semi-manufactured object. The same goes for two flat, long ingots with a bent end (fig. 4, c).

⁶ Brown 1986, 313; Müller-Wille 1977, 143.

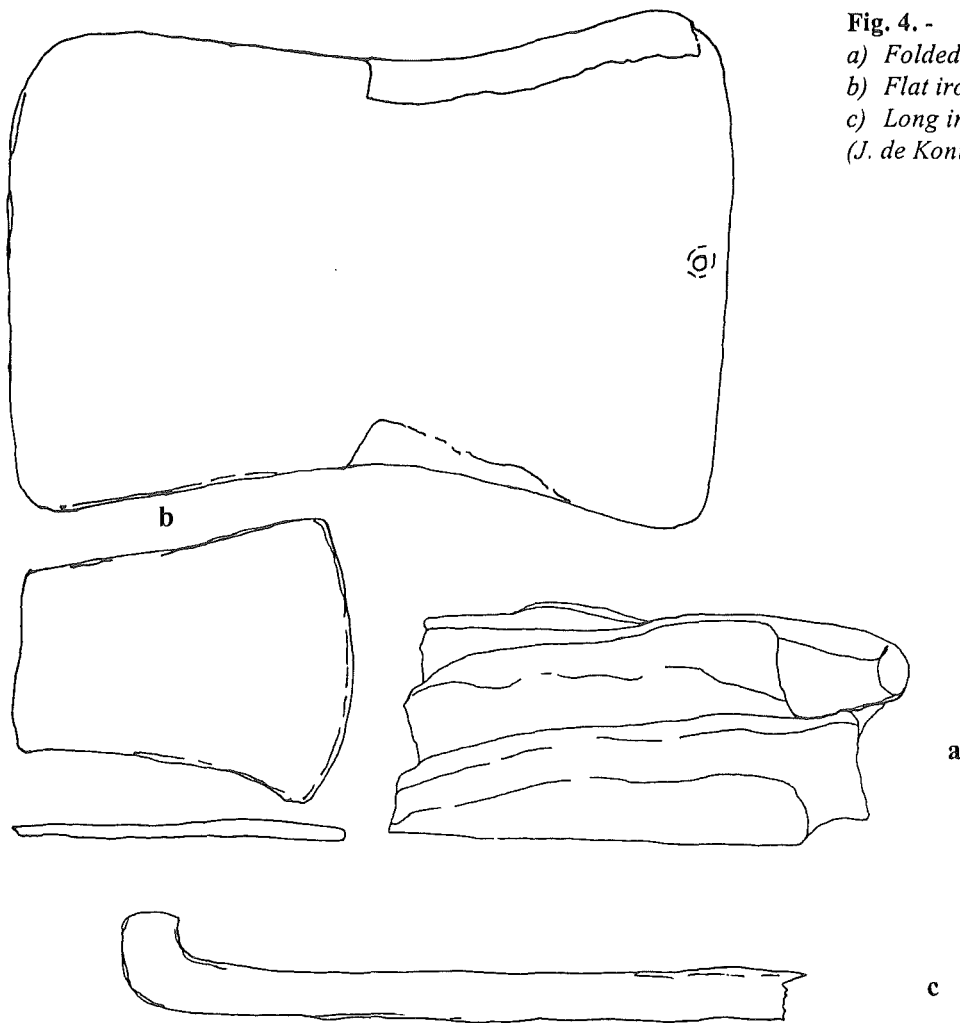


Fig. 4. -
a) Folded sheet of iron;
b) Flat iron ingots;
c) Long iron ingot with one bent end.
(J. de Koning).

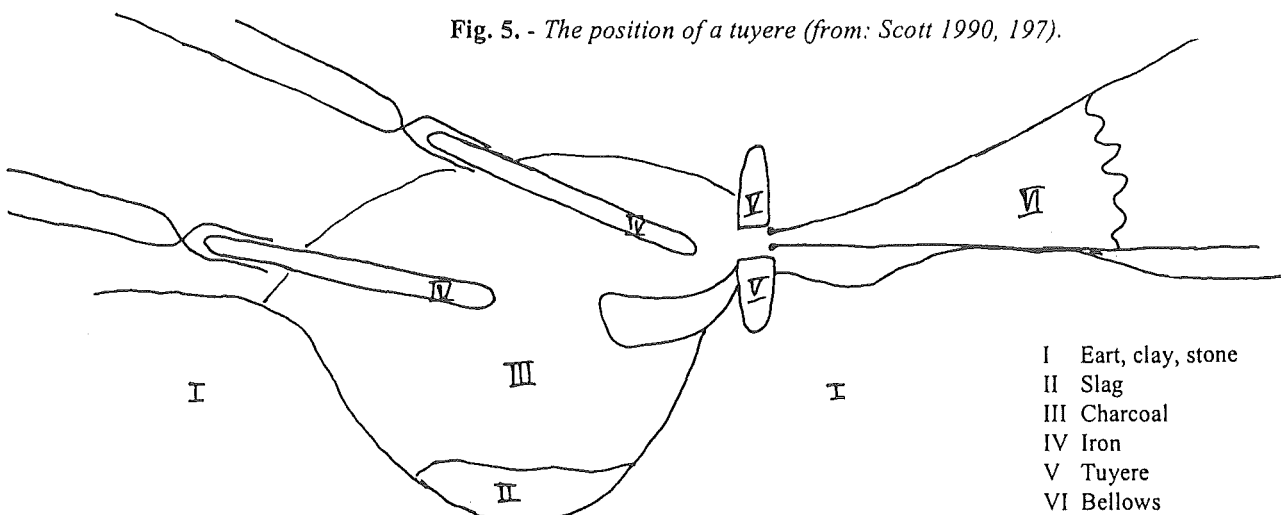
Slags that derived from the production of iron have not been found during the excavation. The slags from Tjitsma are smithing-slags. Some slags are plano-convex and show the form of the base of the hearth.

In the same contexts as the slags and the material from hearths were some tuyère fragments. They were not parts of tubes, but were positioned between the fire and the bellows (fig. 5). This way they protected

the bellows from the fire⁷. One side of the tuyère fragments is slag-like and vitrified. The other side is the outside and has not suffered from the heat that much. They are dated from 475-550 until 650-750 and are found in contexts with iron-slags and hearth-material.

⁷ Brinch Madsen 1984, 29.

Fig. 5. - The position of a tuyere (from: Scott 1990, 197).



- I Earth, clay, stone
- II Slag
- III Charcoal
- IV Iron
- V Tuyere
- VI Bellows

Fig. 6. - Map of the site with the finds of the 2nd period.

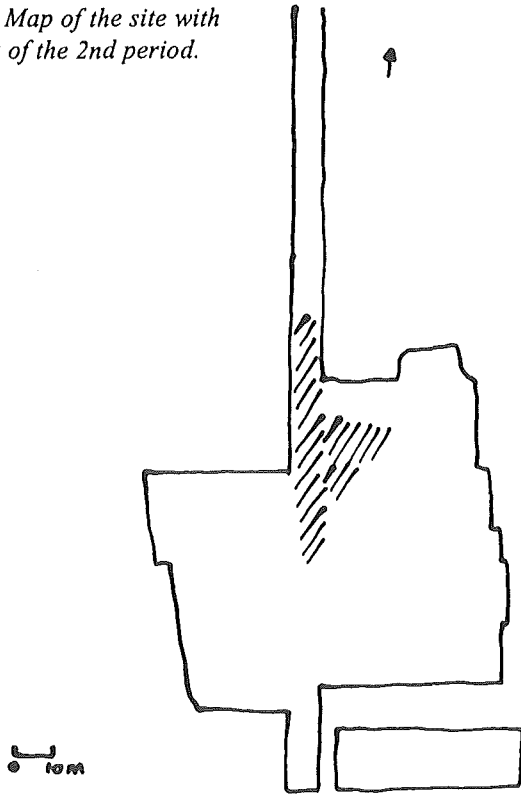
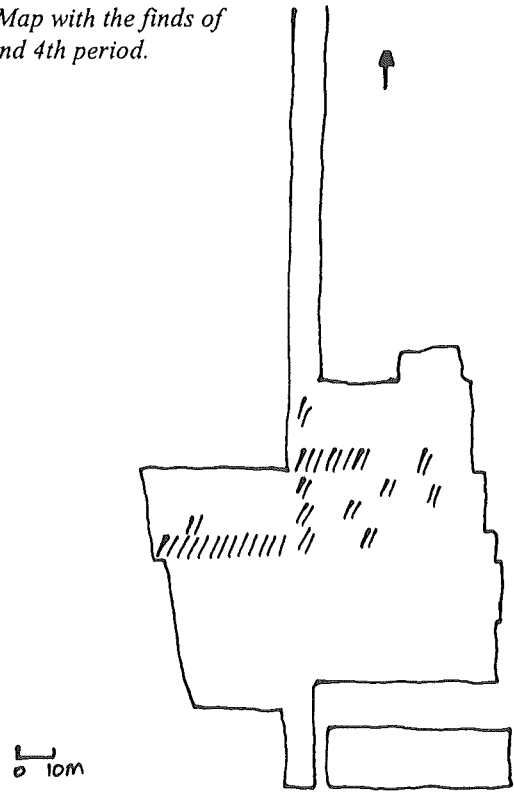


Fig. 7. - Map with the finds of the 3rd and 4th period.



There has been no trace of an anvil, but there is a concentration of hammerscale (usually found around an anvil). This concentration is found in a feature that is interpreted as the floor of the smithy. Except for the hammerscale and some copper and lead, the

feature contained many pieces of iron. All the iron from the site is so corroded that it is very difficult to determine whether some of the pieces of iron are in fact semi-manufactured objects.

Fig. 8. - Map with the finds of the 5th and 6th period.

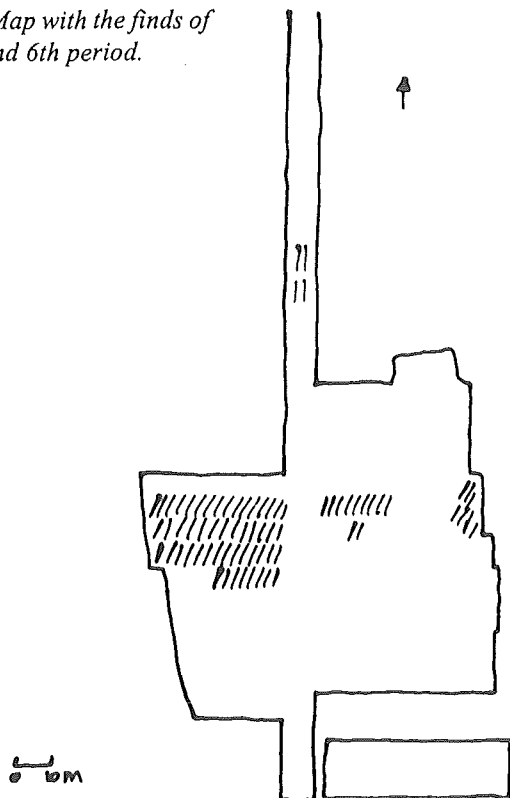
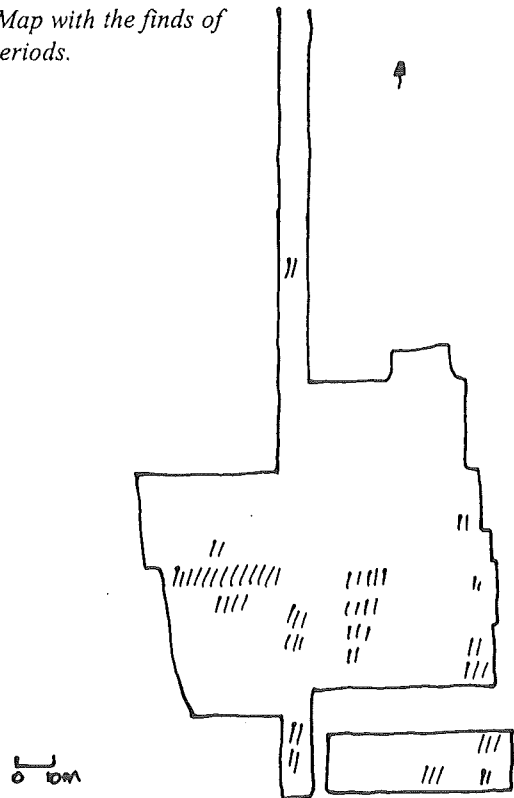


Fig. 9. - Map with the finds of the last periods.



Metal-working during the different periods

The occupation of Tjitsma is dated from 175 until 950 AD. This period is divided into nine phases.

- In the first period (175-250 AD) only a few copper and lead fragments were found at the western side of the *terp*. There are no traces of iron-working and also no traces of gold- and silver-working. Only three silver coins date from this period, but these were not from a metal-working context.

- From the second period (250-300 AD; fig. 6) date some iron-slugs found in the northern part of the *terp*. Here is where the floor of the smithy was also discovered. It was situated at the corner of a small podium built of sods (next to a larger podium with a house). Near the smithy was a well. Except for the small amount of iron-slugs, much other evidence for metal-working was found near the smithy: a lot of fragments of copper, four hearths, crucible sherds, an ingot, and some lead.

- In the third period (425-475 AD; fig. 7); after the Migration Period, the metal-working was moved from the north of the *terp* to the western side. There is still only little evidence for iron-working, but many pieces of copper, lead, a mould, and some sherds of crucibles came to light here.

- The following period (475-550 AD) gives a clearer concentration of metal-working finds: a hearth, a silverdrop, an ingot of silver, many fragments of crucibles, a mould, copper, a lot of lead and many iron-slugs. The people lived on the eastern part of the *terp* during this time. Some finds also come from this part, like the gold mounting and a little goldsmith-hammer. Some slugs were also found on the eastern part, but no concentration was visible.

- Most of the metal-working finds are from the fifth period (550-650 AD; fig. 8). The metal-working is still concentrated at the western side of the *terp*. Here is also a well containing a lot of iron-slugs and copper. Crucibles and moulds were also found at this part of the *terp*.

- In the next period (650-750 AD), the traces of both iron- and copper-working decreased. A few crucible sherds are found, but no moulds. The oldest iron ingot is from this period (although the iron-working is diminishing). There are traces of metal-working on the eastern part of Tjitsma: the goldwire, the crucible sherd with tiny golddrops and a part of a balance were found here. There is, however, no concentration of finds.

- In the seventh period (750-800/850 AD; fig. 9), the evidence for metal-working further decreases. The finds are more scattered over the *terp*. Two iron ingots were found at its southern end for example.

- From the period 800-850 AD dates the touchstone

found in a well. Finds related to metal-working no longer occur at the western side of the *terp*, but there are more of them at the centre (such as three iron ingots) and at the southern side. The traces of occupation increase while those of metal-working decrease.

- In the last period (850-900/950 AD), most of the metal-working finds consist of fragments of lead. Only to the south of the *terp* silverdrops, a golddrop and the touch-needle are found.

At Tjitsma there has been no mass production as for example at Helgö, but metal-working was important at the *terp*. Although the smiths were working in areas of the *terp* where no people were living, they occupied a large part of the *terp*.

The finds that had something to do with gold- and silver-working and the large amounts of copper point towards the presence of an elite near Wijnaldum during the early Middle Ages. Whether part of the elite actually lived at Tjitsma or at another *terp* in the vicinity is difficult to say. In any case, the metal-working took place at the *terp* Tjitsma during many centuries.

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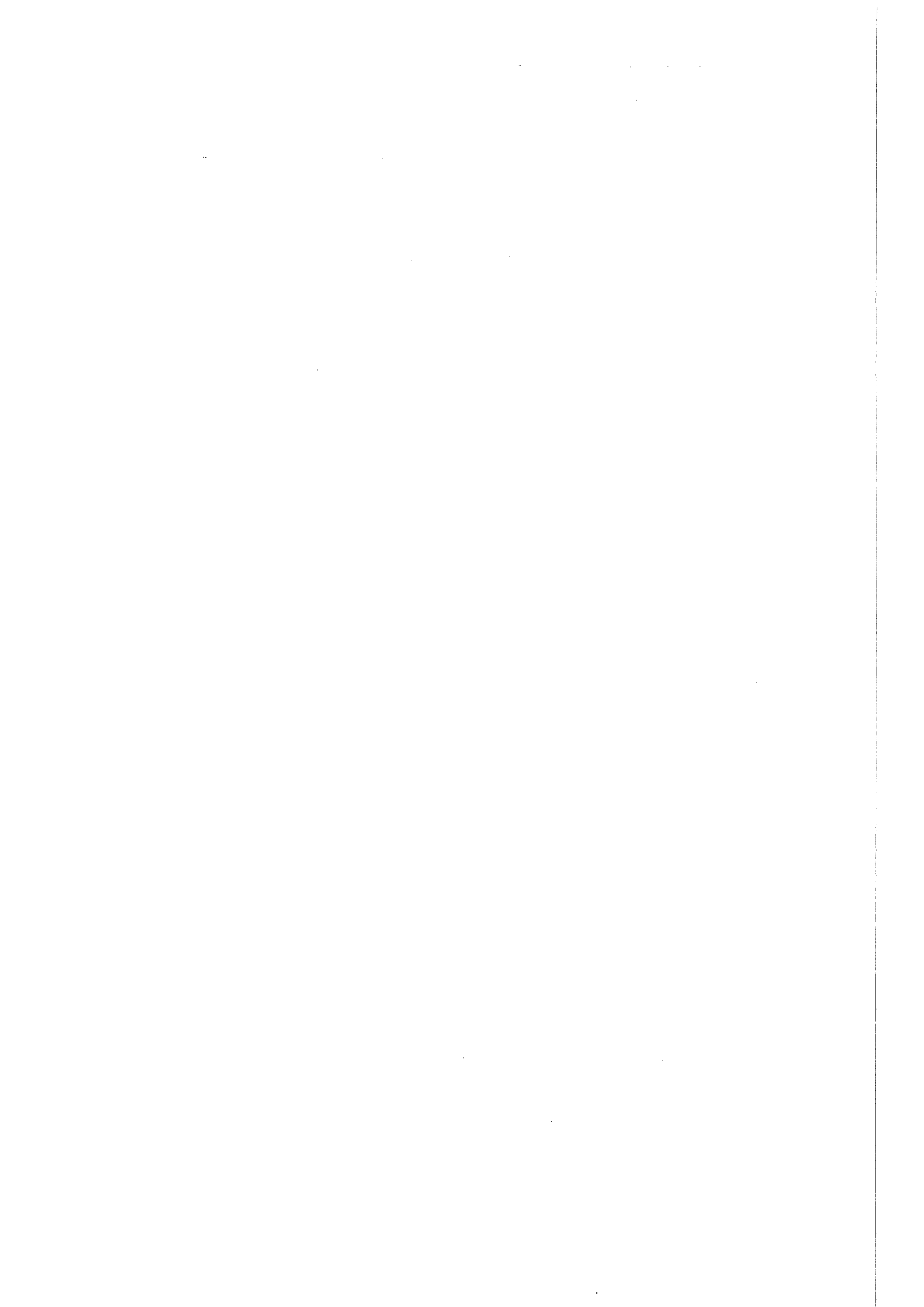
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La producción de hierro en el establecimiento siderúrgico de Fabregada (PrePirineo Catalán) en la Edad Media (siglos XI-XIII)

Introducción

El texto que presentamos a continuación, intentan recoger el estado de las investigaciones que han sido realizadas, hasta este momento, a cerca del yacimiento de *Fabregada*. Después de siete campañas de trabajos de campo, dos de prospección y tres de intervención arqueológica, algunos de los aspectos que nos planteamos, al inicio de la investigación, están aún en proceso de estudio. A pesar de ello, hemos considerado oportuno presentar los resultados obtenidos, tanto por su singularidad como por tratarse de un buen punto de partida para llevar a cabo nuevas investigaciones en historia y arqueología medieval.

En muchos casos, los resultados que aquí presentamos deberán ser contrastados y matizados a medida que proliferen estudios de estas características. El tema central de la investigación y la metodología que hemos aplicado así lo exigen y esperamos que así sea. Por nuestra parte, consideramos dichos resultados como propuestas sobre las que se deberá continuar investigando, con el fin de profundizar sobre este aspecto clave de la tecnología medieval que es la producción de hierro.

Ciertamente no resulta aconsejable estudiar este tema como un hecho aislado, sin conexiones con su entorno social, y es por eso que hemos intentado encuadrar los aspectos más técnicos dentro de su marco histórico, en las coordenadas espacio-temporales que le corresponden. Finalizaremos esta comunicación con las propuestas de futuro que deben dar continuidad a la investigación, algunas de las cuales se encuentran, ya, en proceso de estudio.

Ambito geográfico

El yacimiento de *Fabregada* se encuentra situado en la vertiente norte de la sierra del *Montsec d'Ares*. El *Montsec* forma parte de las sierras exteriores prepirenaicas y es el límite natural entre el *Pallars* y la *Noguera*. En él transcurren los ríos *Noguera Riba-*

gorçana y el *Noguera Pallaresa* que, de poniente a levante, dividen la sierra en tres: *Montsec d'Estall*, *Montsec d'Ares* y *Montsec de Rúbies* y configuran los desfiladeros de *Mont-rebei* y *Terradets*. Su longitud total es de 45 km. y su anchura oscila entre 4,5 i 10 km., con una altura máxima de 1684 mts. en la cima de *Mira Pallars* en el *Montsec de Rúbies* y de 1678 mts. en la cima del *Santalís* en el *Montsec d'Ares* (Fig. 1).

La sierra del *Montsec* se nos presenta como una zona de frontera en varios sentidos. Frontera bioclimática que afecta tanto a la vegetación como a la fauna; frontera socio-económica y cultural entre el llano y la montaña; y, alrededor del año mil, frontera política entre la marca superior de Al-Andalus y los condados pirenaicos de *Urgell* y *Pallars*. En todos estos aspectos la frontera actúa, al mismo tiempo, como línea divisoria y zona de contacto, lo cual le proporciona una gran riqueza y variedad que puede observarse a todos los niveles, tanto naturales como socio-culturales.

Las características propias de los climas mediterráneo y atlántico tienen, en el *Montsec*, su límite septentrional y meridional respectivamente. Esta interacción incide directamente en la fauna y la vegetación de tal forma que es posible encontrar especies propias de uno y otro ámbito climático. A nivel socio-cultural, la confluencia entre el llano – representado por los valles del *Segre*, *Noguera Pallaresa* y *Noguera Ribagorçana* – y la montaña que supera los 1.600 mts. de altitud, es bien visible en las oposiciones entre agricultura y ganadería, buenas y malas comunicaciones, inmigración y emigración, etc. por poner sólo algunos ejemplos.

Fabregada forma parte actualmente del municipio de *St. Esteve de la Sarga* en la comarca del *Pallars Jussà* (Cataluña). Se encuentra situado en un punto de confluencia de caminos y cañadas, ya documentados en el s. XI. Concretamente el *camí ral* que sigue todo el valle de *St. Esteve* y que, por la collada de *Fabregada*, comunica las cuencas del *Noguera Pallaresa* y del *Noguera Ribagorçana*, dentro del territorio bien definido del castillo de *Mur*. La otra

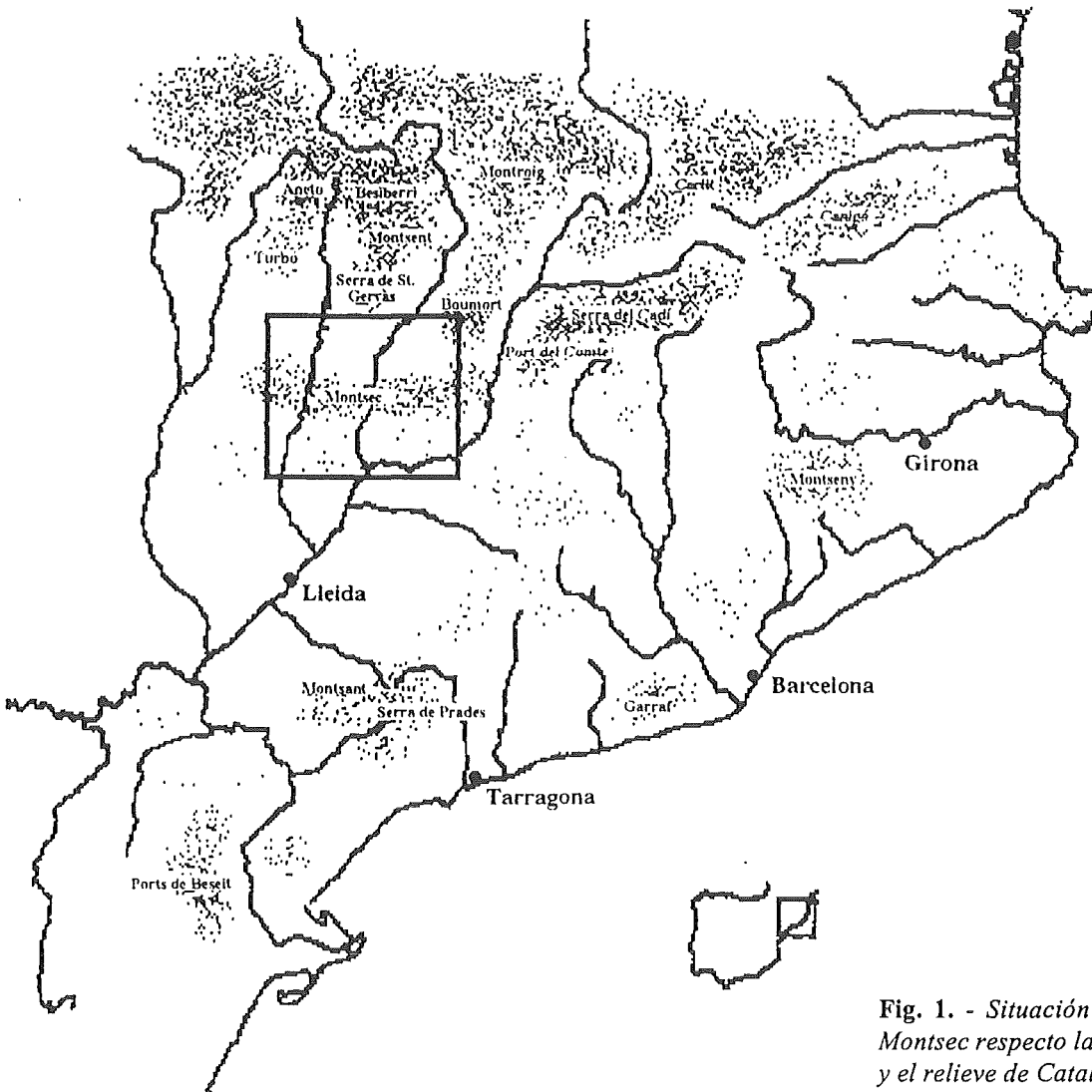


Fig. 1. - Situación de la sierra del Montsec respecto la red hidrográfica y el relieve de Cataluña.

vía de comunicación, es el camino-cañada que, procedente de *Ager*, en la cara sur del *Montsec*, salta la carena por la collada de *Ares* y va a *St. Esteve*, para continuar hacia el norte por las carenas en dirección al *Meüll*, camino de los *Pirineos*.

El Montsec en la Edad Media

A lo largo de los siglos X y XI, el Montsec fué un territorio de frontera, con unas condiciones naturales óptimas para organizar una línea defensiva frente al peligro que representaba el Islam (Fig. 2).

De los rios *Noguera Ribagorçana* hasta el *Segre*, la sierra del *Montsec* se convirtió en una verdadera muralla natural entre musulmanes y cristianos, con cuatro únicos pasos practicables con cierta facilidad:

- El *Pas Nou*: entre los valles del *Segre* y la *Noguera Pallaresa*
- El pas de *Terradets*: sigue el curso de la *Noguera Pallaresa* en dirección N-S

- El *Coll d'Ares*: supera el *Montsec d'Ares* por este puerto de montaña
- El desfiladero de *Montrebei*: sigue el curso de la *Noguera Ribagorçana* en dirección N-S

Los cuatro pasos citados presentan fortificaciones, castillos o torres, tanto en la vertiente sur como en la norte. En el *Pas Nou*: *Vilanova de Meià*, *Castell de Fabregada*¹ y *St. Anna*. En *Terradets*: la baronía de *San t Oïsmè* y la torre de l'*Ametlla* al sur y *Llimiana* y los castillos de *Guardia* y *Mur*, al norte. El *Coll d'Ares*: con *Ager* y *Sant Llorenç d'Ares* al sur y *Alsamora* al norte. Finalmente *Montrebei*: donde encontramos el castillo de la *Pertusa* en su entrada por el sur y los castillos de *Xiribeta* y *Alsamora* en el lado norte.

¹ No se trata del yacimiento de Fabregada objeto de este artículo sino de otro lugar donde aparece el mismo topónimo, situado cerca de *Vilanova de Meià*, en el extremo más oriental de la sierra del Montsec.



Fig. 2. - Sistema defensivo de la sierra del Montsec alrededor del año 1000.

Disponemos de pocos datos sobre el proceso de ocupación del *Montsec* en estos siglos, pero tanto las fuentes documentales como los restos arqueológicos nos indican una gran actividad alrededor del año mil:

- Construcción de torres y castillos: *Mur*, *Guardia*, *Alsamora*, *Castellet de Llimiana*, etc.
- Organización de núcleos de hábitat: *Fabregada*, *San tMartí de Barcedana*, *Moror*, *San tEsteve de la Sarga*, *Alzina*, etc.
- Presencia de la Iglesia a través de la construcción y dotación de nuevos templos, la mayoría de ellos aún conservados: *Sant Salvador de la Serra*, *Sant Feliu de Guardia* o *Sant Roc de la Mata-Solana*, etc. a las que debemos añadir las iglesias de cada uno de los lugares y castillos antes señalados.

A esta relación de núcleos habitados, debemos añadir aquellos que fueron abandonados y de los que tan solo se conserva el topónimo y algunos vestigios que esperan una investigación arqueológica: *El Cuscó*, *San Martí de les Tombetes*, *el Serrat de la Capella*, *Vilamolera*, *Santa Anna*, etc. por citar tan solo

algunos de los más significativos de los que encontramos en la vertiente norte.

La vertiente sur se encontraba dominada por el importante asentamiento musulmán de *Ager*, conquistado por *Arnau Mir de Tost* a mediados del s. XI, después de un primer intento que resultó frustrado por los musulmanes. La ocupación cristiana del sur del *Montsec*, vendrá condicionada por la conquista militar de estos territorios. En este proceso de ocupación debemos señalar los siguientes núcleos de hábitat: *Sant Llorenç d'Ares*, *la Règola*, *la baronia de Sant Oïsmè*, *la Pertusa*, *Corçà*, etc.

Actividades productivas y organización del territorio en el valle de San Esteve

Si nos centramos concretamente en el valle de *Sant Esteve*, observaremos que el paisaje viene dominado por el bosque y los pastos más que por los campos de cultivo, que quedan limitados en las zonas más

bajas del valles y en el lado de la solana. Cerca de los torrentes encontramos pequeñas terrazas relacionadas con simple pero efectivas infraestructuras hidráulicas; pequeñas presas para desviar el agua hacia canales excavados en la roca o contruidos de forma sencilla y balsas para recoger el agua construidas, siempre, aprovechando os desniveles del terreno. Estas terrazas de regadío habían estado ocupadas por huertos hasta hace poco más de 30 años. La pregunta que nos hacemos es ¿Desde cuándo?

En algunas ocasiones la presencia de caminos empedrados de tipología medieval, nos permite especular sobre su origen. Las balsas y los canales excavados en la roca también parecen indicar esta cronología. El mismo tipo de caminos los podemos encontrar en los alrededores de todos los pueblos del valle, pueblos que aparecen documentados a lo largo del s. XI. La mayoría de estos caminos se encuentran en un total estado de abandono y en algunos casos muy perdidos, pero aún es posible seguir algunos de ellos hacia el fondo de los torrentes donde encontramos, además de los huertos, algunos molinos harineros. Una vez más debemos plantearnos su cronología de origen ya que, en todos los casos sabemos que fueron utilizados hasta hace poco más de treinta años.

Sobre los molinos disponemos de una información documental y arqueológica muy interesante. Se trata de un documento de 1075 en el que aparece citado el lugar de *Vilamolera*. Cerca de este lugar, se encuentra una cantera de piedras de molino en la que pueden observarse los negativos de las ruedas extraídas. Otro tipo de instalación relacionada con la transformación de productos alimentarios, son la prensas de aceite, situadas cerca de los pueblos y comunicadas con ellos a través de caminos de las mismas características que los ya citados.

A lo largo de todo el valle podemos observar un gran número de corrales comunicados entre sí por una red de caminos ganaderos, delimitados con muros de piedra seca a cada lado, para evitar que los rebaños entren en los campos cultivados. El trazado de estos caminos suele seguir una línea recta y en muchas ocasiones los encontramos siguiendo las carenas con lo que se convierten en vías rápidas de comunicación dentro del territorio. Estos caminos suelen comunicar los pueblos y corrales con los pastos situados fuera de las mejores tierras aptas para el cultivo; yermos y bosques convenientemente señalados con mojones, *cussols* y *pilarets*. En estos lugares son habituales las pequeñas cabañas de pastor, construidas con piedra aprovechando los desniveles del terreno. La producción de lana, documentada para la zona en el s. XI, nos permite especular sobre la organización del territorio alrededor de esta actividad ganadera.

Los testimonios de actividades productivas que se remontan en el tiempo incluyen, también, canteras de losas, puntos de extracción de yeso, y es posible encontrar antiguos hornos de cal y yeso de los que aún se conserva la memoria. ¿Desde cuándo fueron explotados todos estos recursos?

Algunos de ellos, como las canteras de piedra y losas, obligatoriamente fueron explotados en época medieval. Buena prueba de ello eran los vestigios de la iglesia del *Serrat de la Capella* hoy desaparecidos. Otros como el yeso y la cal, sólo fueron utilizados en las construcciones civiles, militares y religiosas, como puentes, castillos e iglesias. Los análisis de los morteros de estos edificios podrían facilitar alguna respuesta a esta cuestión.

No hemos hablado aún de la explotación del bosque, tanto para la obtención de madera para la construcción, la fabricación de utillaje, objetos del hogar y otros utensilios, como para obtener la energía calorífica, en forma de leña o carbón. Debemos tener en cuenta otras actividades como la recolección de frutos, la producción de pez y el aprovechamiento de ciertas especies vegetales para fines diversos. Entre estas actividades la que ha dejado una huella más profunda y unos vestigios más visibles, ha sido la producción de carbón. Además de topónimos como el barranc de carboners o la *fonte carbonella*, documentada en 1010, encontramos numerosas plazas de carboneo diseminadas por las zonas boscosas de todo el *Montsec*. Lógicamente podemos establecer una relación directa entre la producción de carbón y la industria siderúrgica que estamos estudiando, por lo que no dudamos en asegurar que, por lo menos desde el s. XI, los bosques del *Montsec* eran objeto de este tipo de explotación.

Vemos, pues, como la actividad productiva del *Montsec*, alrededor del año mil, estaba muy diversificada. La necesidad de autoabastecimiento de la comunidad de pobladores, requería este esfuerzo. A partir de este ejemplo, consideramos que el mundo rural medieval, presenta una gran variedad de actividades productivas lo que nos da una visión no tan exclusivamente agrícola como los estudios documentales permiten suponer.

Desconocemos el grado de especialización y el nivel de intercambios de productos dentro del mismo valle y con otros lugares más alejados. Constatamos la falta de algunos productos básicos del mundo medieval, como la sal. Cabe pensar que la imposibilidad de producir sal, propició contactos e intercambios con centros productores com *Gerri de la Sal*².

² Monasterio situado unos 50 Km. más al norte que destaca por la producción de sal y del que se conserva un documento

Fabregada y su articulación con el territorio

De todas las actividades señaladas, la producción de hierro es, sí duda, la más compleja y especializada. El hierro es el material de uso dominante en toda la Edad Media. Su utilización en la fabricación de armamento y herramientas diversas lo convierten en un material estratégico, muy apreciado e imprescindible para el buen funcionamiento de una comunidad. La complejidad del proceso provoca un grado de especialización elevado y permite, a los centros productores, subsistir casi exclusivamente de esta actividad.

Esto es lo que se desprende de nuestra investigación. *Fabregada* es un lugar dedicado a la actividad siderúrgica, que aparece documentalmente definido en la donación que el conde *Ramon IV de Pallars* hizo a uno de sus más fieles vasallos, *Bertran Ato de Montanyana*, en 1038. En esta donación, se establecen unas afrontaciones que limitan el término de *Fabregada* a una estrecha franja de territorio, situada entre *Alsamora* al oeste y *Sant Esteve* al este, ambos a poco más de 1 Km. de distancia. Sobre el terreno, podemos observar como *Fabregada* carece de tierras buenas y aptas para el cultivo y pastos. Actualmente la única zona donde encontramos campos de cultivo cerca de *Fabregada*, es donde se sitúa uno de los escoriales del establecimiento siderúrgico. Podemos decir que *Fabregada* no disponía de otros recursos que no fueran la producción de hierro, por lo que debía ser suficiente para, a través de pequeños intercambios mantener a la comunidad.

Después de la donación de 1038, *Fabregada* permanecerá vinculado a la familia de los señores de *Montanyana* y, por lo tanto, se encontrará limitado con el término occidental del castillo de *Mur*, centro administrativo de todo el territorio de la vertiente norte del Montsec de Ares.

El año 1076, *Bertran de Montanyana* y *Ermengarda* aparecen como constructores de la iglesia de *Sant Esteve de la Sarga*, posiblemente un nuevo templo que substituiría el antiguo del cual parecen conservarse algunos restos en el edificio actual. En el acta de dotación de dicha iglesia, los *Montanyana* hacen donación de un tercio del diezmo de *Fabregada*. Teniendo en cuenta que *Fabregada* producía principalmente hierro, es de suponer que esta parte

del diezmo se pagaría, precisamente con hierro, lo que haría muy atractivo el control de esta parte del diezmo. En resumen, durante el s. XI *Fabregada* aparece como un pequeño núcleo de hábitat concentrado, dedicado a la producción de hierro, controlado por los señores de *Montanyana* y vinculado a *Sant Esteve de la Sarga* por el pago de un tercio del diezmo que generaba.

Fases del trabajo de investigación

El estudio sobre la producción de hierro en la Edad Media al sud del Pirineo Catalán se inició en el año 1990 con una planificación de los trabajos a realizar a partir de la combinación de dos tipos de fuentes y dos metodologías de trabajo diferentes: fuentes documentales y fuentes arqueológicas. Esta complementariedad de las fuentes la consideramos absolutamente necesaria para poder abordar un tema poco trabajado en la historiografía catalana y en el que intervienen múltiples aspectos relacionados con la tecnología aplicada al proceso de producción, impacto en el medio, organización del trabajo, propiedad de las *fargas*,³...

El estudio se inició con un vaciado exhaustivo de la documentación publicada desde el siglo IX al XIII y que afectase al ámbito estudiado. Este trabajo nos tenía que facilitar la localización de establecimientos siderúrgicos que posteriormente serían situados sobre la cartografía correspondiente y, en caso de ofrecer posibilidades, podrían ser localizados sobre el terreno. La revisión de documentación ha afectado, finalmente, a un volumen superior a los 11.000 documentos, de los cuales se han podido utilizar 139, obteniendo un total de 78 *fargas* citadas de entre los siglos IX-XIII para el territorio comprendido entre los Pirineos y el río Ebro en la zona catalana. De estas *fargas*, tan sólo cuatro presentaban las condiciones suficientes para intentar una localización *in situ* y sólo una, *Fabregada*, ha sido finalmente localizada.

El proceso de localización sobre el terreno se hizo después de un trabajo cartográfico intenso, con cartografía a escala 1: 50.000 y fotografía aérea a escala 1: 25.000, 1: 5.000 y 1: 2.000. Los datos extraídos de la documentación se fueron contrarrestando con la información toponímica y sobre mineraliza-

falso en el que se reclaman unos pretendidos derechos sobre una parte del diezmo de Sant Esteve de la Sarga, al que correspondía parte del diezmo de Fabregada. Posteriormente, en una relación de bienes perdidos por el monasterio, aparecerá reseñada esta parte del diezmo.

³ El término *farga* aparece en la documentación medieval como *fabrica*, *fabrega*, *fabricata*, *farga*, y debemos interpretarlo, dentro del contexto catalán, como un establecimiento siderúrgico dedicado a la reducción de óxidos de hierro a hierro metálico a partir del sistema directo, usando como reductor carbón de leña.

ciones de óxidos de hierro para poder confeccionar una cartografía específica para cada una de las *fargas*.

La prospección sobre el terreno se realizó durante los veranos de 1990 y 1991, en la zona escogida, donde se localizaron grandes cantidades de escoria de hierro en los campos cercanos al yacimiento, las estructuras de un poblado y de un establecimiento siderúrgico o *farga* situado cercano a un torrente, y las estructuras de defensa del conjunto, muralla y foso. De todo el conjunto, tan sólo queda en pie la iglesia de la *Mare de Déu de Fabregada*, de gran devoción en la comarca, un edificio del siglo XII de pequeñas dimensiones situado fuera del poblado en la zona este.

En el año 1992 se iniciaron las campañas arqueológicas, limitadas a una duración de 20 días durante los meses de verano, y realizadas por un equipo preparado específicamente para la intervención en un yacimiento de estas características.

Resultados del trabajo arqueológico

Hasta el momento podemos diferenciar tres sectores:

- Sector 100: Zona industrial o *farga*.
- Sector 200: Zona poblado; sistema defensivo.
- Sector 300: Zona de vertedero de escorias.

La mayor parte del trabajo arqueológico realizado hasta el momento se centra en el sector 100, por lo que nos limitaremos a exponer los resultados obtenidos en dicho sector. Las dos últimas campañas se han centrado en el sector 200 por lo que esperamos obtener resultados a corto plazo. De dicho sector tan solo señalar la gran cantidad de objetos de hierro que hemos podido recuperar en muy buen estado de conservación, lo que nos permitirá establecer una tipología muy interesante.

La zona industrial o *farga* se encuentra situada fuera del recinto del poblado existe una hilera de casas paralela al torrente de Sant Esteve. El edificio motivo de nuestro estudio está situado aproximadamente a unos 25 metros de la última casa, al sudoeste del poblado, y mide 7,5 x 5,5 metros. Se adapta a la inclinación del terreno y está construido sobre la vertiente izquierda del torrente (Fig. 3 y 4)

La localización en este sitio de un depósito de mineral de hierro, carbones, pequeños fragmentos de escoria y hierro metálico, tierra cocida y cerámica gris medieval que podemos situar entre los siglos XI y XII, nos indicaba ya una cierta actividad que tendría que estar relacionada con la reducción de mineral.

El ancho de sus muros es de 45 cm., construidos con piedras calcarias de la zona sin ningún tipo de retoque o pulimentación y de tamaños diversos. Entre

las piedras no hay mortero, aunque éstas aparecen unidas mediante barro. El muro oeste se une al del sud en una esquina construida con piedras de gran tamaño, pero aproximadamente a 2,20 metros se pierde el muro original construido con barro para continuar con piedra colocada en seco, correspondiente a una remoción posterior muy tardía. Esta misma técnica la encontramos en el muro norte, el cual se cimienta, en parte, sobre el nivel de destrucción de la estructura medieval. Sólo en un pequeño tramo, situado en el ángulo NE, volvemos a encontrar parte de la construcción original con barro entre las piedras. Esta técnica constructiva la podemos observar, también, en el muro este, el cual se une al sud mediante una esquina construida con piedras de gran tamaño, similares a las que encontramos en el ángulo SW.

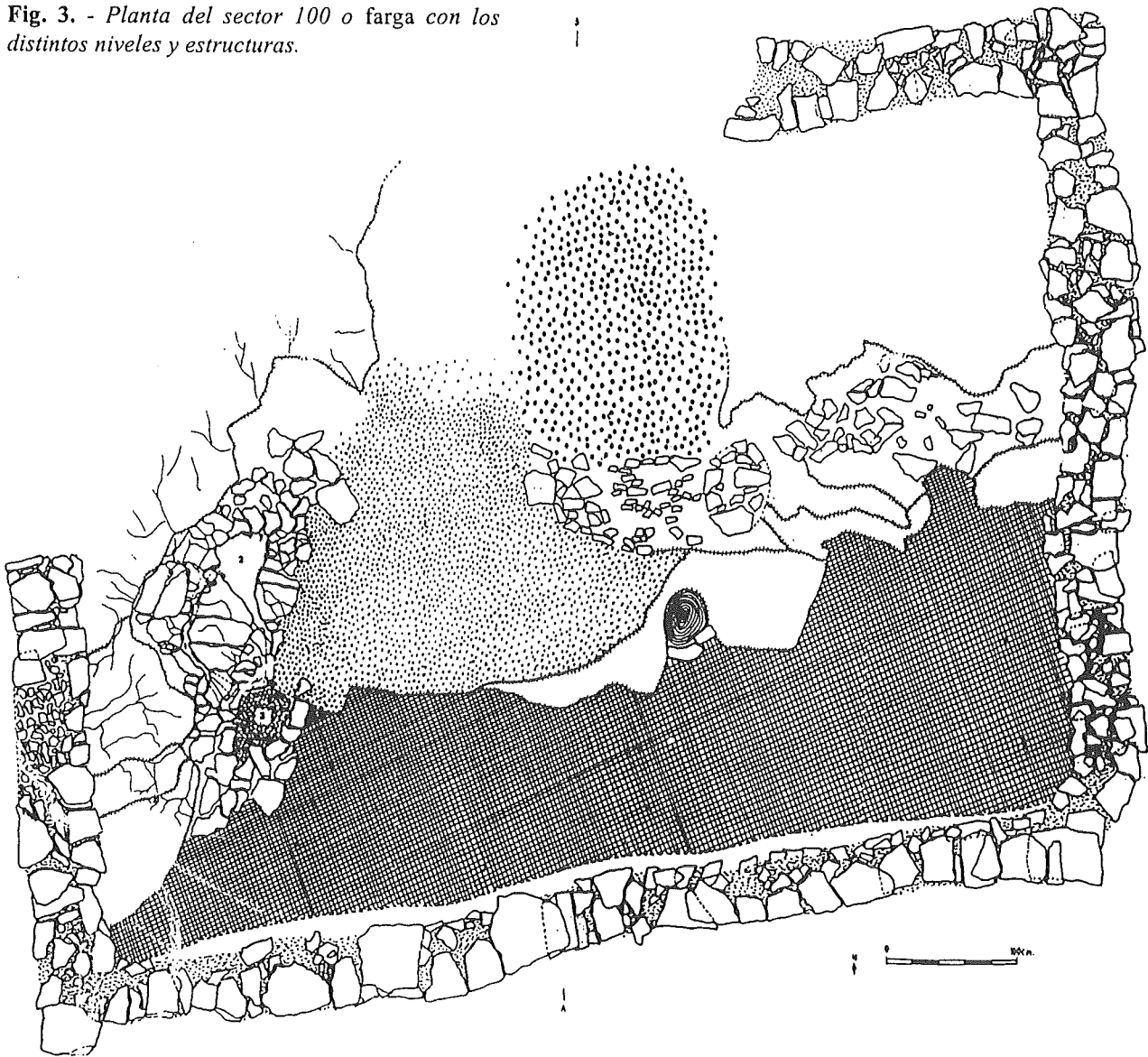
El edificio se asienta directamente sobre la roca madre siguiendo el desnivel natural de la misma, el cual forma dos escalones que siguen la dirección E-W y que dividen el espacio en tres ámbitos, más elevados en el norte que en el sur. Aprovechando el escalón más alto y adosado al muro este, se conservan los cimientos de una pared medianera que discurre hasta el centro del edificio, muy cerca del horno. Esta pared delimita un espacio que fue usado como almacén de mineral y lo separa de la zona de trabajo más cercana al horno. En este espacio se ha localizado un montículo de mineral formado por óxidos de hierro hidratados, principalmente gohetita, de textura granulada, color rojizo y mayoritariamente en forma de terrones polvorientos, más o menos duros, según su composición (Fig. 3 y 4, área marcada con redonditas)

El edificio medieval estaría completamente abierto por su lado norte a modo de cobertizo, lo cual facilitaría el acceso y, sobretodo, la evacuación de los humos. Entre la pared medianera, el muro oeste y el escalón más bajo se ha localizado un pavimento, en lo que sería el espacio central de trabajo, que rodea la estructura del horno (Fig. 3 y 4, área punteada). El pavimento, considerado zona de paso y acceso, está formado por pequeñas piedras para nivelar la roca y tierra pisada, de un color rojizo debido a la descomposición del mineral situado en una zona más alta y un poco más al norte.

En el ámbito situado más al sur y a un nivel inferior hemos podido identificar otro pavimento de las mismas características. En este caso su color es gris ceniza, debido a que se encuentra bajo la influencia de la salida del horno, por donde se evacuarían las escorias y los restos de la combustión (Fig. 3 y 4, área con trama a cuadros)

El espacio interior se presenta en tres niveles situados en diferente altura, configurados a partir de los escalones naturales de la roca madre (Fig. 4). El

Fig. 3. - Planta del sector 100 o farga con los distintos niveles y estructuras.



nivel más alto es el situado más al norte, en el cual también se sitúa el depósito de mineral. En el segundo nivel situamos tres elementos: el horno, el pavimento de tierra batida con restos de mineral mezclados y la pared medianera. El tercer nivel presenta el pavimento de tierra, cenizas y carbones, situado directamente sobre la roca madre y en relación con la salida del horno, situado en el nivel intermedio y en una posición más elevada.

En este tercer ámbito encontramos diferentes elementos que, de este a oeste, són: en primer lugar, un escalón natural con señales evidentes de que la roca madre ha sido retocada para adecuar dos plataformas inclinadas en dirección al inicio del canal de aire. Consideramos posible que su utilidad estuviese marcada por la colocación de las manchas necesarias para insuflar el aire dentro del horno. A continuación encontramos el pozo de escorias o cubeta donde se depositarían las escorias sangradas del horno en diferentes momentos del proceso. Se

encuentra en contacto con los dos pavimentos, donde el escalón es menos pronunciado, a pesar de que la zona de acceso se situaría en el nivel inferior, y aprovecha la pendiente natural del terreno para poder facilitar la evacuación de las escorias coladas.

A continuación y en la zona más amplia de este ámbito se situaría el martillo hidráulico, con la cabeza mirando al este. Esta interpretación se basa en la existencia, en este punto, de un encaje de 60 cm. de profundidad y 30 cm. de diámetro (Fig. 3, marcado con líneas concéntricas), delimitado por piedras, que se apoya directamente sobre el escalón que la roca forma entre la pared medianera y el pavimento interior. Este encaje es apto para soportar la infraestructura que comporta el martillo. Así mismo, encontramos pequeños encajes cuadrados trabajados en la roca que coinciden con una piedra del muro sur colocada transversalmente del interior al exterior, la cual relacionamos con el punto de entrada del eje motriz que accionaría dicho martillo pilón.

Los pocos restos que se conservan en este sector dificultan una interpretación más exacta de las características de este mecanismo, que cabe relacionar con los restos de la presa para retener el agua que se puede observar al exterior del edificio

Las estructuras del horno localizadas nos ofrecen una información bastante completa de sus características. Entre estas estructuras podemos diferenciar tres elementos:

- el horno (Fig. 3: 2)
- la entrada de aire forzada (Fig. 3: 1)
- la salida y el pozo de escorias (Fig. 3, 3).

El horno presenta un muy mal estado de conservación debido a los efectos de las fuertes temperaturas y a la erosión provocada por la circulación del agua una vez abandonado todo el complejo. Se encuentra en una esquina que hace la propia roca natural, aprovechando sus desniveles y está medio excavado en la misma roca y medio construido con piedra caliza. La planta es ovalada, con un diámetro aproximado máximo de 60 cm. y mínimo de 40 cm. y la profundidad máxima que hemos podido calcular es de 61 cm. Desde el centro del horno hasta encima de las piedras que cubren la entrada de aire. En el fondo del horno, en el lado W – que es el mejor conservado –, se puede observar una banqueta que debía tener su paralelo al otro lado. Entre las dos banquetas se inicia el canal de evacuación de escorias hacia el exterior del horno.

El canal de entrada de aire forzado presenta una anchura de entre 4 y 5 cm. y una longitud de 120 cm. Se inicia al lado del pozo de escorias, en un nivel un poco más alto, con una doble entrada para los fuelles, que estarían situados en las repisas inclinadas de la roca natural situadas al oeste. En este primer tramo el canal sigue la dirección SE-NW y aproximadamente en la mitad de su recorrido cambia de dirección (SW-NE) siguiendo una amplia curva que lo introduce en el horno. En su último tramo, 23 cm., se inclina considerablemente tomando un ángulo aproximado de entre 35° y 45° sobre el plano. Todo el canal está construido con piedras, entre las cuales se han encontrado fragmentos de mortero y recortes en la roca.

La salida de escorias se encuentra en el lado SE. Se trata de un canal medio excavado y medio construido que tiene su inicio en el centro del horno, entre las dos banquetas del fondo. Tiene una anchura de unos 10 cms. y una longitud de unos 60 cms. y desemboca en el pozo de escorias situado en el exterior.

Este pozo de escorias que, como el resto de estructuras, está medio construido y medio excavado en la roca, es prácticamente circular, con un diámetro aproximado de 60 cm y su profundidad oscila de

momento entre los 10 y los 35 cms. El fondo de este pozo y del tramo final del canal de escorias está recubierto por una capa que podemos llamar de “tierra escoriada”, formada por los restos de escorias que se han ido depositando y que se encuentran en un proceso de mineralización. La rugosidad de esta capa se corresponde con la superficie irregular de la cara inferior de las escorias coladas.

Por lo que hace referencia a la situación de los dos fuelles y de acuerdo con el espacio del que disponemos, podemos especular sobre su ubicación más probable justamente sobre la roca tocando al muro oeste. Como ya hemos señalado con anterioridad, la piedra ha estado aquí retocada para formar una plataforma con la inclinación apropiada para conectar con el inicio del canal de aire. La entrada del aire a los fuelles se abriría por encima de la cubeta de escorias, por lo que se aprovecharía el aire caliente, que sería insuflado dentro del horno, y con el cual se obtendría con mayor rapidez la temperatura deseada.

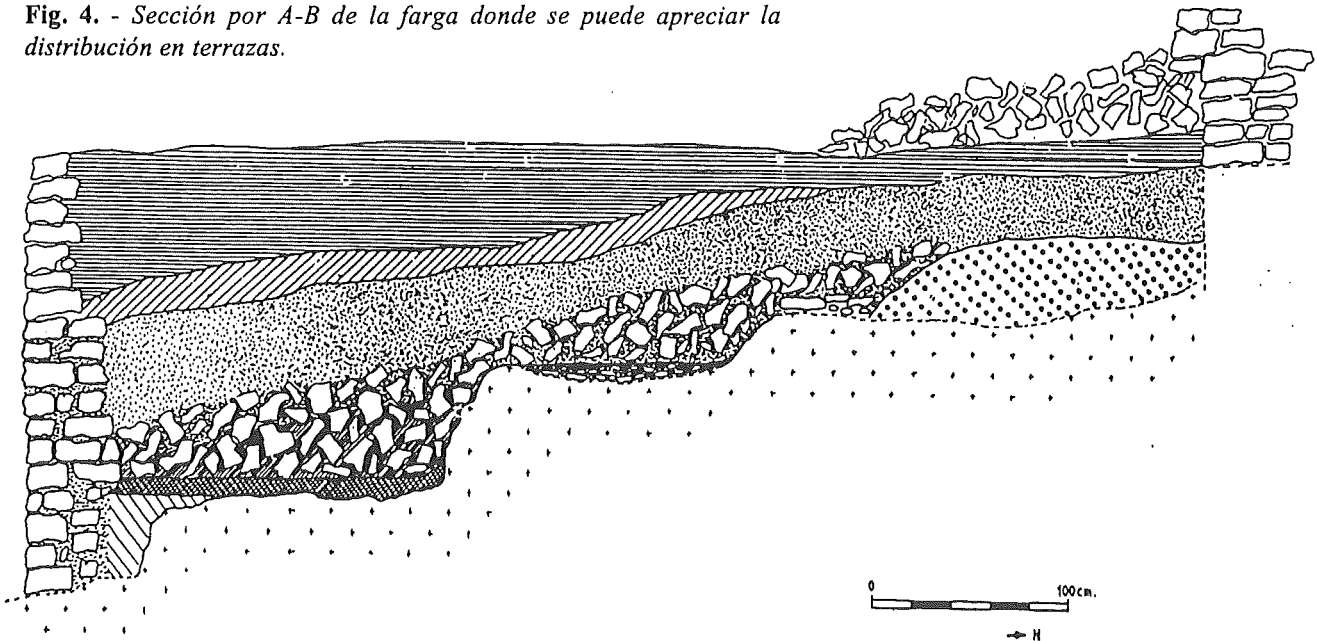
La analítica hasta ahora realizada en las escorias señala que la temperatura del horno tuvo que llegar a los 1300° C⁴. Estas temperaturas hicieron que las piedras que encontramos en el interior del horno tengan un color rojo intenso, además en el fondo del horno se encuentra tierra de silicio en abundancia, producto de la desintegración de las rocas que configuraban la estructura. Esta tierra presenta, según su grado de hidratación, dos tonalidades, una amarilla y otra más oscura, aunque los análisis han demostrado que se trata de la misma tierra. Los análisis realizados al mineral localizado en el interior del recinto de la *farga* revelan que se trata de goethita de gran calidad, con una riqueza en hierro del 40 al 80% .

El muro W de la *farga* limita por el exterior con una zona llana situada sobre el lecho del torrente que, en un primer momento, da la sensación de que se trata de un campo de cultivo. El hecho de que se encuentre en un tramo en el que el torrente presenta un desnivel considerable impide la existencia y formación de manera natural de este rellano. Esta observación nos condujo a realizar una prospección en este sitio que permitió observar la perfecta sedimentación en horizontal de una serie de estratos en una profundidad que llega, en el sitio prospectado, a 1,25 m.

Esta sedimentación tan solo puede haber sido provocada por la existencia en este sitio de una presa destinada a retener el agua para ser utilizada en el

⁴ Los análisis realizados en el material férrico ha sido realizado por un equipo del Departament de Ciència de Materials i Enginyeria Metallúrgica de la Universitat Politècnica de Catalunya, bajo la dirección de la Dra. Júlia Simon i Arias, en colaboración con el Institut “Jaume Almera” del CSIC.

Fig. 4. - Sección por A-B de la farga donde se puede apreciar la distribución en terrazas.



funcionamiento de la *farga*. No se ha localizado hasta el momento ningún rastro de esta presa que, muy probablemente, debió haber sido de madera, pero esperamos poder llegar hasta el lecho de roca del torrente con tal de verificar la posible existencia de agujeros en la roca que nos indiquen su situación exacta y sus características.

Curiosamente la circulación del agua una vez colmatada y desaparecida la presa no ha hecho desaparecer el llano creado por dicha sedimentación ya que, tal y como hemos podido observar durante las estaciones más lluviosas, el agua se filtra por debajo de los sedimentos al entrar en este llano, saliendo por debajo de los estratos en su camino hacia abajo⁵. Los restos de esta presa por el agua situada al lado del edificio de la *farga* confirman el uso de la energía hidráulica, posiblemente para accionar un pequeño martillo pilón, tal y como parece indicar el gran encaje de más de 60 cms. de hondo y los dos pequeños encajes cuadrados, todos ellos situados en el sector sur del edificio. Este martillo facilitaría la operación de forja de la massa de hierro, una vez extraída del horno.

La producción de hierro

Enlazando con lo ya dicho, podemos señalar que la comunidad de pobladores de *Fabregada*, tenía como actividad principal la producción de hierro, la cual no se limita al proceso de reducción del mineral sino que incluye la extracción de mineral, la producción de carbón, el transporte de ambos hasta la *farga*, la elaboración del hierro a partir de la reduc-

ción y la forja y su posterior transformación en objetos de uso, mediante un segundo proceso de forja.

No disponemos de datos sobre la especialización dentro de la propia comunidad, pero debemos suponer que existiría. Así mismo es posible imaginar una cierta estacionalidad de los distintos trabajos a realizados, determinados por las condiciones climáticas y naturales más oportunas.

Por ejemplo; la producción de carbón se concentraría principalmente en los meses de otoño, por ser estos los más adecuados para cortar la madera que será convertida en carbón. Así mismo, el funcionamiento de la *farga* estaría condicionado al caudal de agua disponible, por lo que se limitaría a los meses más lluviosos de primavera y otoño⁶. Esta propuesta de estacionalidad dejaría libres los meses de verano e invierno los cuales estarían dedicados a la extracción de mineral y a la confección de objetos para el uso.

Los trabajos siderúrgicos se alternarían con otras actividades productivas como la agricultura y la ganadería, aunque en ningún caso con la intensidad

⁵ En los estudios del Dr. Francisco Burillo encontramos ejemplos de este tipo de evidencias que configuran y transforman el paisaje y que a menudo son difíciles de comprender e interpretar. Muchos de sus ejemplos tan sólo han conservado el testimonio de la existencia de los sedimentos de colmatación de una presa en los límites, ya que la circulación del agua se ha llevado la mayor parte de los sedimentos. Ver las actas de los diferentes *Coloquio de Arqueología Espacial* de Teruel.

⁶ No disponemos de datos muy precisos sobre la climatología propia del período estudiado, pero creemos posible que se produjera un cierto estiaje durante los meses más secos.

con que se realizarían en los otros lugares dedicados exclusivamente a estas actividades⁷.

La extracción de minerales se realizaría en pequeños afloramientos superficiales, de fácil extracción, diseminados por la sierra del *Montsec*. Estos afloramientos suelen ser cavidades kársticas rellenas de óxidos de hierro depositados allí por la acción del agua. Estos óxidos de hierro procederían de los dos estratos ferruginosos localizados en la estructura geológica del *Montsec*, entre las calcareas y las margas de los niveles jurásicos y entre las calcareas del Cretacio Superior. Desconocemos el método de extracción y el número de afloramientos que pudieron ser explotados. Hasta el momento hemos podido localizar uno de estos yacimientos, pero no deberemos avanzar en su estudio antes de obtener resultados fiables.

Los recursos minerales del *Montsec* por lo que se refiere a óxidos de hierro son muy limitados, por lo que su explotación sólo es posible dentro de una economía marcada por el autoabastecimiento. La localización y explotación de nuevos yacimientos debía ser cada vez más dificultosa, factor que jugaría un papel determinante en el cese de la actividad productiva y el posterior abandono del lugar.

La explotación de los recursos minerales no supondría graves problemas entre los distintos colectivos que habitaban el valle, ya que no se interfería con las otras actividades productivas como la agricultura o la ganadería. Así mismo, el carboneo propiciaba la deforestación de zonas que podían ser aprovechadas como pastos o incluso ser transformadas en terrenos agrícolas. En un principio no creemos que existieran conflictos por la explotación de estos recursos que, obligatoriamente se realizarían fuera de los términos estrechos de *Fabregada*, en zonas de comunales o con el permiso y el pacto correspondiente con sus propietarios.

El transporte del mineral y del carbón se realizaría con animales de carga, por caminos de montaña más o menos acondicionados. Este transporte implica un enorme esfuerzo por el peso y volumenn de los materiales a transportar. Es por ello que pensamos en una posible selección del mineral en el mismo punto de extracción con lo que se reduciría la cantidad a transportar.

Respecto al proceso de reducción del mineral a hierro metálico, consideramos como lo más destacado de nuestra investigación, la localización de un horno alrededor del cual se ordena un espacio de

trabajo concreto. Cabe la posibilidad de que hubiera más de un horno funcionando simultanea o alternativamente, aunque por el momento no podemos demostrarlo.

Teniendo en cuenta las estructuras localizadas y los análisis realizados en las paredes del horno, podemos confirmar que se trata de un horno bajo, de planta ovalada, con un diámetro máximo de 60 cm. y mínimo de 40cm, y una profundidad de 60 cm. Asociado a esta cámara de reducción, encontramos una entrada de aire forzado y una salida de escorias con un pozo de recogida en el exterior. La poca resistencia de la roca calcarea a las altas temperaturas, obligaría a revestir el interior de la cámara de reducción con una capa de arcilla, de la cual disponemos de algunas muestras localizadas en la misma intervención. Los analisis realizadas en las paredes interiores del horno confirman la existencia de este recubrimiento de arcilla que posiblemente sería substituido siempre que se considerara oportuno.

El proceso de reducción de mineral, se completaría con un trabajo de forja de la masa de hierro, destinado a compactar las partículas de metal y a expulsar los fragmentos de escoria que pudiera contener. Este forjado se realizaría con un mazo hidráulico de pequeñas dimensiones si lo comparamos con los grandes mazos de las *Fargas Catalananas* de época moderna. Debemos tener en cuenta que el volumen y peso de la masa de hierro sería, también, muy inferior al que producirían las instalaciones de época moderna.

La cronología que hemos podido determinar para el sector 100 y que se corresponde con la *farga*, viene determinada por los fragmentos de cerámica gris localizados en los niveles de fundamentación y destrucción del edificio, muy distintos de los que encontramos en los niveles de destrucción del poblado y que corresponden al s. XIII. Partiendo, pues, del material cerámico localizado en la *farga*, proponemos una fecha de construcción dentro del s.XI y de abandono durante el s.XII. Esto no implica que dejara de producirse hierro en esta fecha sino que, posiblemente se trasladaría a otro sector del poblado aún por excavar.

Partiendo de las características y capacidad del horno, la mas de hierro obtenida no superaría los 25 Kg. de peso, que sería transformado en una primera fase, en barras de diferentes calidades, tamaños y formas.⁸

⁷ En la cuarta campaña de excavaciones realizada en verano de 1995 en el sector del poblado, se han localizado pequeños pesos de telar que indican una cierta actividad textil.

⁸ El fragmento de perfil de hierro localizado en la segunda campaña sería uno de estos productos semi-acabados que produciría la *farga*.

Posteriormente, a partir de un trabajo de forja, se fabricarían objetos de uso de los que tenemos constancia por las piezas localizadas a lo largo de la intervención. No disponemos de datos sobre el taller de herrero ni de su situación dentro del conjunto o sus características. Esperamos poder localizarlo en futuras campañas.

Los residuos derivados de este proceso de fabricación, las escorias, se encuentran en el escorial, situado a unos centenares de metros del poblado. Así mismo hemos podido localizar algunas escorias en los alrededores del yacimiento, lo que nos indicaría la existencia de más de un escorial. Parece bastante lógico que existan distintas zonas acondicionadas para depositar estos residuos debido a la gran cantidad de estos deshechos que produce esta industria y a su continuidad en el tiempo, entre los siglos XI-XIII.

Los residuos o deshechos debían ser un grave problema debido su gran cantidad y su inutilidad o imposibilidad de reciclaje. Su transporte hacia una zona donde no suponga una molestia, podría estar ligado al recorrido de los transportistas de carbón y mineral, lo que explicaría la situación de los escoriales en el camino hacia las zonas boscosas. Desearíamos poder contrastar este aspecto en otras zonas donde se conserven restos de actividad siderúrgica.

Abandono de Fabregada

Documentalmente podemos afirmar que *Fabregada* ya no existía en el s. XIV, ya que no aparece en los *fogatjes* o censos de hogares, donde sí aparecen los otros pueblos del valle. A nivel arqueológico hemos podido confirmar la cronología de su abandono durante el s. XIII, ya que los materiales localizados en los niveles de destrucción, corresponden a este período.

Debemos suponer que *Fabregada* se abandona a lo largo del s. XIII como núcleo de hábitat y establecimiento de producción de hierro, aunque algunos de sus edificios fueron utilizados como huertos y corrales hasta mediados del s. XX.

Las razones de este abandono estaría propiciado por la interacción de múltiples causas. El progresivo agotamiento de los yacimientos de mineral, cada vez más difíciles de localizar en un medio donde son escasos, la falta de tierras de cultivo y pastos propios que permitieran un cambio de orientación en la actividad productiva de sus habitantes, y una mayor facilidad para acceder al hierro procedente de otras zonas productoras a través de un comercio en expansión, estarían en la base del desdoblamiento del lugar.

Sus habitantes se desplazarían hacia los pueblos vecinos en busca de nuevas formas de vida. El topónimo se conserva por la perduración del culto a la *Virgen de Fabregada*, en la ermita que antes había sido iglesia y parroquia de la comunidad.

Proyectos de futuro

La continuidad de la investigación sobre *Fabregada*, pasa por cuatro aspectos concretos. En primer lugar por el estudio arqueológico del poblado y el escorial, con el fin de analizar el tipo de hábitat e intentar localizar otros materiales y estructuras que nos informen sobre la actividad siderúrgica. El material procedente del poblado nos puede aportar una información muy interesante sobre la vida en este lugar y así poder establecer comparaciones con otros núcleos de hábitat medieval.

En segundo lugar, está previsto iniciar la prospección sobre el terreno para localizar puntos de extracción de mineral. Esta empresa presenta dos graves problemas: por un lado la dificultad que supone localizar pequeños yacimientos, diseminados en una amplia zona y que fueron intensamente explotados en la Edad Media, por lo que poco mineral visible se encontrará. Por otro lado, las profundas transformaciones que se han producido en grandes extensiones de la umbría del *Montsec*, provocadas por las repoblaciones forestales y los correspondientes aterrazamientos. Ello implica la necesidad de planificar esta fase con mucha precisión para concretar al máximo las prospecciones sobre el terreno.

En tercer lugar consideramos imprescindible iniciar el estudio sobre la evolución del paisaje, a través de análisis palinológicos y antracológicos, que nos permitan seguir las transformaciones de la cobertura vegetal y calibrar la incidencia de la presión humana, y en especial de la actividad siderúrgica, sobre el medio. En último lugar consideramos necesario continuar profundizando en el estudio de la dinámica de ocupación del valle en todos sus aspectos, con el fin de avanzar en el conocimiento más amplio de un proceso propio de la Cataluña medieval, como es el proceso de repoblación.

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Developments in metalworking during the medieval period

Innovations in metals technology in the later medieval period were coupled with greater craft specialisation and alterations to both the scale and organisation of production. Evidence for these changes can be found among the finds from British archaeological excavations and also in contemporary documentary sources.

Introduction

This is a brief review some of the available evidence for medieval metalworking from Britain. Archaeology is not our only source of information as technical treatises and surviving documents of other sorts are also useful in showing how and where craftsmen worked. The overall picture is complex, as there are significant differences between ironworking and non-ferrous metalworking, metal extraction and fabrication, urban and rural sites. This paper concentrates on non-ferrous metals and on evidence from towns, and hence deals mainly with metal fabrication.

From around the 13th century there were changes in the organisation of metalworking in Britain, with more centralisation of production and the setting up of guilds in towns to exercise control or protection. Metalworking crafts and industries were becoming more specialised, and much of the archaeological evidence for them is not as widespread as in earlier periods. Surviving medieval documents show there was a concentration of individual crafts in particular streets or areas in towns. This spatial concentration works in two ways: when archaeologists find a metalworking site they find large quantities of material, but very often they find almost nothing.

In metallurgy, as in other ways, the later medieval period was one of considerable innovation; new technologies began to supplant those that had operated unchanged for more than a thousand years. Some of these introductions, and the reasons for their adoption, are also discussed. There were also changes in the scale of operation of the crafts and industries and in the types of objects being manufactured. Both

these changes mean that the nature of the manufacturing debris that is found in the course of archaeological excavations has some notable differences from that of the earlier medieval period.

Alloy selection and use

Work by Cameron (1974), Brownsword and Pitt (e.g. 1983) and Blades (1995) has shown that the composition of the copper alloys used in the later medieval period was different from those of earlier times (e.g. Blades 1995; Bayley 1992a). Earlier medieval alloys tended to be either brasses (copper-zinc alloys) or bronzes (copper-tin) with relatively few mixed alloys. In later times the picture is different with zinc-rich gunmetal (copper-zinc-tin) with several percent of lead predominating for small cast objects. Wrought metalwork is very low in lead and much is again gunmetal, although a proportion is of high-zinc brass.

Larger castings have different compositions. Although church bells had been made from as early as the 10th century (Bayley *et al.* 1993), their typical composition of copper with 20-25% tin and a percent or two of lead did not evolve until the 12th century (*ibid.*, table 4). Cast cooking vessels did not become common until even later and were normally heavily leaded copper with a little tin and percentage levels of arsenic and/or antimony (Brownsword 1981; Blades 1995). This alloy is not a good one and its main advantage must have been low price. The copper that formed the bulk of the metal would have been smelted under strongly reducing conditions from polymetallic ores such as those found in the Harz mountains in Germany. If the metal had been purified the arsenic and antimony would have been removed and up to 10% of the metal yield would have been lost. The cast sheets which were engraved to make memorial brasses have a composition that much more closely mirrors that of the smaller objects. The copper may have come from similar sources to those used for the cast vessels, but it had been carefully re-

fined to remove unwanted impurities before being alloyed. Over the period from the 13th-17th centuries the mean zinc content of memorial brasses rose from around 15% to 28% while tin content dropped from 5% to 1%; lead contents were variable in the range 2-5% (Cameron 1974).

Lead and pewter trinkets are known from the later 10th century (Bayley 1992a, fig 340) as are antler moulds for casting them (Newman 1993). However, from the 13th century a far larger range of trinkets, especially pilgrim badges and ampullae, become common. These were cast in piece moulds made of fine-grained lithographic stone, with lead pegs to correctly locate the two valves (e.g. Homer 1991, fig. 22). The solid badges were normally pewter while hollow ampullae were slush-cast from pure tin. Pewter vessels were cast from the late 13th century onwards and Homer (1991) suggests a range of mould materials were used, though bronze moulds were normal from the later 14th century.

Copper alloy casting

The size of crucibles used to melt copper alloys gradually increased through the medieval period. In the 10th-11th century they were typically globular and 60-80 mm in diameter, while by the 13th century shapes were more usually hemispherical and diameters had increased to up to 200 mm. From the 14th century deeper, thick-walled, flat-bottomed forms became common and continued in use into the 17th century and beyond (Bayley 1992b, fig. 5). Their diameters ranged up to about 180 mm and they would have held up to 10 kg of metal. The fabrics of these new types of crucible were also new ones. Instead of being sand-tempered like much domestic coarse-ware, they were far more refractory and so were much stronger at the high temperatures needed to melt metals. It was this increased strength which made the increase in size possible as the new crucibles could safely support the weight of a far larger amount of molten metal. In the post-medieval period graphitic clays were sometimes used to make crucibles of this form, a development that is still current today. Their advantage was in helping to ensure reducing conditions within the crucible and hence minimise metal losses into crucible slags.

The earlier, round-bottomed crucibles would have been stable when bedded into a charcoal fire, while flat bases suggest a changed hearth or furnace design, perhaps with a grid on which they sat. Agricola's *De re metallica* (Hoover & Hoover 1950) includes illustrations of a range of furnaces and hearths of this type, though they do not usually survive in archaeo-

logical contexts. One exception is a 16th century, brick-built hearth in Legge's Mount in the Tower of London which had associated with it a large number of crucibles and other metallurgical finds (Parnell 1993, fig. 40).

The larger crucibles indicate an increase in the quantity of metal being melted and cast, and mass-production of a sort was certainly practised, though perhaps not yet on the scale that became common during the Industrial Revolution. An example of this is the casting of multiple objects in a single composite mould. The products were strips of unfettled castings like some buckles from Coventry (Bayley & Wright 1987, fig. 49, nos 14-16); multi-piece stacked clay moulds for casting them are also known from Coventry (*ibid.*) and from London (Armitage *et al.* 1981).

Large clay moulds

In addition to the larger numbers of small copper alloy objects, increased availability of metal and growing technical competence led to the production of more large castings, especially from the 14th century onwards. There were two main groups of products, church bells and cooking vessels such as cauldrons and skillets.

The main evidence found for the production of these large castings are quantities of fired clay mould fragments, normally described as 'bell-mould' whatever the form of the casting. Often they are found backfilled into bell pits where the mould had stood while the molten metal was run down into it from a reverberatory furnace where it had been melted. Typically the mould fragments are 20-40 mm thick, oxidised-fired on the outside and reduced-fired inside, sometimes with a fine clay slip on the inner surface. The fabric contained a high proportion of vegetable temper (added to the clay as animal dung) which burnt out when the mould was fired, giving it a slightly porous structure. This was an advantage as it helped avoid trapped gases and hence blowholes in the casting, and also ensured that the mould was not too rigid. Metal castings contract as they cool, so in order to avoid cracking them the core of the mould either has to give as the metal shrinks or has to be removed while the casting is still hot. The special fabric was an elegant answer to this perennial problem.

If only small fragments of mould survive, it is not possible to reconstruct the form of the casting and in these cases the composition of adhering metal waste is the only indicator of the type of casting being made. This approach was used on the surviving

material from the Bedern foundry site in York (Bayley & Richards 1993) where domestic vessels appear to have been the main products. In a few cases where the mould survives better it can be reconstructed and the way it was made identified. An example is a nearly complete cauldron mould from Prudhoe Castle, Northumberland (Wilthew 1986), where the outer part of the mould (cope) was divided vertically into two parts, and these had then been luted together and the rim sealed onto the core (inner part of the mould). The cauldron was cast upside down, probably by feeding the molten metal down one or more of its three feet.

Precious metal working

From the Roman period onwards there is evidence of precious metal assaying and refining as well as fabrication; the quality of the metal was always an important consideration (Bayley 1992c). Separating precious metals from base ones was achieved by cupellation. The metal to be refined was melted with an excess of lead; this was oxidised, forming litharge (lead oxide), which both oxidised any base metals present and dissolved these oxides, separating them from the silver or gold.

Small-scale cupellation was carried out on shallow dishes known as tests or cupels with diameters of 30-50 mm. Up to about the 12th century these cupels were always ceramics, some were purpose-made dishes but sherds from broken pots were used too. Bone ash was also used for making cupels because, unlike clays, it did not react with the litharge but absorbed it, providing better separation and thus more accurate assays. The earliest surviving bone ash examples are 16th-century finds from the Tower of London. There are no British archaeological finds for the intervening period so we do not know when the change took place, though Agricola and Ercker, both writing in the 16th century, describe bone ash as the normal material for cupels and thus probably not a recent innovation.

Parting, the separation of silver from gold, is the other precious metal refining process used in medieval times. Two solid-state processes are described by Theophilus (Hawthorne & Smith 1979) and Agricola (Hoover & Hoover 1950) but archaeological evidence for only one, the salt process, has yet been found (Bayley 1991a). This was of considerable antiquity and continued in use until at least the 13th century (Bayley 1991b). Around the 14th century a new process, acid parting, was developed. In this the silver in a gold-silver alloy was dissolved in nitric acid, separating it from the gold which was not affected. The

production of nitric acid, by distilling vitriol with saltpetre, was a 14th century innovation but there is no evidence that the earliest finds of distillation-apparatus in Britain, which date to the 15th century, were used in this way (Moorhouse 1972). However, excavations on several 16th and 17th-century sites in London, including Legge's Mount, have produced ceramic cucurbits which were used in the production of nitric acid; most have superficial deposits of iron oxide, a by-product of the distillation of vitriol.

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Punching and stamping on Anglo-Saxon artefacts

Abstract

Although much smaller and more severely-limited by the method of manufacture, the design range used for punches on Anglo-Saxon metalwork overlaps with that used in pottery stamps of the period. Information from a study of punchmarks on metalwork is compared with interpretations of contemporary pottery stamps.

Introduction

Punchmarks on early Anglo-Saxon metal artefacts and stampmarks¹ on contemporary pottery have both been widely studied, from various points of view. Naturally, one of the most frequently considered aspects has been the typology or classification of the marks. Several previous studies have concentrated on trying to identify designs which belonged to a particular period, area or social group or individual punches/stamps which belonged to individual metalworkers/potters, but this is not the prime concern of this paper. The way that marks were laid out on the artefact has also been widely discussed, especially for pottery, but also for metalworking to a certain extent. Finally it has often been proposed that the use of both punchmarks and stampmarks had symbolic as well as decorative importance. This paper is an initial attempt to compare the design and employment of punches used on non-ferrous² metalwork with that of stamps used on pottery, as a first step towards considering such theories.

Designs

1 Metalwork

Punchmarked decoration is relatively commonly found on early Anglo-Saxon metalwork, although its prevalence and its nature seem to vary with artefact type, with region and with date. No overall survey of the tradition has yet been attempted, but there are a number of studies of the use of marks on particular artefact types (eg Ager 1985; Leigh 1980; Mortimer 1990). Now a study of marks on material from the 1989-1991 excavations at Barrington Edix Hill (BAEH), a cemetery site, set in its regional context (Mortimer & Stoney 1996), can be added to these works. BAEH can be taken as a typical early Anglo-Saxon cemetery, with a ‘typical’ range of artefact types, mostly dating to the sixth century.

At BAEH, 45 copper-alloy artefacts with punchmarks were examined and recorded in detail using silicon rubber impressions and a scanning electron microscope (SEM) mainly in backscattered electron mode. Images were recorded digitally, allowing accurate measurement of dimensions and angles. Technical details of the project are available elsewhere (Mortimer & Stoney 1996, Appendix) and the research of several other specialists was extremely helpful (eg Larsen 1987; Meeks 1988). The recording process was successful, providing startlingly clear images of the tiny marks, but it also proved time-consuming. Hence future work, especially on larger groups of material, needs to be carefully considered and as much information as possible must be gained from the project already completed. The BAEH

¹ The difference between the terms ‘punching’ and ‘stamping’ may not be clear to a non-technical or a non-English audience. In this paper, punching will refer to the application of marks on metalwork and stamping to application on ceramics. In fact, stamping has equally been used in reference to metalworking. Generally speaking, punching normally implies a greater, and more sudden force was applied than for stamping, which could be thought of as closer to pressing or impressing.

² Non-ferrous artefacts will be used in this study, and most of the commentary will be concerned with copper-alloy artefacts, rather than those of precious metals. Although iron objects of this period may have been punchmarked, it is much more difficult to study them due to their poor preservation.

material was compared with museum collections from nearby sites, excavated earlier this century or in the 19th century (Barrington A, Barrington B and Haslingfield) and with published material from two sites from Norfolk, Morning Thorpe (Green *et al* 1987) and Spong Hill – inhumation graves only (Hills *et al* 1984).

During the early Anglo-Saxon period, the range of punchmark designs that was used on metalwork is small compared with the design range seen in the pottery of the same period (see below). At individual sites, the range of designs seen is, not surprisingly, even smaller. Only 12 different punch designs were used on the 45 artefacts from BAEH (Fig. 1), although several artefacts were marked with more than one type of punch, or with two punches of the same design but of different sizes. The marks were generally small, mostly between 1 and 2 mm across their largest dimension. The smallest examples – as little as 0.78 mm across – were simple circular or oval dots. The larger punchmarks – up to c. 5 mm across – were mostly the more complex designs, such as the ring-and-dot or double-ring-and-dot, but larger examples of the circular/oval form were also seen.

Previous researchers have tended to group together punchmark designs in the same way as they would any archaeological artefact. For example, most of the great square-headed brooches of Kent examined by Leigh (1980) had either circular (=ring-shaped) and triangular based forms (including those with internal detail). Few other designs were seen – a few semi-circular and one cross-shape – making classification relatively simple. During the study of the BAEH material, the method of making punches was examined and a new punchmark typology was proposed, with the highest level of classification based on the method of punch manufacture. In this typology, the marks were divided into five basic groups; a) solid geometric, b) solid, adapted from geometric, c) with punched additions, d) with filed/

engraved internal divisions and e) with both punched and filed/engraved internal divisions. Circular, oval, triangular and rectangular marks are examples of Group a. Group b would include paired triangles, semi-circular or C-shapes, together with X, Z and S forms. To manufacture punches to make marks for both Groups a and b needed nothing more than a file and a good eye for close work, in order to complete the design. Group c includes ring, ring-and-dot and double semi-circular (double C or double U) forms. The method of manufacture for the punches to make these marks is perhaps less obvious, but it is immediately clear that they could not have been made using a file. To take the example of a ring punch, the tip would initially be fashioned so as to give a solid circular mark (as in Group a) and then, after annealing to soften the metal, a small circular depression would be sunk in the middle, using a further smaller circular secondary punch. If necessary, a file could be used to tidy up the circumference of the punch, if necessary. Punches to make the other Group c marks would be made in a similar fashion, using suitably shaped secondary punches. Theophilus (Hawthorne & Smith 1963) makes reference to the manufacture of punches in this way, in Book III, Chapter 18. Group d marks include triangles or other shapes with internal grids, as well as double Vs and Y-shaped marks with internal divisions. A fine-toothed file would be necessary to produce these designs. Group e marks are rare, and the only form seen in this study was 'broken rings' (ring marks with additional divisions, to make a negative cross). Material from the other cemetery sites examined have punchmarks which can be neatly fitted into this new typology. It is certain that the designs seen on the material from BAEH and the other cemeteries studied in this project are by no means the only ones used at this period. However, it is thought that any other types of mark still to be recorded would fit into one of the five groups of this punch manufacture-based typology.

Nearly all the designs commonly seen on metalwork are symmetrical, either around one or two axes. For example, circular, ring and ring-and-dot marks are symmetrical around two axes, and Vs, semi-circular and double semi-circular marks are symmetrical around one axis.

By far the most common punchmark Group at BAEH was Group a – 15 artefacts or pairs/sets of artefacts had Group a marks (all but one circular/oval), either on their own or with other designs (Table 1). The circular/oval marks were frequently used repoussé-fashion, that is to raise bumps or bosses on the front of an artefact, by pressing the punch from the back. Such marking was seen in many simpler forms of wrist clasp, where the sheet

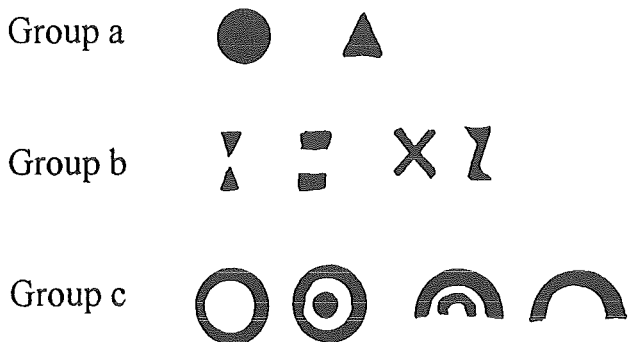


Fig. 1. - Punchmark types found at Barrington Edix Hill 1989-1991 excavations (BAEH).

Table 1

Punchmarks at Barrington, Haslingfield, Morning Thorpe and Spong Hill.

The table shows the number of times each punchmark type was found at the site (some artefacts had more than one type of punchmark on them, so this is not the same as number of artefacts); pair of sets of artefacts counted as one.

		Current site	Museum collections				Published sites	
		Barrington Edix Hill	Barrington	Barrington A	Barrington B	Haslingfield	Morning Thorpe	Spong Hill
group a	circular/oval repoussé	13		2		7	16	3
	circular/oval (non repoussé)	1	1	9		4	13	2
	solid triangular	1	2	1			10	
group b	V		4			1	7	1
	S						2	2
	Z	2						
	Y						3	
	Paired triangles/dots	1	1	1	6	1		
	Paired lines	1						
	X	1					2	
group c	semi-circular	3	7	6	9	4	21	3
	double semi-circular	3		1	4	8	23	6
	ring	1	4	4	8	2	47	16
	ring and dot		1			3	2	1
	double ring					1	1	
	double ring and dot	1	1					
	double semi-circular and dot						1	
	triangle with central dot	1					2	
	triangle with three dots inside	1	1				1	
group d	double V		3				4	3
	double lines						1	
	segmented Y			3	1		1	2
	grid in triangle			2	1		4	1
e	others (group e)						4	
Totals		31	25	29	29	31	163	40

metal used was sufficiently thin to allow this to be carried out without piercing the metal – or at least not too frequently. Other designs were more rarely found, but double semi-circular, Z-shaped marks and semi-circular marks were found on more than one artefact. Ring marks were found on a pair of artefacts from a single grave.

It is interesting to note that double semi-circular punchmarks were found relatively frequently at BAEH and amongst collections from the neighbouring sites of Barrington A, Barrington B and Haslingfield. This is despite the difficulties envisaged in manufacturing the design at this small scale (the 'legs' of the design are between 1.2 - 1.5 mm apart) and it suggests that this particular motif was deemed important. At Morning Thorpe, the double semi-circular marks again seem to be popular, as they are seen on 23 artefacts out of a total of 165 instances of punchmarking. Ring marks³ appear even more popular at Morning Thorpe and Spong Hill, where they are by far the most frequently used design; they were seen on 47 artefacts at Morning Thorpe and 16 (out of 40 instances of punchmarking) at Spong Hill. Ring marks were also the most popular design amongst the metalwork at Norton, Cleveland (Sherlock & Welch 1992, 56-7). Semi-circular and solid triangular punchmarks were common at Morning Thorpe.

Metalworking punches were also critical in brooch designs in Kent, although the dominant forms there were quite different. A brief survey of the punchmarked artefacts at Buckland, Dover, Kent (Evison 1987) shows that, of the punch types seen in the Anglian cemeteries, circular/oval dots, repoussé and otherwise (11 examples) and ring-and-dot (9 examples) are the most common designs, although neither design could be said to be frequently found. This largely reflects the types of artefact found. Particular artefact types which are often elsewhere found to be punchmarked, such as wrist clasps and annular brooches, were rarely or never seen at Buckland. Instead, many of the Buckland finds were brooches, of typical Kentish forms, such as silver-gilt disc brooches and square-headed brooches. These artefacts are still marked with punchmarks – those for niello settings (primarily long runs of small triangu-

lar marks along borders) and those used in notching (creating a beaded effect by marking the lines into short segments) – but these forms are normally classified and discussed separately to the other types of marks. These forms were also noted to be very common amongst the silver great square-headed brooches of Kent (Leigh 1980).

The majority of punchmarked artefacts have only one punch design, but the use of two or more types of mark is also relatively common, with the grander artefact types tending to have more, when they are punchmarked at all. For example, silver great square-headed brooches often have both notching and niello settings (and sometimes other types of punchmark) and larger cruciform brooch styles also tend to have notching, plus more than one other type of mark, where they are punchmarked at all (Mortimer 1990). In these studies on individual artefacts, it can be seen that the frequency and type of punchmark varies over time and geographically, so it must be expected that chronological and geographical variations will be seen in punchmark studies as a whole.







In the future, there should be more research on material from a range of Anglian sites and comparisons should be carried out between marks found on different types of artefact (particularly between copper-alloy, silver and gold artefacts), but this initial research does suggest that different punchmark designs were used at different sites. Similarly, further research should be carried out into seventh-century material, which a cursory survey seems to suggest it is less likely to be punchmarked than the sixth-century material.

2 Pottery

One of the most distinctive characteristics of early Anglo-Saxon pottery is its stamped decoration. From early on (*eg* Myres 1969; 1975), archaeologists have considered it important to record the marks in detail, primarily with the view of identifying stamps which were used on several different pots, which therefore must be the output of individual potters or workshops. The concentration on decoration generally, including that on pot stamps, initially led to the plain pottery of the period being rather overshadowed and under-represented in catalogues and discussions (*eg* Myres 1975). The reality is that stampmarked pots are in the minority in most sites, for example, at Mucking, only 11.7% of the cremation vessels were stamp-decorated (Richards 1987, 102) and 5% of the sherd groups from the settlement were decorated in any fashion (Hamerow 1993, 51). Recent approaches have improved this situation by looking at the vessel

³ It is sometimes difficult to discern the difference between ring marks and simple dot marks when using publication drawings, since drawing conventions often make them look similar. Even with the object in the hand, the two types of punchmark can look similar, due to the problems of reflected light on shiny surfaces. For this paper, the author made the best guess possible on the basis of the drawings, but it would be preferable in future to examine the artefacts personally.

Fig. 2. - The six most common types of stamp mark found on early Anglo-Saxon pots (after Briscoe 1983). A total of 3677 examples were recorded (Briscoe 1983, 71).

Briscoe type	Shape	Number of instances
A4a		341
C2a		220
A1b		225
A5a		170
A2b		165
A3a		124

form first and then considering decoration schemes (eg Richards 1987). Nonetheless the pot stamps have been a very influential area of study.

Several typological approaches have been taken to the stamp marks, each with their own merits. This work has been primarily concentrated on the pottery from cremation cemeteries (urns), so this paper will concentrate on this sub-set of the early Anglo-Saxon record. Pottery from the Illington/ Lackford workshop was considered by Barbara Green and colleagues (Green *et al* 1981 (also used by Arnold 1983, 1988), the Spong Hill urns were studied by Catherine Hills and colleagues (eg Hills *et al* 1994), a separate classification was used in Julian Richards' study (Richards 1987) and the Briscoe's all-encompassing pot stamp project is still under way (Briscoe 1981, 1983). Each of these studies is concerned with the design of the stamp first and foremost. This is reasonable because manufacture of a stamp suitable for marking pottery was not particularly arduous. The materials used to make stamps were reasonably easy to work using a knife, file or small saw. Examples of bone and antler pot stamps have been found (Briscoe 1983, 58-9) and experience (Stokes 1984) shows that stamps made of these materials, of wood, or even of chalk, would have been perfectly practical in use. Thus manufacture of the stamps is not really an issue in the same way as it is for metalworking punches⁴. It is interesting however to note that Briscoe (1983,

59) states that 'each of [the] recorded dies would appear to be the work of an expert' although on what basis is not clear.

Pot stamps are much larger than metalworking stamps; for example, the smallest mark amongst the Illington/Lackford group was 4.9 mm in its largest dimension and the largest mark was 11.9 mm across (Arnold 1988). Stamps for more complex designs, such as animal motifs, are even bigger, between 40 and 50 mm in length.

Each of the classifications has stressed the huge variety in stamp designs and most of the studies have resulted in an extremely detailed classification, comprising many types and subtypes. When comparing the designs used on pots with those used on metalwork, the most noticeable feature is the sheer diversity and the frequency of asymmetric and non-geometric designs (especially the animal and runic motifs, but also spirals and swastikas). This diversity and elaboration is possible, of course, due to the much larger dimensions and the ease of stamp fabrication. The designs used on metalwork can be seen as a subset of those used on pots; so far no punchmark designs have been seen on metalwork that do not have their equivalent on pots.

⁴ If the animal motif marks were made with metal stamps, which seems possible, evidently these would have required far more complex manufacturing procedures.

The popularity of particular designs are not the same on pottery as on metalwork. Using the Briscoe classification (Briscoe 1983), the most common types of stampmark are A4a, C2a, A1b, A5a, A2b and A3a (Fig. 2). Of these, only A1b (rings) and A2b (double rings) are at all common on metalwork. Type A4a (positive cross in a circle) is particularly popular but has not yet been found on metalwork of the period, although one would have thought that its manufacture would not have been a challenge to the metalworkers who could for example fashion punches which gave double semi-circular designs.

Solid geometric designs (Groups a and b in the punchmark typology) are rarely found on pots. The prevalence of these designs amongst the metalwork may be due to the ease of the manufacture, which may have meant that such punches could be fashioned in an *ad hoc* fashion, when circumstances demanded, merely by filing down a suitable piece of iron, perhaps without even the need for controlled heating and quenching processes (tempering). This is particularly the case for repoussé work, where only the merest hint of the outline of the punch tip can be seen from the front of the artefact, and hence the metalworker could have 'made do' with rough and ready punches without compromising the finished design. In contrast, it seems to be the 'norm' that pot stamps would be anything but plain; the potential for elaboration was nearly always seized. Again, the majority of the pots (75%) have either one or two punchmarks (Richards 1987, 102-105).

Regional preferences, or at least differences between use frequency at individual sites, have been noticed. For example, 60% of the urns at the Illington cemetery were decorated with stamps, but the potters supplying this site also used fewer forms with circular and rectangular outlines than those at other sites in Richards' survey (*op cit*).

Myres (1969) suggested that stamped decoration had its greatest intensity of use in the sixth century. Recent studies, such as those at the settlement at Mucking, Essex (Hamerow 1993, 52), have broadly confirmed Myres' theories. Amongst the ceramic material found at the settlements at Mucking, although the overall amount of decorated pottery decreased in the sixth and seventh centuries, the proportion of this which was decorated with stamps increased.

Whereas metalworkers could have used their punches for other purposes (*eg* piercing and scoring/scribing), pot stamps appear to have no other use. However, as pot stamps would be most suitable for working on organic materials (perhaps as dies for marking cloth?), the poor survival rate of organics on archaeological sites may affect this observation. There is no equivalent in pottery for the repoussé

work seen on metalwork. However, considerable relief is gained by the use of bosses and raised collars seen on many pots.

Layout

1 Metalwork

Punchmarks are normally found along the edges of artefacts, or along lines where edges 'should be' – for example, amongst cruciform brooches where the division between the central part of the headplate and the extended 'wings' of the headplate is not defined by a change in height, punchmarks were nonetheless frequently applied to where this division would have been. Occasionally, punchmarks are placed along the centre line of artefacts *eg* down the 'nose' of the animal head of a cruciform brooch. In some instances where punchmarks are placed other than in accordance with these principles, it seems this may have been the work of a less-skilled metalworker, as in the asymmetric, if enthusiastic use, of punchmarks on a cruciform brooch from Hornsea, held in the Yorkshire Museum (Mortimer 1990).

However, punched designs on precious metals may be exception to the rule, see for example, a silver pendant from Dover Buckland Grave 35 (Evison 1987, Fig 21), a pair of silver bracelets from Boss Hall, Ipswich (Scull forthcoming) and a scutiform pendant from Grave 70, Norton (Sherlock & Welch 1992, Plate 14); it is interesting to note that ring marks were used in each of these cases and that a late sixth-century or seventh-century date would be possible for each of these artefacts. Even the more humble artefact forms were sometimes selected for punchmarked designs which are unrelated to the outline of the artefact form, *eg* at Morning Thorpe, S-shaped punch marks are laid out in two concentric semi-circles within the rectangular shaped wrist clasps from grave 97 (Green *et al*, Fig 330).

The orientation of the punchmarks also tend to emphasise the edges of artefacts. In most cases, where the marks have a 'direction', for example, semi-circular or double semi-circular marks, the open ends of the mark (the 'legs' in the case of semi-circular and double semi-circular marks) are placed towards the edge of the artefact, normally at a distance approximately equal to the size of the mark itself. Some exceptions to this rule can again be attributed to inexperience on the part of the metalworker, as on a small-long brooch from Haslingfield, where a row of marks was begun by striking two marks in the wrong orientation, before the mistake was realised (Mortimer & Stoney 1996, 16-17).

Each punchmark on the BAEH material was placed separately. There rarely, if ever, seems to be deliberate overlapping of marks or any use of marks placed close together so as to make an extended design, as seen on some late Roman designs and the earliest phases of Germanic metalwork (see Ager 1985, Fig 15, nos 19-24 and 34-36).

One of the most striking features of the layout of punchmarks on metal artefact is that it is frequently executed in an erratic fashion. Punches were struck at many different angles (sometimes causing partial marks) and marks are often made at widely differing distances from each other, at a variety of different angles to the edge of the artefact or different distances from the edge. This irregularity is especially significant when the skills required in making the punches themselves is considered. This disparity led to the suggestion that punches may have been created by different (more skilled) metalworkers than those who applied them. However, the large number of different individual punches which are present at BAEH and surrounding sites (Mortimer & Stoney 1996, 20-21) shows that there was no difficulty in accessing the products of these highly-skilled metalworkers.

2 Pottery

Stamps are normally seen in combination with raised bosses, collars or incised (hand-drawn) lines which define the overall layout of the decoration on the pot. Stamps were used for emphasis, *eg* running parallel to collars or lines, to fill in areas defined by bosses, collars and lines, and occasionally to add extra detail to bosses (*eg* not just outlining bosses but also making crosses over them). Potentially there is a very wide variety of different designs which could have been produced in this fashion, but the most common are horizontal or vertical bands and triangular fields (Richards 1987, 179). Myres utilised the German terms *stehende Bogen* (standing arches) and *hängende Bogen* (swags) to describe some of the most commonly found designs (Myres 1975, 14-16). Stamps are rarely used on their own, without the decorative framework of bosses, collars and lines. When they are, they either mimic the shapes normally produced by incised lines *eg* triangular fields or horizontal lines, or, just occasionally, they are scattered in a seemingly random fashion (see *eg* Myres 1975, Figs 111-112). Thus the use of stamps mainly seem to be an adjunct to layouts which were already defined in some other way, which is comparable to the use of punches to emphasise edges of metal artefacts.

All decoration is concentrated on the upper part of the pot, which is the most visible portion, and this can be compared with the use of punches on the 'front' of artefacts. Despite this general pattern, some decoration has been noted on the reverse of cruciform brooches, including incised lines, as well as the occasional runic inscription (Mortimer 1990, 288). This brief survey did not find mention of stampmarks inside vessels, but it seems that this should be checked for.

Orientation and alignment of stamps is very varied – in some cases, the placement seems positively slapdash, but there are many examples where the placement is impressively neat (see *eg* the Illington/Lackford workshop (Myres 1975, Figs 349-355)). Evidently the large size of most stamps meant it would be relatively easy to place them accurately.

Symbolism

Several authors have tackled the subject of symbolism with respect to stampmarks on pottery; rather less attention has been given to punchmarks on metalwork. Arnold (1983) proposed a heraldic or totemic function, *ie* that particular marks or combinations of pot stampmarks represented family groups. Other aspects of social identity may be represented by the number of different stamp dies (Richards 1987, 197) although the layout of the stamped impressions and the total number of stamps probably has more to do with the individual potters' preferences (*ibid*). Various origins have been suggested for the symbols, particularly those to do with religion or ritual. Many of the designs with a circular outline may have connections with sun symbols seen on other artefacts, including those from earlier periods (Briscoe 1983, 59); similarly semi-circular or crescent symbols may represent the moon.

Any of these interpretations could be extended to punchmarks on metalwork. One might stress the religious/magical aspects, on the basis that the very small size of the marks on metalwork meant that they could not be seen by all and sundry, only by those wearing the artefact (or those very close to the wearer!). If the punchmarks are 'signalling' something, then they are doing it in the most discrete (secretive?) fashion possible. Even a metre away, the eye cannot 'read' the internal details of the punch designs – it will merely register that there are punchmarks on the artefact. On this basis, are punchmarks primarily of decorative importance, stressing the edges of artefacts, much as a fringe stresses the edge of a curtain? This seems unlikely because of the variety of forms seen (a circular shape would look

similar to a ring-and-dot shape at a distance, but both shapes were used) and because the metalworkers went to considerable trouble to fashion some of the designs (especially Group c, d and e forms), whilst ignoring some of the other designs known to potters which could also have been transferred to the metalworking environment. Hence it seems that there was more to punchmarks than mere decoration.

If marks on early Anglo-Saxon artefacts are symbolic, then the differences in motif prevalence for pottery and metalwork must be further explored. We have no reason to suppose that metalworkers could not produce punches with designs which were smaller versions of the most popular designs seen on pot stamps – after all, they produced other motifs which were at least as challenging – so why didn't they do so? It is presumably largely irrelevant that potters and metalworkers might have worked in different workshops, since in both cases, the artefacts produced are, in a sense, displayed items. However, the potters' product and hence the symbols on them, would be only 'exposed' on the burial day (assuming that cremation urns were not displayed on the mantelpiece as they are today) but the metalworkers products could be worn frequently or everyday. Hence the difference in motif preference between the pottery and the metalwork may be due to different symbolic 'requirement'. Did the potters' products have more of a function in public 'signalling', perhaps about the dead person's social grouping, whereas the metalworkers' products were more to do with the wearer's preferences or religious principles – did the punchmarks perhaps have amuletic connotations? The fact that runic inscriptions are displayed on the outside (the public side) of urns, but on the 'inside' (the back) of brooches, may also be relevant here. Alternatively, were the punchmarks used just the metalworkers own personal mark – a 'maker's mark'? Such aspects deserve more consideration and they will be the main topics of discussion during the presentation of this paper.

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Les ateliers de poterie noire de Lanheses (Viana do Castelo): un phénomène de migration

Avant de traiter de la poterie noire produite à Lanheses, paroisse de la préfecture de Viana do Castelo, nous devons mentionner la production de poterie à Prado, ancienne préfecture éteinte en 1855¹. C'est en effet à Prado que sont nés et ont appris leur art les potiers qui, au premier quart du XIXe siècle, ont initié la fabrication de poterie noire à Lanheses.

1 La production de poterie noire à Prado

1.1 Son antiquité

Dès le XIIIe siècle (en 1220) apparaissent dans la documentation les premières références à la fabrication de poterie à Prado, à présent dans la préfecture de Vila Verde, aux alentours de la ville de Braga, et un peu plus tard, au XIVe siècle, à la fabrication de tuile (Barroca 1993, 163). Nous trouvons la première référence à la production de poterie noire au XVIIe siècle (1645) seulement. Mendez Silva, un espagnol qui a été au Portugal, fait savoir qu'à Prado se fabriquaient des récipients en poterie noire destinés aux marchés de la région entre les fleuves Douro et Minho (Mendez Silva 1645, fl. 179 v.). Les fouilles archéologiques réalisées dans le monastère de Saint Martin de Tibães, situé dans la préfecture de Braga, ont livré ce type de poterie noire (Fontes 1997), probablement produite à Prado pendant une longue période chronologique – de la fin du XVIe siècle au début du XXe siècle. Prado se situe sur la rive droite du fleuve Cávado, en face du monastère de Tibães qui s'élève à mi-côte sur la rive gauche. Pour relier les deux rives,

un chaland assurait la circulation des passagers et des marchandises (Macedo 1966).

Des pièces semblables à celles trouvées à Tibães sont apparues dans les fouilles archéologiques réalisées dans la “Casa do Infante” à Porto (Real 1995, 181-182).

1.2 Sa commercialisation

Des documents historiques confirment l'arrivée, dès le XIVe siècle (1339), de poteries de Braga à Porto, situé à 50 km de distance (Barroca 1993, 161). Plus tard, au XVIIe siècle déjà (en 1628), il y a des documents qui attestent l'expansion commerciale de la poterie de Prado jusqu'à la ville de Porto (Silva 1988, 885). En 1789, il est même fait allusion à la nécessité de reconstruire le vieux pont de Prado, sur le fleuve Cávado, détruit par le passage de plus de 10.000 chars à boeufs chargés de tuile et de terre à potier, qui annuellement traversaient le pont (Oliveira 1985, 156). La documentation nous informe également que la poterie de Prado sortait par la barre d'Esposende (Neiva 1984, 23) et de Viana do Castelo (Capela 1992). Cette production céramique a été parfaitement décrite par Rocha Peixoto à la fin du XIXe siècle. A cette époque-là, Prado approvisionnait une vaste région jusqu'à Trás-os-Montes et aux Beiras (Peixoto 1966, 49-60). Prado était en ce temps-là un important centre producteur de poteries (rouge, noire et vernissée) et de tuiles, dont la production est documentée dès le XIIIe siècle, dans une région du Portugal qui, de nos jours, reste encore connue pour l'extraction d'argile et la fabrication de céramiques (noire, rouge, vernissée, faïence et porcelaine).

La commercialisation de la poterie était faite par les potiers eux-mêmes ou par les colporteurs, et les céramiques étaient transportées dans des chars à boeufs jusqu'à Esposende (Neiva 1984, 23), Porto (Silva 1988, 885) et Viana do Castelo (Capela 1992). De ces ports maritimes les plus proches (Esposende et Viana do Castelo), cette poterie était ensuite ache-

¹ A l'arrondissement de Prado appartenait la plus grande partie des paroisses où l'on fabriquait de la poterie rouge, noire, vernissée et de la tuile. En 1855, la municipalité de Prado a été abolie et ses paroisses partagées entre les municipalités de Barcelos, Vila Verde et Braga. Néanmoins la production céramique de l'ancienne municipalité de Prado est restée célèbre pendant longtemps comme “*poterie de Prado*” (Carneiro 1962). Dans ce texte nous continuerons de faire référence à l'ancienne préfecture - Prado.

minée par bateau jusqu'aux marchés plus lointains, comme Lisbonne au XVIIIe siècle et la Galice (Nord de l'Espagne) aux XVIII-XIXe siècles (Capela 1992).

Néanmoins, nous savons que cette poterie pouvait également être transportée par les femmes. Aux foires des alentours, les femmes transportaient les poteries sur la tête dans de grands paniers ou simplement liées par des cordes. Une photo du début du XXe siècle montre bien cette façon de transporter la poterie (Ilustração Católica 1918).

2 La foire bimensuelle de Ponte de Lima

Prado était traversé par la route royale qui liait Braga à Ponte de Lima. Dans cette dernière ville se tient une importante foire (documentée comme foire dès 1125), où se commercialisaient les marchandises d'une vaste région et qui était, au moins au XVe siècle, fréquentée par les Galiciens (Rau 1982, 63-64).

Nous savons que la poterie de Prado était commercialisée dans la foire bimensuelle de Ponte de Lima au moins dès le XIXe siècle, mais il est fort probable que cette vente se pratiquait déjà durant les siècles antérieurs. À la foire venaient aussi les colporteurs qui achetaient la poterie noire aux potiers et ensuite la transportaient en bateau, sur le fleuve Lima, jusqu'à Viana do Castelo et aux hameaux du mont d'Arga (Fernandes 1996, 14-15; 1997). Peut-être cette prédilection des populations au sud du fleuve Lima pour la poterie noire connut son origine à des époques plus lointaines que les XIXe et XXe siècles. Aujourd'hui encore, des vaisselles en poterie noire se retrouvent facilement dans les anciennes maisons de la région située entre les fleuves Lima et Minho.

La poterie noire produite à Prado (paroisses de Parada de Gatim et S. Mamede de Escariz), est vendue à la foire de Ponte de Lima jusqu'au troisième quart du XXe siècle, et la production s'est éteinte dans les premières années de 1980 (Fernandes 1996, 14-15; 1997). Cette poterie satisfaisait les besoins d'une population rurale qui utilisait les récipients en poterie noire pour préparer, cuisiner et conserver les aliments, aussi bien que pour conserver, servir et transporter les liquides.

3 La migration de potiers de Prado

Dès le XIXe siècle est connue la migration des potiers de Prado vers l'étranger, où ils sont allés produire de la poterie: en Espagne (Garcia Alén 1983, 150-198; Fernandes 1990, 9-14), au Brésil (Coutinho 1989), dans les anciennes colonies portugaises d'Afrique, en France, etc. Néanmoins, il faut encore faire

une étude systématique de ces mouvements migratoires, soit au Portugal même, soit à l'étranger. Ici nous parlerons seulement de la migration des potiers de Prado (paroisses de Cervães et Oliveira) vers Lanheses.

4 Lanheses et la production de poterie noire

Les motifs qui amènent un potier à quitter un endroit pour établir ailleurs un atelier peuvent être nombreux. Deux facteurs sont pourtant essentiels: la présence d'argile et un bon marché pour vendre sa production. Lanheses, aujourd'hui une paroisse de la préfecture de Viana do Castelo, répondait à ces deux exigences: il y avait des carrières d'argile et un bon marché qui couvrait les hameaux du mont d'Arga et les paroisses riveraines du fleuve Lima.

4.1 La production de tuiles à Lanheses

La paroisse de Lanheses, située dans une région où il existe de l'argile, a été un pays de tuiliers et de potiers. La tuile de Lanheses était excellente. La poterie apparaît plus tard et ses habitants lui doivent leur sobriquet – *paneleiros*.

La fabrication de tuiles est documentée dès le début du XVIIIe siècle (1706) (Costa 1868, 172), mais nous pouvons facilement admettre qu'elle remontait à une date plus ancienne. Dans des documents du XIXe siècle, elle est considérée comme étant de très bonne qualité (Leal 1874, 47; Vieira 1886, 229). Quelques auteurs et la transmission orale encore vivante dans la paroisse affirment que ces tuiles ont même été utilisées dans la construction du monastère de Mafra, construit par le roi D. João V dans la première moitié du XVIIIe siècle. Il est vrai que dans la deuxième moitié du XVIIIe siècle une grande quantité de tuiles est sortie du port de Viana à destination de Lisbonne et d'autres régions du Portugal. La tuile de Lanheses était vendue à la fin du XVIIIe siècle (1791) à Viana do Castelo, aussi bien que la poterie de Prado (Bezerra 1791, 115-116).

4.2 La naissance du village et de la préfecture de Lanheses

En 1793, et à cause de l'influence des Seigneurs du Palais de Lanheses, la paroisse devient un village et une circonscription administrative. Plus tard, en 1796, la préfecture de Lanheses a créé une foire bimensuelle (Bolama 1914, 437; Gonçalves 1988, 132-138; Capela 1995, 351-362, 5 et 7).

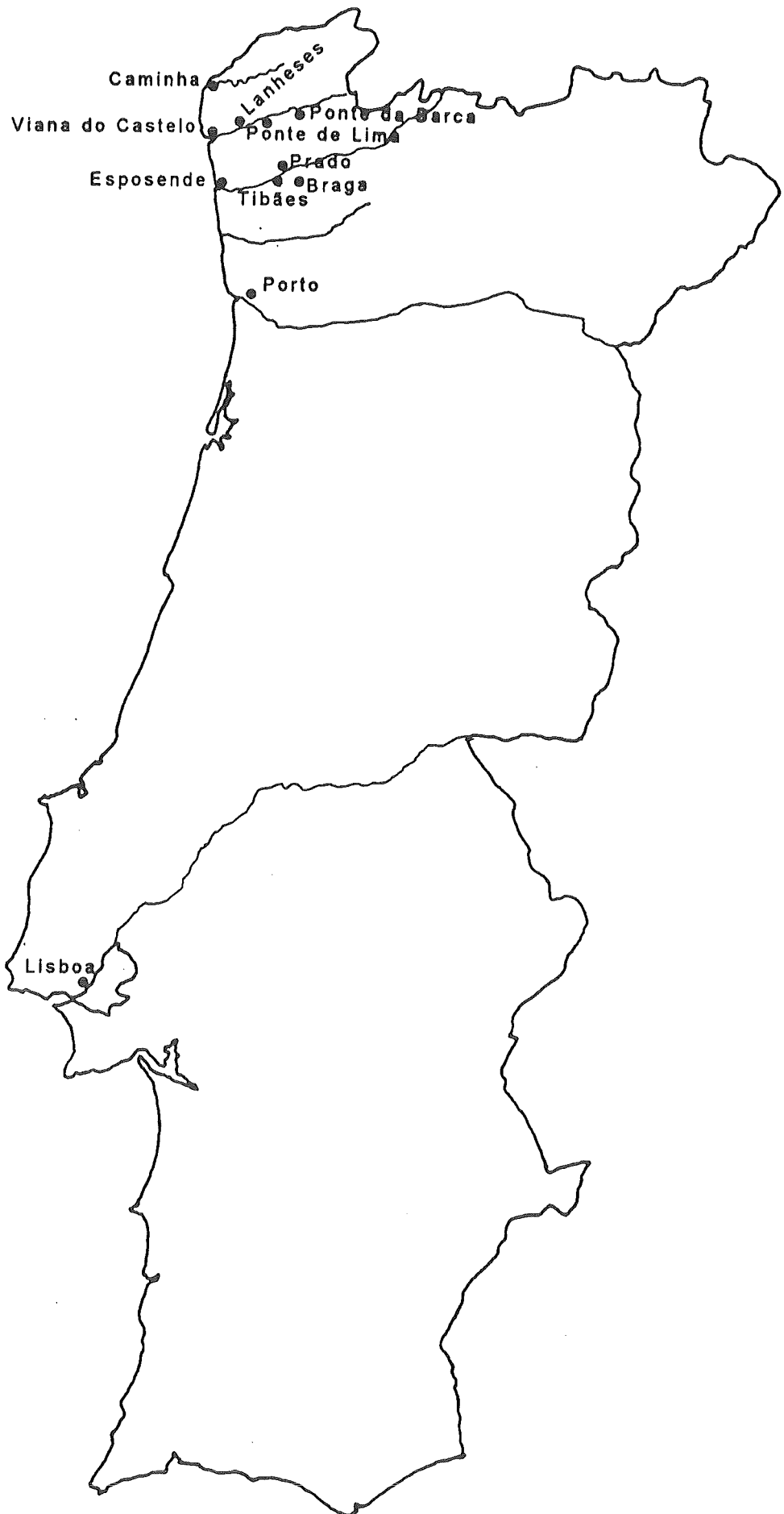


Fig. 1. - Carte du Portugal avec localisation des lieux cités dans le texte.

4.3 Le réseau routier et fluvial

Lanheses est localisé à la croisée de plusieurs chemins: elle est traversée par la route qui relie le village de Ponte de Lima à la ville de Viana do Castelo. D'autres chemins conduisent par la montagne jusqu'aux villages des alentours: Meixedo, Vilar de Murteda, S. Lourenço da Montaria, Vila Praia de Âncora, Caminha, Seixas, etc.

Par ailleurs, située dans une plaine cultivée au bord du fleuve Lima, il y avait des chalands pour traverser des personnes et des marchandises d'une rive à l'autre (Fernandes & Mário 1993, 178 et 180), ainsi que pour assurer la liaison fluviale avec Ponte de Lima et Ponte da Barca, en amont, et Viana do Castelo, en aval (Reis 1981, 186-187).

Cet excellent emplacement, la création de la préfecture et, quelques années après, la création de la foire, ont créé les conditions favorables à l'installation des premiers ateliers de poterie noire.

4.4 Le premier atelier de poterie noire à Lanheses

Conformément à la transmission orale dans la paroisse, la fabrication de poterie noire est toujours restée dans les mains d'une seule famille, celle du premier potier provenant de Prado (Gonçalves 1940, 1). En effet, après une recherche dans les registres paroissiaux² (naissances, mariages et décès) de Lanheses, de 1593 et 1940, nous trouvons seulement des références à des potiers dans la première moitié du XIX^e siècle.

Le premier potier qui est venu faire de la poterie noire à Lanheses s'appelait João Machado da Rocha, fils du potier João Machado da Rocha et de Josefa da Costa, né à Oliveira, paroisse de la préfecture de Prado, et marié à Cervães, également appartenant à la paroisse de Prado, le 18 juin 1786, avec Josefa da Silva Macedo. Ce couple a eu 8 fils, tous nés à Cervães, entre 1789 et 1808. Nous pensons qu'ils sont venus vivre à Lanheses peu après la naissance de leur

dernier enfant, parce que les enfants plus âgés se sont déjà mariés à Lanheses, le premier d'entre eux en 1813. Pendant 5 générations nous trouvons la famille Rocha faisant de la poterie d'environ 1810 jusqu'à 1940. D'autres potiers de Prado sont également venus à Lanheses et certains se sont mariés avec des filles de la famille Rocha³. Nous ne savons pas exactement combien d'ateliers de poteries existaient. Mais en utilisant les données des registres paroissiaux nous pouvons estimer que chaque "génération" de potiers a eu autour de 3 ou 4 ateliers. Cependant, la dernière "génération" de potiers n'a pas eu son propre atelier: ils ont travaillé dans l'atelier de leurs parents.

4.5 La production de poterie de l'extraction d'argile jusqu'à la commercialisation

Nous savons que les derniers potiers de Lanheses faisaient essentiellement de la poterie noire mais aussi un peu de poterie rouge (Gonçalves 1988, 72).

Ils extrayaient de l'argile en été, dans des carrières existantes dans la paroisse. L'argile était achetée aux propriétaires des terrains où se situait la carrière et était transportée dans des chars à boeufs jusqu'à l'atelier. Chaque char à boeufs portait 40 auges (*gamelas*) d'argile⁴.

Le pétrissage de la pâte se faisait de la même façon qu'à Prado. Après avoir été séchée au soleil, l'argile était gardée dans l'atelier. Chaque fois que le potier avait besoin d'argile, il en prenait une certaine quantité et la jetait dans le *masseirão* (un récipient fait d'une grosse branche d'arbre placée horizontalement et dans laquelle il y avait une cavité), où il l'écrasait soigneusement avec un pilon (*pisão*). Le travail au *masseirão* peut être fait par deux personnes en même temps, chacune d'elles ayant son pilon.

Ensuite, l'argile était passée par le tamis (*peneira*) et placée dans une *masseira* (récipient en bois) où elle était pétrissée avec de l'eau. Ensuite, la pâte était placée sur le *vergadoiro* (une sorte de table faite avec une grosse branche d'un arbre placée verticalement)

² Je remercie le professeur Norberta Amorim pour son aide et l'orientation de mes recherches sur les Registres Paroissiaux. Sans son appui, cette étude n'aurait pas été possible. Je remercie aussi Madame Isabel Delgado qui a eu la patience et la bonne volonté de faire les fiches de famille des paroissiens de Lanheses et de m'aider à trouver "mes" potiers.

³ Une étude plus approfondie sur les données extraites des registres paroissiaux sera publiée dans le numéro 2 de la revue *Olaria: revista de estudos arqueológicos, históricos e etnológicos*, Barcelos, Museu de Olaria, 1997.

⁴ Les données ethnographiques trouvées dans cette étude ont été recueillies à Lanheses dès 1994. Nos informateurs ont été:

Monsieur le curé Manuel Franco; Carolina Palma de Lima, petite-fille du potier Manuel Pereira Palma, et qui vit encore dans la maison où était l'atelier; Manuel Pereira Palma, lui aussi un des petits-fils de Manuel Pereira Palma et fils du potier Damião Pereira Palma; Maria Helena Franco, petite-fille du potier Manuel Brás. J'ai aussi parlé avec des personnes qui ont connu les potiers: les bateliers Alfredo Badalheiro et João da Rocha et aussi Manuel Quintas, qui a construit sa maison dans un terrain où il y avait un ancien four de cuisson de la poterie. J'ai aussi utilisé les textes de Gabriel Gonçalves (Gonçalves 1940; 1988) et de Caroline Brettel (Brettell 1991).

et elle était très bien mêlée avec les mains. Sur la forme de pelote l'argile était donnée aux potiers pour qu'ils la travaillent.

Quelques fois le potier malaxait deux argiles différentes extraites de la même carrière à Lanheses. Les potiers ont aussi réussi à acheter de l'argile à la paroisse de Alvarães.

Le potier de Lanheses, comme le potier de Prado, utilisait le tour. Pour façonner les pièces sur le tour il se servait des *canivetes* (éclisses en bois). Ensuite, il lissait la surface de la poterie avec un chiffon, normalement du lin. Ensuite, il l'enlevait du tour avec l'aide d'un fil.

Comme à Prado les poteries de plus grandes dimensions étaient faites en plusieurs parties. Le potier faisait d'abord la partie supérieure du corps, la *base*, qu'il réalisait au tour, et puis faisait la partie inférieure, la *caco*. Ensuite il mettait la *base* sur le *caco* et assemblait les deux parties qui formaient le *búzio*. Le *búzio* était alors aménagé au tour et restait à sécher pendant quelque temps. Lorsqu'il était sec, il revenait au tour pour façonner l'encolure (Marinho 1996, 25-29).

Certaines poteries étaient décorées, quelquefois seulement avec une ou deux incisions sur le corps. Mais d'autres, faites pour des occasions spéciales, étaient décorées à profusion avec des incisions, polissages, impressions par estampage, application d'éléments modelés ou moulés, application de muscovite, etc. Nous connaissons une de ces poteries, sur laquelle a été inscrite la date de 1902. Elle fut utilisée cette année-là, pendant la fête de *Nossa Senhora das Necessidades*, à Ponte de Lima, par une jeune fille de quatorze ans. La décoration des poteries avec application de muscovite était également pratiquée par les potiers de Prado. Des poteries semblables ont été trouvées dans des fouilles archéologiques au monastère de Saint Martin de Tibães (Braga) (Fontes 1997), depuis la deuxième moitié du XVI^e siècle jusqu'au XXI^e siècle, et aussi dans les fouilles archéologiques à la Casa do Infante à Porto (Real 1995).

Sur commande les potiers fabriquaient également des théières, des tasses, etc., qu'ils polissaient sur toute la surface.

Les poteries, après avoir été façonnées et décorées, doivent subir une période de séchage, qui pouvait être plus ou moins longue selon les conditions atmosphériques.

Après le séchage, les poteries étaient cuites. Le four utilisé avait une couverture temporaire, un foyer et une chambre de cuisson séparés par une paroi horizontale pleine de trous. La cuisson des poteries se faisait de la même façon que celle utilisée à Prado. On faisait une cuisson tous les quinze jours, le vendredi. Le jour suivant la poterie était défournée et de bon matin transportée à la foire de Lanheses.

Ces potiers produisaient (Gonçalves 1940, 4) deux modèles de *cântaro* (cruche): l'une était utilisée pour la conservation et le transport de l'eau, l'autre, presque toujours avec un bec verseur, pour transporter et verser du vin et aussi pour préparer et transporter le sulfate utilisé pour le sulfatage des vignobles. Ces cruches pouvaient aussi être utilisées pour la conservation des olives et dans le "jogo do panelo" (jeu des cruches)⁵. Les potiers fabriquaient également des *panelas* et *caçoilas* (pots-au-feu) à deux anses qui étaient utilisées pour dessaler la morue, pour la fabrication du beurre et pour la cuisson des aliments; des *porrões de duas asas* (une autre forme de pot avec deux anses) pour la conservation de la graisse de porc; des *alguidares* (écuelles), les plus grandes pour laver du linge et les plus petites pour l'hygiène personnelle du corps; des *coadores* (passoires) pour écouler les liquides des aliments cuits dans l'eau bouillante; des *púcaros de duas asas* (une autre forme de pot avec deux anses) pour emporter les aliments aux ruraux qui travaillaient aux champs; des *asadinhos* (une autre forme de pot-au-feu, avec une anse) qui étaient utilisés pour la cuisson des aliments; des *chocolateiras* (pichets) pour préparer le café, le thé ou le vin chauffé avec du sucre; des *infusas* (pichets) pour boire du vin; des *fogareiros* (pêles-fourneau) et *assadeiras* (pots à châtaignes) pour la cuisson des châtaignes; des *copos* (tasses) pour l'ingestion des liquides; des *bacios* (pots de chambre) et *vasos* (pots à fleurs). Parfois les potiers faisaient aussi des *cucos* (sifflets onomotopéiques), qui sont des jouets pour les enfants (Gonçalves 1969).

⁵ Les cruches faites par ces potiers (Araújo 1988) et aussi par les potiers de Prado (Parada de Gatim et de S. Mamede de Escariz) (Fernandes 1997) étaient utilisées pour jouer le *jogo do panelo* ou *panelinha* (jeu des cruches): plusieurs garçons et filles, placés à une certaine distance les uns des autres, se jetaient les cruches l'une après l'autre. Celui qui laissait tomber la cruche était obligé de payer une nouvelle cruche et le jeu recommençait (Fernandes 1997; Araújo 1988, I, 46 e 181). Dans un de ses textes, José Rosa de Araújo décrit aussi ce jeu, mais

organisé par les taverniers. À l'occasion des fêtes, religieuses ou non, les taverniers achetaient une grande quantité de cruches à utiliser dans le "jeu des cruches". Quand un des participants du jeu laissait tomber une cruche il était obligé de payer une tournée de vin à ses compagnons (Araújo 1988a). Pour ces jeux, les potiers gardaient pendant l'année les cruches défectueuses et les vendaient à meilleur marché. Les personnes gardaient pendant l'année les cruches qui ne pouvaient plus être utilisées (Fernandes 1997).

La poterie était presque toujours vendue par les femmes des potiers dans les foires de Lanheses, Viana do Castelo et Ponte de Lima, et dans les villages du mont d'Arga et aussi à Meixedo, Vilar de Murteda, S. Lourenço da Montaria et à Caminha, d'où elle continua vers la Galice (Espagne). Aux foires de Viana do Castelo et de Ponte de Lima la poterie était transportée en bateau par le fleuve Lima. La poterie non vendue était gardée chez des personnes que les potiers connaissaient et auxquelles ils devaient une quelconque redevance. Vers d'autres lieux, la poterie était transportée sur la tête par les femmes, mise dans de grands paniers.

Ces ateliers de poterie noire étaient des unités de production familiales à laquelle tous les membres de la maison participaient. Le père et les fils plus âgés travaillaient au tour, les jeunes filles et garçons écrasaient l'argile dans le *masseirão*, la passaient par le tamis et la pétrissaient. Les enfants et la mère ramassaient en montagne du bois mort nécessaire à la cuisson de la poterie. La mère et les filles faisaient aussi le ménage, labouraient la terre, et, aux veillées, filaient du lin nécessaire à la maison. C'étaient également les femmes qui vendaient la poterie aux foires.

Les fils mariés pouvaient créer leur propre atelier ou continuer à travailler chez leurs parents. Damião, un des derniers potiers de Lanheses, n'a jamais eu son propre atelier: il a toujours travaillé chez son père, Manuel Palma.

On a cessé de fabriquer de la poterie à Lanheses dans les années 40. Pourtant Maria Helena Fernandes Franco (Lena Balandra), petite-fille de potiers, a continué à vendre pendant quelques années de la poterie noire à Lanheses, qu'elle achetait aux potiers de Prado. Durant les dernières années d'activité, Damião Brás achetait même de la poterie noire aux potiers de Prado, qu'il vendait à la foire de Lanheses mélangée avec sa propre production..

5 Conclusion

Au Portugal, une des causes de la migration des potiers a été la recherche de régions où il y avait de l'argile et de bons marchés pour vendre leur production. C'est ce qui s'est passé à Lanheses. Les ateliers y ont été créés par des potiers de Prado (paroisses de Oliveira et Cervães), à la croisée de chemins fluviaux et terrestres, centre d'une petite préfecture, créé en 1793 et éteint en 1836 (Rodrigues 1993), avec une foire bimensuelle créée en 1796, et dans une région connue comme étant consommatrice de poterie noire. Pendant presque un siècle et demi, un groupe de potiers, constituant environ une douzaine d'ateliers familiaux, ont fabriqué de la poterie noire. Les tech-

niques utilisées par les potiers de Lanheses, ainsi que la typologie de leurs poteries étaient identiques à celles des potiers de Prado, région d'où ils étaient originaires.

Cette poterie, destinée à une communauté rurale, commence peu à peu à être remplacée par le fer-blanc, le fer-fondu et le plastique. Par ailleurs, les chemins de l'émigration ont amené les enfants des potiers au Brésil, en France et en Espagne. Les derniers potiers, Damião Pereira Palma e Manuel Franco (Néu da Lina), ont cessé leurs travail pendant les années 40 de notre siècle. Avec eux s'est éteinte la production de la poterie noire de Lanheses, commencée dès le premier quart du XIX^{ème} siècle.

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A Local Potter's Workshop at Einbeck, Lower Saxony, Germany, Producing from 1140/1145 - 1230 AD Kilns, Ceramic Products and Production Technology, Environment and Subsistence: an Interdisciplinary Approach

Historical and topographical background

Today, Einbeck is a town of c. 15,000 inhabitants, located approximately 70 km south of Hannover (Fig. 1) at the foot of the so-called ‘Hube’, a hill-range with heights up to 300 m above sea level. It looks out over Einbeck from more than 200 m, surrounding the town to the east and west. Consequently, the main medieval traffic route Frankfurt - Kassel - Hannover - Hamburg had to cross the Hube, a situation which did not change until the early 19th century. Einbeck thus became an important resting place. In addition, a network of roads leading to Holzminden - Höxter - Paderborn - Köln and Hameln - Minden - Bremen turned off in Einbeck. The advantageous location was further supported by relatively good passages across the rivers Ilme and Leine, south and east of the town respectively.

Evidence provided by the ground plan of Einbeck linked with the scant material available from archives indicates a development of the town starting from three nuclei of different periods: the cathedral area of St. Alexandri in the north, the market square and later Old Town in the middle, and the New Town in the south (Fig. 2: 1-3).

The oldest locality is the St. Alexandri area which enjoyed immunity (Fig. 2: 1). According to a document dated 1158 and drafted for Heinrich den Löwen, a county in the Liesgau and an affiliated forest boundary in the Harz were already before the year 1039 linked with the possession of the estate *Enbicke*. The Counts of Katlenburg-Einbeck held these privileges until the beginning of the 12th century. They belonged to the leading nobility in Saxony and under the rule of Dietrich II they founded an ecclesiastical canon's chapter located on their properties. Evidence for the oldest church dating to about 1100 was provided by archaeological excavations¹.

Separated from this area by a brooklet and its swampy depression extending over 200 m, a market settlement developed on a bordering dry loess elevation around the middle of the 12th century (Fig. 2: 2). To the south, this early settlement was protected from ridge to ridge by a fortifying ditch which was up to 15 m wide².

Around 1230/1240, the systematic extension of the market place to the south led to the development of the New Town which was completed in the year 1250 with a ditch-and-wall fortification system (Fig. 2: 3). Between c. 1260 and 1300, a stone wall was built and in 1279 Einbeck received the freedom of the city as exemplified previously by the New Town at Braunschweig (Brunswick)³.

The foundation and development of the Einbeck Old Town around 1150 were probably the reasons for establishing a potter's workshop at the *Negenborner Weg* at a distance of c. 1.5 km from the urban settlement (Fig. 2: 4).

The “Negenborner Weg” site and its investigation

The archaeological site (Fig. 2: 4) has been known since c. 1950 and was discovered as a result of finds of ceramic sherds. In addition to recorded field names like *Kühner Feld*, *Kühner Höhe* and *Cugenhuser Warte*, these finds led to the assumption that the location of the deserted medieval rural settlement of *Kugenhusen* or *Kuynhusen* was to be found here. Historical records regarding *Kugenhusen* are scarce and there are no written sources indicating the beginning or the desertion of the settlement⁴.

Due to plans for the development of a new residential area an archaeological investigation of the site in advance of building construction became necessary. The excavation covered a total of c. 3800 m² and revealed in the first place findings of a former medieval pottery and not of a deserted medieval settlement (Fig. 3). A total of 146 archaeological features was uncovered, *i.e.* loam pits, 3 sunken huts (*Grubenhäuser*), refuse pits, single postholes, the

¹ Plümer 1977.

² Heege 1996, 62, Abb. 1.

³ Heege 1995b with more bibliography.

⁴ A first survey is given in Heege 1993.

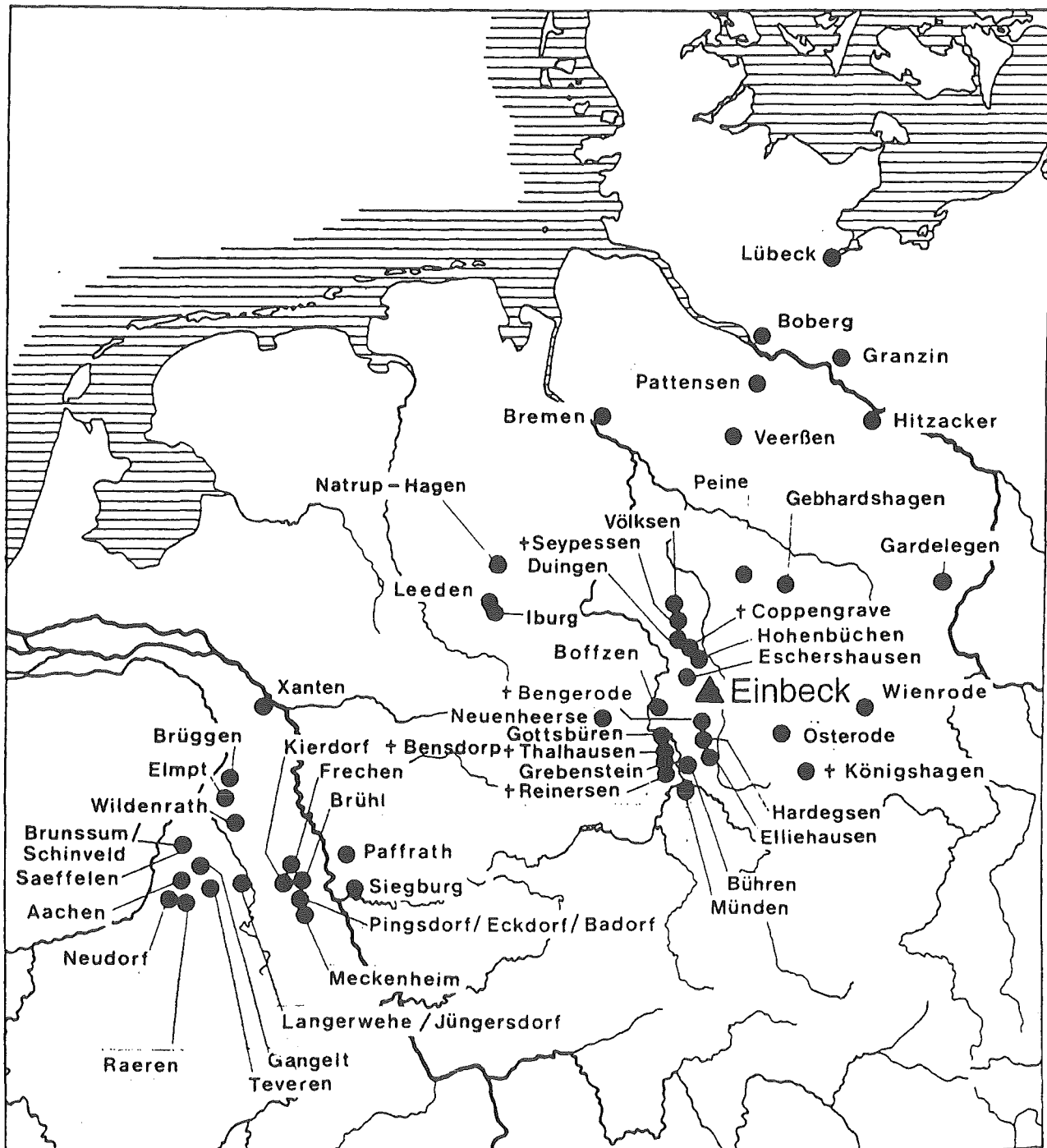


Fig. 1. - Einbeck, "Negenborner Weg - pottery" and the surrounding medieval potteries of Lower Saxony (after Stephan 1982, 120, Abb. 40; supplemented by author).

remains of at least 11 successive kilns, and multiple-phase wooden enclosures of a well. Of particular significance was the c. 500 m² large dumping slope stained dark by charcoal which filled the space of a former trench caused by erosion and including a wet spring horizon. Information about the stratigraphy of the dumping slope was obtained from five profiles (Fig. 3, Trench 1-5) reaching a depth of up to 3.5 m. Typology and stratigraphy allow us to divide the production period into two main phases, representing the second half of the 12th century and the first quarter of the 13th century.

During the excavation, no indications were found as to either the exact location of the actual potter's workshop or the dwellings of the family. Erosion in post-medieval times seems to have destroyed all traces of postholes or house constructions that probably used to be there. Based on findings of clay and sand in the refuse pits as well as of unfired vessel fragments (so-called greenware), it should be obvious that pottery was actually produced, dried, and fired at the Negenborner Weg. The botanical, palynological and zoological data also provide evidence that the potter and his family lived and worked at the site.

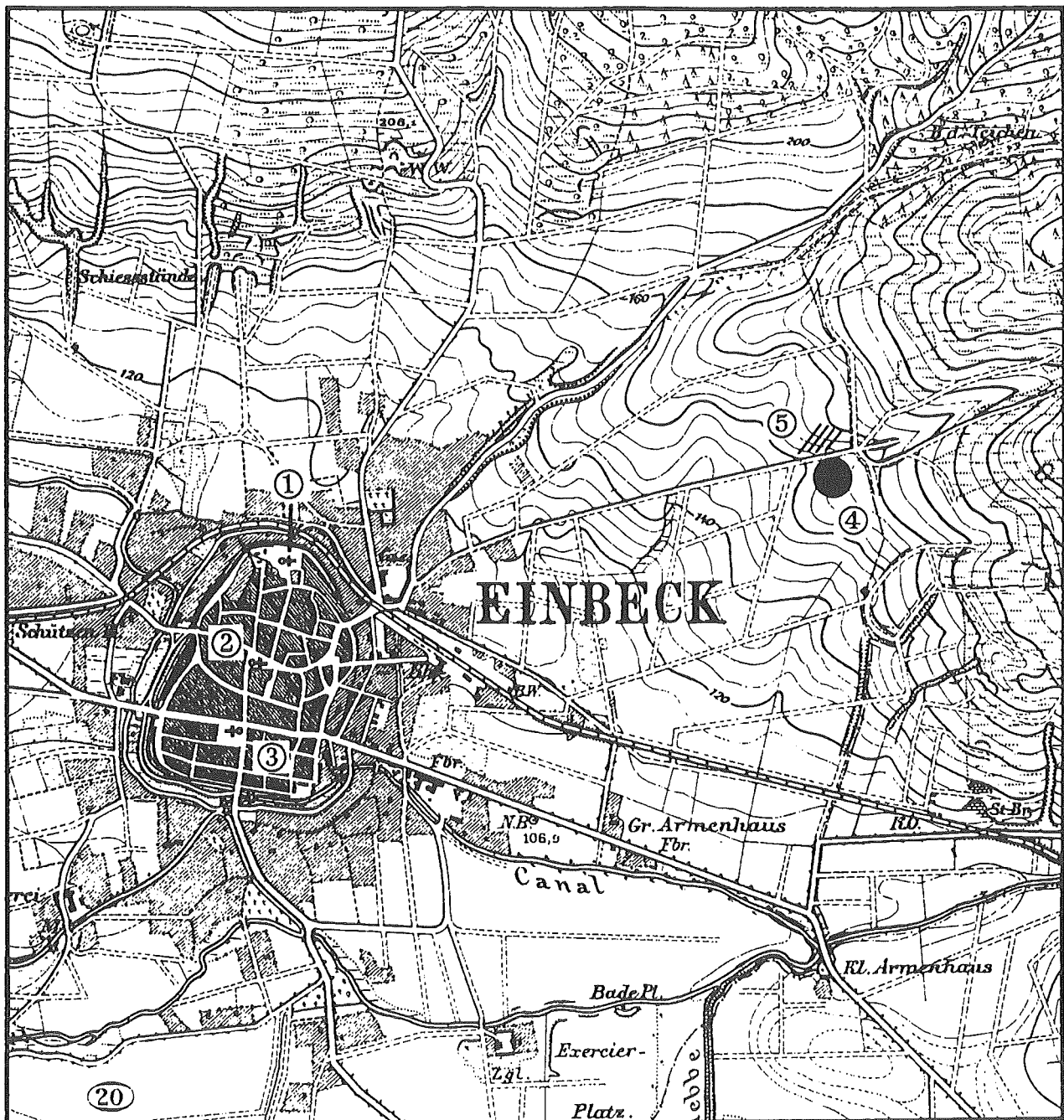


Fig. 2. - The City of Einbeck and the pottery site "Negenborner Weg". 1 St. Alexandri area (c. 1000/1050 AD); 2 Old town, market (after c. 1150 AD); 3 New town (after 1230/1240 AD); 4 pottery site (after 1140/1145 AD); 5 clay deposits. Topographical map 1:25.000 (1878).

Based on the archaeological investigations at the Negenborner Weg, 4 different phases of activities are apparent:

- Scant traces of a settlement during the early Iron Age.
- Loam pits and sunken huts datable to the first half of the 12th century. Remains of the deserted medieval settlement of *Kugenhusen*?
- The medieval pottery (c. 1140/45 AD - 1230 AD).
- The medieval route of the Negenborner Weg, a deeply concave and narrow pass leading across the dumping slope after c. 1300 AD.

In the following paragraphs, information will be provided about the archaeological and scientific results with regard to the medieval pottery. Consideration is being given to the data provided by palynology, archaeobotany, archaeozoology and material science (scientific-chemical determinations concerning ceramics and raw materials)⁵.

⁵ Palynology: Dipl. biol. F. Schlütz, University of Göttingen; archaeobotany: Prof. Dr. U. Willerding, Dipl. biol. D. Paetzold, University of Göttingen; archaeozoology: Dipl. arch. C. Schulze-Rehm, University of Kiel; material science: Prof. Dr. Kl.-J.

Fundamental aspects concerning the pottery

Clay

The pottery was located at the southern border of a quaternary clay deposit which reached the surface approximately 100 m further north and was exploited by open-cast working (Fig. 2). At the northern boundary of the pottery site a bell-shaped digging-pit of c. 1.60 m diameter was documented (Fig. 3). Similar pits for digging clay were observed in Bengerode near Fredelsloh, Ldkr. Northeim⁶.

The clay is to be considered as an ordinary type clay body both on the basis of its chemical and mineral composition and its firing characteristics. Due to the high quantity of calcium and ferric oxide as compared to stoneware clay the softening point is low. It cannot be fired beyond this range without becoming deformed because sintering point and melting point differ by only 30° C. The melting point (*Seegerkegelfallpunkt/Seeger Cone*) of the tempered raw clay is reached at a temperature of 1165°C but already at a temperature of 1100° C deformation and blistering occur. When a kiln load was piled up, the vessels stored at the bottom of the kiln were already in danger of becoming deformed at temperatures between 1000° C and 1100° C.

Light-fabric sherds of earthenware, partly decorated with red painting, occur (according to weight and sherd-count) in a fraction of 0.23 % and the chemical analysis of their clay gives different results from those of the local clay. If there has been local production at the Negenborner Weg, one can assume that light-fabric clay was bought and transported from such pottery centres like Bengerode, Ldkr. Northeim, or Duingen, Ldkr. Hildesheim. On the other hand, some of the glazed miniature vessels among the finds may have been bought by the potter as finished products at a market place for his private use or for the purpose of comparison.

Water

The preparation of clay and the manufacturing of vessels require the availability of water in the neighbourhood of the pottery. Only a few meters north of the kilns, in the wet trench caused by erosion, water

that was obstructed in the ground in front of and on top of the clay deposit was reaching the surface. After the year 1149 AD (dendrochronological dating), a hollow tree trunk was placed in this wet spring horizon to frame a well (Fig. 3). Because ceramic wasters of the beginning of the first production phase were found in the construction pit of the well, it appears that production of the pottery probably started a few years earlier, *i.e.* around 1140/1145 AD.

Around 1206 AD, a case walled with oak boards was placed at the location of the tree-trunk well in order to protect the water source and secure the function of obtaining water against the dumping slope that was gradually sliding downhill. The oak timber was datable to 1202 AD respectively 1206 ± 2 AD; additional timber used for the wooden enclosure can be dated to 1216 AD. In 1219 AD, another oak plank was added to elevate the structure. The wooden components were well preserved. The sequence comes to an end with one-third of an oak trunk dated to 1202 AD which was being used for a second time to frame the case. White, fine layers of slip indicate that after 1219 AD the framed case was ultimately buried by sediments of the brook. After this date at least 0.80 m of deposits from the pottery were added, indicating that pottery activities came to an end possibly around 1230 AD⁷.

Environment of the pottery and firewood

Firewood was probably available from the *Einbecker Wald*, immediately above the pottery site where the calcareous soil enabled the growth of a beech forest with woodruff as potential natural vegetation. Provided they were not used for agriculture, the loess areas in the vicinity carried oak and hornbeam forests. Palynological analysis of sediments from the wet spring alcove next to the Negenborner Weg indicates that already at the start of the potting activities the landscape around Einbeck had been deforested to a large extent. Oak (*Quercus*) and beech (*Fagus*) were the dominant species in the region, whereby oak might be over-represented in the pollen profiles due to its use for mast. There were also shrubs of elder (*Sambucus*) and willow (*Salix*) at the location where the pottery activity was to be established later on. In order to arrange for a path on the

Leers, Dipl. ing. R. Heidrich, Thomas W. Kamphowe, Technical University of Clausthal-Zellerfeld. See Heege *et al.* 1997a.

⁶ Grote 1976, Fig. 19.

⁷ This chronological statement is further supported by technological aspects of the ceramics, considering the complete lack of

'imported' proto- or near-stoneware and of roller-stamp decorated greywares among the finds. For the dating of these ceramic groups (younger than 1230/1240 AD), see Heege 1995a, 21 ff.; Stephan 1995.

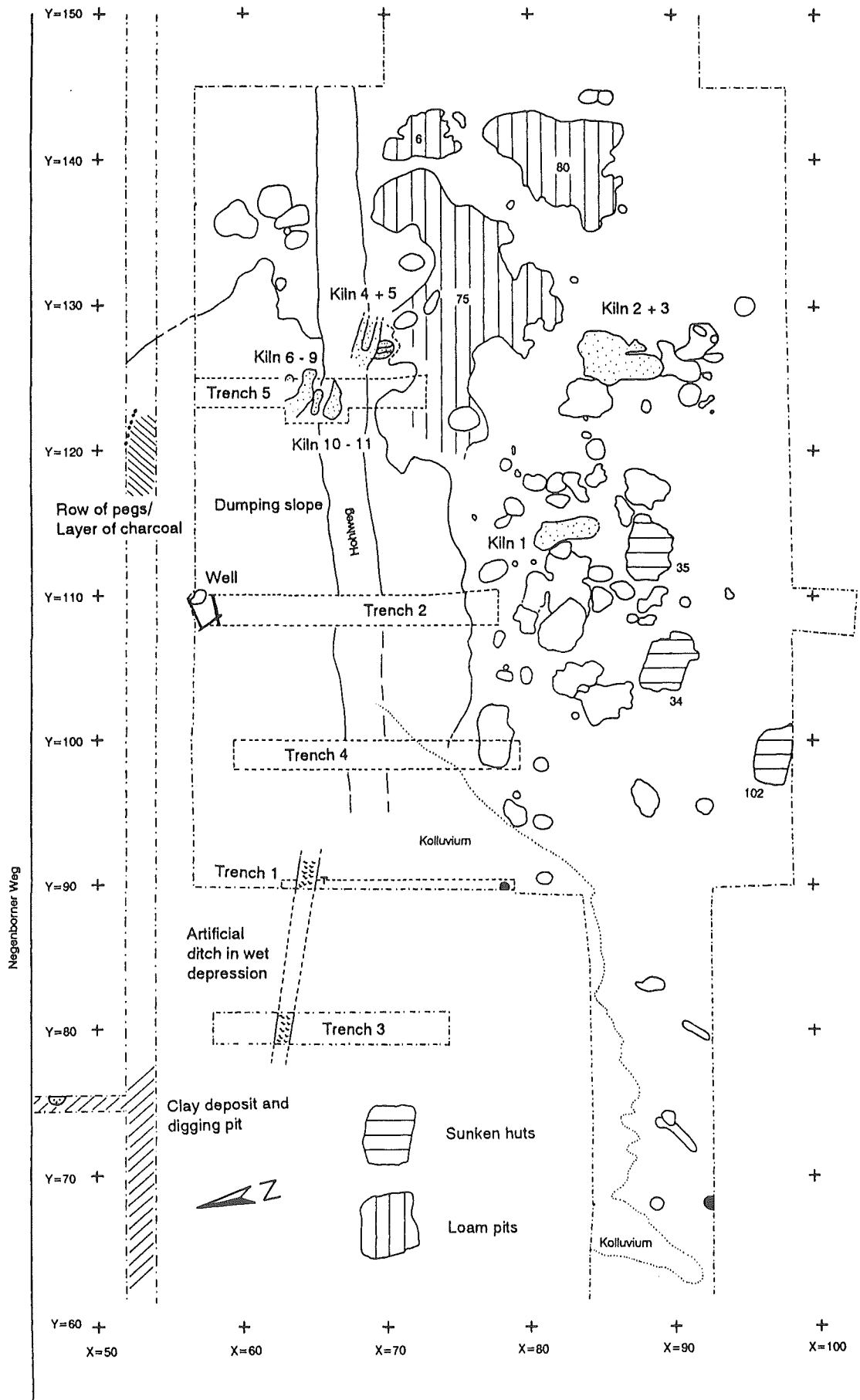


Fig. 3. - Einbeck, "Negenborner Weg - pottery", part of excavation plan with main features (sunken huts 34, 35, 102; loam pits 6, 75, 80; kilns 1-11; tree-trunk-well, refuse pits (not numbered), dumping slope).

wet depression, cut-off branches of the willow were used repeatedly during the pre-pottery phase, when loam pits and sunken huts were in function. Macro-botanical remains indicate typical plant communities of moist, muddy bank areas.

In the period when the pottery functioned, a decrease of beech (*Fagus*) and an increase of hornbeam (*Carpinus*) can be observed in the pollen profiles, pointing to utilization of the surrounding forest as coppice woods, probably providing firewood for the pottery.

After the desertion of the pottery, shrubs of elder and willow were replaced by hazel bushes growing underneath the now developing oaks. At the same time alders appeared, indicating the regressing influence of man in the area of the former pottery and the spring-alcove which by now had been buried to a large extent.

The analysis of charcoal that had remained in the kilns after the last firing gave evidence of oak, beech, and hornbeam as firewood. Collected branches as well as split trunks with a diameter of more than 20 cm had been used.

Manufacturing technique of vessels

The clay that was dug at the Negenborner Weg contains only tiny particles of calcium and few organic components, *i.e.* the clay is 'fat'. It cannot be used in its pure form for manufacturing purposes. If the particles of calcium are not removed, calcium oxide (CaO) will develop under firing conditions which in turn is changed to calcium hydroxide (CaOH₂) when expanding under conditions of absorbing water. This will lead to appearance of blisters and cracks or even to the destruction of the vessel. Numerous wasters found in the dumping slope were the result of such conditions.

Some refuse pits next to the kilns contained tempered as well as untempered clay and quartz sand. Obviously the clay was tempered in order to make it more workable and reduce its plasticity; at the same time, this avoided shrinkage and cracks in the process of drying and firing the vessels.

During the production period of the pottery there is no uniformity in the size of tempering particles, they fluctuate between 0.2 mm and 1.0 mm. The

average amount of tempering material used is 20 volume percent with a fluctuation rate from 15 % to 30 %. The tempering material is distributed evenly in the fabric which indicates careful wedging in order to get a uniform texture of the clay body. The quartz sand used is a river-sand that was neither fractionated nor crushed.

The ceramic material shows manufacturing marks indicating the use of a potter's wheel at the Negenborner Weg, probably a so-called block-wheel (wheel plus turntable rotated by foot)⁸. In the beginning vessels were thrown in the form of slightly bowl-shaped cylinders. The vessels were cut from the wheel and, after a short drying period, shaped by hand to globular pots, etc., using fingers, fists or a wooden club.

The Kilns

The remains of 11 successive kilns of different construction types were documented at the Negenborner Weg (Fig. 3). The lower portions of north-south respectively northwest-southeast oriented kilns were preserved. Together with the stoke pit in front of the kiln, they were dug obliquely into the original loess-hillside or later on into the waster deposits. Apart from one uncertain example of a small up-draught kiln (kiln 10), all kilns were so-called *liegende Öfen*, *i.e.* firing chamber and combustion chamber were aligned (sloping draught with the rear higher than the front). Walls and floors of the kilns were covered with one or more red-cindered coats of plaster indicating repairs.

One kiln was supplied with a massive supporting pillar set in the centre of the firing chamber (kiln 1), a feature also appearing in kilns from the Reinhardswald in northern Hesse, from Salzgitter-Gebhardshagen and Mayen on the central Rhine⁹. Another kiln contains a loam-hump equipped with 3 columns consisting of globular pots functioning as a fire-guard (kiln 2). Such pot-columns occurred also in other northwestern German potteries¹⁰ while they seem to be missing in Rhenish kilns of the same period. Two kilns (kiln 4 and 5) contain a raised 'tongue-like' central baluster (an oblong tongue-shaped loam construction), a feature that is found in contemporary potteries of the Rhineland but rarely in northwestern Germany¹¹. Kiln 8 has an oblique passage between

⁸ Cf. the remains of the potter's wheel from Dortmund-Gropenbruch: Bergmann 1993.

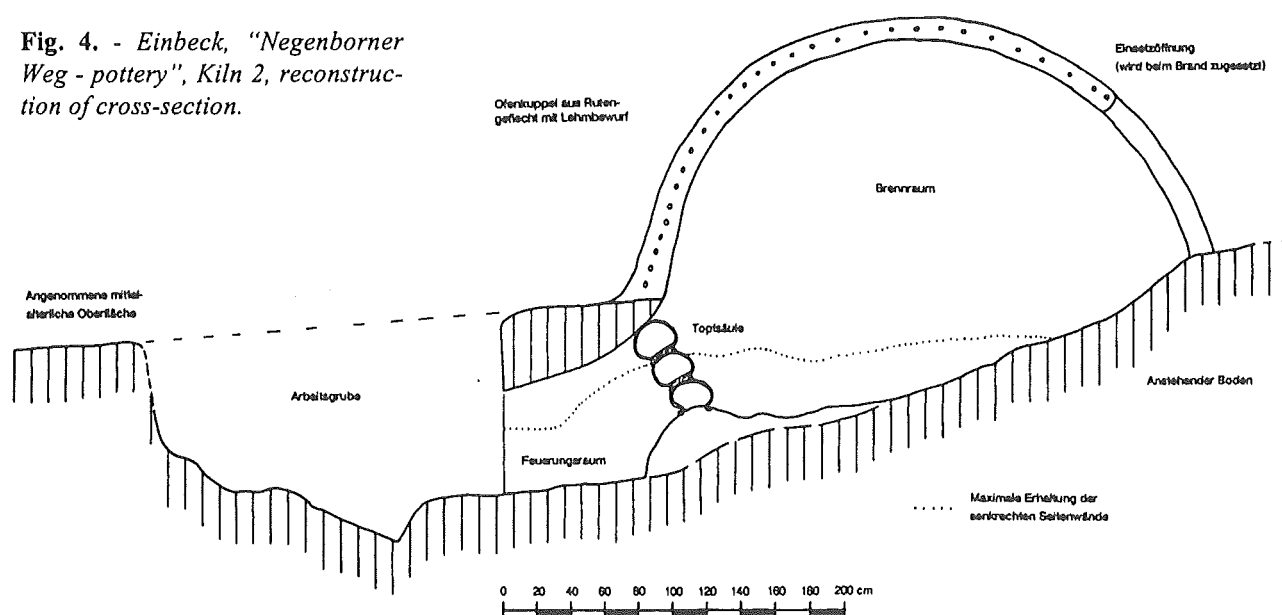
⁹ Desel 1969; Wegner 1990; Rötting 1977 and *Zeitschrift für Archäologie des Mittelalters* 10, 1982, 235.

¹⁰ *E.g.* at Coppengrave (Stephan 1981), Seypessen (H. Stephan

1979), and Duingen (Engel 1951; Engel 1952, 79 note 4) in southern Lower Saxony, Ropperode (Grodde-Braun 1969) and Gottsbüren (Desel 1969) in northern Hesse, Daberkow and Granzin in Mecklenburg (Warnke 1966; Engel 1952).

¹¹ Cp. Jürgens 1988; Janssen 1987; Lung 1958. In slightly

Fig. 4. - Einbeck, "Negenborner Weg - pottery", Kiln 2, reconstruction of cross-section.



the stoke-pit and the (not preserved) firing chamber where it is equipped with a fire-guard of 3 vertical loess/loam columns. Similar construction elements with several fire-guard clay columns are known primarily from northwestern Germany but – in a different version – also from the Rhineland¹².

It is worth noting that there is, in the beginning of the production of pottery, *inter alia* a kiln with predominantly Rhenish tradition (kiln 4) while the later kilns 1 and 2 show relations to kilns from northwestern Germany respectively Hesse.

Information about the dimensions of the kilns can only be estimated inasmuch as there were no traces left related to the arch of the kilns. In order to load the kilns, it would have been an advantage to be in a standing position. Considering the depth of kiln 2, the maximum arch height above the surface might have been 1.40 m (Fig. 4). Examples from northwestern Germany and northern Hesse lead to the conclusion that the opening for loading the kilns was located opposite the combustion chamber, at the other end of the kiln. For each single firing, it had to be cemented tightly. It is not certain whether the construction included a special draught or chimney.

The estimated dimensions in connection with the suggested reconstruction for kiln 2 justify a calculation concerning the volume. For kiln 2, this might have been *c.* 5 m³. Assuming an even more tunnel-shaped construction of the arch of the kiln, a volume of 4 m³ appears probable. Kiln 4 appears to have had

an estimated volume of only 2 m³, while kiln 5, similar to kiln 2, will have had a volume of 4 m³ to 5 m³.

On the basis of the suggested volume and taking into account the size of the available globular pots, it is possible to give an estimation of the amount of vessels produced in one firing operation:

Size of vessel	Kiln 4	Kiln 2/5
Globular Pot height 12-14 cm, diameter 14-15 cm = <i>c.</i> 357 pots/m ³	714	1428-1785
height 16-18 cm, diameter 18-22 cm = <i>c.</i> 133 pots/m ³	266	532-665
height 20-22 cm, diameter 22-24 cm = <i>c.</i> 86 pots/m ³	172	344-430

The ceramic material found consists predominantly of medium-size and large globular pots while the small globular beakers (height *c.* 6.5 cm, diameter *c.* 8 cm) are of little importance. Accordingly, when we assuming a production mix of small and medium/large size globular pots at a ratio of 25 % to 75 % respectively, we will get an impression of the approximate number of vessels per firing and kiln. One firing process in kiln 4 would produce *c.* 350 vessels while kilns 2 and 5 would have a firing capacity of 700-900 vessels.

modified construction: Lütke 1980/81; Meyer 1978; Madsen 1986. The pottery kiln of Seypessen (as yet unpublished) is possibly to be reconstructed as a kiln with an oblong tongue-feature (H. Stephan 1979, 79f.).

¹² Engel 1952; Hollnagel 1956; Janssen 1987; Jürgens 1988;

Kellermann 1950; Wegner 1990. Possibly also *Bonner Jahrbücher* 132, 1927, 279 and Lung 1955/56, kiln 1. Kilns with a noticeably oblique passage (to the no longer existing firing-chamber) also seem to occur in Coppengrave (Stephan 1991). Kiln-pilars are not, however, known.



Firing techniques

In the beginning, firing was conducted under oxidizing conditions, *i.e.* with an ample supply of oxygen. The subsequent reduction firing without smoking (grey colouring not on the basis of free carbon but of newly developed magnetite) was accomplished by closing off the kiln completely after the desired maximum temperature had been reached. The result as compared to ceramics fired under oxidizing conditions was the development of a more stable melting phase, a subsequently lower porosity, respectively a harder fabric. Pliability tests prove the texture of the completely reduced greyware to be 40 % harder than that of the red, oxidized fabric of wasters.

The portion of red, oxidized wasters amounts to less than 10 % and decreases significantly as the pottery develops. This indicates an increasing experience in the skills of reduction firing.

Analysis of wasters (measuring of open porosity, determination of mineral phases) from the Negenborner Weg shows that greyware products (globular pots, globular pitchers, lids, etc.) were generally fired at temperatures between 880° C and 930° C. Overfiring and the subsequent deformation or complete melting of the fabric occur occasionally but not fre-

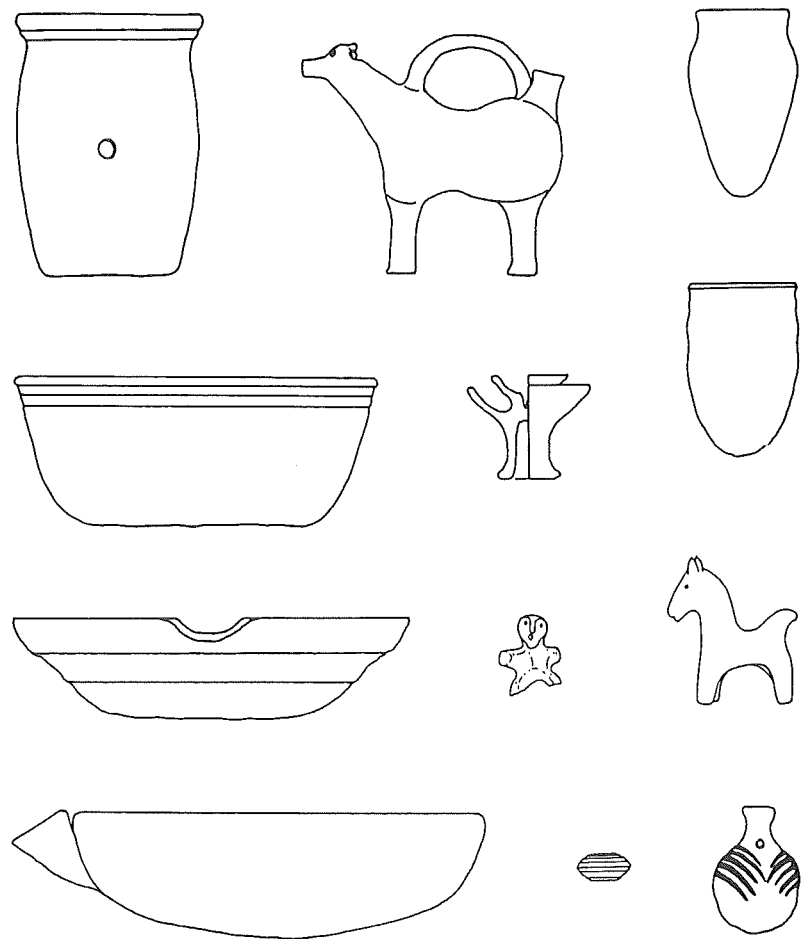
quently. More often under-fired wasters were found. The majority of the waster material was rejected due to cracks.

After firing, the completely reduced greyware shows – based on both micro- and macro-porosity – an average open porosity of 25.3 volume percent (fluctuation between 22-31 volume percent)¹³. Test sequences prove that a maximum of stability in temperature variation is reached at an open porosity of *c.* 20 volume percent which is due to the fact that the porous structure absorbs dangerous tensions and cracks. The high porosity which provides the fabric with elasticity when there are temperature variations also results in a low heat expansion coefficient although heat conduction deteriorates at the same time. The factors mentioned explain the suitability of medieval greyware for use as cooking vessels in an open fire.

The light-coloured earthenware was also fired at temperatures below 1000° C.

¹³ Microporosity due to composition of clay minerals and the resulting factors of shaping procedures, drying and shrinkage, and melting phase stability. Macroporosity due to the composition of the tempering material.

Fig. 5. - Einbeck, "Negenborner Weg - pottery", survey of products, without scale.



The Products

The majority of the ceramic material consists of earthenware which is coloured grey to grey-brown, rarely blue-grey with a metallic gloss, tempered with quartz sand of varying grain-sizes and showing a coarse surface (greyware). The light-coloured earthenware with red painting is represented with only 0.23 % among the total findings. The painting was done with a red-colouring, ferrous clay. There are only 5 fragments of glazed ware which were found in the latest layers of the pottery dumping slope (among other things there were bases of glazed miniature vessels). The glaze consists of a composition of sand containing feldspar, potash and lead compounds (lead-soil-alkaline glazes).

The range of vessel forms shows a remarkable variety (see survey of types, Fig. 5). During the starting phase of the production of pottery, only globular pots of small, medium and large size were being manufactured with volumes of 0.7 - 1.5 litres, 1.8 - 3 litres, and 4 - 5.5 litres respectively, in addition to globular pitchers and lids.

Only during the latest phases beginning around 1200 AD, the production range became diversified and included pointed stove-tiles, tripod pipkins, pans

with a hollow handle, flasks, two-handed amphorae, twofold oil-lamps, cream-bowls (*Satten*) as well as additional forms of dishes, bowls, and plates. Furthermore, serving and drinking vessels like aquamaniles, jugs with globular bodies, globular beakers, small globular pots with handles, and globular beakers with holding grips were included into the production program. The function of the large cylindrical vessels with a flat foot and a round perforation in the central part of the body remains uncertain although this type occurs rather frequently.

Several clay figures may be considered as children's toys. This might also be true for the remains of a light-fabric rattle with red painting.

Production and distribution¹⁴

There were two principal marketing areas for the products of the pottery at the Negenborner Weg: the town of Einbeck itself in the process of development and the surrounding rural/agricultural regions.

¹⁴ The interpretations are speculative and serve the purpose of indicating possible calculations concerning production. A relatively realistic evaluation based on data from the excavation is the state-

On the basis of various investigations in other medieval towns and of parallel ethnographic findings, we can assume that a medieval household was using *c.* 10 globular pots at one time, and that the durability of such pots lasted from one to three years¹⁵. This leads to the conclusion that *c.* 3-10 globular pots had to be bought in a medieval household per year. Assuming that Einbeck comprised at that time *c.* 500 household units, it would have been possible to sell in the town itself *c.* 1500 to 5000 globular pots annually. The peasants in the surrounding regions probably needed a similar number of vessels. Thus, a number of 3000 to 10000 globular pots and countless other special products were being sold per year.

Accordingly, during its entire existence of more than 80 years the pottery might have produced an amount of *c.* 240.000-800.000 globular pots. Every firing of a kiln produced *c.* 10 % to 20 wasters which could not be sold. So the total amount of vessels manufactured would have amounted to 250.000-900.000 pieces. On the basis of 15 % waste the total amount of debris to remain at the Negenborner Weg would have been 37500-135000 vessels. Considering the average weight of a complete globular pot (*c.* 1 kg)¹⁶, the total weight of debris would amount to 37-135 tons. In view of the estimated total volume of the dumping slope (600 m³) and the fact that trench 2 contained only 31.7 kg of ceramics/m³, this estimate may be too high.

On the basis of 80 years of production and the manufacturing of only 250.000 vessels in an average of some 250 working days per year, a total production of 3125 pots annually respectively 12.5 globular pots per working day or *c.* 1 globular pot per hour (based on a 12-hour working day) appears plausible. In this connection no consideration, is being given to digging, transporting and preparing clay nor to making available the necessary firewood. Nevertheless, one comes to the conclusion that the pottery did not need help beyond the family members for its functioning and organisational work. In view of the volume of the kilns, it appears that 5-10 firings would have been sufficient for an annual production.

Nutritional basis and living conditions of the potter and his family

Apart from the production debris of the pottery itself, the excavation yielded numerous other finds, the animal bones and macrobotanical remains giving an impression of the living conditions of a medieval potter and his family.

Among the artefacts of stone and iron, there were numerous items related to agricultural activities and carpentry such as whetstones, knife-blades, the fragment of a spade-appliance(?), a drill for hollow boring, and a saw. An iron artefact similar to a pen – pointed at one end and shaped like a spatula at the other – is probably to be interpreted as a writing instrument. Similar pens were used for making notes on wax tablets. Was the potter possibly able to write?

Among the bone artefacts, there were fragments of a single-row steep comb (for removing lice?) and of a double-row hair comb. The use of glass appears to be extremely infrequent because the dumping slope and refuse pits yielded only one single find of fragments of hollow glass, the shape of which could not be reconstructed. The find is possibly an indication of the relatively poor economic situation of the potter.

Among the iron buckles that were uncovered, there was one piece that might have been part of a harness. The presence of draft- or riding-horses is confirmed by two fragments of horseshoes and one complete horseshoe with frilled edges from the context of the structure of the tree-trunk well. Furthermore, there were 146 bones and skulls from at least 5 adult horses, aged 3-4, 10 and more than 18 years and of various sizes, mostly small and medium (height of withers 137.2 cm). The advanced age of the animals together with the low degree of fragmentation of bones and the lack of traces of dismemberment indicate that the horses in all probability did not serve as food.

The wet spring horizon and the high water table next to the Negenborner Weg made possible the preservation of wooden vessels, *i.e.* dishes, plates, and turned lids. These goods are to be interpreted as part of the household furniture of the potter and his family. The context of the tree-trunk well also yielded a wooden shovel and remains of leather shoes from.

Palynological data point to agriculture in the area surrounding the pottery already before *c.* 1140/1145 AD, as well as to utilization of pasture, meadows and fallow land. There is also evidence for the growth of winter grain.

During the existence of the pottery, part of the tilled land seems to have been turned into meadows. In addition to cereals, cultivation of fiber-plants like flax (*Linum*) and hemp (*Canabis*) is apparent. Also represented are elder, hazelnut, blackberry, sloe, cherry, plum, as well as wild hops. Pollen of verbena and leek indicate a garden in the proximity of the

ment that the dumping slope as well as all pits at the Negenborner Weg contained a total of hardly more than 20 tons of debris.

¹⁵ Heege 1997b; Lüdtkke 1985, 80ff.; Stephan 1995, 88ff.

¹⁶ Small globular pots 400-700 g., medium-size globular pots 800-1000 g., large globular pots 1400-1900 g.

pottery site, and grasses, dock, and clover produce evidence of meadows or pastures in the area.

The above-mentioned results are further sustained by examinations of well-preserved macrobotanical material contained in the tree-trunk well and its immediate surroundings. The layer of the spring horizon and the tree-trunk well contain evidence of aquatic plant communities and reeds in combination with willows and alders. The disturbed ground between the spring and the clay deposit respectively the pottery was covered by a vegetation characteristic for muddy banks. A variety of wild herbs from arable, ruderal and trampling communities as well as nitrophilous species are characteristic for the pottery site. Palynological evidence of meadows and pastures corresponds probably with a variety of fruits and seeds indicating comparable communities, including those of moist habitats. Probably these meadows and pastures will have been located in the surroundings of the pottery.

Cultivated plants used for food were mainly rye and oats, to a lesser extent emmer, wheat, and barley. Millet is also present. Fennel and parsley were probably grown in the garden located in the vicinity of the pottery. Strawberries, raspberries, and apples are to be considered as collected fruits. Furthermore, there were fiber-plants like flax and hemp.

In addition, the dumping slope and refuse pits contained c. 1650 animal bones. The material consisted of approximately equal portions of cattle, pigs, and sheep respectively goats of all ages, furthermore small quantities of geese, chicken, dogs, and cats. Wild animals like deer, wild boar, hare, and screech-owl were represented in smaller numbers. Estimating the weight at slaughter of the various animals on the basis of the weight of the bones (without considering the horses), it becomes apparent that cattle was the most important source of meat by supplying 68 % of the bones, followed by pigs and sheep/goats represented by the amount of 24 % and 8 % respectively.

The bones of cattle and pigs are to a large extent extremely battered and show traces of cuts and strokes. Because the ratio of elements belonging to sections of extremities is well balanced and due to the presence of parts of the skeleton that had very little meat, as for instance skulls, it appears plausible that animals were kept, slaughtered, and processed at the Negenborner Weg. Transport of portions of meat from Einbeck, for instance, would have resulted in a combination of material with distinctly different accumulations of certain bones. The increased quantity of cattle below the age of 3 years emphasizes even more that animals were kept in order to supply meat rather than milk or serve as a working factor.

Zoological and botanical refuse indicates the location of a garden for self-supplying purposes in the

vicinity of the pottery as well as some agricultural activities with an emphasis on livestock. In comparison with other medieval settlements in northwestern Germany like Haithabu or Medenheim the percentage of horses is unusually high.

Perspectives

A pottery workshop was established at the Negenborner Weg in the immediate vicinity of a clay deposit before 1149 AD (dendrochronological dating) and its products were being manufactured until some years after 1219 AD (dendrochronological dating). The range of products – at first limited to only a few vessel shapes – was being diversified essentially beginning around 1200 AD. The most important products were cooking vessels, lids, pitchers and jugs of various sizes. Evidence of production equipment consisted of well-preserved remains of kilns as well as a tree-trunk well. Besides manufacturing ceramics, the potter and his family engaged in agricultural and gardening activities. One can only speculate about the reasons for giving up the production of pottery. Possibly this was caused by deformation and the lacking of hard of the quaternary clay when fired at temperatures above 1000° C. This type of clay was not suited for the production of proto- or near-stonewares, and compared to other potteries in the surrounding region – as, for instance, at Bengerode near Fredelsloh or those in the Reinhardswald in northern Hesse – since c. 1230 AD, the pottery at the Negenborner Weg was possibly no longer competitive. The potter and his family may have resettled in the newly developing pottery centres near Fredelsloh or Coppengrave/Duingen.

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Fornaci di ceramica e organizzazione del lavoro a Roma tra basso medioevo ed epoca moderna: fonti scritte e documentazione archeologica

L'evidenza archeologica, sia in senso classico sia comprendendo i diversi indicatori che segnalano le attività di manifattura della terra¹, è a Roma fortemente compromessa. Da un lato non esistono tracce di fornaci di vasaio se non molto recenti² oppure indirette³, dall'altro gli indizi toponomastici sono estremamente labili e risentono di un mutamento profondo avvenuto nel corso del XVI secolo. Le aree più interessanti ai nostri fini sono invece state profondamente modificate nella topografia a più riprese: tra l'epoca della costruzione dell'Ospizio Apostolico del San Michele e quella della sistemazione delle sponde del Tevere, per arrivare fino al nostro secolo con gli sventramenti di Via dell'Impero e della Via del Mare.

Un percorso tormentato

La tradizione storica ha investito Trastevere del ruolo di "quartiere dei vasaio", cosa che sembra confermata dalle evidenze di una Via dei Vascellari e di una chiesa omonima nel rione unitamente a numerose testimonianze di attività produttive nella zona. In generale Trastevere sembra essere un quartiere ad alta densità artigianale, e, tra le altre attività, le botteghe di vasaio sembrano, ad un dato momento e in una determinata area, predominanti⁴.

Tuttavia questa situazione, che resta comunque documentata chiaramente nella poca e recente documentazione superstite della struttura corporativa⁵, è appunto un dato relativamente tardo. A Roma, malgrado l'assenza di un progetto pianificatore delle attività artigianali, anche di quelle meno compatibili

col tessuto dell'abitato, le officine di vasaio subiscono una lenta migrazione in risposta ai mutamenti urbanistici⁶.

Un importante e non molto noto studio di Isa Lori Sanfilippo⁷ ha già da qualche anno individuato nella intitolazione *de acquariciariis* della chiesa di Sant'Andrea, edificio esistente fino alla fine del XV secolo nel luogo oggi occupato da Santa Maria della Pace, una allusione all'attività di produzione delle *acquariciae*, anfore in terracotta note agli archeologi come *olle acquarie*. La dotta spiegazione filologica della studiosa, suffragata da molti elementi quali l'attestazione di un titolo *de cretacciaris*⁸ e di uno *de li vascellari*⁹, incontra puntuali riscontri nella documentazione fiscale di XV secolo conservata nel fondo *Camera Urbis*, dove nei registri di tasse sono elencate le gabelle pagate da vasaio e mercanti di vasi per l'importazione e/o la vendita di *acquareccie* o *acquarie*.

La stessa documentazione permette di riconoscere ancora nel XV secolo un insediamento relativamente fitto di *vascellari* titolari di fornace nella zona attorno a Sant'Andrea, la regione *in scortecclariis*, immediatamente a ovest di Piazza Navona. Altri indizi documentari sono disseminati tra l'attuale Corso Rinascimento, il *calcarario* e l'Isola Tiberina¹⁰.

E' proprio sull'isola che, intorno agli anni del sacco di Roma, evento di poco posteriore ma forse non del tutto estraneo, i consoli di una *università dei vascellari* finalmente riconoscibile nella sua fisionomia giuridica costruiscono, nella chiesa di San Giovanni Calibita, una cappella intitolata a San Simeone e Giuda *spettante a detta università*, come recita l'atto notarile¹¹. I motivi di questo trasferi-

¹ Amouric 1995.

² Maetzke 1994.

³ Mazzucato 1986.

⁴ Lepre 1976. Per il XVI secolo cf. Archivio di Stato di Roma, *Presidenza delle Strade*, vol. 445, c. 385 ss.

⁵ Archivio di Stato di Roma, *Camerale II, Arti e mestieri*, fasc. 93; Archivio del Vicariato di Roma, *Arciconfraternita del Ss.mo Sacramento e della Ss.ma Addolorata detta "dei Vascellari" nella chiesa di Santa Cecilia in Trastevere*, palchetto 278, t. 1.

⁶ Güll 1996, c.s.

⁷ Lori Sanfilippo 1984.

⁸ Lori Sanfilippo 1981, 290.

⁹ Cherubini 1981, 123.

¹⁰ Tra gli altri indizi documentari cf. in particolare le serie delle gabelle della seconda metà del XV secolo (Archivio di Stato di Roma, *Camerale I, Camera Urbis*, vol. 104-117).

¹¹ Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 1141, c. 331 (29 marzo 1526).

mento sono ignoti, al di là della distruzione e successiva riedificazione di Sant'Andrea: non è soprattutto chiaro il motivo della scelta dell'Isola Tiberina. E' tuttavia certo che per circa due generazioni di vasai ed in particolare per quella di un intraprendente artigiano di Tagliacozzo, Mauro Bonanni, l'*insula licaonia* rappresenterà un punto di riferimento centrale dell'attività associativa dei vasai romani. La stessa chiesa, come anche il portico della prospiciente San Bartolomeo o anche la stessa bottega di Mauro, attigua allo studio di un notaio che in questi anni roga numerosi atti per l'associazione di mestiere, saranno a metà del secolo luoghi di riunione degli artigiani della corporazione. Di questa situazione non resta più alcuna traccia materiale, tranne il dipinto della Madonna della Lampada, un ritratto della Vergine la cui lampada, benché sommersa, non si sarebbe spenta nel corso della disastrosa inondazione del 1557. In quella stessa circostanza il volume degli statuti dell'arte dei vascellari ebbe una sorte meno miracolosa, costringendo alla loro riscrittura una delegazione di artigiani¹².

In questo periodo, una distinzione che pure doveva esistere in parte in epoche anteriori, si delinea in modo preciso. Negli elenchi dei presenti alle assemblee di artigiani emerge una divisione tra *vascellari di ripa* e *vascellari di nagoni*. La divisione è in apparenza geografica, ma in realtà riflette una separazione di tipo economico che muove da un elemento sempre più variabile in quegli anni: il commercio. Il mutamento urbanistico della zona di piazza Navona nel corso del Cinquecento aveva determinato, con ogni probabilità, una forte terziarizzazione delle attività tradizionali di produzione nell'area: se nei primi decenni del secolo alcuni documenti testimoniano un infittirsi dei contatti e contratti per la commercializzazione delle stoviglie in ceramica, alla fine del secolo alcune botteghe sembrano aver preso delle dimensioni molto grandi, mentre le attività di produzione che alcuni vascellari di Navona ancora svolgevano negli anni '60 e '70 del secolo tendono a diventare marginali rispetto al grande affare costituito dal traffico, nella città della corte papale, di tutte quelle specie di stoviglie e suppellettili in ceramica ormai estremamente varie ed elaborate prodotte non solo in città ma anche fuori, ed importate grazie ad accordi commerciali *ad hoc*.

La commercializzazione delle maioliche diventa così un investimento per capitali anche cospicui, rompendo quell'equilibrio tra polo di Ripa e polo di Navona che probabilmente è alla base delle modifiche statutarie del 1544¹³. Questi capitoli, infatti, sono prevalentemente ispirati ad una volontà protezionistica che gli accordi commerciali di fine secolo mettono pesantemente in discussione.

L'azione di disturbo della normale *routine* economica in seno ad una corporazione formalmente unita, esercitata dai mercanti di ceramica, è denunciata da una azione intrapresa dai vascellari di concerto con i bicchierari nel 1566 per *agere contra pignattarios*, o, meglio, *sopra lo apalto delle pignatte*¹⁴. Il commercio di pentole, che si faceva con Gallese e Bassanello, doveva rappresentare una preoccupazione per i produttori romani, ma non solo: un procedimento giudiziario di qualche anno posteriore ci mostra come persino alcuni dei commercianti in città cercassero di impedire, appigliandosi ai regolamenti municipali, forme di controllo di soggetti terzi sul commercio con questi centri¹⁵.

Nelle carte del processo ritroviamo alcuni bicchierari che denunciano un mercante di ceramica, Domenico di Rosato, accusato di condurre i suoi affari in maniera illegale. In particolare aveva rifiutato di vendere la sua mercanzia ad alcuni bicchierai di Borgo per favorire dei commercianti di Parione. Inoltre, e questo risulta alla fine il capo d'accusa principale, lui ed alcuni compagni vengono accusati di praticare una sorta di monopolio, perché acquistavano in blocco la produzione di un certo numero di maestri a Gallese e a Bassanello, impedendo, di fatto, il commercio degli artigiani della regione con la capitale. Per giunta, a seguito di questa speculazione, il prezzo finale praticato da Domenico e dai suoi soci era più alto di quello corrente prima che si fosse messo in affari.

Quasi contemporaneamente, i bicchierai di Parione entrano nell'arte dei vascellari. Un nesso tra i due eventi è probabile e comunque questo episodio sembra testimoniare la necessità per i bicchierai di regolarizzare una loro posizione nell'ambito del commercio di ceramica (i venditori di vasi in terra dovevano pagare, secondo le disposizioni del 1544, l'*intratura*) e per i mastri vascellari il desiderio di assicurarsi il sostegno di un gruppo economico di un certo peso in una situazione che vede, dagli anni '60,

¹² Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 356, f. 400rv.

¹³ 22 giugno 1544. Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 1301 c. 225-232.

¹⁴ 1566, 10 feb., Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 370, 100.

¹⁵ Archivio di Stato di Roma, *Tribunale civile dei Conservatori*, vol. 50, 26 gen. 1574 e seguenti.

un moltiplicarsi di iniziative commerciali indipendenti che sfuggono al controllo dei consoli. Questo sostegno veniva ottenuto in cambio di una posizione di visibilità dei bicchierai che infatti acquisiscono il diritto ad eleggere un proprio console.

Il disegno pare fallire; l'ingresso dei bicchierari è gravido di conseguenze nefaste per l'equilibrio tradizionale: i vasai di Navona vedono messo in pericolo il loro ruolo. Il 21 settembre 1574 il neoeletto console di Navona, Sante, protesta duramente in seno alla corporazione, provocando una fuoriuscita del suo partito dall'organizzazione di mestiere¹⁶. La spaccatura sembra insanabile ed è probabilmente all'origine della nascita di una associazione di tipo confraternale a Ripa, nella chiesa di Santa Cecilia¹⁷. La confraternita del Sacramento, con sede inizialmente nella cappella dei Ponziani, raccoglie i vascellari di Ripa pochi mesi dopo questo brusco strappo. Nel corso del XVII secolo i confratelli otterranno la chiesa di Sant'Andrea de' Scafis, poi dei Vascellari.

Gerarchie senza regole

I mutamenti negli equilibri tra i componenti dell'associazione di mestiere fanno emergere in controtela dei rapporti lavorativi e sociali tra i mastri e gli altri *ottimati* all'interno della corporazione e tra *patrons*, collaboratori e lavoratori nell'ambito delle singole botteghe.

Il predominio silenzioso di coloro che possedevano il "sapere" si rivela spesso in piccole correzioni del notaio che aggiunge o cancella un *magister* qui e là¹⁸. Se questo primato dei titolari di fornace emerge una volta che ci si familiarizza con la documentazione disomogenea di cui disponiamo, ciò che rimane del tutto oscuro è il percorso di formazione dei vasai.

Roma è una città che attrae lavoratori da molte parti d'Italia: tra la fine del Quattrocento e quella del secolo seguente la quasi totalità degli artigiani viene da altre regioni quindi, è possibile, già formata. In tutta la documentazione, diverse centinaia di atti, c'è

un solo caso di *messa a patrone* di un ragazzino, Curzio, figlio di un ortolano, in maniera peraltro piuttosto morbida, senza un vero trasferimento di patria potestà¹⁹. In un altro caso, nel 1586, Francesco de Ubertellis e Cesare Picchi promettono di impiegare nel laboratorio i rispettivi figli²⁰, ma, per il resto, gli artigiani sembrano arrivare a Roma adulti e, tranne gli uomini che costituiscono la spina dorsale della corporazione, sparire nel giro di qualche anno. Una delle rare attività economiche della capitale della Chiesa cresceva in questo modo, senza un inquadramento preciso da parte delle autorità statali e cittadine, tranne le poche ed esclusivamente venali disposizioni dei Conservatori che, in proprio o attraverso appaltatori, quantomeno, esigevano una gabella sulle fornaci.

La definizione classica di artigiano, colui che "è in possesso di tutti i mezzi di produzione e vende il manufatto ad un prezzo che comprende la materia prima da lui fornita e il lavoro che vi ha incorporato", risponde ad un primo approccio al profilo dei vasai romani che controllano l'insieme del processo produttivo. Tuttavia, osservando i fenomeni più da vicino, l'investimento esterno è spesso necessario e le materie prime non sono sempre controllate direttamente, cosa che avvia, sostanzialmente, una fase protocapitalista²¹.

Una tendenza a mantenere le mani libere, evitando di cedere la produzione in blocco a persone esterne al mestiere, si manifesta almeno a cavallo fra Quattrocento e Cinquecento, anche se vi sono delle eccezioni²². Nelle società fra mastri vasai, è invece spesso uno degli associati a riservarsi il diritto di acquistare l'insieme della produzione per rivenderla, cosa che dimostra, indirettamente, che le associazioni di artigiani non sono tra uguali. Anche tra vasai c'è uno dei due soci che mette i capitali e le strutture, l'altro il proprio lavoro²³. Questo, assieme al ricorso ad investitori esterni al mondo artigiano²⁴, è anche un modo di avviare una attività avendo come patrimonio solo la propria capacità professionale anche se con vincoli molto forti.

¹⁶ Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 386, 721 ss.

¹⁷ 1 mag. 1575, Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 387, 242 ss.

¹⁸ Cf. p.es. 13 dicembre 1519, Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 1328, 257 ss.

¹⁹ 1579: Archivio Storico Capitolino, *Archivio Urbano, Sez. I*, vol. 789, fasc. 3, c. 40 ss.: *con patto che detto curtio vada a magnare et dormire a casa sua de sua matre*.

²⁰ Archivio Storico Capitolino, *Archivio Urbano, Sez. I*, vol. 797, fasc. 5, c.211 ss.

²¹ Archivio di Stato di Roma, *Collegio dei Notai Capitolini*,

0848, 389r-390r; Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 848, 82v; Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 848, 83r; Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 848, 83v.

²² Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 1669, 41r; Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 1671, 361v-362r.

²³ Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 888, 58v-59v; 1559: Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 0356, 8rv.

²⁴ 1524: Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 891, 27rv.

Alcuni rapporti di lavoro lasciano intravedere una maggiore indipendenza, come Francesco Baronzanni che nel secondo quarto del XVI secolo aveva delle responsabilità abbastanza vaste nelle due botteghe di Girolamo de Leoni²⁵. Nel 1594 Tiberio assume Cesare a delle condizioni non svantaggiose per lui e sua moglie²⁶.

Ciò che invece resta largamente al di fuori della nostra possibilità di percezione sono i lavoratori più umili: numerosi artigiani che compaiono nelle sottoscrizioni degli atti notarili non hanno voce in nessuno dei documenti che riguardano la corporazione o società per l'esercizio del mestiere: un caso limite è il *povero vascellaro* che muore nel gennaio 1547 nell'anonimato²⁷. Tuttavia negli atti di liquidazione o divisione delle società compaiono di tanto in tanto spese relative a dei *famuli* o dei *lavoranti*: sono appunto questi garzoni anonimi o semianonimi.

Tra produttori e venditori

Alle dipendenze di Girolamo de Leoni, Francesco Baronzanni è allo stesso tempo *magistrum rote* a San Pietro e gestore della bottega di Piazza Navona. Ma questa forma di rapporto non è la più diffusa: l'aumento del giro d'affari legato alla rivendita e il diffondersi di botteghe sempre più grandi e meglio fornite mette in discussione anche un dato linguistico al primo approccio stupefacente. Spia di un rapporto subordinato è la figura del *pizzicaro* che contro ogni evidenza etimologica indica, per un periodo di tempo molto lungo, una figura legata alla vendita di manufatti in terra, una persona che non è *mastro* ed è un po' meno che *vascellaro*. E' possibile che la distinzione esista, all'inizio, non tanto perché è *meno* quanto perché *non è necessario* che sia un vasaio. Tuttavia la sua estraneità ai segreti dell'arte lo rende, nel tempo, una figura necessariamente subordinata.

Il termine, applicato in questo campo, è noto nella misura in cui i capitoli del 1544 sono conosciuti dalla fine del secolo scorso: le due categorie nei confronti dei quali è necessario vigilare, recitano le disposizioni, affinché paghino l'*intratura* sono proprio bicchierari e pizzicaroli. Questo termine, però, nasconde una realtà diversa da quella linguisticamente più attuale e corretta che identifica il pizzicaro col droghiere e che fa immaginare a chi legga questo documento che i vascellari stiano parlando di persone del tutto esterne all'arte. Un documento del 1396 relativo a degli spazi per la vendita di vasi di terra nella zona del mercato di Campitelli specifica invece che i vasi sono venduti *per vaxigerulas picicarolas et vascellaris*²⁸, cosa che denuncia quindi un rapporto piuttosto antico tra queste due categorie.

Rapporto antico e probabilmente di subordinazione: il console di Navona, Santi, protesta infatti nel 1574, più che per l'entrata dei bicchierari, perché nei nuovi statuti che, anche se non è detto esplicitamente, vengono redatti al momento dell'ingresso di questi ultimi, gli uomini di Navona sono detti appunto *pizzicaroli* e non vogliono, per questo, *essere subiecti alli mastri de vascellari*. Che pizzicaro sia dunque parola che può identificare chi vende lo mostra ancora un atto del 1564 in cui Cristoforo Pagliarini, non un artigiano qualsiasi ma un rappresentante di spicco del partito di Navona, è detto *pizicarolus in agone* nel momento in cui salda il prezzo di certi vasi avuti da un mastro di Ripa, Francesco Ubertelli²⁹. Benché Pagliarini sia detto altrove *magister*, egli è una figura completamente diversa da quel Baronzanni che abbiamo visto all'inizio. E' persona che resta, come molti altri, estranea all'atto produttivo. Probabilmente questo tipo di divisione, anche se nasconde una subordinazione, rimane accettabile in una fase di espansione del mercato: al successo ed all'ascesa delle stoviglie di maiolica all'inizio del Quattrocento³⁰ si sommano i fattori eccezionalmente favorevoli del mercato romano, col ritorno della corte papale prima e col prolungarsi dello suo status di capitale rinascimentale fino all'epoca di Sisto V, quando le altre corti europee erano entrate in una fase di declino ormai da tempo. Nell'ultimo trentennio del secolo, la posizione di predominio che i produttori romani avevano acquisito entra in crisi non essendo in grado di reggere nuove concorrenze. In un contesto destinato a subire una involuzione a breve scadenza, questa perdita di posizioni causa rotture irreversibili. Riunendosi a Santa Cecilia nel 1575, i vasai romani entrano già, con largo anticipo, nella crisi seicentesca.

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²⁵ Archivio Storico Capitolino, *Archivio Urbano, Sez. II*, vol. 35, c. 337.

²⁶ Archivio Storico Capitolino, *Archivio Urbano, Sez. I*, vol. 811, 260r.

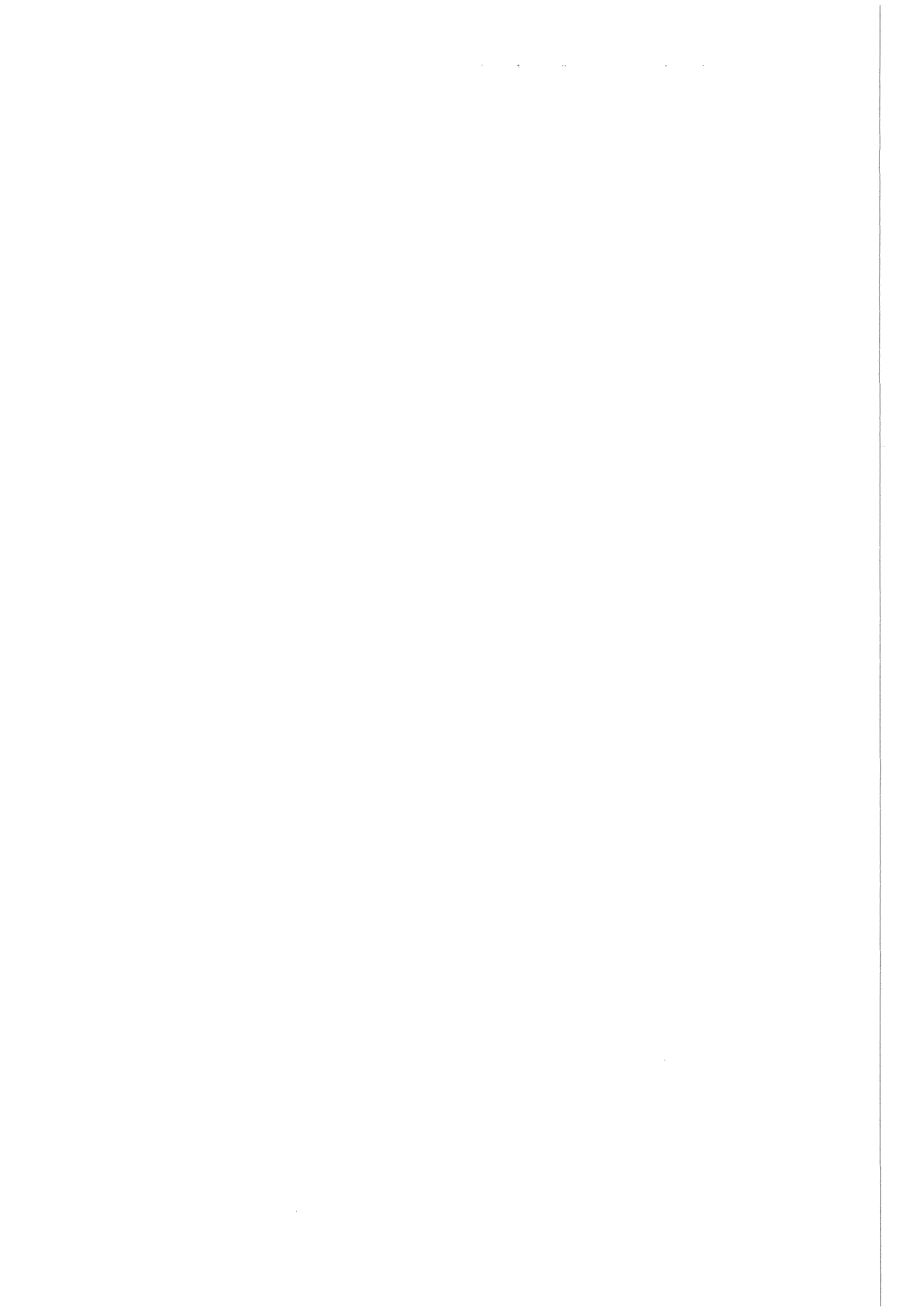
²⁷ De Dominicis 1990, n. 1113.

²⁸ Archivio di Stato di Roma, Archivio del San Salvatore al Sancta Sanctorum, cass. 467, n. 37.

²⁹ 24 dic. Archivio di Stato di Roma, *Collegio dei Notai Capitolini*, 366, 714-715.

³⁰ Goldthwaite 1989.

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Recent research concerning Antwerp majolica production

Introduction

At the beginning of the 16th century, a number of Italians emigrated to Antwerp where they started production of tin-glazed earthenwares. This was the start of a long process of development during a later stage of which faience was created from the original majolica. Given the nature of these decorated ceramics, the material study of it is not limited to the purely archaeological evidence but also includes an obvious art-historical aspect. In addition, it is also possible to connect the material remains with the historical data on the same subject.

In the past, the 16th- and 17th-century majolica was mainly considered from an art-historical point of view. Only in recent decades did a completely renewed examination of the historical sources occur and did the archaeological angle become more important. Over the last 20 years, a large quantity of majolica was excavated during research in the Antwerp city centre and in recent years a number of deposits with production waste could be added to the evidence. As a result it was possible to arrive at a more balanced picture of the Antwerp majolica production.

Historical background

Historical data about the production of majolica in Antwerp is present in abundance and has been studied and published since the 19th century. Recent examination of the available records by Claire Dumortier completed and corrected the picture which had been obtained from historical sources (Dumortier 1988; Dumortier 1991). Majolica production occurred in Antwerp from 1508-1510 onwards. Three Italians played a role during this initial stage: Janne Maria de Capua, Jan Frans and Guido di Savino (alias Guido Andries), the last two of whom were undoubtedly the most important. The Frans and Andries families continued to play a major role throughout the whole of the 16th century, a role which was strengthened by the family ties entered into between the two families. Pot-

ters' workshops run by local craftsmen, who took over the technique, also came into being during the 16th century. A few other well-known names from archive documents are Hendrik Van Grevenbroeck and Jan Bogaert. Equally during the 16th century, the Andries dynasty swarmed out of the potter's workshop '*Den Salm*' (The Salmon), situated in the Kammenstraat. The sons of Guido Andries all remained active in the potters' sector. Three of them stayed on in Antwerp and ran their own workshop: Lucas took over his father's workshop, Joris started elsewhere in the Kammenstraat and Guido II Andries started up a workshop on the Oever. The remaining Andries brothers emigrated: Frans went to Spain, Jasper moved to England where he also worked as a potter and after a while Joris also left Antwerp and started a potters' workshop in Middelburg (Zeeland). Thus they were among those responsible for the spread of majolica production throughout the Low Countries and beyond.

In quantitative terms at least, the Antwerp majolica production undoubtedly peaked in the second half of the 16th century. In the history of Antwerp the year 1585 – the fall of Antwerp – is of major importance, having had not only far-reaching political but also economic consequences. However, both from historical sources and from archaeological information it would appear that majolica potters were still working in Antwerp after this date. On the other hand, the emigration of Antwerp potters, in particular to the northern Low Countries, was an important impetus for the spread of the production of majolicas. A good example of this is Haarlem, where potters from Antwerp set up a workshop.

The majolica potters who had immigrated from Italy were soon able to improve their financial and social position and to work their way up in Antwerp society. Their unique, high quality product – which the local potters could not compete with – constituted an excellent basis for their success. Within the system of crafts and guilds, the majolica potters ('*geleyerspotbackers*') were not included among the ordinary '*eerdenpotbackers*' (earthenware potters) but were part of the guild of St. Luke, which brought

together the main branches of art production. François Frans, nephew of Jan Frans, worked his way up to become master of this guild.

Production

Historical sources concerning the production of the majolica potters are rather scarce and very vague. In some cases information can be deduced from orders. These sometimes state whether the order concerns tiles or kitchen- and tableware but they say nothing about the exact types or the decoration used. Only in the case of an order for a number of tiles by the abbey of Herkenrode was it possible to establish a link with material remains. A large number of these tiles are still preserved in the Royal Museums of Art and History in Brussels. For further information about the production, we have to turn to the study of the material remains themselves, either in museum collections or from archaeological investigations.

The objects in majolica which are kept in private or public collections are often exceptional pieces, which do illustrate the high quality artistic creations of which the majolica potters were capable. But these objects absolutely do not reflect the average range of products and the exact location in which they were found or produced is not known. In some cases, it is possible to identify these objects as products from Antwerp workshops or of certain majolica potters on the basis of the date or initials on the piece (Dumortier 1990).

Finally, excavated material is a very important if not the most important source of information about the actual majolica production. The archaeological material has the advantage that the exact location where it was found can be established but this does not provide definite information on the exact origin. The probability that the majolica found in Antwerp was also made there would appear to be high but this is not necessarily the case. Certainly after the middle of the 16th century, it is possible that majolica was imported from other places of production in the Low Countries. The only objects of which the Antwerp origins are ascertained are those from the potters' waste and waste from kilns.

It has not yet been possible to subject much of the excavated material to a detailed study. Only a few deposits have been studied in full and published in some detail.

Material from archaeological finds

Somewhat surprising is the discovery that there are few early finds among the excavated majolicas,

i.e. finds which clearly date from the first half of the 16th century. In Antwerp, in particular, one would expect to find a relatively high concentration of early majolica objects but this does not appear to be the case.

The most important deposit in terms of quantity was found during the restoration of the bishop's palace by the Schoenmarkt. Here, a large quantity of tiles was found in a layer of rubble, among all sorts of building debris (Dumortier 1992). Originally these tiles must have decorated the floors and walls of the *refugium* of the abbey of Hemiksem which was the function of this building at the time. It was possible to categorize these tiles both chronologically and typologically into various groups but most can be identified as Antwerp products from the third decade of the 16th century. There are tiles with figurative decoration, mostly animals, and there are also tiles with ornamental decoration. The considerable stylistic and iconographic similarity with the tiles from the abbey of Herkenrode, which are preserved in the Royal Museums for Art and History in Brussels, is remarkable. As these could be attributed to the workshop of Guido Andries, the tiles from the bishop's palace undoubtedly also come from the same workshop. In addition there is a noticeable similarity with Italian tiles and with those in the chapel of The Wyne castle in England.

The finds from the bishop's palace include a number of tiles which were part of a tile tableau. In one case, the picture on the fragments from a small tableau of nine tiles can be identified as a scene with Christ on the cross. It is one of the very rare cases when fragments from tile tableaus have been excavated.

With regard to the identification of the table- and kitchenware from the first half of the 16th century, we often tend to include a number of special forms such as altar vases, jugs or drinking bowls among these products. Sherds of majolica drinking bowls were found, among other places, in the Nationalestraat; in a context which is difficult to date with any certainty. A second example is encountered among the finds from the Schoytestraat which – in terms of chronology – dates from the last quarter of the 16th century and the beginning of the 17th century. Outside Antwerp, sherds of so-called altar vases were often attributed to early majolica production. Unfortunately, relatively few examples have been excavated in Antwerp so far. With a lack of accurately dated deposits or production waste from this period, it is not easy to isolate the early majolica production. It is only possible to come up with dating elements for comparative research and iconographic study.

The tiles found in the bishop's palace are of exceptional importance. They are among the few majolica finds which can be dated and attributed to a specific

workshop, even though only in an indirect way. This find also confirms the important role of Guido Andries as a supplier of majolica to prestigious political and religious centres.

Most of the Antwerp majolica finds date from the second half of the 16th century, which is undoubtedly the period during which the majolica production prospered most, at least with regard to quantity. So far, full details of only a few deposits have been published. The finds discovered during excavations in the St. Elisabeth hospital constitute an important assemblage (Oost 1988). The large number of jugs, in particular, makes this deposit unique. An interesting group of jugs are those with a monochrome or speckled blue or purple surface. Examples were found in the deposit at the St. Elisabeth hospital but also, for example, during the excavations in the Steenhouwersvest (Dumortier & Veeckman 1994, 195).

The majolicas discovered in waste contexts consist mainly of plates and ointment jars or albarelli. Bowls, pitchers and other forms are found in much smaller numbers. The objects in majolica discovered in a cess-pit in the Kaasstraat – which can be dated to the end of the 16th century – form a typical and quite rich assemblage (Geyskens 1983). A number of examples of plates are representative of this context, including some with a chessboard design or with ornamental designs as well as a plate with an '*a frutti*' decoration. Unique finds in this deposit are examples of very large, slim albarelli with a monochrome blue colour. Typologically, they appear to be closely related to Spanish examples but it is not clear whether they are products of Antwerp.

The investigation carried out in 1993 on a building site in the Steenhouwersvest was very important (Dumortier & Veeckman 1994). During the excavation, the remains of a majolica kiln were located and examined in relation to a layer of rubble amongst which potters' waste was found. Historical sources revealed that the building in which the kiln was located belonged to Lucas Andries, one of the sons of Guido Andries. The production should probably be dated in the period after Lucas became a member of the guild of St. Luke (1556) and before he took over the workshop from his father in 1562 or at the latest before 1572, at which time he followed his brother who had emigrated to London. These historical facts make it possible to date the excavated production waste accurately in the third quarter of the 16th century. In addition to remains of the kiln, the waste material consisted of semi-finished products, so-called biscuits, wasters and kiln furniture. Three quarters of the production consisted of plates. The albarelli represent 10 % and the remaining forms (jugs, bowls and tiles) only a few percent of the total production. Each type of kitchen-

and tableware also displays considerable uniformity. Typologically, the plates can be reduced to one basic type with a few variations. The same applies to the albarelli and the bowls. Unfortunately most, of the potter's waste consisted of unglazed semi-finished products. The number of fragments of decorated finished products is relatively small. As a result, information on the decoration techniques and designs used is limited. For instance there are decorations in '*sgraffito*' technique. In a number of cases, simple decorative elements are scratched onto the blue background, both on tiles and plates. Also worth noting is a design of three parallel, diagonal stripes often edged with light blue or yellow. This design is often encountered on majolica finds in Antwerp.

Some fragments of jugs are decorated in speckled monochrome blue or manganese. Other sherds have blue, manganese and brown stripes applied in a criss-cross pattern next to and on top of each other. This type of decoration can undoubtedly be linked to the 'marbled pots' described in an order for a large quantity of table- and kitchenware referred to by Thomas van Minden in 1549.

Some tiles have interesting designs. Three fragments are decorated with lion masks surrounded by fruit and leaves. This design is to be found on Antwerp majolica around 1540 and we also encountered it on a tile kept in the museum Vleeshuis in Antwerp. This tile is from a similar production: the model is very similar to fragments from the Steenhouwersvest. The objects from the Steenhouwersvest are probably seconds, maybe even wasters, which could explain the rather crude result. We know that the '*Den Salm*' (The Salmon) workshop produced luxury items, mostly ordered by the gentry and by church authorities. The potter's waste from the Steenhouwersvest indicates that, in addition to the production of prestigious objects, the Andries family also produced more ordinary earthenwares intended for humbler customers.

A second location where production waste from a majolica potter was found was in premises near the Sint-Jansvliet. From historical data it was possible to establish that '*De Tennen Pot*' (The Tin Pot) workshop was located here; This was where Guido II Andries and Andries Eynhouts worked as majolica potters between 1577 and 1615 (Dumortier & Oost 1989). A series of tiles with different types of decoration were found here. A number of tiles with pictures of animals reproduce the stylistic features of the older tiles produced by the Andries family. The find also included a number of tiles with floral designs, together with one example with arabesques. This find is the clearest proof that certain types of tiles which are often regarded as Northern Low Countries products may very well be from Antwerp.

A last site where production waste was found is that of a building site in the Schoytestraat (Oost 1992). The excavation dates from 1991 and at that time, this was the first find of a relatively large amount of waste from a majolica potter. The greatest problem with regard to the processing of the material was the uncertain chronology and the difficulty to identify the workshop where the waste originated (Dumortier 1992). Both the excavation context and the earthenware types probably date this material in the last quarter of the 16th and first quarter of the 17th century. As with the finds from the Steenhouwersvest, the potters' waste consists of fragments of semi-finished products, wasters and kiln furniture. The typological range of the material shows considerable similarity with that from the Steenhouwersvest. Almost three quarters of the finds consist of plates, followed by 10 % ointment jars and tiles; bowls, jugs or less common forms such as drinking bowls occur only occasionally. The chronology of the collected material covers a longer period than that of the material from the Steenhouwersvest. Typologically approximately half of the plates can be identified as an early type similar to those from the Steenhouwersvest, the other half being of a later type.

The decoration on the wasters and on fragments of finished products has not yet been studied in detail. A series of objects in majolica which are not really potters' waste but which were found in the same deposit are important for expanding our understanding of the designs and decoration techniques used. Therefore, there is a strong possibility that these objects are part of the same production.

The find of a number of fragments of genuine wasters with Chinese designs was very important. It is often assumed that these designs are a typical Northern Low Countries innovation in response to the mass import of Chinese porcelain. The fact that these designs already appear in Antwerp in a context which dates from the first quarter of the 17th century not only proves that majolica was still produced in Antwerp up to the 17th century but that the competition of the porcelain was also felt here with the potters trying to bring a renewed and adapted product onto the market.

There is one peculiarity with regard to Antwerp majolica finds which is worth mentioning. When investigating various sites in the city centre sherds of majolica biscuits – in other words semi-finished products – were occasionally found. These finds prove that majolica was also in circulation in semi-finished form. The number of such finds is too large for this to be a coincidence.

Technical aspects of the production process

The excavation of the remains of a majolica kiln in the Steenhouwersvest was of exceptional importance for our knowledge of the technical aspects of the production process (Dumortier & Veeckman 1994). Unfortunately, only part of the kiln could be examined. Under a more recent cellar floor, the bottom-most part of the grate area was discovered; it had been preserved up to a height of approximately 25 cm. The inside of the kiln walls, like the floor of the grate area, showed extensive traces of burning and also a considerable deposit of glaze in the form of a glassy layer. Although the total surface area of the kiln could not be established, we can compare this information with historical data. We know the dimensions of the kiln of Guido II Andries, situated on the Oever: its was approximately 2.30 m long and 2.90 m wide and high. The one in the Steenhouwersvest was probably of the same size, which is comparable to those of kilns used in Italy. Piccolpasso states in his tractate that Italian potters often used kilns five foot wide and six foot high. The illustration of a kiln in this tractate shows a kiln in full operation. The remains of a majolica kiln excavated in Deventer can also be compared to this type of Italian kiln.

Basically, majolica is a sort of earthenware which turns white when fired. Yet three-quarters of the potter's waste from the Steenhouwersvest consists of fragments of earthenware which turns red when fired. These colour variations may be due to two different reasons. On the one hand, it would seem obvious that the potter mixed various types of clay. The local red-firing clay was less expensive than the white, imported clay. On the other hand, experiments revealed that the red biscuits turned white after being fired for a second time.

The way in which the earthenware was thrown also shows very close similarities to the examples from the book by Piccolpasso. The albarelli were thrown on a potter's wheel which was slightly convex. Small ointment jars were thrown from the mast. The mark made by the knife with which the potter cut them off from the large lump of clay can clearly be seen on the bottom. This method is also illustrated by Piccolpasso. The way in which the plates were thrown and the supporting ring formed also displays similarities with Italian examples.

The excavated material also includes a number of objects used in the kiln during the firing process or kiln furniture: clay rolls, stilts, fragments of saggars and red earthenware roof tiles. The clay rolls were used to prevent tiles from fusing together during firing when stacked on top of each other. Similar clay

rolls were also excavated in the Schoytestraat. Stilts were used to make it possible to stack plates and bowls and also to prevent them from sticking to each other. These stilts occur in various sizes without there being any real standardisation. More remarkable was the discovery of fragments of saggars in red earthenware. These are cylinders of various diameters in which dishes and bowls could be stacked efficiently in the kiln and which also ensured a better distribution of the heat. There are triangular or circular openings at irregular distances from each other in the wall of the saggars. As a result, they can clearly be distinguished from the saggars in which faience plates were stacked using pins in the 17th century. Again they can be compared to the saggars illustrated in Piccolpasso's tractate which also have openings in different geometric shapes. Red roof-tiles were also found among the potters' waste. It is obvious that these were also used in the kiln when stacking the objects. Traces of burning and glaze occur on a number of examples.

The study of the remains of the kiln confirms the strong Italian influence on majolica production in the Steenhouwersvest. We encounter this influence both in the shape of the kiln and in the production techniques. The same influence can also be felt in the shapes produced and decoration used, which display clear links with Italian production centres.

Conclusion

Town archaeological research of recent years has considerably accelerated the rate at which we are learning about Antwerp majolica production. A better insight into typology and decoration and into the technical aspects of production were a welcome addition to the rich quantity of historical information. The archaeological data even led to the identification of new workshops.

The Antwerp majolica production is the success story of a few immigrants from Italy who were not only able to acquire a permanent place on the market of ceramics but who also had considerable influence on the production of ceramics throughout the Low Countries. The crucial role which Antwerp played in this as catalyst and as a gateway for the new techniques cannot be emphasised strongly enough. That the strong Italian influence continued for some time is equally obvious.

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Old Russian Glass Goods from Moscow of the Twelfth to Fourteenth Centuries AD Technological Aspects

As a basis for the present study, bracelets (732 items), beads (63 items), vessels (14 items), finger-rings (4 items) and inserts (2 items) have been used. In addition to the glass goods, stone and amber jewelry (14 items of beads, finger-rings and inserts in total) have been analyzed.

Two-thirds of the finds come from the area of the Moscow Kremlin, the remaining goods have been found in the area of Zaryadye, the Cathedral of the Virgin of the City of Kazan, Zaneqlimenye, *i.e.* the area behind the street Neglennaya, and the Monastery of Epiphany (Fig. 1).

To study the technology for making glassware in Moscow, a methodology developed by Z.A. Lvova (1979, 90-104) has been used. The main idea in this approach is the creation of a list of production techniques that the earliest masters and medieval craftsmen were familiar with. The description of the technology used to make a specific item is implemented by a consistent enumeration of all techniques used for making this item on the basis of studying the traces of technological operations (Lvova 1980, 75-85).

The technology for making glassware has been considered by specific categories.

The technology for making all goods has been studied by our team based on the following operations: a technology for making the item, a technology for making decoration (if available), and finishing the surface of the item (if used). The technology for making the item is divided into two groups: the technology for making construction elements and the technology for joining them together. In the event the whole item was completed in one operation, the technology for making the whole object has been described.

We have done a preliminary study of traces left by technological operations with the help of which we managed to specify various production techniques more accurately. All defects of the glass mass are divided into three groups: the state of the glass mass surface, external defects of the glass and internal glass defects (Shchapova 1989, 87-88).

Technological schemes have been made for each category.

Bracelets

As a result of the study of 732 bracelets eight schemes have been identified (Table 1).

Five major production techniques were used for making the bow of the bracelet: drawing, spinning, welding, twisting and winding (Fig. 2: 1-3). Spinning was the most common technique (406 items), drawing was used more rarely (302 items). A twisting technique (11), a winding technique (4) and a welding technique (3) were used very rarely. The ends were finished by pressing them against a flat surface (Fig. 2: 4). The joining of the construction elements was achieved by welding (Fig. 2: 3). The elements of decoration were added. One third of bracelets decorated with the added elements had been subjected to spinning (Fig. 2: 2).

Beads (Table 2)

A small quantity of beads (75 items) has helped to establish a great variety of technological schemes (8).

The bodies of the beads are made by winding and cutting (Fig. 2: 5). The former technique is thermal in nature, and the latter is mechanical (it was applied in the treatment of stone and amber beads). Most of the beads were made by winding (63 items), the remaining ones (12) were made by cutting. The boreholes in the beads were made simultaneously with the body or during a specific operation: cold boring (for stone beads). The latter may be either one-side boring or two-side boring (Fig. 2: 6). The bodies of the beads could be subjected to additional treatment to get a final shape by pressing them against a flat surface, making channels, rolling (Fig. 2: 4, 7, 8). The beads made by serial winding were separated from each other by chopping them off. The decoration of the beads was made by adding elements of decoration. The surface of the beads is treated by using the method of grinding and smoothing. These techniques can be either mechanical (for stone and amber beads) or chemical (*i.e.* smoothing for glass beads).

Table 1: Bracelets

1. <i>drawing</i> + the rod free?	bending + around the tool	pressing + on the flat surface	welding the ends in a lap joint		
2. <i>drawing</i> + the rod free?	adding + the element of decoration single operation	bending + around the tool	pressing + on the flat surface	welding the ends in a lap joint	
3. <i>drawing</i> + the rod free	<i>spinning</i> + the rod	bending + around the tool	pressing + on the flat surface	welding the ends in a lap joint	
4. <i>drawing</i> + the rod free?	adding + the element of decoration single operation	<i>spinning</i> + the rod	bending + around the tool	pressing + on the flat surface	welding the ends in a lap joint
5. <i>drawing</i> + the rod free?	adding + the element of decoration repeated operation	<i>spinning</i> + the rod	bending + around the tool	pressing + on the flat surface	welding the ends in a lap joint
6. <i>drawing</i> + the rod free?	<i>welding</i> + the rods in a butt joint	bending + around the tool	pressing + on the flat surface	welding the ends in a lap joint	
7. <i>drawing</i> + the rod free?	<i>twisting</i> + the rod	bending + around the tool	pressing + on the flat surface	welding the ends in a lap joint	
8. <i>drawing</i> + the strip free?	<i>winding</i> the strip around the tool				

1. <i>drawing</i> + the strip free	<i>winding</i> + the strip around the tool	rolling	
2. <i>drawing</i> + the strip free	<i>winding</i> + the strip around the tool	adding the element of decoration single operation	
3. <i>drawing</i> + the strip free	<i>winding</i> + the strip around the tool	pressing on the flat surface	
4. <i>drawing</i> + the strip free	<i>winding</i> + the strip around the tool	making channels by a point	
5. <i>drawing</i> + the strip free	<i>winding</i> + the strip around the tool	chopping off	
6. <i>drawing</i> + the strip free	<i>winding</i> + the strip around the tool	chopping off +	smoothing
7. <i>cutting</i> + the blank	<i>grinding</i> + the blank	smoothing +	boring one sided
8. <i>cutting</i> + the blank	<i>grinding</i> + the blank	smoothing +	boring two-sided

< **Table 2: Beads****Finger-rings**

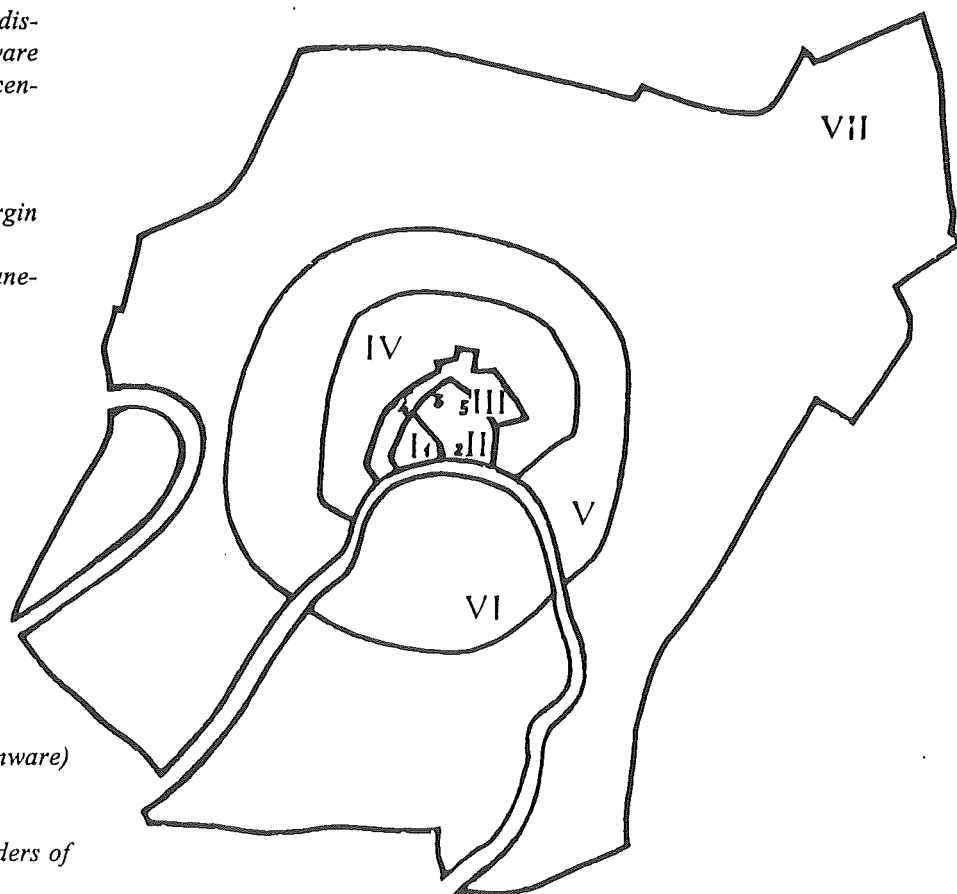
Finger-rings (5 all together) were made by using two technological schemes.

1. <i>drawing</i> + the strip free	<i>winding</i> + the strip around the tool	pressing against a flat surface
2. <i>cutting</i> + the blank	<i>grinding</i> + the blank	smoothing the good

Winding techniques were used to make the bow of the finger-rings. One finger-ring was made by means of cutting (amber finger-ring). Shields of glass finger-rings were arrived at by pressing the object against a flat surface (fig. 2: 4); the shield of the amber finger-ring was made by cutting. The treatment of the surface of finger-rings is represented by mechanical grinding and smoothing (for the amber finger-ring).

Fig. 1. - Map of the Moscow districts with the finds of glassware dating from the 12th-14th centuries:

1. the Kremlin;
2. Zaryadye;
3. the Cathedral of the Virgin of the City of Kazan;
4. Manezhnaya Square (Zaneglimesnye);



- I. the Kremlin;
- II. Kitai-gorod;
- III. Central squares;
- IV. the White City;
- V. the Zemlyanoy (Earthenware) City;
- VI. Z amoskvorechye;
- VII. Moscow within the borders of the 17th century.

Inserts

The technology used for making two inserts could not be identified accurately. They are inside the finger-rings which does not allow us to identify the production technique used. It is possible to suggest that they were made by using casting against a flat surface. (Fig. 2: 9). One insert (made of stone) was made by cutting.

1. casting against a flat surface		
2. cutting + the blank	grinding + the blank	smoothing the good

Vessels

All vessels studied by our team (15 items) have been preserved only in fragments. This prevents us from establishing accurate technological schemes. That is why some technological chains have been restored only in part. Five technological schemes for making vessels have been identified (Table 3).

Most of the vessels were made by blowing. Fragments of many vessels that have been studied do not provide us with the possibility to identify a ratio between the vessels blown freely and the vessels blown into the mould (Fig. 2: 10, 11). In some cases, we have managed to establish that a pontile and a mould were used to shape the bottom of the vessel. Elements of decoration were added.

A variety of technological schemes for making trinkets compared with vessels and bracelets (8 schemes were used to make 732 bracelets, while only six schemes were used to make 63 beads) allows us to suggest that the production of beads and other small trinkets was a secondary business relative and related to the production of vessels and bracelets.

Probably, the production of vessels and bracelets was a more developed and established sector of glass goods in the manufacturing of Old Russian glass. The production of these categories of goods was specialized and had a mass character. A large number of morphologically similar bracelets (around 99 %) and a small variety of vessel shapes confirm this. It is possible to suggest that the production of vessels and bracelets was the basis of the manufacturing of glass in Old Russia.

Table 3: Vessels.

1. <i>blowing</i> + free	chopping off + the tube	smoothing + the edge	adding elements of decoration	
2. <i>blowing</i> + (?)	chopping off + the tube	shaping the rim		
3. <i>blowing</i> + into the mould	using pontil (for shaping the bottom)			
4. <i>blowing</i> + free	pressing + into the mould	using + pontil	chopping off + the tube	shaping the rim
5. <i>blowing</i> + (?)	adding the elements of decoration			

The rest of the goods in Old Russian manufacturing, *i.e.* beads, finger-rings and inserts were the products obtained as a result of learning how to use production techniques and materials as well as a result of creative work. During the period under consideration, the process of making beads developed by a trial and error. But the presence of a small number of beads made by a serial winding among the material that we have analyzed indicates that there appeared a tendency towards a commercial production of beads in the Old Russian crafts. Apparently, the production of beads and finger-rings played a secondary role as it consisted in utilizing the wastes of the vessel and bracelet production. During the manufacturing of the open vessels which were present in our sample, the process of chopping off a glass blank from the glass blow-pipe, the so-called 'hood' remains and it can be used to make small trinkets. This is confirmed by the fact that the colour of the beads coincides with that of the bracelets and vessels. This refers to beads and bracelets of a yellowish colour. All vessels that we have analyzed are of the same colour. We should also mention that yellowish bracelets account for the smallest amount (up to 6 %) of the whole colour range of bracelets found not only in Moscow but in other Old Russian cities as well (Shchapova 1972, 166, table 30).

In the past, scholars studying glass suggested that each craftsman who was a glass-blower possessed a limited number of techniques for treating the material that he used superbly. At the same time production interests (techniques) were kept secret and were passed along only to disciples. That is why the use of similar production techniques for making various categories of goods constitutes evidence for the fact that all these goods originated in the same workshops (Eisen 1916, 1-2; Silant'ev 1984, 61; Likhter 1986, 57).

The production techniques used for making jewelry and vessels are presented in Table 4. A blowing technique as well as other techniques that were not used for any other category were used for making vessels. Most of the features of a number of other techniques that were used for making vessels coincide with those of the techniques for treating beads. The correlation ratio between these techniques is rather high (0.38). Most of the features of the techniques used for making bracelets coincide with those of techniques for making finger-rings. The correlation ratio between these is 0.29, which is not much, but it is sufficient warrant attention, especially if similar designs of these categories are taken into account. Techniques used for making finger-rings are analogous to techniques used for making beads (the correlation ratio is 0.29). The technique for making inserts does not occur in any other category of goods. To add elements of decoration, the same techniques were used for vessels, bracelets and beads.

Given these indications, it is possible to suggest that several types of workshops where Old Russian glassware was produced existed at the same time:

- workshops producing vessels, the wastes of which could be used to make small trinkets (beads, finger-rings);
- workshops producing bracelets, the production of which could be supplemented by making beads and finger-rings;
- universal workshops producing vessels and bracelets where this process could be accompanied by making small trinkets (beads, finger-rings, inserts).

A conclusion about a secondary role played by the production of small jewelry in the Old Russian glass manufacturing makes the existence of specific workshops specializing in the production of beads and other small trinkets of glass very unlikely. Most likely, the production of small jewelry supplemented

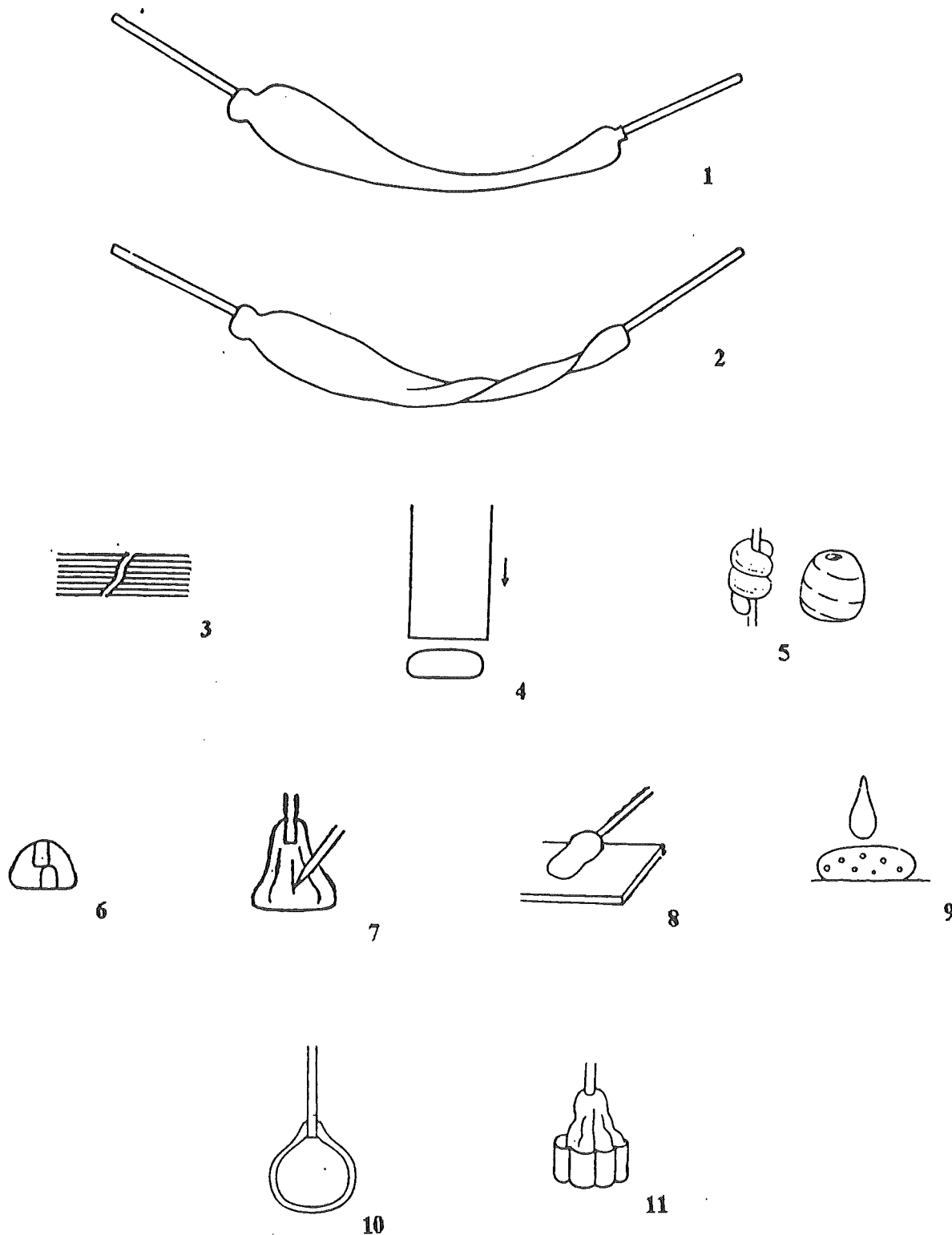


Fig. 2. - Production techniques for making Old Russian glass goods in Moscow in the 12th-14th centuries: 1. drawing; 2. spinning; 3. welding; 4. pressing against a flat surface; 5. winding; 6. two-side boring; 7. making channels with a point; 8. rolling; 9. casting on the surface; 10. free blowing; 11. mould blowing.

both the production of vessels and that of bracelets. Vessels and bracelets could be made either in specialized (*i.e.* individual workshops) shops or in a universal (*i.e.* one) shop but in both cases this process was accompanied by the production of beads and finger-rings.

Finds from glassware workshops can confirm or refute our suggestions. The existence of specialized workshops producing vessels is confirmed by a shop in the Kiev Lavra. Vessels and window-glass were made there using one production technique (Tolochko 1981, 313). A bracelet workshop in

Table 4

Characteristic Features of Production Techniques for Making Old Russian Glass Goods in Moscow of the Twelfth - Fourteenth Centuries

Nomenclature Production technique	Bracelets	Beads	Finger-rings	Inserts	Vessels
Twisting	+	-	-	-	-
Spinning	+	-	-	-	-
Drawing	+	-	-	-	-
Welding	+	-	-	-	-
Winding	+	+	+	-	-
Adding decoration	+	+	-	-	+
Pressing	+	+	+	-	+
Rolling	-	+	-	-	-
Making channels	-	+	-	-	-
Chopping off	-	+	-	-	+
Smoothing	-	+	-	-	+
Casting	-	-	-	+	-
Blowing	-	-	-	-	+
Using pontil	-	-	-	-	+

Lubech is a variant of a specialized shop where only glass bracelets were made (Shchapova 1972, 143-147). Remains of glassware workshops where bracelets as well as beads and finger-rings were made have been uncovered in Kiev. These shops are located in the farmstead of the former St. Michael Monastery and in the Podol district (near the crossroads of Geroev Tripolya Street and Voloshskaya Street) (Tolochko 1981, 313). A workshop located in Reitar-skaya Street in Kiev where the production of vessels and jewelry coexisted (Tolochko 1981, 313-318) is evidence for the presence of universal workshops in Old Russian glass manufacturing. There are no specific workshops which would have produced only beads and finger-rings among all the Old Russian complexes uncovered so far and which are, unfortunately, not numerous.

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Ninth century glassware production at San Vincenzo al Volturno, Italy: some new evidence from recent excavations

Introduction to the research

Recent excavations during the 1990s at the Abbey of San Vincenzo al Volturno in Molise, Italy, uncovered a second glass workshop of early 9th century date. The discovery in the mid-1980's of a glass workshop with furnaces and associated glass working waste created enormous interest. To have found a second, probably earlier, workshop, again with furnaces and this time with thousands of pieces of glass working debris is, to put it mildly, exciting. As a preliminary report to any substantial study and research of the recently excavated glass, this paper aims only to introduce the site and material briefly, to outline some preliminary observations and by this perhaps to indicate the range of information available in the full assemblage.

Glass from the site at San Vincenzo (excavated since 1980) was first examined by the author in 1985-1986. Material from late Roman structures, the 10th/11th century and later monastery were catalogued along with that from the main abbey phases during the height of its power in the early 9th century. This included the glass workshop excavated between 1984 and 1986. All the glass from the 1980-86 excavations was catalogued and written-up with a preliminary assessment by late 1986, for publication as a full inventory of the glass assemblage, and is by now rather out of date. The catalogue, which forms part of the volume on the finds from the site (Stevenson, forthcoming) is still awaiting publication.

A second campaign of excavations began in late 1989 and continues to this day, concentrating mainly on the vast abbey church with a 63 meter long basilica, the related workshops and several external sites in the monastic 'terra'. The second glass workshop was found in the early 1990's and a brief and preliminary examination of the glass from these more recent excavations was undertaken in 1994. It is hoped that a comprehensive study of the abbey glass production and products will be started in due course, and that some of the results may be presented in the paper offered at the conference.

A brief history of San Vincenzo al Volturno and relevant phases to the glass production

Situated in the rocky landscape of the Apennines in the region of Molise, the site lies equidistant from Rome and Naples on the upper reaches of the Volturno river (Fig. 1). The modern abbey is located on the east side of the river in a location adopted by the late 11th century rebuilders of the Benedictine House under Abbot Gerard and his successors. It was from here in the early 12th century that a monk called John wrote the *Chronicon Vulturense*, which outlines the history of the monastery. This chronicle, combined with other written documentation and the results of the archaeological investigations, reveal the complex and long history of the site at San Vincenzo.

A late Roman villa estate, or possibly an early monastery (see discussion in Hodges 1995, 128-129), was established in an area of earlier occupation, comprising extensive Samnite settlement followed by a Republican vicus and Early - Middle Imperial settlement. The late Roman, mostly 5th-6th century, estate was focused on the west side of the river and consisted of a small complex of a 3-storey tower with garden, a basilican building, and a funerary church (San Vincenzo Minore) accompanied by numerous burials (50-60 collective burials) within and around the building. This complex was the centre of local religious practice and a sanctuary for the dead; as Hodges states 'a minor cult centre' (Hodges 1995, 130).

What happened for the next 100 or so years, apart from a few additional burials in the church precinct, is unclear. But as the *Chronicon Vulturense* informs us, early in the 8th century, c. 702-703, three Beneventan nobles, Paldo, Tato and Taso, under the advice of the Abbot of Farfa, set up a monastery using an existing oratory as their first abbey church, probably the funerary church of S. Vincenzo Minore. At some stage also early in the 8th century, the abbey at Monte Casino (home of St. Benedict) was refounded, and lay only about 25-30 km west of San Vincenzo, as the crow flies.

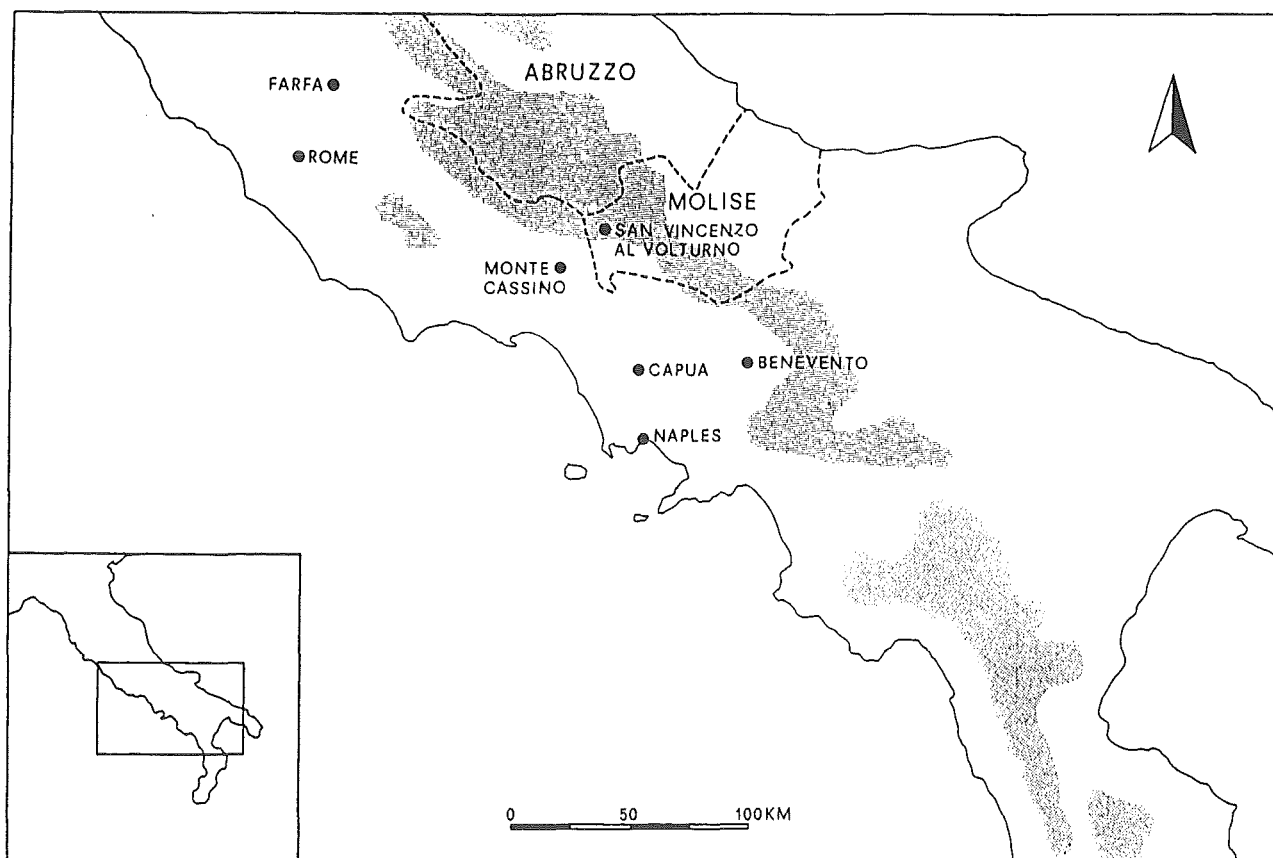


Fig. 1. - The location of San Vincenzo al Volturno within Italy (S. Cann).

By the mid-8th century the monastery at San Vincenzo had gained a modest reputation with a flourishing scriptorium (Hodges 1993, 3). The monastery grew amidst hot debate about whether to make or break its Frankish allegiance, as it lay on the frontier of the Frankish kingdom to the north and the Lombardic principality of Benevento to the south and housed both Frankish and Lombardic monks (Wickham 1995, 138 & 146). By the early 9th century Carolingian interest and involvement in the monastery had fully evolved: patronage was accepted by Abbot Joshua who received aid from Charlemagne's son Louis in 808 to rebuild the abbey church (Fig. 2). The monastery received many gifts from the Beneventan aristocracy as well as the Frankish emperor. The most notable gifts were in the form of land, in Benevento and elsewhere, which made the monastery at San Vincenzo one of the major land owners in Italy at this time (Wickham 1995, 143-145; Hodges 1993, 3).

The mid-9th century was the apogee of San Vincenzo, and its wealth, along with other centres, attracted the marauding Saracens who exacted ransom in 861-862. Twenty years later, on 10th October 881, the monastery was totally sacked and burned to the ground. The monks fled to Capua and although they returned in the early 10th century the monastery

never regained its original wealth, status or power, and was superseded by the abbey at Monte Cassino. Successive restoration, redevelopment and refurbishment of the abbey church and monastic buildings during the 10th century was finally abandoned when a new monastery was begun in 1080 by Abbot Gerard, on the east bank of the Volturno. Falling from political favour, little interest was shown in the San Vincenzo monastery by the new Norman rulers, instead patronage was lavished on the monastery at Monte Cassino.

Relevant phases for the 9th century glass production

The important phases of the site in terms of the glass production are:

a) The local Imperial settlement, of relevance purely due to the inheritance of the refuse from this classical Roman occupation phase within the locality and probably to some distance around. Glass refuse was probably recycled by the 9th century glass workers for colourants and cullet. Little Roman glass was found associated with Roman features, most came from the workshop floors where it may have been

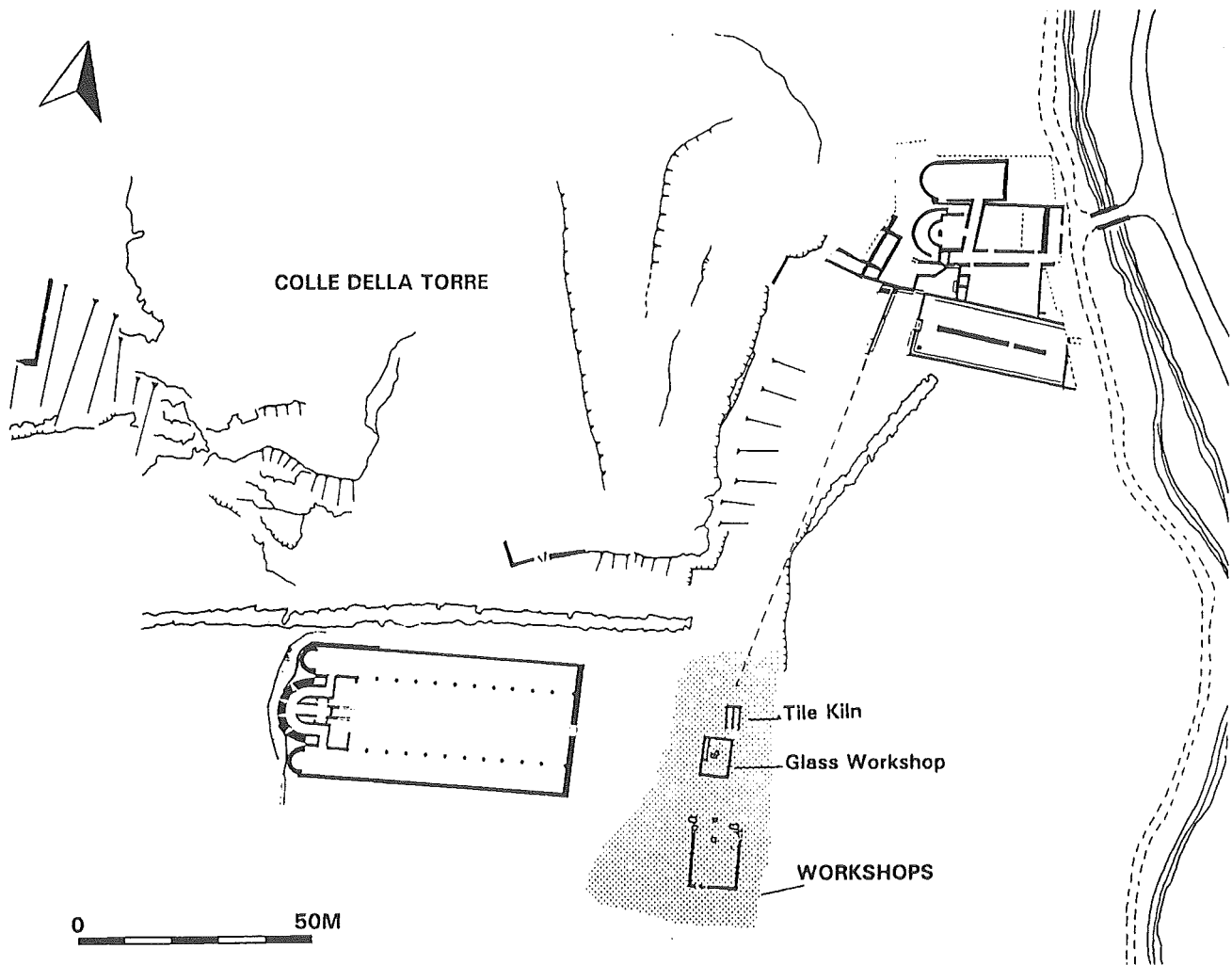


Fig. 2. - Plan of the site of San Vincenzo in the early 9th century, c. AD 808, showing the location of the early glass workshop in front of the abbey church. The refectory, distinguished guests refectory and the garden court lie towards the north-east of the church (K. Francis).

collected as *spolia*, stored and used for the monastic glass production, or from mixed contexts across the site.

b) The 5th-6th century complex comprising a funerary church, basilica and residential tower, each contained various types of glassware, but with a high concentration of lighting equipment in the form of glass lamps. Nearly all the glassware from this period on the site was formed from a glass of not particularly high quality, in natural colours of mostly dark greens and yellow-greens, with bubbles and black and white impurities, similar to other glasses seen across north west Europe at this time. As such the glass from this phase may have been of less value to the 9th century workers than the Roman glass, as impurities could invade and possibly spoil a whole batch. Whilst a few pieces may be identifiable in the 9th century workshops, the majority of the late Roman assemblage was found in and around its associated 5th-6th century buildings.

Despite its probable low value to the craftsmen for recycling, the presence of vessel fragments in the old buildings, and even complete survivals, may have influenced the craftsmen's choice of vessel form. It has been suggested that the 9th century glass workers may have made oil lamps in a style similar to a type used in the late Roman churches and tower (Stevenson 1988). These lamps, with three vertical handles, are referred to here as the 'San Vincenzo type'. The recent work of M. Uboldi (1995) in drawing together the evidence for lamps in late Roman and early medieval Italy, categorised the San Vincenzo form as Type 1.4. Out of the fourteen findspots listed, according to Uboldi only San Vincenzo and a church within her monastic *terra* (at Colle Sant Angelo) have examples of this lamp form in the 9th century. This poses the question, are the 9th century glass workers at San Vincenzo imitating an earlier design found in the vicinity or does the absence of examples from elsewhere merely relate to a lack of excavation and discovery?

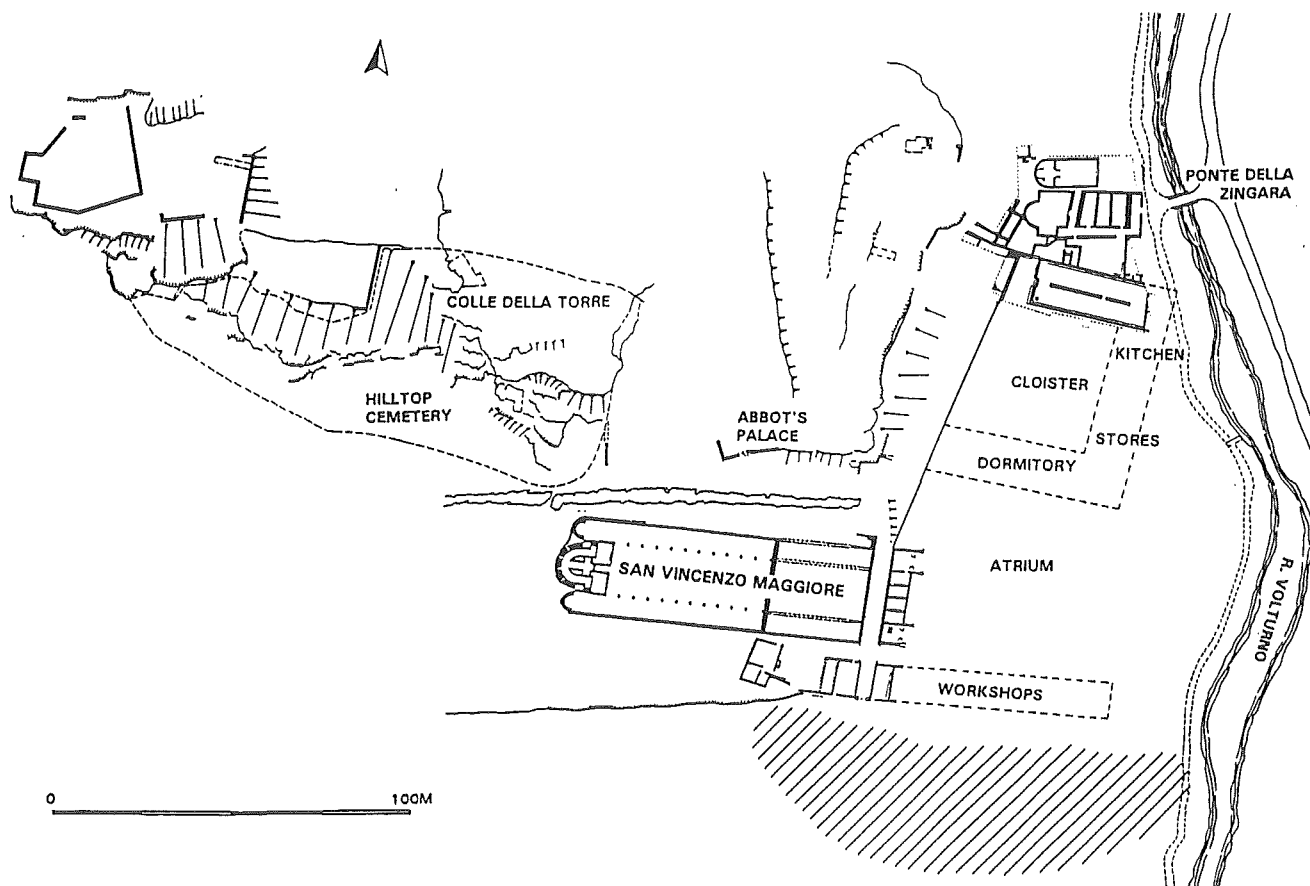


Fig. 3. - Plan of the site of San Vincenzo in about AD 820, showing the line of the new workshop complex which included the second glass workshop (K. Francis).

c) The monastery in its early 9th century phase when the glass workshops were established and active during the major rebuilding programme under Abbot Joshua (Fig. 2 & 3). Funding from the central Carolingian coffers allowed major refurbishment of the abbey which included the setting up of workshops to manufacture the building materials, furnishings and fittings for the monastery. A large glass workshop was established in front of the abbey church, over what had been a tile-making and a bronze making site. Here experienced glass workers made window glass and glassware for the new abbey church under construction and for use in the monastic buildings (Fig. 2). As the atrium of the church extended towards, and finally over, the workshops, these were moved about 20m to the south (Fig. 3) and continued to produce glass, perhaps for the region (the *terra* of San Vincenzo), to trade, or simply to replace broken glass products and to supply new vessels and windows for the monastery.

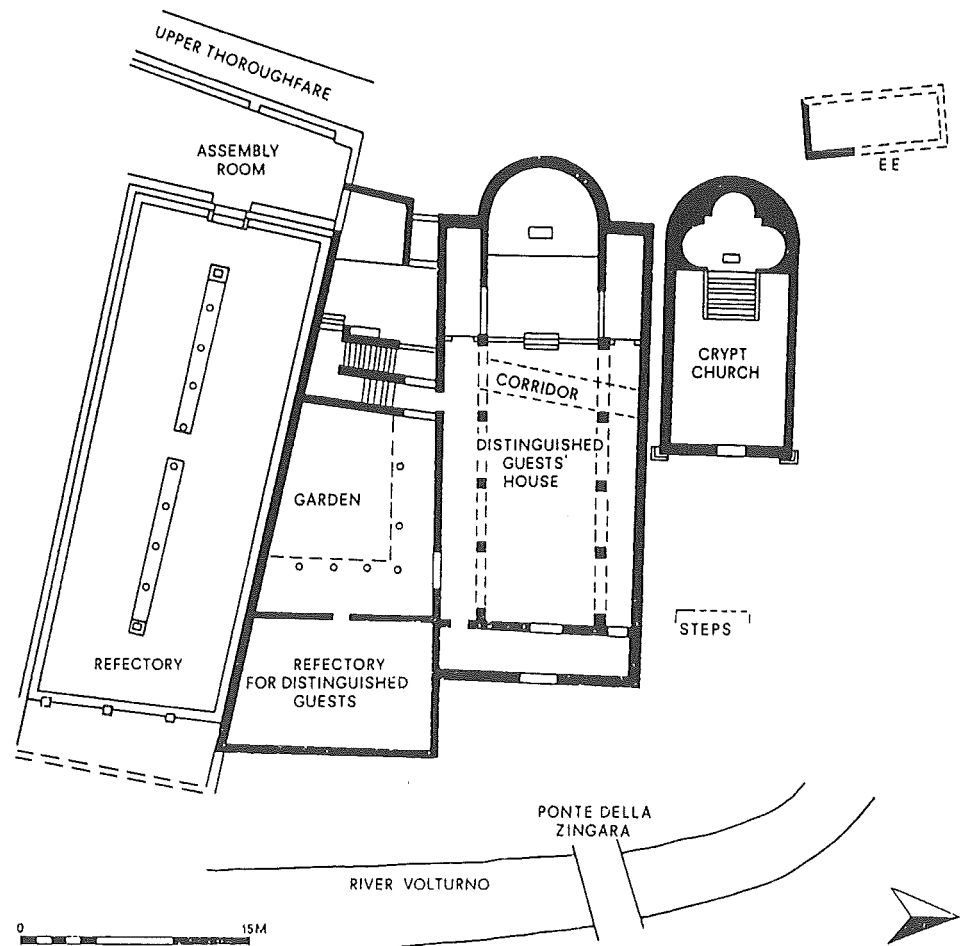
d) The attack and burning of the abbey and its buildings by the Saracens in 881, provides a sealed fire layer of vital significance for dating. It also provides a rare 'snapshot-in-time' scenario for certain undis-

turbed areas, such as in the monk's refectory where lamps and bottles were left lying around on the morning of 10th October 881.

Glass working at the monastery in the early 9th century

The glass workshops represent two closely related phases of glass working at the site. The first in the front of the abbey church was replaced by a second workshop positioned just to the south, when the atrium of the church enveloped the area of the original workshop. The exact time gap between the end of the first and the start of the second is not known and for how long the workshops were active is also unclear. Renewed excavations in the area of the southern workshop complex, during 1996 and to be continued in 1997, may help to define the dating and phasing of these areas. For the time being it can be said that the first workshop was possibly set up in about 808 or before, and was ousted by building development by about 820. The second workshop may have been established before the end of the first workshop as an extension to it or after it had been

Fig. 4. - Plan of the refectory and 'distinguished guest' area at San Vincenzo in the 9th century (S. Cann).



demolished. This southern workshop was inactive in the main by around 830 when it was converted into living quarters (Hodges 1993, 83; Moorland 1985).

Excavations of the first workshop revealed two glass furnaces with a workshop floor between. Some glass working debris was found in primary contexts on the workshop floor. Nearby were associated dumps of glass working debris from the demolition and levelling of the furnaces. These dumps and sweepings produced large quantities of material, consisting of a range of working waste and cullet fragments. Most of this glass is of minute proportion, having been trampled on the floor, swept into heaps, piled up and generally smashed into very small pieces. From the point of view of form, size and date, these tiny pieces are sometimes very difficult to identify.

At a time when one could assume one of the main functions of the furnaces was to produce glass to furnish the church windows, the evidence also points to a rich decorative tradition for vessel production. Plain coloured canes, rods of *vetro a retorti* (sometimes referred to as reticelli rods), trailed glass ends, fragments of decorated vessels, coloured moiles, brightly coloured Roman vessel glass – such as amber or emerald green – and numerous coloured opaque

glass *tesserae*, possibly Roman, were found on the workshop floor or in the dumps. Some of the Roman material was probably used to colour the sheets of window glass in addition to colouring the vessels or the decorative elements on the vessels. Some coloured window glass which was analysed suggests evidence for this practice, as high levels of antimony oxide were present, which is the opacifier used in opaque Roman glass (Freestone 1992, 743). Indeed Theophilus, writing in the early 12th century, indicates that opaque glass such as Roman mosaic *tesserae*, could be collected and used for colouring windows in addition to being used in enamelling (Theophilus Book II, Chapter 12: Freestone 1992, 743). Analysis of some four pieces of cobalt blue glass (window, vessel, and a raw unfashioned lump), blue enamel and green glass in a crucible from San Vincenzo, showed they were of the same compositional type (Bimson & Freestone forthcoming).

Sheet window glass as well as vessel fragments have been found in a range of colours such as purple, ruby red, cobalt blue, turquoise, dark grey with red marbling or streaked red in a green-blue base, opaque red, several semi opaque metals and one very dark grey appearing almost black. A range of glassware

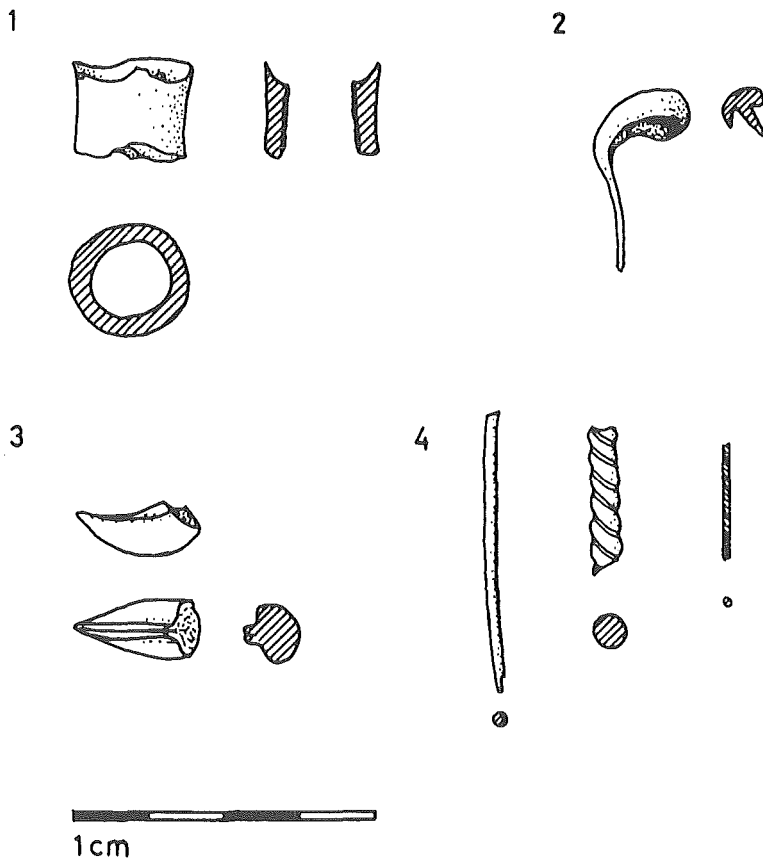


Fig. 5. - Examples of the glass working debris, from around one of the furnaces in the earlier workshop (context 5842):

1. almost colourless moile from the end of a blow-pipe;
2. blue pinched end from making a cane or from trailing thread;
3. cone, deep green with red streaks, formed from trimming the edge of a folded rim or sheet using shears;
4. examples of a plain blue cane and two twisted rods, vetro a retorti, of different widths, both formed in a colourless base with white thread (J. Stevenson).

manufacturing methods as well as decorative techniques are demonstrated in the assemblage, and includes melting the batch, moile removal, pincer and flame work, decorative flashing, festooning of coloured trails and application of trailed thread and *filigrano*.

The southern workshop exhibited a similar range of production and working debris and methods, but less glass material was found associated with it, although greater quantities may come to light during the investigations in the coming seasons. Excavations in 1984-86 revealed several furnaces related to glass working, rectangular and oval in plan, within two or three individual work rooms. At neither workshop was there evidence for the production of the raw glass, a situation found on most sites with glass working evidence. The centres of glass making have so far remained elusive but it is possible that they were established near the source of the main constituents: the silica (sand), the alkali, the fuel, or a combination of any of these, and it should be remembered that in the Roman period the sands found at the mouth of the River Volturmo were considered suitable for glass making (Pliny NH36: 194). The glassworkers at San Vincenzo may therefore have bought in the ready-made raw glass if they were not themselves manufacturing it. Compositionally it falls into the soda-lime-silica tradition.

Crucible fragments found at San Vincenzo, to melt the glass for working, show a variety of sizes. Several bucket and barrel crucibles, with walls of 10-13 mm thickness, are of fairly small dimension with girths around 120-130 cm rising to rims of about 150 mm diameter, and may be estimated as having a height of around 200 mm minimum. One larger vessel of a more globular form, represented by a base, has a lower body diameter of 170 mm and its girth would have been at least 230 mm. This large vessel contained naturally coloured green glass, the base material from which most windows and vessels were formed. Cobalt blue glass was found in a smaller barrel type crucible, being used, presumably, in smaller quantities. Cullet, or old broken vessels and glass pieces, was probably added to the batch not only to increase the volume, but also to aid mixing and melting: to lower the temperature required to fuse the contents of the pot. Naturally coloured Roman glass and other old glasses were probably used for this purpose.

Nearly all the glass made at San Vincenzo in the 9th century appears to have been free-blown, sometimes after pressing into a mould. The window glass was also generally free-blown into a cylindrical form and then cut and opened into a flat sheet. Although none of the iron blow pipes have survived, or indeed any other tools of the glass worker, the pieces of glass

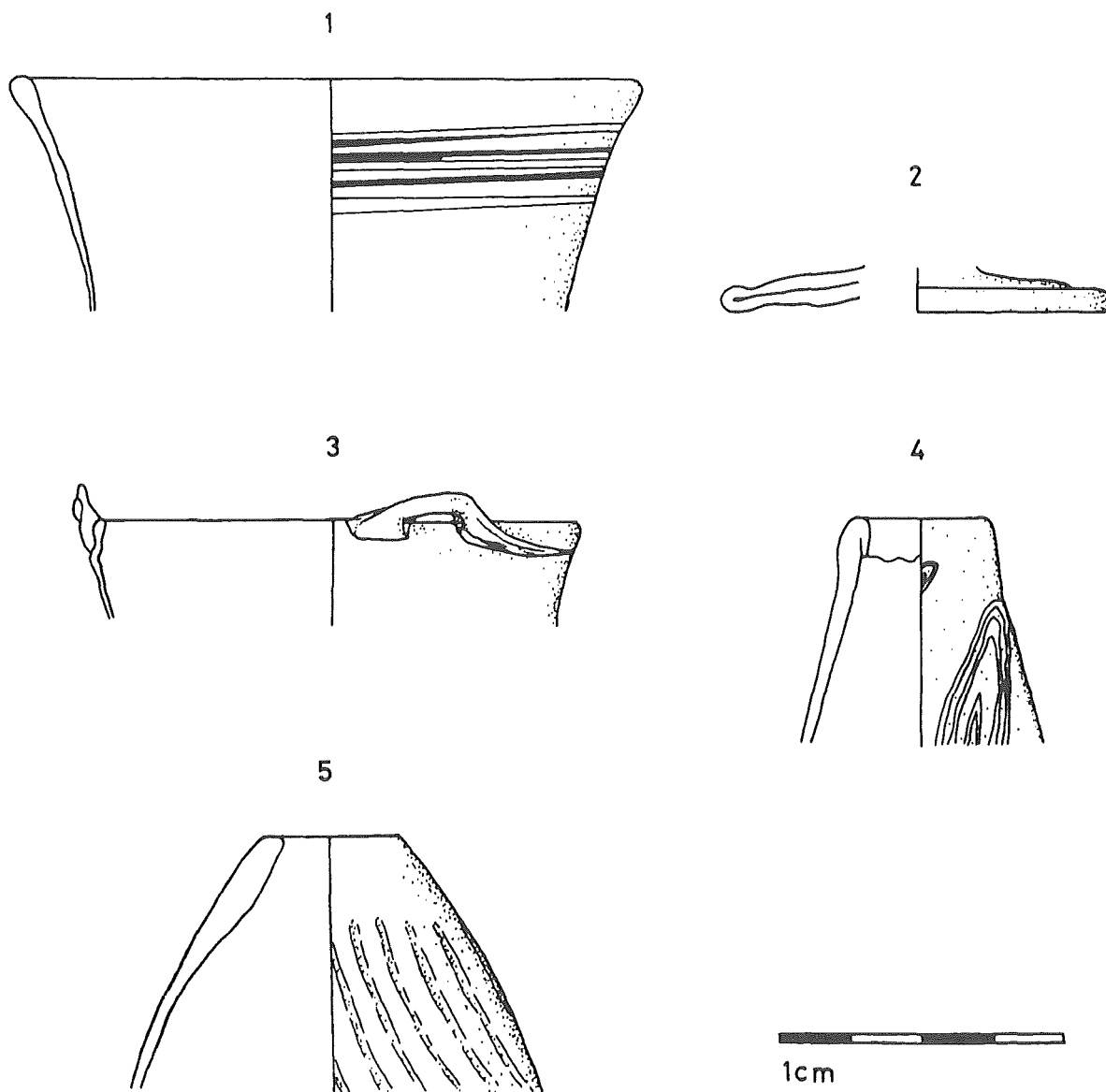


Fig. 6. - Examples of vessel fragments from the living areas and the later workshops: 1. drinking vessel rim in pale green glass with brown and white trailed thread, found in the Garden Court; 2. foot of a stemmed vessel in greenish colourless glass, from the later workshop; 3. rim of a San Vincenzo type lamp (Type a in the text) in a very pale green metal, found in the Garden Court; 4. rim of a bottle with in-sloping neck, in dark almost opaque turquoise-blue with festooned and marvered yellow thread, found in the later workshop; 5. rim and neck of another bottle with in-sloping neck, formed in a greenish-blue metal and decorated with vertical moulded ribbing, found in the monks' refectory (J. Stevenson).

that once attached the glass to the pipe have survived in large numbers. These pieces, called moiles, can show the diameter of the blow pipe at the working end and can also exhibit the methods used to remove the blown glass object from the end of the pipe (Fig. 5.1). Several moiles show a crackled area which is evidence that a drop of water was used to break the hot glass at this point and thus separate the vessel from the moile and pipe.

Once the paraison had been removed from the pipe, this broken end became the vessel rim to be reheated and fashioned into the desired form. It was expanded into an open mouth for drinking vessels,

lamps and bowls and lightly heated in the furnace opening (the glory hole) to round the lip off. Many of the 9th century products have this form of plain flame rounded rim. A few vessels, particularly the bottles, had their lips folded inwards or outwards to thicken the rim. If the rim was uneven it was trimmed; many 'cone' shaped glass pieces came from the workshops, predominantly the earlier one, and are evidence of rims or possibly window sheet edges having been trimmed with shears (Fig. 5.3).

Decorative elements were usually applied before or during the inflation of the paraison while still on the blow pipe. These ornaments included the coloured

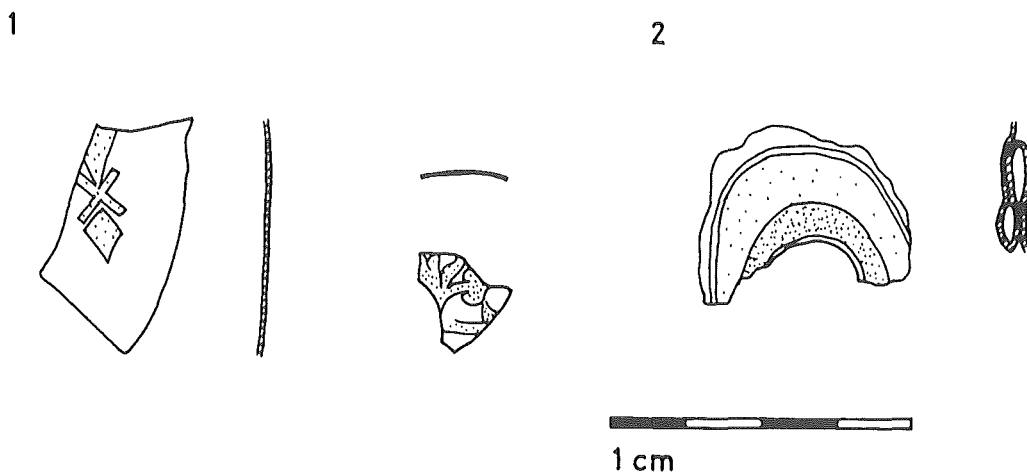


Fig. 7. - 1. Two fragments of gilded glass, one decorated with geometric pattern, the other with a foliate design, found with the remains of a demolished furnace from the early workshop; 2. Fragment of arch from the leg of a goblet, found associated with the early workshop (J. Stevenson).

festooned trails and applied threads and rods found on the vessels. The rods, either plain (*vetro a fili*) or twisted (*vetro a retorti*), were made in advance (Fig. 5.4), and the recovery of many examples of the pinched ends of these items suggest they were being manufactured at the site, in both workshops. The plain coloured canes were formed by pulling a piece of glass, held at both ends, until it became a fine rod often 1 mm diameter or less. Figure 5.2 shows an example of a pulled end either from one of these canes or from the application of trailed thread. The marks left by the instrument used to hold the end, perhaps pincers or tongs, show that the ends of the instrument were pointed and narrow and that the two halves did not meet flush. The twisted canes, a *retorti*, are usually found to consist of one thread of uncoloured glass (i.e. colourless, naturally light coloured or vessel body colour) and one coloured thread. To make these, a ball of uncoloured glass on the end of an instrument like the pontil would have a thick thread of coloured glass applied to one side. The free end would then be attached to a hook or held with pincers by a second person and while still hot the glass would be pulled outwards and twisted simultaneously. Long lengths of twisted cane can result from this process, but they are inevitably found in small broken lengths, and in varying thickness. Predominantly the a *retorti* rods at San Vincenzo have just two colours, opaque yellow and uncoloured, or opaque white and uncoloured. When the twisted rods were applied to the vessel they were usually marvered (rolled and pressed on a marver) into the vessel wall, which created a candy-twist effect when the paraison was inflated. The a *retorti* canes were sometimes positioned in pairs or groups with coloured a *fili* canes, to create a band of decoration usually near the vessel rim.

Another form of decoration not infrequently found on bottles, was that of light vertical or wrythen ribbing (Fig. 6.5). The vertical corrugations could be created using a one-piece mould in which the paraison would be pressed prior to inflation. The ribbed relief pattern would be retained on the paraison as it was inflated, but would become stretched and less pronounced, creating undulations or corrugations. A light twist of the vessel could create a wrythen effect, but this could also be the result of finishing the rim with a tool which causes the neck to twist slightly as the vessel is turned.

Types of vessels produced and their use in the monastery and beyond

Glassware was produced to provide lighting, drinking vessels, liquid containers such as flasks and bottles, some of which may also have been for liturgical use, and bowls and dishes possibly for serving food or for holding other substances.

The complete range and relative quantities of vessels produced by the workshops can not yet be fully established until the excavations are complete, nor can the exact differences and similarities between the products of each workshop. However, it is clear that both workshops were producing various types of oil lamps, dishes, bowls, jars, flasks, bottles with insloping necks, and drinking vessels of which some have a stem and foot. There is no indication as yet that an additional form evidenced in the southern later workshop was being made by the earlier glass workers. This form comprises the constricted-bases of vessels which may be interpreted either as hanging lamps or funnel beakers. It should be noted that there

are considerable problems attributing production to a specific workshop, particularly as vessels present in a workshop may represent cullet and therefore an earlier production date rather than contemporary manufacture at that particular location.

Glass oil lamps for lighting were recovered from the living quarters, particularly the monks' refectory, the 'Distinguished Guests' quarters and the garden court, as well as inside the religious buildings (Fig. 4).

At least three or four different types seem to be in concurrent use (Stevenson 1988). These types consist of:

a) a handled lamp of free-standing or suspended form, with the handles positioned on the rim top, and referred to here as the San Vincenzo type (Fig. 6.3; Stevenson 1988, 201-203, fig. 3; Ubaldi 1995, 109-110, fig. 3, Type I.4). As already outlined, this type of lamp may imitate a form already in existence at the site.

b) a handled lamp of free-standing or suspended form, with the handles positioned down the upper body (Stevenson 1988, 205, fig. 4.7; Ubaldi 1995, 104-108, fig. 2, Type 1.1 and possibly Type 1.2; Isings 1957, 162, Type 134). The earlier workshop contained many small handles which may have been used for this type of lamp.

c) a hanging lamp with a pointed constricted base, requiring suspension from the rim (Stevenson 1988, 203-205, fig. 4.4, 4.5, and probably 4.6; Ubaldi 1995, 120-124, fig. 5, Type IV.1 and IV.2). Some or all of these constricted bases may instead be from funnel beakers, as noted above. Evidence for these came from the later workshop and across the site; these stems were generally very narrow, often around 15mm diameter.

d) one other possible lamp form that may or may not be present is that of the carinated handled lamp with foot, perhaps better described loosely as a mosque lamp type. Pieces of bright olive green lamp, possibly of this form were found in the 9th century church at Colle Sant Angelo, which lay in the *terra* of the monastery of San Vincenzo. Pieces of another possible example were found in one of the niches of the crypt ambulatory in the abbey church, but this may be of a later date.

The church at Colle Sant Angelo, about 5 km from the abbey at San Vincenzo, has over two hundred fragments of vessel glass, a high proportion of which appear to be similar to the products of the San Vincenzo workshops and thus may have been manufactured there. The church may have acquired its lighting equipment and other glasswares from somewhere other than the monastery, its mother church and landlord, but this is perhaps unlikely. Two or three lamps of the San Vincenzo type (Type a, above), at least one constricted-base lamp (Type c) and several handles

possibly of the Type b form mentioned above, including one exquisite example, were found during excavations at the church. Another nine rim fragments may also be from lamps. A high quality small fragment of decolourised bowl was seen to be decorated with *vetro a retorti*, producing two rows of white spirals. A second decorated vessel was that of a possible flask with very wide mouth, or perhaps a drinking vessel, which had trailed thread ribbing running down from the rim.

Across the site at San Vincenzo and elsewhere the vessel fragments identified as lamps were never decorated apart from the use of different coloured handles on some of the examples. Delicate decorative elements of *filigrana* would no doubt be lost by the brilliance of the light shining from within the lamp, making any decoration of this kind futile. Drinking vessels on the other hand were often decorated (Fig. 6.1) and ornamentation is sometimes found on the smaller number of jars, dishes and bowls. All these forms were found in either the monks' refectory, the distinguished guests' refectory or in the covered garden court, and were in evidence at both workshops along with the elements used to decorate them. Interestingly few drinking vessels were found in the monks' refectory whilst bottles and lamps were well represented. An unusual form of bottle with in-sloping neck was found in the 881 fire debris in the refectory and garden court, and in the workshops. Several of these bottles were decorated with white festoons marvered into the richly coloured vessel wall (Fig. 6.4), whilst others were decorated with the vertical corrugation described previously (Figure 6.5).

Survivals and connections

The in-sloping necked vessels were found, and therefore possibly made, in the early workshop and in the later workshop in the layers of the main production period which may have ended by 830. They were also found in the living quarters in the 881 levels and were, presumably, still being used, fifty years or more after being manufactured. A second example of survival and long use may be exemplified by an unusual type of drinking goblet. This goblet has arched legs above a hollow stem, and the goblet bowl placed on the top of the legs. A substantial portion of one of these vessels was found in 1984 in the 881 fire levels in the distinguished guests' refectory and some fragments of others came from the garden court. From the excavations of the earlier workshop, in the 1990's, more fragments of this goblet form were uncovered (Fig. 7.2). This suggests that they were being made by the early glass workers and were still

being used sixty years or more later when the Saracens attacked the monastery.

The goblet referred to here is of further interest in terms of the location of others of this type. Examples have recently been published from three other locations: Monte Barro, Lecce, north of Milan (Uboldi 1991, 89, fig. LV.6); Savona, near Genova (Falcett 1988, 377, fig. XV, nos 31-34) and from a Cappuchin convent at Capodistria (Koper) on the south side of the Gulf of Trieste in Slovenia (Cunja 1989: nos 26-27; Cunja 1994, fig. 4, nos 66-68). Another, published in 1968 and assigned to the 4th-5th century, is in the museum in Aquileia (Calvi 1968, 172-173, no. 346, fig. 27) and is of uncertain provenance although Aquileia lies only 20 kms from the Slovenian border on the north coast of the Gulf of Trieste. It is hoped that the San Vincenzo goblet will be written up and published in due course and further investigation may help to establish if and what the relationship is between the goblets. It would appear at present that there is a north Italian connection with San Vincenzo. Perhaps this connection is to do with the political associations or perhaps it has more to do with purely economic links.

A possible association even further to the north, beyond the upper limits of the Carolingian Empire as well as in the northern region of the Empire, may be found in some small fragments of gilded vessel glass recovered from the early workshop at San Vincenzo. In Borg, Norway, a mid-8th to mid-9th century gilded funnel beaker demonstrates a method of gilding and decorative elements possibly similar to some fragments from San Vincenzo (Henderson & Holand 1992, 48-51, fig. 6, Plate II). Henderson and Holand note that nine other sites in Scandinavia and north west Europe have produced gilded vessel sherds, such as in Helgö, Valsgårde, Åhus and Torslunde in Sweden, Ribe in Denmark, Dorestad in the Netherlands, Liège in Belgium, and Paderborn and Niedermünster in Germany. Most date to around AD 700-900, and probably more commonly to the late 8th century (Henderson & Holand 1992, 49 and footnotes 119-122 which cite the locations and related publications; and see in particular Baumgartner & Kreuger 1988, 65-68; Lundström 1971).

It must be emphasised that direct comparison and detailed research of the gilded pieces has not yet been undertaken so that any association with northern Europe may be spurious. If these pieces are related (and are not remnants of an earlier period) and if there is a connection between San Vincenzo in the southern extremity of the Carolingian Empire and these North European locations, including the non-Carolingian Viking towns, this allows several possible interpretations. The glass may represent the wide

trade links of the Carolingian network and the Scandinavian sea trade, which, according to Hodges (1989, 119), seemed to have expanded in c. 790 and declined by c. 830. More pertinent perhaps, is whether these pieces may suggest the origins of the first glass workers at San Vincenzo, or whether the goblet form discussed previously holds greater significance in this respect. It should be remembered that during the early rise of San Vincenzo, in the last quarter of the 8th century many of the monks and several abbots were from the Frankish lands north of the Alps whilst others were of Lombard origin (Wickham 1995, 138 & 146) possibly from northern Italy. The organisation of manufacture and the mobility, or itinerancy, of the labour force are obvious topics raised from this question of the abbey glass workers' origins or place of training.

The location of San Vincenzo on the border of the Carolingian Empire, gave it the problems and benefits that accompany any border establishment or settlement. There has in the past, been much discussion as to the extent to which the material culture may reflect the social and political affinities of the abbey, and whether different cultural influences are detectable. When the glass was examined in 1985 and 1986 it was thought that some evidence of Mediterranean, Byzantine or Near Eastern traditions may have been seen in the assemblage, and the more recently excavated gilded pieces were initially thought to have possible links with Byzantine or Islamic glass. However, to look at the 9th century glass assemblage from San Vincenzo, particularly with the thousands of fragments now recovered, one is left in little doubt that it is fundamentally from a European tradition. The rims of drinking vessels decorated with *filigrana*, and the *vetro a retorti* rods themselves, adequately illustrate this tradition which extends across northern Europe (Baumgartner & Kreuger 1988, 69 ff; Evison 1983a, 91-92; Evison 1983b, 11-12; Evison 1988a, 121-122; Evison 1988b, 240-244; Näsman 1986, 76-82). In appearance much of the glass from San Vincenzo is astonishingly similar in fabric, quality, decoration and rim form to glass from, for example, the middle Saxon emporium of Lundenwich or Barking Abbey in London; but the range of vessel forms follows a predominantly Italian or localised pattern. It is evident that the full range of forms for this period in Europe has yet to be established, certainly at San Vincenzo at least one form, the bottle with in-sloping neck, appears to be an unusual type not obvious in general glass assemblages of the period. It is perhaps on this note that the paper should come to an end as it would be unwise to attempt to go any further without the comprehensive research and comparison required to make definitive

conclusions. There is still a long way to go and this paper was intended to provide only a preliminary overview. One thing may be stated, though, and with no degree of doubt, that the glass from San Vincenzo can inform us about cultural and economic issues in addition to providing information on the types and techniques of glassware manufactured and the skill of the glass worker in the 9th century.

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I should like to thank the following for their assistance or advice: Karen Francis, Professor Dr Mitja Gustin, Richard Hodges, Martine Newby, John Shepherd, Roz Sherris, Cheryl Thorogood, Lucy Watson, and the Society for Medieval Archaeology for an Eric Fletcher award which allowed the preliminary study of the glass from the more recently excavated workshop. The Faculty of Archaeology, History and Letters of the British School at Rome funded the study of the glass from the 1980-86 excavations.

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Antler- and bone-working in Nerevsky and Lyudin Ends of Medieval Novgorod

Evidence from Waste Analysis

The splendid state of preservation of organic materials deposited in Novgorod soil, the significant area of the medieval town investigated by archaeologists, the rich collection of objects in bone tissues assembled during the excavations open wide perspectives to the study of antler- and bone-working activities. There is no written evidence for an organized antler- or bone-working industry in Novgorod. That is why the archaeological evidence is of the extreme importance.

The research was started in 1994 when Sector X of Troitsky site had been investigated down to the natural soil. Troitsky site (total area of 5,856 sq. m. of which 4,556 have been excavated down to the natural soil, total thickness of cultural layers varies between 4 and 4.2 m) has been excavated since 1973. It is situated in the Lyudin End, in the southern part of the St. Sophia side of the town. Those find categories from Troitsky site which are considered to be indicators of handicraft activities (raw materials and debris, half-finished objects and items discarded during the manufacture) were investigated. There were two different lines of the research:

1. the identification of items to the material and studying the composition of raw materials used by craftsmen;
2. investigation on the distribution picture within different properties and studying concentrations of waste materials in particular areas of properties in particular periods.

These days the analysis of materials from Nerevsky site (total area of 8,840 sq.m., thickness of cultural layers varied between 6 and 7.5 m.) has been finished. Nerevsky site excavated in 1951-1963 was situated in the Nerevsky End, in the northern part of the St.-Sophia side of the town. It is extremely important to compare the results of research based on the materials from the two sites. Both sites demonstrate noticeable concentrations of waste materials in antler and bone and are the largest areas of thorough archaeological investigation on the territory of European Medieval towns.

The post-war excavation assemblage of waste elements from the collections of the Novgorod State

Museum, State Historical Museum (Moscow) and State Hermitage (St.-Petersburg) consists of 939 items. 303 finds come from Troitsky site, 404 from Nerevsky site. 78 pieces were collected on Fedorovsky site in the Plotnitsky End in the market side of the town excavated in 1991-1993 (total area of 1500 sq.m., thickness of cultural layers 2 m.). 40 items in the assemblage come from Michailo-Archangelsky site (area of 656 sq.m., thickness of cultural layers 4 m.) excavated in 1990-1991. The rest 114 finds come from 14 sites (total area of 5444 sq.m.). The degree of waste concentration in different parts of the town can be easily seen if we introduce Index of concentration (Q), which shows the number of elements on the excavated area of 100 sq.m. (Table 1).

Table 1

Index of concentration of waste materials in Novgorod

Site	Troitsky	Nerevsky	Fedorovsky	Mikhailo-Ark.	the rest	all
Q	6.6	4.6	5.2	6.1	<=2.3	4.5

When comparing Nerevsky and Troitsky assemblages, it is worth to stress that waste concentration is more considerable on the excavated area of Troitsky site. The difference will be even more noticeable if we exclude Nerevsky finds dated from the twenties to sixties of the 15th century. Troitsky site lacks the water-logged deposits of the 15th century. Then Q for Nerevsky will be 3.2, which is less than the average Q for Novgorod (4.5) and more than twice as less as Troitsky index (6.6).

There are significant differences in composition of raw materials in Troitsky and Nerevsky assemblages (Table 2).

There can be no doubt that horn-working didn't occur in Novgorod. A few pieces of cattle and goat porous cores are more likely the remains of tanners or skimmers activities.

Table 2

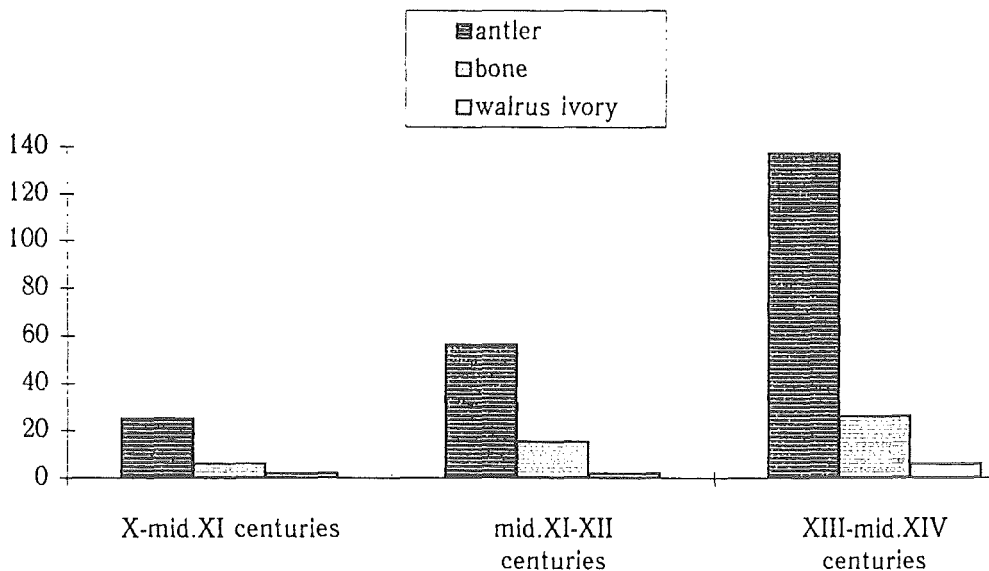
Composition of raw materials in Troitsky and Nerevsky assemblages.

	Antler	Bone	Walrus ivory	Horn (core)
Troitsky	244	51	4	4
Nerevsky	174	200	20	10

Relatively small number of walrus ivory waste fragments doesn't reflect the real proportion of the material among raw materials. Walrus ivory (or "fish tooth" as it was called in Russian Chronicles) was not easily available. It was expensive and exclusive material. Besides, walrus ivory has the excellent working properties and can be utilized thoroughly with minimum debris. One could expect few ivory waste pieces deposited in cultural layers.

Composition of skeletal materials in debris from the two sites at different chronological stages is shown in Fig. 1. From the 10th century onwards it was antler rather than bone and ivory which provided the bulk of raw material for the craftsmen of the Lyudin End. Preference for antler is shown by the manufacturers from the Nerevsky End in the period from the 10th to the mid- or late 14th centuries. The dynamics of the industry development seems to start changing in the 13-14th centuries, when one can see the rise in the utilization of bone in the Nerevsky End, although antler still predominated. This probably reflects the specialization of craftsmen in different parts of the town. In Western and Middle Europe preference for antler shown by town manufacturers was definite in the period from about the 8th to the 11th century. In the course of the 11th to 13th cen-

Fig. 1. - a. Composition of raw materials in waste fragments from the Properties of the Lyudin End of Novgorod.



b. Composition of raw materials in waste fragments from the Properties of the Nerevsky End of Novgorod.

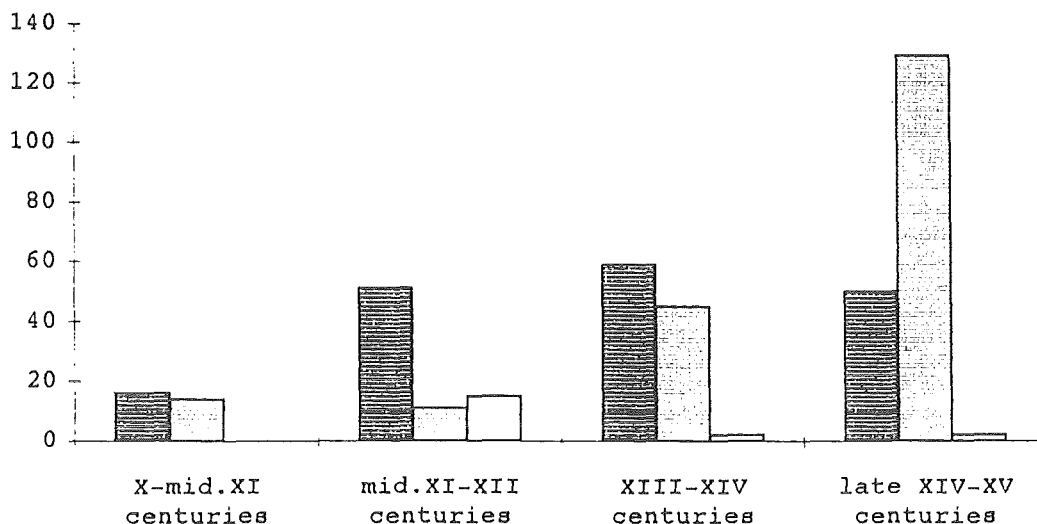


Table 3
Antler waste attribution to species

	elk (%)	rein-deer (%)	red-deer (%)	roe-deer (%)
Troitsky	88	6.3	3.7	2
Nerevsky	81	13	4.6	1.4

turies a noticeable decline in the utilization of antler was compensated by a rise in the use of bone and horn. Eventually antler found in Europe only occasional use as raw material. A noteworthy feature of the industry in Novgorod is unconditional preference for antler for the period from the 10th to the 14th century at least. It enables us to say that there were stable ways of acquiring the raw material. One can also see the continuing rise of the craft activity up to its maximum in the 13th - early 15th centuries.

Elk antler formed the principle source of raw material for manufacturing in Novgorod (Table 3). This is not surprising for the town lies within the natural area of distribution of elk. That is the same in the case with roe-deer. Although we have not obtained yet a precise picture of how elk and roe-deer antlers would find their way into the town, it is clear that fresh antler would be channelled through the country dwellers on the basis of direct links.

Novgorod land is situated beyond the red deer limits, so pieces of red deer antler can be regarded as imported elements in the bulk of raw materials.

In regards to rein-deer antlers it is harder to say whether they were imported. The town lies close to the southern species limits. The area of Novgorod Republic extended northwards up to the White sea in medieval times, so some parts of the state lay definitely within reindeer limits. Anyway the presence of

reindeer remains in the deposits of both sites confirms the existence of long distance trade. It is noteworthy to notice that a third of all pieces of reindeer antler from Troitsky site occurred within the area of property P. Nearly a quarter of those from Nerevsky site come from the 13th-15th century layers within the area of property B. References to the collection of taxes from northern lands occur in two birch-bark documents from the property. In the birch-bark document No. 52 dated from the 13th century the area near Kokshenga and Puya rivers was mentioned. Birch-bark document No. 131 found in the deposits of the 14th-15th centuries refers to the names of the town of Pudoga, rivers Oyat and Shuya and lake Samozero. The character of waste material from the property B confirms the tight links with northern lands.

Unlike the situation in European medieval towns with a flourishing antler working (Hedeby, Schleswig-Holstein, Århus, Ribe, Lund, York, Dublin, Wolin) where most of deer antler elements have been shed naturally in the wild, an opposite pattern emerges in Novgorod. The striking feature here is the fact that most antlers have been cut or sawn off from the skulls of slaughtered animals. Only 25% of antler remains have been naturally shed.

Elk bones seldom occur in the deposits in Novgorod. These are only distal parts of the skeleton (peripheral metapodials, astragalus) and pieces of skulls. The first would likely be brought into the town with the skins, the latter with antlers attached. Underrepresentation of elk bones compared with antler remains means that carcasses would be butchered and skinned in some particular places in the forests. The paucity of bones of members of the deer tribe reveals the fact that venison would unlikely form a

Bone waste identification to species
(Troitsky site)

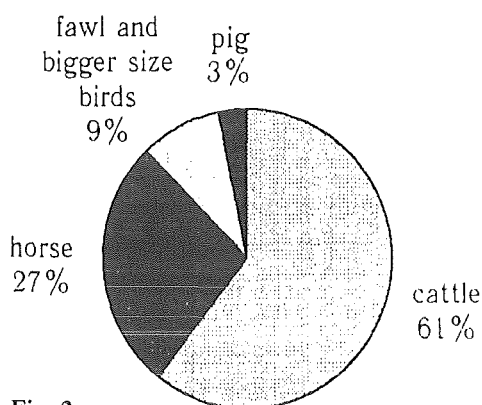
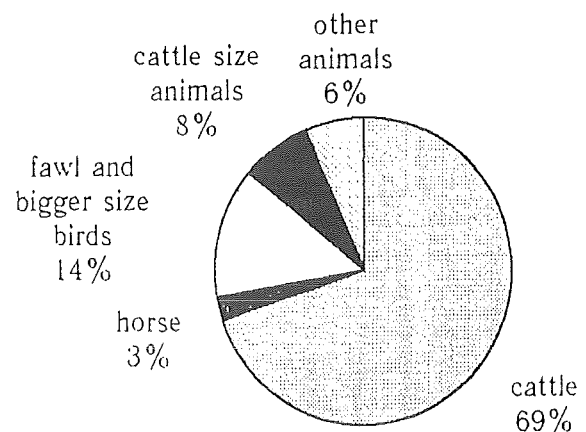
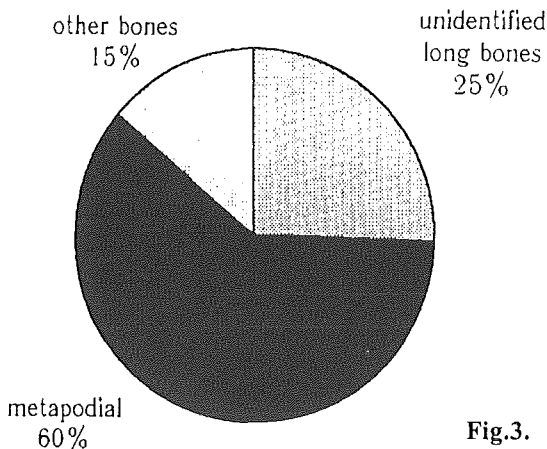


Fig. 2.

Bone waste identification to species
(Nerevsky site)



Osteological identification of bone waste (Troitsky site)



Osteological identification of bone waste (Nerevsky site)

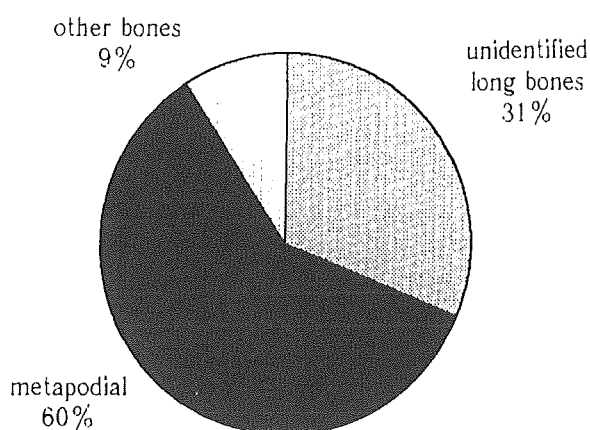


Fig. 3.

noticeable part in a diet. In the light of this evidence it is possibly worth to interpret terms 'losina' and 'olenina' mentioned in birch-bark documents as elk and deer skins rather than venison. According to the famous expert in ancient Russian language Vladimir Dal', 'losina' means elk leather (sort of suede) and 'losyatina' means elk venison.

The total amount of antler waste elements is relatively small. Antler waste was encountered in hundreds and even in thousands pieces in assemblages from European towns mentioned above. It is likely that some material lies outside the excavated area. But the main reason is another. Since elk formed the principal source of raw material for manufacturing in Novgorod one might have expected less waste than in the case of red deer or reindeer antler. Elk antler pro-

vides craftsmen with more compact material. Parts of beams beneath the palm as well as tines practically entirely consist of compact material while those of red deer have wide porous cores.

The analysis of bone waste fragments from the two assemblages reveals similar pattern in the utilization of the material. The vast bulk of bone fragments derive from cattle and horse (over 75% in both cases). Worked bones of big birds (of fowl or duck size and bigger) occurred in quite noticeable quantities. Nerevsky assemblage represents a higher species diversity (Fig. 2). Metacarpals and metatarsals predominate among skeletal bones (Fig. 3). Cattle and horse metapodials with their long straight shaft and thick compact bone have been always preferred by manufacturers working in bone. Metapodials form

Composition of raw materials in finished articles from Nerevsky site

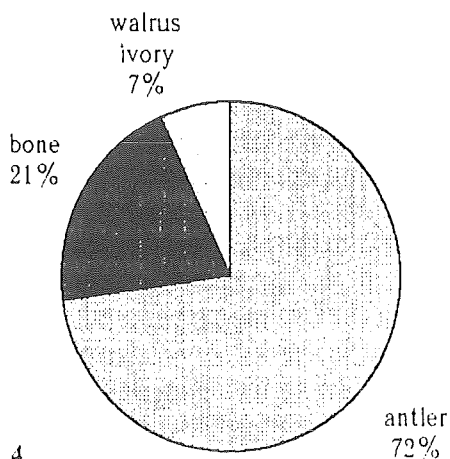
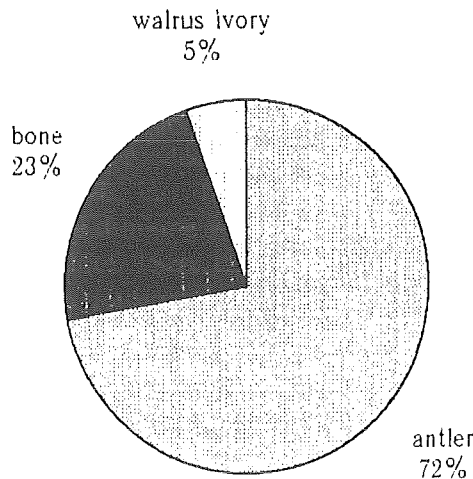


Fig. 4.

Composition of raw materials in finished articles from Troitsky site



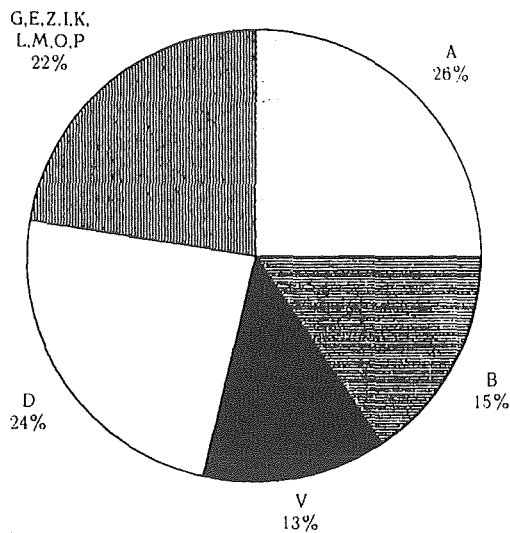


Fig. 5.

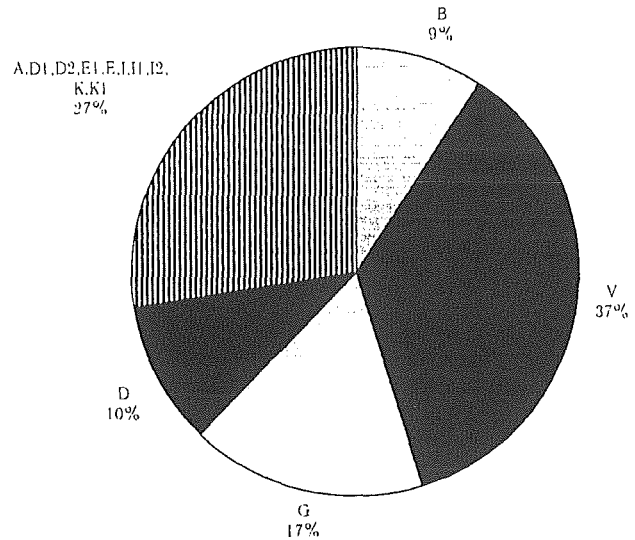


Fig. 6.

the majority of bone waste in the assemblages from the European urban settlements of either Viking age or Middle ages, in Schleswig they take 85% of the assemblage.

It is worth comparing the distribution of skeletal materials in waste fragments with that in finished objects. Both sites demonstrate similar patterns (Fig. 4). Antler dominates (72%). Bone takes 21-23%, walrus ivory quota varies from 5% in Troitsky material to 7% in Nerevsky. The reason why the differences in waste material distribution picture are not revealed in the case with finished objects is probably that items manufactured in the 15th century, when pattern of the utilization of different skeletal materials seem to have been changing, do not occur in the water-logged deposits and are under-represented in the collections.

Areas of antler and bone working activity in the properties of the Lyudin End

The analysis of distribution of the material in different properties on Troitsky site revealed some particular areas of concentrations of waste elements. The greatest concentrations of waste materials were recorded from properties A, B, V, D (Fig. 5). Index Q for each of the four properties is more than the average figures for Troitsky site and Novgorod (4.5) (Table 4). Noticeable quantities of debris occurred on property P. It is the only property among the rest 11 excavated in the Lyudin End where Q is higher than the average Novgorod figure and takes 4.6.

It is worth to show the development of the craft on the material from property A. First, the great concentration of waste pieces occurred there. Second, nearly

the whole area of the property A was situated within the excavated area. And finally, there are investigations on chronology, topography and stratigraphy of the property.

Property A is situated in the eastern part of Troitsky site to the south-east of the point where the Highway and Chernitsyn Street cross. Three phases in the history of the property from mid. 10th to early 15th centuries are revealed by A.S. Khoroshev. More than a third of the whole assemblage of waste elements from Troitsky site have been collected on the property A.

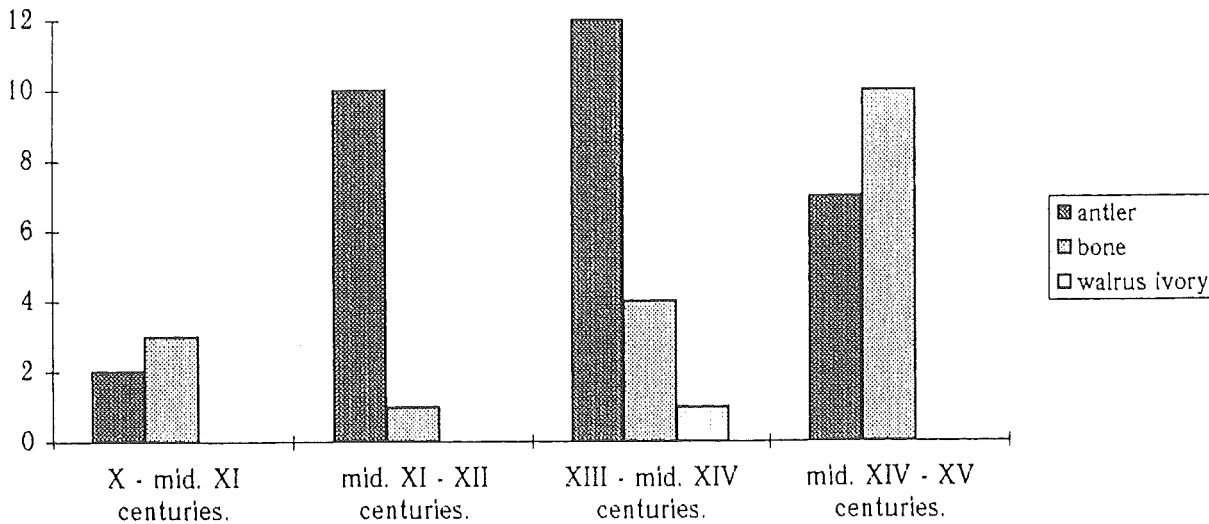
In the first phase of construction dated from the 950s or 960s to the very beginning of the 11th century we can not detect any traces of antler- or bone-working activity.

Generally speaking, the earliest material dated from the 10th and 11th centuries suggests that antler, bone and ivory objects if made in the town at all, were produced on an individual basis or at most on a small scale. Although a splendid collection of nearly 150 single-sided composite combs and comb cases was assembled in the earliest deposits no one piece of waste is associated with comb-making. The most significant concentration of antler and bone offcuts occurred on property P. 11 pieces of sawn antler and bone have been collected both inside or just outside

Table 4
Index of waste concentration for the properties in the Lyudin End

Properties	A	B	V	D	the rest	all properties
Q	14.8	10.6	6.7	15	<= 4.6	6.6

Fig. 7. - Composition of raw materials in waste fragments from Property B (Nerevsky site).



log houses and in the yard. Unfinished objects of the first phase have unattractive appearance and seem to have been manufactured rather by unskillful amateur than professional.

Since the 12th century traces of professional craftsmen's activities working on a more sedentary basis have been detected. In the second phase of construction (late 10th/early 11th century till the first decades of the 13th century) 30 pieces of waste form a very compact group. The vast majority of them are associated with the 12th-13/14th. construction layers of Chernitsyn Street and occurred either inside the log house IV-37 in the very NE corner of the property A or in the yard near the log house IV-37 and log house IV-38 next door to it. This part of the yard is bounded by property crossings from the south and the west. These two log houses were erected after the fire of 1194 which had devastated the complex of buildings (both dwellings and workshop) belonged to the icon painter Olisei Grechin. The new manufacturing complex was also interpreted by B.A. Kolchin, A.S. Khoroshev and V.L. Yanin as painter's workshop and dwelling. We can not charge if the owner would be either a painter or a craftsman working in antler. There probably would be a few craftsmen. The composition of raw materials, the kind of waste and finally the special set of tools provide the evidence for that he would be a professional, a person who would know skeletal materials very well.

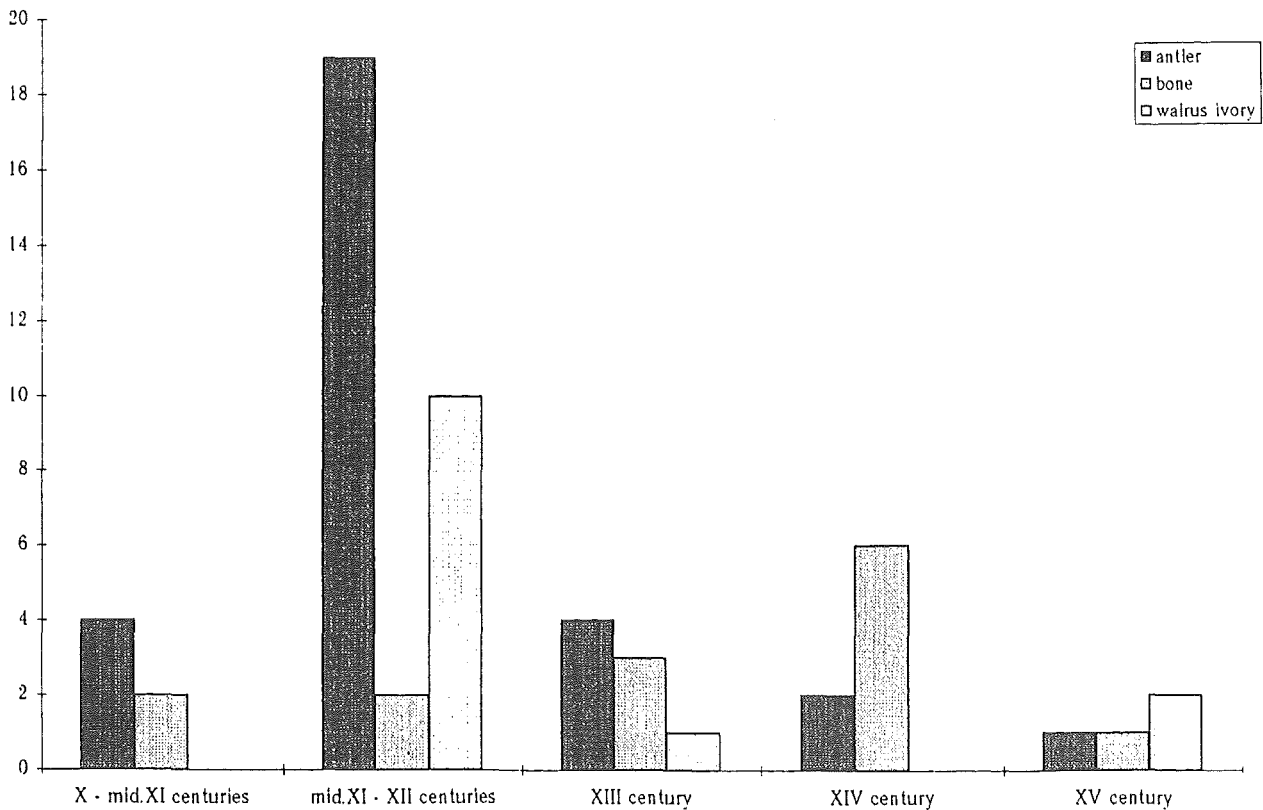
90% of the waste were elk antler offcuts, mostly pieces of sawn or split palms and burrs. The latter testify to the fact that the vast majority of antler (87%) derive from the slaughtered animals. The character of bone elements also reveals the professional craft activity. Only sawn-off epiphysal ends from cattle and horse metapodials discarded during manu-

facturing bone items occurred in some numbers. Interesting tools have been found: an axe, chisels, knives and a double handled rasp. Some of them would probably be from the craftsman's tool kit.

There was a stove attached to the log house IV-38. According to ethnographic evidence in 19th-century Russia workshops of craftsmen working in skeletal materials would be situated close to *plavilnya*, a room with the stove equipped with a big metal vessel with boiling water for softening raw materials.

Even after great fire of 1209 mentioned in the chronicle when property A was burnt down and looted the crafts activity went on at the same area, concentrating inside and outside log house IV-36. It is worth to notice that in the 11th construction layer associated with the very beginning of the last constructional phase of property A (first decades of the 13th century to the beginning of the 15th century) antler working occurred in the NE corner of the property. The data from the birch-bark documents and stratigraphical evidence indicate that property A was one of the group of properties in the hands of the *boyar* clan of the Nesdinichi-Miroshkinichi. At the second phase it was placed at the disposal of priests by the property owning family. By the decision of *veche* the Miroshkinichi property was confiscated. According to the evidence from archaeological materials, including a number of documents the urban property was handed over to the priests of St. Sophia's Cathedral. The property A was divided into two plots of approx. 276 sq. m. The destruction of the Miroshkinichi family probably did not touch the craftsmen who would likely go on working for the new masters.

Another area of antler working activity has been traced in the southern part of property A. Its origin coincided the rebuilding which took place after the

Fig. 8. - Composition of raw materials in waste fragments from Property D (Nerevsky site).

period of decline following the fire of 1213. The flourishing antler working industry occurred in the property A1 (the southern plot of the former property A) in the second part of the 13th - early 14th centuries.

The greatest concentration of waste (56 pieces) is associated with the complex of log houses II-9, II-11 and II-12. The finds occurred both inside the houses and on the nearest territory of the yard. Antler waste included 44 pieces of elk antler, 2 pieces of roe-deer antler and one piece of reindeer antler. More than 75% of antlers have been taken from the skulls of slaughtered animals. 9 sawn epiphysal ends from cattle and horse metapodials occurred in the waste concentration. Yet it is hard to charge what the specialization of the complex would be. One-piece antler combs were definitely produced.

And finally it is worth to mention one more complex within the property A of the third phase (the northern plot of the property A of the second phase).

Table 5

Index of waste concentration for the properties in the Nerevsky End

Properties	B	V	G	D	the rest	all properties
Q	3.2	23.8	7.8	9.2	<= 2.9	4.6

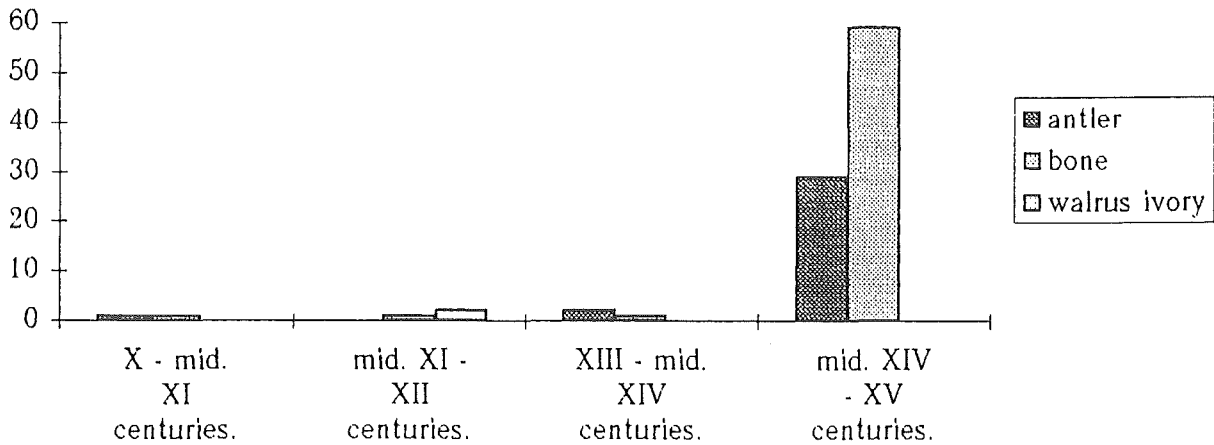
12 elk antler pieces occurred inside and just outside the small log house in the very SW corner of the property in the layers of the first part of the 13th century. Though the concentration is not very big, its composition is curious. These are mainly large pieces of palms and a few pieces of elk beams. The latter are found very rare for these parts of elk antler consist practically entirely of compact material and are utilized. This complex is likely to be interpreted as a storage of raw materials partly prepared for manufacturing.

Areas of antler and bone working activity in the properties of the Nerevsky End

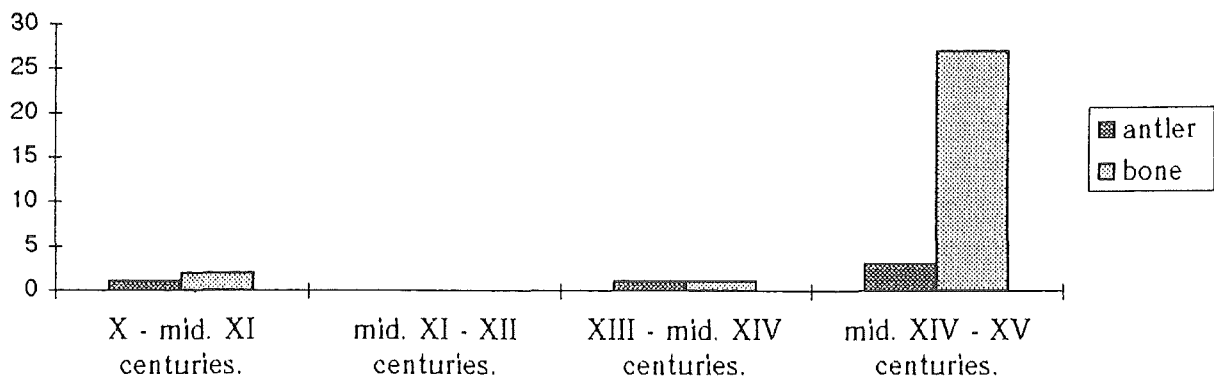
On the territory of the Nerevsky End large concentrations of waste elements occurred in properties B, V, G and D (Fig. 6). It is unlikely that antler or bone working activity would be carried out in the other properties. Analysis of the material from the four properties reveals significant differences in chronological and spatial distribution of waste within these complexes and in the development of the craft activities in the Lyudin and Nerevsky Ends.

All the four properties in the Lyudin End with considerable concentrations of waste demonstrate similar tendencies of the craft activity development from the second half of the 12th century onward and

Fig. 9. - a. Composition of raw materials in waste fragments from Property V (Nerevsky site).



b. Composition of raw materials in waste fragments from Property G (Nerevsky site).



rather stable composition of raw materials. In regards to Nerevsky properties we can trace quite different dynamics of the craft activity.

Properties B and D take 9% and 10% of the Nerevsky assemblage. The whole area of property D lies within the excavated areas. Only eastern extremes of property B haven't been excavated. Index Q for property D is nearly three times as higher as that for property B (Table 5). But we have to take into account that the area of property B was much bigger. Besides, it is very likely that some material from the property lies outside the excavated area.

Chronological distribution of waste material from property B enables us to estimate the craft activity in the period from the second half of the 12th century to the end of the 13th century (Fig. 7). Concentration of 12 fragments of sawn antler and one piece of valuable walrus ivory was located in the north-east part of the property and associated with the period from the last quarter of the 12th century to the first quarter of the 13th century (construction layers 15-17). There can be no doubt that some material from the complex lies outside the excavated site and the whole area of the craft activity was situated in the very north-east corner

of the property. P.I. Zasurtsev, who studied topography and layout of the properties on Nerevsky site, ascribed these layers to the 5 construction period. It was characteristic for the period that the buildings within the property would be arranged in three detached groups consisted of dwellings and a few outbuildings in the north-west, north-east and southern parts of the area. The researcher didn't rule out the three groups would have belonged to different families. A quarter of antler pieces came from rein-deer. Normally rein-deer fragments in Novgorod excavations take 6-13% of antler assemblage. Quite large proportion of rein-deer antler waste as well as walrus ivory fragment definitely indicate close connections of the property owners with the northern lands.

Chronological distribution of the material from property D is different (Fig. 8). The majority of waste fragments come from the 12th century layers. 90% of all finds were collected on relatively small space of about 64 sq.m. to the north-west of the point where Velikaya and Kuzmodemyanskaya streets crossed, in the deposits referred to the construction layers 17-18 and partly 19 (30-s- 90-s of the 12th century) in the late 4th - early 5th construction period.

At the early stages of antler and ivory working activity on the spot (19 construction layer) there was a log house D19A on the corner of the streets. Later (17-18 construction layers) the same space was used as a yard. The composition of raw materials is very special: 11 sawn pieces of walrus ivory, 9 fragments of elk antler and 1 of rein-deer antler, 2 off-cuts of compact bone material (long bones from a cattle size animal). This is the biggest concentration of walrus ivory waste either in Novgorod or in other Russian and European medieval centres.

Walrus tusks would be obtained from hunting the beasts in the White Sea near Mezen Bay, on the Murmansk coast in Kola peninsular and near Spitsbergen (Grumant) island, in the Arctic waters near Vaygach and New Land isles, near the mouth of the Pechora river. The novgorodians started penetrating into far north lands in the 11th century. A lively demand for northern furs and ivories led novgorodians to colonize the far north. In the 12-13th centuries there were not only temporary camps but permanent settlement sites and even vast properties (*votchinas*) belonged to boyar families. Walrus ivory was definitely among those exotic materials, which were considered as symbols of wealth and power. Everywhere in Europe since the development of trade in Viking Age rich people would have delighted in having such beautiful and unusual rarities. The composition of raw materials for bone-working activity occurred in property D indicates the fact that the rich owners had close connections with far north territories.

Both properties V and G, which adjoin the cross-road of Velikaya and Kholopya streets, demonstrate considerable (especially for Nerevsky site) concentrations of waste fragments. The corresponding figures of Q are 23.8 and 7.8. Patterns of chronological distribution of the material from the two properties are very similar (Fig. 9). Against the background of none of bone-working activity before the middle of the 14th century, there were impressive concentrations of waste in the deposits dated from the second half of 14th to 15th centuries. Bone predominates over antler in both assemblages.

Area for bone-working activity was located in the very north-east corner of property V beside the cross-roads of Velikaya and Kholopya streets. The complex corresponds with the 3-4 construction layers and is dated from the first half of the 15th century. 58 sawn bone pieces, 27 fragments of sawn antler, a sawn-off cattle horn core, a variety of finished objects in bone, antler and ivory as well as half-finished and discarded items were collected in the deposits from inside and just outside log houses V4R and V4R(a). These buildings were definitely the

dwelling and workshop of craftsmen. The fact, that sawn-off articular ends from cattle and horse metapodial bones form 86% of bone waste, indicates the professional industry. As a preliminary to bone-working with a view to obtain thick straight piece of bone craftsmen would saw off epiphyses and either chop the diaphysis lengthwise or cut and flatten it having softened the bone in water beforehand. They might also cut the shaft across producing cylinders.

Knife handles were definitely main articles to be produced at the workshop. 39 knife blades (including fragments) and 33 knife handles (including half-finished and discarded ones) come from the area. Knives were likely the principal tools for bone-working. A chisel found in the context might be also from the craftsman's kit.

A very similar manufacturing complex occurred in property G on the other side of Kholopya street opposite the workshop in property V. The fenced off area adjoined the cross-roads of Velikaya and Kholopya streets. There were two log-houses G4CH and G5CH on the plot. They correspond with the 10 construction period (construction layers 4-5) and are dated from the first half of the 15th century. 21 pieces of worked bone, 3 fragments of sawn antler and a sawn-off cattle horn core come from the complex. All bone waste fragments are sawn-off cattle and horse metapodial epiphyses. It is not that easy to determine the specialization of the workshop. The production capacity was less than that of the workshop in property V. It is beyond of question that knife handles were also among the main articles to be produced at the workshop. 16 knife blades and 8 knife handles (including half-finished ones) occurred in the context.

In conclusion it should be stressed that the first noticeable concentrations of antler, bone and ivory waste in the properties of the Lyudin and Nerevsky Ends of medieval Novgorod, which indicated bone-working activity, have been traced to the period of not earlier than the mid-12th century. At this very earliest stage of professional antler and bone handicraft (12th-first half of the 13th centuries) the dependent craftsmen would work on the territory of boyar properties, serve one or a few boyar families and carry out their direct orders. From the second half of the 13th century onward one can see the development of professional handicraft. The production capacity increases. At this second stage (second half of the 13th - late 14th centuries) bigger concentrations of waste were left during the production period much less limited in time. There were a few antler-working workshops in the properties of Lyudin End, which didn't belong to boyar families any more. The production was likely based on both direct and indirect

customer relationships. In the late 14th and 15th centuries two bone-working workshops worked close to each other at the same time in the northern part of the territory investigated in the Nerevsky End. The great production capacity caused probably the maximum

use of easily available and cheap bone, which had been only secondary raw material supplementing elk antler in former times. The workshops in properties V and G more likely belonged to independent craftsmen oriented to the market.

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Late Medieval Bone-Bead Production: Socio-economic Aspects on the Basis of Material from Constance, Germany

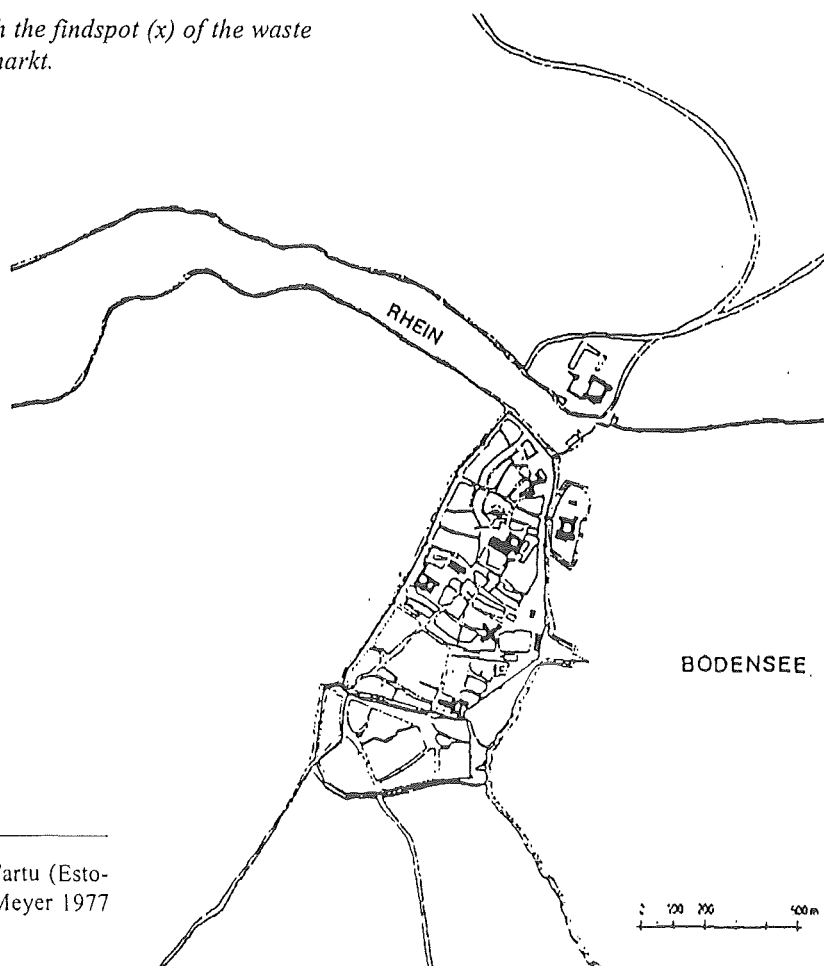
During excavations near the *Fischmarkt* in the medieval town centre of Constance in Southwest Germany (Fig. 1) from May 1984 till August 1986, a rather peculiar find in the field of bone-working came to light: more than 300.000 fragments of flat strips of animal bones with series of circular perforations, together with about forty to fifty thousand chopped-off distal ends of cattle-metapodials, all within an area of about 240 m². With financial means provided by the Gottlieb Daimler-und-Carl Benz-Stiftung and the Landesdenkmalamt Baden-Württemberg (both in Germany), they are now being studied. This paper presents some preliminary results.

Similar finds of perforated bonestrips are known from many medieval towns from Estland to England

and from Hungary to Northern-France¹. In some cases, the assemblages are as massive as in Constance. In the Dutch town of 's-Hertogenbosch, a 16th-century earthen wall was filled with this material (Janssen 1983). In 15th-century Strasbourg (Maire 1990), just as in 15th-century Constance (Oexle 1984), they were used to raise a marshy area in the outskirts of the town. Finds from monasteries or agricultural villages are also known, but these obviously are rarer. Nearly all finds date from the 13th to the 18th centuries. The material from Constance is roughly dated from the late 13th to the early 16th century.

The perforated bonestrips which are the subject of the present paper are the waste of the production of beads, ringlets and buttons manufactured by means

Fig. 1. - Fifteenth century Constance with the findspot (x) of the waste of bone-bead-production near the *Fischmarkt*.



¹ Respectively: pers. comm. L. Maldre, Tartu (Estonia); MacGregor 1985, 101-102 (England); Meyer 1977 (France); Sandor-Maria 1961 (Hungary).

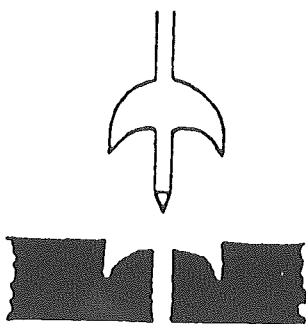


Fig. 2. - Schematic section of a bone-strip, drilled from one side till halfway, with drill.

of drilling. An iron drill was used with a profile showing the negative of the desired object and a longer, pointed pin in the middle (Fig. 2). First, a hole was pierced through the wall to the other side by means of the central pin set at right angles to the bone-wall. Next, the bone-wall was drilled halfway through with the rest of the profile. Then the bonestrip was turned, the central pin was put in the hole and the other half was carved out until the two carvings touched and the object fell out of the strip, leaving a circular hole. Where the two carvings had touched, often a ridge is visible. Finally, the object could be polished and dyed or covered with textile (Mac Gregor 1989). Depending on the profile of the drill, the object was a bead, a ringlet or a button.

Early examples of bone-buttons from Constance, with one hole in the middle, were drilled from one side only (Fig. 3). Some equally early button-strips from Basel-Bettingen, however, were drilled from two sides (Moosbrugger-Leu 1985). The distribution of the finds in Constance as well as in Strasbourg seems to indicate that buttons were made in other workshops than the great mass of beads and ringlets. The oldest bone-buttons, from Constance as well as from Basel and Strasbourg, are from the second half of the 15th or first half of the 16th century. In the Middle Ages, clothes were closed among others by hanging loops around knots, made from leather or other material (Fig. 4). At the end of the Middle Ages, the knots were enlarged with circular bone discs with one hole, to give the loops a better holding. Later, the discs replaced the knots and got more holes allowing them to be fixed by sewing (Moosbrugger-Leu 1985).

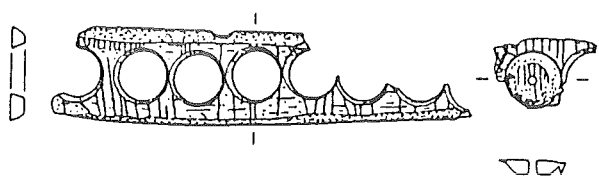


Fig. 3. - Bonestrips drilled from one side, Constance, Marktstätte.

During the late Middle Ages, the beads and ringlets were used mainly for prayer-counting-chains. These were called rosaries or *paternosters* after the prayer for which they were mostly used. Paternoster-chains were widely used among all classes, not only for strictly religious purposes, and they were made from different materials, like various types of metals, glass and wood; they existed in different price-classes, for the different classes of society. The cheapest material suitable for the production of beads, however, was bone, available in large quantities as refuse from slaughtering.

Two skeletal elements of cattle were found in huge quantities in the production-refuse in Constance as well as in Strasbourg: metapodials and the meatless part of the rami horizontali of mandibulae, *i.e.* the horizontal part of the lower jaw. Other bones which are as suitable or even more so as these for the

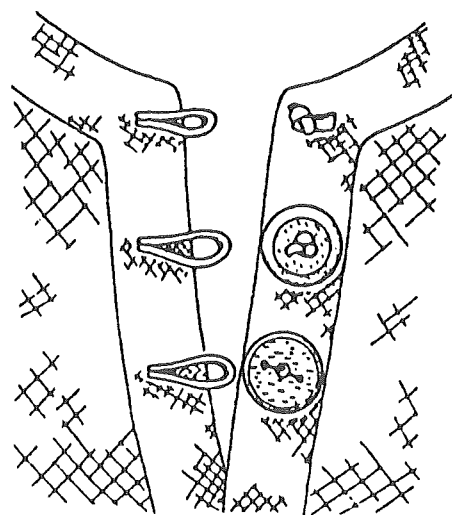


Fig. 4. - Schematic reconstruction of the development of bone-buttons (down) from knots (at the top) through bone-discs with one hole (middle) (partly after Moosbrugger-Leu 1985).

production of beads, were used only in limited quantities. I suppose that complete ones were not systematically available in large quantities: apparently, it was not the butcher who separated these meat-carrying bones of cattle from the meat; rather, the whole went to the consumer and the broken and chopped bones eventually ended up in the consumer's garbage in backyards all over the medieval town. In contrast, the meatless metapodials and rami horizontali apparently were separated from the meat by the butcher and could be obtained in large quantities. If they did not go with the skin to the tanner and remained in the skin during the tanning process (cf. a.o. Serjeantson 1989), the bones had to be cooked for about one and

a half to two hours. Experiments showed the necessity of such a treatment to clean them from fat and strings and make them easier to process. After this treatment, the distal ends were chopped off around the foramen with a heavy chopper or axe (Fig. 5 and 6). Experiments showed that this was quite hard if the bones had not been treated.

A narrow chisel, about 12 millimetres wide, was used to split the remaining part of the metapodia. The chisel width is deduced from chisel traces on split metapodial shafts. Experiments showed that if a wider chisel is used, the shaft more often does not split along the desired axis. The strips then were roughly flattened with a draw-knife or a chopping-knife.

From the early 15th century onwards, pictures show various kinds of work-benches being used for the drilling process (Fig. 7). From the fact that the described breaking-ridges in the walls of the perfora-

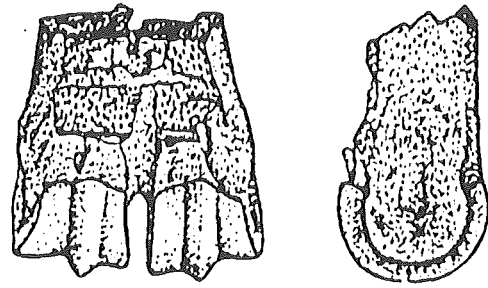


Fig. 5. - Chopped off distal end of cattle-metatarsal (Scale 3:4).

tions in the bone strips often are exactly on the same height, it can be deduced that the drilling-benches used in Constance and Strasbourg already in the early 14th century had a blocking device that prevented the drill from drilling beyond a certain depth, mostly halfway the bonewall (Fig. 8).

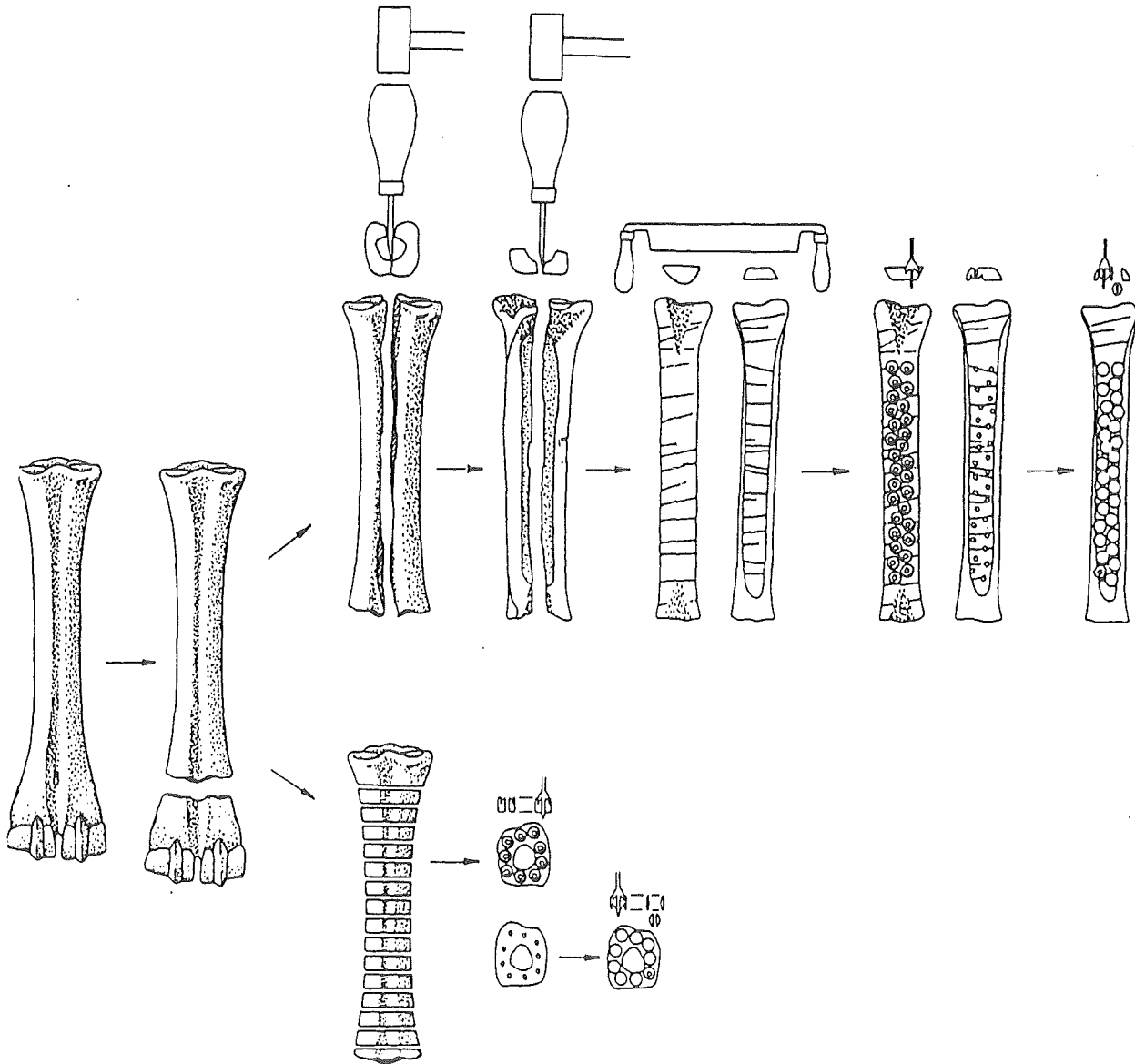


Fig. 6. - Schematic reconstruction of the production of beads and ringlets from cattle-metapodials.

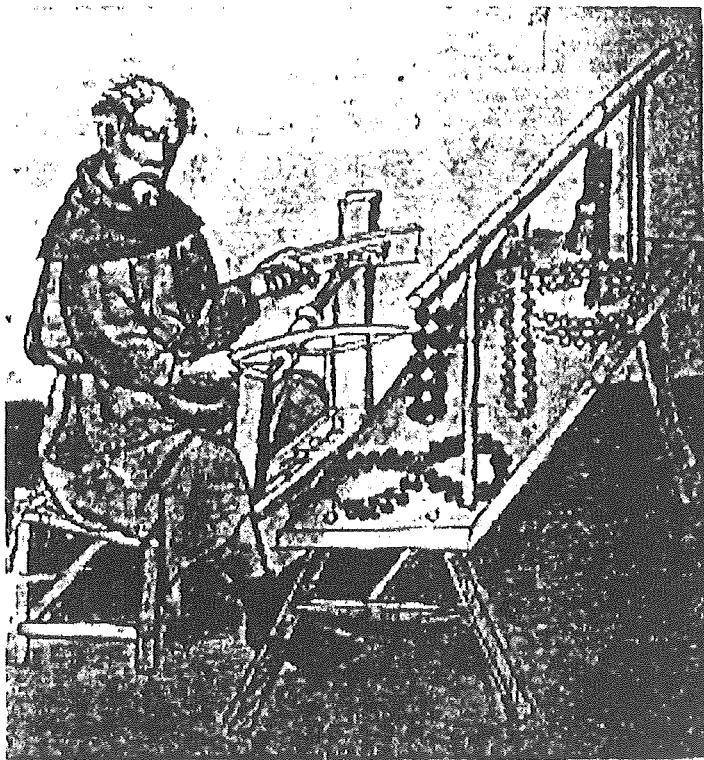


Fig. 7. - Drawing of a Paternostermaker with drilling-bench, Nürnberg, 1425-1436.

The Constance material can be divided in three different phases showing differences in the choice of raw materials and in the range of the products. They show a clear development in skill and in the way the objects were produced.

The first phase gives the impression of a small-scale production, for example as a kind of subsidiary occupation. Only ringlets with a circular section seem to have been produced (Fig. 9, nrs. 1-5). About one thousand perforated strip-fragments have been found, which is a rather small amount compared to the other phases. These strips were mostly made from cattle metapodials. It seems that there was a sufficient supply of them. Apart from these and to a small extent, all sorts of bones were used without there being any indication for a systematic choice. They may well have been taken from the household refuse of the producers themselves. Even bones which are quite unsuitable were used, such as the ramus verticalis of a cattle-mandible (Fig. 10.) or the rather thin part of an occipitale of cattle. The metapodials were split in such a way that not more than two strips could be made out of them, which were, however, as wide as possible (Fig. 11A). For drilling ringlets, it is more important that the bone strip should be wide rather than being as thick as possible. Quite often, the splitting-pattern caused the coalescence suture (*i.e.* the line where the two bone-halves of the metapodium have grown together) to be in the middle

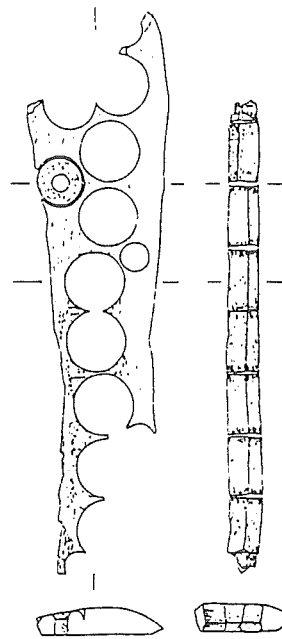


Fig. 8. - Perforated bonestrip with ringlet and breaking-ridges in the walls of the holes.

of the strip. This being a weak spot, the strips often split during drilling with the result that the waste strips of this phase include a relatively high number of incompletely drilled failed pieces.

In the second phase, however, the metapodials were split into four strips (Fig. 11B), which were not so wide; but the middle part was as thick as possible and never had a coalescence suture. Out of these strips, mainly beads were drilled: large quantities of small beads with a diameter of 4 to 5 mm. (Fig. 9, nrs. 8-9) as well as some larger ones (diameter 6 to 12 mm.: Fig. 9, nrs. 10-11). The change from ringlets to beads made it possible to get four times as many objects out of the same bone-surface, as beads have a much smaller horizontal diameter than ringlets (*cf.* Fig. 9, nr. 5-7). This means that the raw material was used more efficiently than in the first phase. The production also seems to have taken place on a much larger scale. The paternoster refuse of the second phase was found in immense quantities (no less than 350 kilograms, or about 150.000 fragments of perforated strips); it had been deposited in high concentrations in layers of several decimetres thick which in some cases consisted almost entirely of perforated bone strips. Just the excavated and dated part of this refuse already corresponds to a production of more than half a million beads and ringlets, which in a period of 10 years with 250 working days each amounts to 200 beads per day or one bead every three to four

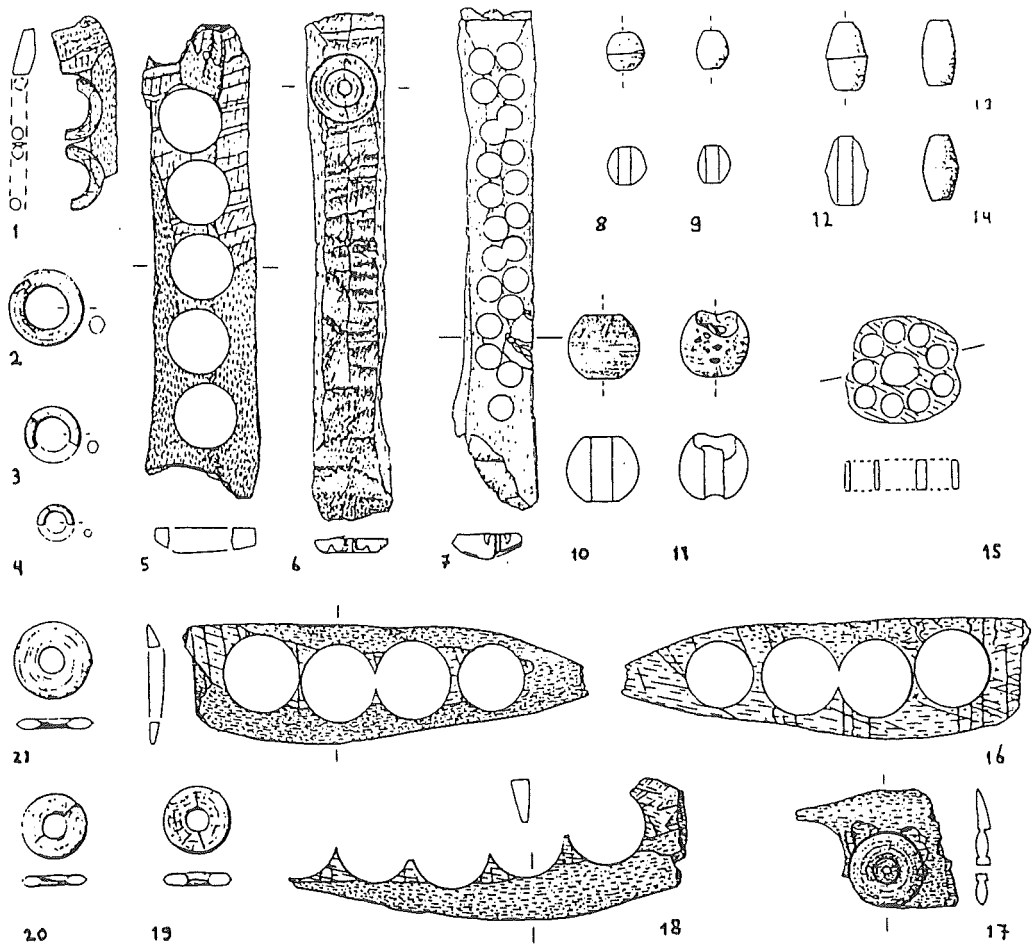


Fig. 9. - Bone-strips, beads and ringlets from Konstanz, Fischmarkt, Phase 1 (nrs. 1-6); Phase 2 and 3 (nrs. 7-15) and Phase 3 (nrs. 16-21). Scale 1:2, except nrs. 8-15 (scale 1:1).

minutes. If only metapodials were used for the production of beads in the way described earlier, about 10.000 metapodials would have been needed, to produce them². Spread over a period of at least ten years this would mean that at least 250 cattle had to be slaughtered per year. This number does not seem inordinately high for a medieval town of about 6000 inhabitants (Kirchgässner 1960). It seems, however, that the supply of cattle-metapodials had reached its limits. There is evidence for other workshops using cattle metapodials during the same period, such as a dice-maker: the refuse of this production was found in the same layers.

Apart from cattle metapodials, radius and tibia of cattle were used for bead-making as well as radius, tibia and metapodials of horse; these types of bone were all used to a limited extent but in quite a systematical way and they were not mixed with any other skeletal elements. All these bones were quite suitable for bead-production but apparently they were not readily available in large quantities (horses will not

have been slaughtered in such large numbers as cattle; for the cattle-zygopodium the reasons have been discussed earlier). Another way to use the available raw material more efficiently was sawing cattle and horse metapodials transversely in slices with a thickness of around 8 millimetres (Fig. 6, below and Fig. 12). The beads were drilled parallel to the length of the bone shaft, and tended to be longitudinal, *i.e.* they were higher than they were wide because their

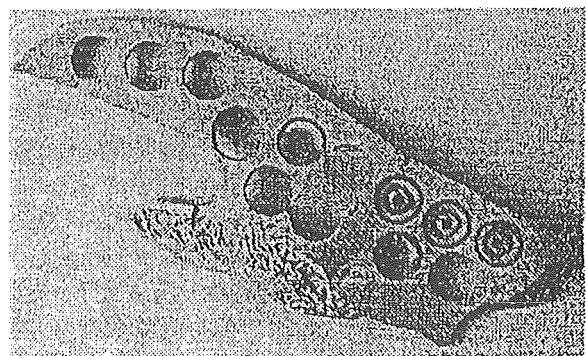


Fig. 10. - Ramus verticalis of Cattle, used to make ringlets, Konstanz, Fischmarkt, Phase 1.

² About 7000 metapodial ends were found in the same layers.

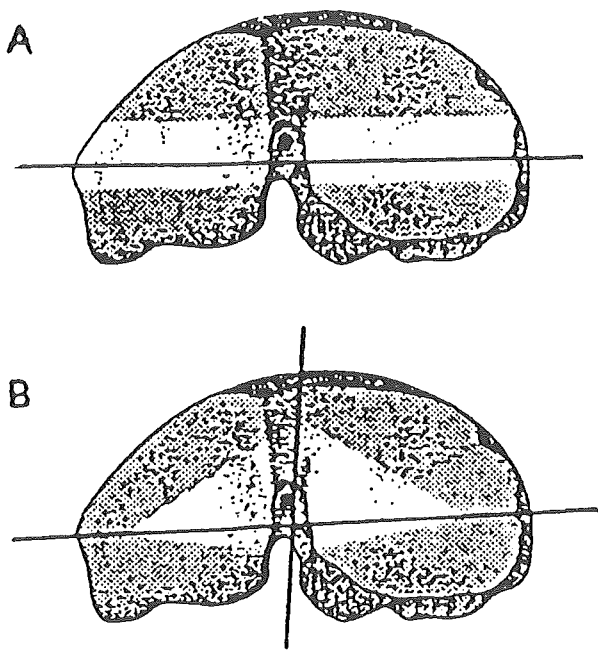


Fig. 11. - *Splitting-patterns (scale 1:1).*

width was limited by the thickness of the bonewall, while their length was in principle unlimited (Fig. 9, nrs. 12-15). This technique may have been more labour-intensive, but it did make it possible to get a larger number of beads out of a single metapodial. The refuse of this technique is only known from the massive finds of bone-bead production waste material found in Constance, Strasbourg and 's-Hertogenbosch.

Another sign pointing to raw material being in short supply can be seen in the fact that the strips were generally used up to the edge; this often caused ringlets to be left unfinished in the strip when it became clear that the compact bone wall was not thick enough to provide a complete bead.

The Constance material from this period gives the impression of an organised, professional workshop. It can be seen that the work was more systematised and segmented into standardised actions following regular, well-considered patterns.

It is tempting to link the sudden emergence of a mass-production, assumed to follow a sudden and explosive increase in demand, with the Council of Constance (1414-1417), which for some years made the population of the town four times as large as usual. A coin of this period is found in one of the younger layers of bone refuse of this phase. It is as tempting to link these heavily concentrated layers of strips of bone with the references in written sources, which mention a Cüntz Paternosterer between 1380-1391, located – together with Kirsten Würfler ('Dice-maker') – on a courtyard in an alley some 50 m above the find spot³. One can imagine Mr. Cüntz Pater-

nosterer or his mate Schrawli carrying the bone-refuse in a wheelbarrow downhill to dump it on the shore of the Bodensee. While textual sources indicate that they worked together, archaeology supplements this through a bone strip which has been split lengthwise in a first drilling process and which has subsequently been remodelled in order to make dice from it. The connection between phase 2 and the references to Cüntz Paternosterer in the written sources would not, however, provide an explanation for the sudden increase in demand.

The material from the third phase shows a sharp decline in terms of efficiency in the use of raw material, but it reveals a growing standardisation and control of the material. The diameter of the small beads increased and there are more large beads and ringlets, but also some flat cylinders and other objects. Sawing bones into transverse slices disappeared. At the ends of the strips, parts which could be useful often remained unused. Incompletely drilled failures are relatively rare among the strips of this phase. The cutting marks on the strips show a greater skill in controlling the cutting knife, as do the chopping marks on the distal metapodial ends. At the ends of the strips, irregularities were cut off which made it possible to position the strips in a more stable way during the drilling process.

While the range of different raw materials the range of products also increased. Only cattle metapodials were used as raw materials, together with lower jaws (*c* 30 % of the strips). In contrast to the jaws used during the first phase, the producer(s) did not use the complete jaw but only the flat parts covering the roots of the molar and premolar teeth; these parts were prepared according to a standardised pattern (Fig. 9, nrs. 16-18 and Fig. 13). Again in contrast to the first phase, irregularities on the inner and outer surfaces were flattened away to make it easier to determine the depth to which the first half had to be drilled (Fig. 9, nrs. 16 and 18). As these parts were too thin for the production of beads, only ringlets with flat section were made out of them (Fig. 9 nrs 17; 19-21).

What could be the reason for this large-scale use of lower jaws that is also encountered in Strasbourg? At the most, twelve ringlets could be made in this way from one jaw and therefore the lower jaws will not have increased significantly the production output in quantitative terms. Finds from the South German town of Biberach seem to indicate that the

³ The written sources about the paternosterer are extensively discussed by Höfler 1990. Meyer (1986, 51) quotes a mention of a 'paternosters-house' in the Tirolergasse 3/5.

flat ringlets could also have been used as bone 'skeletons' of textile-covered buttons (Spitzers in print).

It appears that the third phase shows a broadening of the range of products in reaction to a clear decline in the demand for prayer beads. The growth of standardisation and systematisation, however, continued. The refuse from the third phase provides indications that over a given period of time one and the same, simplified and standardised action was constantly and rather mindlessly repeated by one and the same person, like on a modern assembly line. How else can we explain a monstrously failed large bead (Fig. 9, nr. 11) which had not only been drilled from the second side (where it was clearly visible that no good bead could come out anyway) but was afterwards also polished before finally being thrown away? All this despite an observed increase in terms of skill.

So here we see how at the end of the Middle Ages, the first steps were taken towards a modern way of production. Rationalisation and organisation of the production process are not modern or 18th-century inventions.

To summarise the development described on the basis of the bone strips from Constance, it can be said that the factors of supply of raw material, of demand for products and of degree of organisation and rationalisation of the production process could be combined into an economic model. In the first phase the demand seems to have been rather limited, the supply of raw materials sufficient and the degree of organisation rather low. In the second phase the demand seems to have grown quite suddenly to such an extent that the raw material supply became less sufficient, apparently not having grown at the same pace. As a consequence the degree of organisation seems to have grown. In the third phase the demand seems to have declined again, leading to an overcapacity in terms of supply of raw materials and probably also in terms of labour, in reaction to which new products were sought. Nevertheless, the degree of organisation continued to grow, independently from the stress on the supply of raw materials.

The continuous growth in terms of skills and organisation, following a logical and coherent development, suggests that all three phases belong to one workshop. This, however, seems to be in contradiction with the dating of the accompanying glass and ceramic finds. The first phase, dated around 1300, comes from a soft layer at the bottom of the lake, where older dumps from the long period when the water was still open could easily have been mixed with younger deposits of bone refuse which marked the beginning of the filling up. The dating of phase two is rather unprecise and brings us somewhere in

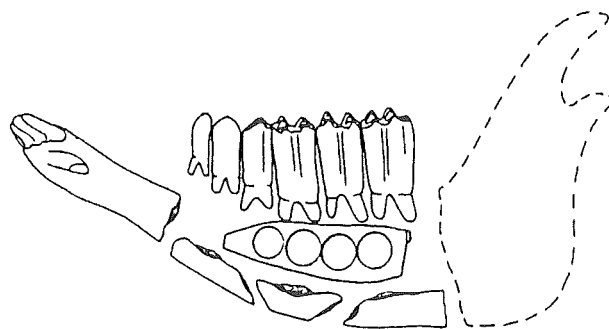


Fig. 12. - Waste-pieces from the working of ramus verticalis of cattle-mandibles as found (scale 2:3).

the later 14th to early 15th century, whereas the third phase can be dated more definitely to the second half of the 15th or the first quarter of the 16th century, *i.e.* the same period to which the early bone buttons were dated as well. If we ascribe the first phase to Cüntz Paternosterer and the sudden increase in demand to the period of the Council, a period of at least 70 years is covered.

Obviously, a lot of interesting information of a technical as well as of a socio-economical nature can be deduced from these peculiar bone strips. The present author would therefore be grateful for information from anybody who recognises such finds among his or her material.

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Except for Fig. 9, nrs. 8-15, Fig. 5 (3:4), Fig. 11 (1:1) and Fig. 12 (2:3), drawings of objects are on scale 1:2.

Fig. 1, 8 and 9, nrs. 6-12: drawing D. Bandemer. Fig. 3-6 and 9, nrs. 1-5 and 16-21; 11 and 13: drawing C. Bürger.

Fig. 7: *Das Hausbuch der Mendelschen Zwölfbrüderstiftung zu Nürnberg* (ed. W. TREUE e.a.), F. Brückmann KG, München, 1965 (Verlagsnr. 1232; Facsimile of Stadtbibliothek Nürnberg Amb. 317.2°, fol 6v).

Fig. 9, nrs. 13-15: Oexle 1985, resp. Abb. 726; 727 and 720 (p. 484 and 486).

Fig. 10 : Photogr. M. Schreiner, Arch. Landesmuseum Konstanz.

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The Production of Timber for Building in England before and after C. 1180 AD

Abstract

Recent archaeological work in the waterlogged zones of London's medieval core and elsewhere in England have revealed much evidence of how timbers were prepared for use in building in medieval times. Detailed, systematic field recording coupled to extensive tree-ring work has enabled the Museum of London Archaeology Service to document and closely date the techniques used. It is now clear that fundamental changes took place in large scale wood-working around 1180-1200 AD. At this time modified forms of old Roman techniques were reintroduced. The principal changes were; the readoption of sawing, and the new demand for more accurately squared timber for prefabricated building or "timber framing".

Definitions

In medieval England terms such as "timber" and "wood" had quite clearly separated meanings (in the medieval latin texts "*Merimum*", and "*Boscus*"). Timber was constructional material from a limited range of species, principally the oaks (*Quercus sp.*), but including beech (*Fagus sylvatica*) the elms (*Ulmus sp.*), and occasionally other species such as ash, the poplars, and sweet chestnut. Timber implied the main stem of a tree and occasionally heavy branches all over about 150mm diameter. The tops and smaller branches of larger trees and the small stems produced by ancient management methods such as "coppicing" and "pollarding" (Rackham 1976; Goodburn 1994; and O'Sullivan this conference) were all considered wood. Wood was used mainly for fuel, but also fencing and light construction work such as the infill panels in buildings with timber frames. Legally, in later medieval times, tenants might have rights to wood, a relatively cheap commodity, but highly restricted rights to timber. This medieval distinction survives in modern English expressions such as "firewood" which is never "firetimber". These

distinctions can also be seen in the waterlogged archaeological record, with a preponderance of wood being used in lower status construction, and timber reserved for higher status, more expensive work. These types of distinction appear to have existed in Late Anglo-Saxon times but were clearly more closely defined later in medieval times. Thus, it is useful to employ these definitions in archaeological study, in this case we are concerned only with timber rather than wood.

The terms "conversion type" and "conversion method" will be used specifically below, they are two aspects of the process of converting a rough log into a prepared piece of timber ie. a plank, a board, or a beam for building use. Conversion type refers to the section of the "parent log" used such as, half or a quarter log, and conversion method refers to how that work was carried out and with what tools eg. by sawing on one trestle with a rip-saw in a frame and two people, or hewing with a narrow bladed axe, single handed. Extensive work on the preserved timbers found in waterlogged deposits on English medieval excavations shows that many of the methods of conversion used are broadly dateable which is not true of conversion types (Goodburn 1992).

Not only are trends in these craft technologies datable but they also provide evidence of wider social and environmental change. The tools, technology and workforce required to carry out the different styles of work were often quite distinct (Goodburn 1992, 1995). The evidence considered here dates to the 10th, 11th, 12th, 13th, and 14th centuries, and mainly derives from the London region but the broad pattern can be seen in the smaller collections of material excavated elsewhere in England or for the period after c.1200, in surviving in early standing buildings. The generalisations that follow are based on study of literally thousands of timbers. This writer suspects that many other European towns have similar sequences of technological change in constructional woodwork although the details and dating may be rather different.

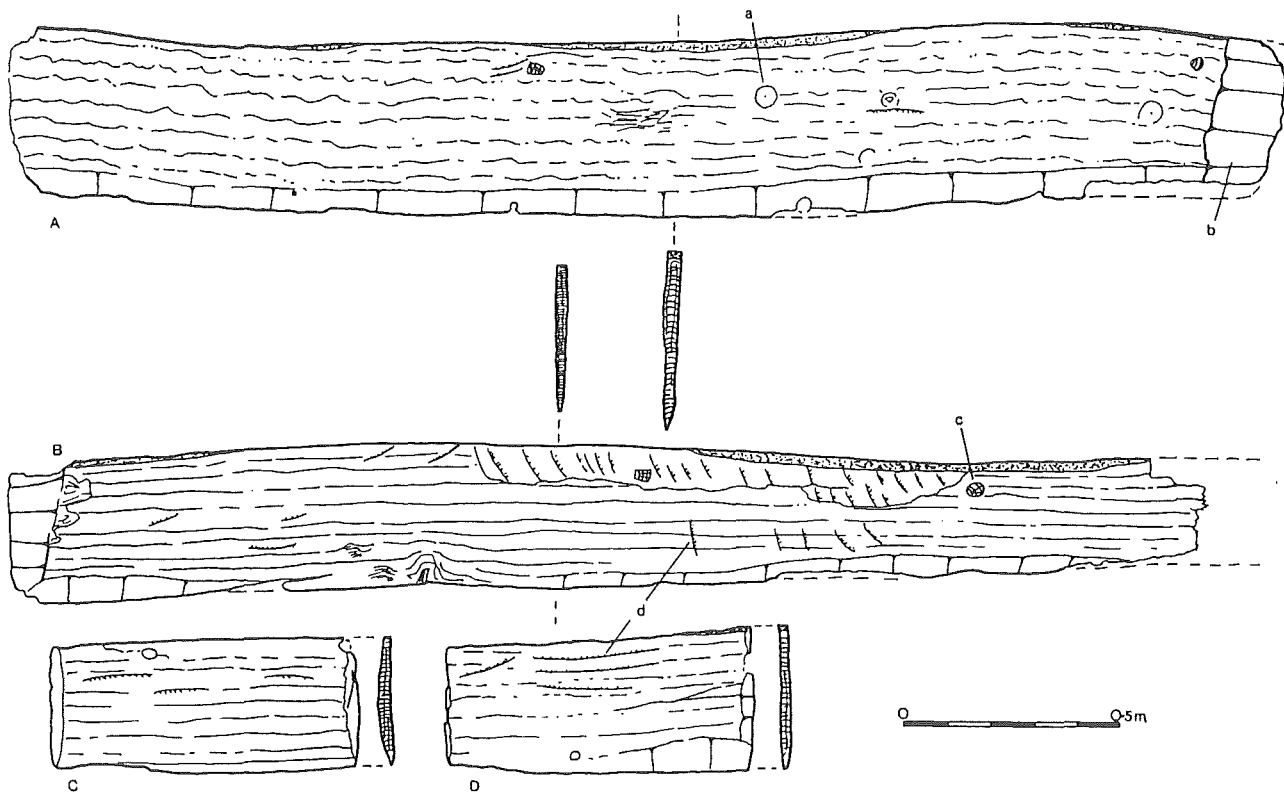


Fig. 1. - Radially cleft oak boards from a timber riverwall of 1181 at Bull Wharf, London: A) From a pollarded or shredded tree; B) From an old wildwood tree; a) Compass mark; b) Hewn splay to overlap next board; c) Oak peg; d) Axe marks; C) and D) Radially cleft oak boards reused from a building in a well of 918, from Cheapside, London.

A systematic approach

The work briefly summarized in this paper would be quite impossible without systematic field recording work often executed in very difficult conditions, waterlogged rescue archaeology sites are never comfortable! The approach used to carry out this timber recording process systematically is described in detail elsewhere and was developed in 1988 from the earlier ground braking work of G. Milne and others at the Museum (Milne & Milne 1982; Goodburn 1990; Spence (ed.) 1990). Essentially it relies on detailed drawing, backed up by the use of pro-forma record sheets, and supported by the guidance of a full time specialist in Ancient Woodwork (this author). Of most relevance to this paper is that the "type of conversion" used is recorded, together with any evidence of the "method of conversion" used, principally toolmarks.

The recognition and understanding of medieval toolmarks on timber has been greatly aided in the last few years by practical experimentation in early woodworking strictly governed by the archaeological evidence. Theories about the conversion methods typical at different medieval periods have been experimentally tested and the experimental toolmarks studied (Goodburn & Redknapp 1988; Goodburn 1992).

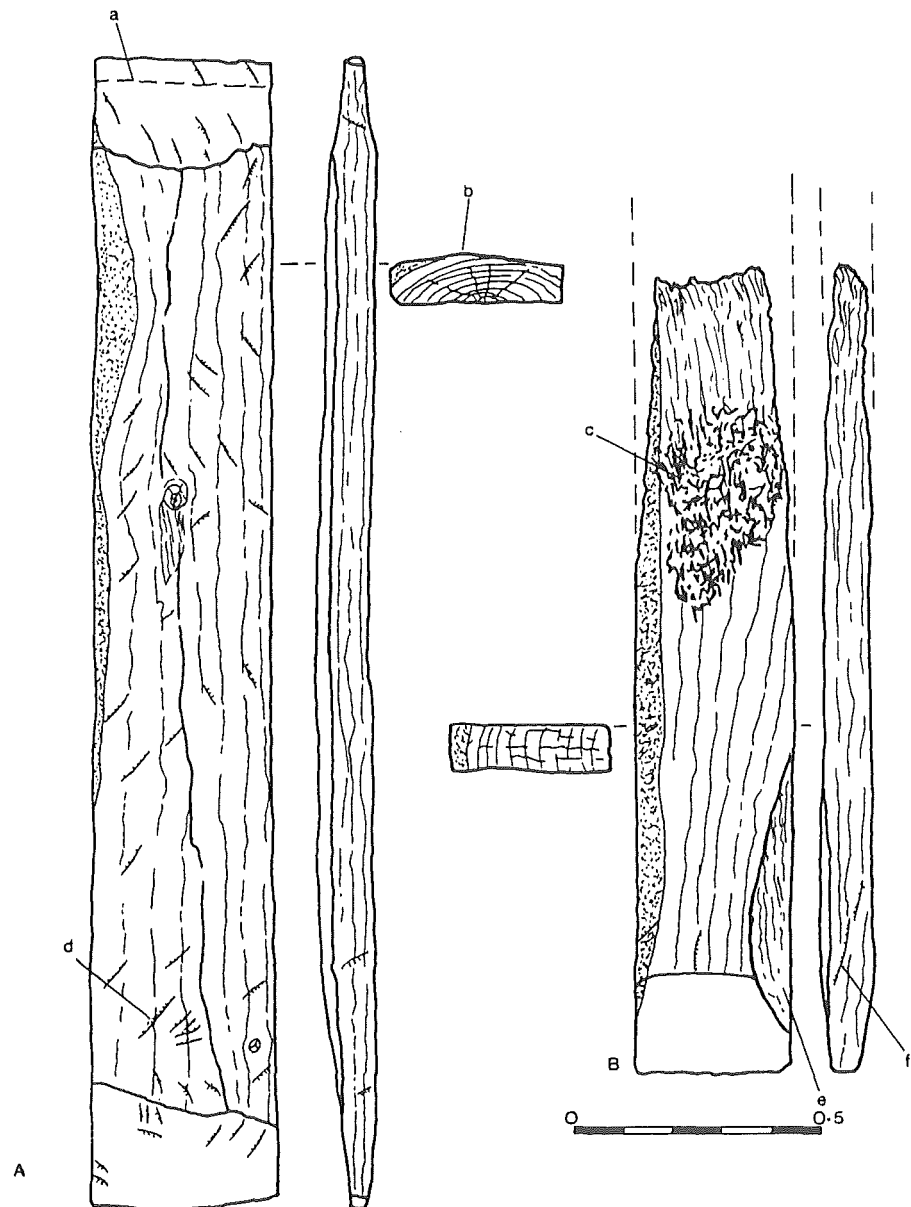
Until very recently the Museum of London was fortunate to have its own tree-ring specialist(s) which has been invaluable in many aspects of the study of medieval woodwork not just the dating. All these specialists have contributed supporting information to this work, I. Tyers, N. Nayling and the late H. Hibberd.

Timber conversion technology before C. 1180 AD

It would be reasonable to assume that with the Norman conquest of England in the 1060's many aspects of material culture would have changed. However, extensive excavation work shows this not to have been the case; in the woodworking field we can not distinguish Late Anglo-Saxon woodwork from that of the Norman period. Technology in other fields such as pottery production was also essentially unchanged, thus the term Saxo-Norman is commonly used by archaeologists for the 11th and 12th centuries. Close tree ring dating of changes in constructional woodworking shows that great changes did take place rather rapidly but not until the period about 1180-1200 AD (Milne *et al.* 1992).

Before the great change boards and planks were produced by the essentially prehistoric methods of

Fig. 2. - A) Thick oak plank hewn from a cleft half log from a bulwark style wharf front of 1145-6 at Bull Wharf, London. B) A thick radially cleft oak stave from a stave style wharf front of 1120-21 at Bull Wharf: a) stain from fitting plank in grooved post; b) hewn ridge; c) heavy charring; d) axe mark 130mm wide; e) as-cleft grain; f) broad axe mark.



controlled splitting (“cleaving”, “rending”, “riving”) usually followed by varying degrees of trimming with axes. The thinner boards were almost always cleft radially from oak, or less commonly beech, following the natural planes of weakness in the timber (Fig.1). This process required access to large numbers of tall straight grained trees with typical diameters of 0.8-1.2m at chest height, that must have grown in high dense woodland. Occasionally shorter managed oak trees were used towards the end of the 12th century where we have a clear case of the use of a stem from a type of pollarded oak for making cleft boards (Goodburn 1994 Un Pub and Tyers 1994 Un Pub, and Fig. 1.b). The resultant boards varied greatly in width but were typically 0.20-0.40m wide, occasionally up to as much as 0.55m wide and between 15mm and 60mm thick with more or less wedge-shaped cross sections. The significance of this is that the width of the finished board would com-

monly have only been about 40% of the diameter of the parent log. Often the section of the parent log used was only 1/32nd of its original bulk.

The logistics of this work with parent logs weighing around 1 tonne per/m length and roughly split boards a mere fraction of that weight, suggests that the conversion work was carried out where the tree was felled.

Thicker planks were made by cleaving logs into thicker slices, 1/8ths or 1/16ths, or by splitting a log in half and laboriously hewing and splitting off the large amount of waste. Many of these thicker planks were actually used as upright posts or beams in timber buildings, wharfs, bridges and similar constructions (Fig. 2). Sometimes a parent log varied in quality such that part of it could be split down into thin fairly even boards whilst other section could only be split down to thicker sections that might be used as posts. Here tree-ring matching of annual ring sequen-

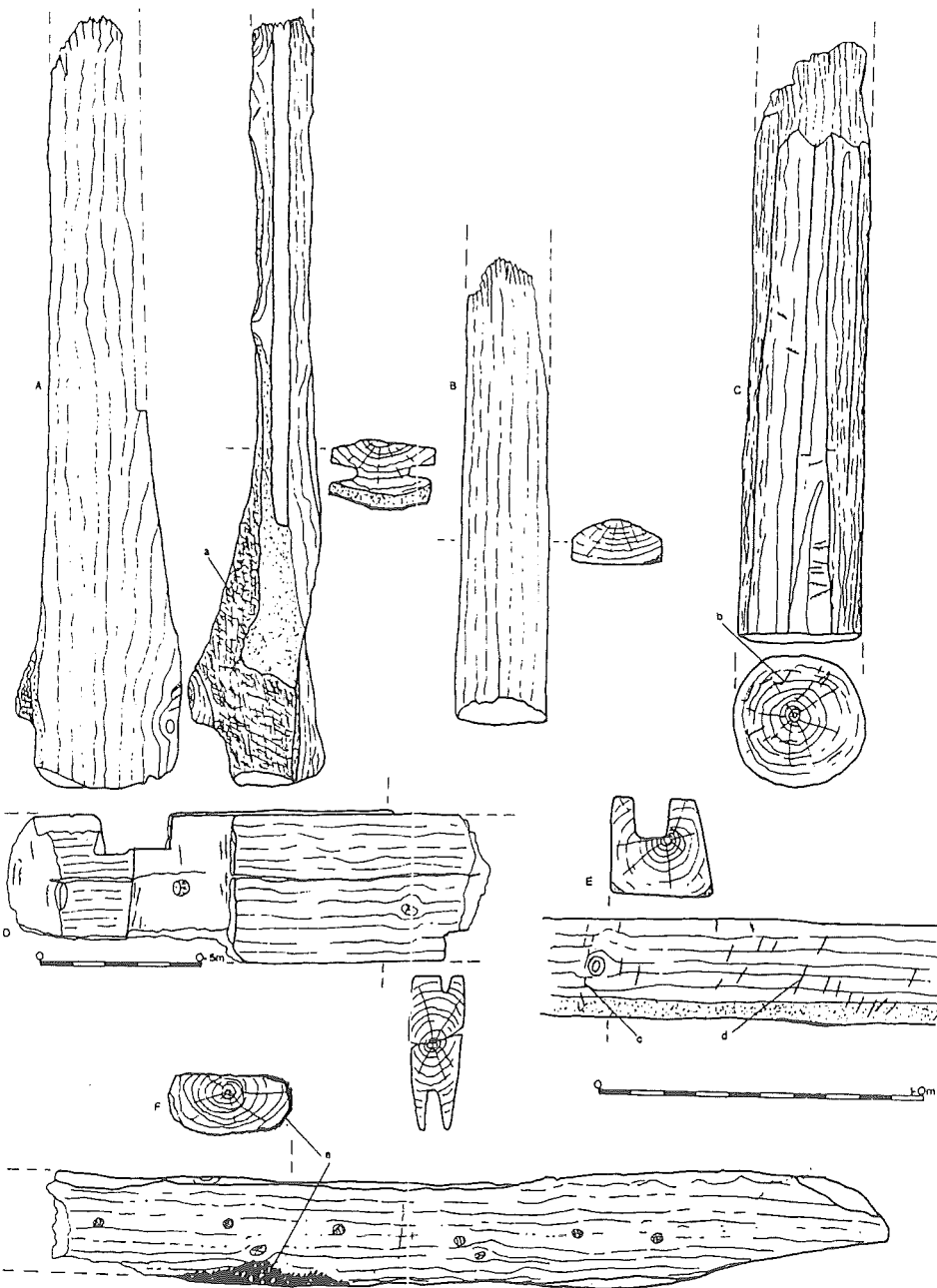


Fig. 3. - A) Oak post hewn from cleft half log from bulwark style wharf front of 1145-6 at Bull Wharf, London.

B) "D" shaped oak stave from earth-fast wharf front of c.1100 at Bull Wharf.

C) Faceted round oak building post reused in low wharf front of the early 11th century at Bull Wharf.

D) Beech wall plate from stave building, reused in building foundations c.1100 from Vintners Place, London, at larger scale than other timbers.

E) Oak sill (1119AD) from wharf front of 1120-21 at Bull Wharf.

F) "D" section oak beam from bridge over the river Fleet London, mid 10th century:

a) bark;

b) axe marks;

c) narrow axe marks from cutting notches in hewing;

d) axe mark about 120mm wide from initial smoothing;

e) heavy charring.

cies of different excavated timbers derived from the same parent log is very useful (Tyers 1994 Un Pub).

When more solid beam-section timbers were required they were either hewn from a large cleft, quarter or half log or hewn to a rectangular, lentoid, asymmetrical quadrilateral, or flattened "D" shaped cross section from a whole log (Fig. 3.). Sometimes logs were minimally hewn to a rounded "D" section particularly when used as joists or similar timbers (Fig. 3e.). In other cases superficially round natural logs were actually carefully hewn and shaved to a regular round section with the sapwood and bark removed, occasionally such timbers were even laboriously hewn from 1/2 logs (Fig. 3c.). Relatively rarely was natural, round, unconverted timber used, in urban structures at least.

Notes on the essential tools used before 1180-1200

The cleaving was principally carried out with hard wooden wedges with perhaps one or two iron wedges or an old axe to start the split. The wedges were driven with large wooden mallets or "mauls". The hewing of timbers, split or cut from whole logs was carried out in two stages, with the rough initial work typically being done with narrow bladed felling axes (blade widths about 65-70mm), followed up in many cases by smoothing with a broad bladed "T" axes (blade widths about 200-350mm, Figs. 1d, 2b.). Sometimes an axe type with a slightly rounded edge around 120mm -130mm wide was used instead (Figs. 2a,3e).

It is quite clear that the woodworkers did not set out to produce very regular straight, square, timbers

neither did their approaches to construction in timber require it (Goodburn 1992, 1993, 1995, and this conference). Lines for establishing straight edges, and squares for setting out right angles were rarely if ever used. Finally, timbers were not prepared to accurate uniform scantlings.

However, very recent work at the site of Bull Wharf (Goodburn 1996a Un Pub.) has shown that some timbers were being hewn to increasingly square and regular proportions from about the middle of the 12th century.

Timber conversion technology after 1180-1200 AD

Around 1180-1200AD on current dating, several very important new techniques in woodworking were adopted. The most important for our purposes were the readoption of sawing, and the production of more accurately squared timber for making fully prefabricated "timber frames" (Milne *et al* 1992; Goodburn 1995). In essence both these technologies were of Roman origin, but they were re established in slightly modified forms, and some Saxo-Norman techniques and tools continued in use.

Sawing planks and beams

It has often been assumed that recent techniques of sawing timber by hand in England were those used in medieval or even Roman times. That is, timber was sawn "in the round" over a pit, as was common from the 16th century onward. In fact at least two different methods were used from the end of the 12th century, with the addition of the more well known "pitsawing" from around 1400 AD. The earlier methods resemble those used in more recent times in other European countries such as France and Switzerland. They involved sawing baulks that had been hewn square first over one trestle ("see-sawing") or over two high trestles ("double trestle sawing" Brigham & Goodburn *et al* 1995). The method of sawing can be reconstructed from the patterning and angle of the saw marks left on the timbers which run from each end at a slope and cross over each other. There is usually also a step in the surface of the timber ("saw kerf join scar") where the the two saw cuts do not perfectly line up. The earliest post-Roman sawn planking known to this author dates to a few years before 1200 AD as it was clearly secondhand and weathered when reused in a timber river wall around 1200AD at Thames Exchange (Milne *et al.* 1992, 134). Many only slightly later examples have been found on a number of sites in London which had

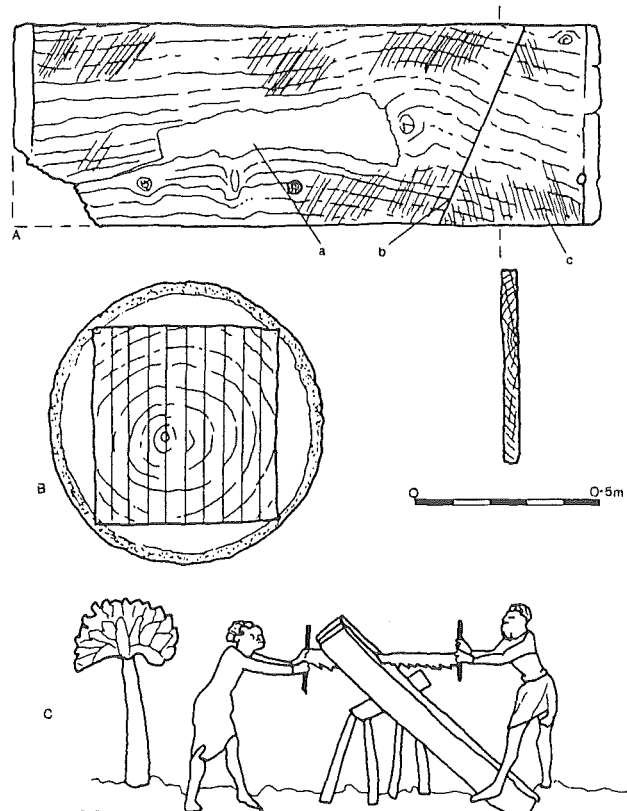


Fig. 4. - A) A see-sawn oak plank used in a timber river wall of the mid 13th century at Vintners Place, London: a) lost during demolition. b) step of 6mm, where saw cuts joined. c) saw marks. B) The hewn parent saw baulk for the plank. C) 14th century English manuscript illumination, showing see-sawing, after Harvey 1975.

clear surviving saw marks showing that the "see-saw" method was used starting with a hewn square baulk (Fig. 4). This method was also used a little later in the 13th century and more especially in the 14th, for producing matched pairs of rectangular section ("boxed halved") beams. Timbers produced in this way can be seen in many medieval and early post-medieval buildings, in England, Denmark and France if not elsewhere. By about 1400AD on current dating the pitsaw method appears to have been introduced and was also used for halving square baulks (Fig. 5b). The evidence for double trestle sawing is less clear but some reused timbers of early 13th century date have been found in London that appear to have been produced in this way (Goodburn in press).

The trestle methods required the lifting of baulks of timber up to 2 tonnes or even more with all that implies. It was also now possible to prepare much more regular planking, trestle sawn planks of oak were between 0.25-0.80m wide and 35-75mm thick. However, typical material was usually 0.45m wide 35mm thick and perhaps 3m long.

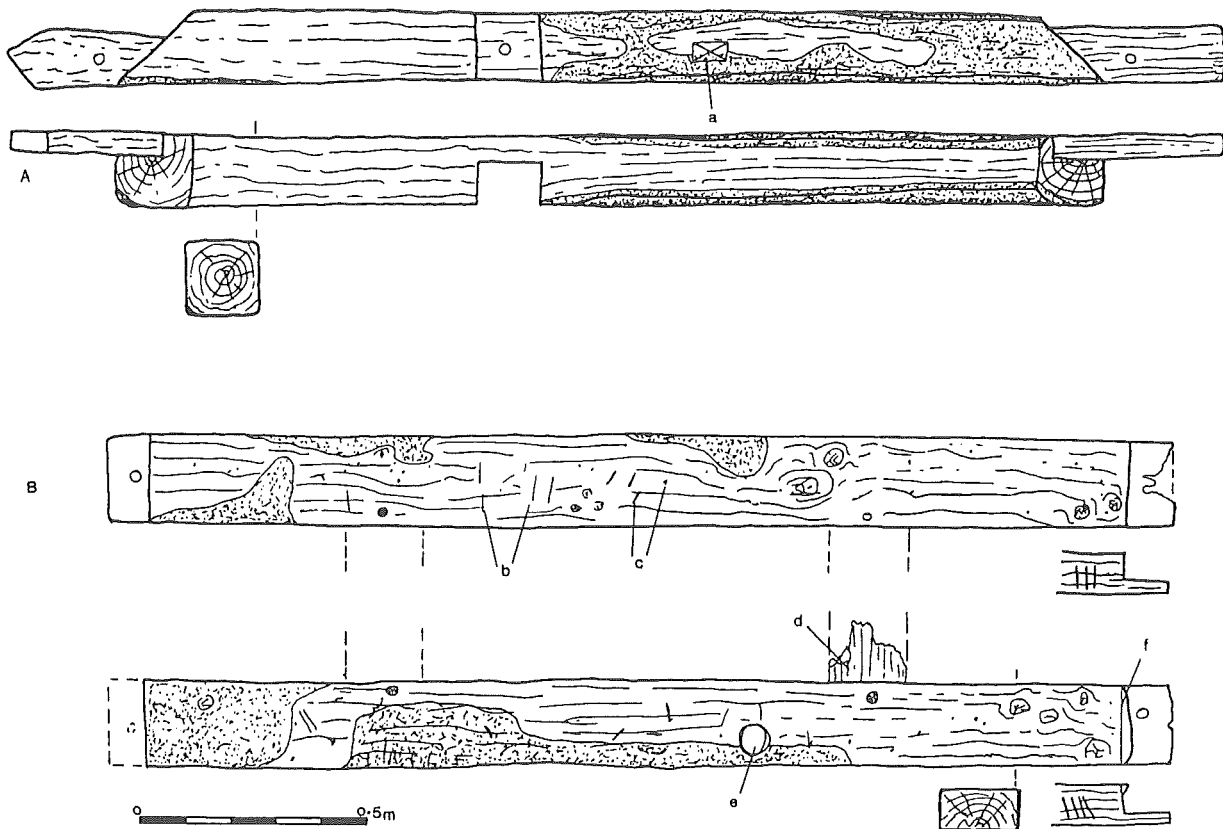


Fig. 5. - A) Square hewn oak timber from timber framed jetty of 1228-9 at Thames Exchange, London: a) scribed "hewing mark". B) Two oak floor joists from St. Ethelburgas church Bishopsgate, London. Both pit sawn from the same hewn beam c. 1400; b) axe marks; c) iron floor board nails; d) hatch beam fragment; e) bell rope hole; f) scribed line for joint cutting.

Hewing all square and true

From the very end of the 12th century we start to find oak and beech timbers in London and elsewhere that have been hewn straight to rather accurate square or slightly rectangular cross sections from whole logs ("boxed heart": Goodburn 1996b; Watson this conference). These timbers were usually mortice and tenon jointed into wholly prefabricated frames (Fig. 5). The earliest closely dated examples are beech sill beams from a riverwall next to the south end of London bridge which have tree-ring felling dates of 1197 AD (Goodburn Un Pub 1996b). The earliest well dated square and true beams found in our oldest standing buildings date to around 1200 or just before, the best known examples being in the Cressing Temple Barley barn Essex (Andrews (ed.) 1993).

The same basic tools were used for hewing such beams as in the earlier period; a heavy narrow axe, for cutting notches in the waste, and splitting it off and a broad bladed axe for smoothing and truing the surfaces. However, the regularity of finish, and accuracy of the work was of a quite different order, involving the use of lines, plumb bobs and squares, together with a whole series of "carpenters marks" which are not found earlier (Fig. 5a).

Some wider implications of these changes in timber conversion technology

Social and economic implications

At the level of social organisation it is clear that specialist woodworking craftsmen who rapidly formed guilds, emerged at the end of the 12th century. The infrastructure required for some aspects of the work such as, producing planks for building was quite different by the mid 13th century from what it had been in the mid 12th. In the earlier period the whole process could have been carried out by one worker with one or two axes and some simple, easily made wooden tools. After the introduction of the new technology some cleft board was still produced under these circumstances but much was sawn out requiring many specialised tools, lifting gear, large trestle(s), carts, and a larger work force.

Implications for the natural environment

There were also close links to the types of woodland that could be harvested for raw materials, cleft timbers of any size were much easier to produce from

large tall, straight, large trees growing in "wildwood conditions". This essentially un managed woodland appears to have become extinct during the 13th century (Goodburn 1994). The remaining trees and woodland were then managed intensively more to produce fuel wood rather than fine timber. This meant that smaller knottier trees typical of later medieval forms of managed tree-growing land (often derived from trees in farm land) became dominant. Conversion of planks by sawing is much better suited to these forms of trees, and rapidly took over. Much of the cleft board that was still used in later times in England was now imported from the oak wildwoods of eastern Europe (Bonde this conference).

Many of the beam section timbers used after ca 1200 were hewn from increasingly young oaks that would rapidly re grow after 30-50 years in managed woodland, whereas in the earlier periods they had often been prepared from timbers cleft from large, ancient trees over 250 years old.

Implications for the built environment

Finally, the new technologies suited the new timber framing approach to building which dominated building in timber in England from the first few decades of the 13th century. Walls and floors could now be made truly flat, often for buildings of several storeys, as fitted the growing, densely populated English medieval town.

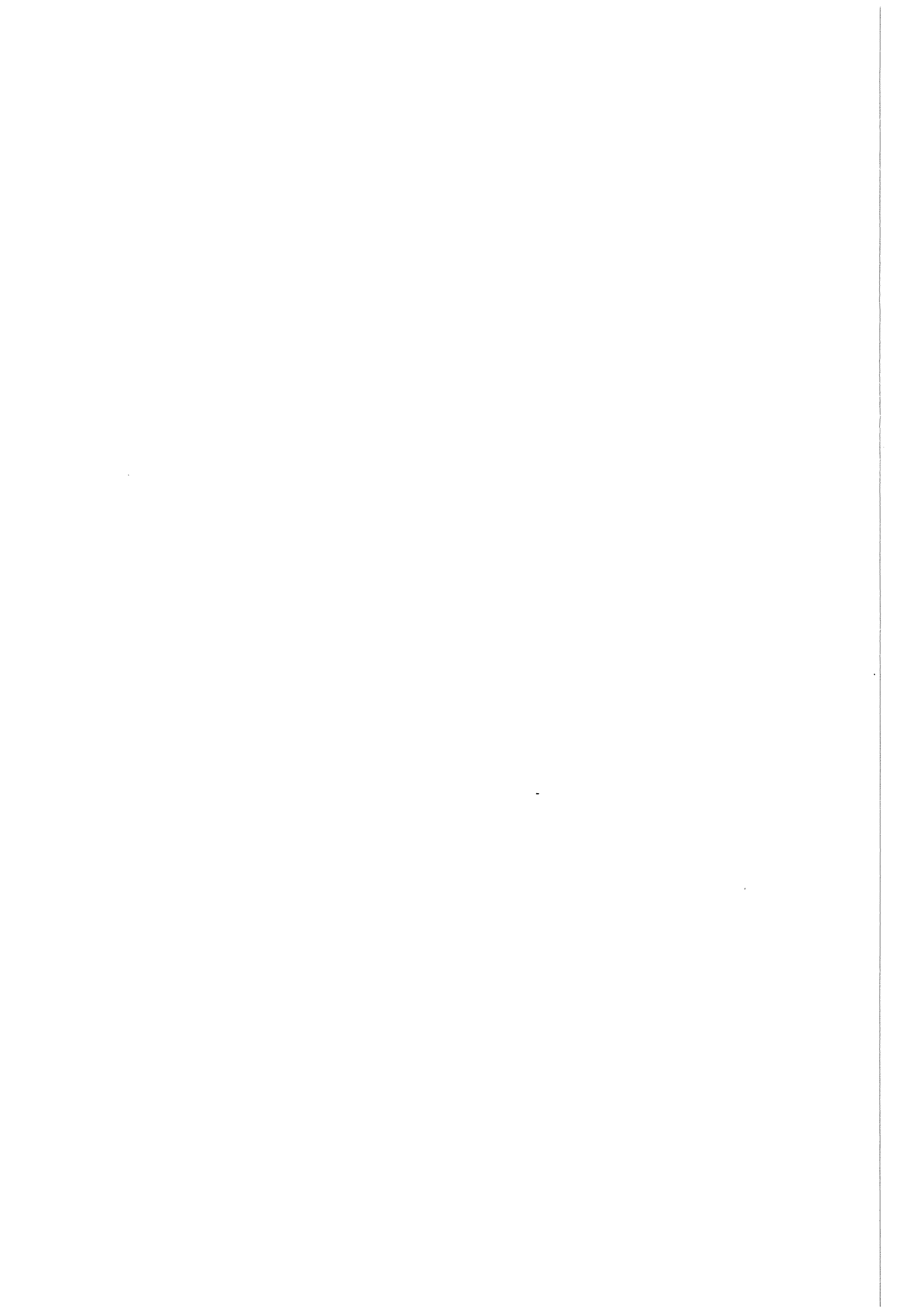
Acknowledgements

This summary paper could not have been produced without the detailed recording work carried out on site by many MOLAS staff, especially R. Bartkowiak, and J. Minkin, and the help of the site supervisors such as J Ayre, R Wroe-Brown and others. This line of enquiry has also benefitted from the encouragement of G. Milne and R. Malt and debate with I. Tyers. and others.

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La représentation des gestes techniques à la fin du Moyen Âge: l'exemple des métiers du textile Première approche

Les métiers du textile à la fin du Moyen Age ont de longue date fait l'objet de belles et nombreuses études. Les historiens des techniques, avec Walter Endrei, ont reconstitué en grande partie leur évolution et proposé des chronologies de plus en plus fines des inventions comme le rouet. Les archéologues ont complété, nuancé ces travaux grâce aux vestiges retrouvés, même s'ils sont parfois difficiles à interpréter. Les uns et les autres se sont tournés vers les images. Les premiers les utilisent comme témoins de l'apparition puis de la propagation de techniques nouvelles, les seconds pour mettre en scène les objets. Les outils, les techniques et les gestes sont donc connus, mais ces informations n'épuisent pas le contenu des représentations des métiers du textile et n'éclaircissent pas leurs fonctions. L'enjeu est de taille puisque dans la culture médiévale les arts mécaniques circonscrivent des champs de connaissances pratiques maintenues en dehors du savoir organisé. L'image pourrait assurer une diffusion plus large de ces savoirs, indépendamment de la transmission orale et initiatique des connaissances du maître à l'apprenti. Seule une étude de très grande ampleur rendrait possible une réponse ferme, ce travail n'a d'autres objectifs que d'en souligner la nécessité.

Pour l'heure, mon propos, plus modeste, est double: à partir d'un sondage (164 miniatures) concernant plutôt l'espace français et les trois derniers siècles du Moyen Age, rappeler ce qu'un historien des images peut attendre de la figuration des gestes techniques et apprécier leur valeur documentaire. Les enlumineurs privilégient filage et tissage (I) et les gestes techniques sont mieux observés que pendant la période précédente (II). Mais du geste mal représenté au geste parfait du professionnel, l'éventail de possibilités est fort large (III).

I Deux activités emblématiques: filage et tissage

Jamais le processus de fabrication d'un produit textile n'est décrit en entier, étant donné le nombre et la complexité des opérations qui entrent en jeu. Les

plus simples et les plus emblématiques, filage et tissage, l'emportent sous leur aspect domestique, même si les techniques figurées sont diverses.

A Les techniques

Une proportion considérable d'images, 72 %, est consacrée au filage. Les procédés anciens sont les plus utilisés. La quenouille courte des Romains n'apparaît pourtant que deux fois, quant à celle sur pied, considérée comme un progrès, sept fois seulement. La longueur des autres varie mais l'instrument est rarement présenté en entier et nombre de figurations dénotent une rapidité d'exécution dommageable même en dehors des marges. La forme et la section de la quenouille, la couleur de son bois, qui est parfois peint, ne changent pas à l'intérieur d'un même manuscrit, mais de l'un à l'autre. Les menus améliorations, attestées très tôt (un bout aminci et des encoches pour faciliter le maintien de la fibre) sont difficiles à déceler. Le travail de la laine est plus volontiers évoqué que celui du lin ou du chanvre. Les images donnent des informations sur la différence de nature, de couleur et d'épaisseur des fibres. Celles du lin, les plus longues, se présentent sous forme de nappe enroulée autour de la quenouille, parfois enveloppée d'un tissu et liée par un lien de couleur. Les brins de laine sont parallèles à l'instrument. Longs, ils sont attachés en deux points seulement, courts de façon plus étroite ce que l'enlumineur traduit par une spirale. La variété des cordonnets est révélatrice de pratiques que les textes laissent mal deviner, même si le détail relève aussi du style. Le choix d'un simple bout de laine ou d'un lacs rouge ou noir, d'une attache ou d'un cône enfilé au bout de la quenouille dont la couleur est assortie à la robe de l'ouvrière, peut être l'indice d'un état d'esprit. La fileuse est plus ou moins soucieuse de la qualité de son travail, de ce qu'il lui rapporte. Elle travaille avec regret voire pour se mortifier ou au contraire elle est fière de sa compétence, de son outil, ou simplement coquette. La longueur du fuseau passe du simple au

double par rapport aux personnages. Il est encore difficile en l'état des recherches de repérer dans ces variations des pratiques régionales distinctes des traits stylistiques. La diversité est aussi grande pour la taille et la forme du peson qui maintient le fuseau en mouvement et empêche le fil de glisser. L'image ne permet pas de saisir sa nature: en bois pour la laine, ou plus lourds, en poteries, en pierres, pour le lin. La figuration des rouets est rare, même s'ils sont attestés dès le XIII^e s. Les tours ou roues à filer sont encore au XV^e s. les plus représentées. Pourtant ce filage est difficile, il demande un grand entraînement et une laine bien cardée ou peignée car les fibres doivent s'arracher du bout des doigts de la main gauche sans jamais se rompre. Le nombre de tours de roue par rapport à la longueur de la laine à filer est fonction de la grosseur du fil et de la torsion souhaitées et doit être maintenu pour obtenir un fil régulier, autant d'éléments dont l'image ne peut rendre compte.

Parmi les opérations rarement figurées, le cardage est préféré au peignage réservé aux meilleurs produits. Le cardage est utilisé pour les fils de trame et les laines de qualité moyenne. Les peignes sont de longueurs différentes selon la qualité du fil à obtenir, les plus grands sont pour les filés d'estaim, ou fil de chaîne et les laines à longues fibres. Les deux techniques sont quelquefois associées dans une même scène. Elles assurent le desserrement des brins, leur redressement ou la mise en parallèle des fibres et précèdent le filage. Le dévidage, qui le suit, s'opère avec des dévidoirs à main peu sophistiqués, malgré un rendement et une qualité du travail inférieurs.

Le tissage est sept fois moins représenté que le filage. L'opposition procédés archaïques – pas forcément inadaptés – et nouveaux, recoupe d'autres clivages. Les métiers à tisser verticaux ou horizontaux, simples ou à plusieurs pédales sont rares. Le tissage à la main l'emporte peut-être par référence à la volonté du tisserand de s'en tenir à des habitudes éprouvées ou plus encore, à cause de la difficulté pour l'enlumineur de figurer un instrument de travail complexe. Le tissage à la planchette ou à la tablette est associé aux travaux délicats, précieux et de petite taille, galon, ruban qui l'emportent sur les grandes pièces tissées sur les métiers à pédales par des professionnels. Les représentations les plus nombreuses sont celles de la Vierge qui travaille dans le Temple. L'importance du bâti du métier et sa qualité sont en proportion non avec le travail réalisé, mais avec la richesse des autres éléments du décor dans l'Annonciation du *De Vita Christi*. Les métiers à tisser les plus récents sont aux mains de tisserands professionnels. Dans tous les cas, le métier est adapté à l'utilisateur et à la taille du produit fabriqué. Le tisserand est assis de telle sorte que les bras pliés à angle droit,

les mains trouvent leur place sans trop de peine sur le plan de travail, la nappe de tissage. Pour rendre le geste plus lisible et permettre au lecteur de voir le produit en cours de fabrication, les enlumineurs adoptent le parti de situer ce plan de travail plus bas, ce qui disparaît dans le cas des représentations de profil. Dans le métier à tisser à pédales étroit, la largeur est déterminée par celle des épaules de l'utilisateur. Les réglages et les réparations ne sont pas montrés.

B Les conditions de travail

Jusque fort avant dans la période, le lieu de travail est simplement suggéré et pas toujours de façon convaincante en raison de l'embellissement à portée symbolique. Les images opposent activités de plein air et d'intérieur. D'après les textes et les données archéologiques, le filage au fuseau se pratique à domicile et au rouet chez le drapier. Dans les documents figurés, le filage s'exerce à l'extérieur, en plein champ, près de la maison, ou au foyer, à l'intérieur de la pièce principale, près de la fenêtre, du feu, de l'établi du mari ou dans son atelier, ou encore dans la chambre. Cette activité n'est pas toujours considérée comme l'essentiel. En effet, la dextérité et l'expérience des ouvrières sont telles que le filage au fuseau accompagne d'autres occupations dont il n'est pas certain qu'elles soient annexes ou secondaires: surveillance du bétail, en particulier des moutons, allaitement, garde des enfants en bas âge et moins souvent jeux avec eux, apprentissage des petites filles, bavardages galants et entreprise de séduction, sans exclure discussions politiques, conversations édifiantes, pratiques de dévotion, chants, voire même lecture dans le cas de Zénobie! Le tissage, associé aux travaux d'hiver, se fait à couvert, mais la diversité des espaces représentés est considérable: temple, palais princier, modeste mesure etc.

Au XV^e s., les enlumineurs rendent compte d'un certain nombre d'améliorations. Le plan de travail est bien situé par rapport à la lumière, à bonne hauteur, les accessoires sont à proximité, parfois à portée de main, panier avec fuseau, bobines ou navettes, pelotes et pour le filage, coupelle pour mouiller les doigts. La qualité et la hauteur de l'assise, rocher, banc, tabouret etc. traduisent un souci modeste de confort, bien compréhensible eu égard au nombre d'heures de travail effectuées. Aucune touffe de laine peignée, aucun bout de fils ne traînent sur le sol. L'enlumineur néglige ce détail par volonté de simplification, souci esthétique, peut-être pour rappeler les pratiques liées aux exigences de la clientèle ou plus sûrement le caractère assez coûteux des matières premières.

Filage et tissage restent des travaux pénibles, même si les femmes enceintes les pratiquent. Ils requièrent une grande habileté et les femmes y ont acquis une réelle compétence. La féminisation massive dans les images tient au choix du filage, à la nature des textes illustrés, aux personnages mis en scène, mais relève aussi dans quelques cas ou elle ne s'impose pas d'un propos délibéré et peut participer d'une entreprise de dénigrement affectant la profession, et au-delà les métiers du textile et les arts mécaniques en général. La dépréciation pesant sur Hercule ou Sardanapale, qui participent à ces activités féminines, n'en est que plus grande. Pour une même opération, le travail individuel est privilégié par rapport au travail collectif, la Vierge file seule alors que le texte évoque dans certains manuscrits ses compagnes, de même parfois Sardanapale malgré la mention systématique d'une activité identique de ses concubines. Quand plusieurs opérations sont évoquées, l'enlumineur peut représenter deux niveaux techniques pour chacune ou les suggérer en figurant par exemple des cardes à côté d'un ouvrier peignant la laine. L'une des *Minyades* file au fuseau pour le fil de chaîne, l'autre à la roue à filer pour le fil de trame, la troisième met le fil en écheveau avec un dévidoir.

II Des gestes mieux observés

Le souci de rendre avec fidélité les gestes techniques ne paraît pas lié à la nature du texte, à son contenu, mais à la date de réalisation, au talent et aux qualités d'observation de l'artiste, à l'intervention éventuelle du commanditaire. Un motif aussi ancien et banal qu'Eue en train de filer peut donner lieu à une description exacte et précise. Dès le XIIIe s. l'enlumineur sait montrer les bons gestes et la position exacte des doigts, sans éprouver toujours le besoin de le faire. Mais la tendance à mieux rendre compte de la diversité des gestes, comme des techniques et des produits, est nette sur la longue durée. Les enlumineurs retiennent pour chaque opération, les gestes qui expriment le mieux la durée ou au contraire les plus spectaculaires. Ils décomposent le mouvement et peuvent en figurer dans une même image deux phases distinctes.

A Les doigts et les mains

Les trois opérations du filage sont représentées. D'abord une petite quantité de fibres est étirée et rassemblée en ce qu'on appelle la mèche. Cet étirage des fibres se fait toujours à la main. La quantité de fibres

prélevée sur la quenouille est plus importante pour le lin que pour la laine. Tous les doigts sont mobilisés pour tirer vers le bas une touffe mousseuse de lin, par contre seuls le pouce et l'index saisissent quelques fibres allongées de laine. Puis la mèche est roulée, retordue par torsion des fibres entre elles, le fil affiné. La quenouille se vide rapidement lors de la production d'un gros fil et lentement pour un fin. La torsion en Z, c'est à dire dans le sens des aiguilles d'une montre est utilisée pour les fibres longues de la chaîne, le pouce est bien visible ce qui n'est plus le cas pour la torsion en S, à l'inverse du sens des aiguilles d'une montre pour les fibres courtes de la trame. Il reste difficile de déterminer la nature de la torsion et plus encore de mesurer son degré qui varie de 15 à 50 % pour celle en S. Les images rappellent du moins que la torsion peut se faire de plusieurs façons. Les mains seules peuvent être utilisées, l'étirage et la torsion sont faits alors l'un après l'autre. Le deuxième procédé est le fuseau. Dans une Bible du XIIe s., il est utilisé par Noémie, maillon indispensable dans la généalogie du Christ, considérée comme mère de l'Eglise. Sa main gauche fournit sans cesse de la matière à filer en l'étirant du paquet de fibres, la droite qui tient le fuseau entretient la rotation et se meut en biais vers le haut. Le fuseau est tenu incliné devant le corps et le fil obtenu est enroulé sur la partie supérieure. La méthode la plus représentée est le filage à la quenouille et au fuseau librement suspendu. La position des doigts permet de distinguer plusieurs moments, d'une part l'amorçage ou les réamorçages du fuseau d'autre part le fonctionnement en quelque sorte à plein régime. La quenouille sous le bras gauche, la fibre est étirée de la main gauche et le bout du fuseau est tenu entre l'index et le pouce de la main droite pour donner l'impulsion qui le met en rotation (premier groupe d'images). Grâce à l'inertie de sa propre masse augmentée de la fusaiolle, le fuseau tourne pendant un certain temps et retord le fil en l'étirant. Le filage se poursuit en donnant continuellement un petit nombre de fibres pour le fil en train de se tordre. L'index et le pouce de la main droite pincet le fil pour arrêter la remontée de la torsion depuis le fuseau (deuxième groupe). Quand le fuseau atteint le sol (troisième groupe) cela suffit pour évoquer la phase suivante, qui n'est pas montrée. La fileuse relève le fuseau, enroule le fil obtenu sur sa partie supérieure et le fixe à l'aide d'un crochet d'une entaille ou d'une boucle, le travail peut alors recommencer. Le fuseau présente d'abord un petit renflement excentré, quand le travail est plus avancé un double renflement, et enfin quand il est plein, un renflement central bien bombé. Il peut alors révéler un zèle excessif, alors que vide ou peu rempli il est l'indice d'une paresse condamnable ou dans le cas de

Sardanapale ou d'Hercule d'une moins grande habileté de l'ouvrier. Le fil est de surcroît mal enroulé.

La première phase de l'opération avec la roue à filer consiste à étirer les fibres, à les calibrer et les retordre. Elle est la plus représentée. Le fil est formé de la main gauche, son extrémité est fixée à la pointe du fuseau. La fileuse tient le fil obliquement écarté de cette pointe. Le bras gauche qui permet d'étirer et de retordre les fibres est à environ 45° par rapport au fuseau. La fileuse actionne la roue motrice à l'aide d'une manivelle de la main droite, la roue tourne vers la droite. Lorsque le morceau de fil atteint une longueur telle que la fileuse ne peut plus étendre davantage le bras vers l'arrière, cette première phase est terminée. La fileuse entame alors la seconde. Elle met le fil à angle droit sur le fuseau et fait tourner la roue motrice, en sens inverse, vers la gauche, et le fil s'enroule de lui-même sur le fuseau. La position du bras pendant l'enroulement du fil est à 90° par rapport au fuseau. Pour le rouet, les fibres sont tirées de la quenouille par la main gauche et la torsion par le fuseau est commencée par la main droite. Le reste du corps participe à cette activité.

B La position du corps au travail

L'énergie déployée et le degré de mobilisation des muscles dépendent étroitement des qualités de l'instrument utilisé. La cardé est fixée entre les genoux et le cardeur tire des deux mains. Avec la cardé supérieure la nappe de fibres est étalée sur la cardé inférieure. La disposition régulière des pointes métalliques des cardes varie selon la nature de la matière première (fibres longues ou courtes) la qualité du résultat à obtenir et détermine une traction dont l'enlumineur éprouve des difficultés à traduire l'intensité. Le corps est penché en avant sous l'effort.

La position de la fileuse tient aux caractéristiques de sa quenouille, à la technique utilisée, à son degré d'habileté et à l'état d'avancement de son travail. Elle peut travailler debout voire en se déplaçant. Elle est surtout représentée assise pour un travail long et continu. Le dos paraît bien droit. Les jambes pliées sont parallèles, ce qui permet à un nourrisson encore dans les langes de reposer sur les genoux de sa mère. Elles sont croisées, pour maintenir la quenouille entre les mollets ou les cuisses. Dans quelques cas, elles sont allongées et la fileuse un peu penchée en arrière, position peut-être plus confortable, ou traduction d'un certain relâchement d'ordre moral pour Sardanapale. Les bergères et les femmes qui filent en plein air, sont assises sur le sol, sur les talons, ce qui est moins inconfortable qu'il n'y paraît voire banal du fait de la rareté relative des sièges, ou jambes pliées sur le côté.

Les fileuses sont figurées sous tous les angles, de trois quarts face surtout, mais aussi de profil pour rappeler l'attention que requiert un travail difficile, de face et même de dos dans les grotesques. La position du visage n'est pas toujours celle du corps, ce qui tient à toutes sortes de raisons en dehors du trait stylistique. L'artiste porte un jugement de valeur sur l'ouvrière, sur sa nature, bonne ou mauvaise et sur sa façon de travailler. Quatre situations se rencontrent par ordre décroissant d'importance: la fileuse ne regarde pas du tout son travail, ce qui révèle un degré de dextérité remarquable, elle surveille son fuseau à un moment délicat (amorçage, réamorçage, fuseau plein), elle veille à ce qu'en tirant une quantité de fibres de la quenouille, elle ne compromette pas l'équilibre de l'ensemble, enfin elle semble guetter sur le fil la présence éventuelle d'un noeud et tente d'y remédier. La position de la quenouille plus ou moins inclinée n'est pas seulement pas adaptée à la vue de l'utilisatrice. Deux pratiques sont peu attestées ou difficiles à repérer, et n'ont peut-être pas le caractère général qu'on leur prête d'ordinaire: passer la quenouille à la ceinture ou la faire reposer sur le bras. Quand elle n'est pas tenue à la main comme la quenouille romaine, placée sur pied ou encore serrée entre les jambes à hauteur des mollets, la quenouille est calée sous le bras (gauche si la fileuse est droitère, sinon l'inverse) à hauteur de l'aisselle ou de la taille. Dans tous les cas, les mains sont libres pour tirer le brin de laine et faire tourner le fuseau.

La fileuse assise actionne la roue à filer à l'aide d'une manivelle, ou debout elle la pousse par les rayons, avec le majeur de la main droite. Assise le geste du bras a une ampleur plus faible, le travail est moins pénible. Le volume croissant de la roue fait que par le jeu de l'inertie, l'instrument n'a pas besoin d'être constamment actionné. Mais l'utilisatrice est de profil car une surveillance sans défaillance est nécessaire. La roue à filer facilite le travail de la laine à longues fibres moins résistante et plus souple. Quand la partie du fil étiré, tendu par la torsion est longue, la fileuse obtient par une rotation plus forte un fil régulier, de torsion lâche.

L'utilisation du dévidoir est fatigante. Là encore le geste est difficile et requiert habileté et vigilance pour un remplissage régulier. Dans le cas des Minyades, l'appareil est du type le plus ancien. Il consiste en une barre centrale tenue dans la main et sur laquelle sont fixées deux pièces recourbées à angle droit l'une par rapport à l'autre. Le fil est passé sur elles. L'instrument est utilisé debout et tourné d'un côté de l'autre jusqu'à ce que l'écheveau soit rassemblé sur les bras en forme de croix.

Les caractéristiques du métier à tisser et la nature de l'ouvrage à accomplir déterminent les gestes du

tisserand. Deux sont souvent retenus: le lancement de la navette de la main droite (l'ouvrière vient de ramener en avant la chasse, pour les métiers à tisser à pédale, une pédale enfoncée ouvre alors la chaîne, la foule) ou du moins l'introduction du fil de trame et l'utilisation du batteur pour bien ouvrir les fils de chaînes avant le passage de la navette et ensuite pour tasser les duites. Les deux gestes, faciles à traduire par l'enlumineur et spécifiques, requièrent aussi le plus d'énergie. La Vierge de l'Annonciation place de la main droite le batteur dans la nappe de tissage ou le tient à la verticale, main gauche. La présence d'une coupelle peut-être pleine d'eau rappelle que les fils de laine, de lin ou de chanvre lorsqu'ils sont secs et sous tension prolongée sont cassants, il est donc nécessaire de les humidifier, mais les enlumineurs ne reproduisent pas ce geste.

III Bilan et essai de typologie

L'enlumineur peut s'intéresser aux gestes techniques et expliciter avec précision des gestes difficiles, mais ce n'est pas toujours le cas.

A Les gestes mal représentés

La fréquence et l'ancienneté de certains motifs, sans cesse repris (Eve filant), peuvent expliquer une exécution rapide. La description des doigts et le détail des instruments de travail s'en ressentent. Le fuseau, voire le fil manquent! L'image se réduit alors à un pictogramme. Les productions médiocres, abondantes ou en séries, et les marges sont les plus affectées par ce travers. Dans la traduction par Laurent de Premierfait *Des cas des nobles hommes et femmes* de Boccace, l'épouse de Marcus Actilius Regulus, file en tirant la fibre de la main droite et à pleine main, double maladresse contraire à l'esprit du texte. Dans un *Bréviaire* à l'usage de Besançon, pour illustrer le mois de mars, une bergère assise garde une douzaine de moutons. Sa quenouille est passée à la ceinture du côté gauche, mais elle tire la fibre de la main droite et fait tourner le fuseau de la main gauche, croisement très gênant.

Dans certains cas, le geste est volontairement mal représenté. La maladresse d'Hercule participe de son humiliation. Dans le *Livre des Merveilles* une bergère de la cité de Catan qui garde des poules "blanches comme neige et qui n'ont point de plumes comme les nôtres mais sont laignées comme mouton" file à l'envers ce qui accentue le caractère étrange, merveilleux de la scène. Sardanapale, vêtu en femme, est découvert par un de ses gouverneurs en

train de filer au milieu de ses concubines, qui partagent son pouvoir. Il file à l'envers et le travail accompli est médiocre, sur son fuseau peu de fil ou mal enroulé. L'enlumineur qui suit le texte souligne le caractère stérile de l'inversion des rôles. Les femmes ne doivent pas parvenir au gouvernement, car elles sont par nature inaptes à cet exercice. Poussant cette logique à son terme, Sardanapale est parfois représenté filant avec un bon geste car il est roi et ses concubines à l'envers. Mais dans *Le livre des merveilles du monde*, pour la Scythie où "les gens...ont merveilleuse policie et gouvernement car les hommes font et executent toutes les besoignes et mestiers que femmes ont accoustumé de faire ailleurs comme filler, pigner laynne", deux hommes filent bien. Le contraste entre leur stature, leur longue barbe bouclée et le geste précis et délicat des doigts (le fil est pincé entre le pouce et l'index de la main droite, majeur, annulaire et auriculaire tendus) paraît suffisamment curieux à l'enlumineur.

B Les gestes différents et le détournement des instruments de travail

L'enlumineur souligne les gestes inattendus. Les Parques se partagent la tâche, l'une tient la quenouille, l'autre en tire le fil de la main droite et le pinçe de la main gauche pour empêcher la remontée de la torsion, la troisième le coupe. Cette division du travail renvoie aux trois fonctions de la femme, transmission de la vie, perpétuation de l'espèce par élevage des enfants et mort (pêcheresse, elle entraîne l'homme dans sa chute). Cette répartition artificielle a le mérite d'obliger l'enlumineur à décomposer le mouvement et donc à l'analyser. Les exemples de "partage du travail" dans *Le Livre des secrets de l'Histoire naturelle* sont repris par contre de situations réelles. Dans le cas des jeunes femmes qui représentent l'Italie, il intervient dans le processus normal de fabrication. Le tissage à la main ainsi réalisé en plein air est pratiqué avec un équipement réduit à l'extrême. Pour l'Arabie, une mère tient les instruments et sa fillette apprend à travailler le fil. L'initiation se fait par l'apprentissage du bon geste, activité pédagogique qui modifie le rythme de travail. Enfin un enfant plus jeune intervient parfois sans avoir été invité à le faire et contrarie ou perturbe le processus en cours. Mais ces manifestations intempestives et spectaculaires – il se saisit du fil, du fuseau, de la quenouille – sont en fait limitées par la mère et semblent de peu de conséquences.

Dans les marginalia l'attribution de gestes techniques à des hybrides ou à des animaux (singe ou truie) et le détournement des instruments de travail de leur

fonction première se rencontrent souvent. Dans le *Livre du gouvernement des rois et des princes* de Gilles de Rome, un hybride féminin file dans la marge au début du second livre qui évoque la place que la reine doit tenir. De manière symbolique le monstre ne peut avancer: il tente de se déplacer vers la gauche et l'autre moitié du corps est tournée vers la droite. Dans les joutes parodiques la quenouille est tenue couchée comme une lance. Quenouilles et batteurs sont aussi brandis comme un bâton à une ou deux mains par des singes chevauchant ours et sanglier ou par des femmes battant leur mari ou chassant le renard ou le loup qui attaque leur bétail. Un même manuscrit comme l'*Estoire del Saint Graal* de Robert de Boron peut rassembler des scènes quotidiennes (filage et dévidage) parodiées quelques pages plus loin par des hybrides et une joute à forte connotation érotique. Dans la *Bouquechardière* de Jean de Courcy, près d'un moulin, une femme aux pattes d'oiseau porte sur le haut du dos un sac de farine (?) trop lourd qu'elle retient à deux mains, la quenouille passée à sa ceinture et le fuseau qui pend au bout du fil sont réduits au rôle de simple attribut féminin. Mais les marges ne sont pas les seules concernées. Dans le *Livre du roi Modus et de la reine Ratio*, la quenouille et le batteur sont figurés côté à côté brandis par les femmes mariées et âgées qui interviennent dans la rixe des suppôts de Satan pour le tonneau de vin. Le batteur est d'abord agrandi, puis transformé en bâton et enfin en massue quand l'enlumineur ne reconnaît plus le motif originel.

L'absence de gestes techniques ne tient pas qu'à l'impossibilité de représenter certains. Elle peut être significative et bien vue. L'enlumineur attire l'attention sur le fait que le personnage n'agit pas. Dans l'image frontispice de la *Cité de Dieu*, pour illustrer la paresse, la fileuse assise à côté du charpentier et du maçon s'est arrêtée de travailler, même si elle tient encore sa quenouille, son fuseau à proximité. Elle n'accomplit plus le travail rédempteur par excellence depuis Eue et Marie, manque à ses obligations professionnelles et sociales et compromet son salut. Dans un *Ordinaire* (sanctoral) où l'intercession de sainte Agnès est sollicitée, seul son fuseau, sur lequel sont enroulées prières à répéter ou réflexions à méditer, est figuré. La lectrice par sa ruminantion dévote fait mentalement tourner et se vider le fuseau (un moulin à prières en quelque sorte) qui a été bien rempli et avec force mérites, par la sainte.

Certains gestes ne sont pas décrits même quand ils interviennent de façon décisive dans le récit. Le *Miroir historial* de Vincent de Beauvais, traduit par Jean de Vignay rapporte l'histoire de la pucelle de Noyon : "Derechief au faubourc de noion une povre pucelle querant son vivre par main et par art filoit au

jour de la feste de lanonciation notre sire et si comme il est de coustume a ces femmes mouiller leur fil a leur bouche ycelle mouilloit son fil et il sahart a sa lange et a ses levres et tordi l'un a lautre aussy comme cordees ensamble..." L'image la montre en train de filer non de porter à ses lèvres le fil, elle illustre peut-être ainsi la fin heureuse du récit puisque grâce à l'intervention de Notre Dame "la grace divine bouta hors le lien de ses levres".

C Les gestes parfaits des professionnels

Le bon geste peut être déprécié et l'excellence considérée comme un défaut. Le rôle des corrélations est essentiel. Deux exemples symbolisent les femmes qui, fières de leur compétence ou par appât du gain, ne respectent pas les interdits religieux, comme la pucelle de Noyon qui file un jour de fête. Leur travail est sacrilège. Les Myniades filent et dévident leur fuseau au lieu de participer au culte bachique et de se soumettre à la condition de leur semblable. Arachné l'orgueilleuse ose défier Pallas en prétendant travailler mieux qu'elle. La déesse, qui l'emporte, n'est pas représentée en train de tisser pour souligner toute la distance qui la sépare de la simple mortelle. Dans ces exemples, alors que les Minyades sont transformées en chauve-souris et Arachné en araignée, seule l'activité coupable est figurée. L'accent est mis sur la qualité exceptionnelle des ouvrières. La sanction, qui concrétise la déchéance de l'être qui a voulu se comparer aux Dieux, n'est pas évoquée.

De toute façon, la connotation négative attachée aux métiers du textile persiste, malgré la promotion toute relative des arts mécaniques. Dans une *Vie et office de sainte Elisabeth de Thuringe ou de Hongrie* du XIVe s., à la suite du texte qui explique qu'elle n'hésite pas à travailler de ses mains la laine et le lin pour faire des vêtements pour les pauvres, l'enlumineur représente la sainte en train de filer, activité choquante pour une fille de roi aux yeux de ses contemporains. Dans le *Livre des proprietes des choses*, traduction par Jean Corbechon de Barthélemy l'Anglais, l'auteur évoque sans aménité excessive le sort des chambrières, chapitre XI : "elle est en hostel pour faire les plus vilz et les plus laborieux offices...nourrie de grosses viandes et vestue du plus vil drap ... souvent injuriée et batue", accablée de travail on ne la laisse ni rire ni jouer. L'enlumineur illustre cette pénible condition au XVe s., par une servante debout en tablier blanc avec une pauvre robe bleue, en train de filer, la quenouille sous le bras et son petit fuseau déjà bien rempli. Au XVIe s. encore dans les *Epistres* d'Ovide, traduction d'Octovien de Saint-Gelais l'activité reste dépréciée. Dans le texte Héro

se lamente et rappelle que la nuit en attendant l'être cher "avec mes femmes fille pour passer le temps, ainsi passans en femenine ouvrage les longues heures, cest notre droit usage tistre et filler quenouilles et fuseaux". Mais dans l'image, l'enlumineur réserve à la vieille nourrice le filage et Héro se contente de porter à ses lèvres la chemise de Léandre.

Ce savoir faire méprisé est pourtant réhabilité. Dès le XIV^e s dans le *Livre du Trésor* de Brunetto Latini, l'image d'une fileuse accompagne l'évocation de la prudence dans le cadre de l'"enseignement del vises et del vertus". Au XV^e s les représentations en bonne part des métiers du textile se multiplient. La figuration se fait dans une perspective géographique et ethnographique dans *Le Livre des secrets de l'Histoire naturelle*, pour l'Angleterre, une femme en tablier blanc file, avec une quenouille sur pied. De même, dans le *Livre de Jehan de Mandeville*, l'enlumineur, qui évoque les Amazones, place en vis à vis, en quelque sorte à égalité, les guerrières en armes qui entourent leur reine et une bergère, qui garde six moutons en filant et protège sa robe par une toile, sa quenouille sur pied placée devant elle. Dans le *Miroir historial* de Vincent de Beauvais, traduction de Jean de Vignay, sainte Marguerite assise sur un banc de bois, file, juste devant elle un agneau dont la présence est symbolique. Son troupeau est considérable, ce qui atteste sa valeur de gardienne.

Cette réhabilitation s'inscrit tardivement dans le cadre d'un processus de production organisé par les métiers. Dans le *Capitolario des mestier et arte de la lana, quale si exercita nella inclyta cita de Venetia*, copié à Venise vers 1523-1526 sont rassemblés les règlements édictés par le métier des lainiers de Venise. Une peinture en pleine page, folio 8, par Benedetto Bordon, évoque la séance du bureau du métier du 1^{er} juin 1523. Le registre supérieur de l'image montre trois représentants en titre de la corporation, en train de siéger, derrière un comptoir, devant un groupe de cinq membres du métier. Le registre inférieur est divisé en deux. A droite, un personnage tond un mouton vivant. Un deuxième trie la laine et la débarrasse des déchets qu'elle contient en éliminant aux ciseaux boutons et pointes grossières, travail réalisé dans le nord de l'Europe par une femme. Un troisième armé dans chaque main d'une baguette de bois souple frappe à coups redoublés sur la laine étendue sur une claie. Les flocons sautent, s'ouvrent se démêlent, les impuretés les plus lourdes retombent entre les mailles de la claie et se trouvent ainsi éliminées. Enfin une femme file la laine à la quenouille. La fileuse ayant fixé au sommet du fuseau une barre de peigné tire dessus à longueur de bras pour amenuiser la laine en un fil à la fois mince, résistant et égal. Elle fait en même temps tourner son

fuseau de la main gauche pour imprimer au fil la torsion nécessaire pour maintenir les fibres ensemble et par le même mouvement de rotation enroule le fil convenablement tordu sur le même fuseau. Dans la deuxième moitié du registre, au premier plan, deux ouvriers nus, dans la réalité protégés de tabliers de cuir, procèdent au peignage et au cardage(?). Le cardeur, à gauche, malaxe avec la cardé supérieure la laine couchée sur la cardé inférieure fixe. Le peigneur, à droite, travaille avec deux longs peignes de fer. L'enlumineur évoque la phase finale quand saisissant les peignes garnis et mêlant les deux écheveaux, il approche et éloigne les deux peignes par tractions successives jusqu'à ce que toute la laine passe d'un peigne à l'autre et soit parfaitement ouverte et ses fibres parallèles. Au second plan, l'enlumineur décrit le chardonnage ou forbattage, qui ne concerne que les draps de qualité dont la laine a été peignée, et dont les fibres fautes d'avoir été cassées par le cardage ne peuvent s'accrocher les unes aux autres. Après lavage, le drap est étendu sur des perches, il est ébouriffé, c'est-à-dire que le plus de brins de laine possible sont attirés à la surface. L'opération n'intervient que sur la face du drap destinée à devenir l'envers. Les ouvriers travaillent avec une planchette ou croix garnie de chardons. Chacun travaille sur une moitié de la largeur entre une lisière et le milieu de l'étoffe, demi-largeur qui dépasse de peu un mètre et permet des mouvements réguliers. L'opération délicate et précise est réservée à des ouvriers spécialisés. Le tout est fort révélateur. En dehors du chardonnage, le travail des lainiers n'interfère pas avec les métiers du drap qui ne sont pas évoqués. Les procédés à l'ancienne réservés aux produits de qualité sont privilégiés. La répartition des tâches entre hommes et femmes et le caractère spécialisé des opérations retenues qui requièrent plus de savoir faire que de force, le confirment.

Les représentations des gestes des métiers du textile dans les derniers siècles du Moyen Âge offrent un bel éventail de la façon dont les gestes techniques peuvent être évoqués depuis le geste mal observé, mal représenté jusqu'au geste parfait du maître de métier fidèlement reproduit. Cette diversité reflète la multiplicité des fonctions de l'image. Mais une part réduite est faite aux gestes et techniques de pointe, tels qu'ils se rencontrent dans les grands centres de production. Les enlumineurs font au contraire la part belle aux activités artisanales ou domestiques les moins sophistiquées qu'ils connaissent mieux, or le témoignage des autres sources à leur égard est en deçà de la diffusion générale de ces pratiques dans la société. Un des mérites des images est donc de les retrouver, même si le propos des enlumineurs est volontiers symbolique, moralisateur, ou satirique

reprenant les exemples bibliques et classiques pour vilipender entre autres l'esprit d'indépendance des femmes.

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Flämischer Einfluß in Siedlung und Kultur während des 12./13. Jh. in Nordostdeutschland

Seit vielen Jahrzehnten bewegt die historische, archäologische und sprachwissenschaftliche Forschung Ostdeutschlands die Frage, in welchem Umfang und in welcher Weise sich flämisch-niederländische Siedler im Zuge des Landesausbaues im ostdeutschen Gebiet zwischen Elbe und Oder im hohen Mittelalter niedergelassen haben.¹ Dieses sogenannte “Niederländerproblem” wird in der jeweiligen Forschungsrichtung unterschiedlich bewertet. Während es im Mittelbegebiet und im westlichen Brandenburg zahlreiche Hinweise auf eine aktive Beteiligung von Flamen und Niederländern anhand der schriftlichen Quellen, der Orts- und Flurnamen gibt, schweigen sich die zeitgenössischen Quellen Flanderns und Brabant über eine nennenswerte Abwanderung von bäuerlichen Bevölkerungsteilen im 12. und 13. Jh. aus.

Wie stellt sich für das Mittelbegebiet und Brandenburg der flämisch-niederländische Einfluß aus der Sicht der verschiedenen Quellen dar?

Im Jahre 1108 erließen Erzbischof Adelgot von Magdeburg und weitere Bischöfe sowie der Herzog von Lothringen, Graf Robert II. von Flandern, der Archidiakon Lambert von Tournai, Propst Bertulf von St. Donatian in Brügge sowie Kleriker aus Brügge und Tournai einen Aufruf² zur Christianisierung und Besiedlung des ostelbischen Slawenlandes. Dieser Aufruf verhallte ohne Wirkung. Erst nach der Mitte des 12. Jh., als die nordwestslawischen Stammesgebiete zwischen der mittleren Elbe und der Oder erobert worden waren, gingen die Markgrafen und der Erzbischof von Magdeburg sowie seine Suffragane in Brandenburg und Havelberg dazu über, daß durch lange kriegerische Ausein-

andersetzungen entvölkerte und zerstörte Gebiet durch einen Landesausbau zu erschließen.

Helmold von Bosau berichtet in seiner zwischen 1163 und 1172 geschriebenen Slawenchronik rückblickend, daß Albrecht der Bär, Markgraf der Nordmark, Boten nach Utrecht und in die Gegend am Rhein und weiter zu den Anwohnern des Ozeans, nämlich zu den Holländern, Seeländern und Flandern geschickt habe und daß von dort eine sehr große Menge Volkes herbeigeführt und ihnen in den Städten und Flecken der Slawen Wohnsitze angewiesen wurden. Durch diese Einwanderung blühten vor allem die Bistümer Brandenburg und Havelberg auf. Die Zahl der Kirchen vermehrte sich und die Zehnteinnahmen flossen kräftig.³ Bereits 1150 hatte König Konrad III. dem Bischof Anselm von Havelberg gestattet, Bauern zum Ausbau des Landes seiner Diözese anzusiedeln.⁴

Wie läßt sich nachweisen, daß es tatsächlich in der zweiten Hälfte des 12. Jh. zu einer Besiedlung des Mittelbegebietes und Teilen Brandenburgs mit flämisch-holländischen Siedlern gekommen ist? Hierzu sind zunächst die schriftlichen Quellen, sodann die Orts und Flurnamen zu befragen. Zu untersuchen ist aber auch, ob sich in der Sachkultur, im Burgenbau und in der ländlichen Siedlungsweise Einflüsse erkennen lassen. Werfen wir zuerst einen Blick auf die schriftliche Überlieferung, ob sich hieraus ein Zuzug von Bauern auf dem Lande oder von Handel- und Gewerbetreibenden in den im 12. Jh. entstehenden und aufblühenden Städten nachweisen läßt. Für das Jahr 1179 erfahren wir, daß Erzbischof Wichmann von Magdeburg den Kaufleuten der Stadt Burg 20 Budenplätze auf der Messe zu Magdeburg

¹ R. SCHÖDER, *Die niederländischen Kolonien in Norddeutschland zur Zeit des Mittelalters*, Sammlung gemeinverständlicher wissenschaftlicher Vorträge, hrsg. von R. VIRCHOW & F. V. HOLTZENDORF, 15. Serie, Heft 347, Berlin 1880.

² Siehe H. HELBIG & L. WEINRICH (Hrsg.), *Urkunden und erzählende Quellen zur deutschen Ostsiedlung im Mittelalter*, Teil 1, Darmstadt, 1984, 96 ff.

³ Helmold von BOSAU, *Slawenchronik*, Neu übertragen und

erläutert von H. STOOB, Darmstadt, 1963, 312.

⁴ Vgl. A. F. RIEDEL, *Codex diplomaticus Brandenburgensis*, I. Hauptteil, Band 2, 438 f. Zum Problem der Ansiedlungen von Bauern im ostelbischen Slawenland vgl. W. SCHLESINGER, *Bäuerliche Gemeindebildung in den mittelelbischen Landen im Zeitalter der mittelalterlichen deutschen Ostbewegung*, in: W. SCHLESINGER, *Mitteldeutsche Beiträge zur deutschen Verfassungsgeschichte des Mittelalters*, Göttingen, 1961, 212 ff.

verlieh. Unter den Burger Kaufleuten werden namentlich die Flamländer Wilhelm Flamiger, Giselbrecht de Thiest, Lambrecht de Lovene und Reinerus de Brosle genannt.⁵ Ein höherer Anteil flämisch-niederländischer Bevölkerung während des späten 12. Jh. wird auch für die altmärkischen Städte Salzwedel und Stendal angenommen.

Die Ansiedlung bäuerlicher Bevölkerung niederländischer Herkunft läßt sich vor allem im Gebiet der Bistümer Naumburg, Meißen und des Erzbistums Magdeburg erkennen. Die früheste Nachricht über angesiedelte Holländer erfahren wir 1152, als Bischof Wichmann von Naumburg einer Gruppe von Holländern bestimmte Sonderrechte verlieh.⁶ 1154 siedelte der Bischof von Meißen "tüchtige Männer, die aus dem Lande der Flandrer kommen" in dem fast menschenleeren Dorf Kühren bei Wurzen an.⁷ 1159 verkaufte der Abt des Klosters Ballenstedt flämischen Einwanderern zwei Slawendörfer an der Mulde östlich von Dessau, die zu einem Dorf mit 24 Hufen zusammengelegt wurden.⁸ 1166 bestätigte Erzbischof Wichmann von Magdeburg die Ansetzung von Bauern nach holländischem Recht im Dorf Krakau bei Magdeburg.⁹ Vermutlich wurden auch in den Dörfern Pechau und beim Wiederaufbau des Dorfes Poppendorf an der Elbe bei Magdeburg 1159 und 1164 flämische Bauern angesiedelt, obwohl sie in den Urkunden nicht ausdrücklich erwähnt werden.¹⁰ Auch bei der Rodung eines Waldes bei Schartau unterhalb von Magdeburg, der besiedelt und eingedeicht wurde, waren offenbar in den sechziger und siebziger Jahren des 12. Jh. Niederländer beteiligt.¹¹ Besonders deutlich wird die flämische Ansiedlung in einer Urkunde Erzbischof Wichmanns von Magdeburg von 1159 beschrieben. Hierin schließt er mit einem Unternehmer (Lokator) Heinrich und anderen Flamen einen Ansiedlungsvertrag ab. Den Flamen wird das Dorf Großwusterwitz bei Brandenburg

übergeben und den Bewohnern das Recht von Schartau übertragen und die Abhaltung eines Jahrmarktes gestattet. Zum Schutz gegen die benachbarten Slawen durften die Flamen ihr Dorf mit einem Wall umgeben.¹² Weitere Hinweise auf die Ansiedlung flämischer Siedler finden sich indirekt durch die Erwähnung einer Flamenbrücke 1174 bei Jüterbog,¹³ von Hufen nach Holländersitte im Fiener Bruch östlich von Magdeburg,¹⁴ von Hufen nach holländischem Maß an der Elbe bei Werben¹⁵ und von Einkünften der am Elbufer wohnenden Holländer 1170, die Markgraf Otto von Brandenburg dem Bischof und Domkapitel von Havelberg schenkte.¹⁶

In welchem Umfang flämisch-holländische Bevölkerungsteile im 12. Jh. an der mittleren Elbe, in Brandenburg und anderen Gebieten im Slawenland sich angesiedelt haben, ist unbekannt und wird in den schriftlichen Quellen nur bruchstückhaft im 12. Jh. überliefert. Für das nachfolgende 13. Jh. fehlen dazu Nachrichten. Auf Grund der insgesamt doch nur wenigen Quellenbelege wurde vermutet, daß mit der Bezeichnung "Flamen" und "Holländer" in den Quellen des 12. Jh. ganz allgemein in dieser Zeit Siedler bezeichnet wurden, die vom Westen des Reiches in den Osten zogen, um sich hier niederzulassen. Dem widersprechen allerdings die zahlreichen aus dem heutigen Nordfrankreich, Belgien und den Niederlanden nach Brandenburg übertragenen Ortsnamen. Diese von den Siedlern mitgebrachten Ortsnamen sowie eine ganze Reihe von ebenfalls übertragenen Flurnamen bestätigen und verdichten das Bild einer unmittelbaren flämisch-niederländischen Siedeltätigkeit. Die Orts- und Flurnamen-Forschung hat dazu ein reiches Belegmaterial zusammengetragen.¹⁷ So gibt es Ortsnamen, die nur in den genannten westeuropäischen Räumen und in der Mark Brandenburg auftreten. Einen besonders hohen Anteil übertragener Ortsnamen weist das Havelland westlich von Berlin auf.¹⁸

⁵ *Urkundenbuch des Erzstiftes Magdeburg*, hrsg. von F. ISRAEL & W. MÖLLENBERG, Teil 1, Magdeburg, 1937, Nr. 479.

⁶ *Urkundenbuch des Hochstiftes Naumburg*, hrsg. von F. ROSENFELD, Teil 1, Magdeburg, 1925, Nr. 210.

⁷ Siehe R. KÖTZSCHKE (Hrsg.), *Quellen zur Geschichte der ostdeutschen Kolonisation im 12. bis 13. Jahrhundert*, Leipzig-Berlin, 1912, Nr. 10.

⁸ Vgl. O. v. HEINEMANN, *Albrecht der Bär. Eine quellenmäßige Darstellung seines Lebens*, Darmstadt, 1864, Quellenanhang, Nr. 39, 468 f.

⁹ *Urkundenbuch des Erzstiftes Magdeburg*, hrsg. von F. ISRAEL & W. MÖLLENBERG, Teil 1, Magdeburg, 1937, Nr. 321.

¹⁰ *Urkundenbuch des Erzstiftes Magdeburg*, hrsg. von F. ISRAEL & W. MÖLLENBERG, Teil 1, Magdeburg, 1937, Nr. 299 und Nr. 310.

¹¹ G. A. v. MÜLVERSTEDT, *Regesta archiepiscopatus Magdeburgensis*, Teil 3, Magdeburg, 1881, Nr. 169.

¹² O. v. HEINEMANN, *Albrecht der Bär. Eine quellenmäßige Darstellung seines Lebens*, Darmstadt, 1864, Quellenanhang Nr. 41.

¹³ Siehe H. HELBIG & L. WEINRICH (Hrsg.), *Urkunden und erzählende Quellen zur deutschen Ostsiedlung im Mittelalter*, Teil 1, Darmstadt, 1984, 78 f.

¹⁴ Ebenda, 84.

¹⁵ Ebenda, 86.

¹⁶ Ebenda, 90.

¹⁷ H. TEUCHERT, *Die Sprachreste der niederländischen Siedlungen des 12. Jahrhundert*, Neumünster, 1944; M. BATHE, *Die Herkunft der Siedler in den Landen Jerichow, erschlossen aus der Laut-, Wort- und Flurnamen-Geographie*, Halle, 1932; K. BISCHOFF, *Elbostfälische Studien*, Halle, 1954; M. BATHE, *Das siebenfache Lichterfelde, Altmärkisches Museum Stendal, Jahresgabe* 19, 1965, 55 ff. u. D. STELLMACHER, *Niederländisches im Lautstande des Mittelmärkischen, Leuvense Bijdragen* 57, Heft 3, 1968, 119 ff.

Ein breiter Streifen niederländischer Siedeltätigkeit zieht sich aufgrund der Orts- und Flurnamen von der Altmark bis in das Magdeburger Gebiet und von der Prignitz über das Jerichower Land, das Havelland bis zum Fläming. Hier treffen wir nicht nur auf zahlreiche direkt oder über Zwischenorte übertragene Dorfnamen, sondern auch auf zahlreiche niederländische Flurnamen. Sie bezeichnen bestimmte Geländesituationen, den Ackerbau, Haus und Hof, Pflanzen, das tägliche Leben, die Tierwelt und deuten auf die Viehhaltung hin. So werden Erhebungen in Niederungsland mit *Dunk*, *Hoewel* oder *-kop* bezeichnet. Niederungen tragen solche Bezeichnungen wie *Wäteringe*, *Lake*, *Schlenke* oder *Fenn*. Ein zur Viehweide umgelegter und eingehogter Acker wird *Heininge* genannt.¹⁹ Der Flurname *Dunk* hat sein Hauptverbreitungsgebiet in den Provinzen Antwerpen und Nordbrabant. Im ostdeutschen Kolonisationsgebiet finden wir ihn in der Altmark und im westlichen Brandenburg.²⁰

Als nächstes ist zu fragen, ob sich ein flämisch-niederländischer Einfluß auch im Siedlungswesen, sprich bei der Hausbauweise, in der Anlageform der Dörfer und beim Burgenbau erkennen läßt. Generell ist davon auszugehen, daß die niederländischen Siedler die ihnen bekannten Hausformen und Gewohnheiten hinsichtlich der Anlage von Dörfern und der Flurgestaltung in die neuen Lebensräume übertragen haben. Leider sind wir mangels fehlender archäologischer Ausgrabungsbefunde kaum darüber informiert, welche Hausformen im 12./13. Jh. durch auswärtige Siedler nach Ostelbien gebracht wurden.²¹ Auch die Wurzeln der für das nordostdeutsche Gebiet typischen Anger- und Straßendörfer sind bisher geklärt. Darüberhinaus darf nicht vergessen werden, daß nicht nur flämisch-niederländische Siedler in das Mittelbegebiet und weiter nach Ost- und Nordostdeutschland gekommen sind, sondern auch Bauern aus anderen altdeutschen Landstrichen angesiedelt wurden. Erschwert wird eine Aufdeckung des direkten Niederländereinflusses dadurch, daß es eine wohl nicht unerhebliche Binnenwanderung in

Etappen vom Westen nach dem Osten gegeben hat und daß dabei unterwegs fremde kulturelle Elemente aufgenommen worden sind.

Mit den deutschen Siedlern kam eine neue Art des Befestigungsbaues, nämlich die Turmhügelburg oder Motte in das ostelbische Gebiet.²² Diese Burgenform stellt etwas Neues und Fremdartiges im slawischen Raum dar. Sie begegnet uns im westlichen Brandenburg im Dossegebiet, vereinzelt im Havelland und vor allem stärker im Fläming.²³ Motten und Turmhügelburgen sind hauptsächlich von der Normandie bis zum Rheinland beheimatet und dürften mit großer Sicherheit direkt von dort durch den niederen Adel übertragen worden sein. Wann diese Übertragung erfolgte ist bisher für das brandenburgische Gebiet noch unbekannt, da keine gesicherten Daten für den Zeitpunkt der Errichtung dieser Anlagen vorliegen. Ebenso wie die Turmhügelburgen begegnen uns vor allem am Rand des Flämings befestigte dörfliche Siedlungen. Hier hatten die Dörfer Blönsdorf, Kaltenborn, Waltersdorf, Wolmsdorf und Frankenfelde Dorfumwallungen. Besonders gut ist sie in Kaltenborn erhalten geblieben.²⁴ Auf der Grenze der Hausgärten zum angrenzenden Acker verläuft ein bis zu 1,5 m hoher Wall und davor ein Spitzgraben. Ob diese mit einem Wall oder Deich umgebenen Dörfer tatsächlich von Flamen im hohen Mittelalter angelegt und besiedelt waren, ist nicht zu beweisen. Die Umgrenzung eines Dorfes mit einem Zaun oder in anderer Form stellte im Mittelalter keine Besonderheit dar und wird schon im Sachsenspiegel als allgemeine Gewohnheit beschrieben. Auffällig ist allerdings das gehäufte Vorkommen der befestigten Dörfern im Fläming, wo allgemein mit einer stärkeren flämisch-niederländischen Besiedlung gerechnet wird. Auch der Hinweis in der obigen Urkunde von 1159 über die Flamen in Großwüsterwitz, die ihr Dorf mit einem Wall umgeben durften, spricht dafür.

Erörtern wir abschließend, ob sich in der Sachkultur ein flämisch-niederländischer Einfluß nachweisen läßt. Die Siedler aus den Altsiedelgebieten

¹⁸ R. E. FISCHER, *Die Ortsnamen des Havellandes*, Weimar, 1976, 330. Weitere von den Niederländern übertragene Ortsnamen in der Altmark und im Elbhavelland sowie in der Prignitz führen K. BISCHOFF, *Sprache und Geschichte an der mittleren Elbe und der unteren Saale*, Köln-Graz, 1967, 127 ff. u. S. WAUER, *Die Ortsnamen der Prignitz*, Weimar, 1989, 415, auf.

¹⁹ M. BATHE, Der Bereich des Flurnamens Heininge, *Altmarkisches Museum Stendal, Jahressgabe* 19, 1965, 38 ff.

²⁰ H. TEUCHERT, *Die Sprachreste der niederländischen Siedlungen des 12. Jahrhunderts*, Neumünster, 1944, 166 ff. u. Karte 11.

²¹ Vgl. G. MANGELSDORF, Haus, Hof und Siedlung während des 12. bis 15. Jh. in Brandenburg und Mecklenburg-Vor-

pommern – zum Stand der archäologischen Forschung, in: *Festschrift für E. Enders zum 70. Geburtstag*, hrsg. von K. NEITMANN & F. BECK, Potsdam, 1997 (im Druck).

²² Vgl. die grundlegende Arbeit von H. HINZ, *Motte und Donjon. Zur Frühgeschichte der mittelalterlichen Adelsburg*, Köln, 1981, 88 ff.

²³ Siehe J. HERRMANN, *Die vor- und frühgeschichtlichen Burgwälle Groß-Berlins und des Bezirkes Potsdams*, Berlin 1960, 94, Abb. 37.

²⁴ Vgl. J. HERRMANN, 1960, Nr. 98, 108, 116, 118 und 174. Zu den Dorfbefestigungen siehe u. a. P. GRIMM, *Die vor- und frühgeschichtlichen Burgwälle der Bezirke Halle und Magdeburg*, Berlin, 1958, 169 f.

brachten ihre eigene Sachkultur mit, bedienten sich aber sicherlich von Fall zu Fall in der ersten Zeit auch der hier vorgefundenen slawischen. Als neu und fremdartig tritt seit der Mitte des 12. Jh. in den Gebieten östlich der Elbe zunächst mit der einheimischen slawischen Keramik vergesellschaftet die Kugelbodentopfkeramik in der Form der weichen Grauware auf. Wir kennen sie vor allem aus dem Raum östlich von Magdeburg und aus dem mittleren Teilen Brandenburgs, vereinzelt aber auch aus dem westlichen Mecklenburg.²⁵ Sie stellt ein Zeichen dar, für den in Gang gekommenen deutschen Landesausbau. Funde dieser frühen Kugelbodentopfkeramik kennen wir aus Stadtkernen, von Burgen und aus ländlichen Siedlungen. Diese Keramik kann zu einem Teil auch von niederländischen Siedlern mitgebracht worden sein. Im späten 11. und 12. Jh. ist diese Keramik aber in gleicher Form und Machart über das Rheinland, Niedersachsen und Westfalen bis in den linkselbischen Raum Mitteleuropas in gleicher Weise verbreitet gewesen. Sie ist also kein ausschließlich flämisch-niederländisches Charakteristikum.²⁶ Erst nachdem man im Rheinland und an anderen Orten zur Herstellung von Steinzeug übergang, bildeten sich bestimmte Werkstattkreise heraus, die für sie typische Produkte herstellten. Eine besonders cha-

rakteristische Steinzeugproduktion erfolgte im flämischen Aardenburg. Aardenburger Steinzeug ist dadurch gekennzeichnet, daß sich zwischen der Gefäßwandung und der Glasur eine weiße Grundierung befindet.²⁷ Dieses Steinzeug ist durch den Handelsverkehr über das nahegelegene Brügge wohl hauptsächlich als Emballage über Hamburg weit nach dem Osten gelangt. Dies vollzog sich allerdings erst im späten 13. und im 14. Jh. und hat mit der flämisch-niederländischen Siedeltätigkeit in Nordostdeutschland keinen Zusammenhang.

Aardenburger Steinzeug ist bei den Ausgrabungen in den Zentren der Hansestädte an der südlichen Ostseeküste gefunden worden, zuletzt auch in Greifswald.²⁸

Fassen wir zusammen, so sprechen zahlreiche Indizien dafür, daß es im 12. und möglicherweise noch im frühen 13. Jh. einen direkten Einfluß auf die Siedlungs- und Kulturentwicklung Nordostdeutschlands durch die Einwanderung flämisch-niederländischer Bevölkerungsteile gegeben hat. Ein gewisser kultureller Austausch vollzog sich archäologisch nachweisbar auch noch im späten Mittelalter im Zuge des hansischen Handelsverkehrs zwischen Flandern und dem Raum südlich der Ostsee.

²⁵ G. MANGELSDORF, Historisch-archäologische Quellen zum Beginn und Verlauf des Landesausbaus im 12./13. Jh. in Brandenburg, in: H. BRACHMANN & H.-J. VOGT (Hrsg.), *Mensch und Umwelt. Studien zu Siedlungsausgriff und Landesausbau in Vor- und Frühgeschichte*, Berlin, 1992, 151 ff. u. P. GRIMM, Zur Entwicklung der frühmittelalterlichen deutschen Keramik in den Bezirken Halle und Magdeburg, *Prähistorische Zeitschrift* 37, 1959, 72 ff.

²⁶ Vgl. H.-G. STEPHAN, Die mittelalterliche Keramik in Norddeutschland (1200 bis 1500), in: *Aus dem Alltag der mittelalterlichen Stadt*, Hefte des Fockemuseums Nr. 62, Bremen, 1982, 65 ff. und G. MANGELSDORF, *Untersuchungen zur Formenkunde spätmittelalterlicher Keramik im westlichen Brandenburg*, Frankfurt/M., 1994, 40 ff. und Karte 1.

²⁷ Siehe u. a. F. VERHAEGHE, Medieval pottery production in Coastal Flanders, in: P. DAVEY & R. HODGES (Hrsg.), *Ceramics and trade. The production and distribution of later medieval pottery in North-West Europe*, Sheffield, 1983, 63 ff.

²⁸ Bisher unveröffentlichtes Fundmaterial aus dem Stadtkern von Greifswald. Zum hansischen Handelsverkehr zwischen Flandern und den Städten an der südlichen Ostsee vgl. J. SCHILDHAUER, K. FRITZE & W. STARK, *Die Hanse*, Berlin 1981, 58 ff.

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La suppellettile per illuminazione tra tardantichità e altomedioevo

Il presente lavoro cercherà di illustrare il tipo di illuminazione in uso dall'epoca paleocristiana fino al periodo carolingio. La conoscenza degli oggetti è affidata prevalentemente a quanto riportato dalle fonti scritte e iconografiche e ai materiali conservati nei musei.

Già nei primi autori cristiani si trovano riferimenti alla luce e al suo valore simbolico, che identifica Dio come *lux mundi*, in opposizione alle tenebre legate al Diavolo¹.

Il simbolismo si traduce in manufatti di eccezionale valore artistico, realizzati in metallo prezioso, di cui ci sono pervenute accurate descrizioni nelle liste dei donativi papali nel *Liber Pontificalis*. Purtroppo sono spesso incompleti i dati relativi al materiale, al peso e alla collocazione in basilica delle lampade, ma tale carenza, che si riscontra per i manufatti antichi, tende a scomparire nelle biografie più tarde, dove al contrario troviamo descrizioni accurate e molto dettagliate.

Questa disparità può essere dovuta al fatto che i redattori nel VI secolo trascrivevano oggetti non più visibili.² Con la ripresa dell'attività edilizia sotto l'impero carolingio, il papato riformisce le basiliche della suppellettile necessaria alla liturgia, dal cui peso e dal metallo si può dedurre l'importanza di una basilica³.

La lista di papa Silvestro (314-335), relativa agli edifici fatti edificare da Costantino in Roma all'indomani della vittoria su Massenzio, fornisce notizie sull'arredo necessario ad una basilica. Dopo gli oggetti destinati all'altare sono menzionate le lampade seguite dalle liste dei fondi destinati al rifornimento dell'olio necessario; Costantino, in quell'occasione istituì anche un corpo di chierici addetti al *servitio luminum*⁴.

L'illuminazione era assicurata da lampade alimentate a cera, oppure ad olio, che veniva conservato in chiesa in contenitori capaci di accogliere grandi quantitativi di liquido chiamati *metretae*, menzionati nella biografia di Silvestro e realizzati in argento⁵. A differenza delle *amae*, destinate a contenere il vino, la citazione delle *metretae* è spesso tralasciata, forse perché, come ha sostenuto il Geertman, tranne Costantino nessun altro ha fatto realizzare questi contenitori in materiale prezioso⁶.

Nelle basiliche l'illuminazione è affidata prevalentemente a lampade in metallo prezioso, ma non mancano esemplari in bronzo o in materiali diversi, come il porfido e l'ottone. Le lampade menzionate possono essere classificate in due tipi: lampadari e lampade isolate.

Lampadari

Corona

I lumi più importanti sono indicati con il termine *corona*, con base cilindrica su cui vengono posizionati bracci che talvolta assumono forma di delfino, reggenti anelli nei quali vengono inserite le coppe in vetro⁷. Il numero dei delfini indica la dimensione e il prestigio del lampadario. La decorazione, presente sul cilindro di base, aveva come tema soggetti desunti dall'arte figurativa cristiana (monogrammi, croci e soprattutto motivi zoomorfi). A volte si aggiungono iscrizioni sia graffite che a traforo. Il lampadario veniva appeso per mezzo di catene attaccate ad anelli posizionati sul cilindro e fissata al soffitto per mezzo di un uncino.

¹ S. Ambrogio dice chiaramente che la luce è scaturita da Dio per vincere le tenebre (*Hexameron*, I, IX, 33); S. Agostino definisce la luce "regina dei colori" e grande profusione di luce c'è ad Ippona la notte di Pasqua (Hamman 1989, 226); Prudenzio dedica un intero inno al momento dell'accensione delle lucerne in chiesa ed identifica Dio con la luce attraverso la quale il cristiano può vedere fuori e dentro se stesso (*Cathem*, V, 155).

² Duchesne, *LP I*, CXXI-CLXII.

³ Geertman 1975, 102-130.

⁴ *LP I*, 173.

⁵ *LP I*, 176.

⁶ Geertman 1987, 193-201.

⁷ Gayet 1902, 299; Leclercq 1907, 557.

Dal Nord Africa, dove si registra la produzione delle lampade coniche in vetro, funzionali a questo tipo di lampadario, l'uso si diffuse successivamente in Oriente e in Italia.⁸

La *corona* è indicata nel *Liber Pontificalis* anche come *fara coronata* o *corona faralis* e più volte viene specificato che essa è un *farus cantharus*, per distinguerla chiaramente da una corona votiva⁹.

Il termine *cantharus*, come chiarito dal Geertman, indica una lampada pendente o applicata¹⁰. Il tipo è molto noto, anche se pochi sono gli esemplari sopravvissuti, perché il metallo poteva essere rifiuto quando l'oggetto si usurava. Alcuni sono pervenuti in stratigrafie archeologiche, come la *corona* rinvenuta nella basilica di Leptis Magna¹¹; altri sono conservati nei musei, ad esempio nel Museo del Cairo¹² e al Louvre¹³.

In Italia si conserva uno straordinario lampadario, rinvenuto ad Aquileia durante gli scavi alla basilica post-teodoriana, edificata tra il 340 e il 360¹⁴, costituito da due cilindri: l'inferiore, di dimensioni maggiori, era alimentato a cera; il superiore, di diametro inferiore, ha sei delfini reggilampada. La *corona*, trovata sul pavimento del quadriportico antistante l'Episcopio, offre importanti indicazioni sull'illuminazione di questi ambienti.

La testimonianza iconografica più nota di questo tipo di lampadario è sul fianco sinistro della *capsella* eburnea di Samagher¹⁵. Altre rappresentazioni si trovano sui sarcofagi, tra cui quello di Felice datato al 723 e quello di Castrocaro della metà del secolo VIII¹⁶.

Farum cantharum

Al *farum cantharum* è stato attribuito il valore di lampada singola¹⁷, ma dall'analisi della terminologia usata sembra che il termine abbia l'accezione generica di lampadario, ossia di *polycandelum*. La necessità di precisare che la *corona* è un *farum cantharum* confermerebbe questa interpretazione, in quanto si chiarisce che la sua funzione è quella di illuminare e non di oggetto simbolico.

Il termine *polycandelum* compare nel *Liber Pontificalis* una sola volta per indicare un lampadario di porfido offerto da Leone III (795-816) alla basilica di San Paolo¹⁸. La forma è a disco con fori per l'inserimento della lampade in vetro e a volte tra i fori sono inseriti motivi decorativi a carattere geometrico o vegetale. Sono realizzati in bronzo e raramente in argento. Molti sono gli esemplari conosciuti, provenienti dall'Oriente e dal Nord Africa, ma non mancano esempi italiani. I ritrovamenti di *polycandela* sono relativi a scavi di basiliche come quelli trovati a Leptis Magna¹⁹, ma i più sono noti da collezioni museali: un lampadario, di cui si conservano ancora le lampade vitree, che sono del tipo con terminazione a bottone, è a Berlino²⁰. I *fara canthara excafoti* e *excadecafoti* sono lampadari capaci di accogliere sei o sedici lampade²¹. A Londra si conserva un lume formato da un cerchio centrale su cui sono alloggiati sedici aste in bronzo intervallate da archetti bifidi sostenuti da una croce²². I pochi lampadari d'argento pervenuti appartengono al Tesoro di Sion, da una chiesa nel sud della Turchia, donati dal vescovo Eutichiano tra il 565 e il 575²³. In Italia *polycandela*, datati al VI-VII secolo e realizzati in ferro e rame, sono conservati presso il Museo di Siracusa: provengono da una raccolta privata e dal sito di S. Lucia di Mendola²⁴.

L'uso dei lampadari è attestato anche in ambito cimiteriale, come quello trovato ad Algeri in un ipogeo sepolcrale di sec.V, la cui forma riproduce una basilica mononave terminante ad abside coperta a cupola. Sul tetto a doppio spiovente sono attaccati i ganci per la sospensione, mentre sui lati lunghi sono posizionati i delfini reggilampada²⁵. Altro lampadario singolare è conservato al Metropolitan Museum of Art, proveniente dalla Palestina, caratterizzato da un piccolo piedistallo, su cui poggia un globo dal quale partono sei bracci in forma di rami terminanti in piccoli contenitori a fiore di loto per l'alloggiamento dei ceri²⁶.

⁸ Wechsel-Kummel 1963, 31 parla di un'origine copta per le corone e Harden 1936, 155 per le lampade vitree prodotte in Egitto.

⁹ In una miniatura carolingia con scena della *Benedictio Fontis* (Biblioteca Casanatense ms. 724 BI 13,2) compare una colomba, con chiaro riferimento allo Spirito Santo, che regge una corona votiva. All'oggetto si aggiunsero bracci e lampade per unire allo scopo simbolico uno pratico e funzionale.

¹⁰ Geertman 1988, 137.

¹¹ Caputo 1984-85, 19.

¹² Strzygowski 1904, Taf. XXXIII, n° 9153.

¹³ Wechsell-Kummel 1963, 31; *Naissance des art Chrétiens*, 263 a-b.

¹⁴ Bertacchi 1978, 340-350.

¹⁵ Angiolini 1970, 41, fig. 8.

¹⁶ Olivieri Farioli 1969, 105, fig. 11.

¹⁷ Mundell & Mango ha recentemente proposto di interpretare alcuni vasi del Tesoro di Hama come lampade proprio basandosi su questo termine. Cfr. anche Montecchi & Vasco Rocca 1988, 244.

¹⁸ *LP* II, 15.

¹⁹ Caputo 1984-84, 231, fig. 19.

²⁰ *Age of Spirituality* 1979, 622, n° 558.

²¹ De Blaise 1975, 352.

²² Dalton 1901, 104, Pl. XXVI, n. 529.

²³ *Handbook of the Byzantine Collection* 1967, 19. nn. 66-67. fig. 66.

²⁴ Agnello 1949, 287-288, fig. 2.

²⁵ De Rossi 1866, 16; *Age of Spirituality* 1979, 623, n. 559.

²⁶ *Age of Spirituality* 1979, 621-623, n. 557.

Canistrum

Nel *Liber Pontificalis* dall'VIII secolo i lampadari vengono indicati con il termine di *canistra*, che potevano sostenere sei o sedici lampade. Il *canistrum*, in genere di bronzo e più spesso in argento, è privo di decorazione. Nella lista di Leone III (795-816) sono riservati ai monasteri e agli oratori, forse per il loro minore prestigio. Nella Dumbarton Oaks Collection un lampadario con struttura a traforo decorato a racemi può essere esemplificativo del termine associato all'oggetto.

Regnum

Nel IX secolo la *corona* è denominata *regnum*: lampadario realizzato prevalentemente in oro, ornato di pietre preziose e gemme, che occupa il posto principale davanti all'altare. La prima menzione si ha nella biografia di Leone III (795-816), il quale dona questo tipo di lume alle basiliche principali, riservando le *coronae* alle diaconie e ai titoli²⁷. L'attenzione riservata alla descrizione del *regnum* dà ragione di credere che fosse particolarmente prezioso, al contrario delle *coronae* che, dal IX secolo in poi, sono realizzate prevalentemente in bronzo e prive di decorazioni.

Nel *Liber Pontificalis* si ha anche la menzione di lampadari in forma di croce e torre. Adriano I (772-795) dona un tipo di lampadario in forma di croce alla basilica di San Pietro, alimentato da ben 1365 candele²⁸; si può ipotizzare che la sua forma fosse molto vicina al grande lampadario ancora oggi presente in San Marco a Venezia.

Lampade singole

Candelabrum

Il termine *candelabrum* è usato nelle liste dei donativi papali dal IV al IX secolo, ma già dal sec. V troviamo la menzione di *cereostata*, il cui peso fa pensare ad oggetti di modeste dimensioni. Il candelabro è composto da un fusto, un piattello che accoglie il puntale e una base a tre piedi. La decorazione interessa prevalentemente il fusto e la base²⁹. Il metallo con cui sono realizzati è quasi sempre il bronzo, ma gli esemplari più prestigiosi sono in argento.

Costantino dona, fra gli altri, sette candelabri d'argento rivestiti d'oro alla Basilica Costantiniana (si ritiene destinati ai sette tavoli delle offerte)³⁰ e quattro a San Pietro (posizionati davanti al sepolcro dell'Apostolo), di cui abbiamo un'accurata descrizione con relativo peso e altezza.

A partire dal V secolo il termine *candelabrum* tende ad essere sostituito con *cereostatium*, che secondo il Geertman non doveva essere più davanti all'altare, ma sopra di esso³¹. Dall'analisi del testo, però, si evince che sia i *cereostata* che i *candelabra* potevano essere sospesi su mensole o su travi, come viene indicato nella biografia di Gregorio III (731-741) e di Adriano I (772-795), mentre nella lista di Leone III (795-816) viene specificato che essi sono presso il *lectorium* per consentire la lettura delle Sacre Scritture³². Negli *Ordines Romani* si fa riferimento sia a candelabri che a *cereostata* portati da sette accoliti e posizionati a terra davanti all'altare dopo una breve processione d'ingresso³³ e non si fa mai riferimento a candelabri sull'altare, posto riservato esclusivamente all'evangelario³⁴. Tuttavia tale regola non venne sempre rispettata, se Leone IV (847-855) sentì la necessità di vietare al Concilio di Reims di posizionare sull'altare altri oggetti che non fossero il Vangelo e le reliquie³⁵, segno evidente che si trattava di una prassi diffusa. Bisogna arrivare al 1200, con Innocenzo III per trovare il primo riferimento a candelabri e croci posizionate sull'altare³⁶ e comunque prima dell'XI secolo non si hanno testimonianze iconografiche relative a candelabri sull'altare³⁷.

Lucernae

Nelle liste papali ai candelabri seguono le *lucernae*, in argento e oro, citate sempre tra le lampade prestigiose. La loro forma è di solito bilicne, ma non mancano quelle a più becchi; il loro peso varia dalle 5 alle 57 libbre. Erano collocate *super fontem*, presso il fonte battesimale o il *lectorium*, sospese davanti alle immagini sacre, ma più spesso davanti al sepolcro di un martire.

Le lucerne in bronzo hanno struttura simile a quelle in terracotta, differenziandosi per la presenza del coperchio che chiude l'*infundibulum*, per un beccuccio sempre molto sporgente, per l'ansa di dimensioni piuttosto grandi e particolarmente elabo-

²⁷ LP II, 20-22.

²⁸ LP I, 499.

²⁹ Sull'argomento è in corso uno studio da parte di chi scrive e a cui si rinvia per ulteriori considerazioni.

³⁰ Geertman 1988, 150 e nota 18.

³¹ Geertman 1988, 151.

³² LP I, 418, 501 e II, 18.

³³ OR I, 52.

³⁴ De Blaauw 1994, 84.

³⁵ Leclercq 1913, 213.

³⁶ De Blaauw 1994, 85.

³⁷ Montecchi & Vasco Rocca 1988, 47.

rata, per la necessità statica di controbilanciare il beccuccio. Le forme molto particolari, il metallo e il costo hanno destinato questo tipo di utensile ad una clientela benestante ed anche conservatrice, legata ai modelli ellenistici che si sono conservati dal periodo imperiale fino alla tarda antichità³⁸. Il tipo maggiormente attestato è quello "ovoide" o "piriforme", dal corpo allungato terminante senza soluzione di continuità nel beccuccio. Le anse si presentano o ad anello con decorazione a traforo o avere motivi decorativi elaborati dalla croce al grifone, sul corpo e sull'ansa erano posizionati anelli che permettevano la sospensione della lucerna.

Numerosi sono gli esemplari conservati nel museo di Berlino³⁹, a Mainz, dove sono presenti lucerne bilicni con ansa a croce greca⁴⁰, nella Dumbarton Oaks Collection⁴¹, la datazione è fissata tra V e VI secolo e l'origine è egiziana o siro-palestinese. In Italia le lucerne "ovoidi" sono presenti nel Museo di Cagliari⁴² e nel Museo di Palermo⁴³, che testimoniano gli stretti rapporti fra l'Oriente e le due maggiori isole italiane.

Particolarmente elaborate sono le lucerne in forma di "nave", come il bellissimo esemplare conservato nel Museo Nazionale di Firenze, proveniente da una casa del Celio a Roma che, dalla iscrizione, si può ritenere un oggetto donato in occasione del battesimo del personaggio citato⁴⁴. Recentemente a Cornus, in Sardegna, è stata rinvenuta una statuina bronzea di San Paolo, ritenuta parte di una lucerna in forma di piccola imbarcazione⁴⁵.

E' frequente in epoca tardoimperiale la lucerna "a volute", con due volute aggettanti che decorano il beccuccio, ma anche un grande foro di alimentazione terminante in un canale aperto, entrambi chiusi dal coperchio. Esemplari sono conservati a Berlino⁴⁶, nella Dumbarton Oaks Collection⁴⁷ e in Italia a Cagliari⁴⁸.

La produzione delle cd. lucerne "plastiche" o *singulares* sotto Costantino ha lasciato testimonianze di notevole pregio. Sono improntate prevalentemente a soggetti zoomorfi (colombe, pavoni e grifoni, quadrupedi), ad esempio i manufatti conservati a Berlino⁴⁹,

nella Dumbarton Oaks Collection⁵⁰ e in Italia a Roma⁵¹, in Sardegna e in Sicilia⁵². Anche gli animali marini, in particolare il delfino, furono presi come soggetti da riadattare alla funzione di lampada, come gli esemplari di Berlino e di Toronto⁵³ che hanno tutti una provenienza egiziana e una cronologia compresa tra V e VI secolo. Dal VII secolo in poi la lucerna perde queste forme elaborate per assumere forma a vasetto con base completamente piatta e larga terminante, senza soluzione di continuità nel beccuccio. L'*infudibulum* diventa largo e con orlo arrotondato da mettere in relazione con l'utilizzo del sego piuttosto che dell'olio vegetale⁵⁴. L'utilizzo di lucerne come mezzo di illuminazione è attestato almeno fino all'XI-XII secolo, come testimonia una miniatura della Biblioteca Laurenziana di Firenze e la scena di donne al Sepolcro della Pala di San Marco a Venezia.

Gabatae

Tra le lampade singole, molto utilizzate in basilica, figurano le *gabatae*⁵⁵, termine che in Isidoro di Siviglia ha il significato di "cavus"⁵⁶. La forma è identificabile con quella di una coppa in metallo che accoglieva un recipiente di vetro nel quale bruciava l'olio.

Le *gabatae* sono prevalentemente in bronzo, più raramente in argento e oro. La prima menzione si ha nella biografia di papa Ormisda (514-523) a proposito di alcuni donativi inviati da Giustiniano e dal vescovo di Costantinopoli alla Basilica Costantiniana⁵⁷.

Dal sec. VIII al termine è associato l'aggettivo *saxisca* forse collegato con un laboratorio attivo nel *Vicus Saxonum*⁵⁸, o ad oggetti importati dall'Inghilterra regione da cui il papato riceve molto metallo prezioso⁵⁹. Le *gabatae* ebbero largo utilizzo negli edifici ecclesiastici, sull'altare, nelle confessioni, pendenti dagli archi del ciborio o dalle *pergulae*, ma anche nella navata centrale e nel quadriportico⁶⁰.

In Italia si conservano prestigiosi esemplari: una lampada in argento, datata alla fine del sec. V con iscrizione votiva è stata rinvenuta nel 1632 nella Chiesa di San Martino ai Monti a Roma⁶¹ e una coppa in cristallo di rocca, conservata nel Tesoro di San

³⁸ Valenza Mele 1981, 87.

³⁹ Wulff 1909, 174, Taf XXXIX, nn. 792, 795-796, 802.

⁴⁰ Menzel 1954, 112.

⁴¹ Ross 1962, 32, n. 31.

⁴² PANI Ermini & Marinone 1981, 79, n. 121.

⁴³ Fallico 1971, 140-143, figg. 8-10.

⁴⁴ Bovini 1950, 10.

⁴⁵ Pani Ermini 1990, 19, fig. 21.

⁴⁶ Wulff 1909, 164, Taf. XXXIII, nn. 782-786.

⁴⁷ Ross 1962, 31, n. 30.

⁴⁸ Pani Ermini 1976, 69, fig. 2; Pani Ermini & Marinone 1981, 80, fig. 122.

⁴⁹ Wulff 1909, 169-174, Taf. XXXV-XXXVI.

⁵⁰ Ross 1962, 39, n. 41.

⁵¹ de' Spagnoli & De Carolis 1986, 83-84, n.39

⁵² Pani Ermini & Marinone 1981, 89, n. 123; Fallico 1974, 488.

⁵³ Wulff 1909, Taf. XXXV, n. 765; Hayes 1984, 138, n. 214.

⁵⁴ Gualandi Genito 1977, 231.

⁵⁵ De Blaise 1975, 409.

⁵⁶ *Etym.*, XX, 4, 11.

⁵⁷ *LP* I, 271.

⁵⁸ De Blaise 1975, 821.

⁵⁹ Delogu 1991, 273-281.

⁶⁰ *LP* II, 30.

⁶¹ Zito 1967, 61, figg. 10-11.

Marco⁶². Alla *gabata* è assimilabile la lampada di Barletta⁶³, che porta sull'orlo superiore un giro di fori per l'inserimento delle candele. La provenienza dall'area orientale spinge a cercare qui i luoghi di produzione di queste lampade come suggeriscono le numerose testimonianze figurative presenti in edifici di culto bizantini⁶⁴. Il mosaico della basilica giordana dedicata a San Giovanni Battista, a San Giorgio e ai Santi Cosma e Damiano, edificata tra 526 e 534, mostra una *gabata* simile a quella raffigurata nella chiesa di San Giovanni a Gerasa, datata al 531⁶⁵.

Tra le lampade utilizzate in chiesa, non citate dal Liber Pontificalis, ma note da altre fonti (in particolare l'Inno V di Prudenzio dedicato all'accensione delle lucerne in chiesa)⁶⁶, sono da inserire le coppe vitree, inserite in anelli e sospese per mezzo di catenelle o funi che venivano riempite d'acqua in cui si faceva galleggiare uno stoppino realizzato con fibre di giunco imbevuto di cera. L'utilizzo è sia come lampade singole, ma più spesso erano usate nelle corone e nei *fara canthara*.

La tipologia può essere riassunta in due tipi principali: la lampada da sospensione – coniche e a stelo – e la lucerna con anse⁶⁷.

Allo stato attuale delle ricerche si è in grado di risalire con una certa sicurezza all'illuminazione degli edifici di culto, per i quali siamo meglio informati dalle fonti, che riservano un'attenzione particolare alla descrizione della suppellettile liturgica.

L'illuminazione delle basiliche (Tav.I).

La maggior fonte di luce era fornita dai lampadari e questo è giustificabile in ambienti molto grandi. La zona absidale riceveva la gran parte delle lampade e risultava il luogo maggiormente illuminato per permettere lo svolgimento della liturgia. All'altare (Tav. I a) erano riservati i lampadari più prestigiosi a cui si associava uno spiccato valore simbolico. Il lampadario in forma di *corona*, successivamente denominata *regnum*, era sicuramente il più adatto. Davanti all'altare trovano posto almeno nei primi secoli sette candelabri, da posizionare davanti ai tavoli delle offerte, che però hanno piuttosto valore simbolico e non funzionale.

La confessione (Tav. I b) viene illuminata da lampadari: un *polycandelum* in porfido e oro è donato da Leone III (795-816) per la *confessio* di San Paolo e una *corona* dello stesso materiale è offerta da Leone IV (847-855) alla Basilica di San Pietro⁶⁸.

Il presbiterio viene illuminato soprattutto dai *polycandela* che data l'abbondanza riscontrata nel testo sembrano costituire la maggior parte dell'illuminazione delle chiese. I lampadari a disco, molto semplici nella struttura, potevano ricevere numerose coppe in vetro e fornire un'abbondante luce. Per la necessità di avere una buona illuminazione durante la funzione liturgica si ritiene che, anche quando non viene indicata la collocazione, la maggior parte dei lumi fosse destinata al presbiterio.

Per le navate si hanno poche indicazioni. Quella centrale – *in gremio basilicae* – è rischiarata prevalentemente da lampade alimentate a cera, ossia da *cereostata*: candelabri di piccole dimensioni e poco peso, che potevano a volte essere sospesi su travi inserite probabilmente tra gli intercolumni del colonnato o pendenti dalle pareti. In questo caso si possono paragonare a piccoli candelieri.

Le navate laterali vengono citate una sola volta nel testo, a proposito dei donativi di Costantino alla Basilica Costantiniana. Si legge che quaranta lampadari sono distribuiti alla navata sinistra e soltanto sedici alla navata destra. Il dato può essere variamente interpretato. Il Geertman, si è basato sull'orientamento della basilica lateranense, la navata destra riceveva una luce migliore e quindi necessitava di minore illuminazione durante la funzione liturgica⁶⁹. Tuttavia va tenuto conto delle testimonianze che riferiscono di una parte sinistra riservata agli uomini e una destra alle donne⁷⁰.

L'illuminazione delle abitazioni private

A differenza dell'illuminazione degli edifici di culto, scarse sono finora le indicazioni circa la suppellettile utilizzata nelle abitazioni private. I motivi di questa forte discrepanza derivano dalla scarsità delle fonti scritte sull'arredo domestico e dai pochi dati desumibili da stratigrafie archeologiche.

Gli scavi archeologici restituiscono una buona quantità di lucerne in terracotta e si ritiene probabile che in casa esse costituissero la maggior parte della

⁶² *Le Trésor de Saint Marc* 1984, 191-193, fig. 23.

⁶³ Toesca 1927, 1104, fig. 801.

⁶⁴ Bonanno 1996, 561.

⁶⁵ Piccirillo 1993, 274, n. 505 e 289, n. 542.

⁶⁶ *Cathem*. Inno V, 90, 141.

⁶⁷ Una prima classificazione degli oggetti in vetro è stata proposta da D. Stiaffini (Stiaffini 1985, 667-688 e Stiaffini

1991, 177-266) e recentemente uno studio tipologico dedicato esclusivamente alle lampade è stato affrontato da M. Ubaldi (Ubaldi 1995, 93-145).

⁶⁸ *LP* II, 15; *LP* II, 123.

⁶⁹ Geertman 1988, 140 e nota 8.

⁷⁰ De Blaauw 1994, 504.

Tav. 1a.

ALTARE			
papa	basilica	tipo	numero / peso
Silvestro 314-335	Basilica Constantiniana	farum cantharum....cum delfinos 80	1 / sing.30
Silvestro 314-335	Basilica Constantiniana	candelabra auricalca....	7 / sing.300
Sisto III 432-440	Basilicam sanctae Mariae... iuxta Macellum Liviae	coronam farum argenteum	1 / 30
Ilaro 461-468	Basilicam Constantinianam	fara cantara argentea	10 / sing. 20
Gregorio III 731-741	oratorio in eandem basilicae (S. Pietro)	coronam auream cum cruce...	1
Gregorio III 731-741	oratorio in eandem basilicae (S. Pietro)	canistra argentea (in tribus lateribus altaris)	2
Gregorio III 731-741	oratorio in eandem basilicae (S. Pietro)	coronulas argentea (in tribus lateribus altaris)	5
Adriano 772-795	Ecclesia Salvatoris quae vocatur Constantiniana	gabatas aureas (ante vestibulum altaris)	3 / 10
Leone III 795-816	Basilica beati Petri	canistris argenteis	
Leone III 795-816	Titulo sanctae dei genetricis quae appellatur Callisti	regnum ex auro purissimo...	1 / 1
Leone III 795-816	Diaconia ...Dei genetricis..... Dominca	regnum ex auro mundissimo....	1 / 2
Leone III 795-816	oratorio vero sanctae Crucis	regnum spanoclistum ex auro purissimo...	1 / 1 et unc. 1 l
Leone III 795-816	Beato Petro apostolo	canthara maiores....habentes in medio cereos ex argento purissimo	4 / in uno 140
Leone III 795-816	Beatum Andream apostolum	cantharos ex argento..	12 / 52
Leone III 795-816	Beatum Andream apostolum	canistros	12 / 88
Leone III 795-816	Sanctae Dei genetricis ad Praesepem	coronas ex argento ...	2 / inibi 54
Leone III 795-816	Basilica ipsius apostoli (S.Pietro)	canistrum ex argento....	1 / 15
Leone III 795-816	Basilica vero beati Apolenarii iuxta civitatem Ravennam	canistrum ex argento....	1 / 15
Leone III 795-816	Ecclesiam beatorum martyrum Nerei et Achillei	regnum ex auro purissimo...	1 / 2 et unc. 6
Pasquale 817-824	Ecclesiam...virginis Mariae ad Praesepem	cantara ex argento	6 / 40 semis
Gregorio IV 827-844	Ecclesiam... beati Marci.....	regnum aureum....	1
Sergio II 844-847	Ecclesia beati Silvestri et Martini	regnum aureum...	1
Sergio II 844-847	Ecclesia beati Silvestri et Martini	gabatas ex argento....	4
Sergio II 844-847	Ecclesia beati Silvestri et Martini	regnum aureum...	1
Sergio II 844-847	Ecclesia beati Silvestri et Martini	gabatas ex argento....	4
Leone IV 847-855	Oratorium beati Leonis...	fara aerea	
Leone IV 847-855	Ecclesia sanctorum IIII Coronatorum	regnum de argento....	1
Leone IV 847-855	Monasterium....Simetri et Cesari	regnum ex auro	1
Leone IV 847-855	Ecclesia beati Petri	butronem ex argento....	1 / 138
Leone IV 847-855	Ecclesia beati Clememtis...	regnum ex auro	3 / exagia 50
Leone IV 847-855	Ecclesia Sanctorum IIII Coronatorum	regnum ex auro	1
Leone IV 847-855	Basilica beati Petri	coronas cum catenulis aureis...	2/20
Leone IV 847-855	Basilica beati Petri	cereostata de argento maiora quibus sedent lucerna vimixae ..	1 / 48 et unc. 10
Bebedetto III 855-858	Basilica beati ...Pauli	regnum de auro purissimo	1 / 2 et unc. 1

suppellettile per illuminazione, per il basso costo, la facile reperibilità e la semplicità di lavorazione che, in termini di produzione, si traduce con la lavorazione dei pezzi su vasta scala, favorendo anche

l'esportazione oltre i confini nazionali. L'utilizzo delle lucerne in terracotta è attestato almeno fino al XV secolo⁷¹.

Recenti indagini in Italia Settentrionale sembrano fornire nuove indicazioni sull'illuminazione domestica, in particolare negli scavi di Monte Barro, dove sono stati rinvenuti alcuni contenitori in pietra ollare, che in seguito a "restauri" antichi sono stati riutiliz-

⁷¹ Per la classificazione delle lucerne tardoantiche si veda l'"Atlante delle forme ceramiche I", per le lucerne medievali Gualandi Genito 1986 e Ceci 1992.

Tav. 1b

CONFESSIONE			
papa	basilica	tipo	numero / peso
Ilario 461-468	Oratorium Sanctae Crucis	coronam auream	1
Ilario 461-468	Beati Iohannis	coronam argenteam	1 / 20
Sergio I 687-701	Basilicam beati Petri	faros argenteos	6 / 170
Leone III 795-816	Basilicam beati Petri	coronas maiores argenteas	2 / 327
Leone III 795-816	Titulum beate Susanne	gabathas	5 / 150
Leone III 795-816	Titulum beate Susanne	canistrum exedecafoti	1 / 12 semis
Leone III 795-816	Titulum beate Susanne	coronam maiorem ...cum delfinos 32	1 / 22
Leone III 795-816	Titulum beate Susanne	canistrum argenteum	1 / 18
Leone III 795-816	Titulum beate Susanne	gabathas argenteas saxisca habente grifos deauratos.	/ 2
Leone III 795-816	Titulum beate Susanne	coronas argenteas cum delfinos 18	2 / 18
Leone III 795-816	Basilica ... beati Pauli	policandilum porfireticum	1 / 1
Leone III 795-816	Basilicam beati Petri	cereostata maiores...	/ 198
Leone IV 847-855	Ecclesia beati Petri	coronas porfiretica...cum delfinos 12	1 / 3 et semis

Tav. 1c

PRESBITERIO			
papa	basilica	tipo	numero / peso
Adriano 772-795	Basilica beati Petri	farum maiorem in typum crucis habentem candelas mille 365	1
Adriano 772-795	Basilica beati Adriani	cereostata argentea	1 / 12
Leone III 795-816	Basilica beati Petri	canistris argenteis	
Leone III 795-816	Beatro Petro apostolo	forocantaras ex argento...	14 / 322 et unc. 3
Leone III 795-816	Basilica beati Petri	farum volubilem ...cum coronis et crucis	1 / inibi 136
Leone III 795-816	Basilica beati Petri	farum argenteum cum gabathas argenteas 20 et canistrum octagoni in medio	1 / 43
Leone IV 847-855	Basilica beati Petri	cera lignea	4
Leone IV 847-855	Basilica beati Petri	cereos deargentatos	27 / 40

NAVATA CENTRALE			
papa	basilica	tipo	numero / peso
Silvestro 314-335	Basilica Constantiniana	cantara cirostata argentea	50 / sing. 20
Silvestro 314-335	Basilica Constantiniana	fara cantara argentea	16
Innocenzo 401-417	baptismi (S. Vitale)	fara canthara aerea cerestata	20 / sing. 40
Celestino 422-432	Beatum Petrum	canthara aerea cerestata	24 / sing. 20
Sisto III 432-440	Basilicam sancto Laurentio	canthara aerea cerestata	24
Leone III 795-816	Basilica doctoris mundi beati Pauli	gabathas fundatas ...qui pendent in faro aereo	8 / inibi 14
Leone III 795-816	Basilica beati Petri	gabathas fundatas signochristas	48 / 101 et semis
Leone III 795-816	Basilica beati Petri	canistros interrassiles ex argento	22 / 125

zati come oggetti per illuminazione⁷². Il dato interessante è il ritrovamento di lampade vere e proprie realizzate con questo materiale⁷³.

Altro materiale sicuramente utilizzato per illuminazione domestica è il vetro. Lampade vitree rinvenute in un villaggio carolingio in Francia sono relative ad un piccolo abitato rurale⁷⁴, in Italia ne sono state trovate a Napoli in via Carminiello ai Mannesi⁷⁵ e nel *Castrum* tardo-antico di S. Antonino

di Perti, dove sono presenti anche le lucerne ad anse verticale ritenute finora solo di diffusione meridionale⁷⁶.

⁷² Bolla 1988, 216.

⁷³ Lusuardi Siena & Sannazzaro 1994, 163.

⁷⁴ Gentili 1988, 271.

⁷⁵ Micaglia 1994, 329-342.

⁷⁶ Falcetti 1993, 314-318.

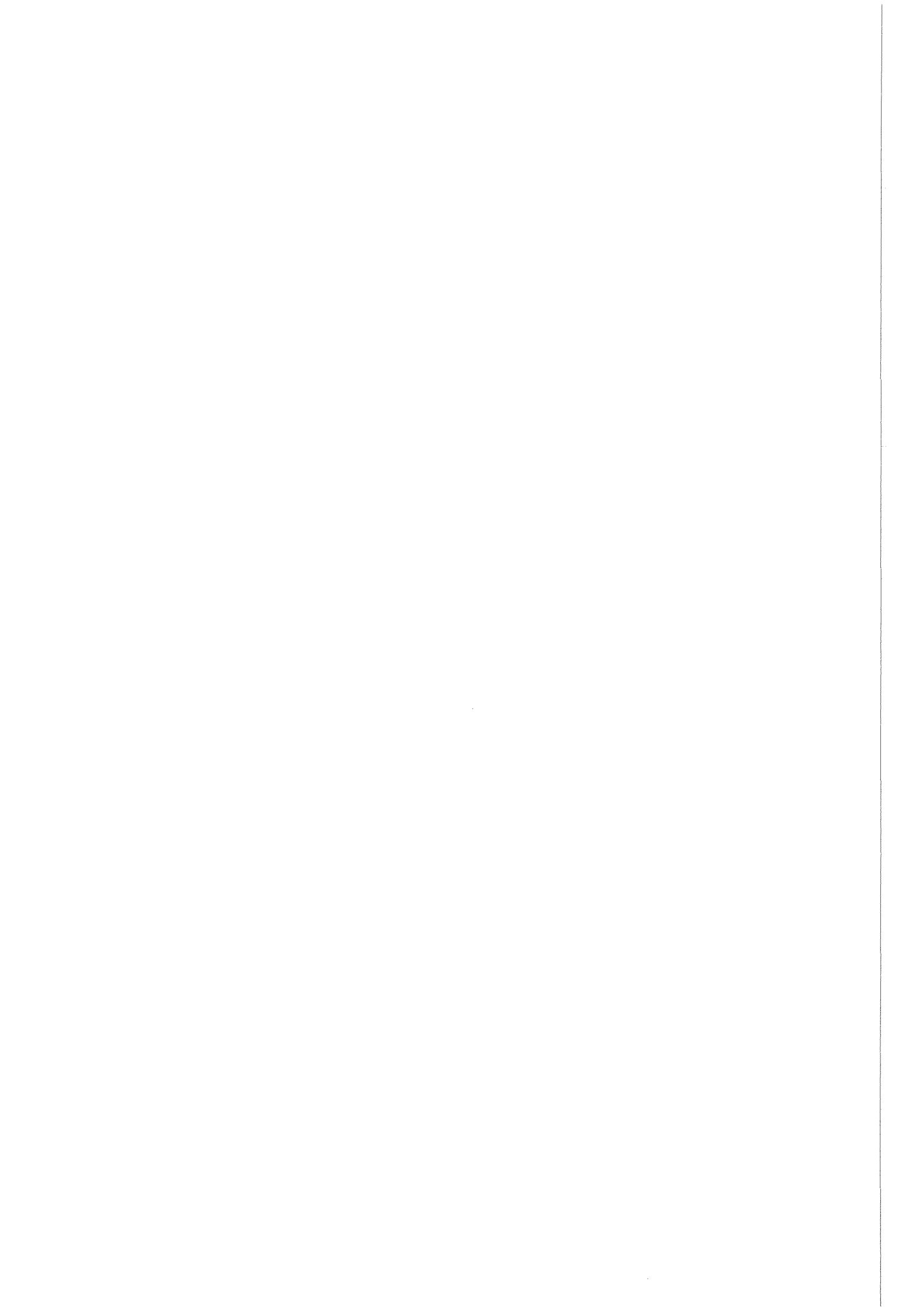
La mancanza di dati a disposizione per l'illuminazione delle case potrà verosimilmente essere colmata con quanto emergerà da futuri scavi relativi ai contesti insediativi.

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English Sixteenth and Early Seventeenth Century Vessel Glass in the Context of Dining

The archaeological study of vessel glass from late medieval and early modern periods in England is still very much in its infancy. The analysis of this material continues to be founded on the art historical traditions of scholarship which evolved at the beginning of this century. This work has been based on artistic and complete vessels which have survived without ever having been deposited in an archaeological context. Investigation has also been undertaken on contemporary documentary sources, with a primary interest in production and monopoly rights, by both W. Thorpe and more comprehensively, Eleanor Godfrey (Thorpe 1961; Godfrey 1975). However a thorough examination of vessel glass in its own right has been less forthcoming.

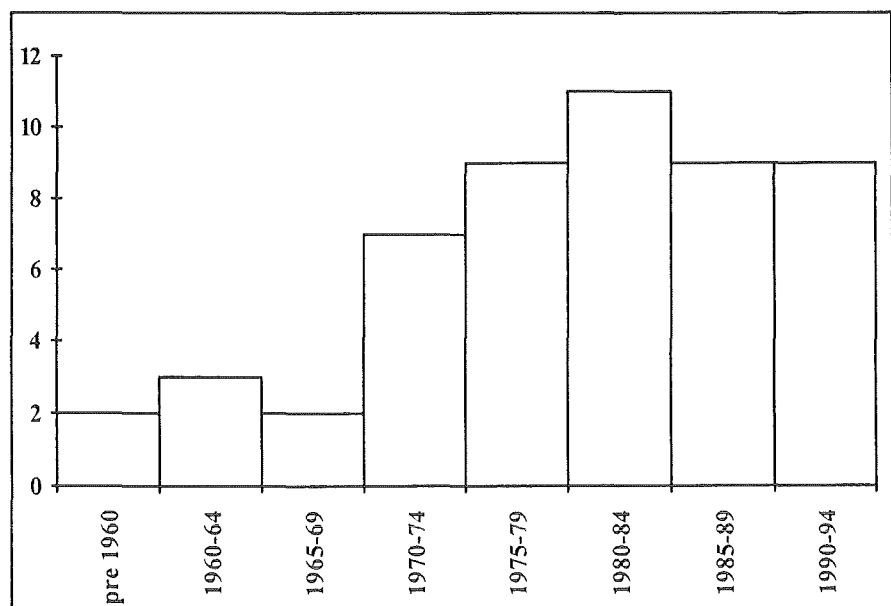
A basic framework for the archaeological study of this material did not begin to be realised until the 1970s, following the marked increase in the inclusion of specialist glass reports within excavation publications (Table 1). This was mainly due to the higher prevalence of the material in the large scale excavations of this period caused by urban re-development. Yet even now the relative numbers of published

reports remains very low, with much of the vessel glass from the sixteenth and early seventeenth centuries either remaining unrecognised, or ignored in favour of more traditional artifact types such as pottery, metal objects and latterly clay pipes.

The only major attempt at a synthesis of this material was made by Robert Charleston (Charleston 1984, 42-109). He was the first to relate excavated material to the historical sources and to establish a basic framework of glass for this period. However he never developed a precise chronology and much work is still needed in this area to achieve a more comprehensive classification. Nevertheless it is now possible to start to examine the glass of the sixteenth and seventeenth centuries in its wider social context. It is the intention of this paper to undertake a preliminary investigation into how certain types of glass were used in the context of dining and what meanings can be inferred from this.

Vessel glass occurs on medieval sites in England from the late thirteenth century onwards and in a variety of forms. There are distinct observable changes in style and preference for a number of

Table 1.
Published Glass Reports for
English sites 1500-1640.



forms, whilst others remain remarkably conservative throughout this period. The greatest variations occur amongst drinking vessels, perhaps the most obvious and conspicuous vessels used. Tall stemmed goblets were the most popular form, originating in the late thirteenth and continuing to the mid-fourteenth century (Tyson 1996, 48). However by the fifteenth century beakers had become much more prevalent and by the beginning of the sixteenth century there appears to have been a complete shift away from the use of glass drinking vessels. However other forms, such as potash flasks, urinals and lamps all first occur in the late thirteenth century and hardly change stylistically until the early seventeenth century. Clearly throughout the medieval and early modern periods there were changes in the way that certain drinking forms were required and used. Consequently the vast increase in use of glass vessels in the sixteenth and early seventeenth centuries, particularly those used for drinking, must be considered within this background. The second half of the sixteenth century sees the presence of larger and larger quantities of vessel glass on most English sites. This can be partially accounted for by the increased production at home and import from abroad, but this growth could only have occurred as a response to demand.

Supposing that observable changes in drinking vessel preferences and forms is linked to their context of use, it is important to look briefly at changes in this context. The vast majority of these vessels would have been utilised most conspicuously in the process of dining. Insights into the dining process in the sixteenth century are given by the rule books which survive, most importantly Erasmus of Rotterdam's *'De Civilitate Morum Puerilium Libellus'*, published in 1530 (Elias 1978, 53). This work demonstrates three important points. Firstly Erasmus illustrates the social control that occurred at the table in which consumption is expressed in a number of communicated rules. These regulations of social action are shown through the use of manners. Erasmus suggests that signs, gestures and conduct were a direct mirror to the soul and therefore reflect visibly upon the self (Ibid.). The whole process of dining was thus a very complex system of regulation, with the way that the individual conducted themselves and the items at the table giving out important messages. Secondly the work is addressed to children, suggesting that this system should be taught at the youngest age and it is not a work exclusive to the nobility or the clergy. Consequently it encapsulates a common code establishing a social identity through manners and objects. Finally Erasmus' work was extremely popular, being one of the earliest mass printed books. It went through eighty subsequent editions and was translated into

fourteen languages. It inspired other such works which contained specific references to the use of vessel glass (Elias 1978, 271).

*'puis il mettra son pain de costé gauche, le
cousteau du costé droit, comme le verre aussi'*
(Calvia, Civilité 1560)

*'Enfant, se tu fais en ton verre soupes de vin
aucunement, boy tout le entierement, ou
autrement le gecte à terre'*
(Anonymous French sixteenth century)

Works such as these help emphasise three aspects of dining in the sixteenth and early seventeenth centuries. Firstly, although earlier manner codes do exist, mass circulated books such as Erasmus' suggest that society was more conscious generally about dining and the regulation of it. These recorded concordances demonstrate a new level of understanding about how the individual should portray their own perception of themselves. Gentility could be expressed not only in what one possessed but how it was used. Secondly the teaching of these codes of meaning was intended to occur in childhood. Ideas of refinement were to be taught and imbedded at the earliest age. Consequently the child was brought up knowing not only who they were but also how that should be displayed. Finally these social codes demonstrate the very real instigation of strict social regulation. The individual's position in society was no longer defined by just the display of wealth or power, subtlety and cultivation was used to emphasised status. Consequently during the sixteenth and early seventeenth century dining became a more regulated and constructed process to enable the furtherance of ideas of the individuals position and status.

Although it is a possible coincidence that the apparent renewed popularity of drinking glasses occurs at the same time as the development of a more complicated dining procedure, it is the suggestion of this paper that this is not the case. In 1587 William Harrison published the second edition of *"A Description of England"* in which he chronicles many of customs and habits of the English (Harrison 1877). In this he refers to the presence of vessel glass at the dinner table,

*'It is a world to see in these our daies, wherin gold
and silver most aboundeth, how that our gentilitie
as lothing those mettals (bicause of the plentie) do
now generallie choose rather the Venice glasses,
both for our wine and beere'*

This he suggests is because it is

'the nature of man generallie, that it most coveteth things difficult to be atteind'

Additionally he notes that this extends further down the social scale,

'and as this is seen in the gentilitie, so in the wealthie communitie the like desire of glasse is not neglected'

'The poorest also will have glasse if they may; but sith the Venecian is somewhat too deere for them, they content themselves with such that are made at home of ferne and burned stone'

(Book II Chap VI: 147).

Here Harrison confirms the desirability of glass as a new medium for tablewares. Traditional metal vessels were being replaced in a number of households with high quality glass. This is not restricted to the nobility alone, but other people with the wealth to buy it. He explains this in part by saying that this is because it is not as available as gold and silver and thus its rarity gives it value. Also he notes the universality of its appeal through the wealthy middle classes and even the poor, although the latter would not have had access to fine Venetian or even quality home products. The glass referred to by Harrison is home produced potash or forest glass, not used in this period for the production of high quality drinking vessel. This apparent universal appeal is confirmed in the archaeological record with glass of varying qualities appearing at a wide variety of social scales for the first time in the late sixteenth and early seventeenth centuries (Charleston 1984: 42).

The increase in the use of glass vessels in the dining process can therefore be partially ascribed to its relative exclusiveness. This element is a message that is clearly communicated by the object to those who used them. This brings into question the role of dining as a forum for the expression of ideas. Such ideas of artifacts acting as agents of communication are far from new. Douglas has argued that food and dining can be seen as systems of communication, ordering life and penetrating social action (Douglas 1982). However such questions need to be examined so that further messages that were passed from the vessels can be defined. Such an investigation should suggest why glass was particularly used for carrying these messages.

McCracken, like Douglas, concentrates more on the consideration of material culture as an expressive medium, similar to language (McCracken 1990). He tries to explain how meaning is passed on from its

inception to the recipient. He acknowledges that one of the greatest limitations to the approach of the study of meaning in objects is the failure to recognise that this meaning is in transit. It is flowing to and from several locations aided by the efforts of both those that produce and consume the object. He proposes a linear model by which ideas of the cultural world are transferred from the world to the object and then from the object to the individual. Messages are embodied into the artifact when it is made and these are the ones which it is possible to extract. McCracken's model of meaning movement follows a distinctly linear progression. Meaning starts in the cultural world and then ends in the individual. But the individual can pass meaning onto the cultural world, creating a self-perpetuating cyclical process. In a system where the progression is a linear one the cultural world and its principles would never change. However they are clearly in flux, giving out meaning but also receiving it. The individual can receive meaning and consume items, which are themselves given significance by society, through the transfer of these ideas in the environment of the table. The individual by absorbing these cultural principles passes them on, either directly or indirectly.

Dining in the sixteenth and seventeenth centuries can be seen as having worked on two levels. In its primary role it acted as a functional venue for consumption where food and drink could be bought and consumed quite conspicuously. Consequently dining acted as a place where display and communication through consumption could be expressed. However dining worked on a more complex consumerist level, it acted as a vehicle by which meaning within society could pass on to the individual. Social relationships, such as definition of the self and communal associations, passed from the 'object' of the table to the individual.

The exclusivity of access to high quality glass vessels has already been stressed here. But other aspects of the messages communicated by the use of high quality glass vessels can be suggested. The use of glass vessels infers further aspects concerning the perceived owner's status. The most obvious is in terms of wealth. Although glass vessels did not cost as much as gold or silver ones, a very telling statement concerning a perceived value in glass vessels can be found in Harrison when he says;

'in time, all (glasses) go one waie, that is, to shards at the last, so that our great expenses in glasses...are worst of all bestowed in mine opinion, because their peeces doo turne unto no profit'

(Book II Chap VI: 147)

Table 2.
Price of Drinking Vessels per Dozen (After Godfrey 1975, 216)

Type of Vessel	Before 1615	1621	1624	1635
Venetian Beer Beakers	20-24s	-	-	10-11s
Venetian Wine Goblets	18s	-	-	7-8s
Domestic Beer Beakers	-	18s	15s	9s
Domestic Wine Goblets	-	16s	12s	5s 6d

Unlike gold, silver and to a more limited extent pewter, glass has no real scrap value when it is broken. Glass vessels when damaged are also almost impossible to repair. Consequently when it is smashed or thought to be out of style it represents a large wasted expense. The use of glass at the table would have denoted a very visible conspicuous display of wealth, one that was completely lost if the vessels need to be replaced. Unfortunately all the price values are not exactly known over this period although some have survived from the early seventeenth century (Table 2).

Even though there are no direct prices for the sixteenth century, they are most likely to have been greater, as Table 2 clearly shows a gradual reduction in price of the vessels per dozen. This is most likely due to the increased quantities of available vessels and as more and more people were able to obtain drinking vessels their relative status value became less. Clearly during the seventeenth century even Venetian glasses were becoming less expensive and can be assumed to have held less importance at the table than during the second half of the sixteenth century.

The use of glass also had the possibility of expressing refinement and achieved position within society. Whilst old types of artifacts continued to be produced, the sixteenth and seventeenth centuries saw an unparalleled expansion of changing fashions and styles of objects. Glass was an ideal medium to express the owner's awareness of these new vogues. Indeed the very fluid nature of glass itself, which lends itself to complicated manipulation such as mould blowing, made it a perfect medium to adapt and exhibit new forms. The variety of decorative techniques available in glass as opposed to metals gave it the edge in the diversity of appearances it could adopt.

Glass vessels were clearly a potentially powerful means of expressing hidden codes of meaning and aspiration. However by the first half of the sixteenth century there was no native glass industry in England

producing high quality wares. In the second quarter of that century however the Crown was clearly trying to establish a home industry when it encouraged Jean Carré, a native of Antwerp, to establish a glasshouse in England in 1567, with the proviso that he teach the craft to the English (Godfrey 1975, 20). Ultimately this venture failed and the long term manufacture of glass was not achieved. Nevertheless the desire to have some control over the industry persisted, extending even to the granting of special licences to glassmakers.

The first comprehensive licence was the monopoly granted to Jacob Verzelini in December 1574. It gave Verzelini the sole right to produce drinking glasses in the Venetian style for twenty one years. The condition of this monopoly was that the glasses had to be sold "*as good cheape or rather better cheape*" than the imported counterparts (Patent Rolls 15/12/1574). The importation of competing Venetian wares was also forbidden, although these could be brought in under special licence for personal use (Godfrey 1975, 30).

The reasons for the granting of a monopoly by the Crown initially seems rather obvious. It encouraged without competition the establishment of a new industry in the country, previous attempts at which had been unsuccessful. The founding of the home industry would curtail unnecessary imports and the consequent drain of bullion. Therefore a protected market was needed and this resulted in the glasses having to be produced at a cheaper rate than foreign ones. However this interpretation of the monopoly is not unproblematic. First it applied only to drinking vessels, not all glass imports. Venetian flasks, jugs and other luxury wares were unaffected, hence reducing the economic value of the monopoly. Second it was possible to have a limited import licence, suggesting that certain individuals could freely obtain Venetian drinking vessels. Indeed Harrison writing thirteen years after the establishment of the monopoly does not suggest that the nobility had any trouble obtaining Venetian glass. This would seem to indic-

ate that the granting of the monopoly was for a more than strictly economic reasons.

The establishment of a monopoly created three levels of glass drinking vessels in the sixteenth century. The highest level was represented by imported Venetian glass favoured by the wealthiest. The next category was the domestic glass produced to near Venetian standards that was only restrictive due to its cost. The last was the much cheaper and poorer quality home-produced potash glass, which even the poorest people had according to Harrison. Consequently access to glass types was severely restricted and stratified, although only with drinking vessels. It is important to stress that this was not necessarily the case for storage and other vessels.

With Verzelini's monopoly due to end in 1595 the Crown issued a patent in 1592 to Sir Jerome Bowes to become effective when that of Verzelini expired (Godfrey 1975, 40). This patent was basically a revision of Verzelini's monopoly. There was also the addition that if he did not produce sufficient quantities of glass he must "*suffer the said Noblemen and others of her Majesties privy council to make thereof only to their owne private use*" glass from foreign sources (*ibid.*).

The granting of monopolies and patents in this period appears to be a direct attempt to restrict and stratify the glass that was available to individuals. Licences granted to import Venetian glass were presumably very exclusive and only available to the nobility, whilst the top quality domestic glass was still prohibitive due to its cost. The licensing of the glass industry had the effect of acting in a similar fashion to the late medieval sumptuary laws. These laws acted as a demarcation of whom should use what products, particularly with clothing (Scattergood 1987, 257). Whilst the sumptuary laws were partly enforced to protect native industries, especially the cloth trade, they were also a response to feared progressive change. They demarcated what styles of clothing were appropriate for whom and were a direct attempt to limit the perceived dangers of individuals trying to appear above their station. These laws were a clear recognition that clothing could be used to express meaning of social aspiration and mobility, which was threatening to the established order (*op. cit.*, 270). Ultimately the sumptuary laws failed as it proved hard to legislate and prosecute people on the basis of their appearance. However the granting of the monopoly to Verzelini proved a more effective social control. Venetian glass would simply not have been available to those thought not worthy enough to be granted a licence. It also provided domestically produced glass of a high quality for fashionable use, but this would have clearly carried very different

status meanings. For the late sixteenth and early seventeenth centuries, at least, the accessibility of glass vessels capable of transmitting powerful messages was strictly and successfully managed.

Conclusion

It is the intention of this paper to briefly explore some of the patterns of consumption of glass that existed in the sixteenth and early seventeenth centuries in England. The study of vessel glass is very rarely viewed in the context of its social setting. Although much further work is required in the classification of this material, it is possible to carry the investigation further. Glass, particularly drinking vessels, increased greatly in popularity from the mid-sixteenth century onwards at a wide range of social scales. These vessels were used in the effective communication of new ideas concerning perceived social status and ranging. The ability of glass to communicate these meanings so effectively often made it a more popular medium for vessels than more expensive gold and silver counterparts. The development of a more sophisticated dining procedure, with its hidden codes of conduct, provided a perfect forum for this expression. Such was the recognition of the potential danger to the established status quo that effective monopolies were granted and the importation of material severely limited to control the use of glass. What resulted was the stratification of glass products available at the end of the sixteenth century and in the beginning of the seventeenth century. Ultimately this regulation failed. Table 2 shows the falling values of both imported and domestic vessel glass. Production appears to have been satisfying demand to such an extent that prices were consistently dropping, lowering the value of the glass as a conspicuous display of wealth. Vessel glass was never subsequently regulated to such a degree, and probably only regained new value meanings with the redevelopment of a new form of lead glass in the 1670s by Ravenscroft.

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‘... some to honour and some to dishonour...’ Vessels in Late Medieval Urban Households¹

‘But in a great house there are not only vessels of gold and of silver, but also of wood and of earth; and some to honour and some to dishonour.’ (2 Tim. 2,21)

Introduction - sources and methods

Reconstructing everyday life in the Middle Ages is like restoring a broken pot, whereby the restorers’ task is not only to place the individual sherds in their original position, but to find out which pieces belong to the same vessel, and what kind of changes have they undergone while lying beneath the earth. Our ‘sherds’ are pieces of historical, pictorial and archaeological evidence which survived under quite different conditions, and they can be placed in the right context only when we consider the intentions, how and why they documented or transformed past reality at one point in time. Written and pictorial sources can be categorized as normative (expressing required conditions), narrative (rendering events according to the narrator’s view), idealising (conveying moral reflections) or, finally, factual ones which simply present facts or objects. This latter category comprises, among other material, account-books, inventories, and testaments, and survived or excavated objects can be put into this group as well. The present paper intends to exploit the compatibility of these two different groups of factual sources in order to draw conclusions which were not included explicitly in either of them – i.e. to complete the ‘vessel’ to be restored.

I The written evidence

I.1 Testaments - possibilities and limits of evaluation

Compared with the ‘core-countries’ of Europe, medieval Hungary does not have an abundance of written sources. Inventories and private account-books are extremely rare, only testaments survived in a few towns in sufficient numbers to be evaluated both qualitatively and quantitatively, and even these can be regarded as realistic only with some restrictions. We must be aware that last wills were not intended to give a full account of the testators’ household. In general, movables played a secondary role beside real estate and money in the property-structure, and in the text of wills as well. Not only were objects of small value neglected, but property bequeathed to the main heir, usually the spouse and/or the children, were not itemized either; rather, they were mentioned in generalizing terms such as ‘all my goods and chattels’. A further difficulty is that the descriptions of the objects are often too concise or obscure, enabling identification only for the owners and the executors².

On the other hand, objects mentioned in the wills were certainly available in the testators’ households. Furthermore, through identifying the function, occupation, wealth and location (home) of the testators with the help of additional sources such as tax-lists and entries in the property-registers (*Grundbücher*), we can place the described items of household in a wider social and topographical context within the town.

¹ Most statements in this paper are based on my thesis ‘*Wills as Sources of Social and Economic History of Late Medieval West-Hungarian Towns*’. Further research on the topic was supported by the Research Support Scheme of the OSI/HESP (Grant No. 1078/1996). I am greatly indebted to J. Gömöri for providing the material of his unpublished excavation in the Fabricius-house for analysis.

² See in general: P. BAUR, *Testament und Bürgerschaft. Alltagsleben und Sachkultur in spätmittelalterlichen Konstanz* (henceforth Baur, Testament), Konstanzer Geschichts- und Rechtsquellen 31, Sigmaringen, 1989, with earlier literature, and most recently: M.C. HOWELL, Fixing Movables: Gifts by Testaments in Late Medieval Douai, *Past and Present* 150, 1996, 3-45.

Name	silver n %	pewter n %	brass n %	bronze n %	glass n %	wooden n %	iron n %	uncertain n %	total n %	pottery n %
beaker	84 20				2 0.48			5 1.2	91 22.1	76 9.53
cup	5 1.2					1 0.24		1 0.24	7 1.7	
mazer	9 2.2							2 0.48	11 2.67	
jug	2 0.48	71 17.2	1 0.24					11 2.67	85 20.6	32 4
bottle		4 0.97						6 1.44	11 2.67	
bowl	1 0.24	124 30.1				1 0.24			126 30.6	3 0.4
plate		41 10							41 10	1 0.1
washb.			5 1.2					4 0.97	9 2.2	
cauldr.								5 1.2	5 1.2	
pot								2 0.48	2 0.48	505 63.4
pan										12 1.5
lid				4 0.97						119 14.9
mortar										
tub										
other			6 1.44	4 0.97	3 0.72			4 0.97	12 2.9	49 6.15
total	101 24.5	240 58.2	6 1.44	4 0.97	3 0.72	14 3.4	4 0.97	40 9.7	412 100	797 100

Table 1

Occurrences of vessels in written sources and archaeological material in Sopron.

Source: Házi II/1-2. *passim* (testaments)

Sopron-Fabricius house (unpublished excavation of J. Gömöri)

The place from which our evidence comes is Sopron, a smaller medium-sized town that had about 3500 inhabitants during the 15th-16th centuries. Lying close to the western border of medieval Hungary, the economic backbone of the town was commerce and extensive production and trade in wine. The majority of the population of the town in the Late Middle Ages was German-speaking, so terms from sources quoted below will also be in that language.

I.2 Vessels in testaments

The roughly 300 testaments from late medieval Sopron (between 1393 and 1526)³ which survived, mentioned movable goods in some 2000 cases altogether which could mean that more pieces or whole sets are referred to at the same time. In this sample, articles of clothing turn up most frequently (450 cases = 22.4 %). These were followed by vessels (220 cases, more than 400 items, 10.9 %) which thus represented the second most important group of chattels for the testators. We shall begin our survey with table-ware (Table 1).

The most frequently mentioned drinking vessel was the *beaker* (German *Becher*, lat. *piccarium*), in most cases made of silver (*Silberpecher*). Although this word may denote several shapes, if no special comments were added, we can identify these vessels with a tall and slender 'gothic beaker/goblet' form. This view is supported by contemporary images and by archaeological finds, such as for instance the hoard from the nearby market-town of Szombathely which also included, among other silver objects, five such items (Fig. 1.a)⁴. This type, which was common all over Central Europe (in the broad sense of the word), was a metal variant of a glass-beaker type known from Italy from the second half of the 13th century. The transition is proved by the expression

³ See the editions: H. JENŐ, *Sopron szabad királyi város története* II/1 and II/2, Sopron, 1931 (henceforth Házi).

⁴ L. ZSUZSA, *A szombathelyi reneszánsz kincslelet* [The Renaissance hoard from Szombathely], Szombathely, 1975.

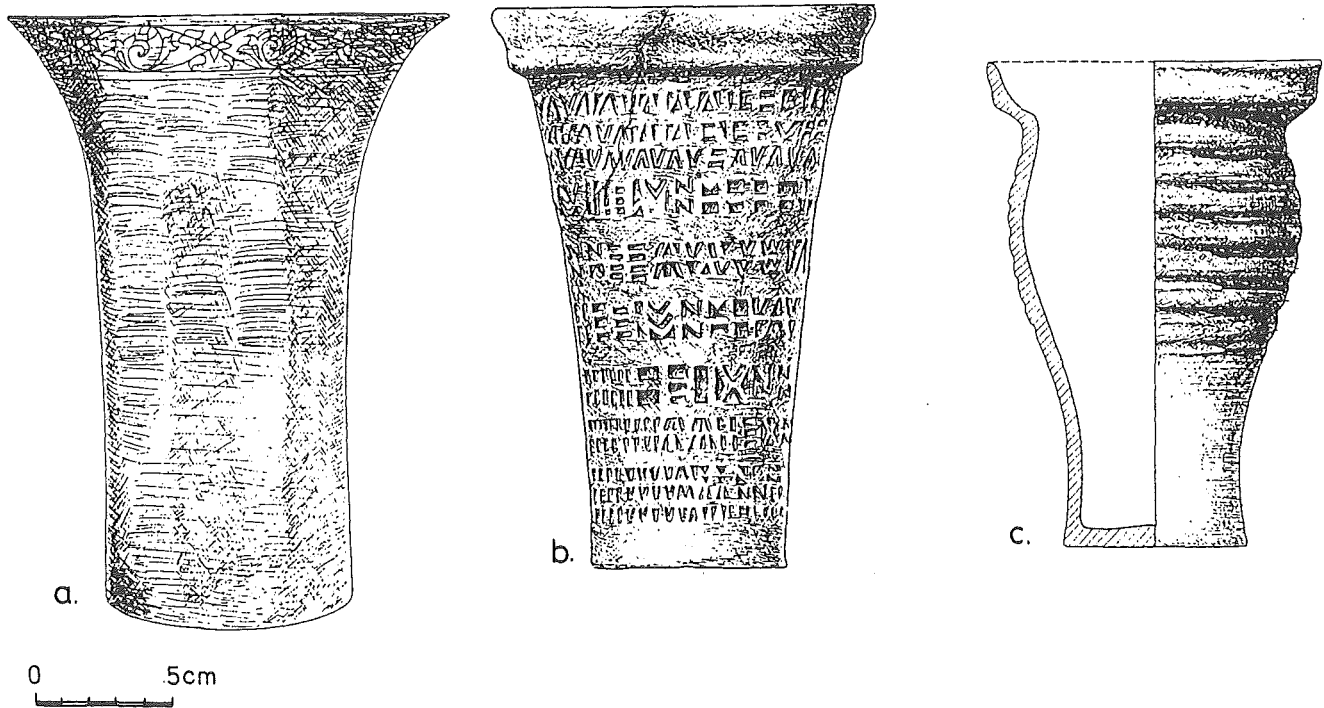


Fig. 1. - Beakers of different materials and with different decoration: a. silver beaker from the Szombathely hoard; b. decorated ceramic beaker resembling a metal prototype; c. 'gothic' ceramic beaker.

'*sulwern glas*' used in Northern Germany⁵. These objects were seldom decorated, and terms referring to special forms are '*gemyndelte pecher*' (*Mündelbecher*), '*geraifelt pecher*' – that is hooped beaker – and '*schinpecher*' which can be identified with the group of beakers fit together (*Haufenbecher*). The item called '*Nyderlendisch Silberpecherel*'⁶ was owned by a priest. Beakers of other materials are extremely rare in written sources: only some specially decorated salt-glazed ceramic ware from Lostice was listed in a probate inventory, this special imported ware being popular even in noble courts⁷.

Other items of tableware made of silver were *cups* (*Schal*) which were small hollow drinking vessels, sometimes gilded, mentioned only by a few wealthy testators, and *mazers* (German *Kopf*, lat. *cyphus*), a type of dome-shaped bowl used for drinking and storing liquids, often with a lid. The shape was the same as that of turned wooden vessels which were in use from the 13th c. onwards⁸. Plain variants made of silver could be found in modest households as well.

Gilded and decorated ones standing on feet were quite expensive, pawned for sums between 10 and 30 guilders.

The most common table-ware for storing liquids were *jugs* (German *Kandel*, lat. *cantera*) made almost exclusively of pewter. Our sources do not give details about the shape, but archaeological evidence from different sites in Hungary, Austria and Germany suggests the prevalence of the cylindrical type⁹. Most jugs were plain, though some adjectives indicate carved decoration. The most important characteristic of these vessels was not, however, their shape but their size, which followed the liquid measuring system used for measuring wine. The biggest sizes, the '*funshalb kandel*' (approx. 4 litres) and the '*dreyhalb kandel*' (approx. 2.4 litres) were rare (1 and 3 occurrences, resp.), just as the smallest one, the '*Acht kandel*' (0.2 litre, 2 occurrences). The medium-sized ones, '*Pint kandel*' (1.6 litre), '*Halb kandel*' (0.8 litre), and '*Seitel kandel*' (0.4 litre) occurred more frequently (9, 16 and 13 times, resp.). These jugs were

⁵ M. HASSE, Neues Hausgerät, neue Häuser, neue Kleider. Eine Betrachtung der städtischen Kultur im 13. und 14. Jahrhundert, *Zeitschrift für Archäologie des Mittelalters* 7, 1979, 39 (henceforth: Hasse).

⁶ Házi II/1. 396.

⁷ Házi II/5, 140, and the expression 'altes stain' may also refer to such vessels, II/1, 233.

⁸ I. HOLL, *Mittelalterliche Funde aus einem Brunnen von Buda*, *Studia Archaeologica* IV, Budapest, 1966, 55, 61.

⁹ W. DEXEL, *Das Hausgerät Mitteleuropas*, Braunschweig - Berlin, 1962, 61-62 (henceforth: Dixel: Hausgerät); I. HOLL, Zinn im spätmittelalterlichen Ungarn, *Acta Arch. Hung.* 39, 1987, 313-335., esp. 322-324, and *Acta Arch. Hung.* 48, 1996, 241-260 (henceforth: Holl, Zinn).

almost exclusively made of pewter. The only exceptions are the silver items named "opherkendl", always in church use. Jugs occur in practically every testament which lists household equipment. Testators mention an average of 3-4 jugs distributed between various relatives while in inventories up to 8 pieces can be found, usually more of the smaller or medium sizes which could be used for drinking as well¹⁰. The most representative items, the 'Schenkandel', were 30-50 cm tall and usually decorated vessels used for distributing wine at the table. The owner of these items, mentioned in an inventory, was a rich widow whose late husband was a member of the city council¹¹.

Smaller bowls (German *Schüssel*, lat. *scutella*) also occurred in different sizes: smaller and medium-sized ones were kept for everyday personal use, bigger ones for serving up food. It was an achievement of eating culture that each person at the table got a dish of his own¹², so wealthier households often contained 10-20 dishes. Their material was pewter or wood; the latter, of course, was not valuable enough to be included in the wills. One example of medieval Sopron pewter dishes even survived to our times¹³. Plates (*Teller*) were less frequently mentioned than dishes, so we can assume that pewter plates had not displaced their more durable wooden counterparts during the 15th century. Special items of tableware were salt-shakers (*Salsvessel*) and vinegar-containers (*Essichvessel*).

Beside tableware, some other vessels were placed in living- or bedrooms. These were the deep, wide basins with broad rim, of pressed brass plate. The 'toilet set' was completed by an ewer or a smaller cauldron. While basins were popular items to bequeath, cauldrons are known almost exclusively from the pictorial evidence – they were probably part of the furniture, not to be separated from the house¹⁴.

The other type of cauldrons, the *Krautkessel*, already belong to kitchen utensils. Otherwise, large metal cauldrons, so common in written material from Northern Germany, turn up rarely in West-Hungarian and Austrian sources¹⁵. Further kitchenware includes mortars, pans, skewers, etc., which were mentioned

only by chance, but help us to complete our knowledge of medieval households.

Finally, we must not forget the great variety of wooden vessels used in wine-production (tubs, vats, buckets, etc.) which were seldom mentioned in inventories, but were certainly present in nearly every household.

In concluding our survey concerning the material of the vessels mentioned in written sources, it is obvious that vessels made of silver ranked among the most precious items of urban households. Comparing the list of testators mentioning silver goblets or beakers with contemporary tax-lists, we can observe that only those paying more than twice as much as the average tax (or more) could afford this 'luxury' in their homes. Craftsmen, for example, who represented about one quarter of Sopron's population, possessed 21 % of all silver beakers mentioned, but if we disregard the most profitable craft, that of the butchers, the proportion of silverware owned by the others drops to 11 %¹⁶.

The metal far more typical in urban context was pewter, also called 'the silver of the poor'. The largest resources of this raw material were located in the *Erzgebirge*, and the most important centres of production were located in Nuremberg, Bohemia and Saxony; in the Carpathian Basin pewterers were to be found in significant numbers in Upper-Hungarian towns (now in Slovakia), in Buda and in Pozsony (Bratislava). In Sopron, two or three masters of this craft were working simultaneously, so the majority of the mentioned pewterware can be regarded as local products. There was practically no household in medieval Sopron in which no pewter was in use. Its occurrence in testaments was, however, confined to those testators who paid less than the triple of the average tax. Citizens paying between the double and triple of average tax were those who already possessed silver vessels, but pewter ware was still equally valuable for them. Those families whose wealth exceeded this limit did not consider pewter worth mentioning any more, although the few probate inventories which sur-

¹⁰ I. HOLL, Ónkannagyártók a 15. századi Sopronban [Pewterers in Sopron in the 15th century], in: *Tanulmányok Csatkai Endre emlékére*, Sopron, 1996, 71-87, esp. 76-78, gives a detailed account of pewter objects, based on both written and pictorial evidence (henceforth: Holl: Csatkai).

¹¹ Inventory of Barbara, Zirkendorfferin: Hazi II/5, 139-140.

¹² Hasse 1979, 33; Dixel, *Hausgerät* 63.

¹³ Holl, Zinn 1987 327-328, figs. 21-22; the item got to the Hungarian National Museum from the private collection of Á. Szalay. See also Holl & Csatkai 80.

¹⁴ On images of households, see e.g. E. ENGLISH & G. JARITZ,

Das tägliche Leben im spätmittelalterlichen Niederösterreich. St. Pölten - Wien, 1976, 28-29, figs. 11-13. See also Holl & Csatkai 82, fig. 3.

¹⁵ G. JARITZ, Die realienkundliche Aussage der sogenannten Wiener Testamentsbücher, in: *Das Leben in der Stadt des Spätmittelalters*, Wien, 1977, 149. This may not be due to the small value of kettles but rather to the fact that these objects were made of different materials, e.g. clay mixed with graphite (see below).

¹⁶ K.G. SZENDE, A soproni iparosok vegrendeleteik tükrében [Craftsmen from Sopron as reflected in their testaments], in: VI. *Kézművesipartörténeti Szimpózium*, Veszprém, 1989, 109-116.

Table 2

Financial status of persons mentioning silver and pewter vessels

Tax-index	0-1	1-2	2-3	3-4	4-5	5-8	>8
pewter	1	6	4	2	-	-	2 (prob.inv.)
silver	-	2	6	4	3	3	8

vived prove that dozens of pewter dishes were in use in those households¹⁷.

The occurrence of other materials beside silver and pewter is insignificant. Brass and bronze turn up as the material used for cauldrons, washing-bowls, and mortars. These were, in all likelihood, imported wares: no craftsmen engaged in their production are known from Sopron. Wood and glass were strongly underrepresented in the wills. To know more about them we have to rely on pictorial sources and on some accidental archaeological finds. Ceramics will be discussed below.

I.3 Vessels in use

As to the tableware surveyed above, it is hard to decide whether these were vessels for everyday use or rather ornamental ones. Perhaps this is not the right question at all, since a clear distinction between these groups was not made before the Renaissance¹⁸. In medieval urban households both functions were fulfilled by objects made to the pattern of 'ordinary' vessels which were suitable for non-functional purposes such as representation and accumulation because of their material and quantity rather than their high quality and elaborate craftsmanship. This period of urban material culture was hall-marked by the silver beaker which was a good investment, despite its practical shape. Silver vessels were frequently pawned to Christians and Jews alike, while no vessel of other material was mentioned in our sources in this context.

These considerations make it clear why was silverware so often bequeathed for the purposes of the church. Silver beakers were transformed into chali-

ces or censers, or their price was invested in the celebration of masses, so they were bequeathed not as personal belongings, but as valuables or as raw material. This transformation is in accordance with the evidence from inventories of church benefices where no items of the bequeathed silverware can be found, only pewter vessels.

When vessels were bequeathed to individuals, the heirs were usually relatives or friends of the same social status as the testators. Priests often gave some vessels to their 'maidservants' or to their female cooks. On the other hand, vessels were not an indispensable part of dowries: they were handed down to girls within the family, but seldom to 'other poor maidens' who received dowry as a charity¹⁹.

On the basis of the written evidence, an upper middle-class household in medieval Sopron was furnished with the following metal vessels: one or two silver beakers, 4-5 pewter jugs, 10-15 pewter dishes and bowls, a brass basin, a bronze mortar, and a cauldron made of brass or bronze. Wealthier families possessed, of course, a larger stock: the number of silver beakers or pewter cans or jugs could be double or triple the amounts listed above.

II The archaeological evidence

II.1 Town archaeology in Sopron

The town of Sopron, the only free royal town which remained within the boundaries of present-day Hungary besides the medieval capital of Buda and its twin-town Pest, has retained much of its ancient character, but it was only after 1945 that it became a model and a solid base of comparison and reference in Hungarian urban archaeology. As a by-product of the severe bombings in 1944, several medieval details of the town were revealed, and from then onwards systematic research brought to light the threefold system of town-walls and unknown details of lay and ecclesiastical buildings both in the city itself and in its suburbs. In the course of archaeological and architectural research, vast quantities of small finds came to light, in the first place pottery, as

¹⁷ B. Zirkendorfferin, II/5, 138f-140, B. Alföldi, II/1, 233-235.

¹⁸ Dexel, Hausgerät 56.

¹⁹ On dowry as a charity see D. HERLIHY, *Medieval Households*, Cambridge (Mass.) - London, 1985, 142. The most important items of a dowry in medieval Sopron were bedding and household textiles.

well as metal and glass, and in luckier cases even organic material (leather). This rich material provides a unique opportunity to investigate the architectural development of practically each building, compare it with the list of owners²⁰, their social and economic status, as well as the material remains of their everyday life. This work has to be completed systematically in the future, but the results achieved so far open up promising perspectives²¹.

II.2 The Main Square and the Fabricius-house

The find assemblage chosen for this presentation is also intended to demonstrate the possibilities of interdisciplinary analysis. It was found in a refuse-pit of the so-called Fabricius house (Fő tér 6.), one of the best-documented merchant houses on the Main Square (Fig. 2). This square was the administrative centre of the settlement even before the 13th century²² when the process of urbanization of the western border-region of East Central Europe reached and transformed Sopron from a fortified royal county-centre to a proper town²³. It was this development which was approved by the urban privileges donated by King Ladislaus IV in 1277. From the 14th century onwards, the square took over the role of the main market place as well. The public character of the place was emphasized by the presence of the Franciscan friary from the 1270s, and later by that of the town hall, apart from that of several shops and stalls.

The houses built around the square were almost exclusively owned by the leading elite of the town: merchants, well-to-do artisans and leading wine-producers. This statement is true for the house at no. 6 as well. It is located immediately beside the innermost circle of the town-walls, built on top of Roman ruins in the decades between 1320 and 1350²⁴. Its

owners were without exception wealthy merchants, and from the second third of the 15th century onwards, nearly all of them were Hungarians – a special feature in a town with a German-speaking majority²⁵.

From the middle of the 15th century onwards, 4 testaments of the owners of this house or members of their family survived. None of them are too detailed concerning chattels, since all four testators had someone to appoint as main heir. Only precious items bequeathed to other heirs were listed. These valuables included festive dresses, golden rings, and one of the owners possessed nine silver beakers and mazers. The only detail mentioned about the house itself was that one of the bequeathed barrels of wine stood 'beside the staircase' which might refer to the cellar beneath the front wing or to the extraordinarily spacious one in back.

The assemblage of late medieval ceramic finds which will be discussed below was excavated by the archaeologist János Gömöri in a small room beside the front cellar (Fig. 3)²⁶. The pit, probably the shaft of a latrine, which contained the material, was over four metres deep and walled with bricks; it has been filled in during a rebuilding of the house. The pit was walled up for regular use, most probably in the middle of the 15th century when the house was owned by a Hungarian merchant who moved there from Körmend, a market-town 90 km south of Sopron. During this rebuilding, a second floor was added to both the front and the back wing. This was the maximum height of civic buildings in medieval Sopron, which only the wealthiest could afford. The date when the pit was filled in can be determined with the help of town accounts which indicate the amount of bricks bought by the inhabitants in the second half of the 16th century (largest amounts from 1553-54, 1565 and 1581-87). Therefore, the vessels which

²⁰ In this respect, beside the tax-lists, the registers of landed property are of the greatest help. See the edition *Első telekkönyv / Erstes Grundbuch*, Ed. K. MOLLAY, Quellen zur Geschichte der Stadt Ödenburg Reihe A / Bd. I, Sopron, 1993.

²¹ See e.g. I. HOLL, Glasfunde des XV-XVI. Jahrhunderts aus dem Haus eines Patriziers in Sopron, *Zeitschrift für Archäologie des Mittelalters* 6, 1978, 96, ff.

²² J. GÖMÖRI, Die Erforschung der Burg der Gesspannschaft von Sopron und ihrer Umgebung in den Jahren 1971-74, *Acta Arch. Hung.* 28, 1976, 411-424.

²³ See K.G. SZENDE, Some Aspects of Urban Landownership in Western Hungary, in: *Power, Profit and Urban Land. Landownership in Medieval and Early Modern Northern European Towns*, ed. F.-E. ELIASSEN & G.-A. ERSLAND, Aldershot, 1996, 141-166, here: 141-146.

²⁴ I. HOLL, Gy. NOVÁKI & K. PÓCZY, Városmaradványok a

soproni Fabricius-ház alatt [Remains of town walls under the Fabricius-house in Sopron], *Archeológiai Értesítő* 89, 1962, 47-62. The architectural research was directed by Ferenc Dávid. I am grateful for his unpublished results.

²⁵ K. MOLLAY, Sopron 14. századi városképének vizsgálata. a Fabricius-ház története kb. 1530-ig [Investigation of the townscape of Sopron in the 14th century. The history of the Fabricius-house], *Soproni Szemle* XVIII, 1964, 1-14, 97-117. The owners who probably were contemporaries of the finds analysed were András Körmendi (from 1434), his son-in-law István Spiller (from 1465), Imre Magas (from 1469), his children, Ferenc and Rozina (from 1500), Mihály Iván (from 1512), Balázs Nagy (from 1530), Mátyás Nagy (from 1535), Egyed Kramer from Pápa (from 1545) and his son Ferenc (until 1585).

²⁶ I am indebted to J. Gömöri for providing me with unpublished details of the excavation.

Fig. 2. - Map of the city of Sopron with reconstructed plot boundaries



came to light date back to the period from the end of the 15th to the first half of the 16th century, the same period from which the testaments were analysed above.

II.3 The excavated vessels (Table 1: right column)

The majority of the excavated vessels were used for cooking, and around 60 % of the material consisted of pots (505 different vessels). Several items had not been broken or could be completed, so we can collect information on the size and cubic capacity of the pots. As Table 3 indicates, the most popular sizes were the medium ones with an average content of 2-2.5 litres; vessels up to the double of this size also come up frequently, while the smallest and largest size-groups (under 0.75 l and over 10 l, resp.) were relatively rare²⁷.

Traces of soot and deposits of burnt food-remains on most medium-sized cooking pots (groups 2, 3, and 4) affirm our assumption that these cooking vessels were in the greatest demand. The smallest and biggest pots, however, were used rather for storage or boiling water.

Two main groups of red- and grey-burnt ware can be distinguished according to the material of the vessels. About 80 % of the cooking pots belonged to unglazed red-burnt products of presumably local manufacturers. The proportion of reduced ware was 16 %, 20 % of which also contained graphite. These

²⁷ I. HOLL & N. PARÁDI, *Das mittelalterliche Dorf Sarvaly*, Budapest, 1982, 1982, 92-93, gives detailed information on the relation of rim-diameters and cubic capacity. Since only a few items from the Sopron assemblage could be reconstructed, my data were completed on the basis of those results.

Table 3
 Sizes of pots in the excavated material (Sopron-Fabricius house)

size	layer 1. (end 15th c.)			layer 2. (1st half 16th c.)			layer 3. (end 16th c.)			total
	red	grey	gl.	red	grey	gl.	red	grey	gl.	
1.	9	-	-	5	5	1	-	-	-	20
2.	73	20	-	27	9	9	1	-	2	141
3.	105	18	1	74	12	9	3	1	1	224
4.	55	6	-	25	9	1	1	-	-	97
5.	13	2	-	8	-	-	-	-	-	23
total	255	46	1	139	35	20	5	1	3	
		302			194			9		505

gl. = glazed

vessels were imported from the neighbouring Austrian production centres, the influence of which can also be detected in the changing shapes (slender body, rounded rim, etc.) of the local products. Otherwise, these pots were scarcely decorated mass ware of very simple shape. Glazed cooking pots appeared in larger quantities in Hungary relatively late, from the second half of the 15th c. and were also mostly imported to Sopron. Nevertheless, the small percentage of glazed ware (under 5 %) in the households of wealthy citizens is conspicuous. I shall return to the explanation of this feature later.

Other cooking vessels such as pans and pipkins were rare compared to pots. These types were always glazed on the inside, mostly brown or yellow. On the other hand, lids for cooking vessels came to light in great numbers. They represent about 15 % of the medieval ceramic wares and are almost exclusively local products. Here again the influence of Austrian workshops is clear: local material represents a medley of Hungarian pottery traditions where conic forms prevail and those from the workshops of Lower-Austria where mostly flat lids were produced²⁸.

Crockery represented less than 15 % of the ceramic material altogether, and more than two-thirds of this were beakers. Tall, elegant so-called 'gothic beakers' are the most characteristic items in all late medieval find-assemblages in East-Central European urban sites. When making these vessels, potters were not bound so much by requirements of practicality, so practically each smaller region had its own special shape²⁹. In Sopron, the common red-burnt clay beakers which come to light in every single late medieval site can be sorted into two main groups: tall and slender ones, and those with a narrow foot and a beaker-like upper part (Fig. 1.c). The great variety of shapes and rims indicate that there was a fair demand for these simple vessels, so products of several workshops could coexist on the market. On the other hand, decorated drinking vessels were very rare in our assemblage. Two items with stamped decoration followed the shape of metalware (Fig. 1.b); both the form and the ornaments can be related with Austrian patterns. The bottom fragment of a fine glazed beaker also points to Vienna workshops³⁰.

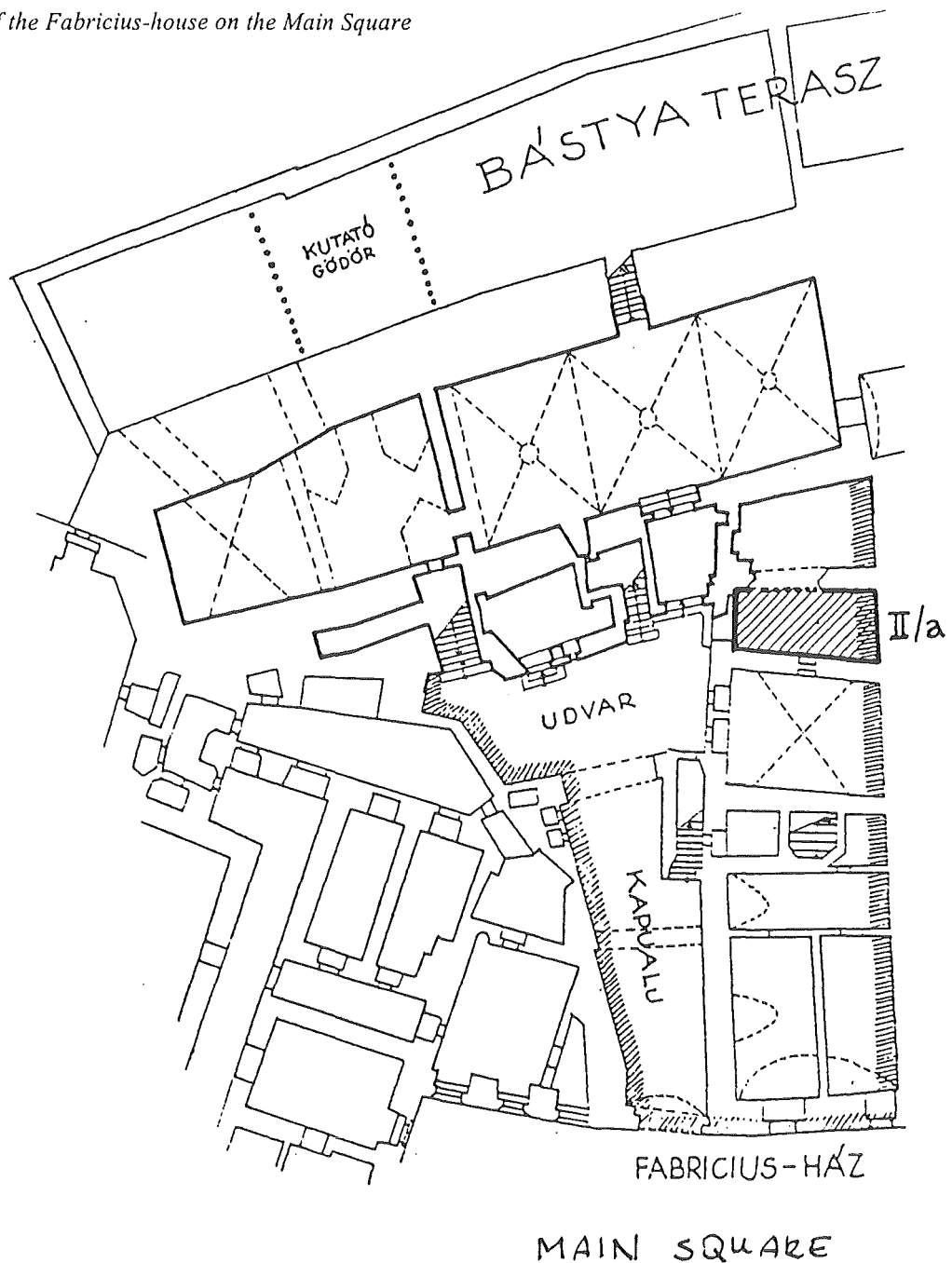
²⁸ S. FELGENHAUER-SCHMIEDT, *Das Fundmaterial des Hausbergs zu Gaiselberg, Niederösterreich*, *Achaeologia Austriaca* 61-62, 1977, 249; B. CECH, *Die mittelalterliche Keramik aus dem Kampthal*, *Achaeologia Austriaca* 71, 1987. In the material of the Kamp-valley, the conic lids were red-fired imported ware. In Bratislava (Hung. Pozsony), both types were present: B. POLLA, *Bratislava, západné suburbium*, Kosice - Bratislava, 1979, figs. 72-74 (henceforth: Polla).

²⁹ On Bratislava (Pozsony), see Polla 1979, Taf. VIII; on Lower Austria, see B. CECH, *Mittelalterliche Keramik aus Wiener Neustadt*, *Achaeologia Austriaca* 69, 1985; on imports from Vienna

to Sopron, see I. HOLL, *Külföldi kerámia Magyarországon a 13-16. századból* [Foreign pottery in Hungary in the 13th-16th centuries], *Budapest Régiségei* XVI, 1955, 169; on Brunn see V. NEKUDA & K. REICHERTOVA, *Stredoveká kerámika v Cechách a na Morave*, Brno, 1969, 210.

³⁰ S. FELGENHAUER-SCHMIEDT, *Die keramischen Funde aus dem St. Michaelskammer in Eisenstadt, Burgenländische Heimatblätter* 33, 1971, 61, Taf. 4-5, and Cech 1985, B 9, B 11; on the glazed beaker/goblet: I. HOLL, *Használati- és díszkerámia a budai várpalotából* [Household- and ornamental pottery from the Buda Castle], *Budapest Régiségei* XX, 1963.

Fig. 3. - Ground plan of the Fabricius-house on the Main Square



Vessels used for containing liquids can also be considered as table-ware. Variants with broader and narrower spouts, *i.e.* different jugs and pitchers came to light, but in relatively small numbers (4 % of all ceramic finds). Nearly all these were moderately decorated local products: one item was glazed and another mixed with graphite. Other items of table-ware include fragments of three dishes and one plate as well as three very small pots which were either toys or containers of spices, oil or vinegar. To the assemblage belonged some other types of household ceramics, such as a few lamps and a money-box, furthermore bricks and stove-tiles, among them a beautiful glazed one with a bird-motif. Detailed

analysis of these items as well as of the few finds of other materials (bone, metal) would go beyond the limits of this paper.

Concluding our survey of the ceramics of the cess-pit (see Table 3), we can assert that 80 % of the material consists of unglazed red ware, local products from Sopron itself or from the village Csáva (Stoob) which, due to its rich clay-fields, was a significant potters' centre. Grey-burnt ware (14 %) was probably also made in the vicinity of the town, while glazed items and those containing graphite were imported from Vienna and Lower Austria. In some cases, the stamps on the rims indicate the workshops where these were made (Fig. 4): Tulln (No. 4-7), Vienna



Fig. 4. - Rim-stamps of foreign origin from the Fabricius-house find-assembly

(No. 2, 11-15), Klosterneuburg (No. 3), the identification of the other stamps is more problematic³¹. The rich variety of stamped ware is undoubtedly due to the fact that Sopron was within the closest catchment area of the production centres. These workshops exerted a strong influence on the shaping of West-Hungarian ceramic ware, so pottery from Sopron and its surroundings can be interpreted as transitional products: their red-burnt gravelled material is closer to Hungarian (Transdanubian) traditions, but the shapes correspond more to their Lower-Austrian counterparts. Further research will hopefully show the boundaries of this transitional territory, and give a better picture of regional interaction in workshop-traditions. To our present knowledge, Kismarton/Eisenstadt is still included in this transitional zone, while in Wiener Neustadt already grey-burnt ware prevails.

III Evidence compared

Even more interesting from our present point of view is what conclusions can be drawn concerning the role and amounts of different vessels in late medieval urban household. (See Table 1).

First of all, it is conspicuous that each type of vessel had its 'own proper material': dishes were made of pewter, bowls and mazers of silver, basins of brass; mortars of bronze; plates of wood; pots, pans, and lids of pottery. In those instances when a certain type of metalware was mentioned in greater numbers, ceramic vessels of similar function seldom occurred. The distribution of pottery jugs and pitchers is also informative. In rural context several nicely decorated ceramic items can be found, while in our assemblage not only the proportion of such vessels is small, but their shapes are very simple too. This fact can be explained by the frequency of pewter jugs, especially those of smaller size.

The above statements are seemingly refuted in case of the beakers, since these occur frequently both among the excavated ceramic material and among silverware mentioned in the testaments. Nevertheless, this puzzle can be solved if we recall our previous assumption concerning silver vessels, namely that these were primarily for accumulation and represen-

³² See Holl & Parádi 1982, 92-112, especially the decorated ware, 101-105.

tation, rather than for everyday use. This is why their counterparts in clay were also present. On the other hand, decorated, stamped, or glazed ceramic beakers were relatively rare, since on festive occasions the table was laid with silverware.

On the whole, compared with pottery finds from rural contexts, e.g. from Sarvaly³², the assemblage of ceramics from the Fabricius-house seems to represent a simple, 'low-key' material with hardly any pieces of a higher standard. This apparent simplicity, however, throws some light on qualitative differences of urban and rural life-styles. Late medieval urban households had the opportunity to meet their demands in a highly differentiated, practically arranged way, choosing the most appropriate material and shape for each purpose.

During the 15th century, living conditions improved all over Europe, and towns were characterized by the consolidation of prosperity. Burghers had both the need and means to make their environment and household as comfortable and as suitable as possible. This pursuit was reflected in the differentiation of the furniture, the appearance of specialized items such as writing desks, book-cases, and sideboards, as well as in the increasing amount of textiles and bedding. The import of a wider assortment of fine cloths was not only a business enterprise of several citizens, but also a way of meeting their own demands³³.

In terms of household equipment, growing wealth was reflected by the fact that new materials (pewter, glass, glazed pottery, stoneware) appeared or became widespread and processed on a higher level. These innovations did not, however, mean that traditional materials such as pottery or wood disappeared at once; they were confined to a more expedient use. It was not by accident that as soon as the presence of metal vessels became common among the majority of the urban population, the output of workshops producing 'metal-like' deoxidized or *Graphitton*-ware abruptly decreased. Pottery workshops in towns gradually gave way to those in villages, producing glazed ceramic ware, while in towns the production of stoneware and chinaware was established on the large scale³⁴. In

many instances more marketable materials had already replaced pottery before the beginning of Early Modern times³⁵.

Table-ware and kitchen utensils were among the two main groups of vessels: the former reflected new trends in a more conspicuous way, since these objects could demonstrate the wealth of the household to a wide circle of friends, relatives, and business partners. In the relatively scarcely furnished rooms, ornamental vessels were literally the highlights of the household. Patterns provided by the nobility were followed by the burghers on a reduced level: the forms and shapes of jewels, dress-fittings, and ornamental vessels were roughly the same, but not their material: gold was substituted by silver, silver by pewter. The possession of objects for accumulation was confined to the wealthiest, those who payed well above the average tax.

The relevance of the picture sketched above would not be complete without placing it into a broader regional and supra-regional framework. Compared with the relatively bigger and wealthier merchant-town of Pozsony, lying beside the Danube about 70 km to the North, Sopron seems to have been a somewhat more conservative and modest place. The main groups of valuable chattels bequeathed in the testaments were the same in both towns: jewels, vessels, clothing and bedding, and the items themselves must have looked like alike or were even made in the same workshops. Nevertheless, the burghers of Pozsony had a much more consolidated scale of values, based on the greater number of precious objects they possessed. The proportion of jewels and silver vessels, primarily beakers and goblets, was higher by far, while pewter vessels were mentioned less frequently, although Pozsony was an important pewter production centre³⁶.

Sources from Lower Austrian towns and from Vienna allow for a similar account of households: differentiated sets of vessels, with the presence of metalware mostly for accumulation and representation³⁷. Moving further north-west, this disparity becomes more and more conspicuous. In Konstanz, the more precious silver mazers ('*chopf*') were just as

³³ A. KUBINYI, Die Rolle der Archäologie und der Urkunden bei der Erforschung des Alltagslebens im Spätmittelalter, in: *Etudes Historiques Hongroises*, Budapest, 1985, 626, 633. See also Hasse 1979, 39; Dexel, Hausgerät 55.

³⁴ See for instance the material from the early modern period published in the catalogue *Keramische Bodensfunde aus Wien Mittelalter-Neuzeit*, Wien, 1983.

³⁵ Löbert 1980, 33.

³⁶ K. SZENDE, '... es sey vil oder wenig, gross oder kchlain'. Besonderheiten und Unterschiede in der materiellen Kultur der Einwohnerschaft der königlichen Freistädte Pressburg und Ödenburg (1450-1490), in: *Alltag und materielle Kultur im mittelalterlichen Ungarn*, Hg. A. KUBINYI & J. LASZLOVSZKY, *Medium Aevum Quotidianum* 22., Krems, 1991, 108-118.

³⁷ G. JARITZ, Zur Lebenshaltung in niederösterreichischen Kleinstädten während des Spätmittelalters, in: *Festschrift Friedrich Hausmann*, Graz, 1977, Jaritz, Wien

frequently bequeathed as the beakers (*Becher*). Already in the 14th century, every second testator in Lübeck mentioned at least one silver vessel³⁸, while in the West-Hungarian towns this proportion did not exceed 25 % even a century later. Data from several other European towns would demonstrate more clearly the similarities in the burghers' mentality and

intentions, and the regional characteristics in meeting these demands. Nevertheless, I hope that this was enough to show that the 'big house' should always be considered as an entity, with vessels 'to honour' identified from mostly written sources and those 'to dishonour' discovered by archaeology.

³⁸ Hasse 1979, 20-23. See also A. FALK & R. HAMMEL, Möglichkeiten einer interdisziplinären Auswertung der archäologischen und Schriftlichen Quellen, *Lübecker Schriften für Archäologie und Kulturgeschichte* 10, 1987, 301-308.

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Pot and Pans: New Perspectives on Medieval Ceramics in Greece

Introduction

When the Boeotia Project started its field research in 1978, little was known about urban or rural developments during the Medieval and Ottoman periods in this part of Central Greece (Fig. 1)¹. This situation has now changed radically. After almost two decades of intensive archaeological survey many hitherto unknown Medieval sites have been recorded

and about eleven thousand Medieval and Post-Medieval sherds have been sampled². A large part of this surface pottery is of fine quality and remarkably well-preserved. Noteworthy is also the fact that this inland region has seen a relatively fair amount of imports from Italy and Turkey. In short, the corpus of eleven thousand Boeotian sherds constitutes a potential source of information which begs for further study³.

¹ The Boeotia Project is a ‘joint venture’ of the universities of Durham and Cambridge. Since 1978 survey work has been carried out in South-western and Northern Boeotia under the direction of Dr. J.L. Bintliff and Prof. A.M. Snodgrass. I would like to thank John Bintliff first and foremost for inviting me to study and publish the Medieval and Post-Medieval pottery sampled during the survey. Provisional datings were provided at an earlier stage by Dr. J.W. Hayes (Oxford), and I profited greatly from his expertise and advices. I am also indebted to the Ephor

of Boeotia, Dr. V. Aravantinos, and to the staff of the Thebes Museum for their help in facilitating my work and generously offering me hospitality. S. Bommeljé read an earlier draft of this text and made some valuable suggestions. My research is supported financially by the Leverhulme Foundation (UK).

² Cf. Bintliff’s paper on ‘The Archaeological Investigation of Deserted Medieval and Post-Medieval Villages in Greece’ for this conference.

³ All the dates are after Christ. Here I use the conventional

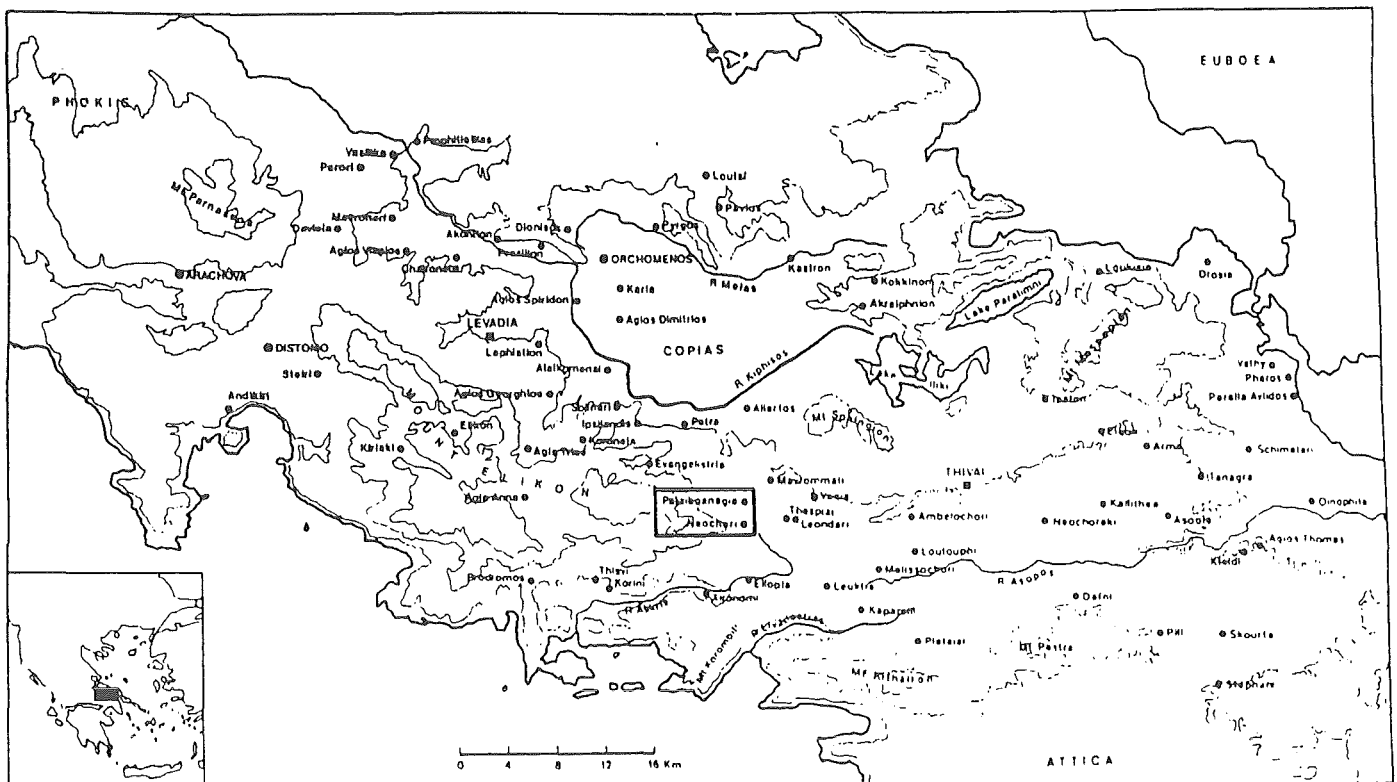


Fig. 1. - Map of Boeotia, Greece with approximate position of the Valley of the Muses (shown in Fig. 2). Early Modern Palaiopanagia = Modern Askra.

Medieval archaeology in Greece

And here the problems begin. Perhaps the main problem is that the archaeology of Medieval Greece is more or less still in its infancy⁴. It is no use denying that archaeology in the Aegean area has long been blinded by its hellenocentric fixation on the Classical and Hellenistic periods⁵. Many archaeologists still have to swallow at the mere thought that the history of Greece did not just grind to a halt after the destruction of Corinth by the Romans in 46 BC. Even stronger is the neglect of the Ottoman period – which spans the four centuries from the conquest of Greek lands by the Turks in the 15th century to their expulsion in the beginning of the 19th century. Hardly any large scale study has been undertaken of the architecture or pottery of the Ottoman period, which count in our traditional western perspective as a dark and untouchable page in the history of Greece⁶.

Until quite recently Post-Classical ceramics in the Aegean were literally treated as the Cinderella of any excavation or surface survey⁷. When in the thirties and forties of this century the first systematic publications on Greek Medieval pottery appeared, especially from excavations in Olynthus, Athens and Corinth⁸, this area of study was condescendingly regarded as a minor branch of art history. Although these publications laid the foundations for the dating of Medieval pottery in Greece, research in those days was still exclusively focused on the identification of fine and decorated luxury wares⁹. Kitchen ware and undecorated domestic pottery were utterly disregarded, notwithstanding the fact that they constituted

the overwhelming majority of the excavated ceramics. In fact, until quite recently it was standard procedure at some Greek excavations to simply throw away all undecorated Medieval pottery – ‘Digging through the Byz’, was and still is the general device of many archaeologists working in Greece¹⁰.

In recent years, matters appear to have changed. Archaeologists – Greek, American, French and British – have had their eyes opened to the wealth of information represented by the material remains of twelve centuries of Post-Classical Greek history. Modern developments in ceramic studies (such as the emphasis on the aspects of production, use and distribution) may be seen in the pages of current archaeological publications¹¹, and the recent discovery of some buildings and a cemetery of the Frankish period (13th-14th century) in Corinth seems to provide for the first time stratified material in association with coins¹². If Greek Medieval archaeology today is anything, it is perhaps best described as a young and even hectic branch of research, trying to find its way in an historical period in which until recently mainly byzantine-ologists, text-scrutinizers, and icon-researchers showed interest.

Medieval surface assemblages in Boeotia

In the last few years, with the blossoming of survey projects all over Greece, the emphasis of archaeological field studies has changed from a hellenocentric view to a *longue durée* perspective, to use the famous expression of the French Annales-historian

chronological term ‘Frankish’ for the dating of pottery used during the Frankish and Catalan domination over Central Greece (ca. A.D. 1204-1500), avoiding in that way the somewhat dubious term ‘Late Byzantine’ (which is not free of unhistorical connotations). Discussion of the terms ‘Frank’ and ‘Frankish’ and the related problems of using this kind of terminology is given by Lock 1995, 8-9 and 271. The designation ‘Turkish’ in this paper means that the pottery is from the Ottoman period (here: ca. late 15th to early 17th centuries).

⁴ Cf. Lock & Sanders 1996, who consider the discipline still at the stage of discovery and record. In their preface they conclude that ‘too often medievalists of the Aegean area find themselves on the periphery of mainstream western Medieval or Byzantine studies.’ See further Lock 1995, 28-24, for a general introduction on the historiography of Medieval studies in the Aegean.

⁵ Morris 1994 gives a good résumé of this ‘classicism’ in the intellectual history of Greek archaeology.

⁶ A notable exception is Kiel 1983.

⁷ According to T. Gregory & A. Kazhdan in the *Oxford Dictionary of Byzantium*, 400, ‘the study of Byzantine pottery is still well behind that of other periods in the history of the Mediterranean, in part because of a lack of interest and in part because of the paucity of stratigraphically excavated Byzantine sites nec-

essary to the elucidation of ceramic chronologies. Pottery from critical periods, such as the ‘dark age’ of the 7th-8th centuries and the 14th-15th centuries, is poorly known and little studied.’ Also Papanikola-Bakirtzis 1992, 21, states that ‘pottery remains one of the most neglected branches of Byzantine art. Glazed tableware – little known and seldom displayed in museums – has certainly not received the attention it deserves.’

⁸ Olynthus: Xyngopoulos 1933; Athens: Frantz 1938 and 1942; Corinth: Morgan 1942.

⁹ Older publications such as R. Dawkins & J.P. Droop’s note on Byzantine pottery found at Sparta (1910-1911) are now considered by Spieser 1991, 249, as ‘*essentiellement des pièces de musées.*’

¹⁰ The reference is from the Dutch-American art-historian Gary Schwartz in the Dutch newspaper *NRC-Handelsblad* (1.11.96), who quotes his former professor of archaeology, John Young.

¹¹ For example see Megaw & Jones 1983; Bakirtzis 1989; Hayes 1992 and Sanders 1993. In 1987, the French Archaeological School at Athens even organized the first specialized conference on Byzantine pottery (published as Déroche & Spieser 1989).

¹² Cf. the interim reports by C.K. Williams II & O. Zervos in *Hesperia* 59 (1990) – 65 (1996).

Fernand Braudel¹³. Nowadays, the history of habitation of Greek lands implies as a matter of course the all embracing study from Prehistoric to Modern times, including Archaic, Classical, Hellenistic, Roman, Byzantine, Frankish, Ottoman and Early Modern periods¹⁴.

This is, however, easier said than done. Until now, surveys have mainly focused upon sampling techniques and produced quite a few theoretical models but much less hard evidence to sustain any detailed long-term history of habitation in Greece beyond the Roman period. According to the leading expert of Frankish Greece, Peter Lock, the emphasis on processual change in most survey projects does not fit easily into historical analysis. Anonymous scatters of pottery, he remarks, 'lack the relationship which excavated material provides and are of course dependent on the current knowledge of ceramics'¹⁵. And especially this (lack of) knowledge of the typochronology of Medieval and Post-Medieval ceramics proves to be a stumbling block for efforts to reach detailed conclusions.

Because of the quantity and quality of the sampled ceramics, Boeotia seems to provide a suitable test case for trying to come to a more detailed typochronology of Post-Classical pottery. Boeotia has been from ancient times a rich and relatively densely populated agrarian region, which has apparently been inhabited continuously throughout the ages¹⁶. These circumstances offer at least some sort of starting point for the study of a continuous Post-Classical history of habitation on a regional scale. Such a starting point seems to be lacking in most other parts of Greece where surveys have been undertaken¹⁷.

When I state that Boeotia has apparently been inhabited continuously throughout the ages, I do of course not mean that habitation has always been at the same sites or in the same density. It is precisely the variations and shifts in habitation pattern which provide opportunities to achieve a detailed compa-

parison between dated fine wares and hitherto undated coarse wares, between dated imported and hitherto undated local wares.

The very starting point for my own research is the fact that some sites in Boeotia have apparently been inhabited continuously throughout antiquity and the middle ages until modern times, while other sites were apparently inhabited during short and clearly bounded periods of time. One of the more exciting prospects of my endeavours is to combine the ceramic data from all these sites into a sort of typochronological mosaic which may ultimately provide a so-called 'floating chronology' for Medieval and Ottoman Boeotia from the 7th to the 19th century.

With a 'floating chronology', or rather horizontal stratigraphy, I mean a string of overlapping datings, which in the end (if you allow me to speculate on the most ideal and successful result of the research) may result in a chronological chain which connects, from a ceramic point of view, the Roman era to our own age¹⁸.

Of vital importance for the construction of this 'floating chronology' is the fact that the Boeotia survey has recorded sites with well-defined chronological boundaries. As other parts of Greece, Boeotia knows the phenomenon of the so-called 'wandering village': settlements that seem to change per period their site location, in search of the best possible settlement location within social, economic and political conditions¹⁹. Thus the wandering village leaves a trace of deserted sites with ceramic material of clearly bounded periods, instead of one multi-period site.

Detailed analysis and seriation of this material could produce the identification of characteristic groups of material for the entire Post-Roman period with overlapping phases of perhaps 150-200 years²⁰. This would be an important step towards the chronological chain of the floating chronology. Moreover, the ultimate possibility which hovers before our imagination is the realisation of a coherent corpus of

¹³ Braudel 1949, see also Bintliff 1991.

¹⁴ Cf. the recent long-period publications of Cherry, Davis & Mantzourani 1991 for the island of Keos in the Aegean, and Jameson, Runnels & Van Andel 1994 for the South Argolid on the Peloponnese.

¹⁵ Lock 1995, 27.

¹⁶ For observations, theories and strategies used by the Boeotia Project in its study of the settlement development in this part of Greece see for example Bintliff & Snodgrass 1985.

¹⁷ Cf. Armstrong 1996, 126-131, for the rather poor quality and few imports of glazed surface ceramics found during the Laconia Survey, near Sparta.

¹⁸ Whereas archaeologists who excavate long-lived settlements tend to use the different vertical levels of occupation – the stratigraphy of successively-older layers of activity – to provide the separate phases of culture, the Boeotia Project suggests that

it should be able to use the different scattered settlements in the same way – what archaeologists call horizontal stratigraphy. Whenever a rural settlement was found from which the pottery included datable fineware from just a single phase of the past, an hypothesis was made that the associated domestic pottery might have the same date range. For each phase of the past in the research area the project could test this against every new site with the same closely-dated fineware. It followed that 'type x cookpot' or 'type y tableware' should never turn up on a site where the only fineware belonged to a different period.

¹⁹ Cf. Doorn 1993 for wandering villages in mountainous Aetolia (in Northwestern Greece) and Gregory 1994, 352 for a similar phenomenon in the plain of ancient Kleonai (on the Peloponnese).

²⁰ Most of the rural sites, that were found through surface ceramics, were small farms or hamlets, and a small number of vil-

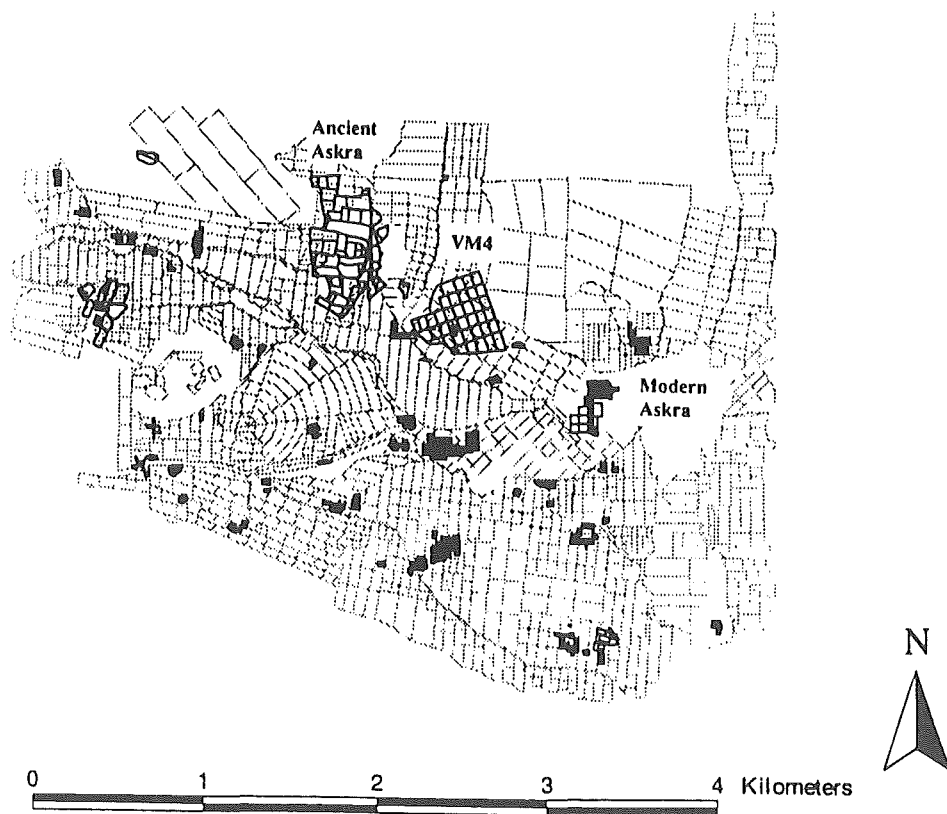


Fig. 2. - Valley of Muses, Boeotia: research area with site and off-site transects (in the centre: site VM4). Modern Askra = Early Modern Palaiopanagia.

Medieval and Post-Medieval pottery in Central Greece. Ideally this could lead to a typo-chronological framework which unlocks the material culture of twelve centuries of Greek history²¹.

In studying the Boeotian ceramics an important chronological anchorage is provided by the fact that the Boeotia Project has disposal over very detailed Ottoman tax registers from the Imperial Archives²². They date from the 15th to the 18th century and provide information about village-names, about the foundation of new settlements, about the number of inhabitants per village, about the number of households, as well as about all sorts of economic output and resources. This textual information can be linked with the archaeological information, so that the pottery need not be studied *in vacuo*, and a cumulative argumentation regarding the habitation history of Boeotia may be formulated. The Ottoman tax registers provide not only the possibility to identify some

sites, but also the possibility to follow in relatively great detail demographic and economic developments of the Boeotian villages, and sometimes of the individual households.

Medieval ceramics of site VM4 in Boeotia

An example of how this textual evidence may be linked to the archaeological data can be found in a large Boeotian hill-site which has been labelled with the codename 'VM4' (Fig. 2). This site, situated on the northern rim of the Valley of the Muses in Southwestern Boeotia, contains a Medieval tower as well as a large settlement from the Frankish and Early Ottoman period²³. Also a substantial prehistoric site and a small Geometric-Classical settlement have been recorded here, as well as some off-site sherds dating from the Hellenistic-Roman and

lages. The Boeotia Project was able to fix them to six main phases of Post-Roman occupation: Early Byzantine (ca. 7th to 9th century), Middle Byzantine (ca. 10th to 12th century), Frankish (ca. A.D. 1200-1350), Late Frankish to Early Turkish (ca. 14th to 16th century), Turkish (ca. 17th to early 19th century) and Early Modern to Modern (ca. 19th to 20th century).

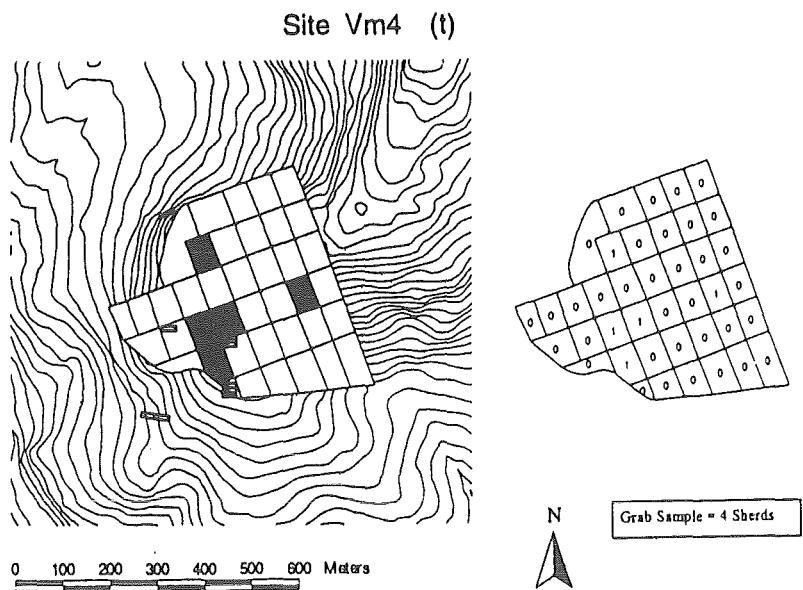
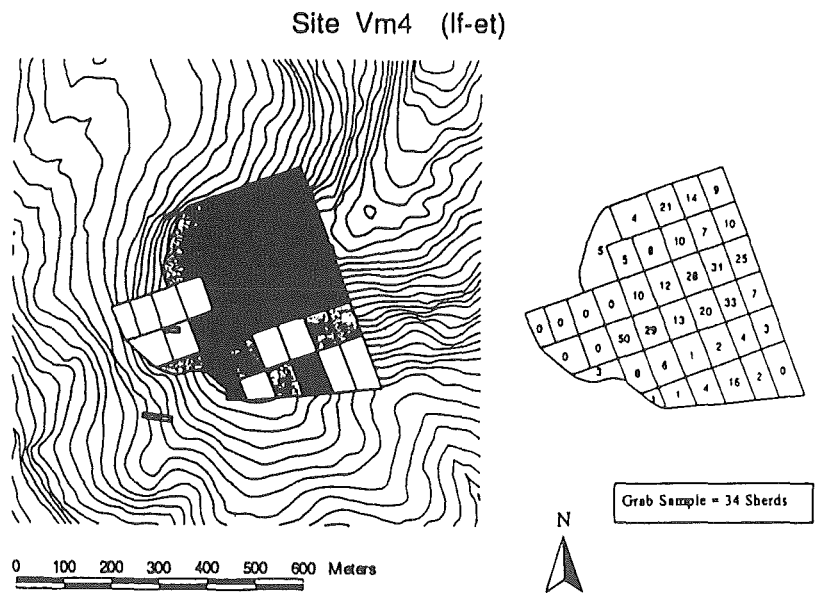
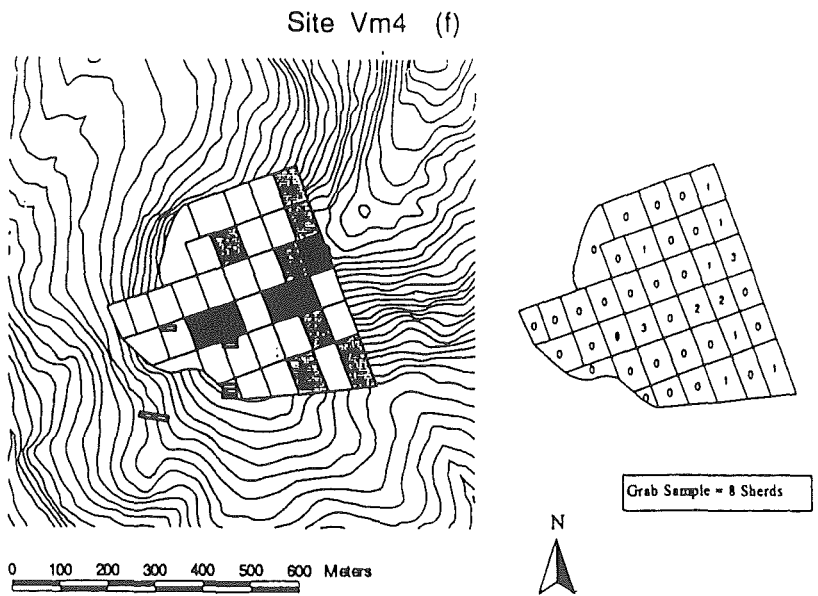
²¹ In addition, the Ephor of Boeotia, Dr. V. Aravantinos, has kindly offered me the opportunity to study some of the excavated Medieval pottery of nearby Thebes. This city was during the Middle Ages one of the most important economic centres of this part of the Byzantine Empire (it may even be ranked third after

Constantinople and Thessaloniki). So, this would be a great chance to compare survey finds with excavated material from the same region.

²² The registers from the Ottoman imperial archives have been studied by Dr. H.C.M. Kiel (University of Utrecht, University of Munich). The Ottoman village population maps are published in Bintliff 1995 and 1996.

²³ A study of the 7 m. high Medieval tower in the Valley of the Muses has previously been undertaken by Lock 1986, 118, no. 13 Palaiopirgos and 1989, 134.

Fig. 3. - a. Site VM4 sampling grids with sherd distribution in the Frankish (f) period, b. in the Late Frankish to Early Turkish (lf-et) period and c. in the Turkish (t) period.



Late-Roman periods, after which a long period of abandonment follows. Only from the 13th century onward (in the Frankish period), was the hill reoccupied, and judging from the amount of ceramics, VM4 soon became a rather substantial community indeed.

We can follow the expansion of site VM4 from a small settlement in Early Frankish times (Fig. 3a) to a large village in Late Frankish and Early Ottoman times (Fig. 3b)²⁴. The finds seem to suggest that thereafter a period of contraction follows, and eventually complete abandonment of the site by the end of the 17th century (Fig. 3c). In short, the vast majority of the sherds recorded at VM4 date from the 13th to the 17th centuries; the absence of any clearly diagnostic Early Byzantine and Middle Byzantine pottery (ca. 7th-12th centuries) is noteworthy.

Among the types of Medieval and Post-Medieval ceramics sampled on the surface, are: Late Sgraffito Ware in a greenish or yellowish colour, a later type of Slip-painted Ware, polychrome Sgraffito Wares (from the Veneto-region and local variants), Blue-and-white maiolica from Italy (*alla porcellana* and *stile severo*), a locally made type of imitation-maiolica and a small polychrome Iznik-fragment from Turkey (Fig. 4)²⁵. What we see here are, in short, high-quality colourful wares with a labour intensive decoration which can generally be dated in the 15th and 16th centuries²⁶.

Apart from these fine wares, VM4 also produced a large amount of unglazed domestic wares for daily use (mainly handle fragments of jugs). Interesting are some lid fragments and objects of fired clay, decorated with stamped circles or incised wavy combing (Fig. 5a). Perhaps these artefacts once belonged to the entourage of a fireplace, as is shown by similar examples found in more Northern regions, for example the Netherlands²⁷. The find of a 'Nine Men's Morris'-game, incised on the inside of a Medieval tile-fragment, is a rarity in Greece, but has parallels in North-western Europe (Fig. 5b)²⁸. Also kiln furniture with glassy residues and wasters were found on the site, which suggest local (glazed) pottery production. The growth of VM4 is thereafter, however, followed by a complete abandonment of the site by the end of the 17th century.

It is interesting to compare this picture obtained from the ceramics with the information obtained from the Ottoman tax registers. By combining the written evidence with topographical data and with ceramic information, it seems quite clear that site VM4 may be identified as the Medieval village 'Panaya' (= Early Modern Palaiopanagia/Modern Askra). In the Ottoman registers this village is listed for the years 1466 to 1646. The number of its households is 79 in 1466, rises to 220 in 1570, and then falls back to 43 in 1646.

One is tempted to relate the finds on VM4 of imported pottery with the opening up of the Greek market by Italian merchants (already after 1204, but especially after 1320) and to the coming of a new elite to Boeotia. The Frankish lords, and thereafter the Ottoman rulers, may have contributed to the rise of a new consumer market for ceramic fine wares. The latter would fit in with the general trend in Europe during the 15th-16th centuries. After the catastrophic era of the Black Death, the continent as a whole witnessed a clear increase in affluence, in the demand for luxury pottery and in the conspicuous consumption of a rising 'middling class' which was no longer satisfied with the old dining habits. In addition, the political security, economic prosperity, low taxes as well as a tolerant administration in Early Ottoman times suggest that 16th century Greek villages experienced a 'Golden Age' of population growth and economic flourishing which would be reflected in a larger variety of ceramics on VM4 and similar sites²⁹.

The sudden decrease of finds on VM4 from the early 17th century onwards, as well as the recorded fall in the number of inhabitants of Panaya between 1570 and 1646 seem to reflect the complicated historical setting of this period, coinciding with the break-up of Boeotian villages into several separate *çiftlik*s or serf-estates and the general political, economic and military breakdown of the Ottoman system, which resulted in Greek lands in a sharp decrease of village prosperity and in depopulation.

The eventual result seems to have been the abandonment of VM4 in favour of a location several hundred meters to the East. At this location a new settlement was established – its foundation is record-

²⁴ The computer maps are from Gillings & Sbonias forthcoming.

²⁵ The pottery was collected in 1982 and 1984. After examination, recording and preliminary dating the sherds were added to the Boeotian corpus of material (now kept at the Thespieae Museum).

²⁶ For more detailed information about the finds on VM4, see Vroom forthcoming. An analysis of the colourants used in the

glazes of the ceramics will also be undertaken by the Archaeological Department of the University of Durham (UK) in the near future.

²⁷ Cf. Dorgelo 1960, fig. 6.

²⁸ Cf. Willemsen 1996, 273.

²⁹ For the 'Golden Age' in 16th century Boeotia, cf. Kiel in press; for VM4, see Vroom forthcoming.

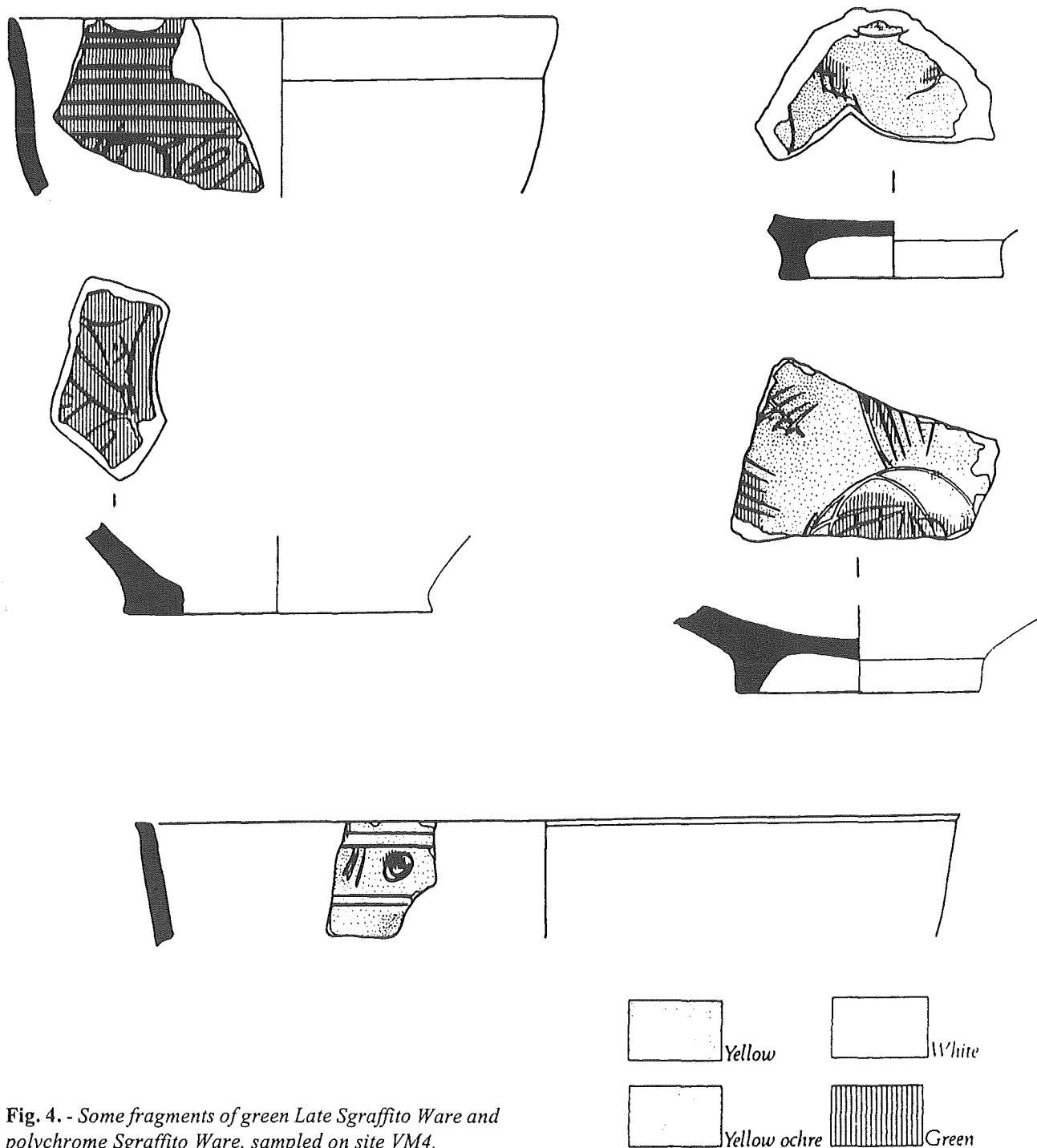


Fig. 4. - Some fragments of green Late Sgraffito Ware and polychrome Sgraffito Ware, sampled on site VM4.

ed by the late 17th-century travellers George Wheler and Jacques Spon – and this settlement still exists today under the name Palaiopanagia or Askra³⁰. The shift in settlement location from site VM4 to the site of present-day Askra would explain the almost total absence of 18th and 19th century pottery on site VM4.

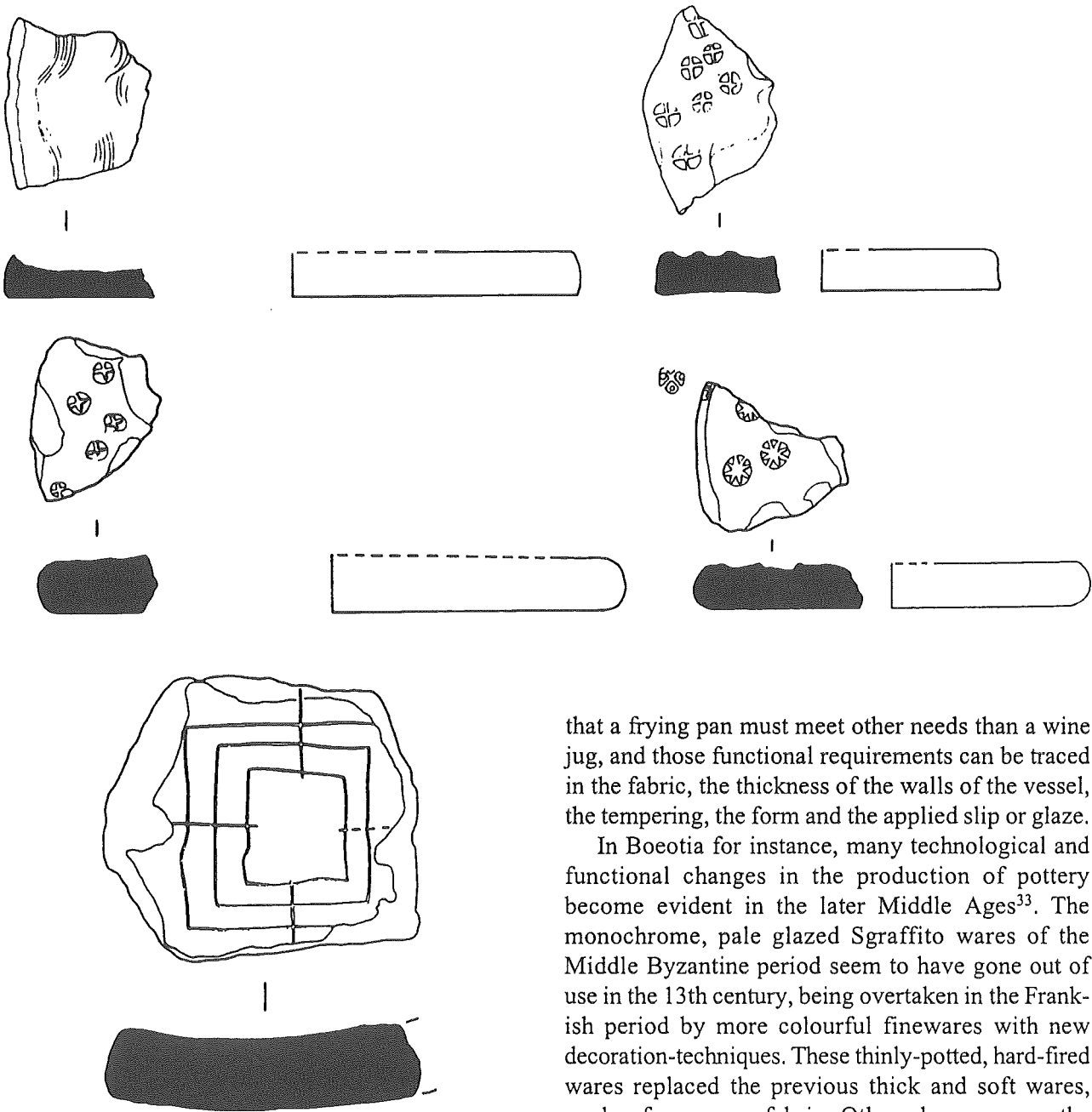
So here we have an example of an apparently fruitful combination of archaeological and textual evidence. It is needless to stress that the relation between broken pieces of pottery and fragments of texts is not always as clear as in the case of VM4 – and never is the relation a simple one. I will not dwell

here on the structural problems of the relation between archaeology and history, such as the confusions about sometimes not very precise terminology and about chronological divisions³¹.

³⁰ Wheler 1682, 476.

³¹ See Lock 1995, 34 and 270-1 for these problems in historical and archaeological approaches. One important point emerging from recent work, however, is his conclusion that 'there is a considerable gap between the material culture of the Frankish Aegean (ca. AD 1204-1500) and contemporary western perceptions of the wealth of that area.'

Fig. 5. - a. Lid fragments, decorated with stamped circles and incised wavy combing, and b. a tile fragment with the lined board of a 'Nine Men's Morris'-game incised on the inside (all found on site VM4).



Functional analysis of Medieval pottery in Greece

But apart from the search for a floating chronology, pottery is of course not only to be considered as a mere dating-tool. Besides its value for chronology, it is quite interesting to use survey material in an effort to establish links between form, fabric, distribution and function of pottery on the one hand, and developments in social habits on the other³². In search of archaeological explanations, one sometimes tends to forget that the main function of pottery was that of a common, everyday utensil – in the kitchen, on the table, in the cupboard, and in transport. It is obvious

that a frying pan must meet other needs than a wine jug, and those functional requirements can be traced in the fabric, the thickness of the walls of the vessel, the tempering, the form and the applied slip or glaze.

In Boeotia for instance, many technological and functional changes in the production of pottery become evident in the later Middle Ages³³. The monochrome, pale glazed Sgraffito wares of the Middle Byzantine period seem to have gone out of use in the 13th century, being overtaken in the Frankish period by more colourful finewares with new decoration-techniques. These thinly-potted, hard-fired wares replaced the previous thick and soft wares, made of a coarser fabric. Other changes were the introduction of the tripod stand, a better quality of the lead glaze and a new range of shapes. From the 13th century onwards we see deep bowls, chalices or goblets with a high ring foot instead of shallow dishes with a low ring base. One may wonder whether these innovations were influenced by the increased use of

³² Blake 1980, 3-8 has questioned the value of the traditional approach to pottery for dating. He argues for instance that pottery 'reflects the components of demand' (rather than supply) and is therefore a 'unique measure of the consumption habits of past communities.'

³³ Cf. Orton 1985, fig. 1 for the different types of change in pottery production.

metal utensils in this period, new economic or social conditions, or perhaps by changes in eating and drinking habits?

In the future it may prove worthwhile to undertake more research into the socio-economic context of the Boeotian ceramics, or into the etymological developments of the names used for vessels³⁴. Textual sources relevant to these perspectives could be Byzantine commentaries on classical texts, Byzantine lexiconographies, cooking books, chronicles, but also account books, contracts, testaments and the archives of Greek monasteries. In addition, the analysis of representations of pottery on medieval icons, frescoes and mosaics could perhaps offer some sort of insight in the use and social context of the objects.

Comparing table habits on 11th century frescoes and miniatures with those on 14th century representations, we can distinguish changes in style. If we look, for instance, at dinner-scenes in the Middle Byzantine period, such as the 11th century 'Last Supper'-fresco in the crypt of the monastery of Hosios Loukas in Boeotia, we see just one large plate, placed centrally on the table. This open plate was used communally for the main course by all diners around the table, who were sitting behind their trenchers. On later frescoes, however, it seems as if a shift towards a greater variety of deeper vessels took place. The 14th century 'Marriage at Cana'-fresco in the church of Agios Nikolaos Orfanos in Thessaloniki shows us the separation of food into several high bowls.

Does this imply that food preparation in Frankish Greece showed a progressive trend to more watery dishes cooked in their own juices, as in Northwestern Europe? Or did the Franks, as newcomers in the Byzantine kitchen, bring new eating customs with them in the 13th century? In historical sources we do notice, for example, references about the different eating styles and cooking habits between East and West³⁵.

This more iconographical approach to the functional analysis of Greek Medieval pottery is, however, not without its handicaps. It is an illusion to hope that by iconographical research one is able to have direct access to historical reality. The style of an artist may seem realistic to us, without necessarily having been so in the Middle Ages. For instance, a cooking pot which the artist represented on a fresco may have existed only in his imagination, however

credible and concrete the picture may appear to us. The Byzantines, moreover, did not perceived the world around them in the same way as we do nowadays. Certainly Byzantine artists had no interest in depicting everyday reality as precisely as possible, because they were more interested in the representation of moral and theological problems. Indeed, nearly all Byzantine painting is religious in content and is based on the faithful reproduction of stereotyped compositions, that were prescribed by the traditions of the church³⁶.

Pottery on Byzantine mosaics, miniatures or frescoes may thus have a purely symbolic meaning. The seemingly realistic representation of the pot or vessel is accordingly more or less a coincident. Certain forms of vessels – real or imaginary – may have served for many decades as a standard example for a school of artists. Other pots may have been neglected by artists because the colour or form did not fit in their aesthetic traditions. In short, the problem whether Byzantine artists represented the reality of their own times, or repeated a standard repertoire (which may even have its origin in the Early Christian period), should be approached carefully. Needless to stress, precise datings cannot be derived from artistic representations of pottery during the Byzantine, Frankish and Ottoman period.

Conclusion

Chemical analysis of glazed pottery, dendrochronological research in relation to ceramic sequences and the identification of manufacturing-centres or consumption-patterns are approaches which are very normal in the study of medieval pottery in Northwestern Europe, but not yet in the ceramic studies of Medieval Greece.

Still, the combination of information obtained by typo-chronological research of the ceramics sampled during the Boeotia survey, by scrutinizing the textual sources, and by looking with a critical eye at the socio-historical representation of Medieval pottery, may in the future prove to be a fruitful and exciting way to come to tenable conjectures about the past. Such a study could very well offer a platform from which to jump into the black hole of Medieval Archaeology of Greece in general, and of Boeotia in particular.

³⁴ See also Bakirtzis 1989, who made an important contribution towards the study of the names, shapes and uses of domestic ware in Medieval Greece (concentrating on the period from the 9th/10th to the 13th/15th century).

³⁵ See Lock 1995, 275 and also Vroom forthcoming.

³⁶ Cf. Mango 1981, 50-51 and Dauterman Maguire & Maguire 1992, 2-3.

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Highly decorated pottery from the late 16th and early 17th century in the western parts of the Baltic area Inspiration, origin and distribution

Pottery for household use can be divided into two groups: kitchenware and tableware, of which the former includes pots for cooking and storage, and the latter dishes, plates, ewers, pitchers, jugs, etc.

Many excavations in Danish towns and rural areas have shown that the pottery inventory of the late 16th and early 17th century consists of three major groups. One is the black pottery, known as ‘Jydepotter’, made in the Jutish countryside without the use of a potter’s wheel¹. The unglazed ‘Jydepotter’ traded out of the production areas were almost entirely intended for kitchen use – the big, black cooking-pots were the pottery equivalent to the cast metal, and they were produced until the beginning of this century. They were mainly used for the cooking of the basic food like gruel, soup and cabbage-dishes, but also for other household production purposes like the preparation of milk for making butter, making of candles or the preparing and dyeing of wool.

The oldest printed cook-book in Denmark from 1616 records the sort of cooking vessels needed: ‘Potter, gryder, kedler, pander’, that is: Pots, saucepans, kettles, pans², the archaeological equivalents being cooking-pots, tripods, coppers and frying-pans (black earthenware, lead-glazed red earthenware or vessels of cast metal).

Because of the possibility of re-using metal, archaeologists usually only meet with coppers in the shape of the loop-shaped iron handles, or the odd leg of a cast tripod together with other metal bits in the bell-(and pot-)founders’ scrap-heap, while the remains of clay pots are numerous. The finds show that smaller saucepans and frying-pans of lead-glazed, turned ware in the shape of tripods with one cylindrical handle were abundant, and that they were used in the same kitchens as the metal pots and black pots, probably for their own specific purposes like the heating of smaller portions of food, the boiling of milk, or the

preparation of various smaller dishes like sauces, pancakes or omelets. To this group belong also the usually not very numerous fragments of glazed but undecorated bowls and saucers for kitchen use.

In principle, cooking vessels were of the same type – if not necessarily made of the same material – at all social levels. In the peasant’s cottage, it could be blackware only, and the castle kitchen would have an ample supply of coppers and cast metal pots as well as cooking-pots of the ‘Jydepotte’ (black ware) type, and glazed tripods for various purposes. The dishes prepared in them might be different, but the process of boiling and frying would be the same. As for tableware, the king as well as the peasant would need a bowl for his soup, a plate for his meat, and a mug for his drink, but the shape, material, and numbers of these would vary according to the economy, social level, and the tradition of the household.

Tableware, to be distinguished as such, belongs to the more wealthy households, farmers in the countryside and burghers in the towns. The function of the tableware was to hold and present the dishes served at the table, but also to indicate the social standing of the household, just as this is the case today. And when it comes to indicating social standing, one would model oneself on those that one would like to be considered equal to – and perhaps aspire to a just somewhat higher position. If one was a wealthy merchant, one knew very well that one could not equal the splendour of the court, but one could try to imitate the ways of the nobility; and if one was an artisan of modest wealth, one could at least try to do like the more humble merchants. In both cases, however, all this was kept to a reasonable level. Sumptuary laws and rules and the unwritten rules of society saw to it that one did not go too far beyond the ways of one’s equals.

¹ A.G. JENSEN, *Jydepotten. Vort Lands ældste Haandværk*, Kbh., 1924. P.v. REENEN & V. JENSEN, *Jydepotten en hun export naar Nederland*, Westerheem XLIV-1 (1995), 1-16.

² *Koge Bog: Indeholdendis et hundrede fornødne stycker, som ere om Brygning, Baging, Kogen, Brendevijn oc Miød at berede*, Kiøbenhavn, 1616. Reprint Århus 1966 and later.

In the 13th and early 14th century, the tableware of the Danish merchant or artisan could be a highly decorated jug from Normandy. Later in the 14th century, it would be jugs of German stoneware, and from the 15th century onwards also of pewter, imitating the silver vessels of the royalty and the nobility. From some time in the last half of the 15th century onwards, Italian jugs and vases and plates made of faience were available in north-western Europa, but they were very rare and may not have reached Denmark at all. From an archaeological point of view at least, they are non-existent. We do, however, see them in the paintings of the period, most often in the shape of vases holding lilies in representations of the virgin Mary. But paintings also document the use of faience in a non-religious environment. One example is a double portrait dated 1496 in the *Koninklijk Museum voor Schone Kunsten* in Antwerp³. It is considered to show the (unknown) artist and his wife, sitting behind a wooden table on which are placed two small loaves, a knife, a pewter pitcher (only half of which can be seen), two dark drinking-glasses of the 'Krautstrunk'-type, a white plate of cherries, and a white vase with blue decorations holding a bunch of flowers – the plate and the vase obviously are made of faience.

In the 16th and 17th centuries, paintings become a very good source of information for the student of daily life of the period. Unfortunately, in Denmark and northern Germany portrait painting were absolutely predominant, and kitchen and table scenes hardly ever occur. But in the Netherlands and parts of Germany, representations of daily life are abundant together with allegories and still-life paintings, often with a highly symbolic content but nevertheless full of information about the material culture of the time. Here, it is obvious that faience (and china) belongs to the highest social levels. It is seen placed on shelves in kitchens, where everything – the size, the number of workers, the dishes prepared – indicate the wealth of the owner. Faience is also shown very often in the luxurious allegories of various sorts, as well as in still-life paintings, where faience bowls and plates can be seen holding exotic and expensive fruits like grapes, figs and almonds, or costly dishes like oysters and sugar deserts. Faience is never seen in the context of daily life in rural environments, and hardly ever in market scenes. Here the red, lead-glazed pottery is predominant, supplemented with wooden plates, baskets and sometimes stoneware jugs. In the much

beloved scenes from inns and public houses, we see lead-glazed pottery, but also stoneware – and pewter jugs and tankards, pewter plates and drinking glasses, but no faience. Obviously, faience is considered to be of a more luxurious nature than glass.

Even if we do not possess paintings of this kind to illustrate daily life in Denmark and northern Germany, it can be assumed that the differences from life in the Netherlands were not very great, and that what occurs (or does not occur) in the pictures is also relevant to the Danish and northern German situation. At the very least, we can safely assume that faience was considered even more luxurious in Denmark, where there was no local production before the 18th century. The rarity of faience in the 16th and early 17th century can be illustrated by the fact, that even if – in the Jutish town of Kolding – dug-up pottery has been collected for about 100 years and several excavations have been carried out where literally every bit of pottery, amounting to thousands of pieces from the relevant period have been collected, only four faience sherds have been found – all in one place, and no doubt remains of one and the same plate, probably made in Arnstadt, (Schwarzburg-Sondershausen)⁴. Instead, there is a very large amount of highly decorated, lead-glazed red tableware, of which a few pieces are recognizable as being of Werra-Wanfried (Hesse) origin. Absolutely predominating, however, is a decorated red earthenware, similar in shape and decoration, but easily recognizable as being of a different origin. They are mainly dishes, plates and bowls with decorations of pipe-clay, white or tinged green by means of the addition of copper oxide, and 'painted' o, the red inner surface with a cow's horn ('slip-cup'). The glaze usually covers only the decorated side of the object.

This sort of decorated pottery has a very wide distribution all over the kingdom of Denmark (then including Scania, Halland and Blekinge, presently southern, western and south-eastern Sweden) as well as the duchies of Schleswig and Holstein, then belonging to the King of Denmark. In fact, it is found in every Danish town, and often also outside the towns.

The origin of the decorated tableware of the late 16th and early 17th century has never been much debated. In the 'classical' publication on Danish earthenware, 'Dansk Lertøj' by Louis Ehlers, the author concludes: 'Most of these types were made all over in the towns, where there were potters in the

³ P. VANDENBROECK, *Catalogus schilderijen 14e en 15e Eeuw*, Antwerpen, 1985, 105-109, afb. 44.

⁴ R. ARTICUS, *Keramikimport des 17. Jahrhunderts in Har-*

burg. Zur Herkunft einiger blau bemalter Apothekengefäße, in: J. ELLERMEYER (ed.), *Harburg - Von der Burg zu Industriestadt. Beiträge zur Geschichte 1288-1939*, Hamburg, 1988, 88-106.

17th century, this type of earthenware is very homogeneous and only differs in small details.' [translation: V.J.]⁵ No doubt Ehlers is right in assuming that 17th-century Danish potters made decorated tableware, but a century is quite a long time, and what applies to the last half of it does not necessarily apply to the first half, the first quarter, or, indeed, the first decade. In the following, I shall suggest another possibility that can explain some of the problems that arise when one looks closer into the matter.

It has already been stated that the degree of uniformity of the highly decorated pottery is very great. Whatever piece is found in one town or part of the country could just as well be found in another. What I have dug up in Kolding has identical parallels not only in the neighbouring towns, but also – to mention just a few – in Ålborg in northern Jutland, in Odense and Svendborg on Funen, in Roskilde and Copenhagen on Zealand, in Halmstad in the present Swedish province of Halland, in Sweden itself (not only in Kalmar at the border between the province Blekinge and Sweden, but also in Stockholm). In Holstein, it is found in Heide in Dithmarschen, close to the North Sea. It is also found in towns where the total absence of clay has prevented any local production at all, like the town of Skagen on the northernmost peak of Jutland. In fact, the very presence of these wares in Skagen suggests the solution of the problem: where did the highly decorated tableware come from in the first place?

The elongated northern peak of Jutland consists of sand, and one has to travel many miles to reach a place where the earth contains clay and thus allows for a production of pottery. Until the beginning of this century, the landscape of sand-dunes and heath made the roads very difficult to travel, and that the idea of transporting fragile goods like pottery by land to Skagen was not even considered is supported by the fact that the only larger collection of pottery from the period hitherto found in the town does not contain one single sherd of the black 'Jydepotte' ware that was produced and traded in large numbers in the vicinity of Hjørring, the main town of Vendsyssel (which is the landscape just south of the peninsula of Skagen). If the people of Skagen bought their tableware on the marketplace in Hjørring, they could hardly avoid buying also some cooking-pots to take home; but apparently they did not, and this is not surprising as we know that almost everything used in larger quantities in Skagen was transported there by boat. The population found their main living from the sea, fishing and supplying the many ships passing on their way to and from the Baltic with things like water and other necessities. The sea was also their link to the rest of the world.

Theoretically, they could have bought their pots in the nearest town on the Swedish or Jutish coast, but for several reasons that is not very likely. Pots were probably not transported as main stores or cargoes, but as a side-trade, brought in in smaller quantities together with other types of goods, and these commodities would of course be purchased where they sold their own product, which was fish. The written sources show that the main trading partner of Skagen was Lübeck. Here, an insatiable market existed for fish – fresh as well as processed – and here one could buy just about anything to satisfy the basic needs as well as the ones for more luxurious commodities. It seems reasonable to assume that it was here that the merchants of Skagen bought the pottery they needed, together with other things, covering a wide range from brick and pantile to small items such as belts and ornaments, not to mention very important, but archaeologically non-existent goods like grain and cloth.

It was not only the people of Skagen who traded their fish with pottery.

The small fishermen settlement (without urban status) of Sandhagen, on the Island of Langeland south of Funen, was excavated by the Museum of Langeland in the 1950s, and here were found the remains of well-built houses with stoves made of glazed, relief-decorated tiles; some of the latter have a diamond-shaped decoration which has very close parallels in Skagen as well as in the fishing settlement of Dragør on the island Amager, south-east of Copenhagen (and to which the specimens from Skagen and Dragør are identical)⁶ At Sandhagen, many small finds indicate a rather well-to-do population, and among these finds were lots of remains of highly decorated tableware like that from the above-mentioned towns, some of them dated by inscriptions to years closely before or after the year 1600⁷.

While the fishermen of Dragør may have taken their fish to the markets in Copenhagen or Malmø, and may also have bought their household goods (including stove tiles) there, the fishermen of Sandhagen had no other place to go but Lübeck, the towns of Schleswig, Holstein and Southern Funen as well as Langeland, the latter being small and no doubt able to supply themselves with fresh fish through their own local community of fishermen. Lübeck, or perhaps one or two other large trading ports like for instance Wismar, Rostock or perhaps Stralsund on the Baltic coast, would be the places where they would go to sell their fish and buy whatever they needed.

⁵ Ehlers 1967, 25-29.

⁶ Liebgott 1979, 105.

⁷ Berg, Bender Jørgensen & Mortensøn 1981, 45-72.

Considering that the highly decorated red earthenware occurs in so many different places and is of such a uniform character that it must necessarily derive from one and the same source, that same source could very well be Lübeck. It is in fact difficult to suggest any other place which those very different and widespread settlements had in common. Indeed, the towns of Skagen and that of for instance Kolding are different from one another in almost every respect but the highly decorated tableware and the glazed stoves; however, when one looks deeper into the archaeological material, other little things point towards a market where the citizens of the two towns may have met each other. One small ornamented bronze buckle found together with the Skagen pottery has its exact parallel in the Kolding material, but there is no reason to believe that the one in Skagen would have been bought in Kolding or *vice versa*. On the other hand, it is difficult to imagine any other town but Lübeck where people from the two towns were indeed to meet. Merchants from Kolding (or Skagen) would have very little reason for going to Copenhagen or Ålborg for instance, or indeed, Skagen merchants for going to Kolding or *vice versa*. Kolding had its own fishermen, and if by chance a Skagen merchant would have bought goods in Kolding, topping of his cargo with pots, he could hardly have avoided to add some black cooking-pots as well, Kolding being one of the ports from where they were traded. In the town itself, sherds of 'Jydepotter' occur in large numbers.

Indeed, when one considers the many different places where highly decorated red tableware of identical appearance occurs in large quantities, one has to accept a common origin. As it will be understood, my suggestion is the market in Lübeck, but not necessarily as a product of the town itself. The potteries where they were made could very easily be situated somewhere else, from where they could easily be transported. During the first half of the 17th century, some of those potters settled down in towns in Denmark, Schleswig-Holstein and Sweden, where they continued to produce the much sought-after decorated tableware.

It is a recognized fact that the trade with Lübeck was a very important factor for Denmark and Sweden in the Middle Ages⁸. Historians know this, but it has

not been taken very much into consideration by archaeologists, who tend to let the finds support theories about other trade routes, oriented more to the west and south-west⁹. In the late 16th and the 17th century, the great days of the Hansa dominance were certainly over, but on the other hand, one will do well not to underestimate the importance of the Baltic trade and of the impact of the very short distance by the best of trade-routes – the sea – from Lübeck to all Danish (and Swedish) ports. The highly decorated tableware even found its way to the three west-coast towns Ribe, Varde and Ringkøbing, as well as to towns like Heide in western Holstein, but from here the distance by road is not very far, and through the cattle and salt trade the contact to Lübeck was already well established.

The potters who produced the highly decorated red tableware covered the demand created by the occurrence of the more expensive, and probably not so easily accessible decorated faience, and as well as they could, they also copied the decorations. When you paint with pipe-clay by the help of a cow's horn, you cannot achieve the fine details of the paintbrush, but it is possible to ornament the middle of the dish or plate with a bird, a flower or a star, or perhaps a person or two, and to copy the more geometrical ornaments on the rim. One of the popular patterns for that purpose was the Wan Li pattern and its derivations, well known from Dutch and Frisian faience plates of the early 17th century, but a closer study reveals many other patterns chosen from the faience products, which, transformed into simpler designs, have been applied to the red clay surface by means of the cow's horn.

It must be stressed, however, that I do not believe that all highly decorated red earthenware dishes and plates were made in Lübeck. I am well aware of the fact that there were local productions in for instance the Dutch provinces¹⁰ and that some of the specimens from those production centres travelled even as far as Denmark. The written sources are too sparse to allow an investigation of the origin of the potters working in Denmark in the 16th and early 17th century¹¹ but there can be little doubt that Albrecht the Potter who worked in Kalmar (Sweden) in the second quarter of the 17th century was of German origin, as was certainly Peter Pole from Stralsund who built stoves at

⁸ In Denmark, the term is used for the period 1050-1536, the first 150 years being called the early Middle Ages, the period 1200-1400 the high Middle Ages, and 1400-1536 (the Danish Reformation) the late Middle Ages.

⁹ Indicators being things like jugs from Normandy (about 1300) and leaden cloth seals from England, the Netherlands and

Germany (late 15th and 16th century).

¹⁰ E.M.Ch.F. KLIJN, *Loodglazuuraardewerk in Nederland/Lead-glazed earthenware in The Netherlands. The collection of the Nederlands Openluchtmuseum*, Arnhem, 1995, 184-192.

¹¹ Søgaard 1944, 214-216.

the castle of Kalmar in 1618¹². So was no doubt the floor-tile maker who worked in Næstved on Zealand in the last quarter of the 16th century. His name is unknown, but he used a glaze based on pewter like that of the faience-makers, and apart from this single case, this was unknown in Denmark until the first faience factory was founded in Copenhagen in 1722¹³.

The fact is, that apart from the works of the faience tile maker, the products of the local potter and the immigrant cannot be distinguished, and whatever plates, dishes or tiles they produced, it was an integrated part of the northern German tradition, which in turn found its main inspiration in the early Dutch and German faiences¹⁴. The purpose of this paper is to stress the importance of Lübeck as a centre of trade and influence – even at this late date – in the towns bordering on the western part of the Baltic Sea and on the Danish waters.

I have chosen not to include a map showing the places mentioned in the paper, because it could easily lead to the misunderstanding that highly decorated red earthen tableware was found only in the places mentioned. The fact is that I can think of no Danish town, where excavations have been carried out, or where pottery from the period has been collected, where it does *not* occur.

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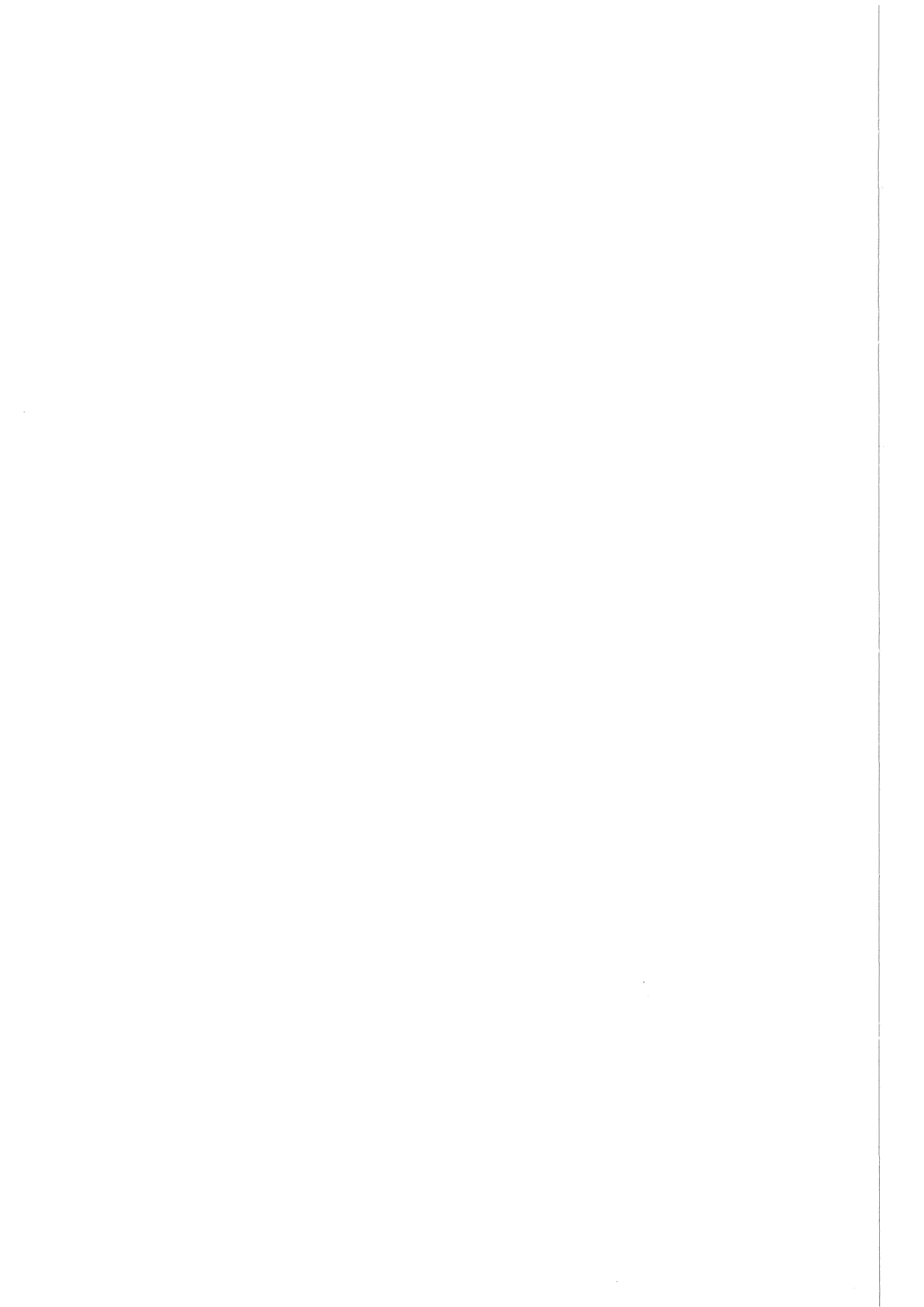
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¹² Birk Hansen 1987, 34-35.

¹³ Birk Hansen 1997, 32-34. Blomé 1995, 92-93.

¹⁴ Jensen 1995, 14.



Sizes and Measures of Later Medieval Pottery in North-Central Italy

Introduction

The research for this study was prompted by exhortations to measure the capacity of whole English pots in order to test their conformity with medieval units of measure, recorded in contemporary descriptions and shown by some single coincidences.¹ In north-central Italy the structural use of pottery in roof vaults and wells favours the preservation of large assemblages of almost complete pots. Those retrieved from buildings can include a wide variety of kinds and shapes.² Although none of the groups considered here were recovered by archaeologists, most of the pottery in three of the four towns probably came from a single datable context.

The purpose of the exercise was to see if the pottery could be grouped into sizes, if the sizes were regular multiples, if they corresponded with known units, if they varied from place to place and if change in sizes and conformity to them could be detected over time. Vessel sizes may reflect different practices in storing, cooking and eating; and their standardisation the extent to which the market impinged on different spheres of domestic activity.

Methods

Various measuring media were considered and tried. Liquid is the most appropriate, as it finds its own level; but it does leak from the cracked or holed pots. The permeable fabric when unglazed absorbs water which would have added a drying stage to the process³ and which might have damaged the vessels. Water dissolves some restoration adhesives. It is also a potentially messy business in a museum environment. Lead pellets and sand were ruled out because their weight could break fragile pots and would have been impractical for the larger ones. Seed is light, which made it easier to fill and empty the containers and allowed us to cover holes and reconstruct missing parts with draughting tape. It was also inexpensive.

We first tried millet,⁴ which was so light that it tended to settle in a non-uniform manner and adhere to the side of the plastic funnel and column. A second more careful measurement of three jugs revealed the following discrepancies:⁵

Assisi form 30	1st ml	2nd ml	Difference ml	%
A715	1,420	1,445	-25	-1.73
A716	1,400	1,420	-20	-1.41
A718	1,440	1,430	+10	+0.70

A rounder seed was sought on the assumption that it would settle more evenly. Agricultural suppliers suggested rape or mustard. At the time it was easier to obtain the *colza* variant of the former.⁶ As a test, the four complete and undamaged jugs at Fiesole were filled to the top with different media:

Inv. no.	Water ml	Millet (error)	%	Rape 1st	%	Rape 2nd	%
1319	1,780	1,700 (-80)	-4.49	1,720 (-60)	-3.37	1,760 (-20)	-1.12
1353	2,080	2,060 (-20)	-0.96	2,060 (-20)	-0.96	2,080	
1335	2,300	2,180 (-120) 2,300 ⁷	-5.22	2,360 (+60)	+2.61	2,300	
1346	3,960	4,000 (+40)	+1.01	3,980 (+20)	+0.51	3,960	
Average error			-2.42		+0.30		

¹ Hinton 1977, 221-222, 235-236; Moorhouse 1978, 15.

² As distinct from the practice of placing only large storage vessels, e.g. in antiquity, Ballardini 1964, pp. 29-31, in the later middle ages, Mazzucato 1970, and in the early modern period, Francovich & Vannini 1977.

³ Three unglazed and undamaged jugs at Montalcino lost about one third of the water left in them for fourteen hours overnight in winter. The fabric of the biscuit example was completely soaked, whereas the coarse ware jugs only appeared to be damp below water level. Assisi A587, a form 18 of biscuit quality fabric, when dry weighed 415 gm, after washing 442 gm and fifteen hours later - kept in a room in August (presumably overnight) - 420 gm, Smout 1980, 7. We assumed it took three days in a warm room for a washed pot to return to equilibrium.

⁴ Suggested by Ezio Tongiorgi.

⁵ Smout 1980, p. 8, who concluded that "some readings may vary from the true capacity by as much as ± 30 ml".

⁶ According to a dictionary, *Brassica campestris oleifera*.

To judge from the first measurements of this limited sample, millet can under record by up to five per cent and overestimate by one per cent and rape from under three and a half per cent to over two and a half per cent. On average millet appears to settle less than rape, although the error differences between the two media are not significant. More care with either medium produced the correct result three times out of four.⁸ In the end rape was chosen because it was easier to handle, as it did not stick to the side of the plastic containers.

The measuring device was a two-litre plastic cylinder marked at 20 ml intervals obtained from a laboratory supplier.⁹ The capacity was recorded either to the nearest graduation or in some cases estimated at half or quarters between. The column had to be filled more than once for larger vessels. Tests measuring grain in a standard at Pistoia showed that pouring speed and especially settlement by knocking the container on the ground affected the amount.¹⁰ The relative velocity at which the pot and cylinder were filled may have varied.¹¹ Whereas the seed in the column could be shaken down, greater care had to be taken with the pots, which were also uneven and broader.

Where possible the vases were measured full. In most cases too little remained of the rim for its circumference to be restored. The sample is mainly made up of jugs with trilobate openings, where the front of the mouth has been pinched (thereby raising the rim height locally) to form a pulled out and lower lip.¹² The shape cannot be easily reconstructed in tape, even when the other side is present. As this opening is almost always everted from a neck more constricted than the body, the easiest arbitrary point, applicable to almost all forms and sizes, was the narrowest part of the neck. Exactly where this occurs is, however, not always clear, which affects both the comparability of the data and its possibility of replic-

ation.¹³ In practice the adoption of this lower point increased the sample by about a half.

At Assisi another jug tradition is present, from which liquid is poured out of a spout applied to, and through a hole in the lower part of, a cylindrical neck. Here measurements were taken at three levels: full¹⁴ and at the top and bottom of the neck hole. Smout felt the top was the most appropriate because the vessel appeared "full" but not overflowing, as the fluid would have been visible in the spout.¹⁵

The main issue was to choose a common point which could be measured on many pots. For vessels less than one and a half litres the errors introduced by the media, device and process may have been less than the rounding, adopted during the analysis, to the nearest decilitre.

Fiesole¹⁶

Sample

The oldest group consists of forty almost complete jugs most of which appear to have been retrieved from a well in 1882.¹⁷ One of the seven oak pails found with them has been radiocarbon dated to 990±40¹⁸ and similar jugs from contexts in the middle Arno valley have been assigned to the 10th and 11th centuries.¹⁹ Fabric analyses also point to a local origin and in particular to the selection of refractory clays from at least 15 to 20 km away as well as to other sources.²⁰ At the time Fiesole, the seat of a bishop, but overshadowed by Florence, may have served as a local consumption and perhaps also as a production centre.²¹ Over half the jugs had been exposed for prolonged periods to the fire confirming their use in cooking²² and a quarter of the handles show friction signs perhaps from drawing water from the well.²³ Others, including a production waster, may have lined the bottom of the well to serve as a filter.²⁴

⁷ The second is a repeat measurement.

⁸ Probably related to filling velocity and shaking – see the next paragraph. Given the number of vessels and measurers, assume that "more care" was not taken.

⁹ Gallenkamp Griffin CYP-700-170W polypropylene.

¹⁰ The grain in a 12.92 litre standard, filled very quickly, weighed 9.94 kg, slowly 10.11 kg, and knocked a number of times on the ground 10.52 kg. Very fast was 1.68% less than slow, slow 3.9% less than shaken and fast 5.51% less than slow and shaken, Rauty 1975, 17, n. 68. We unconsciously stumbled on a medieval issue. A late 14th century Florentine put the loss at 2-3%, Tucci 1973, 589.

¹¹ The process of measuring is illustrated in Blake 1981a, fig. 21.

¹² On these "full" was taken as midway between the handle and the lip, where the vertical section line on archaeological drawings conventionally meets the rim.

¹³ The neck constriction of some baluster jugs at Assisi and Montalcino were marked externally by a ridge or an incised line. The narrowest point of the tall cylindrical neck of some forms would be too low.

¹⁴ In practice to the top of the spout, which was usually lower than the rim.

¹⁵ Smout 1980, 5.

¹⁶ The location of the places mentioned in the text are shown on Fig. 12.

¹⁷ Francovich & Vannini 1989, 11-14.

¹⁸ Francovich & Vannini 1989, 66, n. 31.

¹⁹ Francovich & Vannini 1989, 83-84.

²⁰ Francovich & Vannini 1989, 81-82, 92-93.

²¹ Francovich & Vannini 1989, 81.

²² Francovich & Vannini 1989, 16, 78, n. 34.

²³ Francovich & Vannini 1989, 79, n. 37.

²⁴ Francovich & Vannini 1989, 78.

The pottery, which is unglazed, has been classified mainly on the basis of shape. Those with a squat globular (A1) or biconical (A2) body, collared trilobate mouth, strap handle and a sagging or flat base belong to the largest group A. They appear to have been formed on a turn table. Group B is distinguished by an ovoid body and a flat or concave base. Most of this group have a finer fabric and may have been wheel-thrown. Only one – with a coarser fabric – shows signs of burning. D is a fine jug, analogous to the previous groups, and painted with red slip runs. The two differently shaped and finer C jugs have a plain triangular opening and a flat base.²⁵ One of the last bears a label attesting its provenance from the 1882 well.²⁶

Capacity data

The jugs were measured in 1981 with rape seed and recorded to the nearest 20 ml.²⁷ Twenty one could be filled to the top and 34 to the narrowest part of the neck (Table 1).²⁸

The mode of the full capacities is 26, followed by 21 dl (Fig. 1). Fourteen can be made to fit a scheme based on the distance between these two modes and the outliers, whereas seventeen are accounted for in an interpretation, containing groups based on a span of up to 360 ml.

Multiple	Ideal ml	Mean ml (items)	Ideal ml	Multiple
1	514	520 (1)	638	1
3	1,542	1,540±40 (2)	1,275	2
4	2,056	2,093±9 (3)	1,913	3
		1,968±154 (5)		
5	2,570	2,585±41 (4)	2,550	4
6	3,084	3,950±10 (2)	3,188	6
7	3,598	3,600 (1)	3,825	6
		3,340±60 (2)		
10	5,140	5,140 (1)	5,100	8

The mode of the neck capacities is 19 with a subsidiary at 17 dl (Fig. 2). They can be grouped into three spans between 360 and 480 ml. The interpretation below is based, as was the full one, on the relationship between the principal mode, the 23-25 dl group and the two outliers.

Multiple	Ideal ml	Actual ml (items)	Grouped ml
1	475	500 (1)	
1.3	633	640 (1) ²⁹	
2	950	900 (1)	
3	1,425	1,400±40 (2)	
		1,715±36 (4)	
4	1,900	1,943±57 (6)	1,852±152 (10)
5	2,400	2,432±56 (5)	2,357±130 (7)
6	2,850	[3,100 ±60 (2)]	
7	3,325	3,405±67 (4)	
8	3,800	3,740±62 (4)	[3,573±179 (8)]
10	4,750	[5,060 (1)]	
11	5,225	[5,060 (1)]	
12	5,700	5,740	

Table 1

Fiesole jug capacities: full and at the narrowest point of the neck.

Cat. no.	Type	Full ml	Neck ml
1325	A2	520	500
1352	B1		640
1329	B1		900
1326	A2	1,580	1,360
1316	C	1,500	1,440
1319	B1	1,760	1,680
1331	A1	1,800	1,680
1353A	A2		1,740
1332	A1		1,760
1333	A1		1,860
1349	D		1,900
1353	A1	2,080	1,940
1334	A1	2,100	1,940
1328	A2	2,100	1,980
1336	A1		2,040
1322	B1		2,120
1335	A1	2,300	2,220
1337	A1		2,340
1339	A1	2,520	2,420
1321	A1	2,620	2,420
1317	B2	2,580	2,480
1342	A1	2,620	2,500
1350	B1		3,040
1344	A1	3,280	3,160
1341	A1	3,420	3,320
1318	B2		3,360
1343	A1	3,600	3,460
1340	A1		3,480
1320	C	3,700	3,640
1315	A1	3,800	3,740
1346	A1	3,960	3,780
1345	A1	3,940	3,800
1347	A1	5,140	5,060
1348	A1		5,740

²⁵ Francovich & Vannini 1989, 17-64; also based on my own study undertaken in 1970.

²⁶ Francovich & Vannini 1989, 61; but note that the bottom of later wells in the province of Arezzo were apparently lined with chronologically successive layers of jugs, Francovich & Gelichi, 1983, 8-9.

²⁷ Many of the capacity measurements in Francovich and Vannini's catalogue (1989, 21-64) were incorrectly derived from a handout distributed at a conference to illustrate Blake, 1981b, a paper given outside the published programme (Francovich & Vannini 1989, 16, n. 16).

²⁸ The full capacity of 1343 is approximate as part of the rim is missing. The narrowest part of the neck of 1345 was difficult to determine. 1348 could only be filled to the highest surviving point, which appears to be below where the neck would have been at its narrowest.

²⁹ 1,943 ml divided by 3 equals 647 ml.

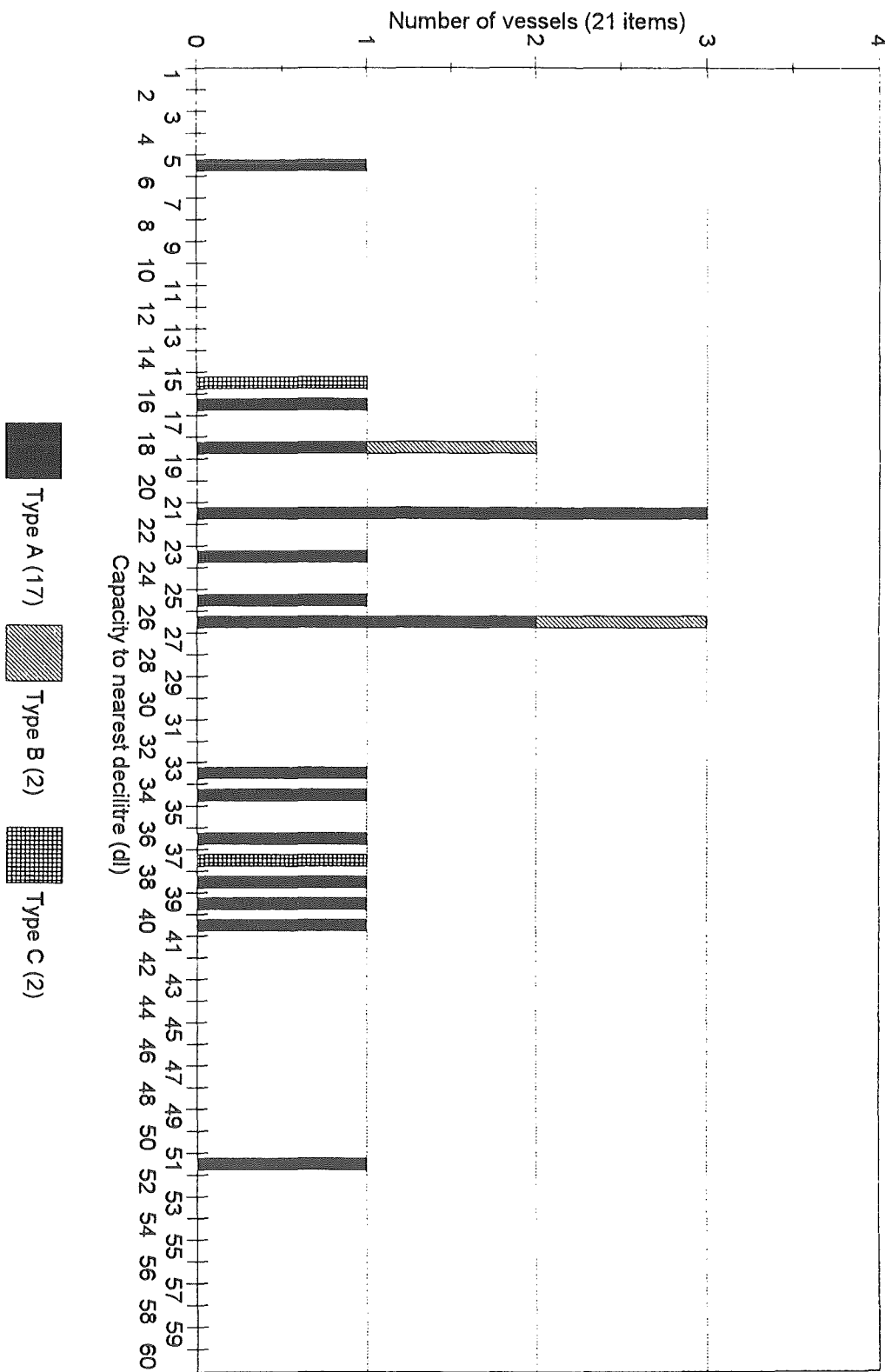


Fig. 1. - Fiesole.
Histogram of full capacities

Ten values are excluded in this scheme. They fall to four if the groups are accepted.

The types have similar values (Figs 1-2). Removing four of the type B and C ones would clarify the neck histogram, but not significantly. Type B (neck mean 2,031 ml) tends to be smaller than A (2,677 ml).

Units of measure

Fiesole doubtless had its own units before it was taken by its neighbour Florence in A.D. 1125.³⁰ Eleventh century rents in kind to Pistoian landlords were determined by their measures. Only in the following century is reference made to a common town market standard.³¹ Later Florentine capacities are better known.³²

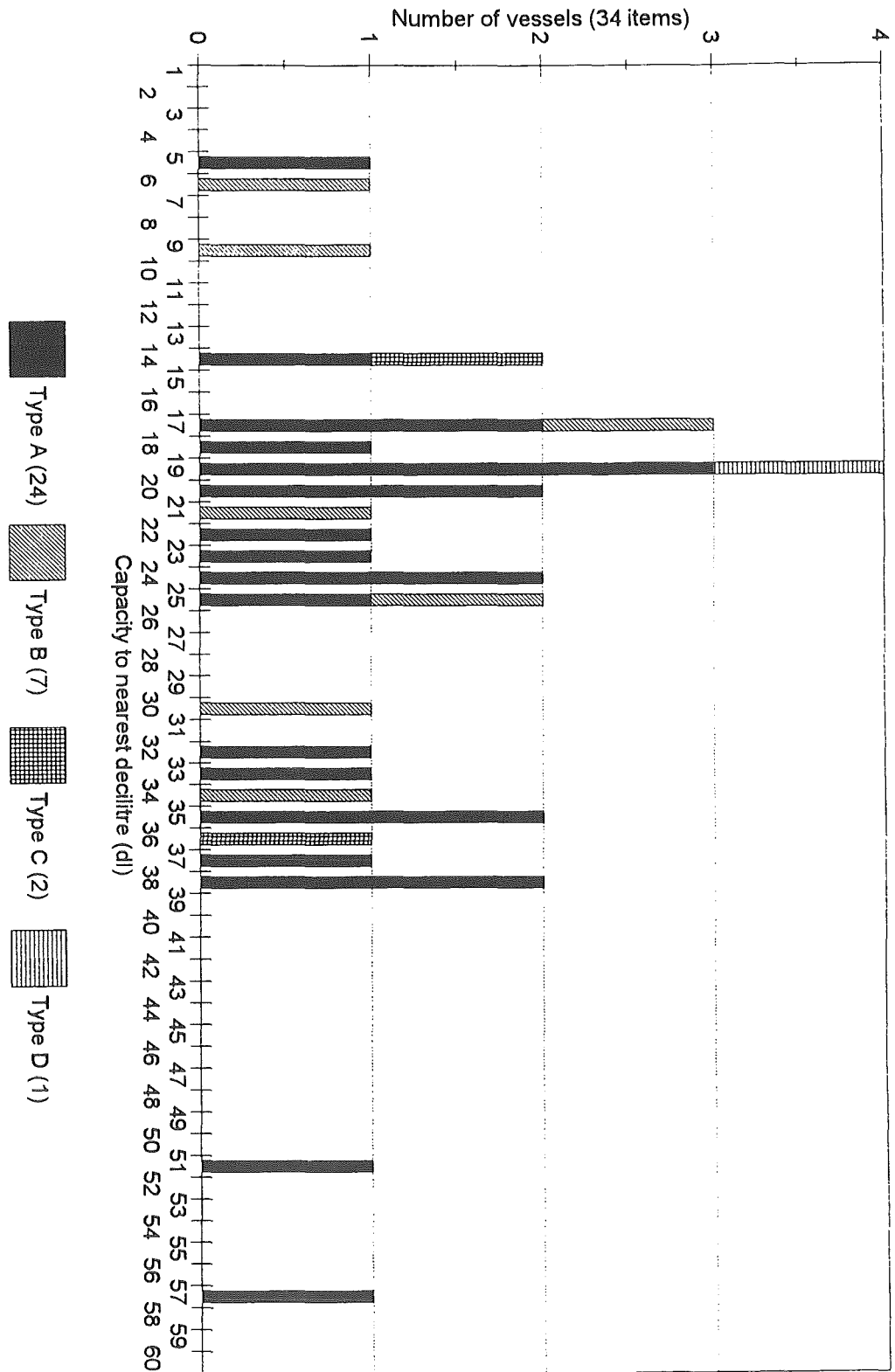


Fig. 2. - Fiesole.
Histogram of neck capacities

Florence unit	wine ml (multiples)	oil
<i>barile</i> ³³ / <i>orcio</i> ³⁴	45,584 (40)	33,429 (32)
<i>quarto</i> ³⁵	4,558	4,198
<i>fiasco</i> ³⁶ / <i>mezzoquarto</i> ³⁷	2,279	2,089
<i>metadella</i> ³⁸ / <i>boccale</i> ³⁹	1,140 (1)	1,045 (1)
<i>mezzetta</i> ⁴⁰	569	522
<i>terzeruola</i> ⁴¹	379	
<i>quartuccio</i> ⁴²	285	261

³⁰ I have not checked the Tuscan bibliography.

³¹ Rauty 1975, 11-13.

³² Cora 1973, 228. The metric equivalences are the same as those given by Martini 1883, 207, and Bofondi 1855, 170, but Cora did not round upwards. See observations on Cora's data in Farris & Caprile 1981, esp. 215-216.

³³ Barrel. For English equivalents of the Italian terms, see Zupko 1981.

³⁴ Pitcher, oil jar.

³⁵ Quart.

Discussion

The above attempts to fit most of the jugs into an elaborate scheme do not convince. The number of divisions in relation to the size of the sample is too great. There does seem to be two groups, one roughly double that of the other (2 and 3.5 litres);⁴³ and thus generally comparable to the later Florentine *fiasco* and *quarto*. The smaller and more numerous group, which covers a larger span, can be divided into two or three. The outliers could be further doubles or halves.

The greater size than later tableware may reflect that many were used in cooking and should therefore be compared with kitchen ware. However, the smaller finer types (B and D) are still big for the table. The smallest pot was burnt and the next smallest seemed to have been used for drawing water from a well. So they cannot be readily differentiated for functional reasons. Pottery at this time either complemented smaller vessels in other materials or served larger groups of people. It does not appear to have conformed to any unit multiples.

Assisi

Sample

The largest known surviving group of almost complete medieval pottery from a single context in Italy was brought to light during the refurbishment in 1968-69 of the refectory of the S. Francesco friary.⁴⁴ The pottery may have been incorporated in the underlying vaults as a structural feature when the room was built, perhaps in the second quarter of the 14th century.⁴⁵ Wasted biscuit and defective glazed ware as well as a decorated trial piece are evidence of local kilns; but used cooking vessels were also deposited, and in the second half of the 14th century large quantities of pottery were brought from 20 km away.⁴⁶

Unlike the multi-purpose jug form at Fiesole, the pottery of this period can be clearly divided into

kitchen ware, storage vessels and table ware. The last has been subdivided into biscuit and by glaze and decoration. Four hundred and twelve of the 647 minimum number of pots preserved were almost complete and consist mainly of closed forms.⁴⁷ The capacities of 158 of the finer and smaller ones likely to have been used on a table are considered here.

Form no. ⁴⁸	Short description
[8	Storage pitcher with pinched spout ⁴⁹
12	Albarello
13	Jar
14	Jug with tubular spout
15	Biconical jug with pinched spout
16	Ovoid pitcher with pinched spout
17	Globular pitcher with trilobate mouth
18	Ovoid pitcher with narrow neck and trilobate mouth
19	Baluster jug with waisted foot, trilobate mouth and strap handle
20	Spherical jug with waisted foot and tall cylindrical neck
29	Spherical jug with waisted foot and pinched spout
30	Baluster jug with waisted foot, trilobate mouth and rod handle
31	Globular jug with waisted foot and narrow cylindrical neck.

The removal of the fill below a floor in a room to the north of the cloister in 1971-72 led to the recovery of more fragmentary material, presumably redeposited there. The pottery is datable to between the middle of the 14th and 15th century. Most of the 400 or so vessels represented are open forms, only about 60 of which were almost complete. Two squat jugs were restored and measured.⁵⁰

Capacity data

The biscuit was measured in 1979 and the glazed ware in 1980 using millet, estimating to the nearest 5 ml (Table 2).⁵¹ Three modes are apparent (Fig. 3):

All mean ml (items)	Tableware mean ml	Multiple
404±77 (23)	389±68 (20)	1
898±116 (67)	931±137 (67)	2/2.5
1,561±148 (62)	1,589±130 (56)	4

³⁶ Bottle.
³⁷ Half quart.
³⁸ Lit. "half of the" (or little half?).
³⁹ Jug.
⁴⁰ Little half.
⁴¹ Third.
⁴² Little quart.
⁴³ Neck: 2,060±279 ml (17 values from 1,680 to 2,500 ml) and 3,478±249 (10 from 3,040 to 3,800).
⁴⁴ Blake 1981a, is the most recent account.
⁴⁵ Blake 1980, 97.
⁴⁶ From Deruta & Palumbo 1971, 353.
⁴⁷ The quantities are summarised as a table in Blake *et al.* 1981, 3.

⁴⁸ The forms were numbered and illustrated in the initial report, Blake 1971.
⁴⁹ Two storage pitchers are included in Table 2, but not in the Figures.
⁵⁰ Blake 1980, fig. 19; 1981a, fig. 16.
⁵¹ By Mike Smout in 1979 and by a team in 1980. Preliminary accounts of the 1979 results appeared in Blake *et al.*, 1981, 6-9, and Blake 1981a, 31-33. The histogram in the latter (fig. 22) includes the 1980 glazed data. Table 2 is limited to the measurements - the only available at the time of writing - made by Smout (1980, 37-43) and of the glazed forms 29 and 30. In his dissertation Smout (1980, 5) adopted the "top of the spout hole" measure, whereas Blake 1981a, 31, used the "bottom of the spout hole" figures. So the data employed here (and in Blake 1981a,

Table 2

Assisi: neck capacities.

Refectory: A prefix catalogue numbers; nordt room: B prefix.

Cat. no.	Class	Form	Capacity ml	Cat. no.	Class	Form	Capacity ml
A648	Biscuit	29b	260	A632	Biscuit	29b	840
A839	Biscuit	30	300	A784	Biscuit	30	840
A76	Archaic maiolica	30	320	A783	Biscuit	30	845
A834	Biscuit	30	330	A758	Biscuit	30	850
A838	Biscuit	30	335	A778	Biscuit	30	850
A649	Biscuit	29b	340	A811	Biscuit	30	860
A832	Biscuit	30	375	A593	Biscuit	12	880
A77	Archaic maiolica	30	380	A939	Biscuit	19	880
A824	Biscuit	30	380	A636	Biscuit	29b	885
A827	Biscuit	30	380	A21	Archaic maiolica	29	900
A830	Biscuit	30	380	A753	Biscuit	30	900
A835	Biscuit	30	380	A762	Biscuit	30	900
A833	Biscuit	30	395	A785	Biscuit	30	900
A829	Biscuit	30	405	A635	Biscuit	29b	905
A941	Biscuit	19	410	A760	Biscuit	30	905
A589	Biscuit	18	430	A775	Biscuit	30	915
A831	Biscuit	30	430	A583	Biscuit	18	920
A825	Biscuit	30	455	A763	Biscuit	30	920
A64	Archaic maiolica	30	460	A766	Biscuit	30	920
A588	Biscuit	18	500	A776	Biscuit	30	925
A818	Biscuit	30	510	A770	Biscuit	30	930
B189	Archaic maiolica		520	A759	Biscuit	30	945
A822	Biscuit	30	555	A629	Biscuit	29b	950
A587	Biscuit	18	580	A633	Biscuit	29b	960
A585	Biscuit	18	650	A92	Archaic maiolica	30	960
A584	Biscuit	18	660	A756	Biscuit	30	970
A586	Biscuit	18	680	A543	Biscuit	15	980
A84	Archaic maiolica	30	700	A631	Biscuit	29b	980
A646	Biscuit	29b	740	A780	Biscuit	30	980
A66	Archaic maiolica	30	740	A754	Biscuit	30	990
A777	Biscuit	30	760	A781	Biscuit	30	990
A786	Biscuit	30	770	A639	Biscuit	29b	1,010
A15	Archaic maiolica	29	780	A767	Biscuit	30	1,020
A638	Biscuit	29b	780	A769	Biscuit	30	1,020
A779	Biscuit	30	780	A755	Biscuit	30	1,030
ABB	Archaic maiolica	30	783	A757	Biscuit	30	1,040
A813	Biscuit	30	790	A768	Biscuit	30	1,040
A637	Biscuit	29b	800	A774	Biscuit	30	1,040
A645	Biscuit	29b	820	A764	Biscuit	30	1,050
A772	Biscuit	30	820	A810	Biscuit	30	1,085
A942	Biscuit	20	820	A623	Biscuit	29b	1,130
B163	Archaic maiolica		820	A52	Archaic maiolica	30	1,140
A761	Biscuit	30	830	A595	Biscuit	13	1,140
All	Archaic maiolica	29	840	A765	Biscuit	30	1,160
A39	Archaic maiolica	29	840	A7	Archaic maiolica	29	1,240
A49	Archaic maiolica	30	840	A725	Biscuit	30	1,255
A59	Archaic maiolica	30	840	A580	Biscuit	18	1,300
A598	Biscuit	14	840	A103	Biscuit	31 b	1,320

fig. 22) for form 29 are based on measurements taken at two different points in the vessel: for the twenty four biscuit forms 29a and 29b the higher "top" and for the nine archaic maiolica form 29s the lower "bottom".

The two larger form 20 jugs were only measured to the bottom of their tall necks; and Smout cryptically noted against the capacity figures of the form 16 "Tip" and of 15 "top" (perhaps referring to measurements to the top of their spouts).

Cat. no.	Class	Form	Capacity ml	Cat. no.	Class	Form	Capacity ml
A93	Archaic maiolica	30	1,320	A579	Biscuit	18	1,590
A716	Biscuit	30	1,420	A721	Biscuit	30	1,590
A727	Biscuit	30	1,420	A729	Biscuit	30	1,590
A771	Biscuit	30	1,420	A723	Biscuit	30	1,600
A718	Biscuit	30	1,430	A712	Biscuit	30	1,605
A694	Biscuit	30	1,440	A717	Biscuit	30	1,620
A720	Biscuit	30	1,440	A616	Biscuit	29a	1,640
A732	Biscuit	30	1,440	A702	Biscuit	30	1,640
A740	Biscuit	30	1,440	A62	Archaic maiolica	30	1,650
A944	Biscuit	20	1,440	A613	Biscuit	29a	1,660
A715	Biscuit	30	1,445	A741	Biscuit	30	1,660
A625	Biscuit	29a	1,460	A607	Biscuit	29a	1,670
A742	Biscuit	30	1,460	A696	Biscuit	30	1,670
A735	Biscuit	30	1,480	A705	Biscuit	30	1,680
A698	Biscuit	30	1,490	A738	Biscuit	30	1,695
A707	Biscuit	30	1,490	A612	Biscuit	29a	1,700
A101	Archaic maiolica	30	1,500	A706	Biscuit	30	1,700
A6	Archaic maiolica	29	1,500	A703	Biscuit	30	1,720
A708	Biscuit	30	1,500	A726	Biscuit	30	1,740
A728	Biscuit	30	1,500	A617	Biscuit	29a	1,760
A61 8	Biscuit	29a	1,520	A619	Biscuit	29a	1,840
A731	Biscuit	30	1,520	A699	Biscuit	30	1,840
A736	Biscuit	30	1,520	A695	Biscuit	30	1,870
A719	Biscuit	30	1,530	A897	Biscuit	30	1,890
A730	Biscuit	30	1,530	A601	Biscuit	29a	1,960
A737	Biscuit	30	1,530	A33	Archaic maiolica	29	2,400
A710	Biscuit	30	1,540	A577	Biscuit	18	2,980
A724	Biscuit	30	1,540	A571	Biscuit	17	3,860
A943	Biscuit	20	1,540	A575	Biscuit	18	4,000
A709	Biscuit	30	1,560	A534	Biscuit	16	4,240
A600	Biscuit	29a	1,570	A576	Biscuit	18	4,260
A18	Archaic maiolica	29	1,580	A492	Storage	8C	13,900
A19	Archaic maiolica	29	1,580	A480 I	Storage	8a	15,240

It is striking that the two principal jugs seem to have been made with the same sizes in mind, shown by the similar modes and emphasised by the gaps between the modes (Fig. 4).⁵²

Forms 29 & 30 ml (items)	Form 29 ml	Form 30 ml
388±70 (19)	300±40 (2)	398±65 (17)
926±131 (60)	906±127 (17)	934±132 (43)
1,589±131 (54)	1,649±136 (13)	1,569±124 (41)
	2,400 (1)	

As the two forms make up almost 90 per cent of the sample and thus largely determine the shape of the histograms and the overall means, the little represented forms have to be examined separately. The tableware forms with few examples fall within the modes, except the jar at 1,140 ml and the globular jug 31 at 1,320 ml.

The pitchers, however, have a distinct mode with a mean of 583±91 ml. The only other group centres at the other extreme on 4,090±168 ml. The rest are near 1, 1.5 and 3 litres with one at 1,300 ml (Fig. 5). The mean of the two storage jars is 14,570 ml.

Units of measure

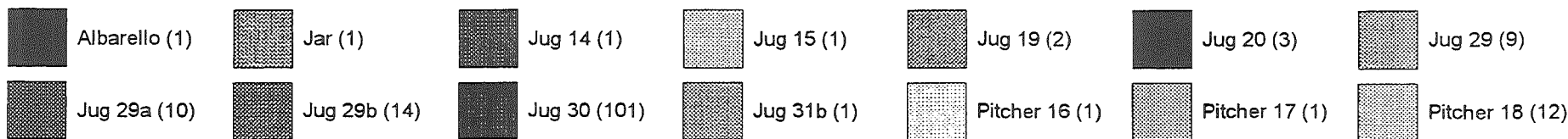
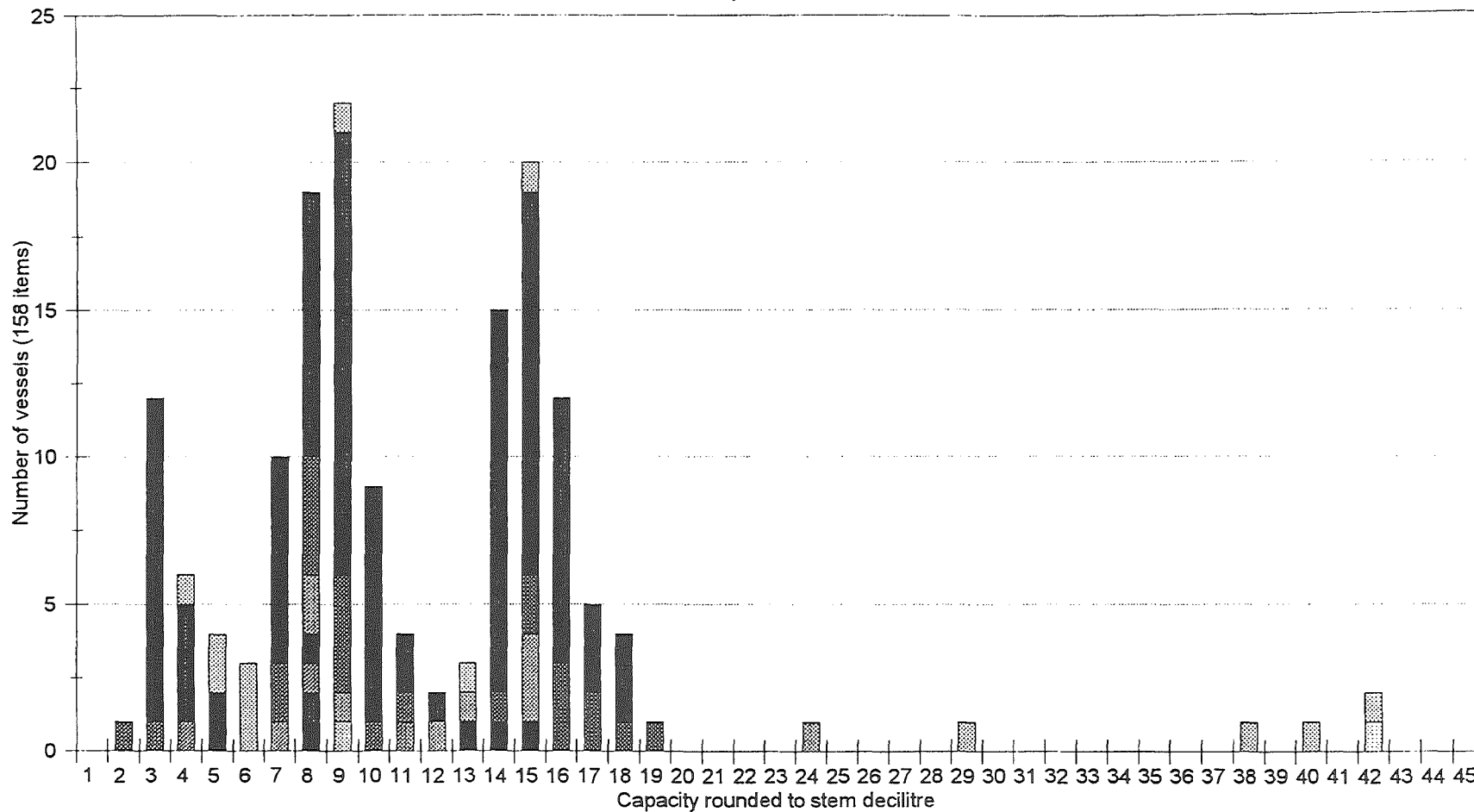
The size hierarchy of liquid containers in use at Assisi has been worked out from the late 14th century accounts of the friary and the commune.⁵³ In one instance *brocche* were bought to hold oil. Wine was purchased in *brocche* of nine or ten *petitti* capacity and in flasks of 20 *fogliette*. The 1380 statutes required inn keepers who sold wine to keep glazed earthenware vases conforming to the communal norm for the four smallest sizes at least three inches high.⁵⁴ The original capacity standards do not survive,⁵⁵ but a metric concordance for the town's weights and measures was published in 1855.⁵⁶

⁵² Had the capacities of Form 29 been taken at the same point, the two times multiple mean would have been closer to that of form 30; but the four times multiple differential would increase (see preceding note).

⁵³ Palumbo 1971, 351-357.

⁵⁴ Palumbo 1971, 349-350.

Fig. 3. - Assisi, Convento di S. Francesco, refectory. Histogram of capacities of presumed tableware and pitchers



⁵⁵ The biconical jug with a lead seal on the handle, acquired from an antique dealer in Assisi, presumably was found elsewhere to the south, Blake 1981a, 29.

⁵⁶ The standard for a *boccale* of wine was measured. That for oil contained 65 *libbre* to which by custom another by weight was added, Bofondi 1855, 54-55.

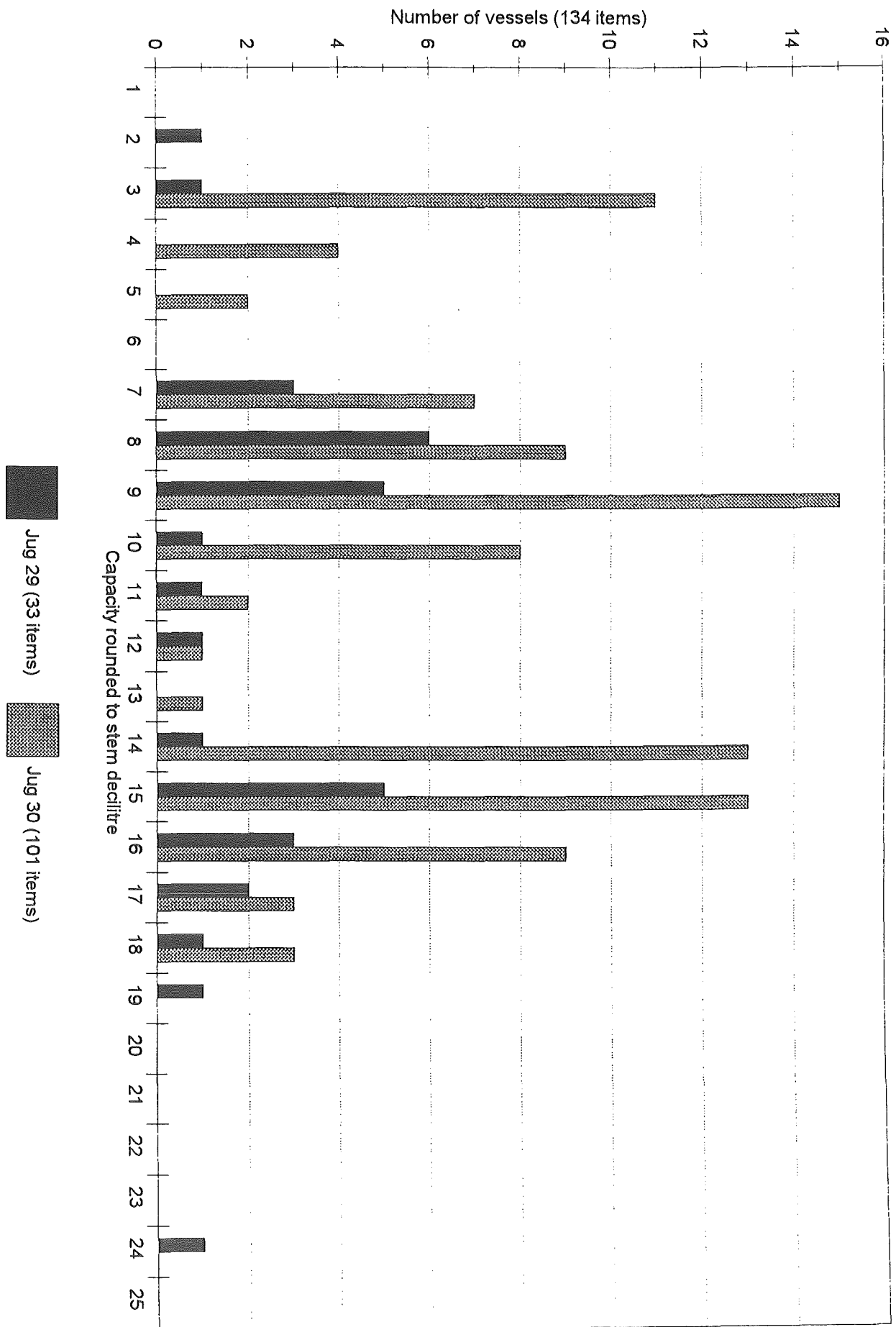


Fig. 4. - Assisi, Convento di S. Francesco, refectory. Histogram of capacities of applied spout (Form 29) and trilobate mouth (Form 30) jugs

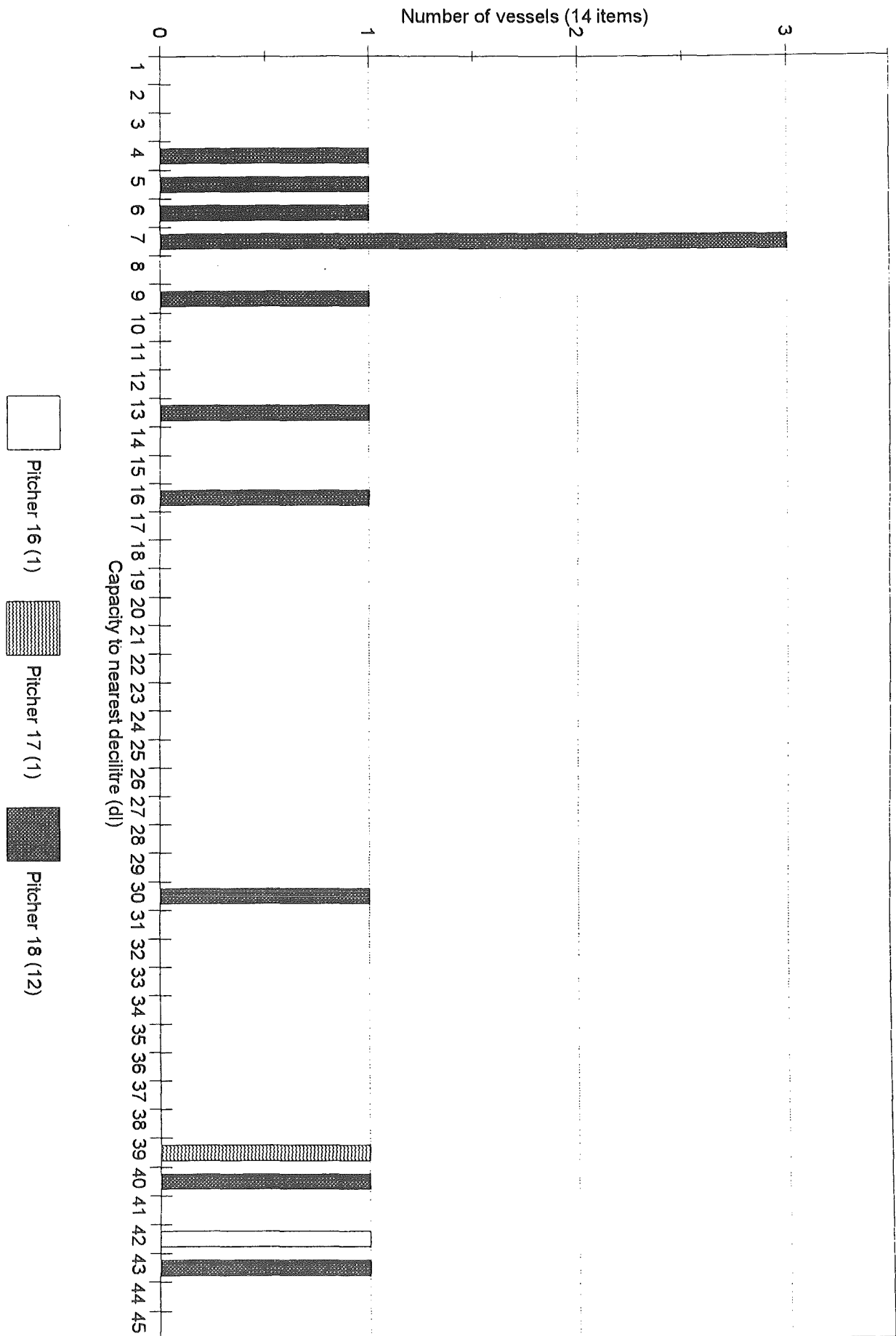


Fig. 5. - Assisi, Convento di S. Francesco, refectory. Histogram of capacities of pitchers. Form 16 with applied spout, 17 and 18 with a trilobate mouth and 18 with a narrow neck

Late 14th c. units (x) ⁵⁷	1855	wine ml (x)	oil ml(x)
<i>barile</i> <i>brocca</i> ⁵⁸ / <i>anfora</i> ⁵⁹ (9-10)	<i>mezzolino</i> ⁶⁰ / <i>caldarello</i> ⁶¹	58,454 (30) (11)	24,573 (66)
<i>fiasco</i> (20) <i>petitto</i> ⁶² (1) <i>mezza petitto</i>	<i>boccale</i>	1,948 (1) [974]	(1) 2,234
<i>foglietta</i> ⁶⁴ (1) <i>mezza foglietta</i>	<i>libbra</i> ⁶³ <i>quartuccia</i>	487 (1/4) 244	[372] (1) (1/4) 559

Discussion

The mean of the principal mode of the refectory tableware is close to the 19th century *mezza petitto*. Those of the other two do not correspond well with its half and double and fall between the known units. Nor do they approximate to otherwise undocumented "thirds". Estimated full capacities do not provide a better fit.⁶⁵ However, the 1:2:4 multiples fall within the standard deviations of each size mean; and it clear that different shapes serving the same function were produced to fit the same size scheme. It thus seems reasonable to assume that the three refectory sizes correspond with the following contemporary units and that the medieval measures were about ten to twenty per cent less than those of the same name a century ago.

Late medieval unit	Late medieval capacity ml
<i>petitto</i>	1,600 - 1,800
<i>mezza petitto</i>	800 - 900
<i>foglietta</i>	400 - 450

Jug shapes may have changed by the time of the 1380 ordinance. Three Assisan inches according to an 1832 concordance are 128 mm.⁶⁶ One of the two restored squat jugs⁶⁷ from the later north room find is 127 mm high and, when filled to the rim of the spout, holds an 1855 *mezza petitto*. If this is more than a coincidence, it indicates a remarkable stability of the unit over five centuries and that either the above conclusion about smaller measures in the first half of the 14th century is incorrect or they had changed in about half a century.

The pitchers' mode is distinct, perhaps because these forms held other substances. Nearly all of those measured are the narrow neck Form 18, which is the most suitable for oil. The mean of the mode is about 25 ml greater than the 1855 *foglietta* or one and a half *libbre* of oil; and that of the largest, which includes two other pitcher forms, is almost exactly eleven *libbre*. Three others correspond to 2.5, 3.5 and 8 *libbre*.⁶⁸

The larger storage vessels may have been used to keep dry foodstuffs, whose capacities were calculated on another system. The two reported here could have held quarter of a *barile* of wine or about 40 *libbre* of oil.

The samples of all the forms bar the two principal table jugs and the smallest pitchers are, however, too small and the spread of hypothetical units too wide for any fit proposed to be meaningful.

Montalcino

Sample

A similar group was found in 1912 during repairs to the vaults of the portico under the town hall.⁶⁹ This part abuts an earlier structure dated 1295 and on stylistic grounds has been attributed to various periods before 1360.

One hundred and ninety four almost complete pots are conserved in the local museum. The storage pitchers are distinguished by the shape of the mouth and by the upper attachment of the handle. Although the coarser fabric kitchen ware consists mainly of cooking pots, a third are jugs. The "biscuit" label implies a class destined to be glazed and fired again. Some, however, have no analogues amongst the glazed; but, unlike the contemporary Assisi group, two share the coarser kitchen jug form. The only glazed narrow necked jug (A1) may have been made to the south in a neighbouring region.

Apparently only one plain disc piriform based jug survives from the building of the post office in 1958-59. The decoration of similar jugs, found in 1969 behind the *Caffè* on the opposite side of the central

⁵⁷ (x) = multiple.

⁵⁸ Jug, pitcher.

⁵⁹ Amphora.

⁶⁰ Little half.

⁶¹ Bucket or cauldron?

⁶² Small.

⁶³ Pound.

⁶⁴ Little bottle.

⁶⁵ Montalcino's baluster jugs, the same shape as Form 30, when filled, are on average 10.5/±3.5% bigger than the neck

measure, those corresponding to Assisi's smallest size 15.36 ±3.41% greater, to the intermediate 11.03 ±3.08% and to the largest 9.80 ±1.73%. The estimated full capacities for Assisi's Form 30 are 459, 1037 and 1723 ml.

⁶⁶ *Raccolta*, 1975, 75.

⁶⁷ B163.

⁶⁸ Blake *et al.* 1981, 7.

⁶⁹ Blake, in preparation, will replace Blake 1980, 92-93.

⁷⁰ Blake 1980, 93. See the date of relief blue in the Arezzo section, note 97.

square, points to manufacture within the late 14th or the first half of the 15th century.⁷⁰ The plain jug could, however, date from later in the 15th century.⁷¹

Capacity data

In 1985 one hundred and thirty eight of those found in the town hall were measured to the nearest 10 ml with rape seed.⁷² Ninety six of these could be filled to the rim, but the measurements of only 125 were taken at the neck.⁷³ Three of the later jugs were almost complete and five survive to the neck (Table 3). The capacities of the 139 closed forms are considered together.

Ninety five could be filled to the top. The pitchers were built to hold greater quantities than the table ware; whereas the kitchen items straddle the two categories (Fig. 6). It is easier to examine the two extremes at different scales. Those less than 2,500 ml fall into four groups represented by modes at 14, 7, 20 and 3 dl (Fig. 7). The bigger-vessel cluster is made up mostly of tall neck jugs from two categories supplemented by the singular jar and "imported" jug. The dominant baluster jugs determine the other modes. The piriform and globular ones contribute to the 7 dl mode and the conical and remaining kitchen jugs to the principal mode.

Table 3

Montalcino capacities.

Town Hal: A & B prefix catalogue numbers; Caffè Fiaschetta: C prefix; post office: D; via Caldini: E. * Note: the neck capacities of the open forms and pitcher B51 are given as the same as the full ones. Neck capacities of cooking pots B16-17, B20, B24-25, B27-28 & B33 have been estimated by multiplying the full measure by 0.8848 (the mean of the full:neck ratios of those measured).

Cat.no.	Class	Form	Full ml	Neck ml	Note
A47	Archaic maiolica	Baluster jug	280	240	
A32	Archaic maiolica	Baluster jug		280	
A41	Archaic maiolica	Baluster jug	320	280	
A6	Archaic maiolica	Piriform jug		300	
A33	Archaic maiolica	Baluster jug	400	340	
C11	Polychrome maiolica	Piriform jug		360	
B141	Biscuit	Narrow neck jug		500	
C10	Relief blue	Piriform jug	560	500	
A17	Archaic maiolica	Baluster jug	580	520	
C8	Archaic maiolica	Piriform jug	620	540	
C9	Relief blue	Piriform jug		560	
A45	Archaic maiolica	Baluster jug	700	580	
A7	Archaic maiolica	Baluster jug	660	600	
A46	Archaic maiolica	Baluster jug	700	600	
A48	Archaic maiolica	Baluster jug	720	640	
A53	Archaic maiolica	Globular jug	780	640	
D1	Plain maiolica	Piriform jug	740	660	
A44	Archaic maiolica	Baluster jug	740	680	
B140	Biscuit	Narrow neck jug		700	
A21	Archaic maiolica	Baluster jug	840	720	
B28	Kitchen	Cooking pot	840	743	*
B139	Biscuit	Narrow neck jug		780	
B136	Biscuit	Baluster jug		820	
B138	Biscuit	Narrow neck jug		860	
B108	Biscuit	Basin	880	880	*
B33	Kitchen	Cooking pot	1,000	885	*
A31	Archaic maiolica	Baluster jug	1,100	940	

⁷¹ Vannini 1985, 423, 432.

⁷² By Raffaele Gianetti and Alessandro Regoli.

⁷³ Only the full measurements of some complete cooking pots were taken. Neck capacities of cooking pots B16-17, B20, B24-25, B27-28 & B33 (indicated by an asterisk in the Note column on Table 3) have been estimated by multiplying the full

measure by 0.8848 (the mean of the ratios, which ranged from 0.8533 to 0.9021 [standard deviation ± 0.187], of full:neck of the four [B5, B6, B22, B31] where both capacities were measured). The four open forms and pitcher B51 do not have "necks" distinct from their apertures.

Cat. no.	Class	Form	Full ml	Neck ml	Note
B48	Kitchen	Low neck jug	1,160	960	
A37	Archaic maiolica	Baluster jug	1,060	1,000	
A40	Archaic maiolica	Baluster jug		1,020	
A12	Archaic maiolica	Baluster jug		1,040	
A20	Archaic maiolica	Baluster jug		1,040	
B134	Biscuit	Baluster jug		1,040	
A42	Archaic maiolica	Baluster jug		1,080	
A52	Plain maiolica	Baluster jug		1,080	
B137	Biscuit	Baluster jug		1,080	
B107	Biscuit	Basin	1,080	1,080	*
A36	Archaic maiolica	Baluster jug	1,240	1,100	
A14	Archaic maiolica	Baluster jug	1,260	1,100	
A19	Archaic maiolica	Baluster jug	1,200	1,120	
A38	Archaic maiolica	Baluster jug	1,200	1,120	
A49	Archaic maiolica	Baluster jug	1,200	1,120	
A8	Archaic maiolica	Baluster jug	1,220	1,120	
A27	Archaic maiolica	Baluster jug	1,240	1,120	
B127	Biscuit	Baluster jug	1,240	1,120	
A24	Archaic maiolica	Baluster jug	1,260	1,120	
A51	Archaic maiolica	Baluster jug	1,260	1,120	
B132	Biscuit	Baluster jug	1,210	1,130	
B125	Biscuit	Baluster jug	1,260	1,150	
A23	Archaic maiolica	Baluster jug		1,160	
A5	Archaic maiolica	Conical jug	1,320	1,160	
A9	Archaic maiolica	Baluster jug		1,180	
A29	Archaic maiolica	Baluster jug	1,320	1,180	
A30	Archaic maiolica	Baluster jug	1,320	1,180	
A13	Archaic maiolica	Baluster jug	1,340	1,180	
A28	Archaic maiolica	Baluster jug		1,200	
A15	Archaic maiolica	Baluster jug	1,360	1,200	
A25	Archaic maiolica	Baluster jug	1,420	1,200	
B124	Biscuit	Baluster jug	1,310	1,210	
B131	Biscuit	Baluster jug		1,220	
A50	Archaic maiolica	Baluster jug	1,360	1,220	
A35	Archaic maiolica	Baluster jug		1,240	
A4	Archaic maiolica	Conical jug		1,240	
B126	Biscuit	Baluster jug	1,360	1,240	
A26	Archaic maiolica	Baluster jug	1,380	1,240	
B17	Kitchen	Cooking pot	1,420	1,256	*
A16	Archaic maiolica	Baluster jug	1,360	1,260	
B114	Biscuit	Baluster jug	1,380	1,260	
A22	Archaic maiolica	Baluster jug	1,400	1,260	
A18	Archaic maiolica	Baluster jug	1,420	1,300	
B46	Kitchen	Tall neck jug	1,450	1,310	
A3	Archaic maiolica	Albarello		1,320	
A34	Archaic maiolica	Baluster jug	1,460	1,320	
B112	Biscuit	Conical jug	1,500	1,360	
B121	Biscuit	Baluster jug	1,510	1,390	
A39	Archaic maiolica	Baluster jug	1,520	1,400	
B113	Biscuit	Baluster jug	1,540	1,420	
B120	Biscuit	Baluster jug	1,600	1,420	
B115	Biscuit	Baluster jug	1,640	1,460	
A11	Archaic maiolica	Baluster jug	1,640	1,520	
A43	Archaic maiolica	Baluster jug		1,540	
B109	Biscuit	Tall neck jug	2,040	1,700	
B27	Kitchen	Cooking pot	2,000	1,770	*
A2	Archaic maiolica	Jar	2,040	1,780	
B16	Kitchen	Cooking pot	2,040	1,805	*

Cat.no.	Class	Form	Full ml	Neck ml	Note
B44	Kitchen	Tall neck jug	2,080	1,900	
B42	Kitchen	Tall neck jug	2,180	2,020	
B43	Kitchen	Tall neck jug	2,260	2,080	
B110	Biscuit	Tall neck jug	2,280	2,100	
B39	Kitchen	Tall neck jug	2,240	2,120	
B38	Kitchen	Tall neck jug		2,180	
B1	Kitchen	Pan	2,200	2,200	*
B35	Kitchen	Tall neck jug	2,380	2,200	
B14	Kitchen	Cooking pot		2,280	
A1	Green & brown lead	Spherical jug	2,360	2,300	
A10	Archaic maiolica	Baluster jug		2,340	
B13	Kitchen	Cooking pot		2,340	
B34	Kitchen	Tall neck jug		2,600	
B25	Kitchen	Cooking pot	3,080	2,725	*
B24	Kitchen	Cooking pot	3,240	2,867	*
B8	Kitchen	Cooking pot		3,080	
B9	Kitchen	Cooking pot		3,140	
B6	Kitchen	Cooking pot	3,680	3,140	
B32	Kitchen	Cooking pot		3,400	
B106	Storage	Pitcher EFG		4,180	
B3	Kitchen	Bowl	4,240	4,240	*
B31	Kitchen	Cooking pot	4,700	4,240	
B5	Kitchen	Cooking pot	4,880	4,360	
B22	Kitchen	Cooking pot	5,480	4,880	
B100	Storage	Pitcher G	5,280	5,100	
B81	Storage	Pitcher E	6,940	6,640	
B82	Storage	Pitcher E		6,700	
B99	Storage	Pitcher G		6,810	
B80	Storage	Pitcher E	7,480	7,320	
B78	Storage	Pitcher E		8,000	
B79	Storage	Pitcher E		8,420	
B90	Storage	Pitcher G	9,720	9,420	
B77	Storage	Pitcher E	10,480	10,260	
B95	Storage	Pitcher G	11,020	10,720	
B104	Storage	Pitcher EFG		10,860	
B20	Kitchen	Cooking pot	12,480	11,042	*
B72	Storage	Pitcher E	11,620	11,300	
B67	Storage	Pitcher E	11,900	11,460	
B93	Storage	Pitcher G	12,100	11,700	
B75	Storage	Pitcher E	12,420	12,080	
B74	Storage	Pitcher E		12,180	
B92	Storage	Pitcher G		12,430	
B59	Storage	Pitcher C	13,080	12,480	
B70	Storage	Pitcher E	12,960	12,520	
B69	Storage	Pitcher E		13,100	
B64	Storage	Pitcher E	13,760	13,160	
B61	Storage	Pitcher C	13,780	13,280	
B71	Storage	Pitcher E	14,000	13,640	
B84	Storage	Pitcher F	14,100	13,820	
B66	Storage	Pitcher E		13,960	
B89	Storage	Pitcher G		15,000	
B58	Storage	Pitcher C	15,700	15,200	
B65	Storage	Pitcher E	15,760	15,480	
B50	Storage	Pitcher A	15,780	15,480	
B88	Storage	Pitcher G	16,480	16,100	
B63	Storage	Pitcher D	22,360	21,960	
B56	Storage	Pitcher B		24,200	
B51	Storage	Pitcher B	53,080	53,080	*

Multiple	Mean ml (items)	Baluster jugs ml
1	333±50 (3)	333±50 (3)
2	707±87 (12)	706±73 (7)
4	1,336±147 (40)	1,341±140 (34)
6-7	2,173±132 (11)	

The principal kitchen ware mode is determined by the two-litre jugs with the cooking pots peaking at 3 and 5 litres (Fig. 6). The main cluster is shared with biscuit-fabric forms. The two largest cooking pots held capacities similar to a couple of the pitchers.⁷⁴

Multiple	Kitchen ml (items)	Cooking pots ml	Jugs ml	Multiple
2	1,000±131 (3)	920±80 (2) (1 Low neck)	1,160	1
3	1,435±15 (2)	1,420 (1) (1 Tall neck)	1,450	1.3
4	2,169±126 (7)	2,020±20(2) (5 Tall neck)	2,228±126	2
7		3,333±254 (3)		
10		5,020±333 (3)		
25		12,480 (1)		

The larger storage vessels are more widely spread with most falling between 9.5 and 16.5 litres. Three modes are formed by four pitchers each at 12, 14 and 16 litres with an uncertain frontier between the first two (Fig. 6).

Multiple	Mean ml (items)	
1	7,210±270 (2)	6,567±936 (3)
2	12,010±292 (4)	12,157±678 (7)
2	13,910±145 (4)	12,380±1350 (13)
2	15,930±319 (4)	13,215±1920 (17)
3	22,360 (1)	
8	53,080 (1)	

The capacities of 130 closed forms were measured to the neck. No distinction was made between rim and neck on the largest; and the neck capacity of eight cooking pots was estimated.⁷⁵ The main deciliter modes for those less than 3,000 ml are 12 and 6, with minor ones at 23 and 3 (Fig. 8). Baluster jugs make up almost entirely the principal mode, whereas other shapes just form the majority of the secondary mode.

Multiple	All (items)	Multiple	Baluster jugs
1	300±40 (6)	0.25	285±36 (4)
2	659±115 (19)	0.5	645±88 (8)
4	1,199±133 (54)	1	1,195±134 (47)
6	1,791±65 (5)		2,061±214 (15)
7	2,196±109 (10)	2	2,340 (1)

Kitchen ware predominates between 1,700 and 5,000 ml with modes at 2 (10 items), 3 (7 items), and 1 (5 items) litre.⁷⁶

All (items)	Multiple pots ⁷⁷	Cooking	Multiple	Kitchen jugs
863±90 (3)	2	814±71 (2)	3	960 (1 Low neck)
1,283±27 (2)	3	1,256 (1)	4	1,310 (1 Tall neck)
1,825±55 (3)	4	1,787±18 (2)	6	1,900 (1 Tall neck)
2,174±103 (7)	6	2,310±30 (2)		2,120±66 (5 Tall neck)
2,925±210 (6)	7	2,990±166 (5)	8	2,600 (1 Tall neck)
	8	3,400 (1)		
	10	4,493±278 (3)		
	25	11,042 (1)		

The pitchers form modes at 12, 7 and 15 litres (Fig. 9).

Multiple	Mean ml (items)
1	4,640±460 (2)
2	7,315±681 (6)
3	12,132±1,246 (18)
4	15,452±371 (5)
5	21,960 (1)
6	24,200 (1)
13	53,080 (1)

Units of measure

There is apparently no direct record of Montalcino's units. According to the 1782 Tuscan concordance, those for wine were similar to Siena but for oil to Florence.⁷⁸ However, a local historian noted that Montalcino's weight was two per cent heavier than Siena's and for oil eight per cent.⁷⁹

Siena unit	wine ml (multiples) ⁸⁰	oil 1783 ⁸¹	oil 1883 ⁸²
<i>barile</i>			
<i>staiò</i> ⁸⁴	22,792 (16)	41,300 ⁸³ (2) (1)	(16) 20,800
<i>quartarone</i> ⁸⁵	5,698 (4)		
<i>mezzoquarto</i>	2,849 (2)		
<i>metadella</i>	1,425 (1)	(4)	<i>boccale</i> (1)
<i>mezzina</i> ⁸⁶			
<i>quartuccio</i>		(1)	

A 1411 inventory of possessions at Montalcino includes glazed *coppi* each possibly filled with a *staiò* of oil.⁸⁷

⁷⁴ Cooking pot B22 (5,480 ml) cp. Pitcher G B100 (5,280 ml); Cooking pot B20 (12,480 ml) cp. Pitcher G B75 (12,420 ml).

⁷⁵ See note 73.

⁷⁶ Fig. 9 includes cooking pots but not kitchen jugs.

⁷⁷ Eight of the twelve cooking pot capacities have been estimated (see note 73).

⁷⁸ *Tavole*, 1782, 679-680. The Florentine measures are summarised in the Fiesole section.

⁷⁹ Pecci, undated, 11.

⁸⁰ Derived from 15th-century usage, *Tavole*, 1782, and two 19th-century concordances, Piccinni 1981, n. 73. See also Francovich 1982, 84-85.

⁸¹ *Tavole*, 1783, 6.

⁸² Martini 1883, 737. Probably an unreliable source for earlier measures at Siena, because his equivalence for a *boccale* of wine is 1,368 ml. Cf. note 80.

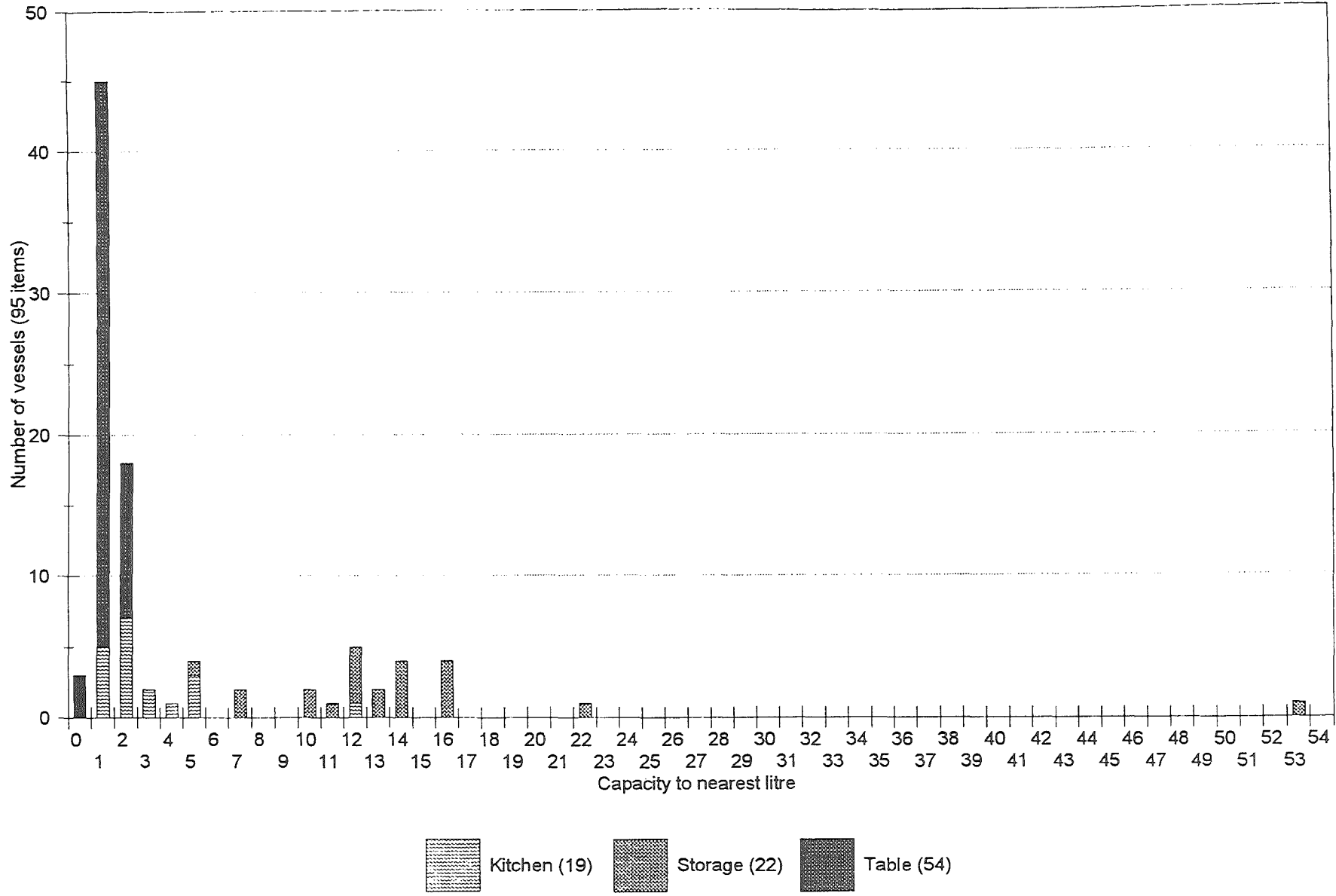


Fig. 6. - Montalcino. Histogram of full capacities by category

⁸³ Calculated by using the metric concordance for Florence (see section on Fiesole).
⁸⁴ Bushel.
⁸⁵ Big quart.
⁸⁶ Little half.
⁸⁷ From Alessandro Regoli's transcription: *tre choppi vetriati pient dolio di tre staja.*

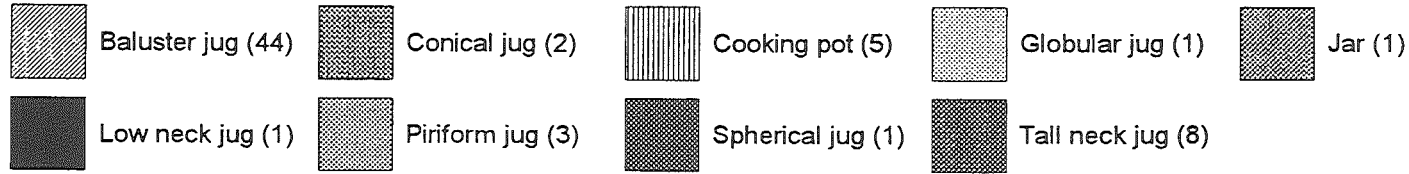
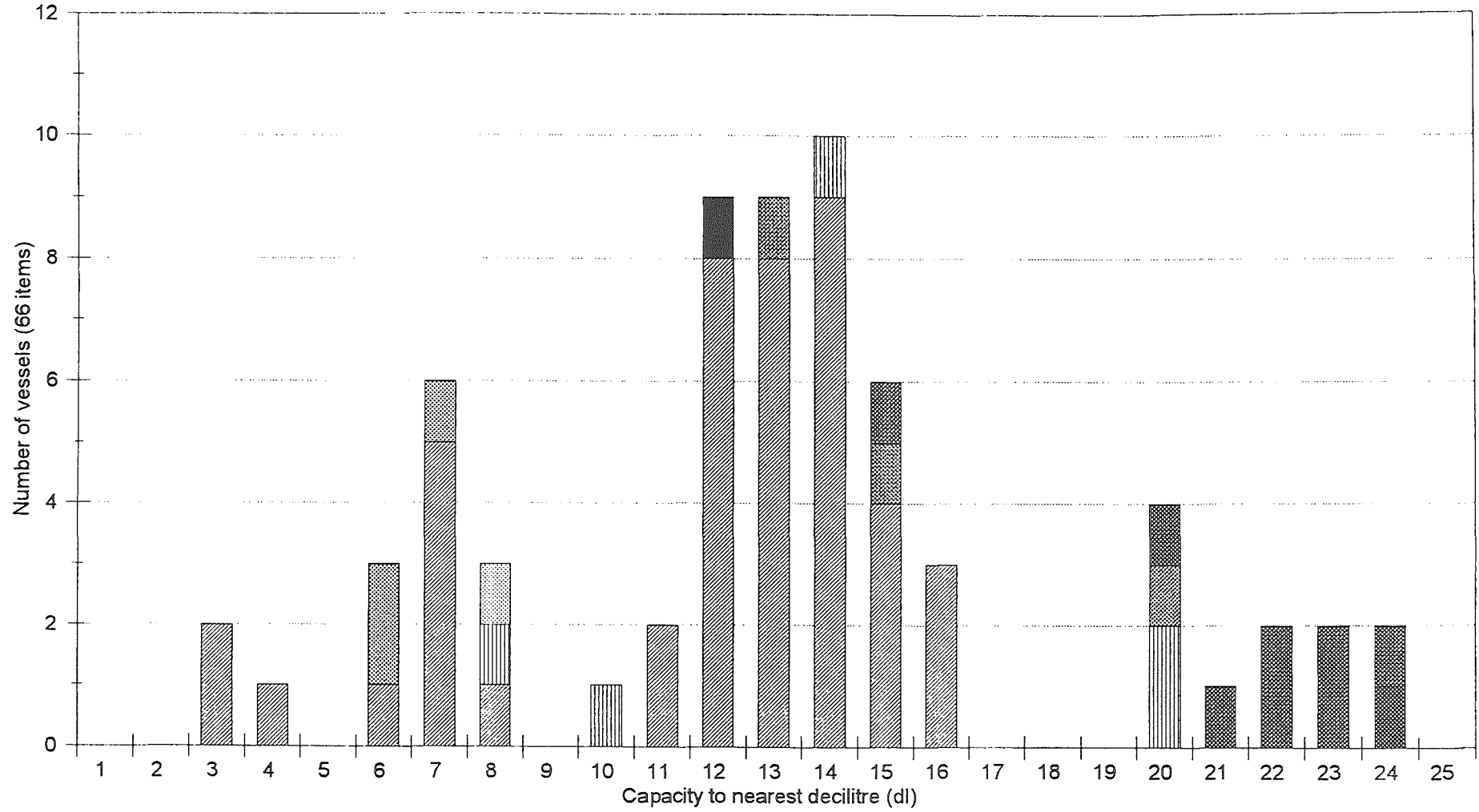


Fig. 7. - Montalcino. Histogram of full capacities of closed forms less than 2,500 ml

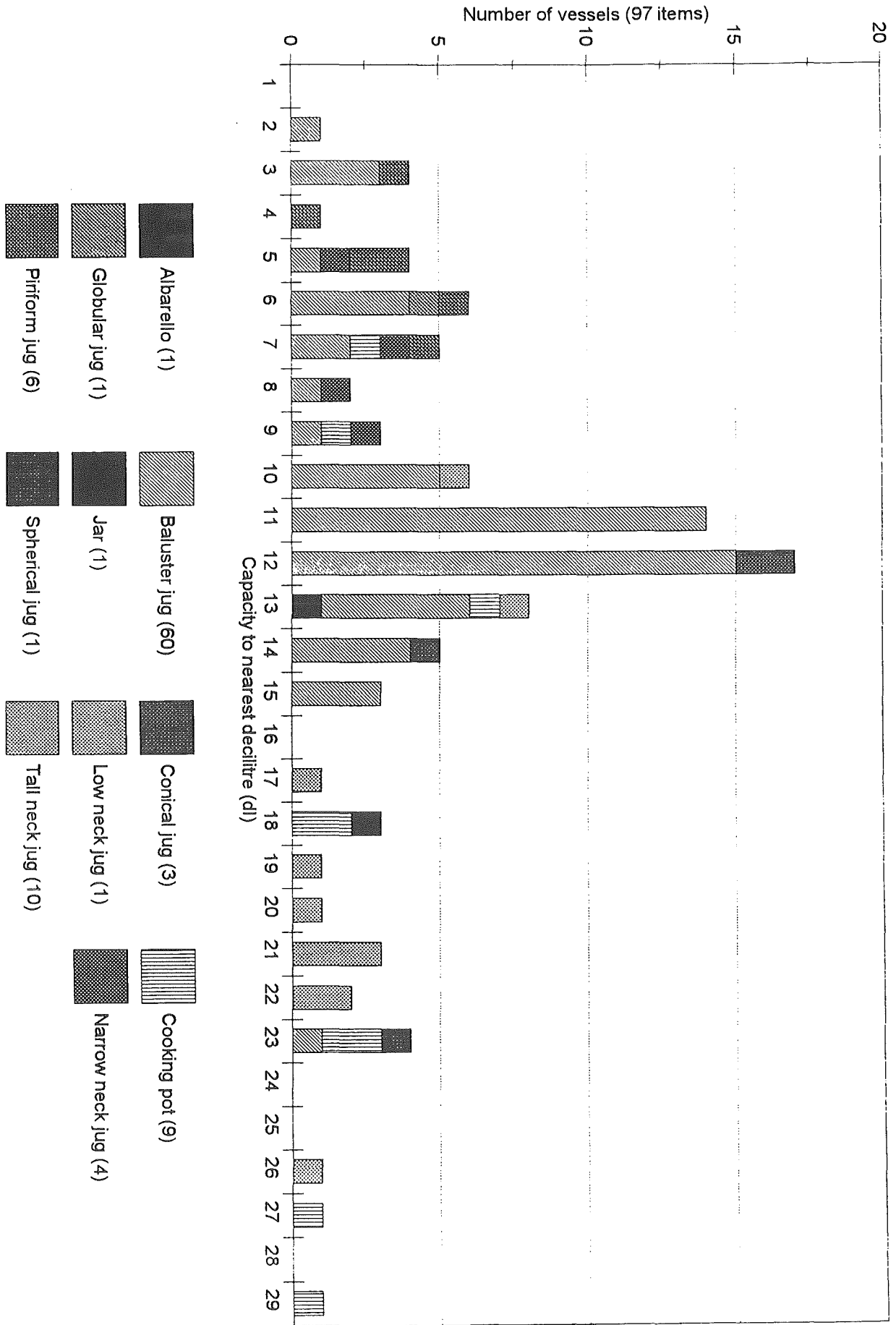


Fig. 8. - Montalcino. Histogram of neck capacities of closed forms less than 3,500 ml

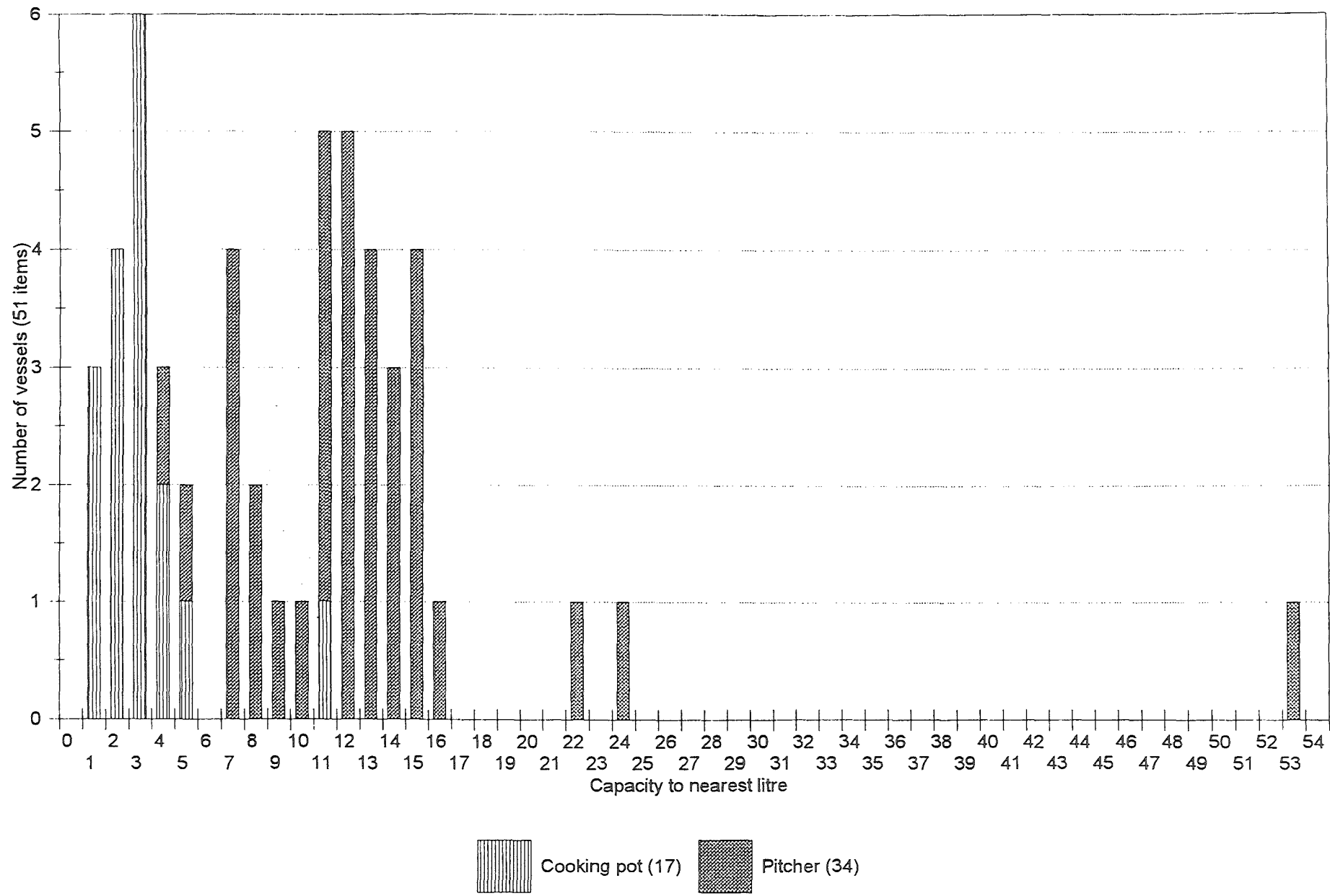


Fig. 9. - Montalcino. Histogram of neck capacities of cooking pots and pitchers

Discussion

The baluster jugs, whether filled to the rim or neck, fit better 1:2:4 multiples than those of Assisi. With greater confidence we can assert that the late medieval measures, assuming they followed the Siense nomenclature, were:

Late medieval Siense unit	Late medieval capacity ml
<i>metadella</i>	1,200 - 1,350
<i>mezzina</i>	650 - 700
<i>quartuccio</i>	285 - 335

If Montalcino's were heavier in the 14th century, then Siena's at that time may have been less than the 19th century concordances suggest. The later piriform jugs do not vary significantly from the *mezzine* and *quartucci*.

The kitchen ware does not readily fit a scheme of multiples, although the larger cooking pots correspond roughly with a half *staio*, *quartarone* and *mezzoquarto*. But there is no reason why this category should fit wine, oil or dry units. In the early 15th century – when shapes had changed – large, medium, small and little were distinguished.⁸⁸ The variety of sizes in the town hall find are broader than even that simple classification.

In 1411 jars capable of holding a *staio* of oil existed. Only one of this and another of *barile* dimension were placed in the earlier vault. Most of the surviving storage pitchers are in a rather imprecise half *staio* range. In the early 15th century monks near Siena bought *quartaroni* wine containers which may correspond to the smaller pitchers.⁸⁹ As well they acquired large *coppi* for water or oil and even large

vaselli of one *staio* in which to keep vegetable com-pote.⁹⁰ This category may have also been used for storing dry foodstuffs. The documents show larger pots being identified by units of measure, but this apparent precision is not reflected a century earlier amongst the material at Montalcino.

Arezzo

Sample

Unlike the bulk of the finds examined from the other towns, the medieval material published in the museum catalogue does not come from a single context, although, even where the provenance is no longer known, it is likely to be local.⁹¹ Wells cleaned out between the 1880s and 1920 both within the town and from nearby settlements are probably the source of most of the almost complete jugs and pitchers in the collection.⁹² Biscuit, kiln waste and documented potters indicate local production.⁹³

The vessels have been classified according to decoration and shape. Most belong to the archaic maiolica tradition of tableware covered with a white tin-opacified lead glaze and decorated in purple-brown and green. Only six of the catalogued items (including one biscuit) are the canonical baluster jugs, like those at Assisi and Montalcino, which are believed to date from the first half of the 14th century.⁹⁴ Three jugs with a less waisted foot are called transitional.⁹⁵ Pear-shaped jugs with a thickened base edge form the largest group. As well as decoration in green and brown ornament, four are painted in relief blue,⁹⁶ which appears to date from the third quarter of the 14th to at least the middle of the following century.⁹⁷ The second type of green and brown decoration is similar to that within a medallion on the front of the spherical jugs which are assigned to the second half of the 15th century.⁹⁸ Found with, and decorated in a similar manner to, the latter are three squat jugs (one has only been biscuit-fired) which have an unusual cordoned profile.⁹⁹ Amongst the biscuit ware are three microjugs less than 10 cm high. The unglazed pitchers have been divided into two groups. Type B has a taller neck with a collared rim. Similar items come from other Tuscan contexts datable to the 15th and early 16th century.¹⁰⁰

Capacity data

Of the 130 pieces catalogued, the sizes of 92 are recorded to the nearest 50 ml (Table 4).¹⁰¹ The mode is 10 dl (33 values between 900 and 1,100 ml) with a subsidiary at 20 (fourteen between 1,900-2,100) (Fig. 10).¹⁰² They are made up mainly of piriform jugs with the spherical ones giving the modes a positive

⁸⁸ Piccinni 1981, 599.

⁸⁹ Piccinni 1981, 598; Francovich 1982, 84.

⁹⁰ Piccinni 1981, 600.

⁹¹ Francovich & Gelichi 1983, 8-9.

⁹² The remains of as many as 210 vessels were acquired from one well in 1889, Francovich & Gelichi 1983, 7-8, 10-11, n. 18, p. 17. Another context could have been buildings to judge from the pottery found in 1971 built into the vaults of a town house, 17, 29, 35.

⁹³ Francovich & Gelichi 1983, 18, 24, 35, 50.

⁹⁴ Francovich & Gelichi 1983, 30-34, 50-51.

⁹⁵ Francovich & Gelichi 1983, 34.

⁹⁶ Francovich & Gelichi 1983, 34-35, 39, 43.

⁹⁷ Vannini 1985, 430-431; Wilson 1987, cat. no. 23.

⁹⁸ Francovich & Gelichi 1983, 39, 51.

⁹⁹ Francovich & Gelichi 1983, 39.

¹⁰⁰ Francovich & Gelichi 1983, 28-30.

¹⁰¹ "Following the indications of Blake 1981a", Francovich & Gelichi 1983, 55, i. e. measured to the narrowest point of the neck, essential for those restored with overlarge lips.

¹⁰² The capacities are rounded down to the stem, because it produces a more even distribution than the more usual rounding up (e.g. from 1,150 to 1,100 rather than to 1,200 ml).

Table 4

Arezzo capacities (from Francovich & Gelichi 1983, 55-76).

Cat. no.	Class	Form	Dec	Capacity ml	Cat. no.	Class	Form	Dec	Capacity ml
115	Biscuit	Micro		100	77	Green & brown	Spherical		1,100
116	Biscuit	Micro		100	85	Green & brown	Spherical		1,100
76	Green & brown	Spherical		350	112	Biscuit	Piriform		1,150
69	Green & brown	Spherical		500	73	Green & brown	Spherical		1,200
15	Green & brown	Piriform	I	600	87	Green & brown	Spherical		1,250
17	Green & brown	Piriform	I	600	1	Green & brown	Baluster		1,300
52	Green & brown	Piriform	II	650	7	Green & brown	Transitional		1,300
16	Green & brown	Piriform	I	750	129	Unglazed	Pitcher B		1,400
40	Green & brown	Piriform	I	750	19	Green & brown	Piriform	II	1,400
41	Green & brown	Piriform	II	750	8	Green & brown	Transitional		1,400
42	Green & brown	Piriform	II	750	80	Green & brown	Spherical		1,400
53	Green & brown	Piriform	II	750	88	Green & brown	Squat		1,400
106	Relief blue	Piriform		800	109	Biscuit	Baluster		1,500
114	Biscuit	Squat		800	21	Green & brown	Piriform	II	1,500
18	Green & brown	Piriform	I	800	4	Green & brown	Baluster		1,600
25	Green & brown	Piriform	II	900	3	Green & brown	Baluster		1,650
43	Green & brown	Piriform	II	900	6	Green & brown	Transitional		1,650
22	Green & brown	Piriform	II	950	86	Green & brown	Spherical		1,650
36	Green & brown	Piriform	II	950	37	Green & brown	Piriform	II	1,750
44	Green & brown	Piriform	II	950	63	Green & brown	Spherical		1,750
51	Green & brown	Piriform	II	950	10	Green & brown	Piriform	I	1,800
105	Relief blue	Piriform		1,000	107	Relief blue	Piriform		1,800
113	Biscuit	Piriform		1,000	20	Green & brown	Piriform	II	1,800
130	Unglazed	Pitcher B		1,000	61	Green & brown	Spherical		1,800
26	Green & brown	Piriform	II	1,000	46	Green & brown	Piriform	II	1,900
28	Green & brown	Piriform	II	1,000	12	Green & brown	Piriform	I	1,950
30	Green & brown	Piriform	II	1,000	11	Green & brown	Piriform	I	2,000
31	Green & brown	Piriform	II	1,000	110	Biscuit	Piriform		2,000
33	Green & brown	Piriform	II	1,000	13	Green & brown	Piriform	I	2,000
34	Green & brown	Piriform	II	1,000	14	Green & brown	Piriform	I	2,000
38	Green & brown	Piriform	II	1,000	35	Green & brown	Piriform	II	2,000
49	Green & brown	Piriform	II	1,000	47	Green & brown	Piriform	II	2,000
50	Green & brown	Piriform	II	1,000	48	Green & brown	Piriform	II	2,000
54	Green & brown	Piriform	II	1,000	64	Green & brown	Spherical		2,000
55	Green & brown	Piriform	II	1,000	65	Green & brown	Spherical		2,000
56	Green & brown	Piriform	II	1,000	120	Unglazed	Pitcher A		2,100
74	Green & brown	Spherical		1,000	62	Green & brown	Spherical		2,100
79	Green & brown	Spherical		1,000	9	Green & brown	Piriform	I	2,100
84	Green & brown	Spherical		1,000	24	Green & brown	Piriform	II	2,150
111	Biscuit	Piriform		1,100	128	Unglazed	Pitcher B		2,250
29	Green & brown	Piriform	II	1,100	124	Unglazed	Pitcher A		2,400
57	Green & brown	Piriform	II	1,100	60	Green & brown	Spherical		2,500
70	Green & brown	Spherical		1,100	127	Unglazed	Pitcher B		3,000
71	Green & brown	Spherical		1,100	122	Unglazed	Pitcher A		3,100
72	Green & brown	Spherical		1,100	123	Unglazed	Pitcher A		3,500
75	Green & brown	Spherical		1,100	126	Unglazed	Pitcher B		4,000

skew (i.e. the latter are slightly larger).¹⁰³ The former forms a third mode at 7 dl.

Multiple	Piriform mean ml ¹⁰⁴	Values	Range ml
1/3	720±71	(10)	600-800
1/2	1,002±59	(24)	900-1,150
1	2,009±63	(11)	1,900-2,150

The seven earlier baluster and transitional jugs fall between 1,300 and 1,700 ml, together with two piriform and two spherical values. The two squat forms (800 and 1,400 ml), despite one or two piriforms sharing the same values, also appear to be distinct from the main forms. Nine pitchers are spread

between 1,000 and 4,000 ml. They could fit a system of multiples of 500 ml with an anomalous group of three centring on 2,250 ml.

Examination of the make up of the pear-shaped jugs show that the biscuit and one relief blue contribute to the two modes and the remaining relief blue are not on their own (Fig. 11). The two types of green and brown decoration are indistinguishable in the 20 dl subsidiary mode, but I is on the low side of the main mode (four values between 600 and 800 ml). Only because type I does not contribute to the main mode, is it possible to suggest that type II is closer in size to the similarly decorated spherical jugs.¹⁰⁵

Units of measure

Arezzo would have had its own measures prior to being ceded to Florence in 1384, which may have been maintained until the 1782 Tuscan reform.¹⁰⁶

Discussion

Given the lack of research on Arretine nomenclature and measures, the pots must stand on their own. The principal mode is 1,000 ml with a subsidiary double at 2,000 ml. Amongst the piriform jugs there is minor mode at 700 ml, which can be explained as a "third" on analogy with Florence, where, however, it is in relation to the most popular unit which is half the size.¹⁰⁷ The earlier forms fall without exception between the two main modes, which suggests a change in sizes over time or that they may have been imported. There are, however, less typical spherical and piriform jugs of similar capacity. Distinctions cannot be drawn between the later forms or types as the differences are small.

The regular spacing of the larger pitchers is suggestive; but the scale has almost as many divisions as examples and in the lower part has error margins of twenty per cent.

Discussion of results

To judge from the material examined in this paper, the finer jugs used on the table in the 14th and 15th century were made in three distinct sizes, whereas the two proposed for the 11th century are less well defined. A similar situation seems to have prevailed in the northern Marche. In 1434 a potter promised to supply Fano with *boccali*, *mezze* and *fogliette*. "Archaic" jugs at nearby Pesaro fall into three groups centring more or less on 1,500, 750 and 375 ml.¹⁰⁸ An analogous situation has been suggested in Emilia Romagna where late 14th century purchases at Imola have been compared with jugs at Faenza. Seven are seen to correspond with four wine sizes and three of a different form and glazed green with oil.¹⁰⁹ On the other hand, it has been suggested that jugs in Rome were not standardised before the early 15th century.¹¹⁰ However, because the number of examples measured were few, these hypotheses are inadequately substantiated.

The only distinctive kitchen ware examined was found at Montalcino. The main group of jugs of about two litres were larger than those used on the table. The cooking pots were on the whole bigger still at around three or four and a half litres. Seven were smaller, comparable to kitchen and table jugs; and one was half a *staio*. The main groupings are similar to those of the jugs at Fiesole, also used in cooking. At best general size ranges can be suggested, but at neither place was the evidence sufficient to suggest a system of sizes.

Arezzo and Assisi's pitchers both range up to four litres with a small size being proposed only at Assisi. Whereas they could be carried from the larder, the large storage vessels presumably stayed put.¹¹¹ Again a main size of around 12 or 14 litres could be proposed for the latter, but not a convincing hierarchy. Both can be compared with jugs and pitchers at Pisa, whose dimensions were not standardised.¹¹²

¹⁰³ Spherical: 1,067±47 ml (nine 1,000-1,100); 2033±47 (three 2,000-2,100).

¹⁰⁴ The relatively imprecise measurements make it difficult to establish the boundaries between capacities and to decide which values should be included in the calculation of the means.

¹⁰⁵ Piriform green and brown II: 990±49 ml (20 values between 900 and 1,100 ml) cp. spherical: 1,095±75 ml (eleven 1,000-1,250).

¹⁰⁶ I have been unable to consult the concordances used for Siena in the Montalcino section.

¹⁰⁷ The Florentine units are summarised in the Fiesole section.

¹⁰⁸ Measured by analogous methods to Blake, 1981a, with similar results. The smallest unit is represented by one example and neither the number of the others nor the raw data are pro-

vided, Berardi 1984, 96, 107, nn. 17-18.

¹⁰⁹ 1:1/2/1/4 with a 1/3 for wine. The metric capacities are not supplied; but, if the graphic representation of the volume on figs 124-125 is cylindrical, then the quart size wine jug may be about 1,370 ml and the oil one about 1,290 ml, Gelichi 1992, 219-223.

¹¹⁰ Based on a sample of six: 550; 600; 1,350; 2,300; 2,550; 3,200 ml, Mazzucato 1980, 157.

¹¹¹ The front basal edge of some of Montalcino's have been worn from repeated tipping.

¹¹² Estimates: 290-350; 580-650; 800-950; 850-1,050; 2,300-2,600; 4,100-4,600; 6,500-7,500; 13,000-15,000 ml, Berti & Gelichi 1995, 204-205. Lack of standardisation also observed in two-handled jars at Rome, Mazzucato 1978-80, 120.

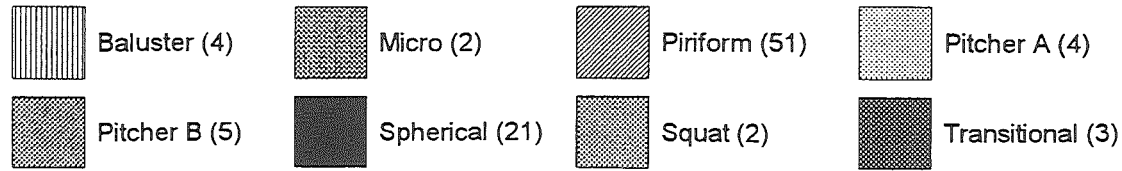
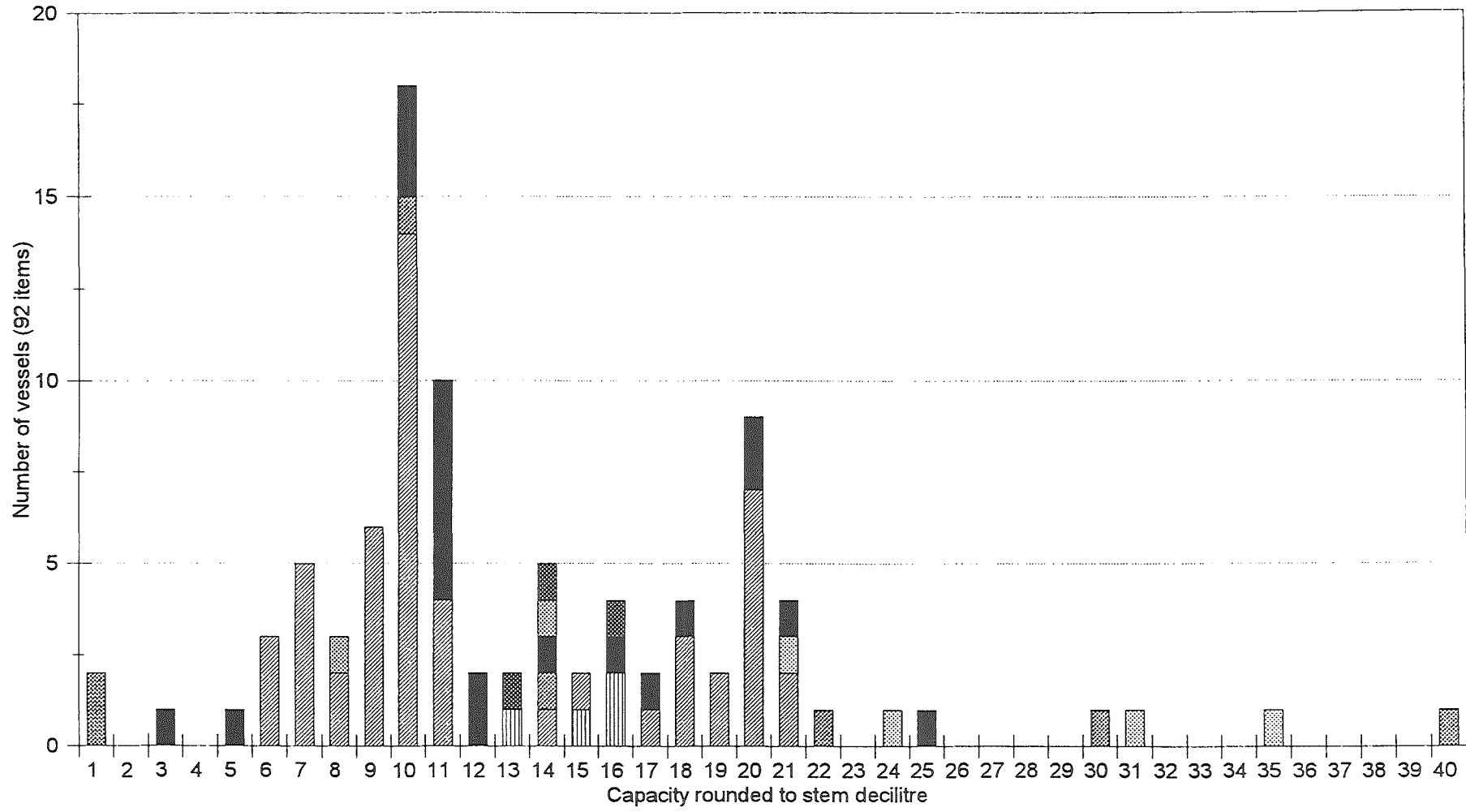


Fig. 10. - Arezzo. Histogram of capacities of all forms

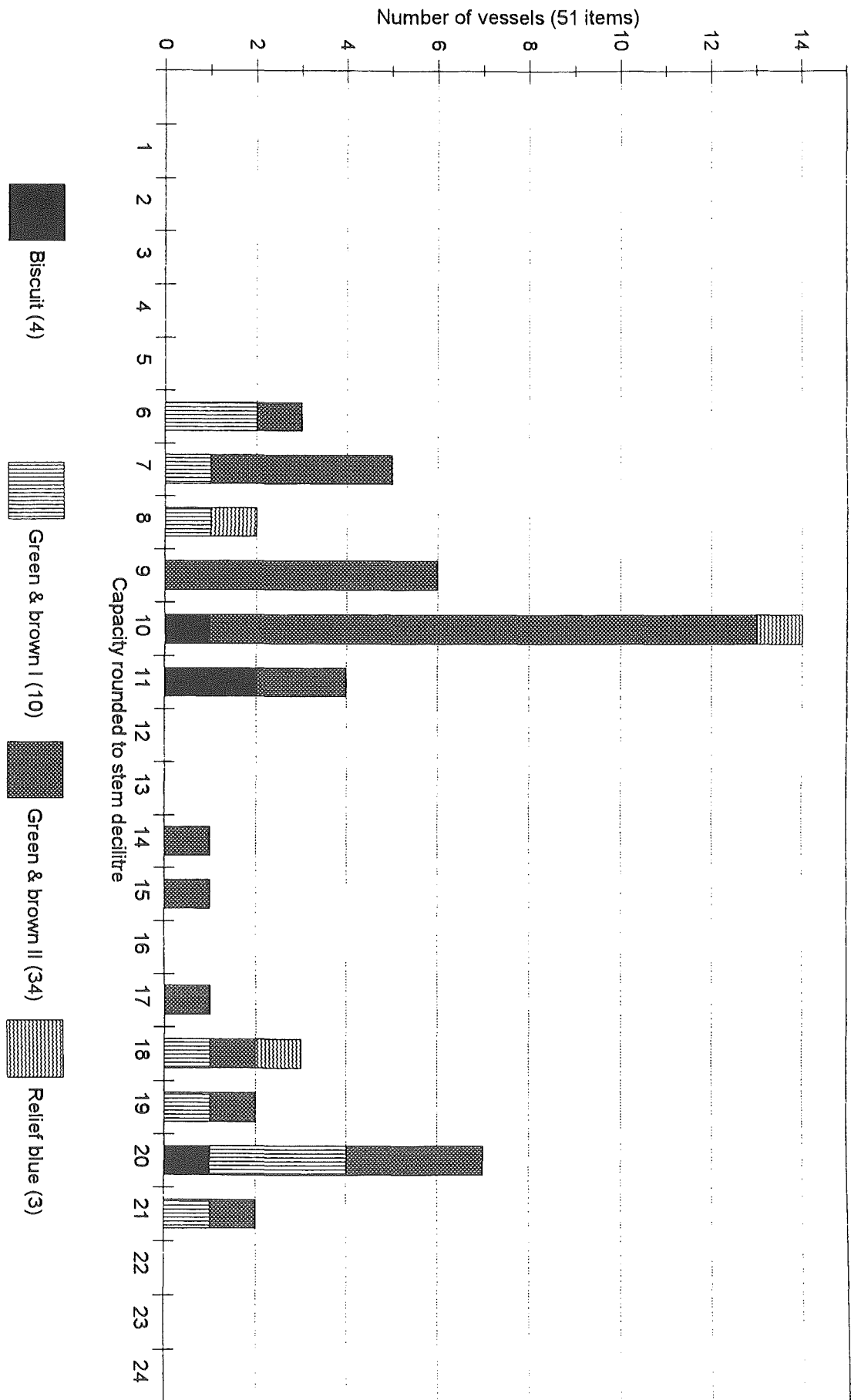


Fig. 11. - Arezzo. Histogram of piriform capacities

As well as being grouped into size categories, the late table jugs also appear to fall into multiples of 4:2:1 at Montalcino and Assisi and of 4:2:1.3 at Arezzo, although the "third" is in only one jug shape. Similar multiples have also been proposed for late 14th and early 15th century material at Faenza and Pesaro regardless of jug form.¹¹³

At Genoa some late archaic maiolica jugs have the same capacity as the surviving late medieval standards.¹¹⁴ Nineteenth century concordances supply the metric equivalents of units of similar late medieval nomenclature. Where early standards do not survive, it has been assumed that the units established in the later middle ages remained fixed for four or five centuries. At Pistoia, for instance, the administration of weights and measures was vested in the same institution which controlled the market from 1284 to the 1782 Tuscan reform, when Florence's standards were imposed.¹¹⁵ At Assisi, however, the jug sizes are about ten to twenty per cent less. The Montalcino jugs filled to the rim fit better the 1883 concordance for Siena than the one calculated by a historian.¹¹⁶

At Genoa metal standards ensured the near constancy of the *pinta*, but apparently the scrubbing of the marble measures of capacity led to an extraordinary increase in the size of the *barile* between 1462 and 1606 from 56 to 80 *pinte*.¹¹⁷ Where the compilers of metric concordances relied on the standard for the larger unit and applied earlier divisions to it, the 19th century equivalents may overestimate the size of the smaller unit.¹¹⁸ As well, local usage tended to round the weight contained in a particular capacity to the nearest *libbra* which could introduce errors in the smaller units of over ten per cent.¹¹⁹ Apart from unintended change, measures could be reformed in early modern times to legalise differences between amounts bought and sold.¹²⁰

Because the weight of the content was the common denominator of the various measures of capacity, dif-

ferent units sometimes with the same names were employed for grain, wine and oil. Not enough narrow necked jugs deemed to be suited to contain oil were available to test for different size systems at Assisi and Montalcino. At Faenza a smaller number of measurements has been employed to confirm the use of archaic maiolica jugs for wine and distinct green glazed ones for oil.¹²¹ The large storage vessels, which are often described as containing oil, do not conform readily with any scheme of multiples. Most at Montalcino centred on 12 litres or approximately half a *staio*.

After the Roman Empire, the first political forces in northern Italy to emerge with an interest in standardising measures were the later medieval municipalities. Even a common system of names, based on a consumption ration or what a person, beast or cart could carry, or of weights of agricultural produce inevitably led to as many standards as there were markets¹²². Later attempts to unify them on a regional basis were not always successful.¹²³ The 1855 concordance for the Papal State noted that the greatest variety was to be found in liquid measures: 179 for wine and 167 for oil.¹²⁴ In this context it is not surprising that jugs from Arezzo, Assisi and Montalcino appear to conform to distinct norms and that Montalcino's differ from Siena's.

Although all the table jugs have three modes, the distribution of values between the groups varies from place to place. The medium size is the most popular at Arezzo and just ahead of the largest at Assisi, whereas nearly all the jugs are in the largest group at Montalcino. The smallest size is the least popular, but at Arezzo where it is a third (rather than a quarter) it equals the number of large piriform jugs.¹²⁵ In capacity terms this means that the inhabitants of all three towns favoured jugs in the 800-1,350 ml range and were least likely to use ones containing less.¹²⁶ In terms of units, one centre may have a preferred a

¹¹³ See notes 108 and 109.

¹¹⁴ The capacity of the Genoese wine *amola* before the 16th century was 873 ml, Farris and Caprile 1981, 234. That of the jugs, datable to the second half of the 14th and 15th century, is 870 ml at the narrowest point of the neck, about 3 cm below the rim, and 970 ml at 1 cm below the rim. The number of jugs measured and the results of each measurement are not stated, Mannoni 1975, 116, 134.

¹¹⁵ Rauty 1975, 10, 14, 23.

¹¹⁶ 1,368 cp. 1,425 ml. See notes 80 and 82.

¹¹⁷ Tucci 1973, 591. By the mid-19th century it reached 90, Martini 1883, 223. The *amola* or *pinta* also increased slightly from 873 to 883 ml, Farris & Caprile 1981, 234.

¹¹⁸ Borzone 1982, 46, noted how Genoa's *libbra* did not change over four centuries in a study devoted, however, to explaining how the metric concordances were wrong.

¹¹⁹ The true weight of a *boccale* of wine at Perugia was 11%

more than the rounded one and nearly 4% less at Assisi, Bofondi 1855, xii.

¹²⁰ Tucci 1973, 588-599.

¹²¹ See note 109.

¹²² Bofondi 1855, x-xi, records the specific gravities of grain as varying from 0.6 to 0.8, wine 0.962-1.054 and oil 0.895-0.915.

¹²³ Tucci 1973, 586-587, 597.

¹²⁴ Cp. 43 for weight, Bofondi 1855, xiii. Despite commercial pressure towards uniform liquid measures, whose impact was perhaps greatest on the large containers - in wood for wine and ceramic for oil - used in maritime trade, Tucci 1973, 596; Pini 1981, 177, 180.

¹²⁵ Arezzo: large 25%; medium 58%; small 17%; Assisi: 41%; 45%; 14%; Montalcino: 83%; 13%; 7%.

¹²⁶ Cp. conclusion for Genoa and eastern Liguria: "more or less standardised capacities from about half to two litres with a

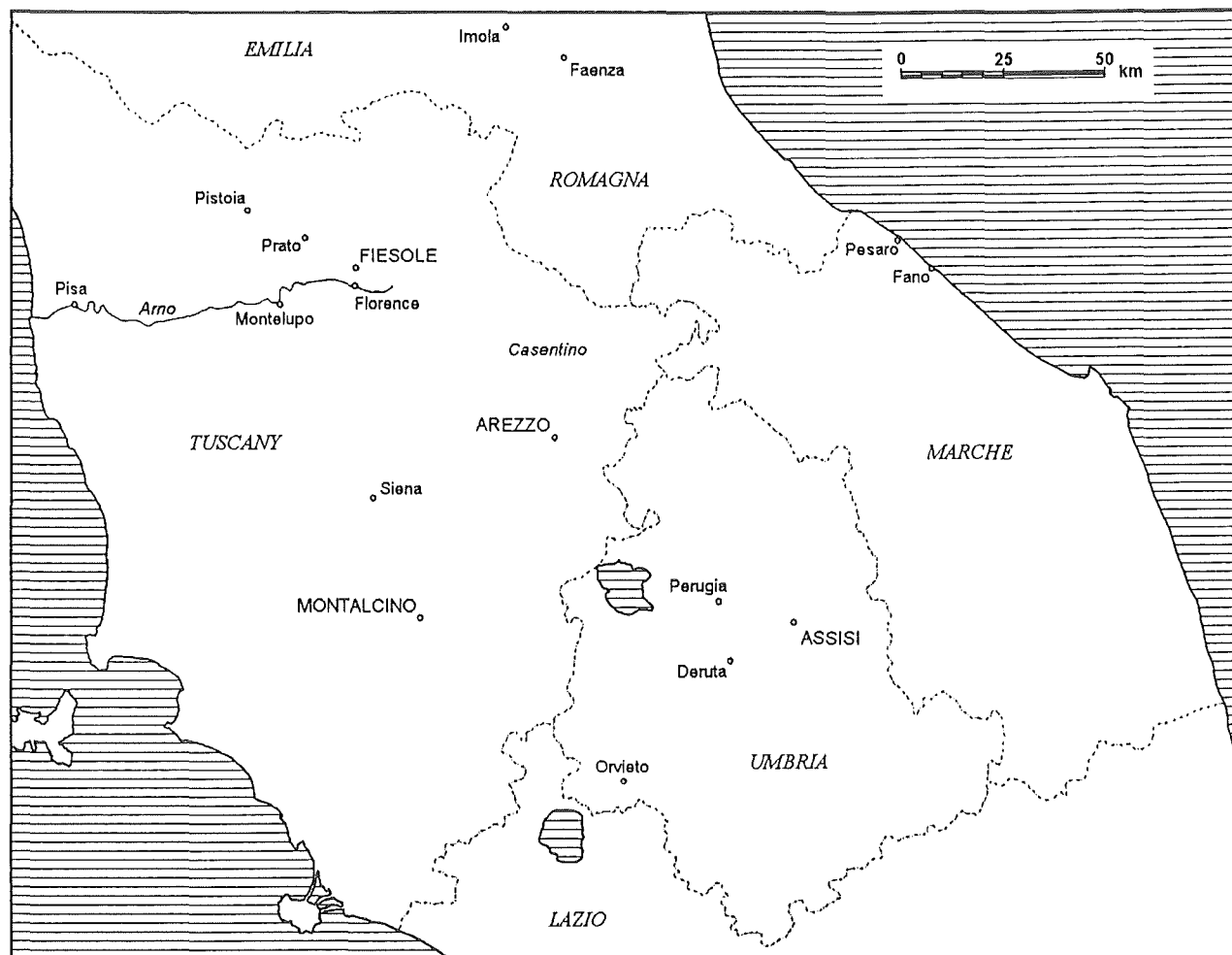


Fig. 12. - North-central Italy. Location of places mentioned in text

“whole” size whereas another a “half”, which may have only been slightly smaller than the first centre’s “whole”. The size distribution of the jugs studied may reflect that they were destined for family or collective consumption. The smaller sizes are likely to have been commoner in taverns.¹²⁷

With such geographical variation the only way to show change in sizes over time would be in one place. The 10th-11th century jugs at Fiesole tend to be much more capacious than the glazed tableware of three or four centuries later. The surviving later piri-form jugs at Montalcino are on the small size and the earlier baluster and transitional jugs at Arezzo do not conform with the later modes. But the Fiesole jugs may not have served only as tableware; and the later Montalcino and earlier Arezzo jugs are too few to make a valid comparison. At Rome small and medi-

um small spherical jugs for individual drinking were replaced in the twelfth century by larger taller ovoid ones for collective use, which in turn gave way at the start of the 15th century to a more standardised globular shape.¹²⁸

The glazed jugs by virtue of being made to definable sizes were more standardised than those found at Fiesole. Arezzo’s table jugs, most of which are fifty to a hundred years later than those from the building vaults in Assisi and Montalcino, conform more closely to its sizes.¹²⁹

If only one form in one category were made in size multiples, late medieval specialisation in pottery production is unlikely to have been the cause of increasing standardisation.¹³⁰ Municipal statutes did require some ceramic measures to be used in retail trade. From 1284 at Pistoia the measures for the sale

prevalence for around one litre”, Fossati and Mannoni 1981, 416.

¹²⁷ Pistoian taverns had to have the half and quarter size measures, which according to the 1782 concordance were 980 and 490 ml, Rauty 1975, 41

¹²⁸ Mazzucato 1980, 156-157. The only figures provided are

for the second stage, see note 110.

¹²⁹ To judge from the spread shown by the standard deviations, which depend on where the boundaries are drawn and on measurements under the control of different researchers.

¹³⁰ Blake 1981a, 32-33.

of wine in taverns had to bear the municipal seal and from 1340 were chained.¹³¹ In late 14th century Assisi they had to be made of glazed earthenware.¹³² In 1355 Florence's coopers were required to keep a marked *mezzina* in earthenware or copper so that buyers could check the capacity of barrels.¹³³ Two late 13th century basins at Pistoia of an otherwise unknown form seem to have been made for measuring grain in the market.¹³⁴

The requirement to provide ceramic standards of the smaller liquid measures for the sale of wine in taverns clearly had an impact on the late medieval nomenclature of table jugs. Ceramic forms and the measures of their contents are separately named in later 14th century acquisitions at Assisi. But in contemporary Florence and in early 15th century Siena liquid containers could be called by the names of measures of capacity and even be defined as of another size.¹³⁵ That the traffic could go the other way is shown in the metric concordances for Assisi and Siena where the unit is called a *boccale*.¹³⁶ In the 17th century a Genoese copper measure could be in the form of an *amola di creta*.¹³⁷

The few known late medieval jugs bearing lead seals or the holes for them in the handle or the neck were presumably these tavern measures.¹³⁸ The complete ones may be the best source for late medieval wine measures where the original municipal metal standard does not survive. Were jugs with sealed handles filled to the brim as were metal standards? On analogy with the 17th century practice of marking with holes the upper limit of the measure on copper jug standards, the position of the seals on the neck about half way between the narrowest point and the rim may indicate the point measured.¹³⁹ The narrow-

est point, however, of late medieval jugs at Genoa coincided with the contemporary standard.¹⁴⁰

Another question is how late medieval potters achieved the precise size. Individually thrown pots of the period vary in dimensions and would have shrunk during firing. Yet the holes for the seals were pressed through the raw clay handles and the alleged grain measures at Pistoia are exact to the rim.¹⁴¹ Potters may well have determined the general size of the vessels they planned to make by selecting an appropriate lump of clay.¹⁴² All pots were weighed at Assisi and Montalcino, but the correlation was difficult to test as hardly any are complete. The makers certainly had an interest in distinguishing clearly the sizes as the sale price depended on them. In claiming exemptions at Fano, a potter offered to sell his jugs at specified prices according to size.¹⁴³ At Florence and Imola jug prices were more or less proportional to size.¹⁴⁴

The pottery at Assisi and Montalcino belongs to the first half of the century preceding many of these examples and to an earlier typological stage. But even the contemporary material from Arezzo shows some variation. Potmaking in this period was not a precise art. A few capacity measurements are unlikely to be an accurate guide to the sizes in use and certainly cannot be used as a criterion for attributing a jug to a particular centre.¹⁴⁵ To explore further some of the implications of the results of this preliminary study,¹⁴⁶ other large assemblages or large collections from a particular place should be measured.¹⁴⁷ Their publication should include the raw data and an account of the methods employed. Another desideratum is the measurement of the sealed jugs.

The outcome of further study should not be merely metrological, but explore the cultural signifi-

¹³¹ Rauty 1975, 14, 41.

¹³² See note 54.

¹³³ Cora 1973, 23.

¹³⁴ Of 8 and 16 litres, Vannini 1985, 391-393; 1987a, 356-357, 359, 396-397.

¹³⁵ Farris-Caprile 1981, 199-200, 219; Piccinni 1981, 597-598.

¹³⁶ See above.

¹³⁷ A clay flask, Farris & Caprile 1981, 234, fig. 70. Cp. the copper skeuomorph of a medieval Roman two-handled jar marked SPQR, Mazzucato 1978-80, 120; and see note 112.

¹³⁸ With a hole through the top the handle in the Arno valley and in the Casentino usually of archaic maiolica jugs (including at Prato of small, medium and large sizes), but also on jugs of unglazed type at Pisa & Berti 1982, 179-180, n. 8; Berti & Gelichi 1995, 198, pl. 2.7-8, fig. 3; Busi 1984, 469; Francovich *et al.*, 1978, 86, L88, 88, L94, L97; Vannini 1987b, 68, 70, fig. 23, PO50; Viti, 1995, 136, nos 86 GL 35 and 29 D; with seal in place on a form of south Umbrian or north Lazio type, Blake 1981a, 111.

Small lead seal through the neck about 1-2 cm below the rim at Faenza and Siena, Liverani 1961, 103, pl. 48a; Francovich

1982, 76, n. 30, fig. 66; and two in Museo di Roma, Mazzucato 1980, 159.

¹³⁹ Farris & Caprile 1981, 234.

¹⁴⁰ See note 114.

¹⁴¹ The capacity of 18th century English beer mugs bearing pre-fired stamps were as much as 155 ml less and 65 ml more than the 1,155 ml standard, Bimson 1970, 166.

¹⁴² The weight relationship between whole forms of archaic maiolica found in Liguria is apparently jug 1, bowl 0.7, plate 0.6, deep bowl 0.55, brimmed bowl 0.25, Mannoni 1973, 18.

¹⁴³ Berardi 1984, 107, n. 17.

¹⁴⁴ Cora 1973, 87; Gelichi 1992, 222.

¹⁴⁵ Cora 1973, 229.

¹⁴⁶ The constraints of time, place and length have limited this study, which should have included the full range of Assisi data, research on Arezzo's and Fiesole's measures and on arid capacities in general, statistical testing and have been better illustrated.

¹⁴⁷ For example, the possible late 14th century tavern group of 140 almost complete beakers and jugs discharged into a cess pit in Ferrara, Visser Travaglini & Ward Perkins 1983, 384; Gadd & Ward-Perkins 1991, 119; and the storage jars built into vaults, see note 2.

cance of sizes and the prevalence of different units, which will be a valued extension to research still centred on form and decoration.

Summary conclusion

The measurement of the capacity of pottery found in four places in Tuscany and Umbria showed marked differences in sizes according to time, place and function. The 11th century jugs at Fiesole of around two and three and a half litres were larger than those commonly used on the table three and four centuries later. The preferred size of the latter was about one litre. The favourite kitchen size was about two litres for jugs and three litres for cooking pots. Pitchers varied from a half to four litres in capacity, whereas the storage jars centred on twelve to fourteen litres.

Although there is a spread in sizes within all categories, only the 14th and the 15th century table jugs fell into distinct multiples. It is proposed that this was in response to municipal legislation to control wine measures in the retail trade, exemplified by its impact on contemporary nomenclature. It is suggested that the few extant ceramic standards – jugs bearing lead seals – and large groups be measured. However, the lack of precision in sizes points to the futility of drawing conclusions from the measurement of small samples.

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Different Shape – Same Function ? Medieval Hand-Washing Equipment in Europe

‘*Cum ablueris manus ut comedas nihil tangas nisi prandium, donec comedas*’; in the 12th century, the baptized Jew Petrus Alphonsus wrote the ‘*Disciplina Clericalis*’, a so-called ‘*Tischzucht*’. These ‘*Tischzuchten*’ are normative texts originating in the Mediterranean and Hispano-Arabic regions written in order to define good table manners. Hand-washing has not only a metaphoric, but also a pragmatic function. The hygienic purposes after the meal are known especially in the Islamic world. In the Bible we get to know another function. The Psalmist 26, 6 ‘*Tunc lavet manus hunc versum dicendo*’ supplies a kind of model for missals. Hand-washing has a ritual meaning. In the medieval church ritual hand-washing took place on various occasions. This ceremonial act had to be performed with or in running water. The ritual use is a sign. It signifies the purity in a moral and ethical sense. It is a sign of inner purity. Hand-washing rituals and acts occur in most of the world religions. But in the Latin Christian world, one of the most popular acts is the hand-washing of Paulus handed down to us in the words of Mt. 27,24. Architectural sculpture (Naumburg cathedral) or illuminated manuscripts (Psalter of Besançon) portray Pilatus washing his hands and depict objects like basins or aquamaniles. As M. Hütt (1993) has shown, the liturgical function of aquamaniles in particular was adapted from the profane use. Documentary evidence thus suggests that there were no special objects for this liturgical ceremony, so vessels of everyday life had to be adapted. The lack of written and archaeological evidence for most of the metal vessels makes it difficult to assess the relative importance of lay as opposed to ecclesiastical functions.

From an archaeological point of view, there are different stages of quality in laying the table (Müller 1996a, 155, Abb. 1). Hand-washing equipment can be associated with objects like candelabrams, dinner-bells or table-cloth. Hand-washing objects are not only specific things like lavabos or aquamaniles or unspecific objects like vessels or basins, which could be used in different ways, but also things like towels. At the least, they are quality products which are clearly

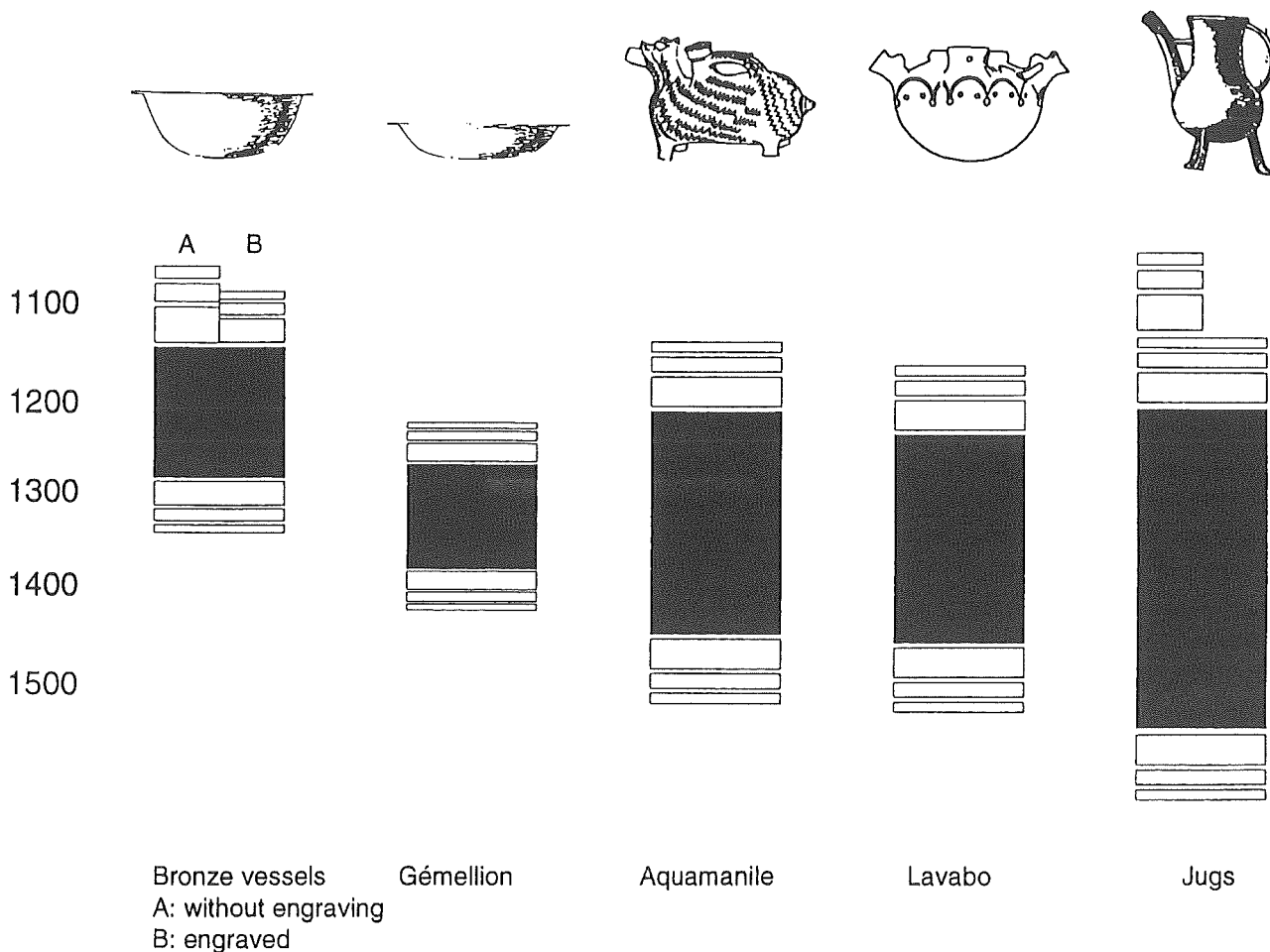
non-essential things. Other things associated with the meal are not represented in the archaeological material: rooms or spaces, table service (servants, musicians), sitting-orders or grace. On the whole, the meal is a complex socio-cultural phenomenon, so material culture represents only one side of a society rich in gestures (Schmitt 1994; Henisch 1978).

From late antique and early medieval times onwards, we know lots of objects which were possibly connected with hand-washing. The so-called ‘Coptic vessels’, ‘*Perlrandsbecken*’, jugs and pans made of bronze are found in richly endowed graves (Lavoye 316, Krefeld-Gellep 1782, Köln-Dom, Niederstotzingen, Sutton-Hoo). Later vessels are objects of Anglo-Irish origin like the hanging-bowls or the jugs produced in the Rhineland such as the ‘*Tatinger Kannen*’. Outside the Carolingian empire, the latter have been found in early towns (Haithabu/D), chieftain’s farms (Borg/N), fortifications (Starigard/Oldenburg) or graves (Birka/S). At first being connected with the spread of Christianity and combined with liturgical functions (Winkelmann 1984), these jugs are now interpreted as highly valuable tableware found in the periphery of the Carolingian world (Meier 1994, 180). Vessels and jugs were used in various ways. They cannot be defined only as hand-washing objects and their function was only in some cases a liturgical one. They are part of the actual dinner-service and were combined with other grave goods for a wealthy life after the death (Müller-Wille 1976, 132 ff.; Vierck 1991). Nevertheless, all these objects show the significance of late medieval hand-washing and some of them are important for the development of the later Romanesque engraved vessels and other high medieval objects (Fig. 1).

Hanseschalen

The so-called *Hanseschalen* were made from copper and copper alloys. Their occurrence in central, northern and eastern Europe between the late 11th and early 13th century led to the denotation ‘*Hanse-*

Fig. 1. - Handwashing-objects. Types and probable dating.



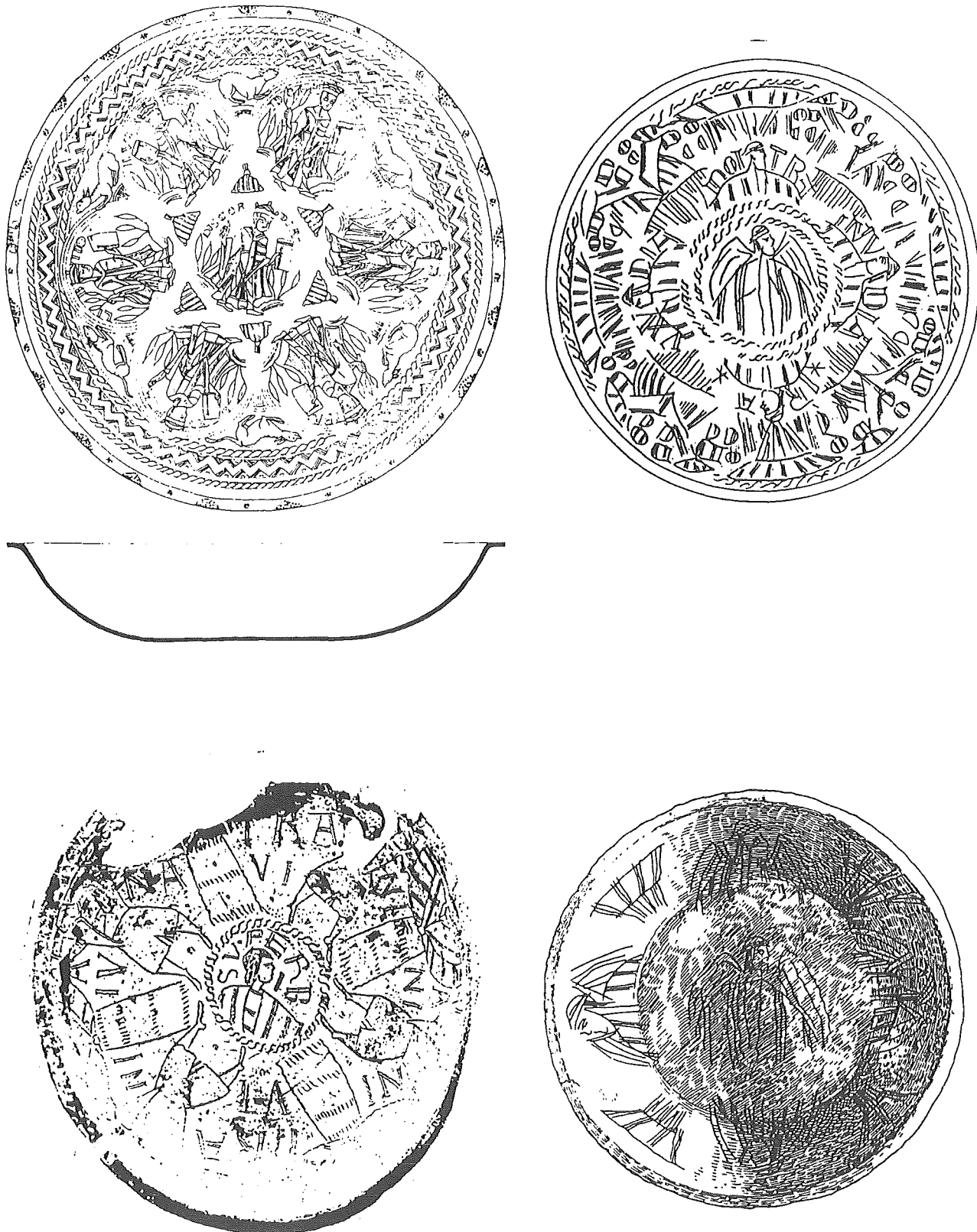
schale' (Müller 1996a, 161 Abb. 7). The distinctive mark is the decoration inside the vessel. The vessels were cast and then decorated with techniques like scribing, engraving, punching and attaching decorative stripes and discs of sheet-metal. Since no precise data concerning the shape of these bowls, the production technique and the composition of the material were available, a suitable criterion for their classification has been provided by the ornaments (Poklewski 1961; Weitzmann-Fiedler 1981; Müller 1996b, 146, Abb. 1). We have themes from classical or Christian literature (Herakles, Pyramus and Thisbe) as well as personifications of ethical or moral ideas (Virtues and Vices, *Artes liberales*; Fig. 3a, Type B1-5; C1-3). The craftsman also produced vessels with ornaments (Fig. 3b right, Type E1-5) and animal- or plant-style decorations. A very special group are the vessels without any engraving but of the same shape in the tradition of the Viking Age bronze vessels which were found in tombs in Denmark, Sweden or Norway (Müller-Wille 1976, 134, Abb. 57; Eisen-schmidt 1994, 62 f.).

If we take a look at the archaeological material (Fig. 3), we see that most finds were made in north-

western Europe, but also in northeastern Poland and the Baltic (Prussia, Estonia). Most of the finds in the Northwest were discovered in places connected with water like the North Sea, the river Scheldt, but also in bogs and lakes. In central Europe some finds have turned up in castles and fortified sites, but also in rural settlements.

The distribution of the finds reflects first of all the absence of grave goods in northwestern or central Europe in contrast to regions with grave-goods and different burial customs in northern and northeastern Europe. Graves with engraved vessels from the late Viking world are known from Gotland (Trotzig 1991) and late Iron Age or early medieval sites in Finland and the Ladoga region (Vilusenharju/SF; Jarovscina/RUS). The vessels from coastal regions in Pomerania (Kaldus/PL; Pokrywnica Wielka/PL), Prussia (Wiskiauten/RUS; Wietrowo/RUS) and Livland (Krimulda/LET) were found in graves in most cases. Some of them can be regarded as imports from the West, some of them may have been produced in central Europe or the Baltic (Poklewski 1961, 50ff.). Bowls with geometric (Fig. 3b) or plant ornaments and bowls without engraving can possibly be con-

Fig. 2. - Engraved Vessels, Typ B/C. 1 Strelarsund bei Rügen/D. 2 Waal bei Rossum/NL. 3 Maastricht/NL. 4 Kiev/ Ukraine.



nected with funeral rites as mentioned above. If not the primary, at least the secondary function of those vessels was ritual. The interpretation of these graves is made more difficult by religious ambivalence or change from heathendom to Christianity and it is dif-

ficult to link the various finds or groups to definite tribes or ethnic groups.

The finds from sites linked with bogs, lakes or rivers have to be interpreted in different ways (Schulze 1984; Schäfke 1986). One hypothesis points

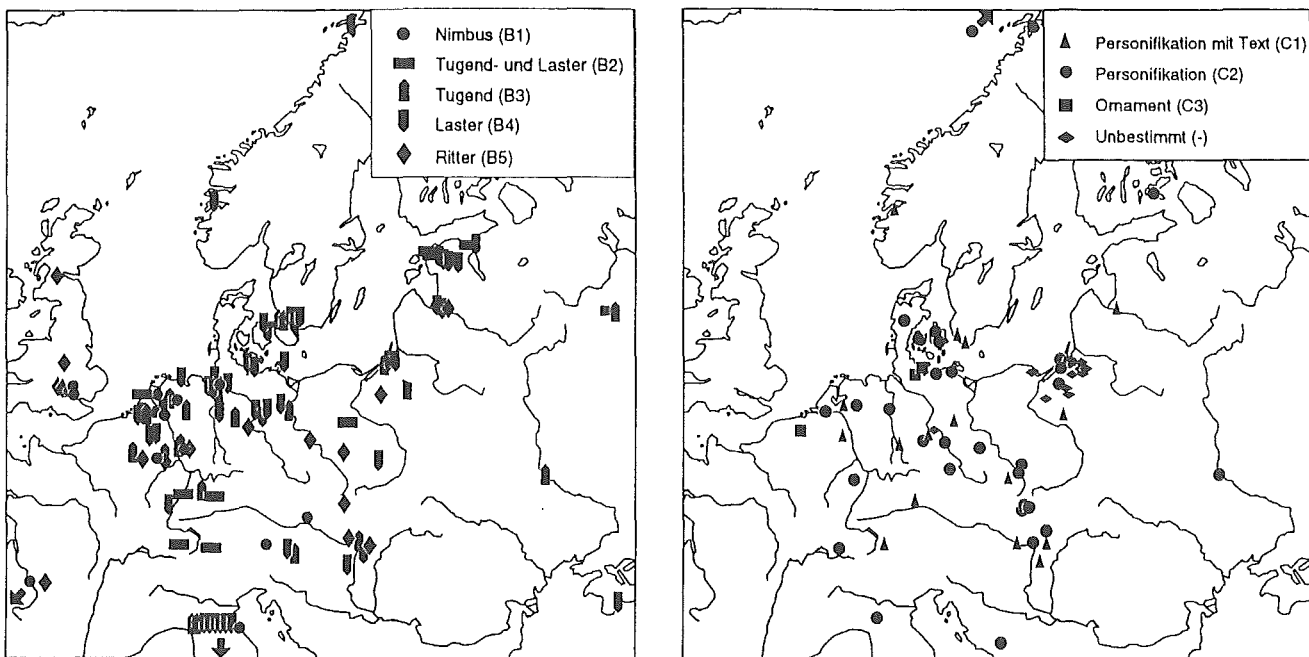


Fig. 3a. - Distribution of engraved vessels. Left: Type B. Right: Type C.

out the profane nature of these locations. Losing the vessels by transport could be accepted for finds from the North Sea or the rivers Scheldt or Rhine. Written sources, for instance, mention the transport of bronze vessels on the Rhine. A lot of vessels were discovered in bogs or lakes. Only in Estonia sites with 10, 20 or 30 vessels are known. T. Tamla (1996) has linked these places (Mäetaguse, Aseri, etc.) with the question of Christianisation. Treasures with engraved vessels were also found in other places (Waterneverstorf/D; Pusztavasád/HUN; Cegléd-Madaráshalom/HUN). On the whole, the interpretation of sites presents a lot of problems concerning the sacred and secular in high medieval society – hiding places for stolen goods, merchants' depots or sacrificial places in a Christian society (Dinzelbacher 1996).

One problem related function can be demonstrated by the vessels depicting motifs of Virtue and Vice (Fig. 2.1). From the pagan antique to the Christian late antique period and until medieval times this theme was of great importance. Contemporary scholastic discussion treated Virtue and Vice just as popular culture. The 5th-century poem *Psychomachia* by Prudentius has long been recognized as the major literary source for the theme of the battle between the Virtues and Vices. In this way, Prudentius became the primary source for both the literary form and the iconography of this battle in the Middle Ages. The clear pattern of victory and defeat that is shown and its position in the church indicate that some form of moral conflict between good and evil is intended. But the allegory was important not only for text and illustration. Architectural sculpture like portals or bronze

doors (Novgorod, Hildesheim) and objects of craftsmanship in Romanesque art like reliquaries, shrines or candelabums took up this theme too. In medieval allegory, Vices are *Superbia*, *Luxuria*, *Prudentia*, *Idolatria* or *Avaritia*. The *Virtutes* are *Caritas*, *Temperantia*, *Spes*, *Fides* or *Fortitudo*. As a large part of the medieval society was illiterate, the illustrated manuscripts had only a limited reach in social terms and we should not overestimate the influence of texts like *Psychomachia* written by Prudentius or the *Hortus Deliciarum* of Herrad von Landsberg

The vessels are different in terms of decoration and motifs. Within the theme of Virtue and Vice, some sub-types appear. First, we have the personifications of Virtues or Vices only. The composition scheme of these vessels is different only in small details. On the bottom plate is a central figure sitting on a throne or walking moderately like the *Discordia* on a bowl found in the Strelarsund (Fig. 2.1). Attributes like books or a disc-like object are common but not exact in allegorical tradition. This medallion is framed with a decorative band and an inscription that characterizes the personification. Below the rim on the inside, we see semicircular medallions again with personifications denoted by inscriptions. The space between these medallions is often filled in with abbreviations of other personifications mentioned only by inscriptions. This compositional scheme was derived from the actual scholastic discussion. The Virtues and Vices were arranged in a tree-like structure known in medieval manuscripts or architectural sculpture as '*abor bona*' and '*abor mala*'. Several vessels have combined personifications and quite a

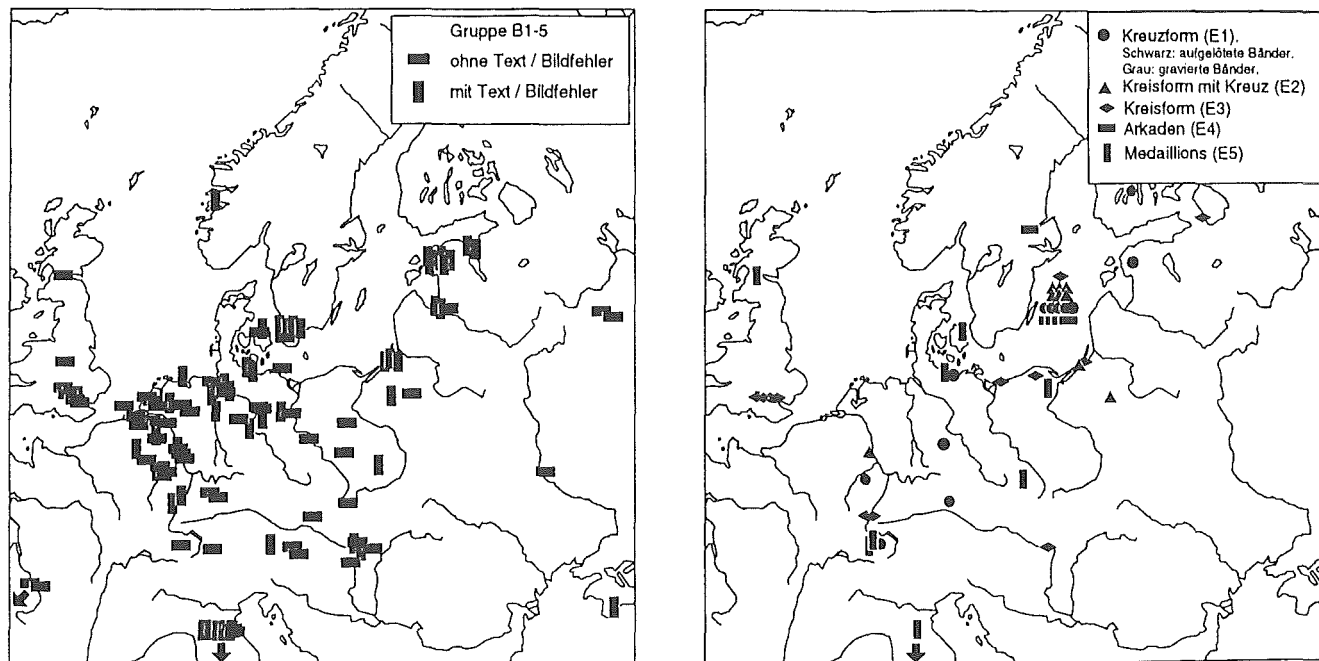


Fig. 3b. - Distribution of engraved vessels. Left: Typ B (correct/faulty inscription or iconography). Right: Type E.

few show knights (like a 13th-century vessel from Maastricht/NL; Fig. 2.3). These ‘*Ritterschalen*’ can be derived from the iconographic motifs in the Prudentius text and its descendants. On these vessels, ethical and moral themes are combined with scenes from the life of the nobility. Another sub-type is characterized by women with a will, the allegory of the God (Pokrzywnica Wiekla/PL, grave 16; Müller 1996b, 149 Abb. 2.3). From a typological point of view, it is possible to distinguish bowls with a flat base and those with an omphalos-shaped one – this might be of chronological importance.

The composition is quite individualized, but the motifs follow common lines. The formal features and the subjects of the ornaments may be compared not only with contemporary objects of craftsmanship like caskets, candelabums or reliquaries, but also gaming-pieces or scales. Furthermore, we can compare the motif of the enthroned person with representations on episcopal or royal seals and coins (Hütt 1993). Based on these multi-dimensional examples, the identification of production centres and of relations and similarities between vessels presents numerous problems.

The design of these vessels shows two different stylistic tendencies. One group like the bowls with mythological or Christian themes is a very accurate one with a minute treatment of the theme. Here we can see the accurate execution of realistic architectural elements, parts of landscape or dress (Weitzmann-Fiedler 1981, Nr. 1-25). The same goes for the inscriptions which denote the personifications. Another group was made in a more schematic way,

often named ‘barbaric style’ with thick, stiff lines. Taking a look at the inscriptions, their composition and rendering make the differences more striking (Fig. 2.1.2.4).

In order to understand the vessels, the user had to be able to read. He was also expected to know the mythological themes. The symbolic speech of iconology being an indifferent one; it is necessary to know the inscriptions especially on the vessels with Virtues and Vices.

We also have ‘relict’ inscriptions, often faulty and illegible and cord imitation bordering the medallions (Fig. 2.2). Other examples are bowls without bordering or background ornament (Fig. 2.4). It is a reduction in symbolic speech. Obviously we are also confronted with a misunderstanding. The figures are so-called ‘Angels’. They are an allegory of the Virtues, but the inscriptions denote Vices and then the vessels would be copies of the accurate ones (Fig. 3b). Either the craftsmen were not familiar with the iconology or they were not able to write and the vessels with faulty inscriptions or iconography would indicate that the consumers did not demand accurate vessels with classical themes providing moral or ethical instructions. Alternatively, the vessels give us an example of a change in allegory, so other things – texts, pictures or objects – were used or demanded by the consumers. The first vessels with themes from literature and motifs of Virtues and Vice were possibly made in northwestern Europe (Poklewski 1961, 50). The complexity of themes and the knowledge of writing leads one to assume that they were produced by clerical persons (Weitzmann-Fiedler 1981, 13).

The fact that the vessels were copied and found in central and northeastern Europe when at the same time accurate ones were produced indicates an increasing demand (Fig. 3a-b).

The older vessels without any engraving were used for keeping food for the dead or in ritual and ceremonial actions. Hand-washing is one function, but not the only one. One thesis is that the vessels with a schematic composition or a faulty inscription carry on traditional use within a new frame of motifs and deeds accepted by Christianity. There is only little archaeological evidence for two basins like the vessels with themes of Virtues and Vices (Müller 1996b, 163 Abb. 9). When used for hand-washing, the vessels depicting Vices are basins: all the Vices were swept away by pouring the water with vessels with themes of Virtue. Sweeping away the vices also means clearing the dirty hands. In agreement with literary evidence but not with the archaeological sources, vessels were often used in ceremonies like baptism or penance particularly in monasteries (Weitzmann-Fiedler 1981, 9ff.). As Weitzmann-Fiedler pointed out, the production and use of the engraved vessels stopped in the middle of the 13th century with the change of rules of penance. The liturgical function within the Holy Communion ('*lotio manibus*') cannot have been the only and the primary one especially for the vessels without inscriptions or engravings. If we take a look at the inscriptions, we see Vices like *Superbia*, *Avaritia*, *Luxuria*: the users were warned against doing these things. Avarice, idolatry, pride, luxury, intemperance – all these are slogans for a society in transition. On the one hand, these vessels give moral instructions ('*religiöses Basiswissen*'). On the other, the custom of welcoming guests by offering them the possibility to wash their hands on arrival as well as before, during or after the meal is part of the good manners in the higher classes of the 11th and 12th century. As I pointed out, the social function of washing hands is more than the hygienic purpose. It is a visible sign of social behaviour. At any rate, the finds clearly belong to a class of specialised and somewhat superfluous objects of highly quality reflecting processes of innovation, emulation and also cultural transmission/transition.

Gemellions

The name 'gemellion' has been derived from the latin *gemellus*. The word denotes the combination of two vessels used for hand-washing and thus gemellions are used in pairs. One vessel is a pitcher with a spout almost shaped like the nozzle of an ani-

mal, the other one is a basin for collecting the water that has been poured. Gemellions were made in Limoges, a centre for inlaid enamel objects from the late 12th century onwards (de Vasselot 1957; Gauthier 1987). Most of the gemellions are objects of unknown provenance; only in some cases they were found in an archaeological context (Bergen/N). The motifs (minstrels, musicians, falconers) are standardized elements of medieval iconography and linked with the representation at court (M. Müller 1994). A function as profane hand-washing vessels is the most probable one for the gemellions. The motives from the world of nobility indicate that the vessels were used at the table and not only for hygienic reasons. They were part of a complex system of acquiring social prestige and they had representative purposes as well. The liturgical function is known from some statements in inventories like one from France, dated to 1380. There, '*2 bacins de chapell, d'argent dorez; en chascun une rose ou fond, à un esmail de 2 dames qui tiennet 2 faucons ...*'. They were also used in the late 16th century (Eckerle 1986, 211). The gemellions succeeded in particular to the engraved bronze-vessels with the theme of virtue and vice or motifs from classical literature (Ovid's Pyramus and Thisbe). We can not specify the consumers of the gemellions, but the quality of the vessels identifies them as high-status groups not only in castles but also in towns. Only these groups could afford specialised and exclusive vessels like the gemellions indicating growing material comfort and improving living standards.

Aquamaniles

Aquamaniles (Fig. 4) are sculptural pitchers made of copper alloys or ceramic (Falke/Meyer 1935). The contact with the Mediterranean and the Islamic world during the Crusades as well as the long-distance trade led to the adoption and adaptation of cultural behaviour like the hand-washing procedure. Massive production of aquamaniles does not start before the late 12th and early 13th centuries. Thus, we have a chronological gap between the objects from early medieval cemeteries in Italy and later ones which cannot be closed by finds dating from the 9th or 10th century (Kasten 1976). The aquamaniles of the high medieval period are an innovation based on the importance of hand-washing in the Islamic world in combination with the ceremonial act in the Christian world. The aquamaniles combine the act of hand-washing from the Christian liturgical ritual and the profane hygienic function from the Islamic world with a motif of one's own experience and philosophy of life. The motifs of the metal aquamaniles reflect

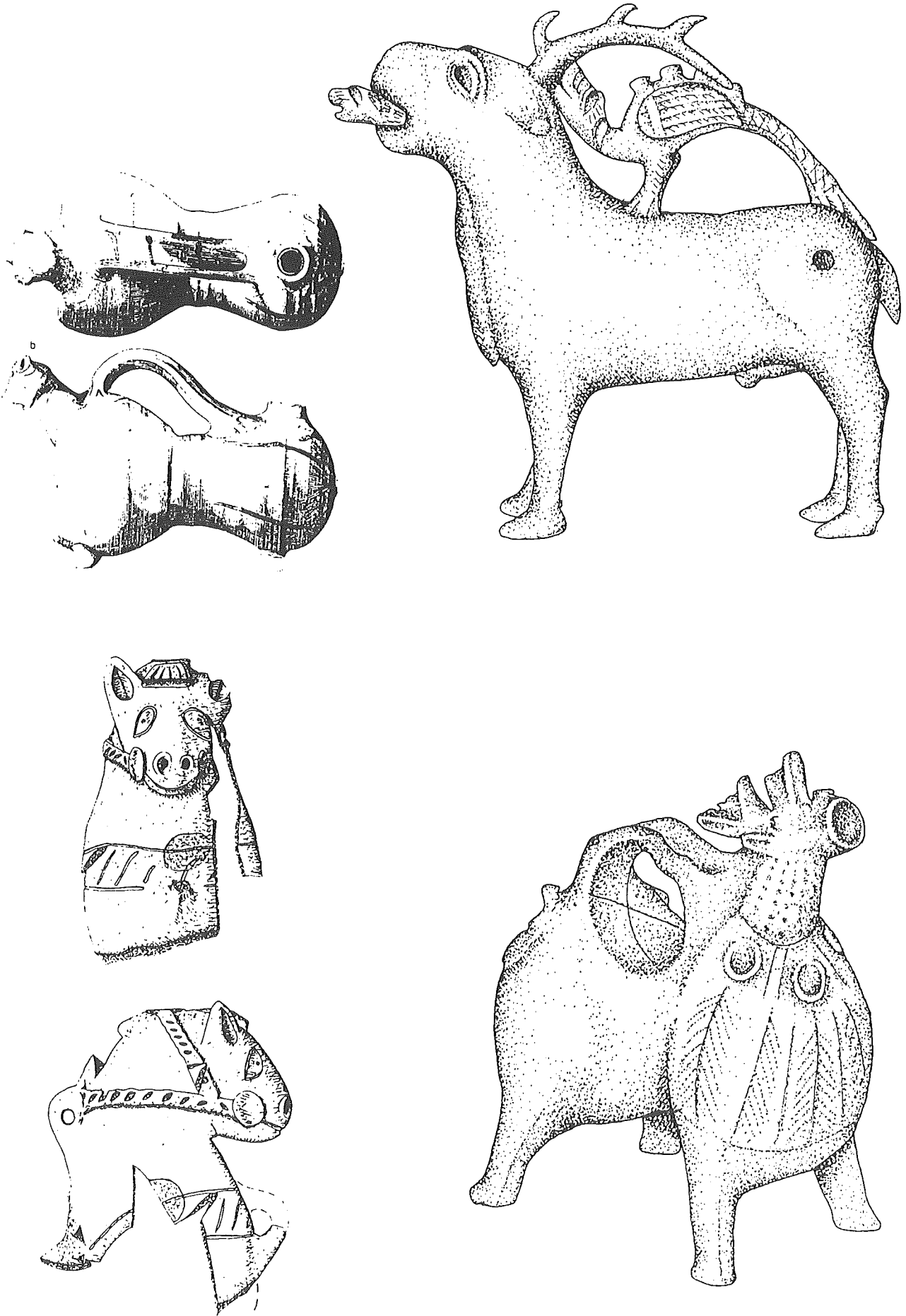


Fig. 4. - Aquamaniles. 1 Steinheim a. d. Murr/D. 2 Nationalmuseum Kopenhagen. 3 Burg Greifenstein/D. 4 Coppengrave/D.

the medieval world. One of the most common motives is the knight and his world (jousting, hunters, minstrels). The theme of the knight and his world is not common in the Islamic world but it is in the Christian world, so the motifs are often a novelty. Animals including lions, horses, rams, deer, dog-shaped creatures or birds are depicted too. Fabulous creatures and beasts like griffons, unicorns, dragons are other favourite themes. Early examples (11th/12th centuries) of metal aquamaniles like a deer, now at the Nationalmuseum in Copenhagen (Fig. 4.2), indicate an oriental influence in design.

When dealing with the organisation of casting bronze goods, one must differentiate between high-quality products like the lion in Braunschweig, the doors in Hildesheim, Gnezdovo or Novgorod on the one hand and the small products of craftsmanship on the other. The production of tripod cauldrons or censers could be traced by archaeological excavations in Lübeck, Greifswald or the church of Hitfeld near Hamburg. The metal aquamaniles, including the high-valued ones, are mass products for wealthy consumers and were not produced as singular objects like the 'Braunschweiger Löwe' (Westermann-Angerhausen 1993; Seiler 1995).

For the aquamaniles, two aspects are the most interesting ones: the possibility of an allegorical interpretation and the substitution of metal by ceramic objects. Symbolic or allegorical interpretation of texts, pictures and objects is one of the most popular ways of defining and understanding the world in medieval society. Allegory is the additional discovery of meanings in texts, pictures or objects. In the 11th and 12th century, allegory becomes very popular, particularly the '*Physiologus*'. These texts were developed in the Hellenistic world in the 2nd to 4th century and were then copied in the medieval world. The '*Physiologus*' and the later developed bestiaries (*Bestiarien*) are part of a Christian natural science, though not, however, with a scientific standard but with an ethical ones. The animals of the '*Physiologus*' and their interpretation by medieval philosophers and clergymen found their way into architectural sculpture and crafts or applied arts. The world of chivalry, the lion as a symbol of strength and power, the horse not only as a sign of nobility but also of wealth, all these are abbreviations of more complex allegories. This way of making things visible and teaching people morality is not only represented by aquamaniles; nor is it an allegory in every case: sometimes it is only decoration. One example of an allegorical interpretation is the motif of the deer (Hütt 1993; Abb. Fig. 4.4). The deer and the ram, symbols in Christian iconology, were known through psalms (Ps. 41, 2) and daily sermons. The deer also

could be associated with the motif of the fight between the deer and the snake. The so-called '*Jüngerer Physiologus*', dated to the 12th century, tells us one version (Hütt 1993). In Christian terminology, this is an allegory of man's struggle against sin in the person of the snake. Although the motif and the allegory of the deer is very complex, the result of ritual washing has a simple purpose. Most of the customers were not able to read or write. They were not familiar with the allegorical interpretation discussed in scholastic circles but the possibility of an allegorical interpretation guaranteed social prestige.

The metal aquamaniles are linked to the ceramic ones which imitate their metal counterparts.

An aquamanile, found at Burg Greifenstein, demonstrates these links (Fig. 4.3). It is a horse made of yellow glazed earthenware. Compared to other ceramics, the object is very valuable. The figure is executed in a highly realistic way with the mane and the bridle of the horse which the potter shaped by means of his own techniques, but which are an imitation of some parts of metal horses. A dog-shaped beast made of fine, red painted earthenware was found at Steinheim a. d. Murr/D (Abb. 4.1), The figure does not show the elegance of the metal creatures, but the ware belongs to the high-quality fabrics. The flat handle and the short thick legs are shapes created by ceramic techniques. This kind of pottery with fine clay and the cross-shaped painting is typical of the region in south-west Germany. Another example is a deer from Coppengrave, an important pottery production centre in south-east Niedersachsen (Fig. 4.4).

The deer is comparable to an aquamanile that was found in the bailey of a fortification at Rerik/D. The piece was found in a sunken-floor house which contained late Slavonic and early German pottery. The deer was made of grey, red-fired and glazed earthenware, and the complex can be dated to the late 12th century (Müller 1997). It is the earliest example of a ceramic aquamanile in north-east Germany. The nostril and the antlers are shaped in a very realistic way and a claw alongside the neck was possibly associated with another figure sitting on the back of the deer as with the snake/dragon of the Copenhagen aquamanile (Fig. 4.2). The medieval potters shaped the aquamaniles in their own way. They did not just copy the metal counterparts. Little ceramic hand-formed figures like horses, knights or dogs found at production sites at Coppengrave/D (Stephan 1981) could be interpreted as toys and these show another element of influence. Only the motif as a whole (the Lion, the Knight) and some details were derived from the metal objects. The early aquamaniles were made as quality goods. The potters often used innovative techniques in fabric, glaze and decoration (Scholk-

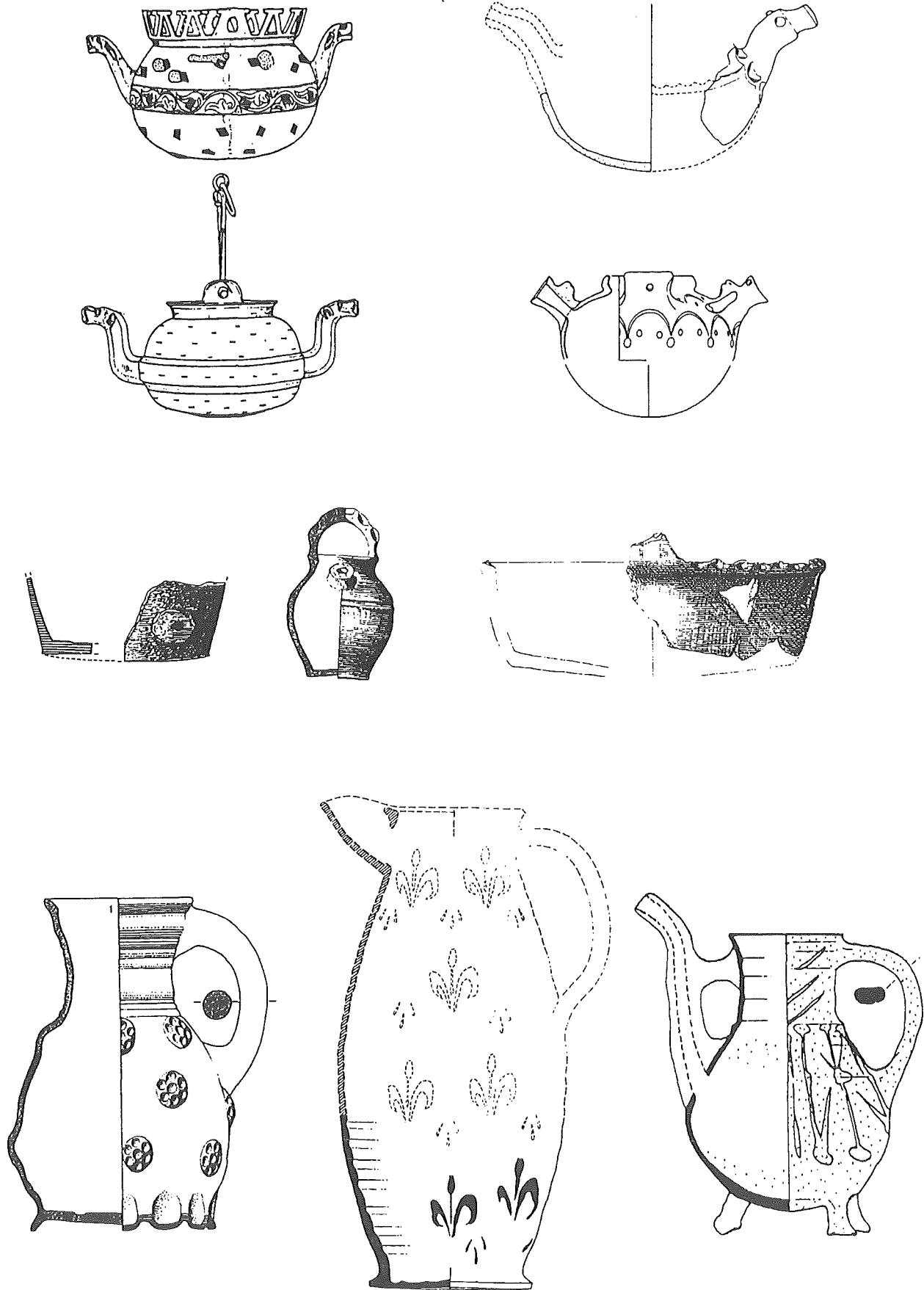


Fig. 5. - Lavabos, bassins, jugs. 1 Essen/D. 2 Rogum/D. 3 Lübeck/D. 4 Utrecht/NL. 5 Neubrandenburg/D. 6 Museum Stuttgart. 7 Freiburg/D. 8 Schleswig/D. 9 Staveren/N. 10 Stekene (Boudelo)/B.

mann 1989; Verhaeghe 1991). In this sense, the distribution of aquamaniles could be part of the distribution of highly-valuable wares (Gross 1994). Most of the finds come from castles and urban sites, only a few are known from rural settlements (Kasten 1976). All these finds indicate a profane use. This interpretation can also be applied to ceramic aquamaniles from monastic sites which were found in the outer courtyard, the guests' quarters or the abbot's tower. The absence of finds inside the church, *refectorium* or chapter houses is not only a problem of excavation: it may indicate that ceramic aquamaniles substituted for the metal ones only in the profane function (Hütt 1993).

Linking material culture with social structures (Steuer 1995; Verhaeghe 1994; but also Müller & Bernbeck 1996), the finds from castles can be interpreted in two ways. First, they might be linked to the varying 'degrees of nobility'. In medieval society, we have a clearly defined scale of nobility. The users of ceramic aquamaniles could be lower-ranking groups like '*Ministerialen*'. Their living-standards does not allow for luxury items like copper-alloy aquamaniles. If archaeological finds reflect social group and status in a direct way, we have to look at the change of material culture in space and time. Social status and its material evidence might vary from north-west France to north-east Poland. Secondly, the finds could reflect other social networks like the so-called '*Burgsassen*', the people who served the nobleman. They are liable in higher social customs.

Aquamaniles from an urban context, possibly objects of the urban middle classes (Verhaeghe 1991), are an expression of the desire to emulate the nobility's world on one side. On the other side, these finds indicate gradually increasing living standards and the popularisation of social customs like hand-washing. After all, the consumers can be characterized as customers not quite wealthy enough to afford the more expensive metal originals. But being well aware of more prestigious customs and fashions, they wanted and they bought the ceramic aquamaniles as an act of social emulation.

Lavabo

The term lavabo denotes a group of vessels (Theuerkauff-Liederwald 1988, 171ff; 361ff.). The typical later so-called 'lavabo' is a container or cistern with a spout on either side (Fig. 5.1-4). It is an earthenware, pewter or brass cistern, suspended and set together with a basin. The rim or the spouts are often animal-shaped. Most of the metal lavabos are finds without any location but stylistic differences allow us

to define regional groups like the lavabos in Scandinavia (Theuerkauff-Liederwald 1988, 369ff.). The links between the luxurious metal objects and their ceramic competitors are the same as between the metal and ceramic aquamaniles (Verhaeghe 1991). Their shape replicates metal counterparts, but apart from the occasional detail, their decorative features are unique and originate from the potters' own traditions. The manufacture of these vessels was essentially stimulated by demand, which the potters were able to satisfy with their own medium. Early earthenware lavabos (late 13th/14th century) are known from Belgium and the Netherlands (Verhaeghe 1991) or Oldenburg/D (Müller 1996a, 164 Abb. 10), later ones from Lübeck (Fig. 5.3) or south-west Germany (Gross 1995). With this kind of lavabos we reach a new level of hygienic purposes. The medieval citizen paid more attention to personal hygiene. In the 15th century, these hanging cisterns (Fig. 5.5-7) customarily occur with a basin combined with a wash-stand or a washing facility. By the 14th century another type, more simple in terms of material and manufacturing techniques, had become established in Europe. Medieval copper-alloy basins from archaeological excavations are quite rare (Huis Merwede/NL; Huys te Haarlem/NL; Bergen/N). The finds dating to the time around 1400 show the variety of this kind of vessels and suggest that not all these finds should necessarily be identified as cooking- or tablewares. D. Gaimster and F. Verhaeghe (1992) have published a group of vessels with face-mask handles from a number of Flemish, Dutch, French and English towns. The dating of this regional group could be set to the time around 1500. The pictorial evidence suggests that these basins would have been used as wine-coolers. As D. Gaimster and F. Verhaeghe point out, other functions from the general domestic sphere have been considered as well. During the late 16th century, these washing-equipments are common in bedrooms or dormitories particular in wealthier households, often also in hospitals or public houses. Hanging-cistern, basin and wash-stand define a new piece of furniture (Mohrmann 1990, 575ff.).

Substitution and Imitation

For hand-washing purposes, two different sets of vessels were used. One is a jug for pouring the water combined with a basin for collecting it afterwards. Jugs and basins were mostly used in the late antique and early medieval times. The other type of set consist of two basins which could be used in the same way. The custom of hand-washing and the sets went through changes depending on time, space and social

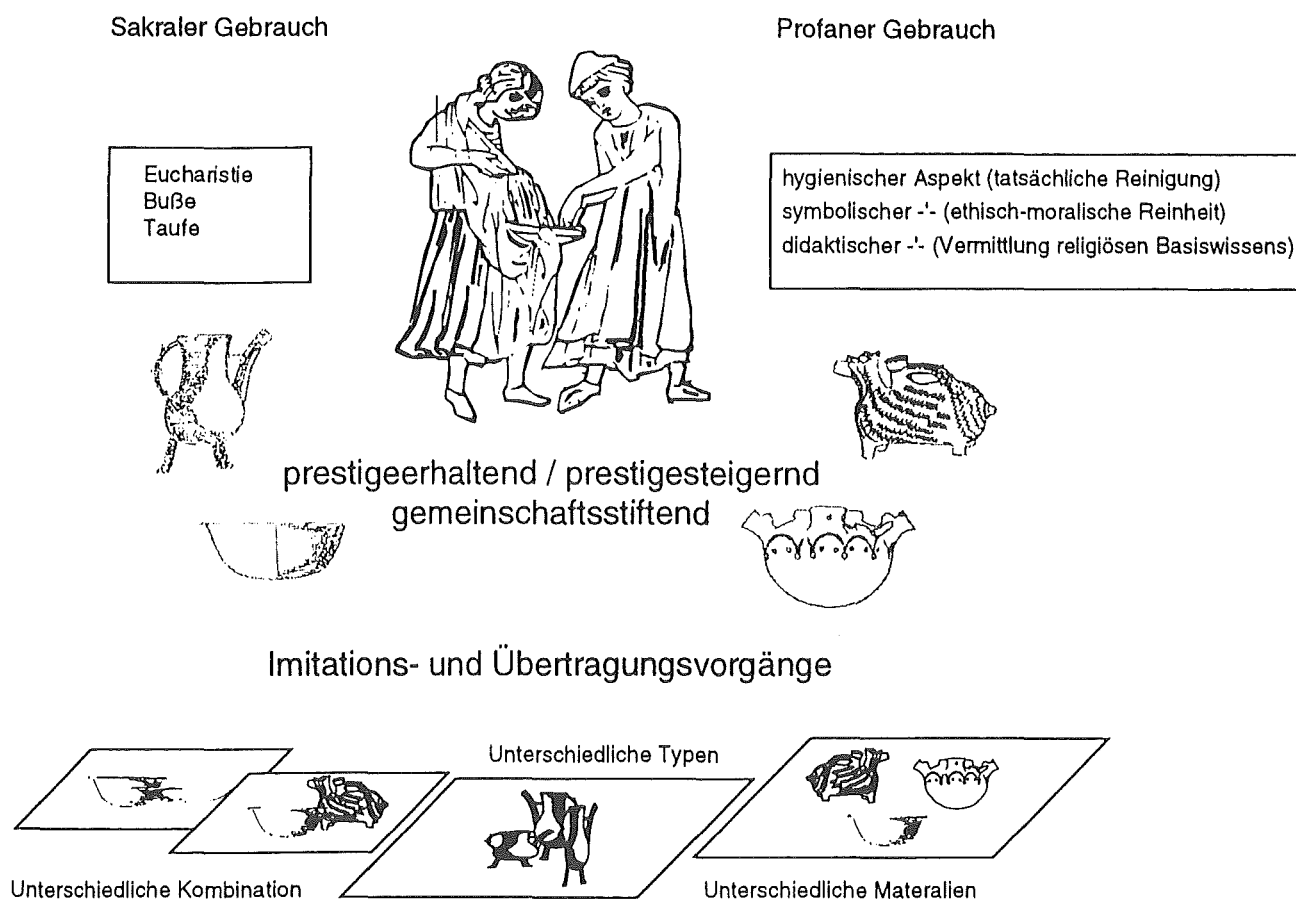


Fig. 6. - Handwashing. Substitution and imitation.

group (Fig. 6). The chronology of metal and ceramic objects does not contradict a sequence leading from metal to pottery or wood. However, new types of hand-washing objects from the 13th century onwards do not only reflect the growing material urban culture. They are not only a reference to new hygienic attitudes. The spreading of hand-washing equipment is part of a process of gradual popularisation of things and customs (Wiegelmann 1994). '... appearing first in higher and/or richer circles, they soon acquire the aura of wealth and status and are then adopted as such by broader groups; at this point, those in higher social circles replace them with other, newer objects and fashions, the older ones eventually losing their status' (Verhaeghe 1991, 55).

There are two possibilities for substitution (Fig. 6): first, objects can be substituted with regard to their material. The cases referred to earlier give some examples of interaction between ceramic and metal objects; other examples were collected by F. Verhaeghe (1991). Interaction does not only occur between ceramics and metal, but also between metal, glass or wood.

Another phenomenon is the competition in function, which can be fulfilled by different objects. Engraved vessels with mythological, Christian or

ethical themes are often used in pairs; aquamaniles combined with basins are rather scarce. Most of the basins are unspecific ceramic basins or metal objects of high value. At first, early aquamaniles might be combined with late engraved bronze vessels. An aquamanile and an engraved vessel found in the rural settlement of Dabrun/D indicate the links between these two groups of hand-washing tools. Lavabos comprise also other objects apart from the hanging cisterns. Lavabo often means a copper-alloy or ceramic ewer that is contemporary with the aquamaniles. Some of the lavabos have inscriptions like 'venez laver' which indicates their primary function. A typical group are three-legged jugs with a pear-shaped body, a long neck and a curved handle (Fig. 5.10). These jugs made of copper-alloy and their ceramic counterparts reflects the recurrent phenomenon of gradual popularisation. These objects could be used multi-functionally, not only for hand-washing, but also for storage or drinking. In some cases, the interaction between metal and ceramic jugs is well documented (Verhaeghe 1991, 46, Fig. 6). In other cases, jugs are made 'only' of high-quality wares like early glazed earthenware or the so-called 'highly decorated earthenware' (Fig. 5.8-9). They would be used in many ways and thus other functions within

the general domestic sphere have to be considered as well. Such ewers were also used to serve extraordinary drinks. The pictorial evidence from the late 13th century onwards confirms the existence of a wide range of such jug-like vessels. Some of them are directly associated with hand-washing. Objects for hand washing are part of a precious table-equipment concerning objects like trays or candle-holders. In this case, the use of innovative techniques (highly decorated; early tin-glazed; slip etc.) emphasizes the meaning of washing-hands in a symbolic and social context. The vessels mentioned here were also used for washing hands for hygienic reasons. According to N. Elias but not in agreement with H.P. Dürr we have to expect an increased hygienic consciousness in the late medieval and early modern times. The value of the metal objects and the aura of wealth also suggest a context of symbolic and high-level social behaviour. It is the demonstration of purity in an ethical and moral sense combined with the attitude of courtly table manners. The occurrence of contemporary ceramic objects reflects the imitation and adaptation of upper class social behaviour by middle class groups which can not be identified more precisely. This imitation also reflects a process of gradual 'popularisation', of social emulation. This aspect is part of a complex phenomenon in medieval society, not particular to hand-washing, but characteristic of striving to achieve courtly table manners in general. Hand-washing was a moment not merely for the display of good manners but also for the display of enviable possessions.

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A Tristram and Iseult Mirror Case from Perth, Scotland

Summary

In the collections of Perth Museum and Art Gallery is a newly recognized mirror-case depicting Tristram and Iseult. Its history is reviewed and arguments presented for its re-identification as a mirror-case, the significance of its iconography and its general cultural significance. This is a provisional statement which we expect to revise after the Medieval Europe Conference, with a view to full publication.

Description

The object has the Perth Museum and Art Gallery accession number 2151 and comprises a single, open-work, outer compartment of a pewter mirror-case. It is oval in shape measuring 54 mm (l) x 46 mm (w) x 5 mm (d), and weighing 15.20 gms. It depicts elements of the Tristram and Iseult legend based upon the tryst beneath the tree and has an accompanying Anglo-Norman inscription. The distorted and broken remains of a hinge and clasp are opposed on the top and bottom edges, partially folded against the body of the case. The back carries the remains of a white deposit.

Discovery and pre-1995 analysis

The mirror-case was discovered in 1921, during construction work in St John's Place - King Edward Street (NGR approx. NO 1184 2359), within the medieval heart of Perth and the focus of the developing burgh. It was presented to Perth Museum and Art Gallery on 5 June 1921 by Mr T McLaren (Burgh Surveyor). The circumstances of its discovery are discussed in more detail below (Dating and duction).

Soon after its discovery (and before 1925?) it was seen by Mr F C Eccles and Mr E MacLagan (Victoria

and Albert Museum) who identified it as a badge or decorative plaque representing the Tristram legend, made in France in the 13th century.

By 1938 Mary Boyle (secretary to the French pre-historian Abbé Breuil) was researching the “*plaque*”. Correspondence indicates she was to publish it as “An Interesting Medallion Found in Perth” but this seems to be no longer extant and there is no record of its publication (see correspondence in PMAG). As part of the work for this, the then Curator of the Museum, Mr J Ritchie took the mirror-case to the British Museum where chemical tests were employed to show its composition as a lead-tin alloy (ie pewter), with no silver content. Mr Ritchie also corresponded with Sir George MacDonald on Mary Boyle's behalf. MacDonald had reported on the Perth Hoard, found 12 months earlier in the same general area as the mirror-case (MacDonald 1921). In a letter of 14 February 1939 Ritchie informs MacDonald that following its discovery the “medal” was given to Balfour Paul, the Lion King of Arms, “to find out something relative to it”, and he in turn submitted it to “French Authorities who decided it was of French origin”. (See correspondence PMAG).

Fresh eyes were brought to bear in the late 1980's when preparatory work for a new exhibition at Perth Museum and Art Gallery led to the opinion of Brian Spencer (then, Museum of London) being sought. He brought the mirror-case to the attention of Dr M Jones, (then Sheffield University) who produced a significant interpretation of its iconography. He identified the characters of King Mark, Tristram, Iseult, Brangain and Tristram's hound Husdent. He made some head-way with the Anglo-Norman inscription, particularly the phrase ME PORTERA DE JOIE (‘Will Bring Me Joy’). In concert with Prof. Claude Buridant (Strasbourg University) he made little sense of the remainder. Dr Jones felt it to be ‘an important piece of Anglo-French (ie made in Britain but in a French speaking milieu) Romance iconography’ (see correspondence 2 March 1989, in PMAG). He doubted it was an item of jewellery and was inclined to accept it as a decorative plaque, but never saw the

actual object. Dr Jones expressed an intention to publish it more fully but he and B Spencer were diverted from further study by the interest of A de Mandach (Switzerland). Mr de Mandach undertook a study of the mirror-case as part of a wider Tristram study and incorporated the work of Spencer and Jones. It awaits publication.

In 1995 work leading to this paper commenced when one of the authors (M. Hall) sought to clarify what was known of the mirror-case and shortly afterwards was approached by Prof. Owen to see 'the Tristram and Iseult plaque' in pursuit of his interest in the Franco-Scottish culture of the 13th century.

Identification as a Mirror Case

Examples of simpler metalwork mirror-cases in the Perth collections (Spencer, forthcoming b.), other published examples (Bayley *et al* 1984; Egan & Pritchard 1991) and discussions with colleagues soon led to its re-identification as a mirror-case. Brian Spencer and Dr Ingeborg Krueger were particularly helpful and brought similar pieces from Billingsgate, London (Spencer forthcoming a.) and Regensburg, Bavaria (Krueger 1995) to our attention. Both mirror-cases depict in a similar but devolved style the same aspects of the Tristram legend as the Perth case and are discussed below (Iconography and Inscription).

Bayley *et al* 1984 (and Bayley 1990) discusses the survival of a white deposit on some mirror-cases, which X-ray Diffraction (XRD) has shown to be calcite (calcium carbonate) ie the remains of the putty used to hold the glass of the mirror-cases in place. Traces of a white deposit are clearly evident on the back of the Perth mirror-case. The National Museums of Scotland kindly agreed to analyse a sample of this, using XRD and X-ray Fluorescence (XRF). The work was carried out by Peter Davidson (Dept. Geology and Zoology). The XRD analysis showed that the pale grey to white efflorescence was a mixture of calcite and quartz (the quartz in diminishing amounts) and the presence of calcite was confirmed by a violent reaction and total dissolution in a small drop of concentrated hydrochloric acid. XRF analysis confirmed the lead-tin alloy composition of the mirror-case and also revealed a small amount of lead (<1%) in the calcite. Could this be contamination from the body of the mirror-case or does it represent a vestigial trace of lead sulphide (galena)? Galena was used as a 'blacking' to improve the appearance of the glass setting (Bayley *et al* 1984; Bayley 1990). The small trace of quartz could either be the remains of whatever 'glass' was used or perhaps contamination picked up from the soil.

Iconography and inscription

The inscription of the Perth mirror-case has two elements: a circumferal inscription and two central bands bearing the names of the key protagonists: above the central zone occurs the name:

W A R C U I S

and below the central zone the names:

T R I S T R E W I S O U D C

In the spelling of these names the T's are represented by reversed J's and the C in Isoudc represents an E. The M's are clearly upside down. These names – Marcus, Tristram and Isoude are all consistent with insular Anglo-Norman forms (Prof. Owen).

The circumferal inscription is somewhat more problematical. Accepting the convention of a cross as the start it seems to commence bottom right and runs:

+ I I R M C P O R J E R A D E I O I E N C [L]
F A U D R A
I E : S U R I E N C M C

Here, a correct J seems to represent a T (in Porjera) and the C's again represent E's.

Prof. Owen translates this as two phrases (separated by). The first is IIR ME PORTERA DE IOIE NE LI FAUDRA. The R and the preceding ll break is problematical. If it were a malformed QI or KI (from the Anglo-Norman form KI or KOR/K'OR – 'the person who now') this would give a grammatical sentence with the meaning 'whoever will carry me of joy there will be no lack to him/her', ie 'the person who carries (wears) me will have no lack of joy.

The second phrase, IE SURIE NE ME, is even more of a puzzle of which no really satisfactory sense can be made – a degree of garbling seems highly likely. IE SURIE could be 'I smile' with typical A-N confusion of verb conjugations. If NE ME could be taken as NE MEN, this would be 'nor lie', making the whole read 'I am smiling nor lying'. An alternative is that IE SURIE could be an Anglo-Norman form from S(e)urer, meaning "I assure (make safe, guarantee, protect)." This would make the NE ME difficult to explain. However, if the word order had been garbled and the R represents a B this would give IE SU BIEN EME, meaning 'I am well loved'. The phraseology is appropriate both if the mirror-case had an amuletic quality (in line with its courtly love imagery) and for a functional mirror, designed and owned to re-assure the vanity of its user when peered into.

The iconography is arranged in three zones upper, middle, and lower, contained by the circumferal inscription and separated by the horizontal inscriptions.

The upper zone is empty due to breakage or, possibly excision. It does contain, along its lower horizontal plain (above WARCUS) vestiges of a design marked out in hatching. The lower zone contains

a hound, facing right, between two pillars, this must be Tristram's hound Husdent (or Petitcru). The central zone contains, on the right, a knight on horseback advancing left, his sword raised. In front of him is a tree/post-like structure probably representing the trunk and a superimposed fountain with laver attached. Beyond this, on the left are three standing figures. On the extreme left two figures stand together in an attitude of conversation, they may be wearing crowns and they wear long cloaks with long, decorated girdles. To their right the third figure wears a slightly shorter garment (close and folded) with a belt rather than a girdle. The figure's left hand is raised and holds what seems to be a goblet.

This clearly represents the tryst scene from the Tristram legend (Loomis R.S. 1938) though not in a conventional manner. It incorporates the earlier episode of the love potion (in the chalice, suggesting the figure is Iseult's maid Brangain) which led indirectly to the tryst. It also shows Tristram (the knight) approaching in a war-like manner (perhaps exhibiting his knightly qualities? perhaps to evoke his earlier heroic victories?). The tree with spring and laver is to be expected, under it Tristram and Iseult meet. The two remaining figures (particularly if crowned) are presumably Mark and Iseult as King and Queen before Iseult attends her clandestine meeting. The one element of the tryst that is missing is King Mark spying on the lovers from the tree's branches. This may be what is missing from the upper zone, and the placing of the name WARCUI above the scene, and those of TRISTREW and ISOUDC below would seem to support this. Was the image deliberately cut out at a later date as it did not sit well with the "lover" who owned the mirror-case? This is by no means certain. The mirror-case does not show Tristram and Iseult actually meeting and so its designer may have thought a spying Mark unnecessary. What does survive of the design in the upper zone certainly does not resemble the branches of a tree. The Perth mirror-case conflates various aspects of the legend in an inventive way, given its confined space. Such an approach is not untypical of Tristram and Iseult art. In his discussion of The Forrer Casket, Loomis, R.S. (1938, p.43-44, figs 19-23 esp. fig 21) points out that this bone basket carved in the early 13th century follows at least three different manuscript traditions of the Tristram legend. The lid of the casket (also see Cherry 1991, plate 75) shows Mark and Iseult in bed after their marriage, with Brangain bringing the remaining love potion. The scene is shown within a Romanesque arch, flanked by two towers. Their open colonnaded lower storey suggests an architectural possibility for the empty upper zone in the Perth mirror-case. What does survive there

could just be the base of such a tower. Something markedly similar can be observed in the Regensburg and Billingsgate cases; (and see Krueger 1, 1995, 231 & n.58, 232, fig.30 & 31). The upper zones of each has three very crude, tower-like structures, consistent with them being later devolved examples. The empty zone would then be an accidental loss not a deliberate excision. This would be entirely consistent with the sorts of blow holes and blockages typical of the intricate moulds used to manufacture such artefacts (pers. comm. Spencer 1996). There remain clear difficulties however. Why towers? (to represent Mark's authority?) and why three? Do the Regensburg and Billingsgate cases accurately represent what may have been in the Perth mirror-case?

Dating and production

In trying to arrive at a date for the mirror-case three avenues present themselves: the archaeological context, the design style and the dating of other mirror-cases. All end, in varying degrees in the 13th century.

The archaeological evidence is at best tentative. It relies on trying to put together the discovery of the mirror-case with the discovery of the Perth Hoard over a 12 month period. Both were recovered from the same construction site in St John's Place - King Edward Street, Perth: The Hoard on August 2, 1920 (see MacDonald 1921) and the mirror-case in June 1921 (notes and correspondence PMAG). For the Hoard, Mr T McLaren (Burgh Surveyor) recorded the precise location as "near the north side of the new building site and immediately to the east of the Guildhall Close, 18 inches below the surface". It comprised well over 1,000 coins (Scottish, English and French) deposited in the late 15th century. The site was long known as Little College Yard and was attached to the medieval Parish Church of St John. Work was continuing on the site 12 months later when the mirror-case was found some 8ft below ground level and adjacent to an enclosed well, this time to the west of Guildhall Close. Throughout the construction period, a good deal of green-glazed pottery as well as some iron tools and charred wood was also discovered. This very tentative stratigraphic relationship (allowing for residuality and a probably complex and deep stratigraphy) between the coin hoard and the mirror-case points to a pre 15th century date for the mirror-case. Any future excavation in this area or the discovery of further archival material may yet throw more light on this aspect.

The Victoria and Albert Museum suggested an early 13th century date for the mirror-case but no

detail of this attribution survives. A fresh examination moves us closer to it.

The costumes of the figures depicted include long, close, folded garments, lengthy girdles, a slightly shorter female (?) dress and a simply attired horse: All are consistent with a 13th century date. Most significant in this respect however is the Tristram figure. He is dressed as a knight of the early to mid 13th century. He has chain mail (including a hauberk) encompassing the whole of his body, wears a flat-topped great helm and carries a small shield and a broad sword. Similar attire can be found depicted in other artistic media which help to confirm this date. Examples include:

- The Chertsey Abbey tile of Richard I charging Saladin, mid 13th century
[Cherry 1991, plate 30 and Eames 1980 - design 468]
- The battle scene from the Maciejowski Bible of c.1250
[f. 10, m. 638 Pierpont Morgan Library as figured in Pierce 1990, plate 13]
- The Crusader Knight from a 12th century wall painting at Arienes Church
[Hallam 1986, 79 top.r.]
- The Effigies of Knights in the Temple Church of St Mary London
[Egan & Pritchard 1991, plate 132]
- The Silver Seal Matrix of Robert Fitzwalter (d.1235)
[Cherry 1991, 1]
- Bronze seal matrix of Finn Gautsson of Mel, Sunnhorland, Bergen, Norway (signatory to the Treaty of Perth 1266)
[Glendinings Auction Catalogue - Ancient, English and World Coins and Historical Medals 2.Oct. 1996. London, No. 490, p. 28, plate VII and cover].
- Three Ivory Chess Knights,
[Cat. 146-8 in Alexander, Binski 1987, 253-254]

The impression of a 13th century date is confirmed if we look at the dating evidence of other metal mirror-cases. The generally accepted view of these is that they were introduced in the mid 13th century (Bayley *et al* 1984; Spencer forthcoming b; Egan & Pritchard 1991). Similarly French ivory mirror-cases, though much more sophisticated do not appear until the 13th century (Koechlin 1924; Mac Gregor 1985, 99, which also makes reference to cheaper composite bone mirror-cases).

The two most direct parallels for the Perth mirror-case – Billingsgate and Regensburg, do not come from closely dated contexts but have suggested dates of the late 13th-14th century (Billingsgate - Spencer

forthcoming a.), and 12th-14th century (Regensburg - Krueger 1995, 231 footnote 58). Krueger (231 & footnote 59) accepts a 13th century date for both on stylistic grounds. Both pieces are neither as complete nor as well executed as the Perth mirror-case and their inscriptions are much more garbled and illegible. It does seem fair to see them as degenerate in comparison to the Perth piece, perhaps influenced by its type and so later in date. There is, of course, the possibility that all three were influenced by a more precious example/examples in circulation.

In looking at the production of the mirror-case several lines of enquiry open up. It is, as stated above, composed of a lead-tin alloy and was clearly cast in a mould typical of the sort used for lead pilgrim badges (for example Spencer 1990 and 1987 Cat.451).

The Perth mirror-case displays a striking similarity with start and break conventions and abbreviations typical of those used by engravers of seals and coin dies. This argues for the involvement of a skilled craftsman, even accepting some degree of illiteracy (see below). Other aspects of the production (For example a ghost A in WARCUIIS, perhaps due to a modification of the mould in an attempt to improve the spacing of the letters) perhaps suggest the hand of an apprentice. If the upper zone is absent due to a casting fault then there clearly were problems with the piece, at least intermittently. At this stage we do not know enough to say whether this is an earlier prototype discarded or one that did go into production. The latter does seem most likely, after all the casting fault could have been such that it made the piece weak resulting in the dropping out of the upper zone during use rather than in production.

Can we deduce anything of its place of origin from its production. Could it have been made in Perth itself? Or was it made elsewhere in Britain or on the Continent? The Anglo-French inscription is taken as strongly indicative of an insular origin but of course craftsmen, like their skills were international [Campbell 1991, 130, and Stevenson 1988]. It seems then appropriate to review what we know of metal-working in Perth.

To date there is no direct evidence from Perth for the working of pewter, though there is plentiful evidence for the working of most other metals – including gold and silver – and the moulds from the High Street excavation (1975-77) for casting copper alloy trinkets are of the type that could have been used for the mirror-case (Holdsworth 1987, 157-158; Spearman 1988, 134-147, esp. 144-145 and references; Bogden forthcoming). The operation of a variety of metal working crafts is supported by documentary references in the late 12th-early 13th century. They include, Henry the Bald, a goldsmith (Scone Liber,

No 82, 86, 45; Duncan 1973, 40, 46) Baldwin the Lorimer a Fleming (RSSi, No 121; Duncan 1973, 37) and William the helmet-maker (RRSii, 471-2). In addition, well over 1,000 metal artefacts have been recovered from Perth excavation sites. Whilst some were clearly not made in Perth – eg pilgrim badges of St Thomas, of Canterbury, Our Lady of Walsingham and St John the Baptist at Amiens – many others were. It would be very surprising if the ability to work pewter were the only craft absent from Perth. In the 12th and 13th centuries Perth underwent an economic boom as one of Scotland's leading burghs and it contained a large number of flourishing industries, providing finished goods for local consumption and export (Yeoman 1995, 69-84). In addition it enjoyed a good deal of Royal and ecclesiastical patronage (Duncan 1973 and Duncan 1975, 467-471, 475-477; and Anderson 1922, 138). Given the large number of wealthy burgesses and the constant comings and goings of high ranking members of society there is clearly a market for a wide range of products across all social classes. In addition in Scotland generally there was a plentiful supply of the basic raw material – lead, eg from Siller Holes, West Linton, Lothian. Clearly, Perth had the craft potential to produce the mirror-case.

Clearly it can not, as yet, be conclusively proved that the Perth mirror-case was made in Perth, though it's Anglo-Norman inscription argues for production in Britain. However, running counter to this argument is the picture developed so far in the wider study of pewter and copper alloy mirror-cases. Bayley *et al* (1984) (followed by eg Allason-Jones *et al* 1986 and Spencer 1992), looks at the distribution of mirror-cases in Britain (including a number of identical punch decorated types, in gun metal, one of them found in Perth – see also Spencer forthcoming, b) and suggests that the common traits displayed indicates their possible production at the same workshop in the Low Countries or SE England, in the 13th century. Bayley and Spencer detail a significant amount of evidence to indicate the general availability of mirror-cases from the mid 13th century. A number of illuminated manuscripts and written records indicate Continental usage and production, particularly in France and Flanders. (Krueger 1990) pushes the dates for the production of mirror-glass (not necessarily mirror-cases) back into the 12th century and adds Germany as a manufacturing centre). The conclusion of Bayley and Spencer is that into the early 14th century the growing popularity of mirror-cases was sustained by imports. Thus, a ship's cargo from the Low Countries arriving in London in 1384 included 1,000 mirrors. Egan and Pritchard (1991, 365) support this and indicate that the production of mirrors itself (by

'mirrorers') is not visible in the written record until the 14th century. Biddle and Hinton (1990, 654) note a record of commodities from Bruges on route to London being confiscated at Sluis in 1371, including two tuns (4,480lbs) of mirrors. Perth's position in an extensive trading network (Stevenson 1988, Ditchburn 1988 and Yeoman 1995) would clearly support this line of argument.

The final aspect of production to be discussed here is the level of literacy displayed. Engravers, either seal-makers or goldsmiths are known to have worked across a variety of media if inscriptions needed to be cut. If such a skilled craftsman had produced the Perth mirror-case could we have expected a more intelligible inscription?

All three Tristram and Iseult mirror-cases exhibit varying levels of illiteracy. Callander (1924, 105) in his discussion of inscribed jewellery of the 14th century in Scotland, notes 'That the engravers of these inscriptions were quite illiterate craftsmen is evident, as it is very seldom that all the words are correctly spelt. Inverted and contorted letters and mis-spelt and reversed words are of frequent occurrence.' It is tempting to expect cheaply and, mass produced items such as these mirror-cases to automatically exhibit the illiteracy of their makers. But at this time illiteracy was applicable across all levels of society (Clanchy 1993, 224 ff). Craftsmen in lead and pewter like other craftsmen (eg seal makers see Heslop 1987, 114-117) were capable of working across a whole range of products – in lead from pilgrim badges to the likes of the Ludgvan Crucifix (Stratford 1984, 245). This was a world aware of the importance of words regardless of individual literacy. In this Christianity was a key influence (from the Prologue of St John's Gospel we have 'In the beginning was the Word the Word was the true light ... the Word was made flesh ... ' see Jones (1968). But the Word went hand-in-hand with the image, each authenticating the other. Where the two are combined we have both the words and the image of these words "made flesh". (See also Camille 1987, 34-35). Such mirror-cases could have been made and owned by literate and illiterate alike: For both they would have carried this double, reinforcing message.

The Culture of Romance

The final aspect of the Perth mirror-case to discuss here, is the illumination it offers on the extent of Franco-Scottish culture in the 13th century. Romances (from the French *roman*, 'vernacular') were essentially tales of love and chivalry, which came to be preferred to the feudal epic. Tristram and Iseult,

whose story was loosely linked to the Arthurian cycle, became recognized as ideal lovers. The popularity of their story ensured their depiction on a wide variety of artefacts, including bone and ivory caskets and mirror-cases, misericords, embroideries, tiles, wall paintings, manuscripts and metalwork (many are discussed in Loomis 1938). The earliest surviving Tristram romance, in French showing Anglo-Norman features, is believed to be the incomplete version by Thomas, who probably composed it in England in c.1160. French romances are known to have circulated in Scotland, and one, the Romance of Fergus (a play on the Grail legend by 'Guillaume le Clerk' may have been produced by Bishop Malveisin of Saint Andrews for William the Lion's entourage (see Owen 1991, intro.). It survives in two northern French manuscripts and a Dutch translation.

The genesis of the Tristram legend can be traced to myths woven around the name of an eighth-century Pictish King, (Drostan) though it was developed largely in Wales and Cornwall. It found fertile soil in Perthshire in the 12th century and surviving documents indicate a possible Tristram "cult". Gilbert, Earl of Strathearn (1171-1223) had his foundation charter (dated 1200) for Inchaffray Abbey witnessed by one Tristram, Laird of Gorthy, one of whose sons was also Tristram. The Earl of Strathearn's first wife was French (Matilda, daughter of William de Abigni, Count of Abermarle) and it has been suggested that Tristram may have reached Strathearn in her train. The Earl's second wife, whom he married about 1210, was named Yseult and was the sister of two Norman Knights in the earldom (see Duncan 1975, 447-452, and Ritchie 1952, 16.1).

Whilst it seems unlikely that there is any proveable, tangible connection between the Strathearn Tristrams' and the Perth mirror-case, they were operating in a shared cultural milieu. Whilst the dating is feasible, the status of the Strathearn Tristrams perhaps argues against them possessing such cheaply made pewter items. Sumptuary Laws in England and in Scotland indicate that by the mid to late 14th century the wearing of jewellery was a matter of rank (Cherry 1987, 177; Strachy *et al* 1767-1832; Luders *et al*, 1810-1828; General 1875). Whilst the Perth mirror-case is not strictly jewellery it obviously has a parallel function and nobility seem more likely to have used the more sophisticated ivory mirror-cases (some of which also depicted Tristram designs). We should also remember that though made of pewter, as a mirror-case it is more of a status object than say a simple badge or pilgrim souvenir. There is, of course, the possibility of the retinue of such nobility possessing such mirror-cases. The real importance of the "Strathearn Tristrams" and the Perth mirror-case

being in Perthshire in the same broad time frame is in illustrating how romance imagery permeated across social ranks. The Perth mirror-case shows that imagery penetrated the lower social orders and became part of popular iconography. Both show that 12th-13th century Scotland was no cultural backwater but vibrantly in tune with European cultural tastes.

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Cencelle. Materiale ceramici da una città medievale¹

Le campagne di scavo svolte negli anni 1994-96² nel sito della città altomedievale e medievale di Cencelle (VT), hanno fino al momento messo in luce, stando a quanto emerso dallo studio dei materiali ceramici appena iniziato, le fasi della sua vita più tarda. La città, fondata da papa Leone IV nell'854 per gli abitanti di *Centumcellae*, l'attuale Civitavecchia, divenuta poco sicura a causa delle incursioni saracene, venne infatti abbandonata prima del 1416, quando è menzionata tra le terre disabitate del Patrimonio di S. Pietro³. La ceramica proveniente dai settori I e II ha restituito un quadro delle produzioni utilizzate a Cencelle abbastanza vasto tipologicamente e che sembra abbracciare tutto l'arco di tempo in cui fu attiva la città e anche oltre.

I Le ceramiche con rivestimento piombifero e il lustro metallico

La presenza di alcuni frammenti di ceramica a vetrina pesante, da attribuirsi probabilmente alla produzione di IX-X sec., costituisce l'attestazione più vicina cronologicamente al momento della fondazione. Si tratta di frammenti abbastanza minuti di forme chiuse, nei quali non è presente la decorazione applicata, caratterizzati da impasto di colore grigio, con vetrina verde oliva ricca di inclusi, nel

caso del frammento di orlo con attacco di ansa (Fig. 1: 1), e da vetrina di tonalità più chiara e con minore quantità di inclusi, nel caso dei frammenti di fondo a base piana⁴.

Ancora ad una forma attestata nella *Forum Ware* della metà del X sec.⁵ riconduce il frammento di lucerna a vasca aperta (Fig. 1: 2), anche se l'impasto beige e la vetrina interna verde, spessa e con sporadica presenza di inclusi, sembrano avvicinarla piuttosto alla invetriata monocroma verde, di produzione sia laziale che non, ampiamente diffusa a Roma nel XII e XIII sec.⁶. L'evoluzione dell'uso di quest'ultima tecnica nel Lazio può essere seguita a Cencelle, vista la presenza, anche delle forme aperte (bacini) coperte da vetrina monocroma di colore verde brillante presente all'interno e all'esterno del vaso; l'impasto è anche in questo caso di colore beige (Fig. 1: 3). Sono infatti i bacini di alcune chiese di Roma, quali S. Croce in Gerusalemme, S. Maria Maggiore e SS. Giovanni e Paolo, a costituire, alla metà del XII sec., le prime attestazioni di questa classe⁷.

Scarsamente attestata fino ad ora è la graffita arcaica "tirrenica": un frammento di catino ad impasto crema, polveroso, con inclusi medi e molti vacuoli, su piede ad anello (Fig. 1: 4), presenta il fondo del cavetto decorato da un fiore a quattro petali ovali e allungati inscritto probabilmente in un rombo, come

¹ Sono a cura di Maria Isabella Marchetti i capitoli I. *Le ceramiche con rivestimento piombifero e il lustro metallico* e II. *La maiolica arcaica*, di Francesca Romana Stasolla i capitoli III. *La ceramica comune* e IV. *La ceramica da cucina*. I disegni, dove non altrimenti indicato, sono delle autrici.

² Le indagini si svolgono nell'ambito del progetto di ricerca Leopoli-Cencelle, diretto da L. Ermini Pani, che vede la convenzione tra la Cattedra di Archeologia Medievale della Facoltà di Lettere e Filosofia dell'Università degli Studi di Roma "La Sapienza" e l'École Française de Rome, Université de Paris X - Nanterre, nella persona di Françoise Bougard, e la partecipazione della Cattedra di Storia dell'Urbanistica, Università "La Sapienza" di Roma, della Cattedra di Archeologia Medievale, Università di Chieti "G. D'Annunzio", delle Cattedre di Archeologia Medievale e di Analisi Merceologica, Università della Tuscia (Viterbo), delle Cattedre di Lotta alle Malerbe e di

Scienze Forestali, Facoltà di Agraria, Università della Tuscia.

³ Per le notizie storiche si veda da ultimo Ermini Pani 1996, 7.

⁴ Le presenze di questo tipo di ceramica a Cencelle erano state rilevate in raccolte di superficie (Coccia 1986, 40-42) in base alle quali il sito è stato inserito nelle carte di distribuzione della vetrina pesante nel Lazio tra tardo VIII e tardo X sec. (*Ceramica invetriata* 1992, 419 e 420, fig. 1); sulla più recente periodizzazione della classe si veda Mazzucato 1993 e Mazzucato 1995.

⁵ Ci si riferisce al pezzo rinvenuto alla Crypta Balbi (*Ceramica invetriata* 1992, 390-91, fig. 24, n. 31); stessa forma ha anche la lucerna dal *castrum* tardoantico di S. Antonio di Perti nel Finale (SA), nel quale la vetrina è a macchie e di colore bruno-giallastro scuro (*ibid.*, 79).

⁶ Lucerne con questo tipo di rivestimento in *Crypta* 3, 224-34.

⁷ Whitehouse 1967, 55-56.

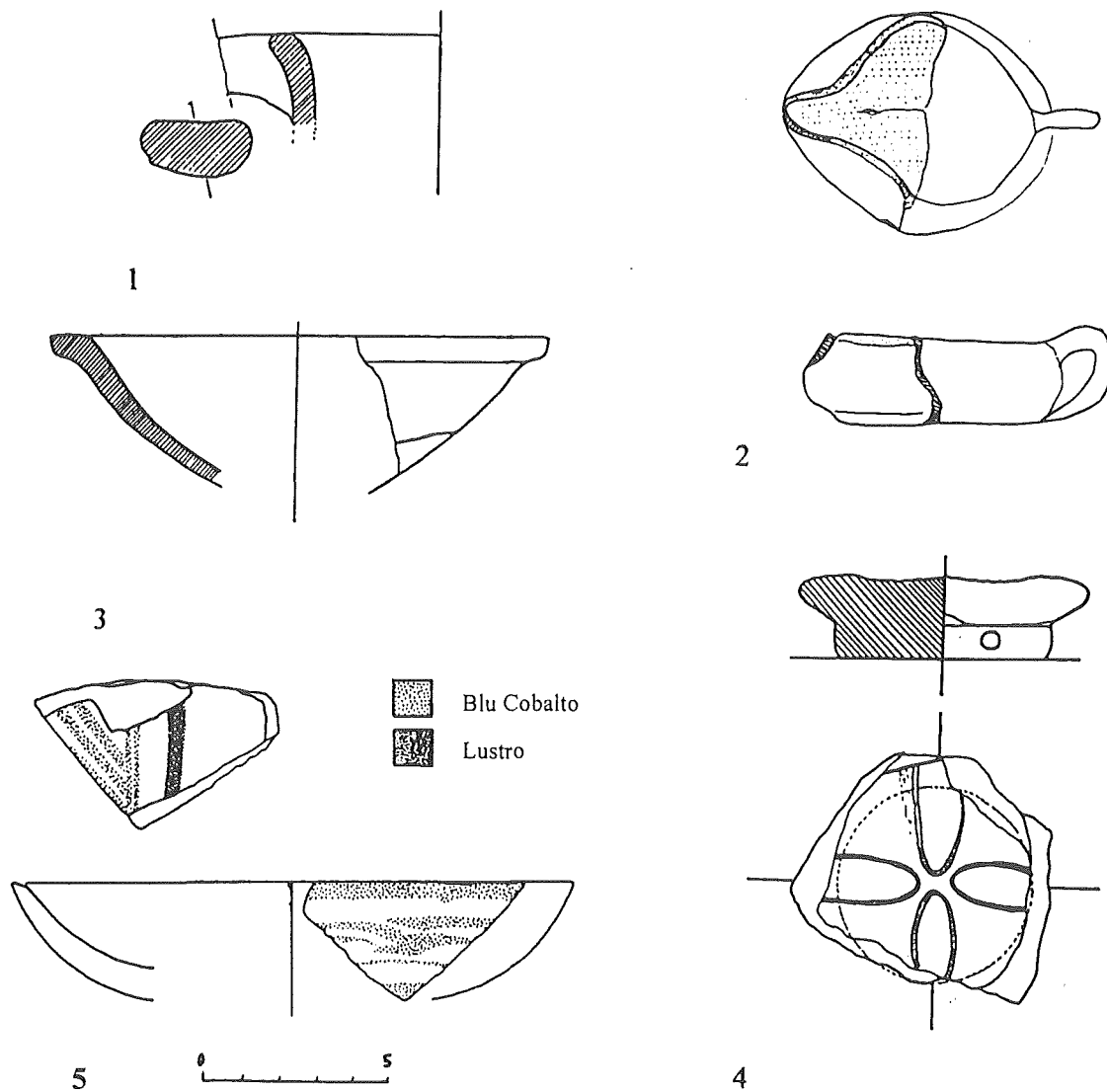


Fig. 1. - Ceramiche con rivestimento piombifero e il lustro metallico. 5 (dis. di Giovanna Cristiano).

avviene nel caso del bacino ancora *in situ* nella chiesa di S. Anastasio (Lucca), datato al XIII sec.⁸. Come quello lucchese il frammento da Cencelle va probabilmente ricondotto all'area produttiva savonese di questa classe: confronti stringenti si trovano infatti tra il materiale proveniente dal S. Domenico vecchio al Priamàr⁹.

Seppur sporadiche, vi sono attestazioni di lustro metallico di probabile produzione catalana, oltre ai frammenti di una ciotola ad impasto duro, di colore arancio rosato, decorata all'interno da raggi blu che suddividono campi decorati a lustro, sul fondo da smalto bianco. Si tratta in questo caso del motivo decorativo ritenuto relativo alla prima fase evolutiva

della ceramica cosiddetta tipo Pula (Fig. 1: 5). La presenza di questa classe di produzione valenzana è ampiamente attestata in Italia a partire dalla metà del XIV sec.¹⁰ e per tutto il XV sec., ma il pezzo da Cencelle trova raffronto proprio nei bacini di S. Maria Novella a Marti (Pisa) del 1330, che costituiscono per il momento la più antica attestazione del tipo, anche rispetto a quelli dell'Ospedale vecchio di S. Giovanni a Roma, del 1348¹¹.

Fino qui le classi con attestazioni quantitativamente "minori" e quindi meno rilevanti sia dal punto di vista della storicizzazione dello scavo che da quello della valutazione complessiva sulla circolazione ed utilizzazione della ceramica a Cencelle. Nonostante l'esiguità del materiale fino ad ora recuperato, dovuta in qualche caso anche al fatto che si tratta di materiale per ora residuo, sembra comunque utile poter rilevare la varietà delle classi attestata secondo quanto avviene in altri centri coevi del Lazio tra i quali spicca naturalmente Roma.

⁸ Berti & Cappelli 1994, 154-155, fig. 124, tav. 28, gruppo IV.

⁹ Lavagna & Varaldo 1986, figg. alle pp. 127 e 129.

¹⁰ Lerma *et al.* 1986, 199, fig. 15.

¹¹ Berti & Tongiorgi 1985, 13-22, tav. II, 4, fig. 1, 4.

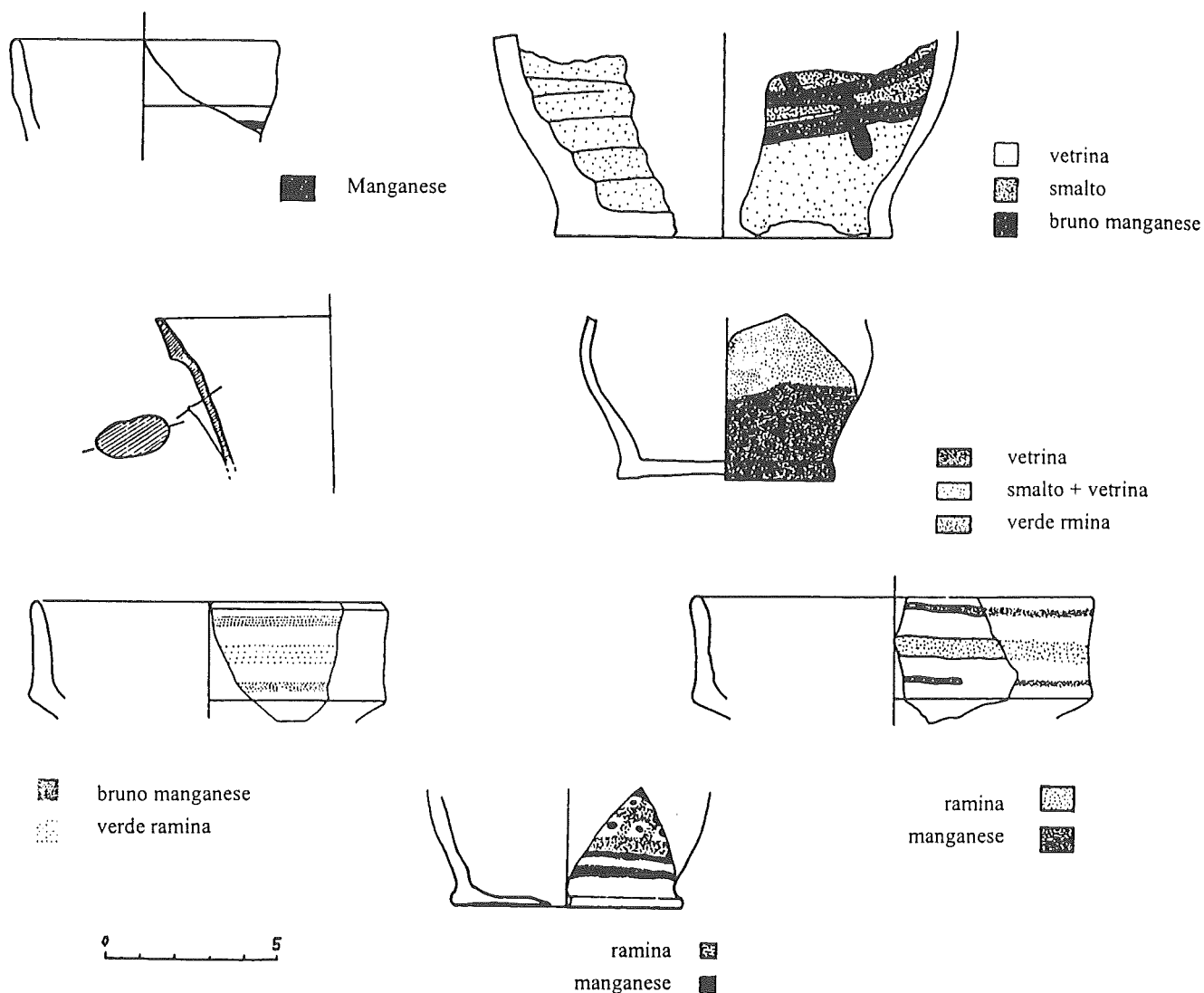


Fig. 2. - Maiolica arcaica. 1, 7: dis. di Francesca Granone; 2: dis. di Liliana D'Ona; 3: dis. di Francesca Romana de Angelis; 5: dis. de Giacomo Consoli; 6: dis. di Daniela Carlini.

II La maiolica arcaica

Per quanto riguarda invece le classi ceramiche "datanti" delle fasi in corso di scavo, sicuramente il ruolo principale spetta alla maiolica arcaica¹², presente a Cencelle con una discreta varietà di forme e motivi decorativi, che sembra al momento rimanere, per la maggior parte, cronologicamente circoscritta nell'ambito della prima metà del XIV sec.¹³. Le caratteristiche morfologiche dei manufatti presentano alcuni elementi abbastanza costanti, quali gli impasti in genere duri, non ben depurati, di colore variabile dall'avorio, al beige, al rosa pallido. Il colore dello smalto è per lo più bianco-grigiastro, la

sua superficie liscia, è spesso e nella maggioranza dei casi opaco. L'interno delle forme chiuse e la quasi totalità dei piedi e dei fondi, sono ricoperti da vetrina sottile e poco coprente, alle volte mal distribuita, di colore variabile dal marrone chiaro al giallo ocre. La decorazione è in verde ramina e bruno manganese. Se l'ambito cronologico di riferimento sembra essere abbastanza circoscritto altrettanto può dirsi quello culturale di sviluppo e diffusione: proprio le caratteristiche morfologiche qui notate come costanti del materiale di Cencelle sembrano richiamare maggiormente, insieme alla tipologia delle forme, le produzioni di Tuscania, anche se non sono certo mancati i rapporti con altri centri dell'Alto Lazio.

¹² La schedatura preliminare di questa classe è svolta nell'ambito di un seminario annuale dagli studenti dell'insegnamento di Archeologia Medievale dell'Università degli Studi di Roma "La

Sapienza", ai quali si deve parte della documentazione grafica.

¹³ Una preliminare presentazione di questo materiale è stata fatta da chi scrive in Marchetti in c.s.

LE FORME

Boccali

Il rinvenimento di una notevole quantità di orli a fascia trilobati, su alto collo leggermente svasato (Fig. 2: 1) fa ritenere che questo tipo di boccale fosse molto diffuso; sono inoltre frequenti anche gli alti piedi svasati, non rivestiti da smalto, ma da vetrina, in genere abbastanza sottile e poco coprente, di colore marrone chiaro od ocra. Si tratta di una forma che a Roma venne prodotta fino alla metà del XIV sec. circa e che non sembra aver avuto una diffusione omogenea nell'Alto Lazio¹⁴. Sono pure attestati i piedi meno svasati su base piana, accomunati ai precedenti dalle stesse caratteristiche morfologiche (Fig. 2: 2-3).

Elemento comune con le forme attestate a Tuscania¹⁵ è costituito invece dal boccale con corpo a doppio tronco di cono e fascia cilindrica centrale. Per questa forma, nota anche a Viterbo e a Roma la cronologia rimane oscillante tra la prima e la seconda metà del XIV sec.¹⁶

Rara è l'attestazione di corpi globulari schiacciati, come quello forse pertinente ad un boccale del cosiddetto tipo orvietano, con becco "a pellicano", della seconda metà del XIV sec.¹⁷

Tazze

Sono attestate infine le piccole tazze biansate con parete leggermente svasata, orlo a fascia, una o due anse e base piana note con varianti in area altolaziale nella prima metà del XIV sec., a Tuscania, Roma, ma anche in Toscana¹⁸ (Fig. 2: 4-5).

Ciotole tipo Agnus Dei

Tra le forme aperte sembra prevalere quella della piccola ciotola biansata, a parete carenata, su piede a disco con base piana, anse sono per lo più a sezione ovale, a volte schiacciata (Fig. 2: 6-7). Si tratta del tipo cosiddetto *Agnus Dei*, forma che, attestata a Cencelle in diverse varianti, sembra presentare le caratteristiche della sua ampia produzione di XIV sec.¹⁹: nell'area laziale è infatti largamente documentata, sia con il motivo decorativo da cui prende nome che con molti altri²⁰.

Ciotole carenate

Abbastanza consistente risulta anche la presenza delle ciotole a corpo carenato, con orlo appiattito superiormente, ampiamente attestate, nell'area altolaziale²¹ (Fig. 3: 1).

Scodelle

L'unico esemplare fino ad ora documentato di scodella ha impasto duro, mal depurato, di colore beige; lo smalto, interno ed esterno, non si discosta per il colore e l'opacità dal resto del materiale di Cencelle; la scodella presenta una larga tesa con bordo pronunciato e rivolto verso il basso. Anche in questo caso un confronto, sebbene non puntuale, proviene da Tuscania, in una scodella su piede a disco della seconda metà del XIV sec.²²

I MOTIVI DECORATIVI

Sequenze periferiche

- Il motivo decorativo più frequente sia sui boccali che nelle forme aperte, in entrambi i casi situato sotto l'orlo, è costituito dalla treccia o catena in verde ramina, talvolta semplificato nella semplice linea ondulata (Fig. 3: a-b). Questo tipo di sequenza è caratteristica della maiolica arcaica ed ha perciò una diffusione sovraregionale molto estesa, a partire dal XIII sec. o poco dopo²³.

- Sul corpo dei boccali, il motivo principale è delimitato da fasce a tre linee parallele verticali, campite di tratti obliqui o a V, rese in bruno manganeso (Fig. 3: c-d). Anche in questo caso si tratta di un decoro largamente diffuso e standardizzato²⁴.

- Il motivo delle V, campite in bruno e disposte orizzontalmente compare nella parete esterna delle ciotole carenate (Fig. 3: e), mentre quelle di tipo *Agnus Dei* presentano la fascia esterna per lo più decorata da una semplice linea in verde orizzontale, oppure da due linee in bruno ed una verde al centro (Fig. 2: 6-7); più raro sembra il motivo che alterna il reticolo alle linee verticali (Fig. 3: f).

- Sulle tese delle forme aperte ricorre costantemente la successione di tratti radiali o obliqui resi

¹⁴ Si veda il caso di Tuscania (Romei 1994, 86-87).

¹⁵ Romei 1994, 87 e 92, fig. 3, 5.

¹⁶ Mazza 1983, 78, n. 95 (seconda metà XIV sec.); *Crypta* 3, 264, n. 261; Ricci Portoghesi 1972, fig. 5, 24; Luzi & Romagnoli 1981, 49, c/9 (prima metà XIV sec.).

¹⁷ Romei 1994, fig. 3, 6.

¹⁸ Mazza 1983, 42-43, nn. 42-45; Ricci Portoghesi 1972, tav. 6, 17; *Crypta* 3, 259, n. 244, tav. 24.

¹⁹ Per l'analisi sull'evoluzione di questa forma nel Quattrocento si veda Mazzucato 1982.

²⁰ A Tuscania nella seconda metà del XIV sec. (Romei 1994, 87, fig. 6, n. 19; presso Farnese (VT) tra la seconda metà del XIV sec. e gli inizi del XV sec. (Frazzoni & Vatta 1995, 107, fig. 1, nn. 1-2).

²¹ Frazzoni & Vatta 1995, 107, n. 3, fig. 1, n. 3, fig. 4, n. 12; Ricci Portoghesi 1972, fig. 6, n. 35.

²² Romei 1994, 92, fig. 7, 35.

²³ Si veda ad es. per Lucca Berti & Cappelli 1994, 217, tav. 40, 9a 3; per la Toscana Vannini 1990, 61, tavv. XXXV-XXXVI.

²⁴ Per la classificazione Berti & Cappelli 1994, 218, tav. 41, 1b.

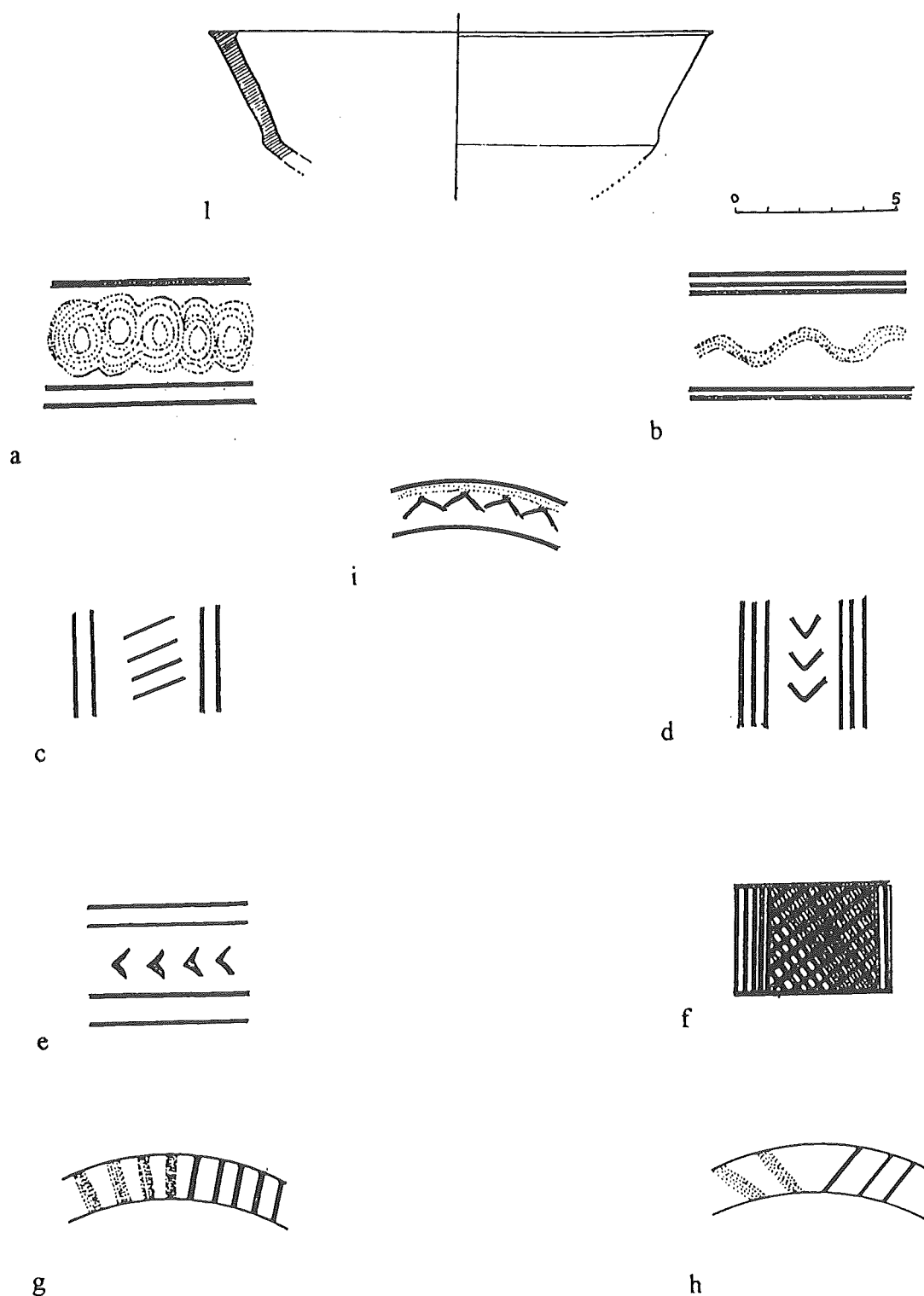


Fig. 3. - 1: Ciotole carenate; a-i: motivi decorativi.

alternativamente a gruppi in bruno e verde²⁵, come avviene del resto negli esemplari laziali di questo tipo di forma (Fig. 3: g-h).

- Compare per il momento soltanto nella tesa della scodella la fascia di linee spezzate resa in bruno (Fig. 3: i). Questa sequenza, pur non sembrando diffusa quanto le precedenti, compare nell'area altolaziale a delimitare il motivo principale sul fondo del cavetto di una ciotola della prima metà del XIV sec.²⁶.

Motivi principali

- La decorazione del corpo delle forme chiuse presenta una discreta varietà di motivi da quelli lineari in obliquo che alternano il verde al bruno, a

²⁵ Corrispondenti al tipo 1 in Berti & Cappelli 1994, 216, tav. 39, 1a 1-1a 2.

²⁶ Mazza 1983, 50, n. 56.

quelli vegetali, a quelli geometrici: oltre ai piccoli rombi in bruno, campiti in verde, vi è il rombo con fiore a quattro petali in verde (Fig. 4: a); questo tipo di motivo, con varianti, è attestato anche a Roma²⁷.

- Un frammento di parete documenta la decorazione a retino verde con piccole "croci" centrali in bruno (Fig. 4: b): questo motivo ha confronti abbastanza vicini Tarquinia, Tuscania e Viterbo, anche se è noto fuori dell'area altolaziale²⁸.

- In più di un esemplare di ciotola biansata, anche se frammentario, è attestato il motivo eponimo dell'*Agnus Dei* (Fig. 4: c). Questo tema iconografico è ampiamente noto infatti su questo tipo di forma, ma anche sulle forme chiuse, nella prima metà del XIV sec., nell'area altolaziale a Viterbo²⁹ e a Tuscania³⁰, ma anche ad Orvieto³¹.

- Accanto a questo tema, ma sempre a carattere religioso, è quello dei simboli della Passione, cosiddetto Golgota (Fig. 4: d). La produzione di questa tipologia è attestata nelle stesse aree della precedente, più o meno con la stessa frequenza³², con un attardamento fino alla seconda metà del XIV sec. ad Orvieto³³.

- Il cavetto delle forme aperte, ed in particolare di queste ciotole, presenta una grande varietà di motivi: decorazione a graticcio a larghe maglie in bruno con verde di fondo; fondo a retino in bruno con pennellate in verde; retino che campisce il tondo in verde sul fondo del cavetto, che è già attestato nella zona di Civitavecchia³⁴; motivo del fiore a petali campiti in modo alternato a retino e con il verde, noto in due esemplari di area orvietana³⁵ (Fig. 4: e-f).

- Il motivo del nodo, assai diffuso nel Medioevo³⁶, compare a Cencelle sia sulle piccole ciotole fino ad ora esaminate, che su forme aperte di maggiori dimensioni, dove meglio si apprezza l'uso del retino come fondo del motivo principale allo scopo di evidenziarlo meglio (Fig. 4: g).

- Sempre su forme aperte è la decorazione radiale in bruno e verde, simile a quella diffusa anche in Toscana³⁷, nel quale si ritrova ancora il retino di fondo.

Infine, lo scavo di Cencelle, nell'ambito delle produzioni ceramiche con rivestimento ha restituito una, seppur modesta, quantità di graffita a stecca e a

punta, sotto vetrina verde³⁸. In questo caso l'interesse risiede soprattutto nel dato cronologico offerto da questa classe che sembra travalicare di molto il limite del XIV sec., desunto dalle fonti e confermato fino ad ora dai manufatti ceramici, per la vita dell'abitato.

Maria Isabella Marchetti

III La ceramica comune

Il panorama della ceramica di uso comune – che compare a Cencelle in modo piuttosto costante nella stratigrafia dei settori I e II – si caratterizza per la massiccia presenza di manufatti rivestiti da semplice engobbio, con superficie talora lucidata o schiarita³⁹. All'interno di questa relativa omogeneità per quanto riguarda impasti e modalità di lavorazione, è comunque possibile operare una scansione su basi funzionale e tipologica per questo materiale che cronologicamente sembra porsi tra IX e XIV sec., anche se il contesto stratigrafico autorizza a considerare i reperti più antichi come residui. Le datazioni presentate sono al momento ricavate dall'esame morfologico dei recipienti, visto che non è stato possibile ancora stabilire una connessione di contemporaneità tra manufatti e strati di vita della città: il materiale presentato proviene cioè sostanzialmente da stratigrafie di interro o di frequentazione molto tarda, ben successiva al periodo d'uso dei recipienti ceramici esaminati. La maggior parte del materiale esaminato presenta un impasto compatto, abbastanza ben depurato ed in genere piuttosto sottile in rapporto alle dimensioni generali dei manufatti, con un colore che va dal crema all'arancio rosato più o meno intenso, spesso con evidenti intenzioni di schiarimento delle superfici.

Alle prime fasi di occupazione della città vanno riconnessi pochi pezzi, residui rispetto alla stratigrafia fino ad ora indagata, riferentisi comunque della fase iniziale della vita di Leopoli: sono frammenti di orlo di forme chiuse in ceramica acroma, per lo più brocche o anforette, che trovano confronti nell'ambito dei materiali di fine VIII, IX e X sec. Si

²⁷ *Crypta* 3, 268, tipo 1, fig. 88 1c.

²⁸ Ad es. Pisa, gruppo VIb (Berti & Cappelli 1994, 220, tav. 45, b3, l).

²⁹ Mazza 1983, 53, n. 61.

³⁰ Ricci Portoghesi 1972, fig. 1, 2.

³¹ Satolli 1995, 82, n. 41.

³² Mazza 1983, 80, n. 99; Luzi & Romualdi 1992, 221; Raspi Serra 1980, 280-81, n. 6, tav. LXII f; *La ceramica orvietana* 1985, 82, n. 49.

³³ Satolli 1995, III, n. 3.

³⁴ Un esemplare integro è attualmente esposto nel Museo di Civitavecchia; un altro proveniente dal ducato di Castro in Luzi & Romualdi 1981, 50, C/11 (metà del XIV sec.).

³⁵ *Ceramica orvietana* 1985, 83, nn. 54 e 71 (metà del XIV sec.).

³⁶ *Crypta* 3, 269, 2a; Ricci Portoghesi 1972, fig. 1, 9; Mazza 1983, 59, n. 69.

³⁷ Berti & Cappelli, 1994, 260, tav. 69, a4.

³⁸ Per questi materiali si veda De Minicis & Marchetti 1996, 83.

³⁹ Per una più estesa presentazione di questo materiale si veda Stasolla in c.s.

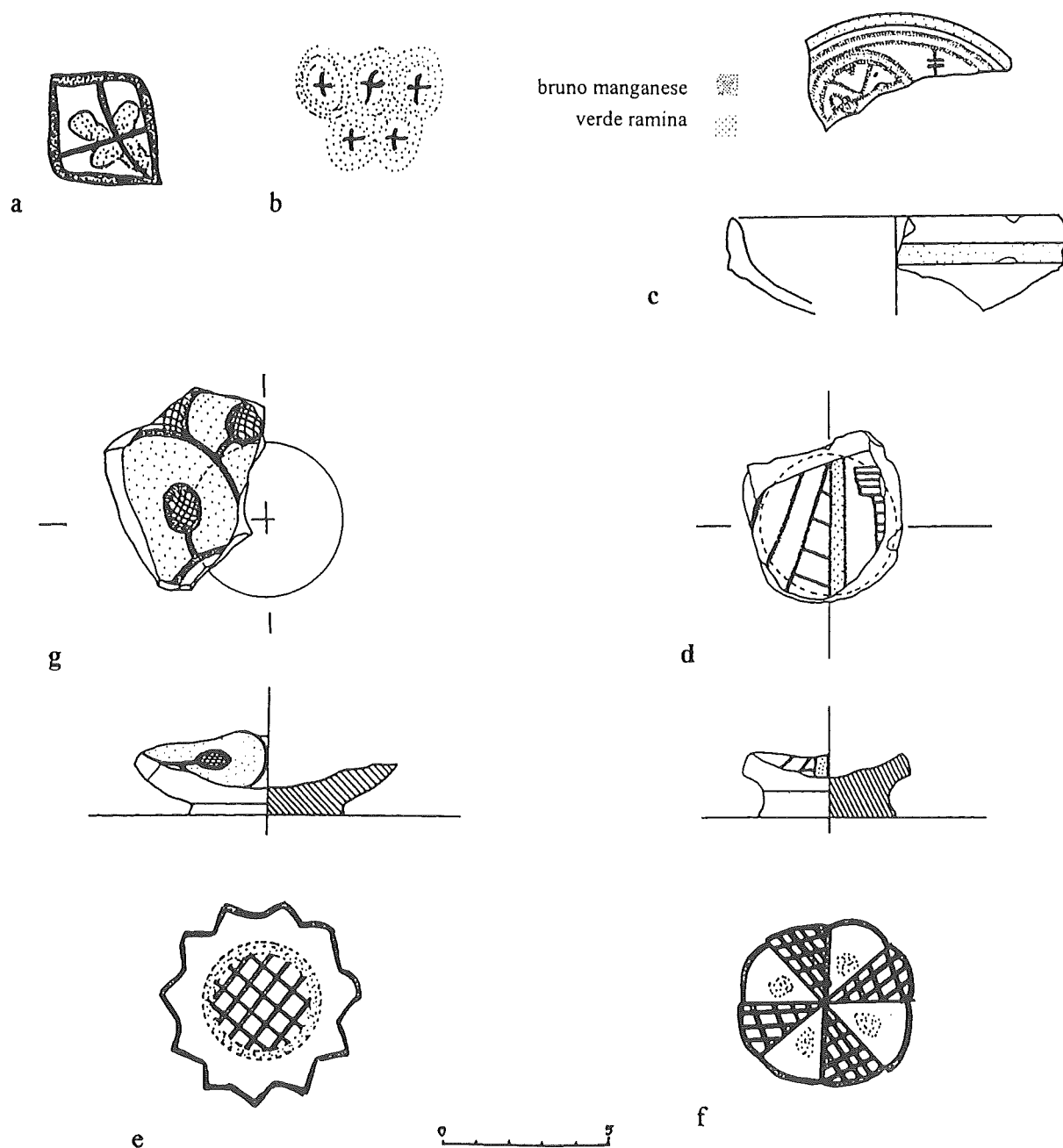


Fig. 4. - I motivi decorativi principali.

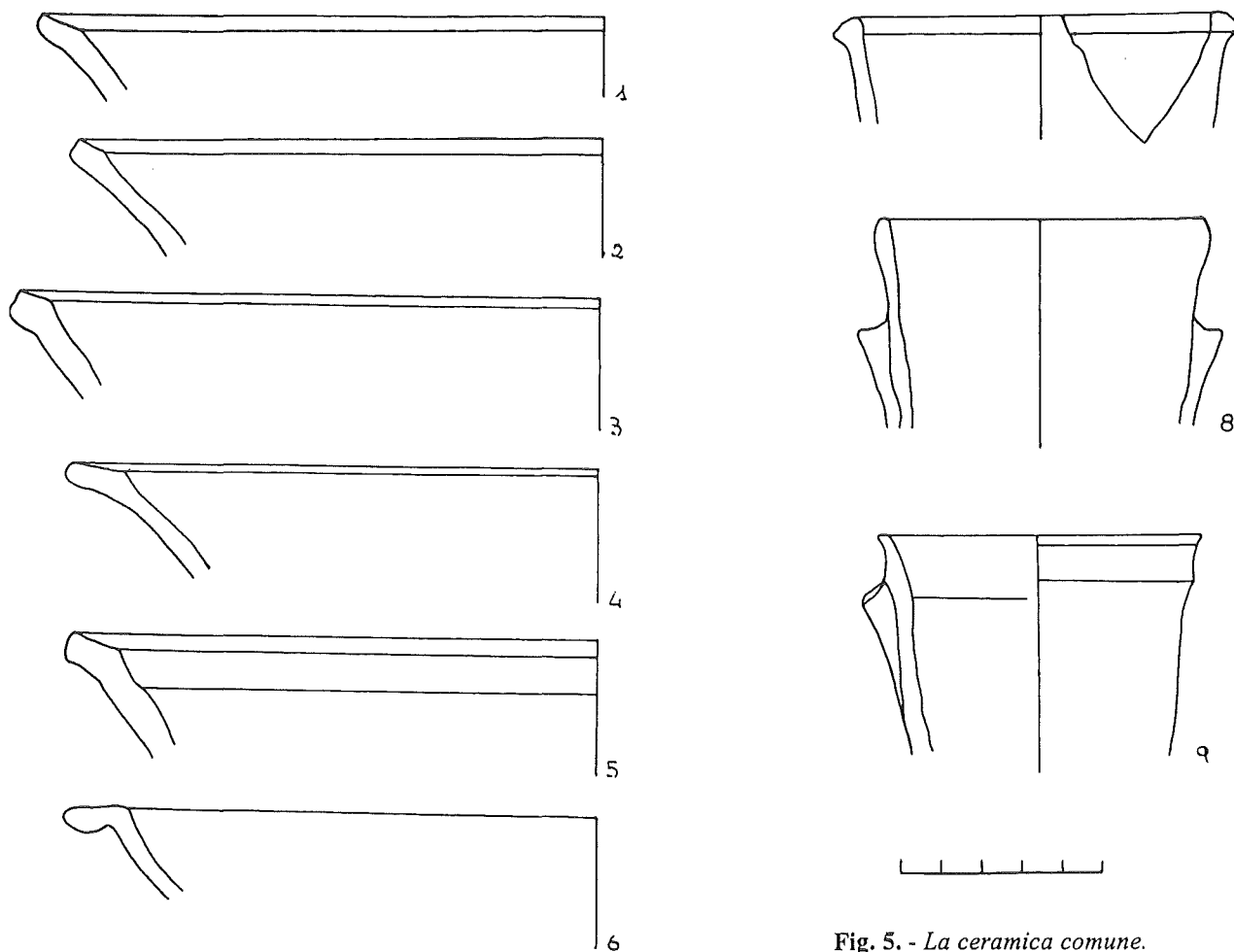
tratta per lo più di brocche monoansate con collo verticale o appena svasato ed orlo modanato, oppure di anforette dalle caratteristiche analoghe, in acroma depurata, cui possono essere probabilmente associati fondi piani e piuttosto spessi, tagliati a coltello (Fig. 5: 7). Ad essi vanno forse associati i pochi frammenti di pareti con decorazione incisa a pettine. La maggior parte di manufatti trova sostanziale corrispondenza con le produzioni dell'inizio del IX sec. diffuse nella Campagna Romana e ben esemplificate a Pianabella⁴⁰, tra i cui materiali sono state rintracciate le maggiori affinità.

Per quanto riguarda il materiale pienamente medievale, i contenitori da immagazzinamento sono

rappresentati prevalentemente dalle anfore a corpo globulare, o più spesso biconico; dal punto di massima espansione della pancia si dipartono due larghe anse a nastro, che talvolta presentano una triplice solcatura (Fig. 6: 11). Non sono stati rinvenuti al momento sia esemplari che presentino l'ampliamento nella parte mediana, in area romana spesso associato alle più tarde anfore a corpo biconico⁴¹, oltre ai beccucci riferibili a questi grandi contenitori. Inoltre, fino ad ora non sono stati riconosciuti né coperchi né

⁴⁰ Patterson 1993, figg. 2 e 5.5.

⁴¹ Romei 1990, 265-66.

Fig. 5. - *La ceramica comune.*

pedistalli che dovevano corredarli. I fondi che per tipologia di impasto e per dimensioni potrebbero essere riferiti alle anfore sono piani, privi di ombelicatura centrale; le superfici sono in genere ben lisciate. Per quanto riguarda i colli e gli orli, colpisce inoltre l'assenza di analogie con i tipi di produzione romana che, pur essendo molto differenziati, presentano in genere orli assottigliati o ingrossati, talora appena estroflessi, ma privi di una netta demarcazione rispetto al collo⁴². I frammenti di Cencelle presentano collo breve, spesso fortemente estroflesso e l'orlo è nettamente caratterizzato da un profilo triangolare e da una sottolineatura a stecca all'interno, che costituisce quasi un gradino. Le anse, poi, partono non dal collo – come negli esemplari romani – ma dalla parte più alta della spalla, anche questa nettamente marcata. Dal punto di vista sia morfologico che degli impasti, almeno a giudicare dall'esame autoptico, queste anfore presentano analogie maggiori, rispetto ai contesti romani, con i manufatti di Tuscania⁴³. Ciò che comunque diffe-

renza i nostri manufatti da quelli di Tuscania è la minore altezza del collo, in taluni casi quasi atrofizzato e la mancanza di engobbio di rivestimento, presente a Tuscania, mentre a Cencelle le superfici delle anfore appaiono ben lisciate, ma non engobbiate. Inoltre, alcuni esemplari di Cencelle presentano un andamento del corpo chiaramente biconico, caratteristica questa più vicina ai tipi romani che a quelli dell'Alto Lazio.

Contenitori da immagazzinamento o da trasporto sono rappresentati anche da qualche frammento di *dolium* di tradizione classica e da un frammento di una giara islamica ad impasto duro, ruvido, poco depurato, con molti vacuoli, di colore rossiccio; all'esterno presenta un engobbio color crema assorbito. La decorazione impressa a stampo con matrice stanca è disposta, come spesso avviene in questo tipo di recipienti, su un doppio registro e comprende motivi a foglie d'edera e a zig-zag. Questo frammento contribuisce a definire il raggio delle importazioni che pervenivano alla città laziale in modo diretto o mediato da altri centri: si tratta, infatti, di una forma tipica delle giare di area islamica occidentale diffuse tra l'XI e il XIII sec. lungo le coste siciliane, provenzali e dell'Italia tirrenica⁴⁴. L'esemplare di Cencelle

⁴² Manacorda *et al.* 1986; Romei 1990.

⁴³ Johns 1973.

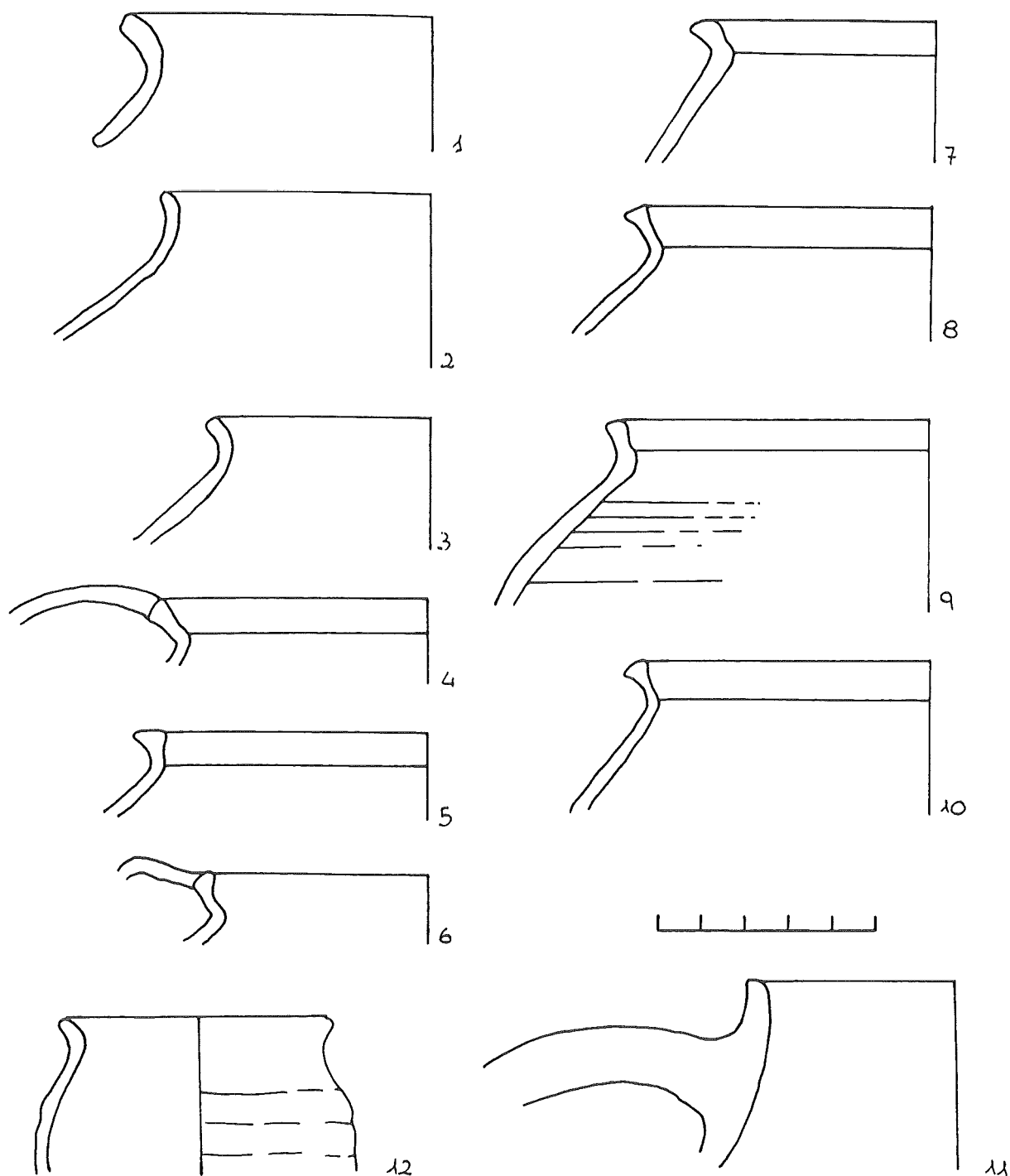


Fig. 6. - La ceramica comune e la ceramica da cucina.

non è isolato nel panorama del Lazio settentrionale: un frammento di giara con una decorazione impressa ugualmente a stampo su due registri, ma che presentano rispettivamente un motivo floreale ed uno presumibilmente animale, proviene dalla torre del castello della Badia di Vulci⁴⁵; un altro è stato rinvenuto negli scavi inglesi di Tarquinia⁴⁶.

A Cencelle sono presenti due "microvasetti", i piccoli contenitori dall'orlo estroflesso e dal corpo globulare nel nostro caso costolato (Fig. 6: 12), prossimi agli esemplari romani del XIII sec.⁴⁷. La loro diffusione anche in altri siti laziali, ad esempio a

Caprignano, in Sabina, ha fatto ipotizzare per questi piccoli recipienti una funzione polivalente.

Nelle scodelle e nei catini colpisce l'analogia con le forme della maiolica arcaica, qui anche prive di rivestimento: possono essere divisi in tre gruppi, tutti con un diametro tra i 25 ed i 30 cm. Un primo rag-

⁴⁴ Scerrato 1979; Ximenes 1976; Brentchaloff & Sénac 1991; Berti & Tongiorgi 1972.

⁴⁵ Luzi 1995, 119-120.

⁴⁶ Johns 1973.

⁴⁷ Ricci 1990a, 304.

gruppiamento comprende bacini con orlo estroflesso e parete quasi verticale (Fig. 5: 1-3); il secondo gruppo prevede bacini con orlo a tesa, corpo emisferico o pareti più rettilinee, talvolta con una leggera scanalatura al di sotto dell'orlo e dotati di fori per la sospensione in prossimità dell'orlo (Fig. 5: 4-5); il terzo gruppo raduna ciotole e piccoli catini con tesa appena accennata (Fig. 5: 6). Questi ultimi contenitori di più modeste dimensioni richiamano da vicino alcune ciotole provenienti da Toscana, anch'esse prive di rivestimento o ricoperte da vetrina verde⁴⁸, piuttosto che i coevi tipi romani. Stesso ambiente e stessa epoca – nell'ambito del XIV sec. – va ipotizzato per i due boccali⁴⁹ (Fig. 5: 8-9). In questo filone di associazione con i materiali in maiolica arcaica vanno forse considerati alcuni frammenti di orlo trilobato ad impasto rosato o crema molto ben depurato.

Il complesso dei materiali fino ad ora rinvenuto se non può essere esaustivo in merito ai quantitativi dei manufatti ceramici nell'arco della vita della città, comunque contribuisce a connotare un deposito con una fisionomia autonoma. Possono non essere significativi i dati ancora esigui relativi ai contenitori da dispensa e da trasporto, ma colpisce la massiccia presenza di forme della coeva maiolica arcaica prive di rivestimento, spia di un commercio di materiali non rifiniti – forse di seconda scelta? – parallelo a quello dei pezzi di pregio. La dipendenza formale da Toscana, poi, tradisce una linea di tendenza nei rapporti della città papale gravitante, almeno nei secoli del pieno Medioevo, più verso il Lazio settentrionale che verso Roma.

IV La ceramica da cucina

Sono state raggruppate sotto questa denominazione le produzioni di ceramica da fuoco, quali pentole, testi, piatti-coperchi, oltre al materiale più genericamente detto "da cucina", in riferimento all'uso molto diffuso nel Medioevo di porre boccali e piccole olle accanto al fuoco, non necessariamente a diretto contatto con le fiamme, così che tale materiale si presenta combusto solo su un lato, nel caso dei boccali quello opposto all'ansa. Lo scavo non ha ancora restituito ambienti identificabili con cucine o con i loro eventuali annessi, pertanto non si dispone di dati complessivi in merito al corredo di recipienti in dotazione delle varie famiglie di Cencelle, ma dall'analisi dei materiali rinvenuti nella

globalità della stratigrafia, oltre che dalla comparazione con i risultati dello studio delle altre classi ceramiche, soprattutto della ceramica comune, è possibile identificare alcune linee di tendenza che trovano riscontro in altri siti coevi della stessa area geografica e culturale.

La maggior parte dei frammenti appartiene ad olle di diverse dimensioni, con orlo ben distinto, a sezione prevalentemente triangolare (Fig. 6: 4-10). A molti degli esemplari analizzati vanno attribuiti i frammenti di anse a nastro, a sezione piuttosto sottile, impostate direttamente sull'orlo e rispetto a questo leggermente sovrastanti, caratteristica questa che sembra identificare le produzioni romane rispetto ai coevi manufatti⁵⁰. Le diverse varianti sono accomunate dalle forti analogie con le olle di tradizione romana che dalla stratigrafia della *Crypta Balbi*⁵¹ hanno trovato conferme cronologiche a partire dagli inizi del XIV sec. Tra i nostri pezzi ritroviamo sia gli esemplari con bordo sagomato – per altro presenti anche a Toscana⁵² – talvolta con una depressione interna più o meno accentuata, che quelli con orlo semplicemente estroflesso, sia pure ben distinto dalla parete, in analogia con la scansione dei reperti romani della *Crypta Balbi*.

Anche nel caso di questo tipo di manufatti, comunque, si nota la presenza di frammenti in un qualche modo residui rispetto alla globalità dei materiali che costituiscono la stratigrafia finora indagata a Cencelle. Va infatti segnalata la presenza di pochi esemplari di olle ad orlo estroflesso, tipico della tradizione altomedievale romana, che sembra scomparire, sia pure in maniera graduale, all'inizio dell'XI sec. e che rappresenta il primo dei tre tipi identificati nella *Crypta Balbi*⁵³ (Fig. 6: 1-3). Negli esemplari di Cencelle si passa dagli impasti grossolani, rossicci, con cottura talora in atmosfera ossidante-riducente, a quelli meglio depurati, ma dello stesso colore, ad ollette con evidenti tracce della lavorazione al tornio, a pasta compatta, dal colore grigiastro, con engobbio dello stesso colore steso uniformemente all'interno ed all'esterno. Rispetto al complesso della *Crypta Balbi* – oltre che ad altri contesti topograficamente più vicini a Cencelle, come Formello⁵⁴ –, al momento non sono state rinvenuti esemplari di olle con orlo appena distinto dalla parete, diritto e talora anche rientrante, che sembra rappresentare nel complesso romano un momento di passaggio tra le forme di tradizione altomedievale e quelle del pieno Medioevo.

⁴⁸ Johns 1973.

⁴⁹ Romei 1994, fig. 4.

⁵⁰ Ricci 1990b, 224.

⁵¹ Ricci 1990b per l'analisi della ceramica da fuoco rinvenuta

nello scavo della *Crypta Balbi*.

⁵² Johns 1973, 57.

⁵³ Ricci 1990b.

⁵⁴ F. Boannelli in Boitani & Boannelli 1995, 81-84.

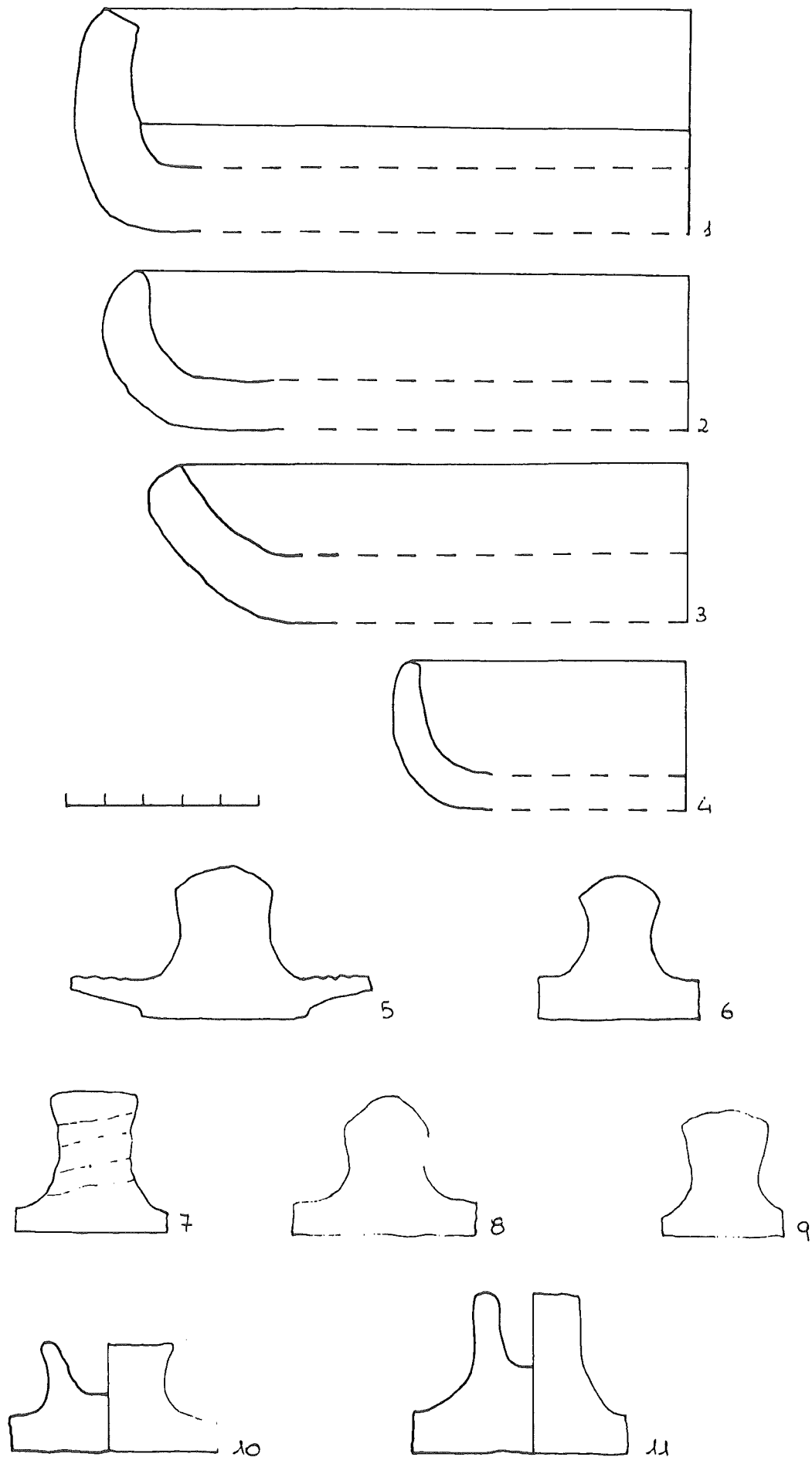


Fig. 7. - La ceramica da cucina.

Piuttosto diffusa sembra essere anche la presenza di testelli, identificabili nei tipi con la parete verticale o estroflessa oppure pressoché piani, con l'orlo appena rilevato (Fig. 7: 1-4). Nei primi due tipi, presenti nella vicina Tarquinia in contesti di XI-XII sec.⁵⁵, la parete è comunque rilevata e talora segnata internamente alla base da un colpo di spatola o da una solcatura realizzata con le dita; la loro dimensione varia da diametri di 14-15/28-30 cm. Meno comune sembra essere invece la diffusione dei tegami, finora rinvenuti in pochi esemplari frammentari; non sono stati comunque rinvenuti manici o versatoi.

Per quanto riguarda i coperchi, invece, ci si trova di fronte ad una certa varietà morfologica: poiché mancano esemplari integri, la casistica va effettuata fondamentalmente sulle prese, che possono essere semplici, a sezione circolare, oppure incavate, o anche sagomate (Fig. 7: 5-11). Quest'ultimo caso rappresenta un'elaborazione più curata rispetto alle precedenti e sembra corrispondere un impasto più fine ed una maggiore cura nella modellazione del pezzo. I pezzi ricostruibili prevedono comunque pareti poco rialzate, quando non addirittura pressoché orizzontali, talora con orli anneriti, di tradizione altomedievale. Sembra difficile vedervi esclusivamente materiali residui, poiché le pentole provenienti dagli stessi strati ben si collocano nel panorama del XIV sec.: ci si trova anche qui di fronte ad una sorta di "anomalia tipologica" rispetto ai complessi romani, anomalia che contribuisce a fare di Cencelle un centro dall'autonoma identità, con relazioni sia con la capitale sia con i più vicini centri di produzione dell'alto Lazio.

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⁵⁵ Bartoloni & Ricci 1995, 101.

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Analisi archeometriche e problemi riguardanti alcune ceramiche islamiche con rivestimento opaco

Inquadramento storico-geografico

Nel X e nell'XI secolo la Sicilia era governata dalla dinastia kalbita al servizio dei Fatimidi della Tunisia e la popolazione siciliana in genere, e artigiana in particolare, era prevalentemente arabomusulmana. L'isola, dunque, era parte integrante del mondo islamico ed intorno agli anni 1060 le lotte interne tra fazioni politicamente avverse di Musulmani favorirono l'intervento dei Normanni dell'Italia Meridionale, a cui fece seguito una lunga guerra di conquista.

I combattenti normanni avevano due scopi principali: impadronirsi della Sicilia per assumere potere, titoli nobiliari e terre da far coltivare; riportare alla cristianità questo lembo di Europa islamizzato sostituendo alle moschee le chiese e i monasteri. Questo modo di procedere dei Normanni corrisponde al principio delle crociate medievali. La differenza tra le crociate in Medio Oriente e questa in Sicilia consiste nel fatto che nell'isola non c'erano luoghi santi da liberare, ma Musulmani da convertire.

E' ampiamente accertato dallo studio dei reperti ceramici superstiti che gli artigiani isolani dell'XI secolo erano molto abili nell'ottenere, dopo due diverse e successive fasi di cottura, dei prodotti di qualità da utilizzare comunemente. Il singolo prodotto artigiano era destinato ad una clientela di modeste condizioni economiche, mentre il signore preferiva prodotti importati dal Vicino Oriente di maggior pregio estetico.

Tecniche produttive

L'officina del vasaio era composta da più artigiani, ognuno destinato ad una singola operazione che svolgeva con grande impegno e perizia. Si trattava di uomini che eseguivano un lavoro a catena e gli oggetti prodotti erano uguali per dimensione e decorazione.

Le argille erano scelte tra quelle ubicate non lontano dalla officina del vasaio (per risparmiare sui costi del trasporto), la cui composizione variava da

un distretto ad un altro dell'isola. L'argilla era resa duttile con un processo di depurazione oppure di manipolazione con l'aggiunta di dimagranti naturali (sabbia) o artificiali (cocciopesto), in modo da renderla efficiente alla lavorazione e alla cottura.

Con questo impasto argilloso il tornitore foggia delle forme diversificate e vastissime, alcune destinate a rimanere senza rivestimento: tegole, mattoni, grondaie; altre destinate ad essere decorate: catini, albarelli, boccali.

I prodotti che dovevano essere decorati erano dapprima sbiancati con uno schiarimento superficiale sulle pareti mediante un particolare trattamento delle ceramiche, oppure con un modo di alimentazione della fornace. Questo schiarimento di colore giallo tenero consentiva, successivamente, di stendere i colori sul fondo schiarito e non sulla superficie rossa dell'impasto. La tecnica di schiarimento è stata messa in evidenza dalle analisi al microscopio (Arias, Berti & Tongiorgi 1975, 141) e successivamente dalle spiegazioni appropriate di Antonino Ragona (Ragona 1979, 23-25).

La decorazione policroma era applicata con due tecniche diverse e complementari: con l'invetriatura piombifera o con l'invetriatura stannifera (impropriamente detta anche smalto o maiolica). Per la prima tecnica si preparava una miscela di sabbia silicea a cui era aggiunto piombo calcinato. L'invetriatura stannifera era composta da vetrina piombifera opacizzata con biossido di stagno.

L'invetriatura al piombo, trasparente, era posta sopra i colori, mentre l'invetriatura stannifera, bianca e opaca, era posta sotto la decorazione policroma. Nel primo e nel secondo caso la ceramica decorata aveva bisogno di una seconda definitiva cottura nella fornace del vasaio.

Argomento della discussione

Intendiamo qui presentare un tipo di ceramica che, da molti anni a questa parte, si rinviene in Sicilia in quantità piuttosto limitata e in maniera diluita nel

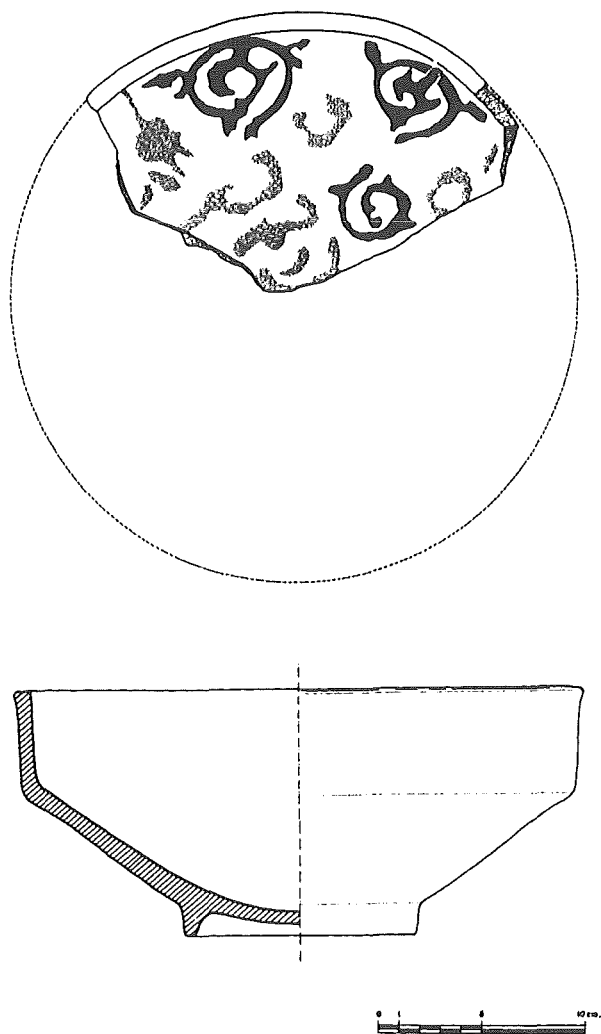


Fig. 1. - Fondo e parete di catino cilindrico, ricostruito nella forma, decorato con spirali in bruno e verde sopra superficie piombifera biancastra opalescente. Il decoro verde è diffuso sotto la superficie piombifera. Proviene dagli scavi del sito denominato Castello della Pietra (Provincia di Trapani).

tempo. Sono frammenti, di cui a volte si riesce a ricostruire la forma originaria (catini fig. 1, alberelli fig. 2), decorati a tratti, spirali, rombi coi colori bruno e verde disposti, con lo stesso spessore, sopra una superficie biancastra, opalescente, simile alla copertura stannifera.

Sono stati rinvenuti a Palermo, nei primi anni ottanta, nello spazio antistante la Cala (l'antico porto della città) e lungo la strada di accesso al Castello a Mare che difendeva la Cala (fig. 4), durante la costruzione di un sottopassaggio automobilistico; ai primi degli anni novanta in due opposti punti cardinali della città (in Piazza XIII Vittime ed al Palazzo Reale) durante scavi sistematici della Soprintendenza Archeologica di Palermo (fig. 2), e, di recente, nel Convento della Magione durante scavi stratigrafici, in contesti antecedenti la seconda metà dell'XI - prima metà del XII secolo (fig. 3).

Nella provincia di Trapani, alla fine degli anni ottanta, alcuni frammenti sono stati recuperati, in superficie, nelle campagne di Balata di Baida e, molti anni prima, durante scavi archeologici, nel villaggio abbandonato del Castello della Pietra (fig. 1).

Nella Sala Medievale del Museo della Ceramica di Caltagirone sono esposti dei frammenti di ceramiche che presentano le stesse caratteristiche di rivestimento e di decorazione di quelle rinvenute a Palermo e nella provincia di Trapani.

Che queste ceramiche avessero una copertura stannifera (come a volte sostenuto da D'Angelo 1980, 245, fig. 1) è stato più volte contestato e, infine, di recente affermato (Molinari 1991, 196; Patterson 1991, 220) che l'invetriatura stannifera, in quei secoli, era una prerogativa del Nord Africa; tuttavia non si è escluso che circolassero nell'isola prodotti importati e che lavorassero, con gli artigiani siciliani, anche immigrati nord africani.

Indagini

Il rivestimento del campione rinvenuto al Castello a Mare di Palermo (fig. 4) è già stato analizzato da Marco Verità (della Stazione Sperimentale del Vetro di Murano). Egli ha indicato che il reperto è interamente ricoperto da una invetriatura bianca, ottenuta sospendendo in un vetro piombifero, dei grani di quarzo macinato. Sopra l'invetriatura bianca sono stati applicati dei decori (D'Angelo 1995, 46, figg. 2 e 3). La decorazione sopra l'invetriatura dovrebbe essere intenzionale: l'artigiano di quei secoli, con molta probabilità, doveva sapere che i granuli di quarzo impedivano la trasparenza. E sapeva che il prodotto, durante la seconda fase di cottura nella fornace, doveva raggiungere e non superare una determinata temperatura perchè i due colori utilizzati per la decorazione, il verde e il bruno, avevano dei tempi di fusione diversi. Il bruno manganese resisteva meglio all'esposizione del calore della fornace perchè più refrattario, il verde ramina, più solubile, si diffondeva facilmente nel rivestimento piombifero biancastro, opalescente. Questo fenomeno si può osservare nel frammento di catino rinvenuto al Castello della Pietra e visivamente evidenziato nel disegno (di Valeria Brunazzi) alla fig. 1.

Confronti

La Torre Civica di Pavia (crollata di recente) conteneva numerosi "bacini ceramici" della prima metà dell'XI secolo, tutti provenienti dal mondo islamico; la maggioranza, per la precisione, era di

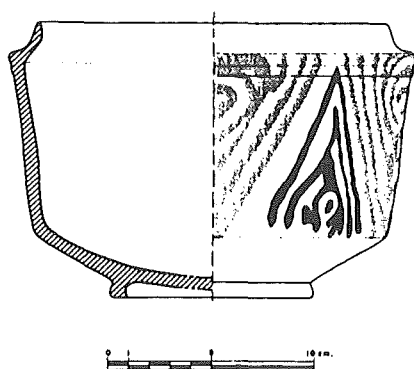


Fig. 2. - Frammento di alberello, ricostruito nella forma, decorato con tratti e spirali in bruno e verde sopra superficie piombifera biancastra, opalescente, proveniente da scavi a Piazza XIII Vittime di Palermo.

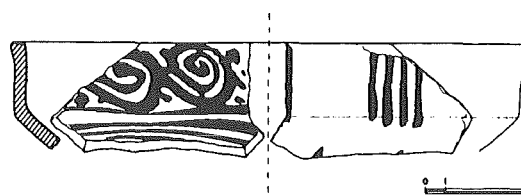


Fig. 3. - Parete di catino cilindrico decorato con tratti e spirali in bruno e verde sopra superficie piombifera biancastra opalescente proveniente dagli scavi nel Convento della Magione di Palermo.

origine egiziana (Blake & Aguzzi 1989, 223). Lo studio mineralogico eseguito da Sergio Sfrecola ha indicato che i rivestimenti vetrosi dei bacini egiziani della Torre Civica di Pavia contenevano abbondanti cristalli di quarzo mal fuso e, contemporaneamente, molte particelle di biossido di stagno (Sfrecola 1989, 242-243, bacino A fig. 39-40, bacino 12 fig. 20-21 e bacino C).

E' chiaro che i prodotti della Sicilia che utilizzavano granuli di quarzo ed i prodotti dell'Egitto (posti nella Torre Civica di Pavia) che utilizzavano cristalli di quarzo mal fuso sono diversi: entrambi utilizzavano il quarzo non finemente macinato, ma i prodotti egiziani contengono biossido di stagno mentre quelli siciliani non lo contengono. Tuttavia, una correlazione tra le due produzioni potrebbe essere possibile.

Infatti, Shelome Goitein, nel primo volume sui documenti della Geniza del Cairo, segnala che prodotti di ceramica erano mandati da Rosetta, Egitto, in Sicilia (Goitein 1967, 110).

F.D.A.

Analisi archeometriche

Gli impasti e i rivestimenti di quattro frammenti di ceramiche medievali rinvenute a Palermo (Cala, Castello a Mare, Curbici e Magione) sono stati studiati al microscopio stereoscopico e, ad esclusione dell'ultima, in sezione sottile. In tab. 1 sono sinteticamente riportati i risultati di queste ultime analisi.

Gli impasti

Gli impasti provenienti da Cala e da Castello a Mare, pur con alcune differenze, risultano piuttosto simili; entrambi (il secondo è già stato studiato e descritto da L. Lazzarini, in D'Angelo 1995, 61) sono caratteriz-

zati da una matrice argillosa ricca in ferro ossidato (responsabile del colore rosso), includente microfossili a guscio calcareo e frammenti argillosi, e da uno scheletro ben assortito e angoloso, costituito in prevalenza da calcari (più o meno dissociati dalla cottura), quarzo e selci subordinate. Del tutto con-

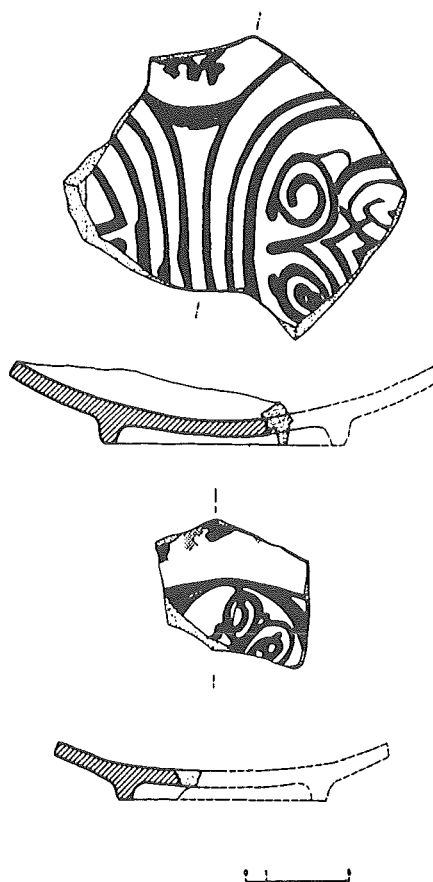


Fig. 4. - Fondi di catini decorati con tratti e spirali in bruno e verde sopra superfici piombifere biancastre, opalescenti; provenienti, in alto, dalla Cala ed in basso dal Castello a Mare di Palermo.

Tab. 1

Tabella riassuntiva dei caratteri mineo-petrografici delle ceramiche studiate. Le percentuali modali indicate sono soggette ad errore, in quanto determinate attraverso diagrammi per la stima visuale delle percentuali. Le dimensioni indicate sono le massime osservate: x=scasso; fine; xxxxx= abbondante, grossolano.

Sezione sottile N.	4942	4943	4944
Luogo reperimento	Cala	Castello a mare	Curbici
Matrice argillosa %	68	70	66
Ferro diffuso %	xxxxx	xxxx	xxx
Calcio diffuso %		x	xxx
Isorientazione matrice	xx	xxx	xxxx
Microfossili %	2	3	
Microfossili mm.	0,25	0,25	
Inclusi argillosi %	1	1	0,1
Inclusi argillosi mm.	0,4	0,5	0,6
Assortimento scheletro	xxxx	xxxxx	xxx
Arrotondamento schel.	xx	xx	xxx
Dimensioni massime	xxx	xxx	xxxx
Quarzo policristallino %	0,1	0,1	0,1
Quarzo policristallino mm	0,2	0,3	0,35
Selci %	1	1	0,01
Selci mm	0,35	0,4	0,4
Calcari %	5	4	
Calcari mm	0,5	0,3	
Quarzo %	4	4	12
Quarzo mm	0,4	0,4	0,75
Quarzo (sub) angoloso %	xxxx	xxxx	xx
Quarzo subarrot. %	x	x	xxx
Quarzo arrotondato %	x		xxx
Feldspati %	0,1	0,1	0,1
Feldspati mm	0,1	0,1	0,2
Mica Bianca %	1	0,1	0,1
Mica Bianca mm	0,1	0,15	0,1
Biotite	1	0,1	0,1
Biotite mm	0,1	0,15	0,1
Schiarimento lato 1 mm	0,25	0,1	0,5
Vetrina lato 1 mm	0,15	0,2	0,15
Quarzo in vetrina lato 1%		xxxxx	?
Bolle in vetrina lato 1%		xxx	?
Schiarimento lato 2 mm	0,5	0,06	0,4
Vetrina lato 2 mm	0,1	0,15	0,1
Quarzo in vetrina lato 2%		xxxxx	xxx
Bolle in vetrina lato 2%		xxx	xxx
Caratteri vetrina lato 1	localmente molto devetrificata	devetrificata localmente, specie intorno a quarzo e bolle	Scaglie superficiali di devetrificazione (vetrina poco conservata in sezione, mal determinabile)
Caratteri vetrina lato 2	I pochi tratti conservati in sezione sono totalmente devetrificati	localmente molto devetrificata, specie intorno a quarzo e bolle	localmente devetrificata

frontabile con questi ultimi impasti appare, anche se al solo esame stereoscopico, quello della ceramica proveniente da Magione.

Il campione da Curbici si differenzia molto, anche macroscopicamente, dai tre precedenti. La matrice, di colore chiaro, evidenzia una componente calcarea

in percentuale paragonabile a quella ferrica. Lo scheletro, poco assortito, risulta costituito quasi esclusivamente da quarzo; parte degli individui è arrotondata e, osservata allo stereoscopio, presenta le superfici tipicamente smerigliate dall'azione eolia.

Mentre i caratteri composizionali delle prime tre ceramiche sono compatibili con una provenienza siciliana, la presenza di quarzo eolico nell'ultimo impasto suggerisce una probabile produzione nordafricana.

I Rivestimenti

Tutte le ceramiche studiate presentano, su entrambi i lati, una fascia di schiarimento superficiale; di spessore variabile, essa risulta più o meno evidente sia all'osservazione stereoscopica sul taglio perpendicolare alle superfici, sia all'esame in sezione sottile (soprattutto utilizzando la luce convergente).

In tutti i casi è presente un'invetriatura su entrambi i lati; in nessun caso il rivestimento è stannifero. Al microscopio polarizzatore la vetrina dei frammenti di Castello a Mare (già studiata e descritta da M. Verità, in D'Angelo 1995, 461) e di Camporeale evidenzia numerosi inclusioni di quarzo e bolle; non sembrano invece esservi inclusioni nella ceramica proveniente da Cala (tratti più o meno estesi delle vetrine sono andati persi durante la preparazione delle sezioni sottili).

Tutte le invetriature sono interessate da processi di devetrificazione più o meno diffusa, anche attraverso tutto lo spessore del rivestimento; l'alterazione produce scaglie parallele alla superficie, facilmente asportabili, od anche, prevalentemente intorno al quarzo e alle bolle, plaghe concentriche a frattura concoide; le parti devetrificate (cioè trasformate in fasi minerali) appaiono di colore bruno torbido a nicols paralleli e molto birifrangenti a nicols incrociati.

L'effetto dell'alterazione, che può essere facilmente notata anche ad occhi nudo sulla superficie delle ceramiche, è quello di sbiancare ed opacizzare il rivestimento, in maniera più o meno importante e diffusa a seconda del grado di devetrificazione; tale processo interessa indifferentemente anche le parti decorate, sfumando o annullando l'intensità della colorazione.

Nelle parti non alterate, la vetrina appare limpida e trasparente a nicols, ed è completamente estinta a nicols incrociati. Le sezioni sottili comprendono parti sia incolori, sia colorate di verde; in quest'ultimo caso il pigmento, completamente disciolto nel vetro, appare distribuito omogeneamente dal bordo fin verso l'interno.

E' stato preso in esame il frammento della ceramica rinvenuta a Castello a Mare sottoposto a ricot-

tura (D'Angelo 1995, 466); dopo tale trattamento, le parti devetrificate sono scomparse e tutto il rivestimento appare omogeneo e trasparente; macroscopicamente, il colore delle parti non decorate appare giallino. La fascia schiarita si è ridotta a causa del riscaldamento in presenza di ossigeno, mentre le inclusioni di quarzo sono ancora presenti.

Conclusioni

L'effetto di opacità dei rivestimenti presi in esame è probabilmente dovuto alla concomitanza di più fattori, l'influenza di ciascuno dei quali non è accertabile se non con studi più approfonditi. Alcune considerazioni possono tuttavia essere fatte:

- la diffusa devetrificazione dei rivestimenti produce senza dubbio un'opacizzazione, non ricercata dagli artigiani perchè avvenuta in tempi successivi alla realizzazione dei manufatti;
- la presenza, quasi certamente intenzionale, di uno schiarimento superficiale in tutti gli impasti gioca probabilmente un ruolo importante nell'effetto finale;
- la vetrina della ceramica da Cala non sembra includere quarzo, ma ora appare opaca similmente alle altre; l'esperimento di ricottura sul frammento da Castello a Mare mostra come la vetrina diventi trasparente, anche se le inclusioni di quarzo non scompaiono; in questo caso, tuttavia, il rivestimento non risulta bianco: la riduzione dello schiarimento superficiale, dopo la ricottura con ossigeno in eccesso, può forse permettere al colore dell'impasto sottostante di trasparire in parte;
- le inclusioni di quazzo, come pure le bolle d'aria, potrebbero fornire comunque un certo grado di opacità, soprattutto se esistesse una forte differenza tra gli indici di rifrazione del quarzo e del vetro (quest'ultimo varia in funzione della sua composizione).

C.C.

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Elementos para la Difusión y Cronología de la Cerámica Gris Medieval en las Comarcas de Barcelona

El estudio de la cerámica medieval catalana ha experimentado un notable desarrollo a lo largo de las dos últimas décadas, teniendo en cuenta que las conclusiones de los trabajos de campo anteriores, que se iniciaron en los años cincuenta, habían sido más bien escasas o no vieron la luz hasta largo tiempo después. Diversas publicaciones sobre el tema se han convertido en obras de referencia. Entre ellas cabe citar el volumen *Ceràmica grisa i terrissa popular de la Catalunya medieval*, dirigido por M. Riu, el corpus generado por la publicación de la obra *Catalunya Romànica*, o las actas de los Congresos de Arqueología Medieval Española y de Cerámica Medieval del Mediterráneo Occidental. Además, hay que señalar la inminente publicación de las comunicaciones presentadas en la mesa redonda *Ceràmica medieval catalana*, celebrada en Barcelona en 1994 bajo el patrocinio de nuestro Servicio, y las aportaciones realizadas en el marco de la mesa redonda *Contextos ceràmics d'època romana tardana i de l'alta edat mitjana (segles IV-X)*, celebrada en 1996 y organizada por el Museo de Badalona, la Universidad de Barcelona y nuestro Servicio. Con todo, el panorama general de estas producciones continúa siendo poco claro, debido a dos de sus características principales: la índole utilitaria del material, destinado a un uso casi siempre doméstico y generalmente culinario, y la escasa difusión de los productos a causa de la peculiar estructura económica de la época.

Tal estado de cosas hace necesarios estudios minuciosos sobre ámbitos territoriales poco extensos, si se quiere llegar a determinar los rasgos de esta cerámica que más interesan desde el punto de vista arqueológico, tales como su cronología y lugar de producción. En nuestro caso, para alcanzar tal objetivo, hemos estudiado un territorio que abarca gran parte de la actual provincia de Barcelona, basándonos de forma mayoritaria en las conclusiones de nuestras propias excavaciones, desarrolladas desde 1979 hasta el presente.

Lógicamente, el estudio de estas producciones y sus mercados también debe hacerse en función de su ámbito cronológico. El amplio período elegido, que

abarca los siglos VII al XIV, señala el desarrollo, casi de principio a fin, de lo que normalmente se entiende por cerámica gris medieval catalana. Por tanto, lo hemos dividido en lapsos más cortos, en los que parece que el conjunto del material reúne ciertas características comunes, ya sean tipológicas o tecnológicas.

Cerámica de los siglos VII al X

Se trata de una época todavía mal conocida, en la que hasta hace muy poco sólo se incluían los materiales de dos o tres yacimientos (p.e. El Bovalar, Seròs y Puig Rom, Roses). En el área del Berguedà, en las estribaciones pirenaicas, donde hemos desarrollado una parte importante de nuestro trabajo, la cerámica más antigua procede de la iglesia de Sant Vicenç de Rus (Castellar de N'Hug). En este lugar descubrimos un conjunto homogéneo, correspondiente a la preparación del pavimento del templo primitivo. Se trata de ollitas de perfil en *ese* con el labio exvasado, simple o escalonado, de buena factura y color gris algo oscuro, aunque también se dan



Fig. 1. - Situación del área estudiada dentro del conjunto de España y la península Ibérica.

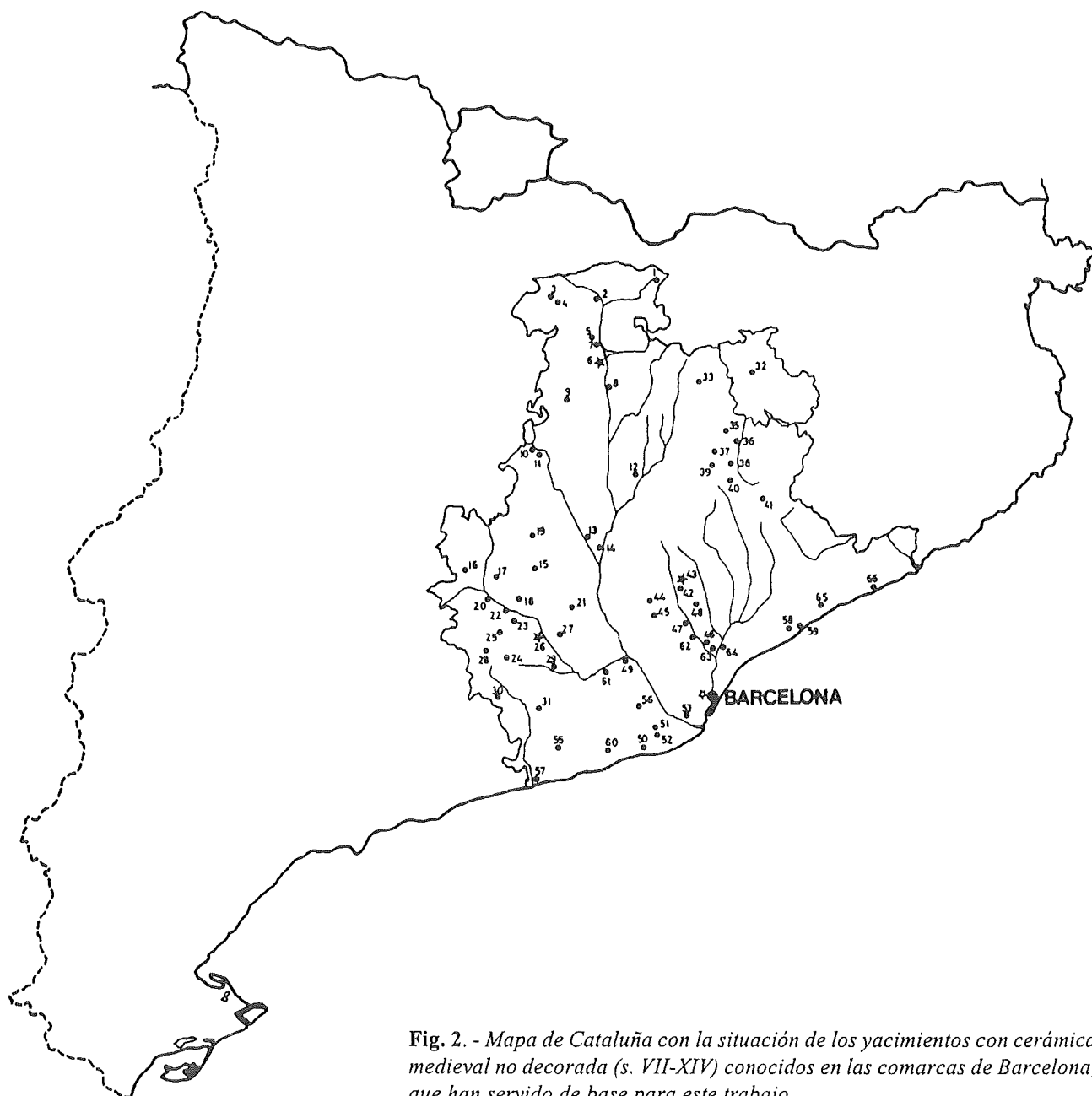


Fig. 2. - Mapa de Cataluña con la situación de los yacimientos con cerámica medieval no decorada (s. VII-XIV) conocidos en las comarcas de Barcelona, que han servido de base para este trabajo.

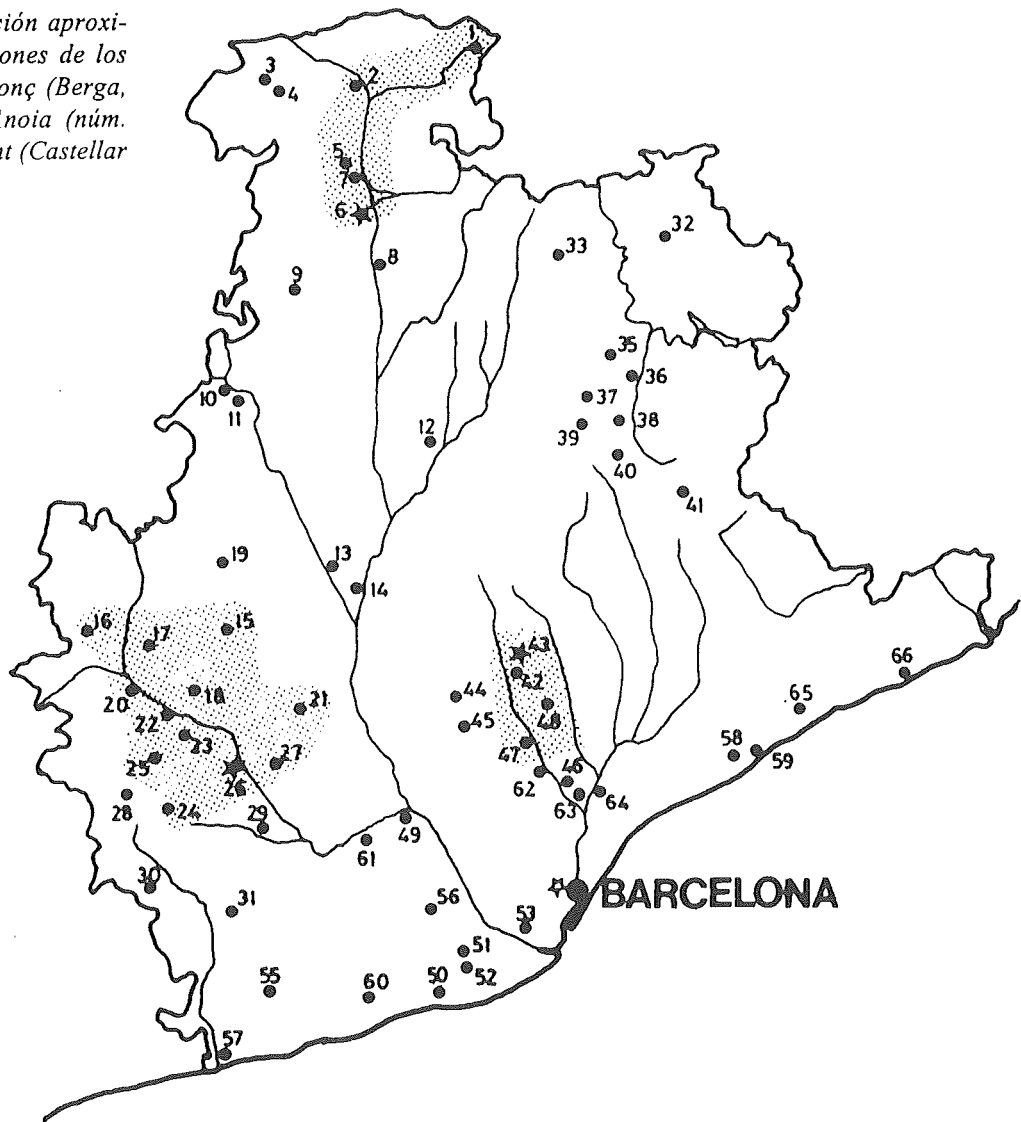
algunas piezas oxidadas (Fig. 4: 1, 3). Dentro del mismo conjunto se encontró una boca de *spatheion*, que proporciona una fecha que oscila entre los siglos VI y VII (Lusuardi & Murialdo 1991, 124, lám. 1.7; Villa 1994, 390, lám. VII, 11-12; Ramallo, Ruiz & Berrocal 1996, 145 y 147, fig. 6.96, 8.152, 9.173).

Esta datación constituye el *terminus post quem* (*tpq*) para nuestro material, complementado por un *terminus ante quem* (*taq*) del 965, año de la primera referencia documental a la iglesia. Además, últimamente, disponemos de un paralelo formal para la cerámica gris. Se trata del hallazgo de Vilaclara en Castellfollit del Boix (Fig. 4: 5), fechado por termoluminiscencia entre los siglos VI y X, aunque sus excavadores optan por una data del siglo VII (Enrich,

Enrich & Pedraza 1995, 104). Todo ello nos hace pensar que las piezas de Rus pueden ser de un momento avanzado de esa misma centuria, teniendo en cuenta su morfología y el fragmento de ánfora que las acompaña.

En la misma área pirenaica, hemos descubierto el material de la primera fase de la iglesia de Sant Quirze de Pedret (Cercs), datado en el último tercio del siglo IX (López Mullor & Caixal 1995b, 240, lám. 1-4). Se trata de cerámica gris y oxidadada con un repertorio formal corto, compuesto básicamente por ollitas con borde redondeado y ligeramente exvasado, cuerpo globular y fondo plano o un poco cóncavo (Fig. 4: 2, 4). Ocasionalmente, alguna pieza tiene el borde lobulado dando lugar a un vertedor. La

Fig. 3. - Área de difusión aproximada de las producciones de los talleres de Casa En Ponç (Berga, núm. 6), Cabrera d'Anoia (núm. 26) y la Vinya d'en Sant (Castellar del Vallès, núm. 43).



decoración, presente en un reducido número de ejemplares, está formada por cordones con impresiones digitales o bien por motivos incisos, geométricos o vegetales. Las pastas pueden ser grises u oxidadas, aunque las primeras son mayoritarias. En el monasterio de Sant Sebastià del Sull (Saldes), situado unos veinte kilómetros al norte, se podría haber localizado algún fragmento similar a los de Pedret pero datado a finales del siglo X. Este hallazgo da idea de una difusión de alcance limitado.

A unos ochenta kilómetros al suroeste de este área, en la comarca del Anoia, se encuentra Santa María de Rubió, donde han aparecido piezas de excelente factura, de pasta muy dura que adopta tonalidades bicolors, rojiza en la pared externa y gris en la interna, o de *sandwich* con el núcleo reducido. Sus formas se circunscriben a las ollas bajas, algunas de ellas con boca trilobulada o vertedor cilíndrico. Ciertas piezas presentan una decoración incisa de líneas paralelas o meandros o bien de ambos motivos asociados, que aparecen en franjas

sucesivas ocupando los hombros de las ollas. Este conjunto posee una posición estratigráfica que hace presumir una fecha del siglo X, como mínimo. Además, el yacimiento proporciona un *taq* de 1063-1094, y conocemos un paralelo en Les Coromines, Aguilar de Segarra (Fig. 4: 6) fechado entre los siglos VII y X (Enrich & Enrich 1993, 301-302, 310).

Por último, debe mencionarse la llamada *cerámica espatulada*, definida a partir de hallazgos en la ciudad de Barcelona (Fig. 4: 7) y caracterizada por el tratamiento de su superficie (Riu 1984, 31-32). Este material empieza a conocerse lentamente, y en la provincia de Barcelona se ha localizado en Sentmenat (Fig. 4: 8-11) (Roig, Coll & Molina 1995, 67, 151). Fuera de ella, existen ejemplos en las comarcas de Girona, como Sant Pere de Rodes (Port de la Selva), Sant Martí d'Empúries (l'Escala) y Peralada (Llinàs *et alii* 1995, 39). La cronología de esta cerámica todavía no se ha determinado exactamente. E. Riu la situaba entre los siglos VIII/IX y XI/XII con argumentos tipológicos (Riu 1992, 249). Ahora, a

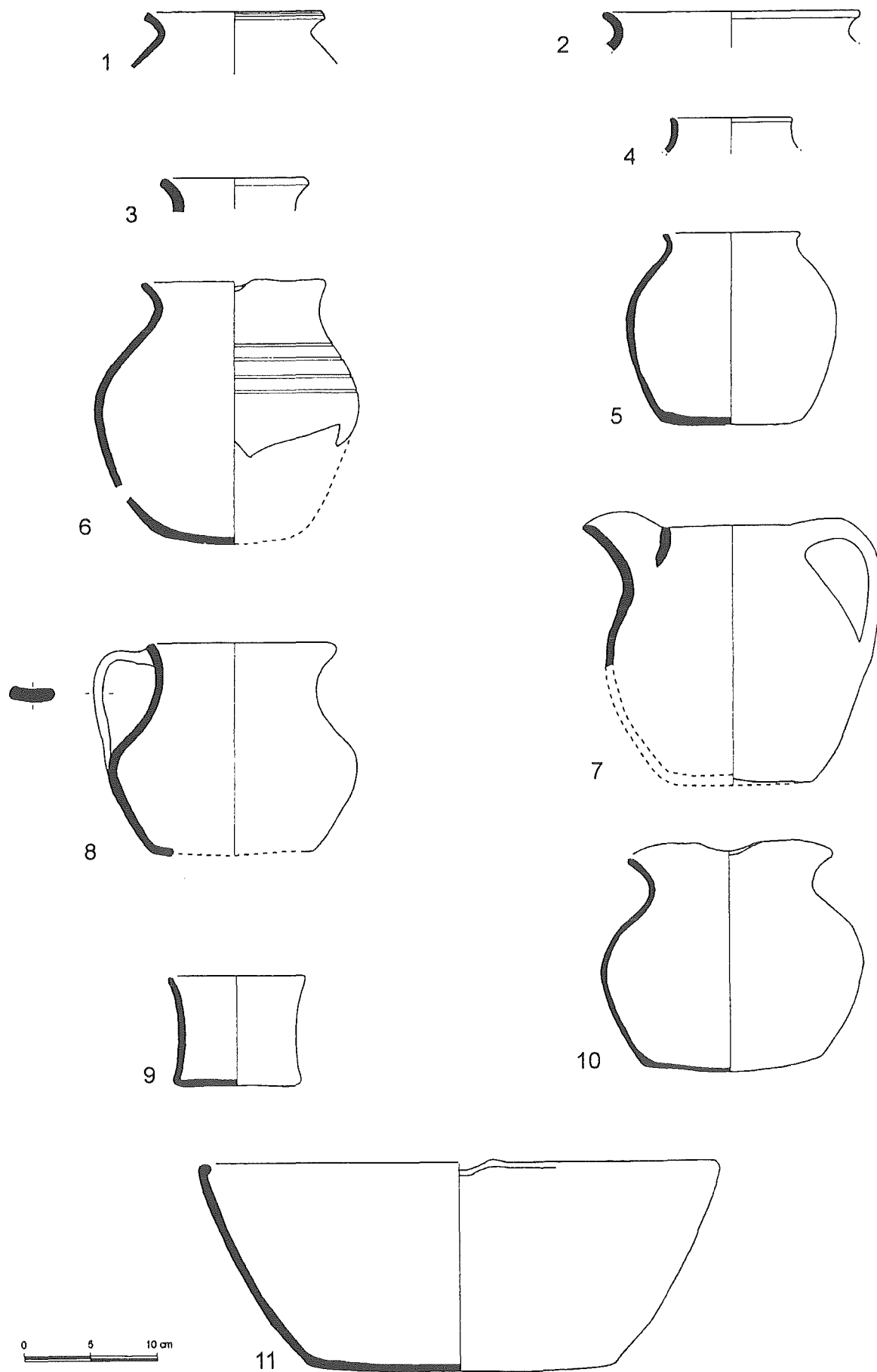


Fig. 4. - Cerámica de los siglos VII-X.

1 y 3: Sant Vicenç de Rus, Castellar de n'Hug; 2 y 4: Sant Quirze de Pedret, Cercs; 5: Vilaclara, Castellfollit del Boix (según Enrich, Enrich y Pedraza); 6: Les Coromines, Aguilar de Segarra (según Enrich y Enrich); 7: Barcelona (según E. Riu); 8-11: Sant Menna, Sentmenat (según Roig, Coll y Molina).

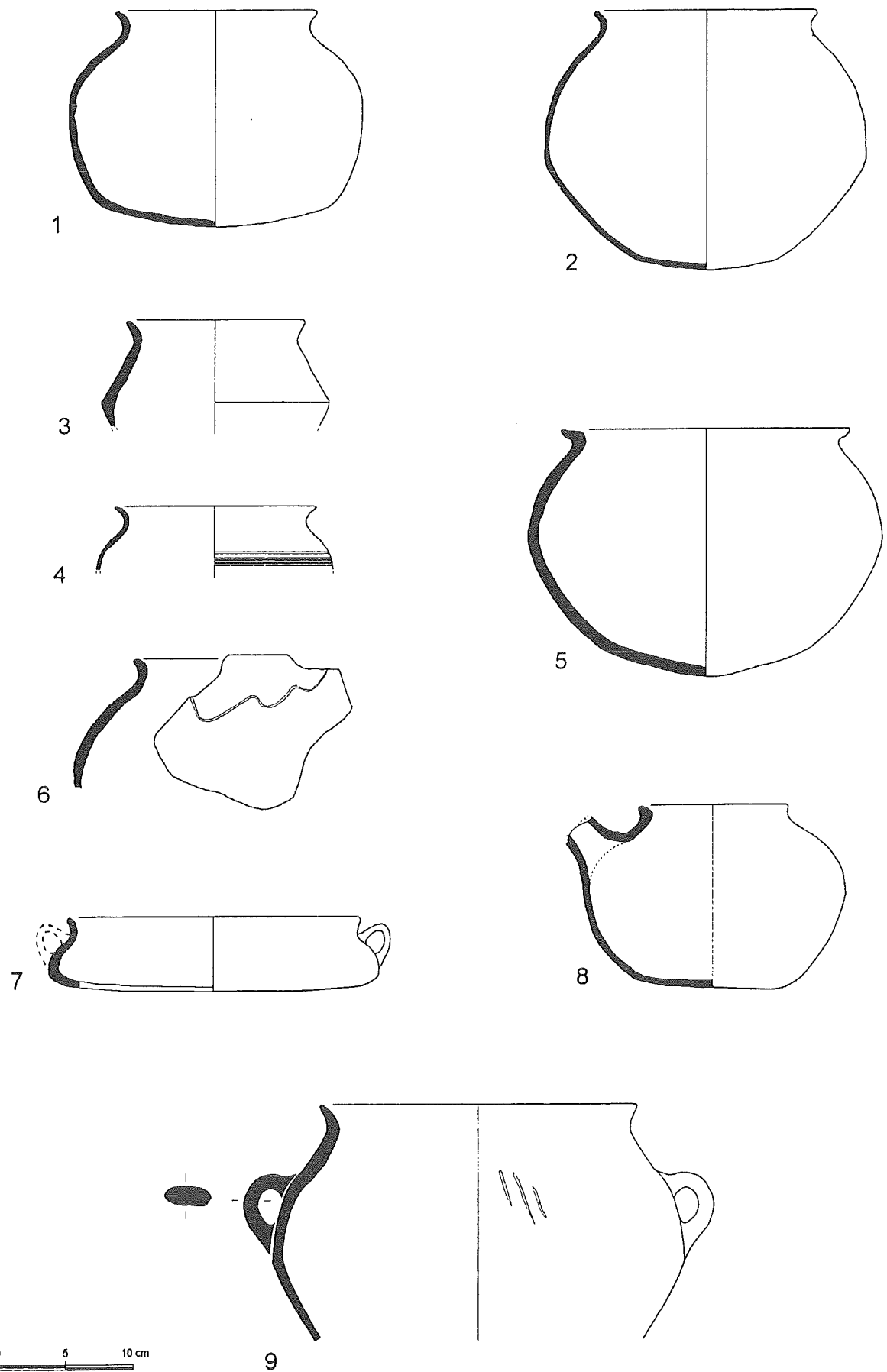


Fig. 5. - Cerámica del Berguedà.

1: Sant Vicenç de Rus; 2, 5 y 7: Casa En Ponç, Berga (según Bolòs y C. Riu); 3-4: Sant Llorenç prop Bagà, Guardiola de Berguedà; 6: Sant Quirze de Pedret; 8: Sant Sebastià del Sull; Saldes (según M. Riu); 9: Vilosiu (según Bolòs).

tenor de los últimos hallazgos, parece que debe centrarse en los siglos X y XI, sin descartarse perduraciones que, de momento, no se han comprobado.

Cerámica de los siglos XI-XIV

Osona

En este área se han excavado numerosos yacimientos durante los últimos años. Por nuestra parte, poseemos materiales bien fechados en Sant Vicenç de Malla, Sant Quirze de Muntanyola (Fig. 7: 2, 7), Santa Eulàlia de Riuprimer (Fig. 7: 6, 8), Sant Boi de Lluçanès (Fig. 7: 9), Sant Vicenç de Torelló y Sant Cristòfol de la Castanya (El Brull). Además, se conocen los ejemplares de l'Esquerda, Masies de Roda (Fig. 7: 1, 3, 5, 10-11) (Ollich 1980), el Pla de les Lloses (Tona) y Vic. Por ahora, no se ha encontrado alfar alguno.

Se pueden individualizar, de momento, dos producciones diacrónicas tipológicamente distintas. La primera, fechada en el siglo XI, tiene como forma más típica la olla de tamaño mediano o pequeño con el borde exvasado, ligeramente biselado (Fig. 7: 6) o redondeado y a veces con encaje para tapadera. Estas piezas, ocasionalmente presentan decoración de franjas y meandros incisos. Las pastas son heterogéneas, aunque se pueden individualizar dos grupos. Las del primero son negruzcas, duras y compactas con desgrasante pequeño de cuarzo y la pared externa alisada en muchos casos. En el segundo son de color gris claro con matices terrosos, extremadamente frágiles y con desgrasante de nódulos grandes de cuarzo y calcita.

La segunda producción, fechada a partir del siglo XII, presenta un repertorio formal más heterogéneo, apareciendo ollas de hombros muy desarrollados (Fig. 7: 11). Continúan los bordes redondeados (lám. IV.2, 7) y los que poseen encaje para tapadera (Fig. 7: 9), aunque los más innovadores son de perfil zoomórfico (Fig. 7: 8, 11). También aparecen cazuelas carenadas de borde triangular (Fig. 7: 10). Las pastas de estos productos son de mejor calidad que las de la centuria anterior. Las decoraciones, siempre incisivas, continúan siendo de líneas horizontales y paralelas efectuadas con punzón romo, complementadas en ocasiones por trazos oblicuos.

Si se pudiese comprobar que buena parte de esta cerámica, datada entre los siglos XII y XIV, procede de un solo centro, obtendríamos una difusión relativamente extensa, que no sería extraña a tenor de las buenas vías de comunicación natural a través de la llanura de Vic, del valle del Ter o hacia el altiplano del Moianès. De todos modos, el origen común de

tales piezas, por ahora, es sólo una hipótesis difícilmente demostrable.

Àrea de Barcelona

En la comarca del Baix Llobregat, inmediatamente al sur de Barcelona, no se han descubierto alfarerías de esta época. En la capital, en cambio, se conocen citas documentales de talleres (Batllori & Llubià 1974, 117; Riu 1990, 112-113; Padilla & Vila 1994) e incluso se ha localizado uno de ellos cerca del monasterio de Pedralbes y existen referencias de otro en el área de la plaza del Duque de Medinaceli (Riu 1980b, 112). No obstante, la mayoría del material aparecido recientemente se encuentra inédito, debiendo ceñirse el repertorio de piezas estudiadas a unas pocas de la capital unidas a las de yacimientos periféricos.

En Barcelona conocemos directamente los materiales descubiertos en la iglesia de Sant Llätzer, que se han de situar a finales del siglo XII o inicios del XIII. Esta cerámica es similar a la de un lote estratificado al construirse Santa María de Castelldefels (Fig. 12: 2), consagrada entre 1100 y 1106. A la vez, los dos grupos, sobre todo el segundo, se pueden asociar a una serie de ollas, mayoritariamente de pasta oxidada aparecidas en la ermita de Bellvitge (l'Hospitalet de Llobregat) (Fig. 12: 1) de hacia principios del siglo XII, y en la de Sales (Viladecans) fuera de contexto, en la Torre del Baró (Viladecans) fechadas en el siglo XIII avanzado, o bien en la iglesia de Santa Margarida de Sant Genís de Rocafort (Martorell) (Fig. 12: 4). En este último yacimiento, en los rellenos de un campo de silos amortizado en la segunda mitad del siglo XII, aparecieron lebrillos con reborde horizontal (Fig. 12: 6), vertedor pinzado (Fig. 12: 5) e incluso encaje para tapadera (Navarro & Mauri 1986, 491-493). Por último debe mencionarse una olla aparecida en las bóvedas de la Pia Almoïna de Barcelona, fechada en los siglos XIV-XV, que adopta la misma morfología y presenta una pasta similar a las ya enumeradas. Acaso indica un momento final de la producción o se trata de una pieza residual (Beltrán de Heredia 1994, 141, fig. 62).

El Berguedà

Se trata de una zona relativamente bien conocida. Las secuencias estratigráficas que hemos descubierto en las iglesias antes citadas de Sant Vicenç de Rus y Sant Quirze de Pedret y en el monasterio de Sant Llorenç prop Bagà (Guardiola de Berguedà) han permitido identificar cuatro *facies* de cerámica gris

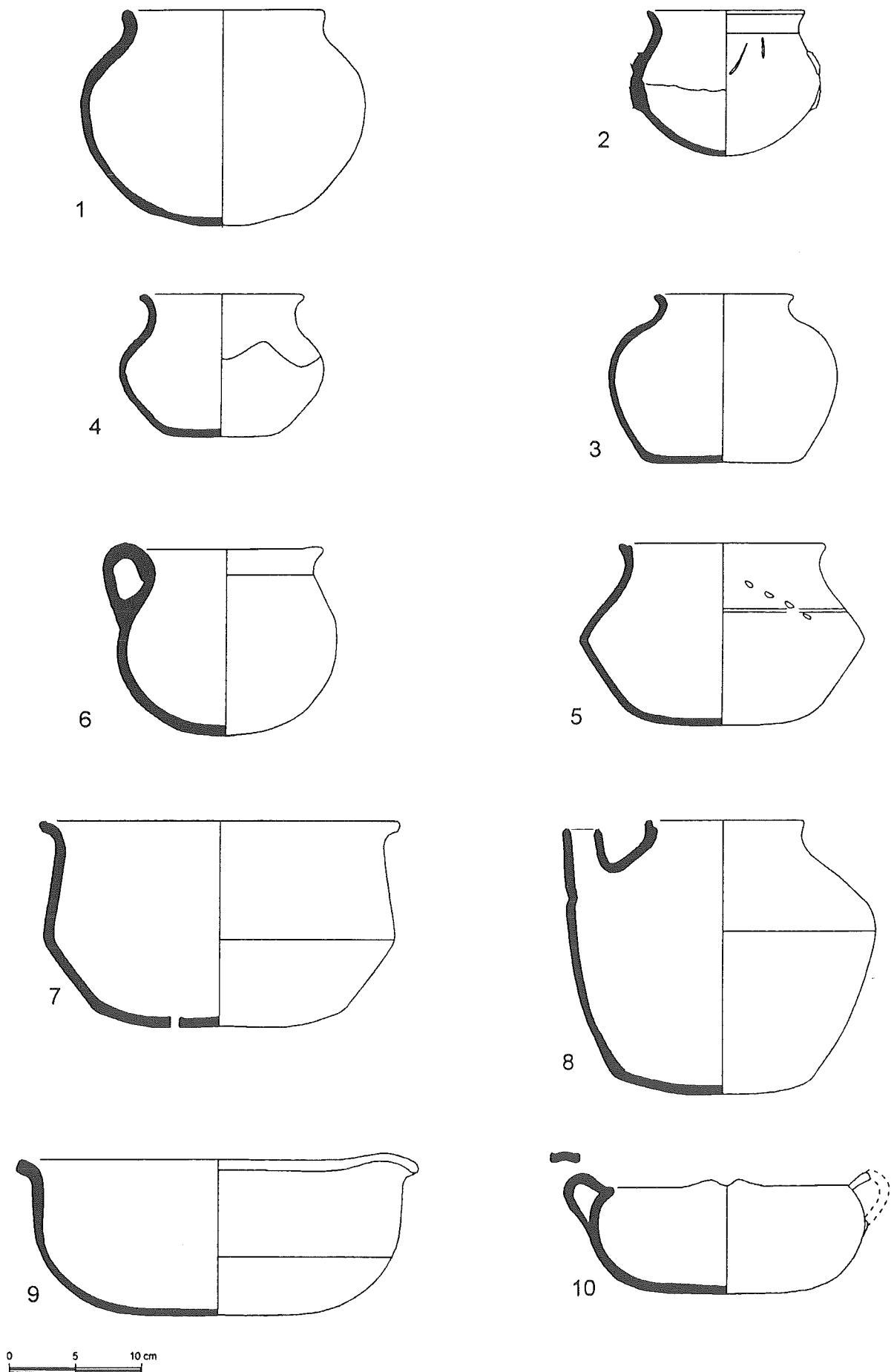


Fig. 6. Cerámica del Berguedà.

1: Montclar de Berguedà (según Bolòs y C. Riu). Cerámica del Bages; 2: Sant Miquel, Cardona; 3: Bergús, Cardona (según Bertrán); 4, 6 y 10: Sant Marçal de Relat, Avinyó (según Bolòs); 5, 7-9: El Carme, Manresa (según Bolòs y Padilla).

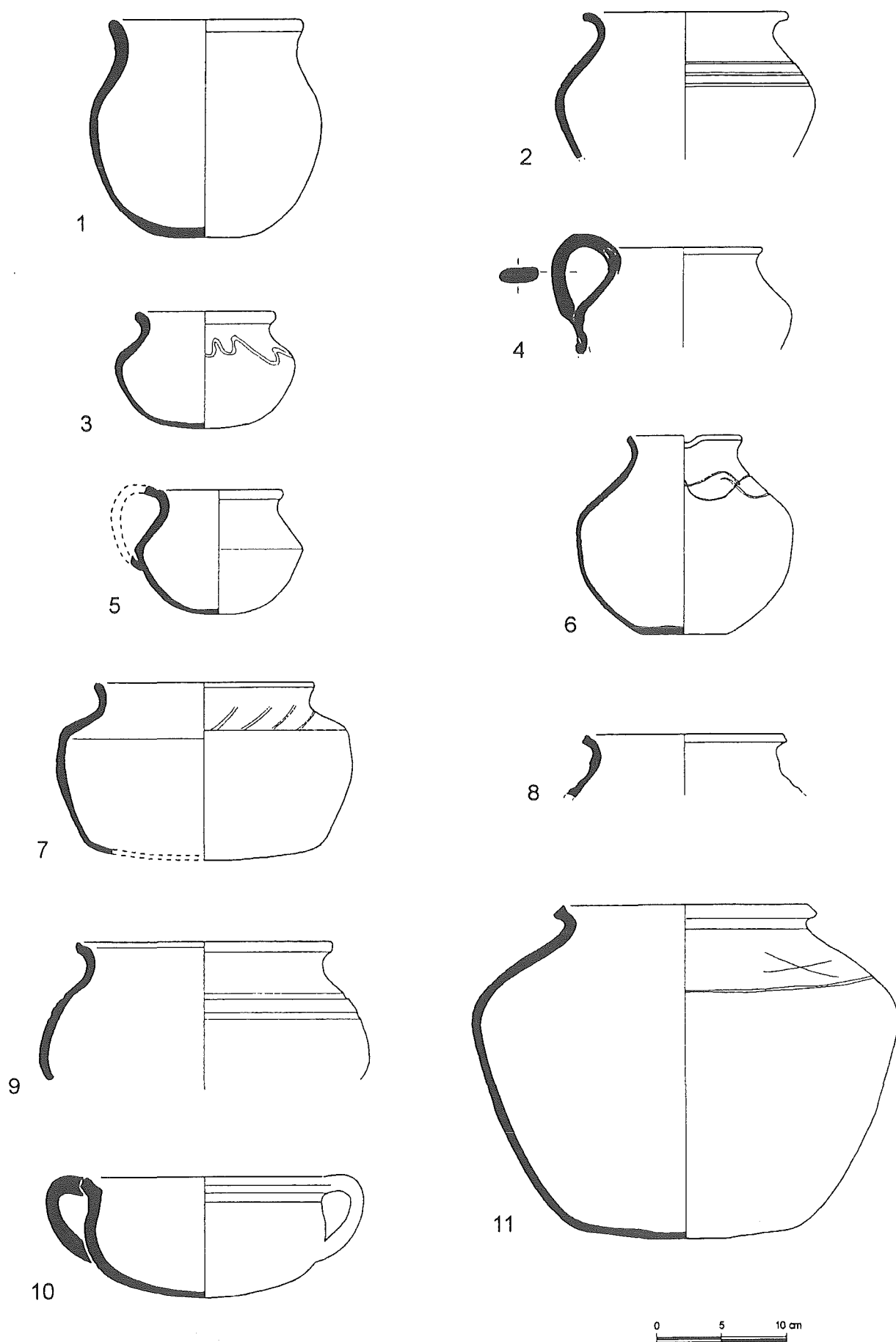


Fig. 7. - Cerámica de Osona.

1, 3, 5, 10-11: l'Esquerda, Masies de Roda (según Ollich); 2 y 7: Sant Quirze, Muntanyola; 4, 6 i 8: Santa Eulàlia de Riuprimer; 9: Sant Boi de Lluçanès.

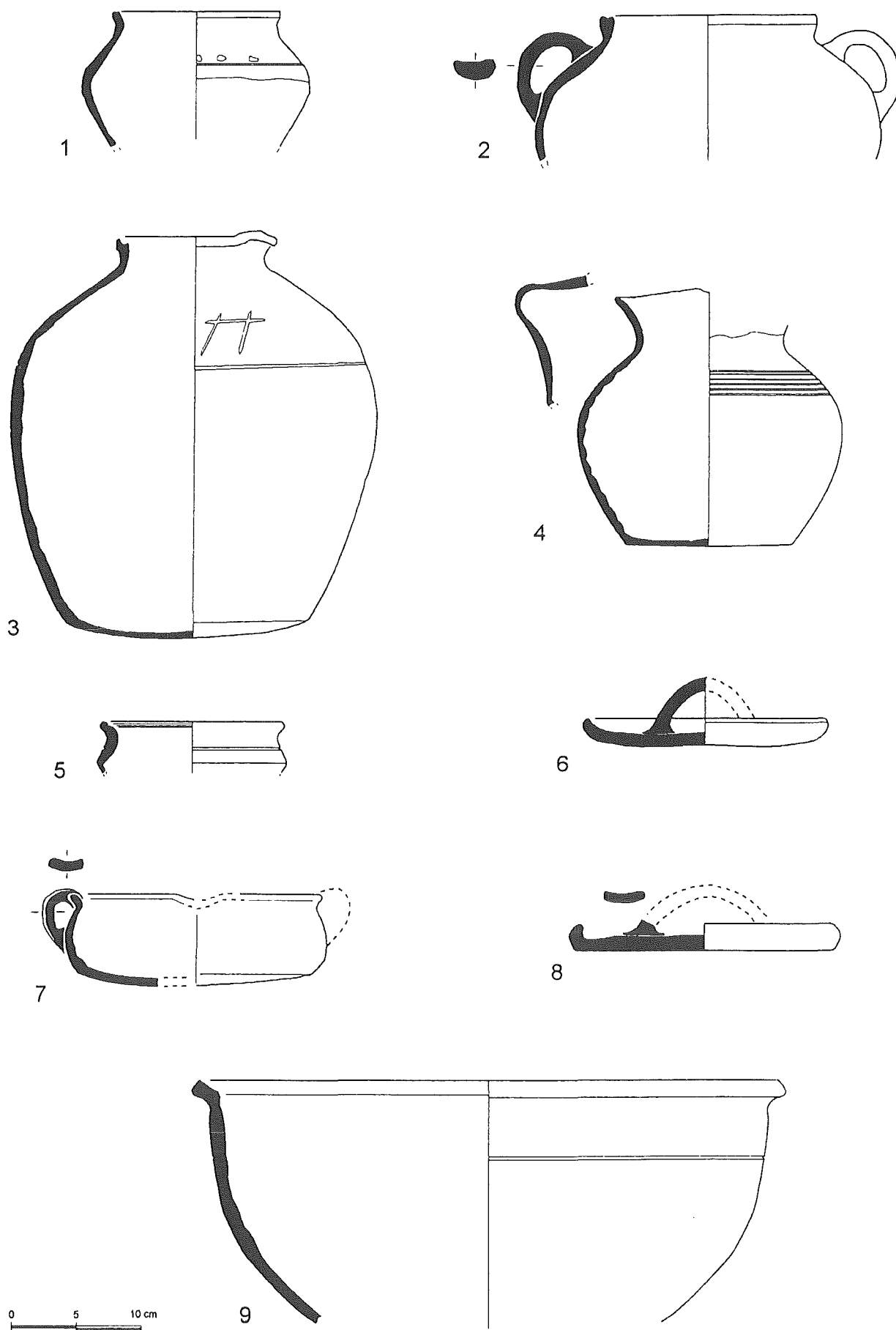


Fig. 8. - Cerámica del Anoia.

1, 3, 7-8: Cabrera d'Anoia (según Leenhardt, Padilla, Thiriot y Vila); 2: Cabrera d'Anoia (según López Mullor y Nieto); 4: Les Ferreries, Piera; 5-6: Santa Maria, Rubió; 9: Castell, Mediona.

características. Las dos primeras, que ya hemos visto, se fechan entre los siglos VII y X. A finales del siglo X se observa un cambio en el ajuar doméstico con la aparición de un repertorio formal que permanece hasta finales del siglo XI. Los centros productores de estas cerámicas todavía no se han descubierto. A principios del siglo XII entra en funcionamiento el taller de Casa En Ponç (Berga), que distribuye sus productos en este área hasta bien entrado el siglo XIII.

En los últimos años del siglo X se aprecia un descenso en la calidad de las manufacturas respecto de las inmediatamente anteriores: el torneado se vuelve descuidado, las paredes son más gruesas, las arcillas están peor decantadas, la cocción se realiza a temperatura menor y el repertorio formal se reduce. De aquel momento conocemos material hallado en Pedret y Sant Llorenç prop Bagà. Los estratos fundacionales de la basílica de este cenobio consagrada el año 983 (López Mullor & Caixal 1995a, 56), ofrecen un repertorio formal homogéneo caracterizado por las ollas de borde exvasado redondeado y a veces zoomórfico con carena alta y fondo cóncavo (Fig. 5: 3), también aparecen cazuelas de borde grueso y exvasado. La decoración puede ser de cordones con impresiones digitales situados en la carena, o incisa de trazos oblicuos bajo el borde. En la iglesia de Pedret se halló un conjunto fechado en los primeros decenios del siglo XI (*Id.* 1995 b, 240-243, lám. IV, VIII-IX). En este caso volvemos a encontrar ollas de borde exvasado (Fig. 5: 6), así como una tapadera.

Aunque de momento desconocemos centros de producción en la comarca contemporáneos de estas producciones, otros yacimientos han proporcionado algunas piezas significativas. Tal es el caso de Sant Pere de Grau d'Escales (Montmajor), con una datación del siglo X y primera mitad del siglo XI, y el Roc de la Palomera (Saldes) con material del siglo XI (Riu 1975, 285, fig. 10.4, 6-7).

La alfarería de Casa En Ponç (Berga) se excavó a finales de los años cincuenta, permaneciendo el material mayoritariamente inédito (Riu 1975 y 1980a, 56-59) hasta ser objeto de estudio por parte de J.I. Padilla, quien dio a conocer sus caracteres generales y tipología (Padilla 1984). La cronología de su actividad parece centrada en los siglos XII y XIII. Las pastas de la cerámica que allí se obró son blandas, porosas y de factura esquistosa, adoptando sus colores un abanico amplio de tonalidades grisáceas, desde el siena al negro. El desgrasante comprende buena cantidad de nódulos pequeños de cuarzo y mica. Los motivos decorativos, realizados con un punzón fino y romo, son líneas horizontales, meandros y trazos que forman aspas (Fig. 5: 2, 5, 7).

Los trabajos recientes en yacimientos de la zona han contribuido a confirmar la datación del período productivo de este alfar y a averiguar el área que pudo abastecer (fig. 3). En primer lugar, cabe citar el *Mas A* de Vilosiu (Saldes), una parte de cuya cerámica parece proceder de Casa En Ponç, de acuerdo con los análisis químicos (Pradell *et alii* 1991, 605), habiendo sido fechada en el siglo XIII (Bolòs 1985, 239-240). En Pedret este material apareció, junto con piezas más modernas, en estratos de finales del siglo XIII (López Mullor & Caixal 1995b, 243-244). En Sant Llorenç prop Bagà lo encontramos en niveles del siglo XII avanzado (Fig. 5: 4) (*Id.* 1995a, 76). Probablemente, también proceda de este taller una pieza localizada en la necrópolis de Sant Vicenç de Rus (Fig. 5: 10). Así pues, la difusión de sus productos vuelve a indicar un alcance comarcal, seguramente favorecido por el fácil recorrido a través del curso alto del Llobregat.

Además, en Sant Sebastià del Sull (Saldes) se encontró una olla *cannata* (Fig. 5: 8) ligeramente anterior a los productores de Casa En Ponç (Riu 1981, 215-217). Su perfil se parece al de una ollita sin vertedor descubierta en Montclar (Fig. 6: 1) fechada hacia finales del siglo XI o principios del XII (Bolòs & Riu 1985, 318). También se conocen dos piezas muy similares entre sí, una del *Mas A* de Vilosiu (Fig. 5: 9) (Bolòs 1985, 239-240) y otra del Roc de Palomera (Riu 1975, 285, fig. 11.1-3), que no se parecen en absoluto a las de Casa En Ponç. La primera se ha datado en los siglos XIII-XIV y la segunda en el XI.

El Anoia

En esta comarca hemos documentado cerámica en Santa María de Rubió, que debe fecharse hacia el último tercio del siglo XI. Se trata de recipientes de borde exvasado y redondeado, presentes en otros yacimientos de la zona, como el Collet de Sant Pere Màrtir (Òdena) (Enrich 1992, 450) o la Tossa de Montbui (Santa Margarida de Montbui) (Enrich & Enrich 1978, fig. 3), fechados en los siglos XI y XII. A partir de la segunda mitad del siglo XII y durante el XIII y XIV se documentan las actividades de dos alfarerías: Cabrera d'Anoia o d'Igualada, bien conocida, y otra todavía no localizada, posiblemente más tardía, que se intuye a través del hallazgo de sus productos en algunos yacimientos de la comarca.

Parece que a mediados del siglo XII se inició la actividad del alfar de Cabrera. La arcilla de sus productos es en general bastante homogénea, y se caracteriza por estar poco depurada y presentar desgrasante en abundancia, de unos tres milímetros

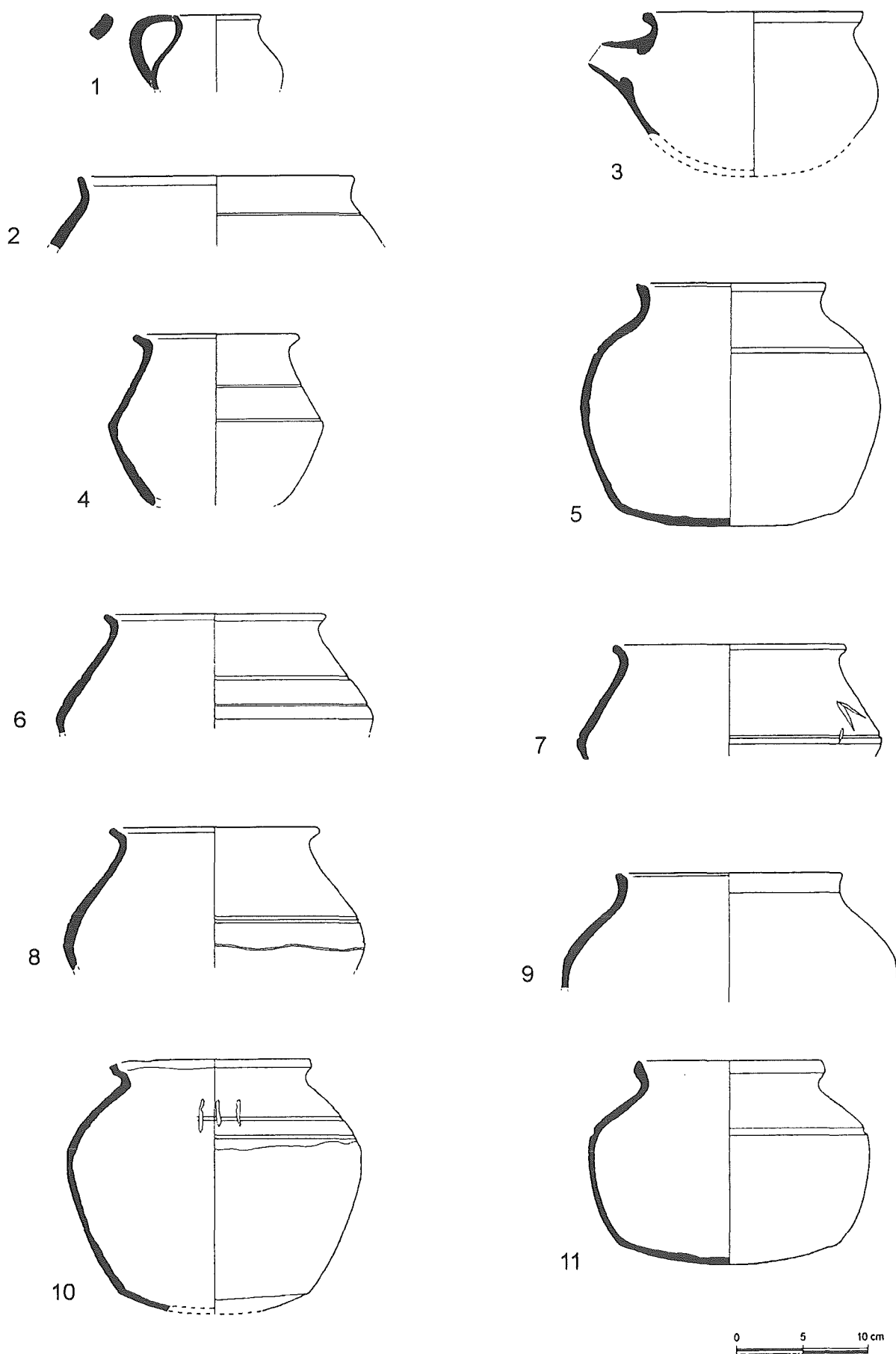


Fig. 9. - Cerámica del Anoia.

1-2: Santa Càndia de Orpi; 3 i 9: Cabrera d'Anoia (según López Mullor y Nieto); 4 i 8: Santa Maria, Rubió; 5, 7 i 11: Sant Jaume Sesoliveres, Igualada; 6: Castell, Mediona; 10: Cabrera d'Anoia (según Leenhardt, Padilla, Thiriort y Vila).

de espesor y procedente de la roca granítica. Las pastas son duras y porosas, generalmente de color plúmbeo, aunque aparecen ejemplares negruzcos. La factura es tosca. Es frecuente la presencia de decoración incisa colocada en el tercio superior de la pieza, compuesta por líneas longitudinales y paralelas, trazos verticales y oblicuos que a veces forman aspas, o bien de ambos motivos combinados (Fig. 8-9).

Este centro se conoce desde los años cuarenta, cuando se recogieron materiales de superficie, pero su primera excavación tuvo lugar en 1974. Entonces publicamos una tipología sucinta de la producción de la alfarería y se propusimos una datación centrada entre la segunda mitad del siglo XII y el tercer cuarto del siglo XIII (López Mullor & Nieto 1979). Entre 1987 y 1993, en el yacimiento han tenido lugar nuevas campañas a consecuencia de las cuales han aparecido variantes de las formas definidas en la primera serie, o bien de las que se habían descubierto más tarde en yacimientos periféricos. Estos trabajos en la alfarería han dado lugar a que sus excavadores formularan dos propuestas cronológicas para su período de funcionamiento. La primera abarcaba desde finales del siglo XI o *probablemente del siglo IX (sic)* hasta más allá del final del siglo XIII (Leenhardt, Padilla, Thiriot & Vila 1993, 176), mientras que la segunda se ha circunscrito a los siglos XII-XIV (Padilla & Vila en prensa).

Por nuestra parte, hemos matizado la cronología propuesta en 1979, a la vista de los resultados de nuestras excavaciones recientes en yacimientos periféricos, ya aludidas. En Santa María de Rubió contamos con un conjunto de piezas fechado en el último cuarto del siglo XIII a tenor de su asociación con un grupo de monedas (Fig. 8: 5-6; 9: 4, 8). En Sant Miquel de Veciana se hallaron cerámicas de una fecha similar, también asociadas a piezas numismáticas. En Santa Cànidia d'Orpí el material de Cabrera, que era minoritario, apareció en un contexto situable entre finales del siglo XIII y mediados del XIV (Fig. 9: 1-2), de nuevo gracias a monedas y a datos documentales. Además, en Sant Jaume Sesoliveres (Igualada) se encontraron piezas pertenecientes a sendos depósitos de principios del siglo XIII y mediados del XIV (Fig. 9: 5, 7, 11), siempre acompañados de numerario, siendo en el segundo la cerámica de Cabrera mayoritaria pero no exclusiva. En la iglesia de Sant Pere de Castellfollit del Boix, situada en la comarca del Bages, en el límite con la del Anoia, se identificó una pieza de Cabrera. El material del castillo de Mediona (Fig. 8: 9; 9: 6), que hemos tenido ocasión de estudiar gracias a M. Barceló y H. Kirchner, se puede fechar hacia el 1300, a través de su asociación con monedas y cerámica fina.

Estos ejemplos indican que la datación del tercer cuarto del siglo XIII para el cese de la actividad en el taller de Cabrera, que aventuramos en un principio, debería rebajarse como mínimo hasta los dos o tres primeros decenios del siglo XIV, sin descartar una producción algo más larga. Últimamente también ha mejorado nuestro conocimiento de la difusión de los productos de este centro, gracias a la comparación con los nuevos materiales hallados y, en algún caso, a la realización de análisis de pastas (Vendrell & Molera en prensa). En la figura 3 se puede observar que, de momento, sobrepasa los 20 km en línea recta (Veciana) y llega a las comarcas vecinas (Castellfollit del Boix, Mediona). Se trata, posiblemente, de uno de los centros con mayor proyección, aunque el alcance de sus exportaciones, relativamente escaso, resulta muy típico dentro del conjunto de talleres de esta época.

Como han evidenciado las excavaciones de Sant Jaume Sesoliveres o Santa Cànidia d'Orpí, en esta zona existen materiales contemporáneos o posteriores a los de Cabrera. El origen de todos ellos es, por ahora, desconocido, pero la mera presencia de los primeros demuestra que este taller no tuvo la exclusiva del mercado. Además, se conoce una olla procedente de Les Ferreries (Fig. 8: 4), que presenta una textura similar a la del material de Cabrera. M. Riu (1990, 112) plantea la posibilidad de que en este lugar existiese un centro productor pero por ahora no ha sido localizado.

Otras producciones

El repertorio visto hasta aquí no agota la nómina del material propio de las comarcas barcelonesas. En el Vallès Occidental, por ejemplo, se conoce el taller de la Vinya d'en Sant (Castellar del Vallès), cuya actividad se ha datado entre finales del siglo XII y finales del XIII, habiéndose establecido una difusión de sus productos, que como viene siendo habitual se restringe a esta comarca (fig. 3) (Coll, Molina & Roig 1994, 834-836). Es probable que una de las piezas que presentamos, procedente de la plaza de Sant Roc de Sabadell (Fig. 11: 2) y datable a nuestro juicio en el siglo XIII avanzado, sea originaria del centro referido. Además, existen materiales anteriores hallados en otros yacimientos. En Santa Maria de Ègara se localizaron diversas formas, la más antigua de las cuales (Fig. 11: 7) data de mediados del siglo XI, aun cuando existen otras típicas del XII (Fig. 11: 2, 6) (Moro & Roig 1994, 619-624). En L'Aiguacuit (Terrassa) (Fig. 11: 4), aparecieron ollas que se fecharon en los siglos X-XI (Barrasetas, Martín & Palet 1994, fig. 73). A nuestro entender, sin embargo, el ejemplar que presentamos puede ser más tardío.

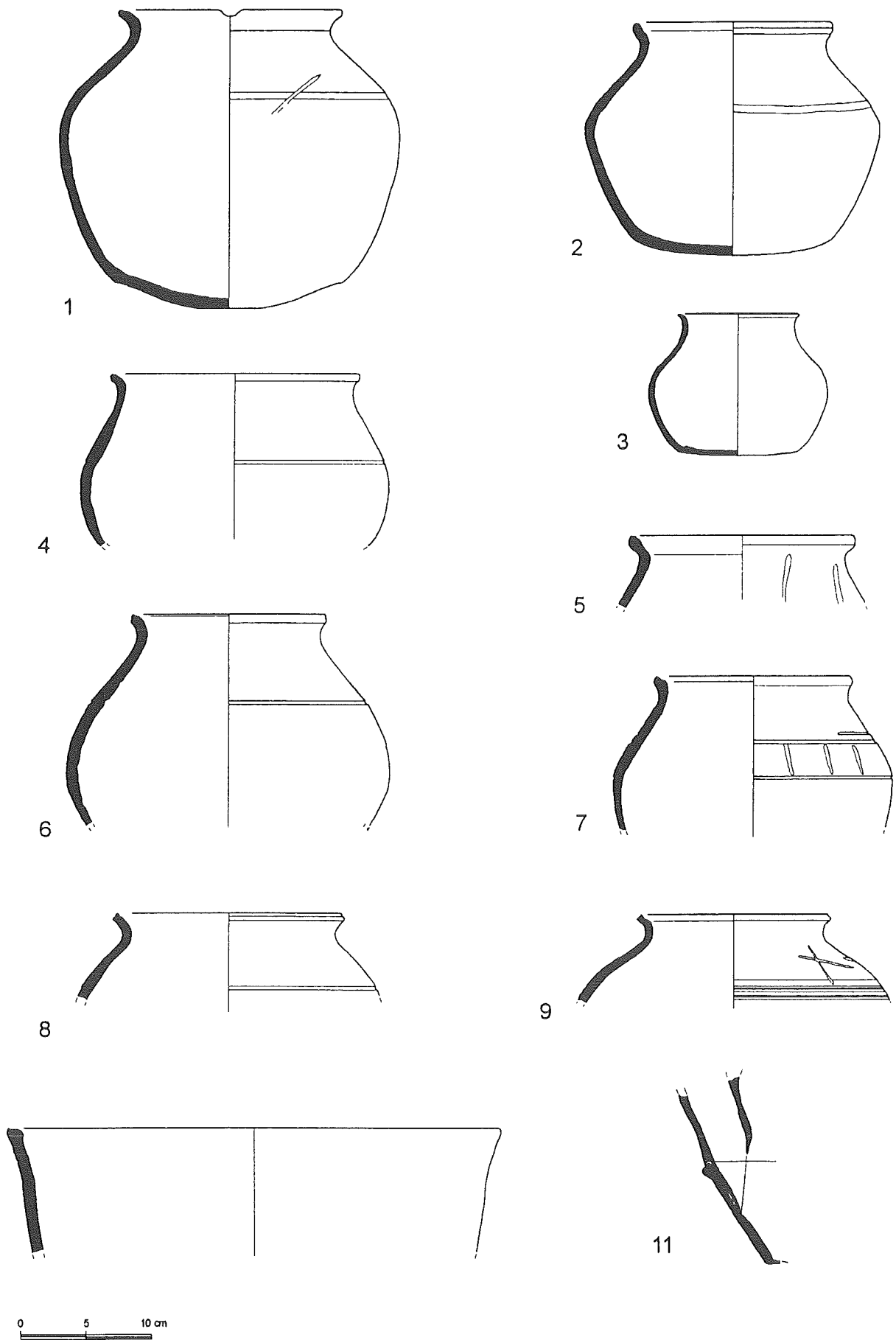


Fig. 10. - Cerámica del Penedès.

1-2: Can Marimón, Mediona (según Roig, Molina y Coll); 3, 7 y 11: Olèrdola; 4-6, 8-10: Santa Maria de Lavit, Torrelavit.

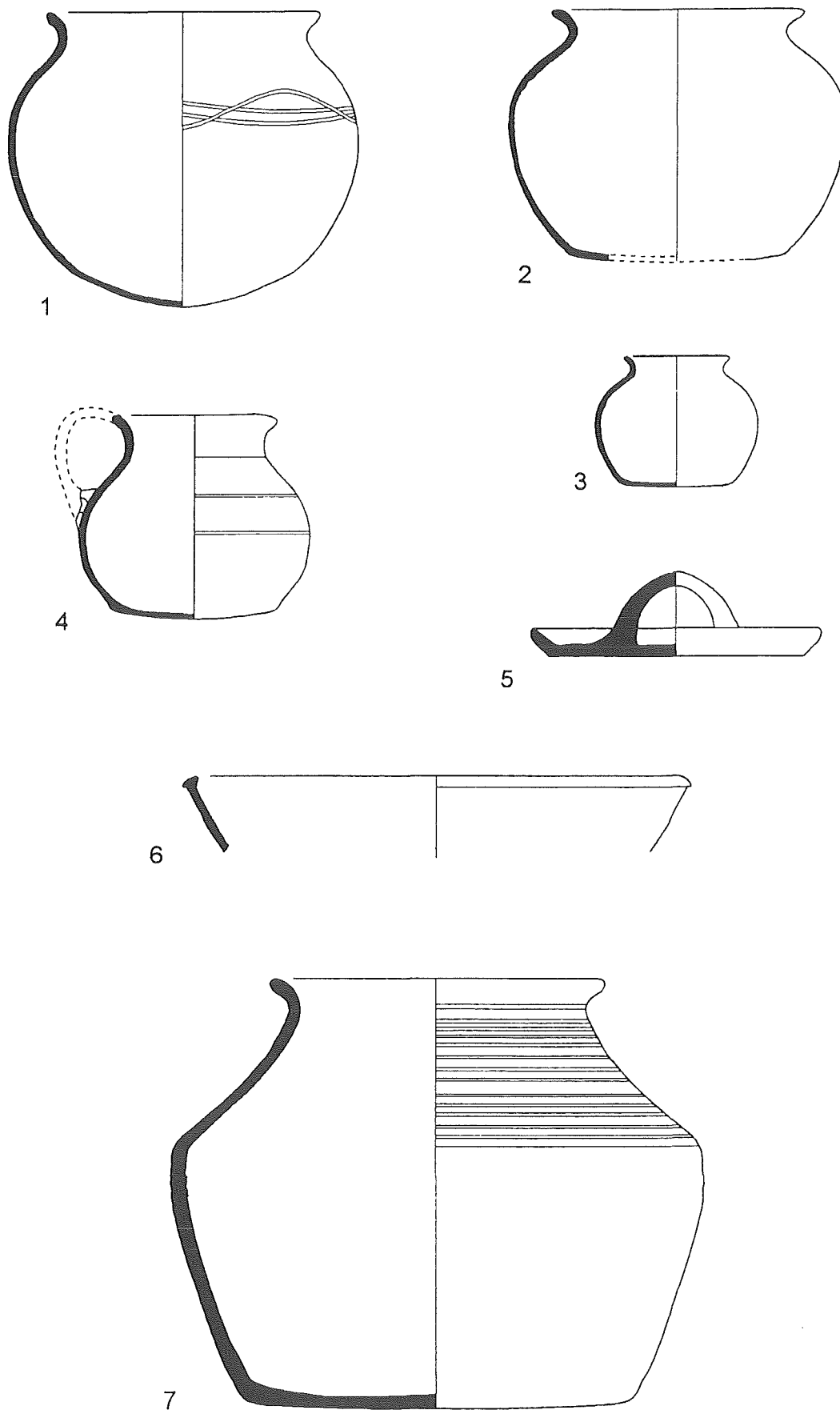


Fig. 11. - Cerámica del Vallès.

1 y 5: La Vinya d'en Sant, Castellar del Vallès (según Coll, Molina y Roig); 2: La Salut, Sabadell; 3, 6-7: Santa Maria d'Ègara, Terrassa (según Moro y Roig); 4: Aiguacuit, Terrassa (según Barrasetas, Martín y Palet).

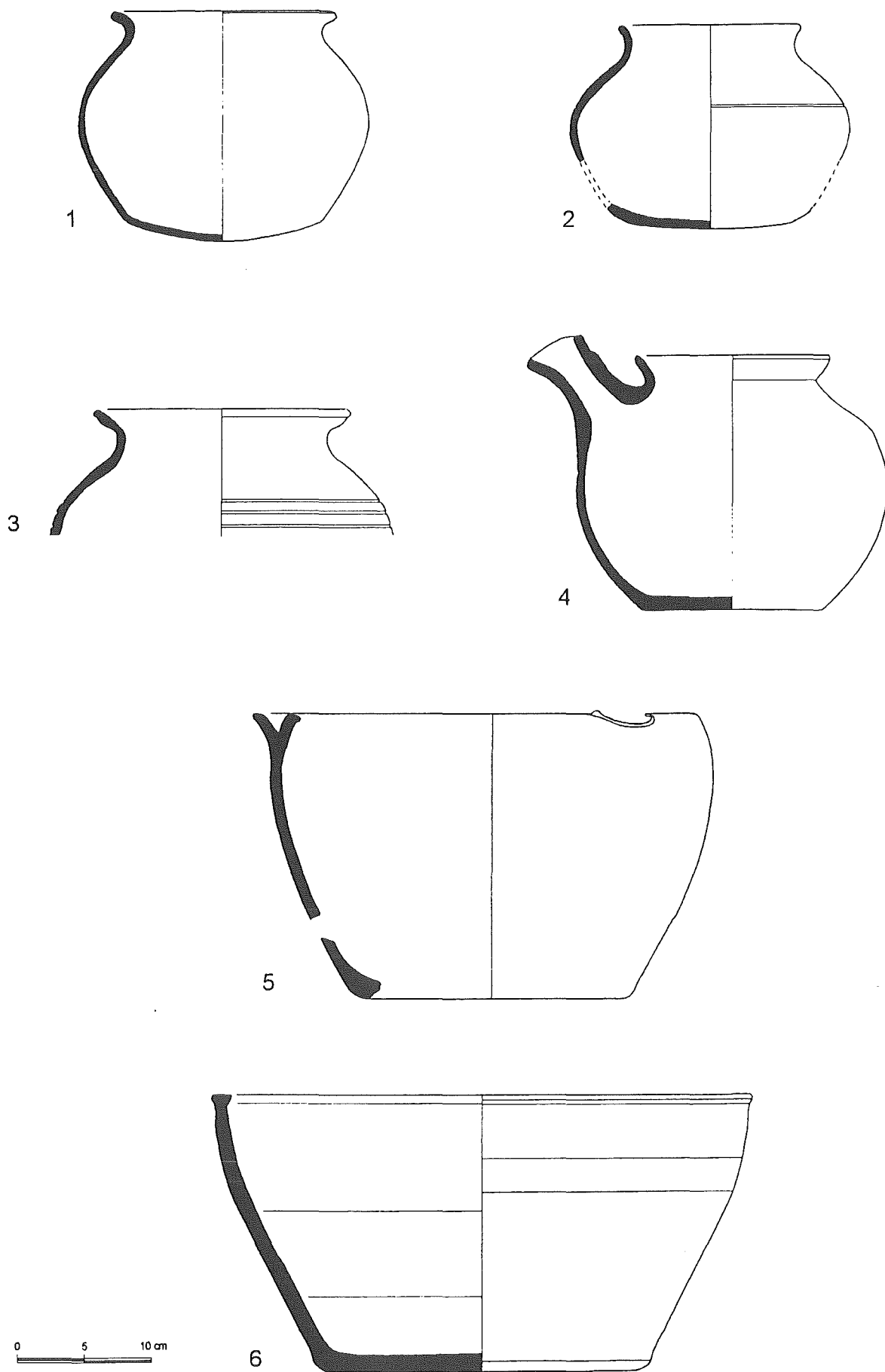


Fig. 12. - Cerámica del Barcelonès y el Baix Llobregat.

1: Nuestra Señora de Bellvitge, l'Hospitalet de Llobregat; 2: Santa Maria, Castelldefels; 3: Torre del Baró, Viladecans; 4-6: Santa Margarida de Sant Genís de Rocafort, Martorell (según Navarro y Mauri).

En el Maresme, la comarca costera situada al norte de Barcelona, la intensidad de las excavaciones en yacimientos de este período ha sido escasa, habiéndose publicado sólo algunas piezas descubiertas en los estratos superficiales de antiguas villas romanas. Lo más preciso que se puede decir de ellas es que resultan heterogéneas, pues junto a ollas como la de Can Modolell (Cabrera de Mar) muy semejantes a las que hemos visto en la zona de la desembocadura del Llobregat, aparecen piezas como las de Torre Llauder o las de Rocafonda ambas en Mataró, cuyas cronologías tal vez debieran rebajarse.

En la comarca interior del Bages no hay, por el momento, noticia de alfar alguno. No obstante, los hallazgos realizados tanto en su capital, Manresa (Bolòs & Padilla 1986, 254-259), como en otros yacimientos cercanos, tales como Sant Marçal de Relat (Avinyó) (*Id.*, 251-254), Bergús (Bertrán, 1982, 183, fig. 6) y Sant Miquel, ambos en Cardona (Fig. 7: IV.3), son significativos e indican una producción propia entre los siglos XII y XIV. Su epicentro debió estar situado en Manresa, que en el siglo XIV poseía importantes alfares que elaboraron cerámicas comunes y decoradas en verde y manganeso (Batllori & Llubia 1974, 55; Cabestany & Riera 1984, 184; Telese 1992, 94). Por nuestra parte, presentamos una pieza de Sant Miquel de Cardona (Fig. 6: 2), una ollita bastante original de la que sólo conocemos su *taq*, de finales del siglo XIV. A nuestro entender, es un producto relativamente tardío que no tiene nada que ver tipológicamente con la olla de Bergús (Fig. 6: 3), seguramente anterior. También se aleja formalmente del material descubierto en las bóvedas de la iglesia del Carme de Manresa, que se ha fechado entre 1322 y 1428 (Fig. 6: 5), lo que nos hace pensar en un producto tal vez local o *regional*, no muy anterior al *taq* mencionado. En esta misma iglesia se documentó un lote importante de jarras (Fig. 6: 8) y lebrillos (Fig. 6: 7, 9). Por otra parte, es conocido el yacimiento de Sant Marçal de Relat (Avinyó) que ha proporcionado ollas de borde redondeado (Fig. 6: 6) y cazuelas (Fig. 6: 10), que se han fechado en el siglo XII.

En la comarca del Penedès las investigaciones llevadas a cabo en las iglesias de Sant Valentí de les Cabanyes, Sant Marçal de Terrassola y Santa Maria de Lavit (Kirschner 1989, 56-58), estas dos últimas en el término de Torrelavit, en el santuario de Nuestra Señora de Foix y en el *castrum* de Olèrdola, pese a que han aportado información sobre unos materiales que hasta hace bien poco eran absolutamente desconocidos, todavía no permiten trazar un panorama claro de la producción y difusión de la cerámica gris medieval. Sin embargo, el grupo de piezas situable en el siglo XIII es por el momento el más revelador.

En Mediona, además de los materiales del castillo, ya mencionados, una parte de los cuales proceden de Cabrera d'Anoia, se han publicado piezas del yacimiento de Can Marimon, fechadas en el siglo X (Fig. 10: 1-2) (Roig, Molina & Coll 1992, 125-127), aunque a nuestro juicio presentan similitudes con producciones más tardías. Por otra parte, la excavación de Santa María de Lavit dio ejemplares datados hacia finales del siglo XIII (Fig. 10: 4-6, 8-10). También debe mencionarse un posible lebrillo con vertedor aparecido en Olèrdola (Fig. 10: 11), que no tiene paralelos en este área.

En la comarca del Garraf, la excavación del castillo de Cubelles nos ha proporcionado un lote de cerámica que podría situarse a principios del siglo XIII. No obstante, esta cerámica se encuentra en estudio a la espera de nuevos hallazgos que confirmen la datación propuesta.

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Zur sozialen Aussagekraft mittelalterlicher Keramik aus Hannover

1 Einleitung

In den Jahren 1982-87 führte das Institut für Denkmalpflege Niedersachsen am Bohlendamm die wohl letzte ausgedehnte Stadtkerngrabung in Hannover durch. Die in drei Vorberichten knapp vorgestellten Grabungsbefunde waren 1994 Gegenstand einer Masterarbeit am Lehrstuhl für Archäologie des Mittelalters und der Neuzeit an der Universität Bamberg¹. Der vorliegende Aufsatz stellt einen Auszug der Ergebnisse dieser Arbeit zu den Keramikfunden des hohen bis späten Mittelalters dar. Es erschien sinnvoller, die zentralen Erkenntnisse zur Keramikentwicklung in zugegeben sehr knapper Form bald nach Abschluß der Auswertung vorzulegen als auf eine ausführliche Publikation der Gesamtuntersuchung zu hoffen².

Da mit der demnächst erscheinenden Gesamtpublikation zur mittelalterlichen Keramik in Hannover (Büscher 1996) eine wesentlich umfangreichere Materialbasis zur Verfügung stehen wird, soll in dem vorliegenden Aufsatz nur am Rande auf die weitgehend geklärte, formale und typenkundliche Entwicklung der mittelalterlichen Gefäßkeramik in Hannover eingegangen werden. Dafür sollen die Warenarten, also die über technologische Kriterien definierten Keramikgattungen, im Mittelpunkt stehen.

Die Forschung der vergangenen zwanzig Jahre brachte zahlreiche Veröffentlichungen zur südniedersächsischen Keramikprovinz hervor, darunter mehrere Monographien (jüngst Ring 1990). Gemeinsam ist dieser, von H.G. Stephan begründeten Schule das Bemühen um eine möglichst differenzierte Aufgliederung des Fundmaterials in Warenarten und -Varianten.

Da die so definierten Warenarten schon für den heutigen Bearbeiter z.T. nicht mehr nachzuvollziehen bzw. wiederzuerkennen sind (z.B. Glüsing & Röber 1992, 138, Anm. 17), wurde für die Auswertung des Fundmaterials vom Bohlendamm ein anderer Weg gewählt:

Die Keramikfunde sollten nach technologischen Kriterien (Härte, Brandführung, Magerung, Bruch- und Oberflächenbeschaffenheit) so gegliedert werden, daß diese Einteilung einerseits auch für den mittelalterlichen Menschen erkennbar gewesen wäre, andererseits durch petrographische Analysen zu Beschaffenheit und Herkunft abgestützt werden³. Die Zugkraft dieses Ansatzes wurde jüngst durch die petrographischen Analysen zur Braunschweiger Keramik untermauert, die ebenfalls eine wesentlich gröbere Materialgruppengliederung zutage brachte als bislang vermutet (Scholz & Rötting 1995).

2 Die Definitionen der Warenarten

2.1 Uneinheitlich gebrannte, ältere Kugeltopfkeramik (Warenarten a und b)

Die bereits von P. Grimm (1959) ausgeschiedene ältere Kugeltopfkeramik ist am Bohlendamm in zwei Varianten vertreten, die sich über die tendenzielle Brandführung unterscheiden lassen: die oxidierend gebrannte Ware a und die reduzierend gebrannte Ware b. Beide Warenarten stammen nach dem petrographischen Befund aus dem norddeutsch-hannoverschen Raum. Sieht man von der brandführungs- oder lagerungsbedingt unterschiedlichen Farbe des Scherbens ab (orangebraun bzw. schwarzgraubraun), glei-

¹ Der ausführlichste Vorbericht: Büscher u.a. 1984. Die Arbeit Atzbach 1994 ist über die Universitätsbibliothek Bamberg ausleihbar, ferner liegt je ein Exemplar beim Institut für Denkmalpflege und beim Historischen Museum in Hannover.

² Die wichtigsten hauskundlichen Ergebnisse werden in einem Aufsatz in den *Nachrichten aus Niedersachsens Urgeschichte* 1997/1 (im Druck) vorgelegt.

³ Nomenklatur nach Bauer u.a. 1986 unter Berücksichtigung von Erdmann u.a. 1984. Farbangaben nach Michel-Farbenführer, Farbentafeln für Briefmarkensammler³³ (Ohne Jahr). Die petrographischen Analysen führte dankenswerterweise Herr Dipl.-Geol. P. Scholz, Würzburg durch, seine Ergebnisse sind in Atzbach 1994, Anhang 4 dargestellt.

chen sich beide Varianten hinsichtlich der übrigen Kriterien: die Magerung besteht aus mittleren bis sehr groben weißen bis rötlichen Feldspatpartikeln, dazu kommt ein wahrnehmbarer Glimmeranteil. Der Scherben ist hart gebrannt, nach der Größe der Magerungskörner wird jeweils in eine grob (a1/b1) und eine mittel gemagerte Variante (a2/b2) unterschieden. Die letztere ist gleichmäßiger gefärbt und sorgfältiger überglättet, der Übergang zu Warenart d3 der jüngeren Kugeltopfkeramik ist fließend.

2.2 Pingsdorffartige, hellgrundige Warenart c

Harte bis sehr harte, hellgrundige und vereinzelt mit rotem bis rotbraunem Pinselstrich bemalte Ware liegt in drei Varianten vor, für die als Herkunftsgebiet das südniedersächsische Pottland festzustellen ist.

Variante c1 zeigt im Bruch feine, kaum wahrnehmbare Partikel durchsichtigen Quarzes. Im Gegensatz zur braungrauen bis hellmattbraunen Oberflächenfarbe dieser und der beiden übrigen Varianten ist der Kern stets schwarz. Die Oberfläche läßt deutliche Riefen von der Herstellung auf der schnellaufenden Drehscheibe erkennen.

Variante c2 unterscheidet sich durch die homogene Farbe, aber auch durch die Magerung aus mittleren, undurchsichtigen Quarzkörnern, die an die deshalb sandpapierartig rauhe Oberfläche hervortreten. Diese wirkt insgesamt unregelmäßig und zeugt von freihändiger Aufformung und anschließender Überformung auf einer Arbeitsscheibe.

Variante c3 wurde wie c1 – an die sie sehr erinnert – auf der schnellaufenden Drehscheibe geformt, allerdings fühlt sich die Oberfläche kreidig an.

2.3 Einheitlich reduzierend gebrannte, jüngere Kugeltopfkeramik (Warenart d)

Gemeinsam ist den drei Varianten der jüngeren Kugeltopfkeramik die charakteristische braungraue bis schwarzgraubraune Oberfläche („Grauware“, „grautonige Irdenware“), der sorgfältige und einheitliche reduzierende Brand und der harte bis sehr harte Scherben.

Variante d1 ist mit runden oder kantigen, feinen und stets durchsichtigen Quarzkörnern gemagert. Vereinzelt größere Partikel sind ebenso die Ausnahme wie Basalteinschlüsse. Die Partikeldichte ist deutlich höher als bei der älteren Kugeltopfkeramik, ausgebrochene Körner hinterlassen Höhlungen, die den charakteristischen „wabenartigen“ Bruch ergeben, der stets heller als die Oberfläche gefärbt ist. Die Wandscherben lassen die Verwendung der schnellaufenden

Töpferscheibe deutlich erkennen, lediglich die Kugelböden sind freigeformt, aber überglättet.

Variante d2 entspricht technologisch d1, sie unterscheidet sich jedoch deutlich durch ihre schwarzgraubraune Oberfläche, der Bruch ist stets hellgraubraun. Weite Partien der Innen- und Außen-seite zeigen einen charakteristischen, metallischen Glanz (self-slip-Engobe). Im Verein mit der tendenziell höheren Härte weist er auf eine höhere Brenntemperatur hin. Der Übergang zu d1 ist fließend. Sowohl d1 als auch d2 stammen nach Ausweis der petrographischen Analyse aus dem Raum Duingen/Coppengrave.

Variante d3 weicht deutlich von den beiden übrigen Varianten ab. Im Bruch sind runde oder kantige, weiße, undurchsichtige Quarzpartikel zu erkennen. Obwohl sie meist von feiner Korngröße sind, gibt es auch mittlere oder grobe Einschlüsse. Die Gesamterscheinung der Oberfläche erinnert an Variante d1, klar abweichend ist jedoch der im Kern schwarze bis braunschwarze Bruch, der auch kompakter wirkt als die „wabenförmige“ Struktur von d1 oder d2. Die Gestaltung der Wandscherben ist deutlich unregelmäßiger als bei den beiden anderen Varianten und weist auf den Gebrauch einer langsamlaufenden Arbeitsscheibe. Der petrographische Befund stellt d3 eng zur älteren Kugeltopfkeramik und läßt den Ursprung im Raum Hannover erkennen.

2.4 Faststeinzeug und Steinzeug (Warenart e)

Diese Warenarten seien lediglich kurz angesprochen: mit Variante e1 ist das Siegburger Steinzeug bzw. Steinzeug Siegburger Art bezeichnet, bei den Varianten e2 und e3 handelt es sich um rehbraun bis nußbraun engobiertes Faststeinzeug bzw. Steinzeug aus südniedersächsischer Produktion.

2.5 Glasierte Waren

Bereits aus den ältesten Schichten des Bohlen-dammes liegen vereinzelt, frühe glasierte Scherben vor, die sich freilich in Gestalt und Technologie voneinander unterscheiden, gemeinsam ist ihnen lediglich die grünbeige bis olivgelbe Bleiglasur.

Von diesen frühen Vertretern unterscheidet sich die frühneuzeitliche „Hafnerware“ deutlich, die hier nur der Vollständigkeit halber angesprochen sein soll. Die Magerung ist kaum erkennbar, der mattbräunlichrote Bruch zeigt allenfalls vereinzelt Schamottpartikel. Der Scherben ist hart bis sehr hart und stets oxidierend gebrannt. Die Fertigung erfolgte konsequent, auch bei Kugeltöpfen, auf der schnellaufenden

Abb. 1. - Hannover-Bohlendamm. Die Verteilung der Randformen über die Warenarten der Irdenware.

II	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30-31	
a1	■			■				■				■	■																		
a2	■ ■											■																			
b1	■		■	■ ■	■			■ ■	■ ■ ■		■																				
b2	■ ■ ■	■ ■ ■	■		■ ■			■	■ ■ ■	■	■ ■ ■ ■	■	■ ■ ■	■																	
c1												■ ■																			
c2	■		■								■ ■		■																		
c3					■		■				■ ■	■																			
d1						■				■	■ ■	■ ■	■ ■ ■	■ ■	■ ■ ■ ■	■	■ ■	■	■	■	■	■	■ ■		■	■ ■	■ ■				
d2		■ ■		■						■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■		■ ■		■	■		■ ■	■		■	■	■ ■	■ ■	■ ■	■ ■	
d3													■	■ ■												■		■			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30 31	

Abb. 2. - Hannover-Bohlendamm. Die Stellung der Randformen in der relativen Chronologie (Horizonte).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
A	■	■		■	■				■	■	■																					
A/B	■	■	■	■	■			■	■	■	■	■	■	■			■															
B					■			■							■	■			■	■												
C					■		■				■	■	■	■	■	■	■						■				■	■		■	■	
D		■						■			■	■	■	■	■			■			■	■	■			■	■	■	■			
E		■	■	■		■				■	■	■	■	■	■	■	■		■							■	■	■		■	■	
F																																

Randformen der mittelalterlichen Irdenware

	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	
A																											
A/B																											
B																											
C	■		■				■																				
D			■																								
E	■	■	■	■					■				■	■		■	■			■		■	■	■		■	
F					■		■	■	■		■	■		■					■	■		■	■				

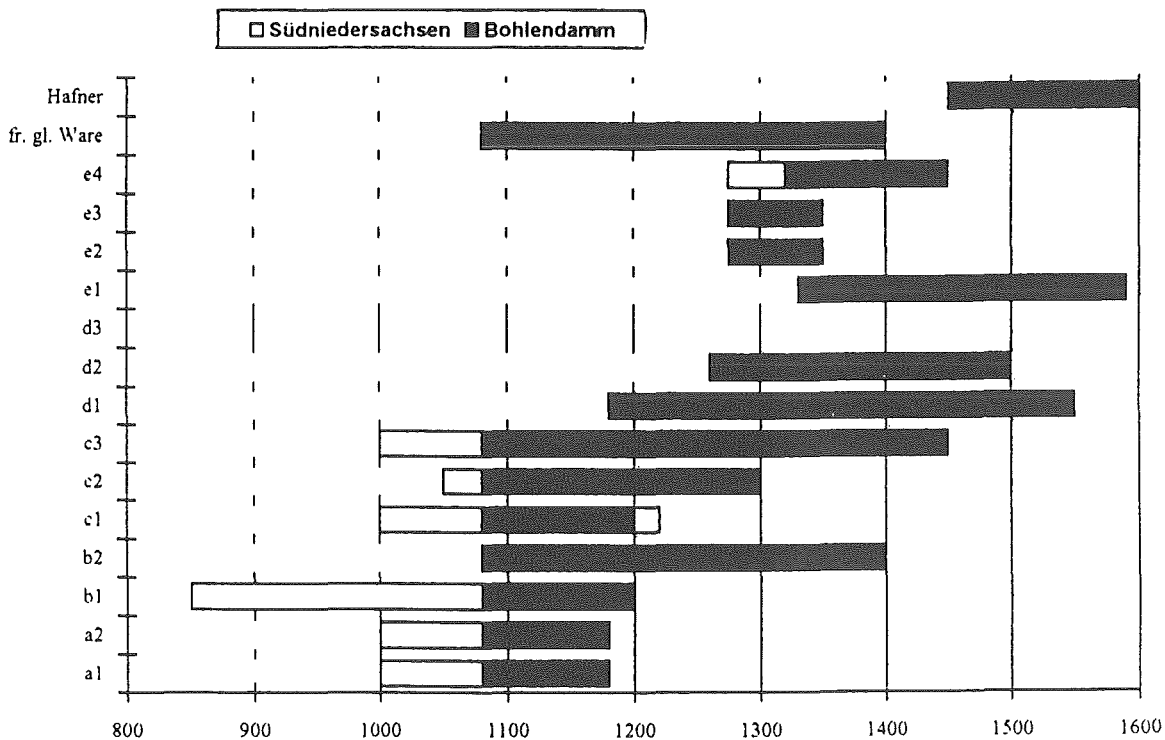
RF Steinzeug

Randformen der Hafnerware

Abb. 3. - Hannover-Bohlendamm. Konkordanz der Mittelalterlichen Keramikwarenarten in Südniedersachsen.
 Abkürzungen: Warenart (Wa), Hälfte (H.), Mitte (M.), Viertel (V.).

Bolen- damm	Hannover (Büscher1992)	Braunschweig (Rötting 1985)	Weserbergland / Pöhle (Claus & Fansa 1983)	Minde (Peine 1988)	Werla (Ring 1990)	tom Roden (Röber 1990)
a	Wa 2301/02 11./12. Jh., S. 114, 129, 133	Granitgrusware E 11./12. Jh., S. 29-31, 152	Wa 220-260 9.-M. 12. Jh., S. 31	Wa 11-12 11./12. Jh., S. 28, 144 f.	Wa 3100, 3200 (=2500) 11./12. Jh., S. 15, 45	Wa 21-24 1. H. 12. Jh., S. 21 f., 116.
b1	Wa 2301/02, 4100-03 11./12. Jh., S. 67, 72	Granitgrusware D/F 9.-12. Jh., S. 29-32		Wa 13 12./13. Jh., S. 28, 144 f.	Wa 2300-2500, 4300/4400 9.-13. Jh., S. 16, 45	Wa 26 12. Jh., S. 24, 116
b2	Wa 4102, 4103 11.-2. H. 13. Jh., S. 91	Granitgrusware F, S. 29-31	Wa 410, 413, 448 M. 12.-13. Jh., S. 32	Wa 33 12. Jh. bis fr. Neuzeit S. 38, 147	Wa 4100 12./13. Jh., S. 17, 45	Wa 40-43 12./13. Jh., S. 29-34, 116, 119
c1	Wa 3303 2. H. 11.-1. H. 13. Jh., S. 103, 129	Gelbe Irdenware J S. 33	Wa 350-360 8.- M. 13. Jh., S. 32	Wa 21 11.-14. Jh., S. 146	Wa 3500 spätes 12./13. Jh., S. 17, 49	Wa 35 12.-M. 13. Jh., S. 26, 116
c2	Wa 3302 2. H. 11.-1. H. 13. Jh. S. 69, 103, 129			Wa 22 11.-14. Jh., S. 146	Wa 3502 spätes 12./13. Jh., S. 17	Wa 35b 12./13. Jh., S. 26, 116
c3	Wa 3400 2. H. 11.-1. H. 13. Jh., S. 70, 129			Wa 3501 spätes 12./13. Jh., S. 17	Wa 35a 12./13. Jh., S. 26, 116	
d1	Wa 4500, 4600 um 1200-15./16. Jh., S. 76 f., 100, 131	Graue Irdenware L/ Mündelkeramik 13.-16. Jh., S. 29, 36, 48	Wa 420-452, 470 12.-15. Jh., S. 32 f.	Wa 31/34 13./14. Jh., S. 146	Wa 4100-4500 12./13. Jh., S. 45-47	Wa 44, 46 M. 13.-16. Jh., S. 36 f., 119 f.
d2	Wa 4700, 4800 13.-16. Jh., S. 100-103, 131		Wa 481-490; Höxter: 420 ! 13.-15. Jh., S. 33 (Stephan, Höxter, S. 59)	Wa 41 13./14. Jh., S. 147	Wa 4700, 4800, 4900 2. H. 13.-16. Jh., S. 19 f. 48	Wa 47-49 M. 13.- M. 16. Jh., S. 38-41, 120
d3	Wa 4200, 4300 12.-15. Jh., S. 92, 95, 132	Granitgrusware N 13. Jh., S. 29, 38		Wa 32-35 13.-15. Jh., S. 36-39, 145		Wa 41-43 13./14. Jh., S. 29-33, 116
e1	Wa 5300 ab 1300, S. 80, 132	Steinzeug ab 1300, S. 48, Tab. 5	Wa 511 14./15. Jh., S. 30	Wa 51 ab 1300, S. 147	Wa 5400 ab. fr. 14. Jh., S. 48	Wa 51 ab 1300, S. 121
e2	Wa 5501 2. H. 13.-14. Jh., S. 108, 131	Fast-/Frühsteinzeug Q 14. Jh., S. 48, Tab. 5	Wa 550-70 M. 13.-15. Jh., S. 33	Wa 45 13. Jh., S. 147	Wa 5100, 5200 3. V. 13.-14. Jh., S. 48	Wa 50, 51, 56 M. 13.-14. Jh., S. 43-47,
e3	Wa 5502 2. H. 13.-14. Jh., S. 108, 131			Wa 46 13. Jh., S. 147		
Fr. glas. Keramik	Wa 6101, 6102 Ende 11.-14. Jh., S.	Bleiglas. Irdenware M hochmittelalterl., S. 37	Wa 600 12.-14. Jh., Stephan, Höxter, S. 59)	Wa 60 11.-14. Jh., S. 148	Wa 6000 12./13. Jh., S. 50	Wa 60 12.-14. Jh., S. 121

Abb. 4. - Hannover-Bohlendamm. Die absolute Chronologie der Warenarten am Bohlendamm und in Südniedersachsen.



fenden Töpferscheibe, die meist innen oder beidseitig aufgetragene Bleiglasur ist sehr homogen.

3 Formengut, Einordnung und Datierung der Warenarten

Die Verteilung der Randformen (RF) über die Warenarten (Abb. 1) und über die Siedlungsperioden (Horizonte) des Bohlendamms (Abb. 2) läßt sowohl die formenkundliche als auch die chronologische Entwicklung der Keramik erkennen. Die oben vorgestellten Warenarten sind mit bereits aus der Forschung bekannten technologischen Gruppen zu identifizieren (Abb. 3), aus diesem Abgleich ergibt sich zunächst eine Bestimmung der „Laufzeit“ der jeweiligen Warenart (Abb. 4), sodann die auch über Vergleiche abgestützte Datierung der Gefäß- und Randformen (Abb. 5) - für die ausführliche Erörterung der Formen nebst Literaturverweise sei auf die Magisterarbeit verwiesen:

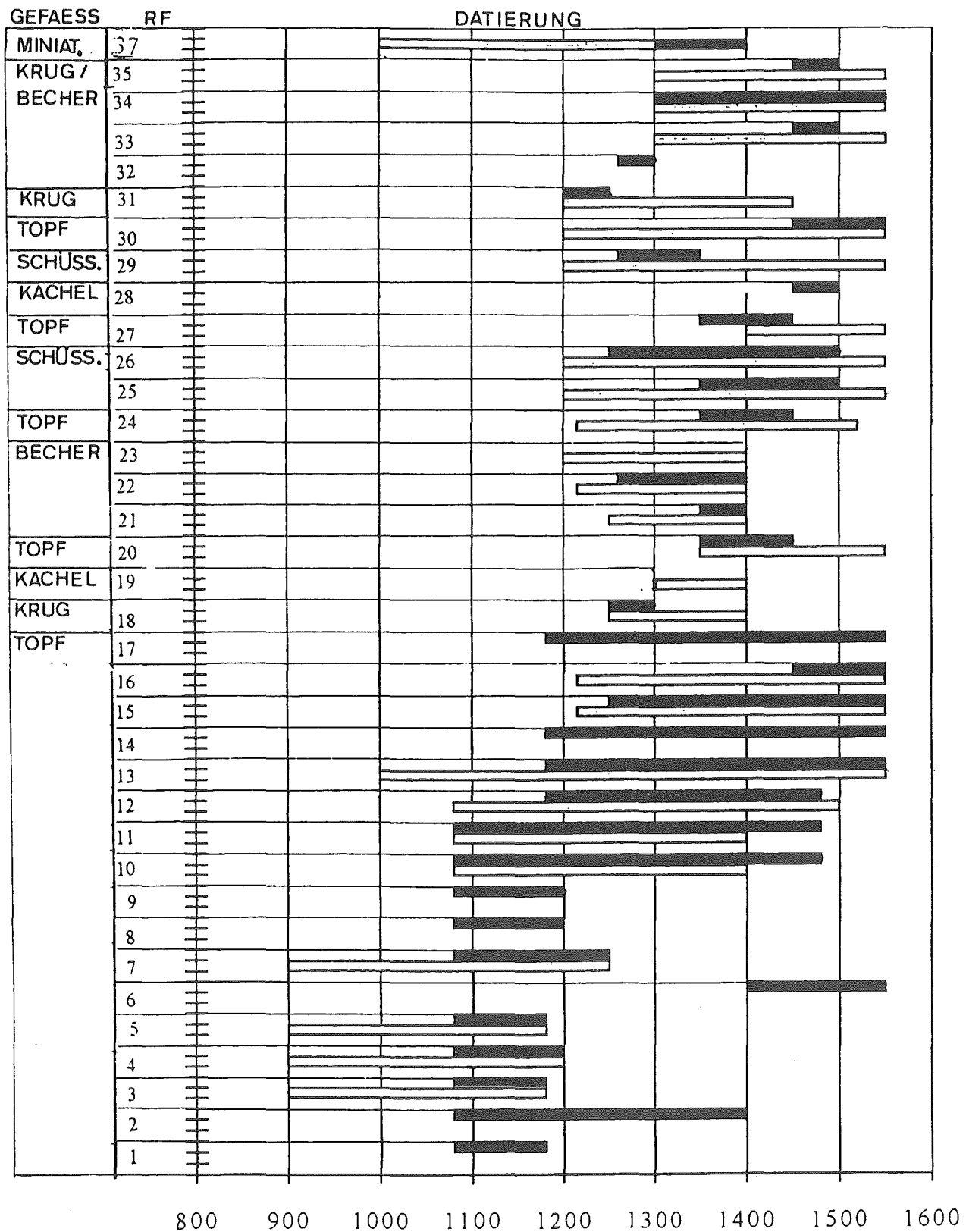
Vom (späten) 11. Jh. bis um 1200 bestimmt der Kugeltopf klar das keramische Haushaltsgeschirr am Bohlendamm (Hor. A, RF 1-17). Bis zum späten 12. Jh. ist die Brandführung der Töpfe uneinheitlich, d.h. es gibt neben den grauen Töpfen der Warenarten b1 und b2 auch rotes bis oranges Geschirr der Warenarten a1 und a2. Diese ältere Kugeltopfkeramik wurde nach

Ausweis der petrographischen Analysen im Raum Hannover gefertigt, wohl für den lokalen Bedarf.

Schon in den ältesten Befunden ist gleichzeitig eine teils scheibengedrehte hellgrundige Irdenware vorhanden (Warenarten c1-c3). Sie steht in der Tradition der westeuropäischen rotbemalten Ware und wurde im Gegensatz zur älteren Kugeltopfkeramik im südniedersächsischen „Pottland“ zwischen Hameln und Alfeld hergestellt, wie die Analysen zeigten. Die feinere Machart und der Importcharakter weisen sie in der Frühzeit als eine gehobene Ware aus, deren Formengut auf Tischgeschirr beschränkt zu sein scheint, hierbei handelt es sich um kleine, als Trinkbecher genutzte Kugeltöpfe (meist RF 11-13). Dies gilt auch für die nur in geringer Stückzahl belegte frühe, außen bleiglasierte Ware, die gemeinsam mit Warenart c3 bis weit in das späte Mittelalter in Gebrauch ist.

Ab dem späten 12. Jh., Hor. A/B, wird eine sorgfältig gebrannte, graue Irdenware (Warenart d1) in zunehmender Menge aus dem „Pottland“ eingeführt, die in der Folgezeit das irdene Geschirr beherrscht. Im Laufe des 13. Jh. erweitert sich der Formenschatz beträchtlich: Kugeltöpfe und seit dem späten 13. Jh. Grapen stellen zwar weiterhin den Großteil des Geschirrs, sind aber offenbar in verschiedenen Größen und Proportionen – also auch für verschiedene Funktionen (Becher, Kochtopf, Vorratstopf) – in Gebrauch. Ihre meist langlebigen Randformen eignen

Abb. 5. - Hannover-Bohlendamm. Die absolute Chronologie der Rand- und Gefäßformen auf der Grabung Bohlendamm (ausgefüllt) und im übrigen Südniedersachsen (umrandet).



sich trotz ihrer Vielfalt nur bedingt als Datierungsinstrument (RF 2, 10-17, 20, 27, 30). Während sich das ältere Schankgeschirr auf Topfbecher und Tüllenkannten beschränkte, treten nun Mehrpaßbecher und

Einhenkelkrüge hinzu (RF 21-23, 31). Besonders diese Formen besitzen etwa ab der Jahrhundertmitte auch Stand- oder Wellenböden. Schüsseln und Schalen in verschiedenen Größen vervollständigen den

Abb. 6. - Hannover-Bohlendamm. Die Stellung der Warenarten in der relativen Chronologie.

Warenart	a1	a2	b1	b2	c1	c2	c3	d1	d2	d3	e1	e2	e3	e4	Haf	Anz.	%
Horizont A	20	1	56	84	3	1	1									166	7,7
Horizont A/B	25	87	170	253	25	4	4	29							(1)	597	27,8
Horizont B	2			2	1			18		1						24	1,2
Horizont C	1	5	3	42	4	2	6	88	88	13	(1)	6	6		(1)	266	12,2
Horizont D		1	6	13	1			50	15	4	5	3	3			101	4,7
Horizont E	3	2	17	64	2	5	28	181	140	6	30	11	9	37	116	651	30,3
Horizont F				1					1	1		2			331	336	15,7
Summe	51	96	252	459	36	12	39	366	244	25	36	22	18	37	449	2141	99,5
Anteil (%)	2,3	4,4	11,4	21,4	1,6	0,6	1,8	17,5	11,3	1,2	1,6	1,0	0,8	1,7	20,7	99,5	

Gesamtsumme (inkl. 7 früh- und 3 sonstige Faststeinzeugscherben= 100 %): 2151

gedeckten Tisch (RF 25,26,29). Den wachsenden Wohnkomfort belegen im 14./15. Jh. eigenständige Kacheltypen, die sich aus älteren Topf- und Schüsselformen entwickelt haben (RF 19).

Das wenig ansprechende Äußere dieser Warenart wird nur durch Riefen im Halsbereich und Bandhenkel belebt – beider Ausführung ist chronologisch empfindlich. So überrascht es nicht, daß ab der zweiten Hälfte des 13. Jh., Hor. C, die genannten Gefäßformen auch in einer qualitätvolleren, schwarzgrauen Ware gefertigt werden (Warenart d2). Der Trend zu dünnwandigem, wasserdichten Geschirr gipfelt in steinzeugartigen, teils gesinterten Einzelstücken. Auffallend sind wechselseitige Formübernahmen mit Metallgeschirr (besonders Grapen). Dies wirft ein neues Licht auf die Oberflächengestaltung dieser Warenart: Möglicherweise imitierte sie metallenen Hausrat, der in Wertschätzung und Preisgestaltung

deutlich über dem irdenen Geschirr lag und seit dem 14. Jh. zumindest wohlhabende Haushalte prägte⁴.

Ebenfalls als südniedersächsischer Import erscheint seit dem späten 13. Jh. rot oder braun engobiertes Fast- und Frühsteinzeug (Warenarten e2-e4). Es ist auf Schank- und Trinkgeschirr beschränkt und bezieht sich deutlich auf rheinische Vorbilder (RF 32-35). Steinzeug Siegburger Art (Warenart e1) aus dem Rheinland und in täuschender Imitation aus dem "Pottland" verdrängt ab dem 14. Jh., Hor. D, die Frühformen.

⁴ Metallgeschirr: Drescher 1982, 157-174; Hasse 1980, 136. Metallene Parallelförmchen zu Keramikgefäßen in Auswahl: Dixel 1973, Kat. 129, 130 (Grapen); Kat. 247 (Schüssel); Kat. 286 (Tüllenkanne); Kat. 828 (Kugelpf).
 4 Metallgeschirr: Drescher 1982, 157-174; Hasse 1980, 136. Metallene Parallelförmchen zu Keramikgefäßen in Auswahl: Dixel 1973, Kat. 129, 130 (Grapen); Kat. 247 (Schüssel); Kat. 286 (Tüllenkanne); Kat. 828 (Kugelpf).

Abb. 7. - Hannover-Bohlendamm. Die Verteilung der Warenarten über ausgewählte Befundtypen im Vergleich. Die Daten sind Grundlage für Abb. 8 und 9.

Alle Befunde (Abb. 8)	Warenart Summe Anteil (%)	a1	a2	b1	b2	c1	c2	c3	d1	d2	d3	e1	e2	e3	e4	Haf
		51	96	252	459	36	12	39	366	244	25	36	22	18	37	449
		2,3	4,4	11,4	21,4	1,6	0,6	1,8	17,5	11,3	1,2	1,6	1,0	0,8	1,7	20,7
Latrinen (Abb. 9 rechts)	III-11 III-17 II-44 Latrinen Anteil (%)	3	1	4	4	1		5	2	15	2			1	4	
										56		9	1	1	21	6
								1	1			16				28
		3	1	4	4	1		5	3	72	2	25	1	1	21	38
		1,7	0,6	2,2	2,2	0,6	0	2,8	1,7	39,8	1,1	13,8	0,6	0,6	11,6	21
Schichten ohne Latr. (Abb. 9 links)	Horizont C Horizont D Horizont E Hor. C-E Anteil (%)	1	5	3	42	4	2	6	88	88	13	1	6	6		1
										50	15	4	5	3	3	
		3	2	17	64	2	5	28	181	140	6	30	11	9	37	116
		4	8	26	119	7	7	34	319	243	23	36	20	18	37	117
		1	7	22	115	6	7	29	316	171	21	11	19	17	16	79
		0,1	0,8	2,6	13,7	0,7	0,84	3,5	37,8	20,4	2,5	1,3	2,3	2,0	1,9	9,4
	Grube H obere Füllg					9		4	8	13		13	(1)	1		
													2	2	1	1

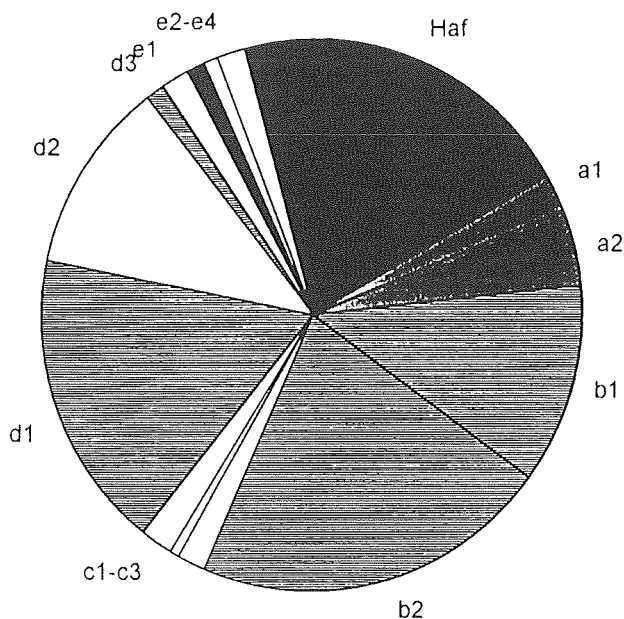
Parallel zu diesen Importwaren wird im Raum Hannover weiterhin graue Irdenware getöpft: die Warenarten b2 und d3 folgen als „Landrassen“ dem Formenkanon der südniedersächsischen Produktion - freilich in geringerer Menge - bis in das 15. Jh., ihre petrographische Analyse stellt sie eng zur älteren Kugeltopffware und damit zur heimischen Produktion. Möglicherweise handelt es sich bei dieser Keramik um die Produktion des „Potthofes“ in Hannover.

Im Laufe des 15. Jh., Hor. E, verändert sich der Geschmack: Erst vereinzelt, seit dem 16. Jh. deutlich, wird gegenüber der grauen, jüngeren Kugeltopferkeramik helltoniges Geschirr bevorzugt, die sog. „Hafnerware“. Es ist dank seiner zunächst gelben und grünen Bleiglasur nicht nur ästhetisch, sondern auch praktisch der einfachen grauen Irdenware überlegen. Diese wird offenbar bis in das 16./17. Jh. gefertigt, beschränkt auf einzelne Schüsseln und Töpfe. Wahrscheinlich entwickelte sich die Hafnerware aus den älteren helltonigen Produkten (Warenart c3 und frühe, glasierte Ware). Zugleich vollzieht sich der technologische Übergang von der älteren Mischfertigung der Kugeltöpfe zur vollendeten Drehscheibenware.

4 Die Vergesellschaftung der Warenarten als Sozialindikator

Die Betrachtung des Anteils der Keramikfunde in den Zeithorizonten (Abb. 6) könnte die Mengenentwicklung des historischen Geschirrs widerspie-

Abb. 8. - Hannover-Bohlendamm. Anteil der Warenarten im Gesamtfundinventar.



geln. Hier ist allerdings eine Verzerrung zu berücksichtigen: der Großteil der Befunde stammt etwa aus der ersten Hälfte des 13. Jh. (Hor. A/B), während rein zahlenmäßig die jüngeren Befunde deutlich zurücktreten – weil die oberen, jüngsten Schichten am Bohlendamm nicht mehr erhalten waren. Umso augenfälliger ist der Sprung von Horizont A (7,7%) zu A/B (27,8%). Vom Beginn der Besiedlung des Stadtgebietes bis etwa 1180 hat sich am Bohlendamm weniger Keramik abgelagert als von etwa 1180 bis

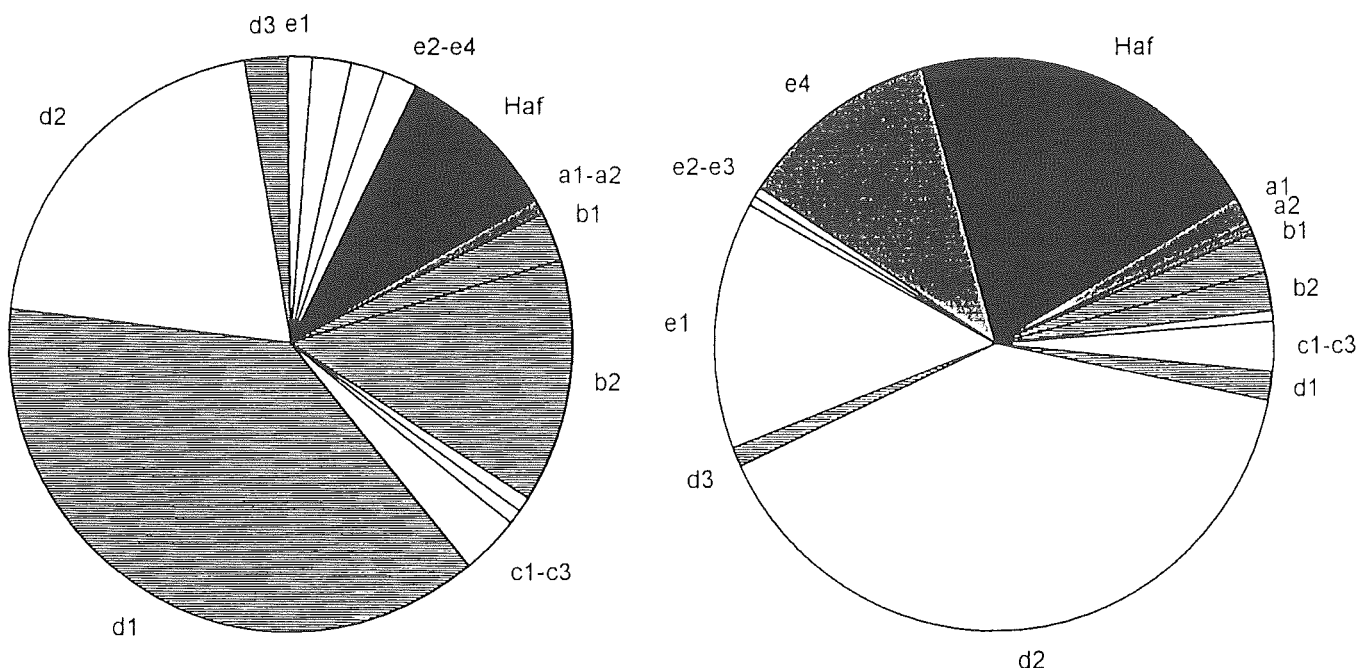


Abb. 9. - Hannover-Bohlendamm. Links: Anteil der Warenarten im Inventar der Kulturschichten Hor. C-E (ohne Latrinen). Rechts: Anteil der Warenarten im Inventar der Latrinen III-11, III-17 und II-44.

1250! Diese Materialzunahme ist nicht anders zu bewerten denn als Ausdruck einer intensivierten Siedlungstätigkeit. Trotz der schlechten Erhaltungsbedingungen für die oberen Schichten sind in den 17 erfaßten Befunden des endmittelalterlichen Horizonts E mehr Scherben enthalten (30,3 %) als in den 33 Befunden des Horizonts A/B (27,8 %). Diese mengenmäßige Zunahme dürfte in direktem Zusammenhang mit der Bevölkerungsentwicklung stehen.

Die Mengenanteile der vorgestellten Warenarten zeigen ein klares Übergewicht der grauen Irdenwaren (b2 und d) gegenüber den übrigen; insbesondere die helltonigen Irdenwaren und das Fast-/Frühsteinzeug (Warenart e2/e3) treten klar zurück (Abb. 7, 30 und Abb. 8). W. Janssen erkannte am Vergleich des Fundgutes der Burg Hausfreden und des Dorfes Königshagen, daß *gehäufte* Vorkommen von (Fast-)Steinzeug offensichtlich als Indikator für gehobenen Lebensstandard zu betrachten sind (Janssen 1966, 90-98). Siegburger Steinzeug war – wegen des hohen Brennholzbedarfes und des erheblichen Ausschusses – kostspieliger als Irdenware⁵. Die geringe Gesamtstückzahl der mittelalterlichen Steinzeuge am Bohlendamm wäre somit ein Anzeichen für eine weniger wohlhabende Einwohnergruppe.

Dieses Bild läßt sich durch eine gezielte Betrachtung präzisieren:

Vergleicht man die Inventare der aufwendig ausgemauerten und wohlhabenden Anwohnern der Lein- bzw. Köbelingerstraße zuzuweisenden Latrinen III-11, III-17 und II-44 mit jenen der übrigen zeitgleichen Befunde (Hor. C-E), so ist ein bemerkenswerter Unterschied festzustellen: Die Latrinen enthalten einen deutlich höheren Anteil an Glas, Faststeinzeug und Steinzeug Siegburger Art als die übrigen Befunde derselben Zeitstellung (Abb. 9).

Zugleich zeigen die betreffenden Latrinen aber auch einen deutlich erhöhten Anteil der metallisch glänzenden Warenart d2 – auf Kosten der Warenart d1. Wahrscheinlich war auch diese qualitätvollere Variante der grauen Irdenware (härterer Brand, sorgfältigere Fertigung) eher teurer als die "gewöhnliche" Warenart d1. Demnach ist ihr gehäuftes Auftreten offenbar ebenfalls als Sozialindikator geeignet. Somit zeugen die Inventare dieser Latrinen von gehobenem Lebensstandard der zugehörigen Haushalte an der Köbelinger- bzw. Leinstraße. Auch die ältere Grube H enthält einen erhöhten Anteil Warenart d2

(siehe Abb. 7), darunter zwei vollständige Gefäße, dies könnte dementsprechend einen gewissen Wohlstand des zugehörigen Anwesens "alt L 1" widerspiegeln.

5 Schluß

Die Auswertung der Funde vom Bohlendamm zeigte, daß in Hannover eine deutliche Zunahme des keramischen Haushaltsgeschirrs ab etwa dem 13. Jh. festzustellen ist, sie ist entweder die Folge eines allgemein gestiegenen Lebensstandards oder des Bevölkerungszuwachses der prosperierenden Stadt.

Obwohl ab 1200 südniedersächsischer Import den Geschirrmarkt in Hannover dominiert, wird weiterhin in alter Tradition aber neuer Form im Raum Hannover getöpft, wahrscheinlich auch im Potthof.

Die Zusammensetzung der keramischen Inventare läßt am Bohlendamm (Fast-)Steinzeug und jüngere Kugeltopfkeramik mit metallisch glänzender Oberfläche als Wohlstandsanzeiger erkennen. Beide Warenarten konzentrieren sich in aufwendig gemauerten Latrinen, deren Inventar zudem Glas enthält.

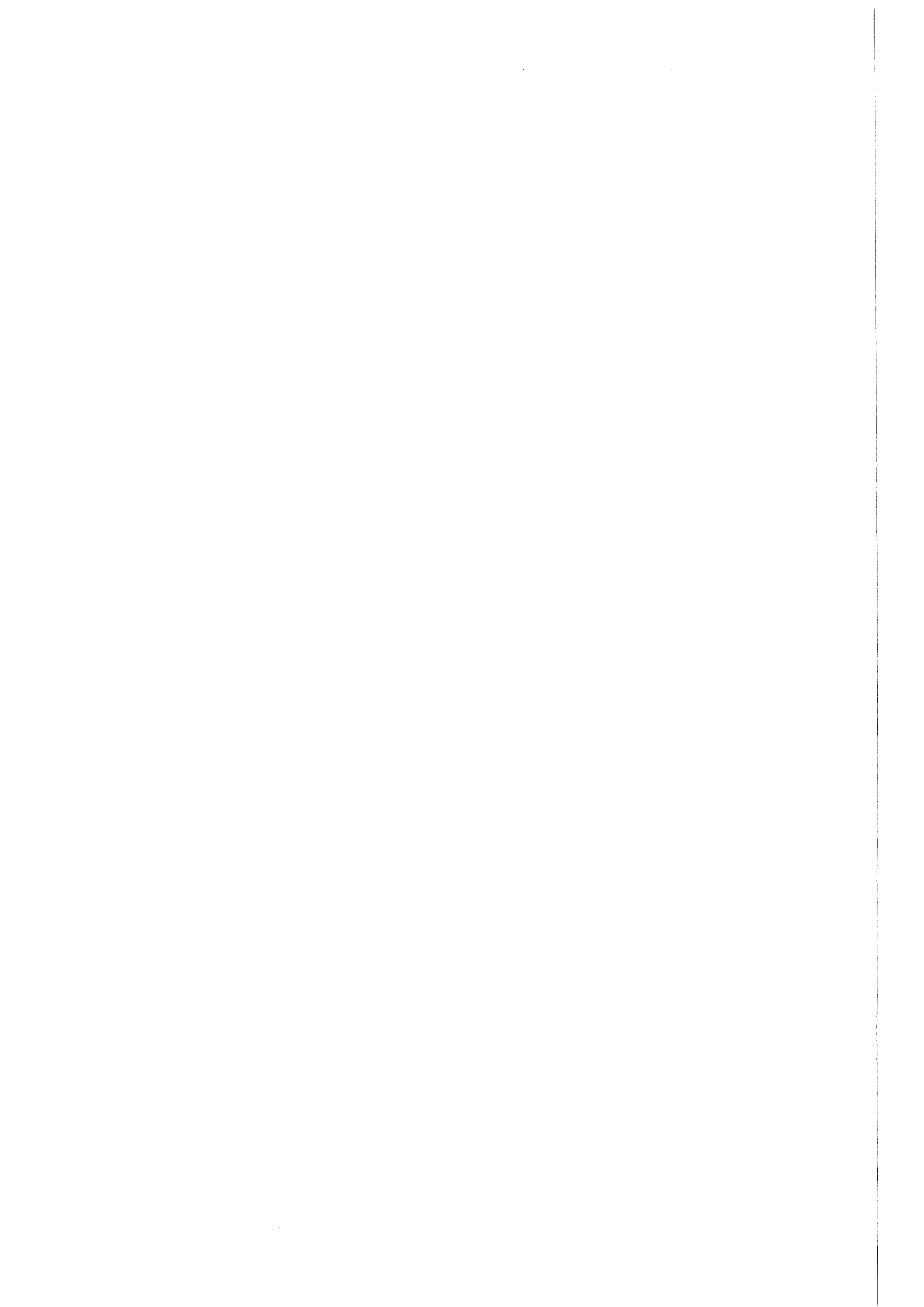
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⁵ Die Abwurfhalden der Siegburger Aulgasse belegen den hohen Qualitätsstandard der Steinzeugproduktion, der sich gewiß im Preis niederschlug; Beckmann 1975.

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Cooking pots and the origins of the Scottish Medieval Pottery Industry re-visited

It is now twenty-five years since Lloyd Laing published his paper ‘Cooking pots and the origins of the Scottish Medieval Pottery Industry’ (Laing 1972). This was not the first paper on Scottish medieval pottery, but it was the first to look specifically at cooking pots separately from finewares or imported vessels and to try and formulate a regional and national typology. Laing’s work was largely based on unstratified and undated museum collections and limited excavation. As a consequence he was probably the first to recognise the importance and the need to excavate well stratified and independently dated pottery assemblages.

Previous work by Stuart Cruden in the 1950s had concentrated on large unstratified assemblages, of mainly jugs and ‘finewares’, recovered from castles and abbeys during restoration work by the Department of the Environment (Cruden 1952-58: Melrose Abbey, Bothwell Castle and Glenluce Abbey). As this material was effectively unstratified, in the absence of supporting contextual information or independent dating Cruden dated the material by comparison with similar English vessels and by the historical dates associated with the monuments.

Laing, like Cruden relied on comparisons with English material for both typologies and dating due to the lack of excavated material in Scotland. By reading over their reports one can see just how far the discipline of medieval archaeology and pottery studies has developed over the last 25-30 years. The amount of excavated and published material available in 1972 for Scotland was one assemblage, while complete cooking pots numbered six and profiles twelve. The work of both Cruden and Laing was done immediately before the explosion of excavation that took place from the mid-1970s onwards. Yet despite the huge increase in excavated material many of the problems raised by Laing still remain.

Laing began his 1972 paper with the following warning:

‘Any attempt to study the origins, development and regional styles of Scottish medieval pottery is fraught with almost insurmountable obstacles,

and it seems unlikely that we shall be in a position to construct a detailed regional chronology in the next few decades’ (p. 183)

This opening statement may seem very negative in the light of the huge amount of pottery assemblages now excavated but many of the problems Laing went on to highlight still remain. A major problem was and still is the lack of kilns and published kiln assemblages from Scotland, he refers to two known sites which had been subject to excavation. The site at Stenhouse, near Falkirk, had been excavated under rescue conditions in the late 1950s. This site is still unpublished although measures are now underway to bring the material to publication in the near future. The other kiln or group of kilns at Coulston in East Lothian was subject to a series of excavations at the time that Laing was writing, these have now been partly published (Brooks 1980) and this is still one of only two published medieval pottery kilns in Scotland.

The main theme of Laing’s paper concerns cooking pots, in particular those in ‘white gritty’ fabrics. This fabric group now known as Scottish East Coast White Gritty Ware is one of the most common and most complicated of medieval fabrics found in Scotland. This fabric or more precisely group of similar fabrics, is thought to have been produced in the east of Scotland in the area from Berwick, on the English border, to the river Tay. This coastal stretch is the of white firing clays which are distinct from the iron rich red clays to the north and west. A key to understanding these fabrics is provided by the publication of the Coulston kilns already mentioned.

Coulston Kilns

The site of Coulston lies in East Lothian, near the town of Haddington some 15 miles south of Edinburgh. Several excavations have been carried out on the site since it was discovered in the 1940s but the published report only deals with the material from

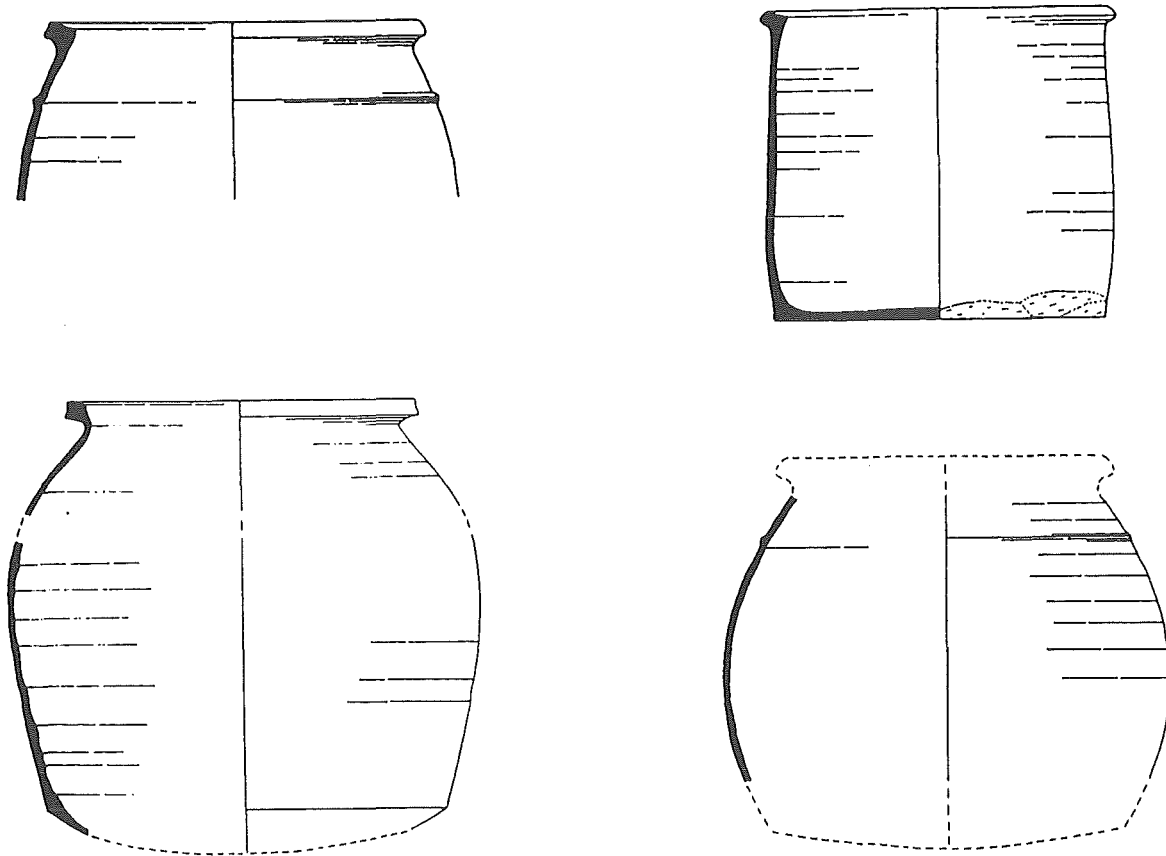


Fig. 1. - Cooking pots from Coulston kiln.

excavations carried out by the National Museum of Antiquities of Scotland (now the National Museum of Scotland) in 1971 directed by Dr David Clarke. Two probable type 2 kilns were excavated. Kiln 2 had been excavated in the 1940s and was re-excavated. The flue of kiln 2 cut into kiln 1 suggesting that it was earlier and had gone out of use possibly when kiln 2 was built. Kiln 1 seems to have been rebuilt several times and was of a different construction from Kiln 2. A type 3 kiln on the site had been excavated in 1969 by Mr B.N.J. Edwards from the National Museum but this material remains unpublished. The results of further field work comprising of geophysical survey (magnetometer), contour survey and trial trenching in 1976 and 1977 suggest the presence of possibly as many as seven kilns on the site. Due to the disturbed nature of the site all the 10,000 sherds recovered from the 1971 excavation and from field-walking were considered as one unstratified homogenous group (Brooks 1980).

The vessels recovered from the site comprise of cooking pots, jugs, some with face-masks, bowls and dishes. Three main styles of cooking pot were recovered, globular (82%), straight-sided (10%) and slightly barrel shaped (8%). It must be noted that very few complete vessels or even complete profiles were recovered and that these categories of form are based

largely on rim sherds. The rims were normally square. What was also noted was a cordon around the shoulders of the globular pots which seems to be a Coulston 'trademark'.

As the assemblage was largely unstratified there is no dating evidence for the excavated pottery. The assemblage was therefore dated by comparison with similar material from Scotland and the North of England. As face-masks and other anthropomorphic designs were features of jugs made on the site a Yorkshire and Scarborough influence pursued. This was used to date the assemblage to the mid to later 13th century. Scarborough ware has been found on a large number of sites in Scotland confirming trade links with the Yorkshire area and other towns on the east coast.

Kelso Abbey Pit Group

The next major development concerning 'white gritty' wares was the excavation of a large sealed pit group from Kelso Abbey (Cox & Haggarty in Tabraham 1984). Here 18 kilograms of sherds produced 34 vessels of which 21 were cooking pots, 19 were straight-sided, the others being globular. The Kelso material is very distinctive apart from straight-sides

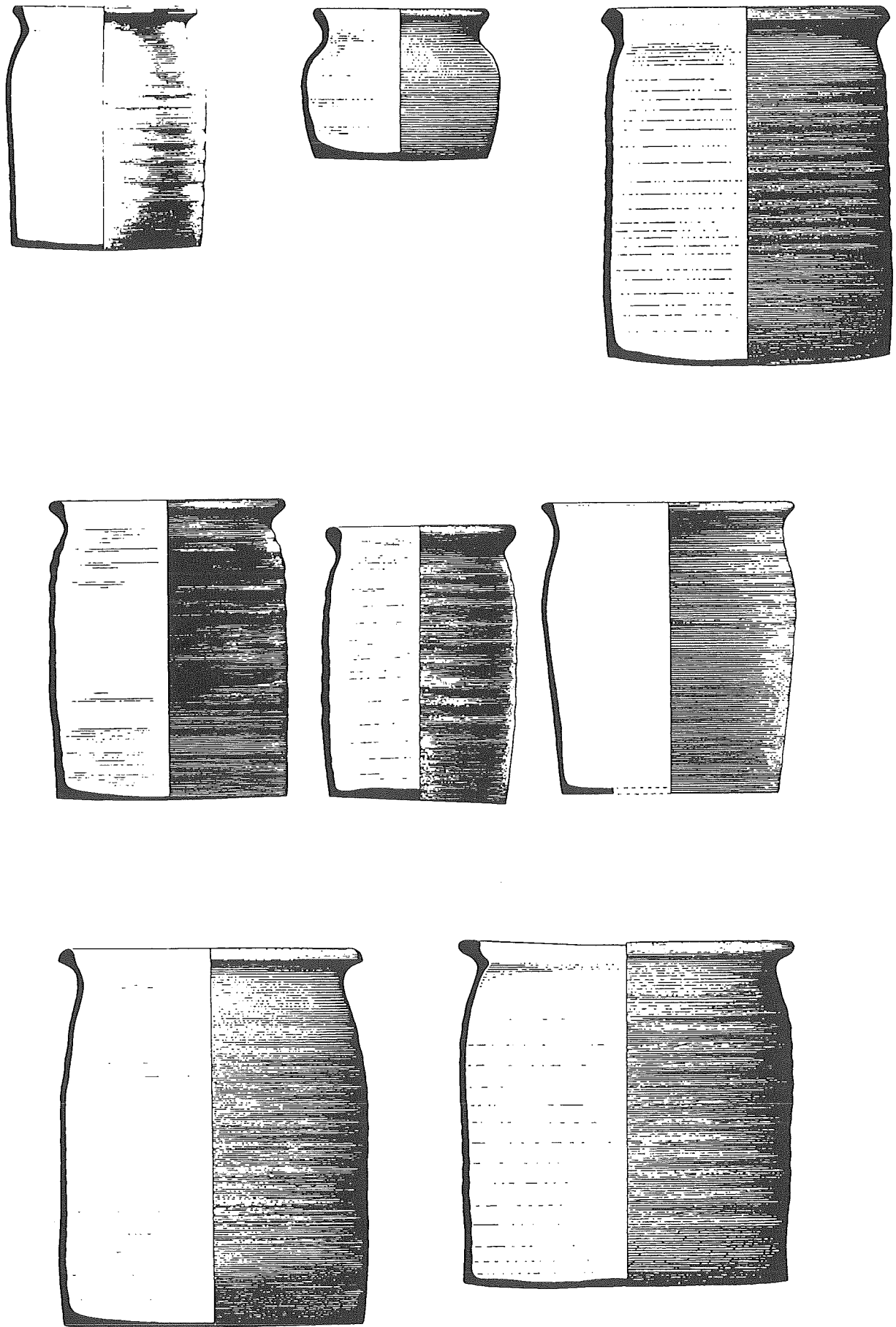
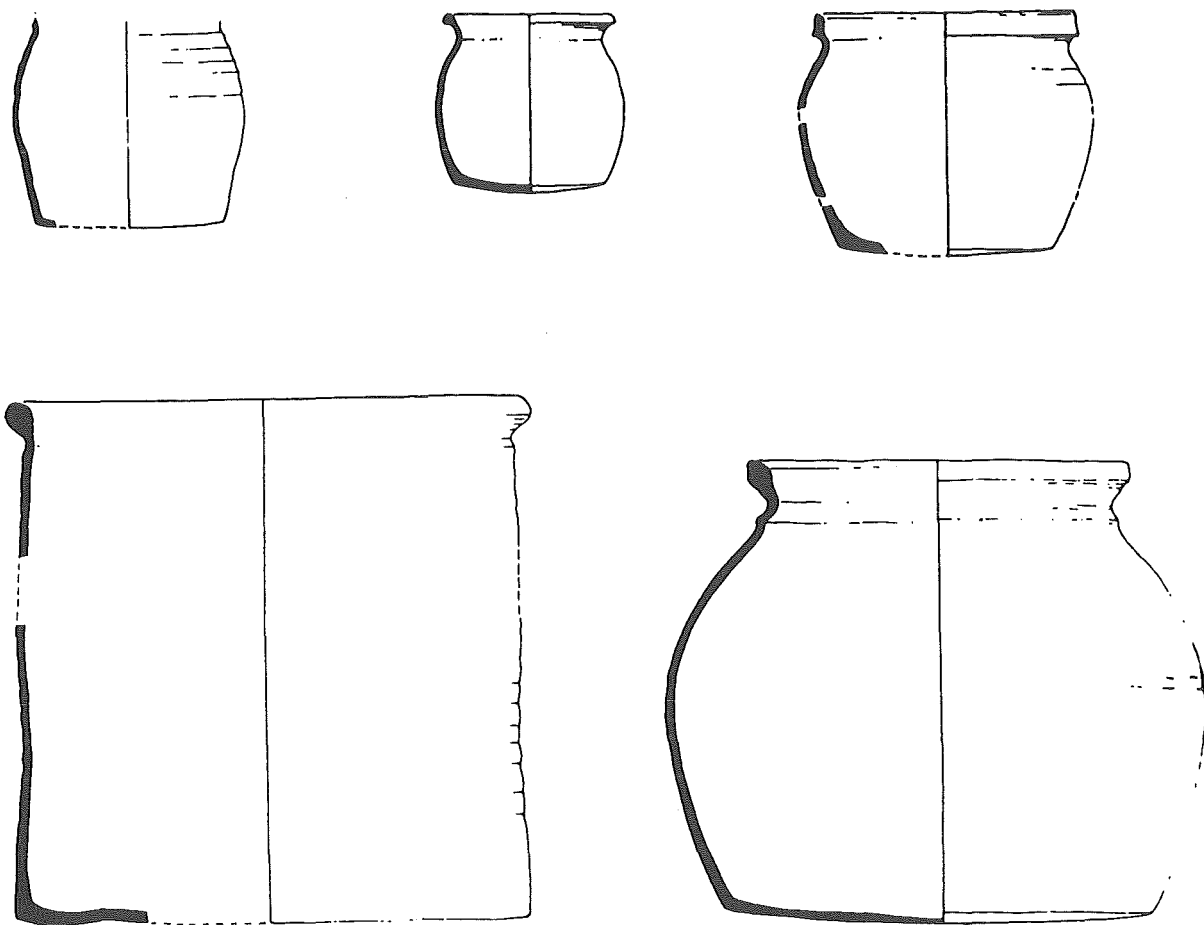


Fig. 2. - Cooking pots from Jedburgh Abbey and Kelso Abbey.

Fig. 3. - *Cooking pots from Aberdeen.*

and a flat base the vessels are extremely well made with the thickness of the walls rarely exceeding 4 mm. Kelso type straight-sided white gritty cooking pots have been recovered from a number of sites throughout Scotland (Aberdeen, Perth, Elgin, St Andrews) and from Bergen and Trondheim in Norway (Reed 1990).

The Kelso material has been dated by two methods, the pit that the group was recovered from was sealed by the abbey infirmary building which on architectural grounds has been dated to the later 12th century. Also an example of a Kelso straight-sided white gritty cooking pot was excavated in Perth stratified below a timber beam that has been dendrochronologically dated to 1150-52 (from the unpublished Perth High Street excavations). Therefore both methods date the assemblage to the later 12th century and this is regarded as the beginnings of the 'white gritty' industry. It has been suggested that the skill and technology required to make such vessels may have been introduced with the introduction of Reformed monastic orders into Scotland in the 12th century (Haggarty 1984).

End of the 'white gritty' industry

The next piece of the white gritty jigsaw came from a series of excavations at Inverkeithing in Fife which confirmed the presence of white gritty fabrics in later 14th and mid 15th century contexts. This seems to mark the final phase of the white gritty industry. The initial skill of the potters as demonstrated by the Kelso assemblage had been lost and these vessels are much thicker walled, heavier and cruder (MacAskill 1983)

White gritty wares from St Andrews, Fife

Recent work in St Andrews by The Scottish Urban Archaeology Trust, Scotia Archaeology Ltd and others at a number of sites in the burgh has greatly added to the corpus of 'white gritty' material from Fife. I am going to concentrate on the assemblage from Castlecliff adjacent to St Andrews Castle, excavated by Scotia Archaeology Ltd between 1988-90 (Haggarty & Will in press).

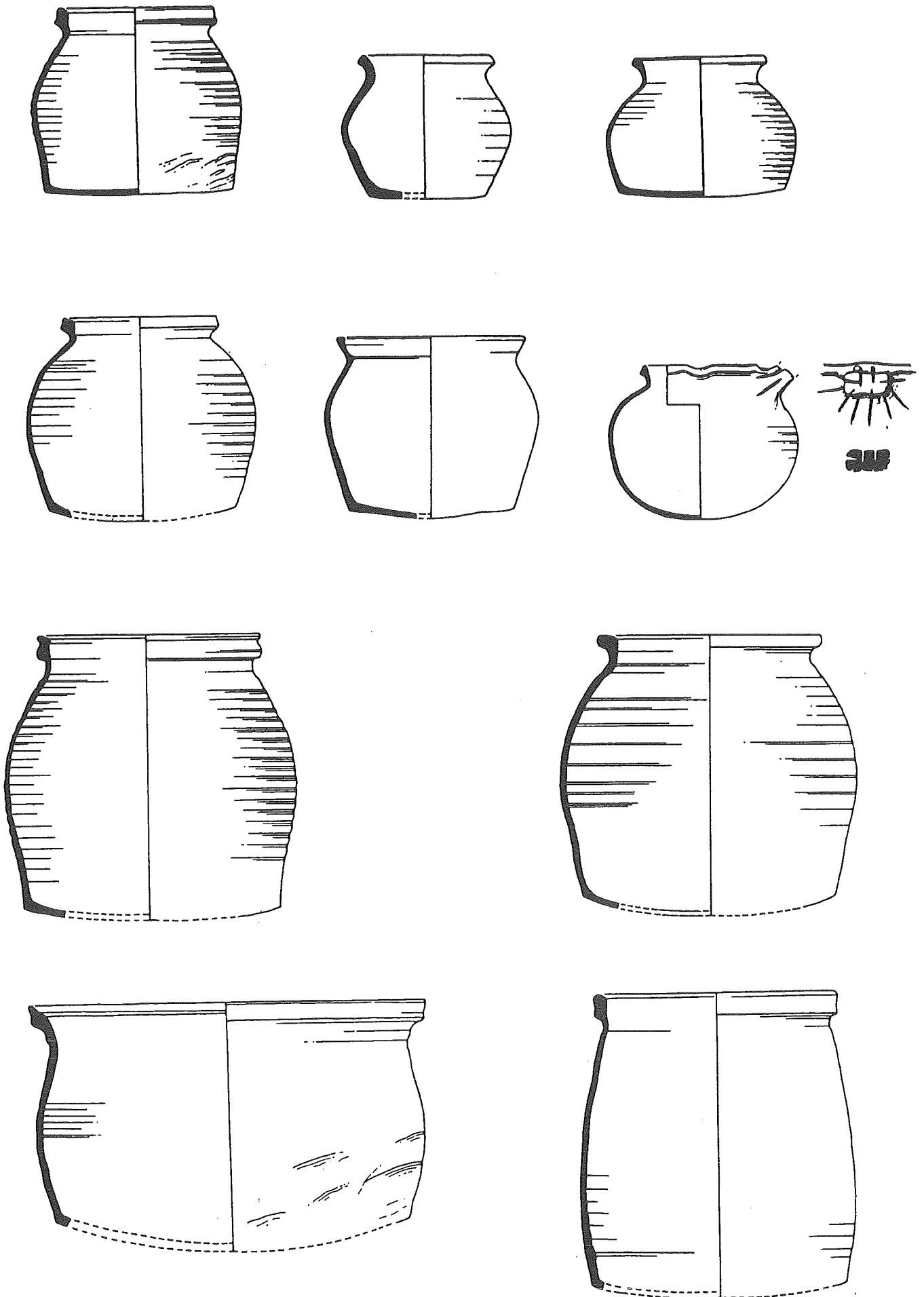


Fig. 4. - Cooking pots from St Andrews.

The assemblage consisted of over 9000 sherds thought to date to the 14th century, which when stuck together produced over forty complete vessels and profiles of both cooking pots and jugs. The white gritty fabrics comprise c.97 % of the pottery on site, this figure is normal for St Andrews (Hall forthcoming). The other three percent comprises other Scottish fabrics and a wide range of imported fabrics from England and Continental Europe. It is largely the imported fabrics, particularly the Yorkshire wares that have been used to give the 14th century date for the whole assemblage.

Much of the pottery was recovered from four large pits that appear to have been filled in at the same time. Although there were several clearly defined layers filling these pits the frequency of cross-joins between the layers marks them as a single occurrence. Unfortunately these pits were divorced from the rest of the structural sequence of the site and cannot be independently dated. The group of pits may represent some industrial activity in that area of the site. The reconstructed vessels from the pits are mainly cooking pots and jugs, including one very ornate three handled green glazed white gritty jug with a bridge spout that appears to be copying the highly decorated jugs of Scarborough and Yorkshire.

The cooking pots are largely barrel shaped with flat bases, although some are globular but again with flat bases. One example of a Kelso type straight-sided cooking pot was recovered and should be classed as an imported rather than a local product. The barrel shape of the cooking pots seems to be a Fife trait.

No kiln sites have been positively identified from Fife but large numbers of sherds have been collected from fieldwalking in the Leuchars and Tentsmuir area suggesting a kiln in the area. Another site at Balchristie has also produced a large number of sherds. A geophysical survey of the proposed kiln site in the early 1970s did locate a large anomaly, so far this has not been tested by excavation. A programme of trial trenching was commissioned 2-3 years ago but was abandoned.

Petrological work on 'white gritty'

Little systematic work has been done on white gritty fabrics in terms of the geological or chemical composition of the fabrics. Work on material from Coulston, Kelso and Fife has confirmed that the fabrics are different. This lends support to the theory of different production areas. It is only when more kilns site have been discovered and excavated that more meaningful petrological work can be undertaken along with a study of vessel typology.

Summary of white gritty wares

Therefore one 'white gritty' production site has been partly excavated, a date to the later 12th century has been established for the beginnings of the white gritty industry with an end date in the 15th century. Three production areas have been suggested; Borders, Lothian and Fife (Haggarty 1984) with regional styles and forms of cooking pot. Straight-sided vessels from the borders, globular vessels with a shoulder cordon from Lothian and globular to barrel shaped vessels from Fife with a possible sub-group of two-handled cooking pots also from Fife (Laing 1972). The problem of chronology has not been answered, as the differences in vessel shape and form could reflect a chronological development through time rather than a regional variation.

White gritty fabrics also occur in large quantities outwith the known production areas and are often the second largest fabric group on a site after the local fabric (Aberdeen, Murray 1982). White gritty fabrics have been found throughout Scotland from Glasgow Cathedral to Kirkwall on Orkney (MacAskill 1982) and as far afield as Norway (Reed 1990) making it the only Scottish fabric to be 'exported'. The 'white gritty' industry was a very successful and skilled pottery industry supplying pottery on a regional if not national level. A sign of the success is expressed from Perth where examples of vessels in the local red firing clays had a covering of white slip so copying the appearance of the white gritty vessels (MacAskill 1987).

Other trends in Scottish medieval pottery Scottish medieval redwares

The other main fabric type found in Scotland is known as Scottish medieval redware, again this is a very broad term used to describe any redware fabric that cannot be identified as the 'local' fabric for a town or area. It is only where large amounts of excavation has taken place that local fabrics can be established, this is therefore limited to Aberdeen (Murray 1982) and Perth (Holdsworth 1987) although material from other towns should soon be available. These fabrics are thought to date from the later 13th century through to the 15th century.

One other local redware fabric has been established for the deserted burgh of Rattray in Aberdeenshire (Murray & Murray 1993) where the only other published kiln was discovered. This kiln has had a major impact on the study of ceramics in Scotland as the kilns suggest small scale production for a local market. 78% of the pottery found on site was in the local fabric with an additional 3% representing coarse hand-made wares.

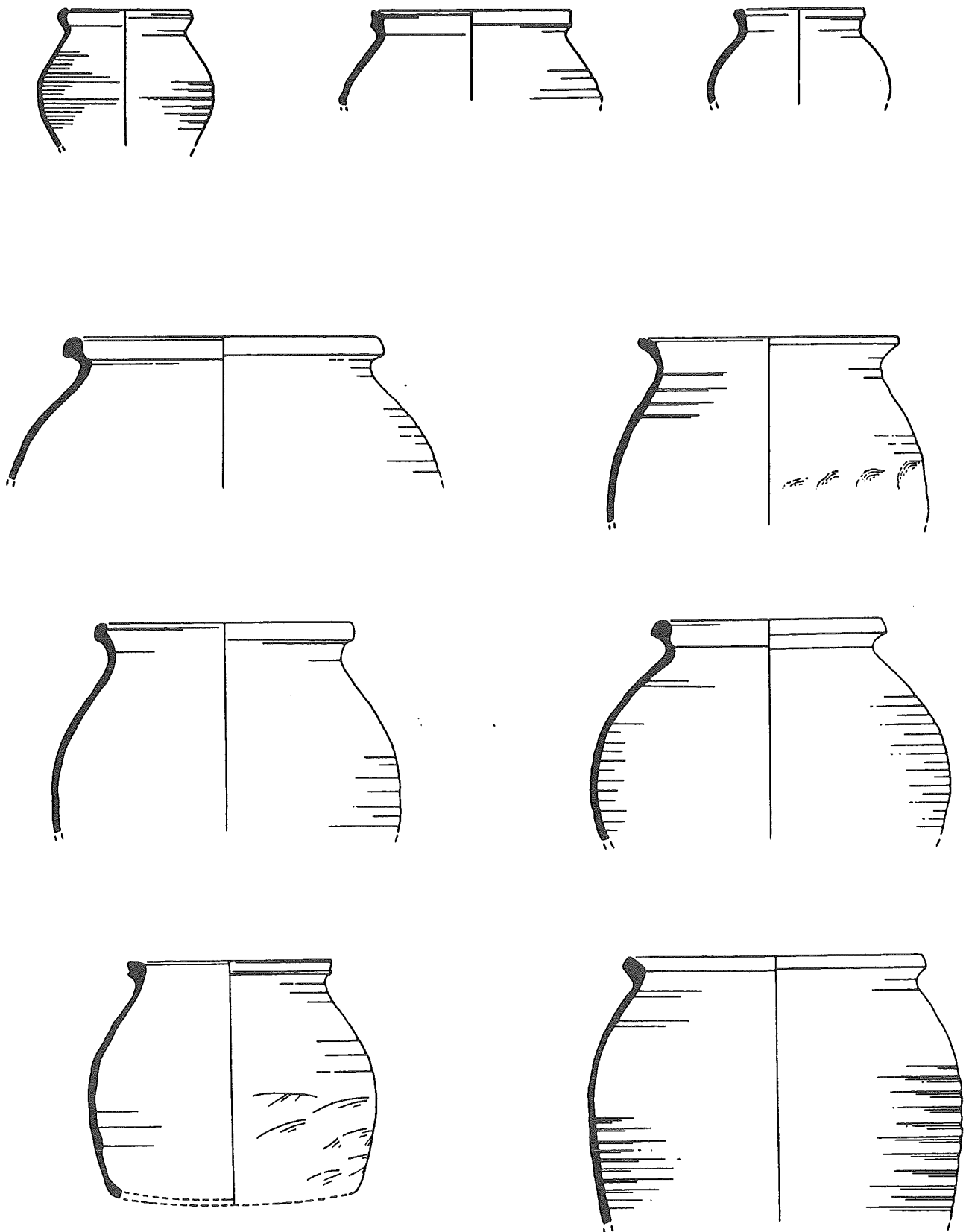


Fig. 5. - *Cooking pots from St Andrews.*

Excavations at both Kelso Abbey (Cox 1984) and Jedburgh Abbey (Haggarty & Will 1995) recovered a coarse redware fabric which may pre-date the white gritty wares. Unfortunately very few sherds were

recovered and no profiles were obtained. But sooting and fuming marks on the sherds suggest that the sherds were from cooking pots. Initial petrological analysis suggests a possible Northumbrian source.

Imports

Without going through every imported sherd from Scotland, it is possible to summarise the general trends concerning imports to Scotland based on the more recent discoveries many of the which are unpublished) There have been no major changes concerning pottery imported into Scotland since Liz Thoms paper at the Ceramics and Trade conference in 1980 (Thoms 1983). Although the range of imports is basically the same there is now a wider distribution as more sites have been excavated.

Imports often get more attention than the small number of sherds would normally receive. Imports as a general rule make up a very small percentage of Scottish assemblages, usually less than 5%. Their main analytical role is as a means of dating the rest of the assemblage and often the site. In St Andrews the average amount of imported material from several excavations in the town was less than 3%, although at Rattray the figure reached 9%. The low figure for St Andrews may be explained the success of the local white gritty industry making the area self sufficient in ceramics.

The East coast imports are largely dominated by Yorkshire and German stonewares while the west coast is predominantly French jugs and platters. This division is not absolute it may be that the better examples have been found in these areas. Recent excavations at Paisley Abbey near Glasgow, uncovered German earthenware while at Dundrennan Abbey (Radley & Will forthcoming) in the south-west of Scotland local copies of German stoneware drinking mugs have been recovered, suggesting that there was a demand for these vessels but that the German wares were possibly not available.

Recent excavations at Whithorn and Carrick Castle on the west coast have recovered large fragments of Beauvais hammer-head platters and other French wares, including vessels from Rouen Loire Saintonge and North French green glazed jugs. While on the east coast recent excavations at Edinburgh Castle (Will 1997) and Holyrood Palace (Will forthcoming) have recovered sherds of Spanish Andalusian Lustreware, which has also been found in Perth and Melrose Abbey. Martincamp vessels seem to have a wide distribution throughout Scotland especially along the east coast. The published imported pottery from Fast Castle in the south-east of Scotland (Haggarty & Jennings 1992) has a mixture of Beauvais, Martincamp, Rhenish and Frechen/Cologne stonewares along with Iberian and Italian wares. At the moment this assemblage can be regarded as unique in terms of the combination of fabrics and range of vessels. Therefore the trading

mechanisms for Scotland are more complicated than east coast and west coast sea routes.

Low Countries wares occur mainly on the east coast but in very small numbers, the assertion by Frans Verhaeghe in 1983 that 'Low Countries pottery traded into Scotland was a minor trade' still holds true (Verhaeghe 1983). Aardenburg wares, Low Countries Greywares and Redwares do occur and the range of vessel forms recovered especially for the redwares is increasing.

A new addition to the list is Pingsdorf type red painted wares which have now been recovered from unpublished sites in both St Andrews (Haggarty & Will in press) and Perth (Cheer 1991).

English Wares

By far the commonest pottery imported into Scotland is from Scarborough and other Yorkshire kilns with sherds found on most sites especially on the east coast. The size and number of sherds is usually quite small but would seem to be from highly decorated jugs and aquamaniles. A large assemblage has recently been excavated in Leith the port supplying Edinburgh where large fragments were recovered from tall narrow jugs which should provide profiles of vessels. London sandy wares also occur but again in very small numbers.

The imported vessels did have a major impact on the local pottery industry in terms of vessels forms and styles of decoration. Local copies have been found of Yorkshire highly decorated jugs in St Andrews and Rattray, German stoneware frilled bases in Edinburgh and the German stoneware drinking mugs already mentioned from Dundrennan Abbey.

Post-medieval pottery

The post-medieval period suffers from similar problems to that of the medieval period. There is one main fabric that is found throughout Scotland. This fabric known as 'Scottish post-medieval reduced ware', is thought to have been made at a number of kilns although only one has been published at Throsk (Caldwell & Dean 1992) on the upper river Forth, close to Kincardine Bridge. Limited excavation recovered large amounts of sherds although no kiln structure was found. A large anomaly was picked up by geophysics but could not be excavated at the time. Historical research has found records of a community of potters working in the area until the early 18th century.

The vessels are normally jugs with a thick green glaze often with wavy inscribed decoration on the shoulders and signs of knife trimming round the base (Haggarty 1980). An oxidised version is also found and many vessels display signs of both oxidisation and reduction.

Future work

Historic Scotland have funded a programme by the British Geological Survey using ICPS and thin sectioning. Initially the aim of this project is to analyse fabrics from sites on the major river systems in Scotland and to try to identify differences in the clays. Sherds from 'local' products from different sites on the same rivers have been chosen. If successful this programme may be expanded to cover material from a wider distribution throughout Scotland. The initial stage of this programme has just started (Spring 1997) and hopefully some preliminary results will be available by the time of the conference.

Also a programme of fieldwalking is due to begin this year in an area to the north-east of Perth in Angus. The aim of this project is to locate new redware kilns. Little previous work has been carried out in this area although local clay sources have been exploited recently by modern potters and brickmakers. It is intended to use both documentary research and cartographic evidence as well as known find spots in this project.

There is also a commitment from Historic Scotland to clear the publication backlog including the kiln site at Stenhouse. The backlog has caused problems as major assemblages are still not accessible including material from Glasgow, Ayr and Perth High Street. The Perth excavation has a large well dated and stratigraphically secure pottery assemblage including a large number of imported wares.

Now may be the time to look again at the Northern English material but not for typological or chronological reasons. The north-east of England has a group of unsourced 'Northern gritty' fabrics with the same kind of problems as 'Scottish white gritty ware'. Therefore it would seem sensible to compare vessel typology and the petrological composition of both fabric groups to try and identify common features which may lead to the identification of production areas. Ceramic links between the two countries were strong as demonstrated by the large amount of Scarborough and Yorkshire material found in Scotland. Similarly if the ceramic technology was introduced by the monastic orders there is another strong link with the Yorkshire area.

Conclusions

A great many excavations have taken place in Scotland in the last 10-15 years largely as a result of a Historic Scotland programme of excavation at a number of monuments in state care, mainly castles and abbeys but also in urban centres and rural areas as a result of developer funding and local council initiatives. Therefore the amount of excavated pottery has vastly increased since Laing was writing. This work has a much wider geographical spread making it possible to recognise regional and national trends. Unfortunately a great deal of this work is still unpublished so that a synthesis of Scottish pottery is still some way off.

Even with this huge increase in excavation some of the problems in Laing's essay still persist, there is still a lack of known kiln sites and well dated assemblages. Therefore the huge increase in excavation in the last 20 years has not solved the problems. It is now time to review the excavated assemblage and to identify problem areas. These gaps in the archaeological record can then be explored by well thought out research designs aimed at specific problems.

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La rue Sous-le-Château à Huy (Belgique, province de Liège): premiers jalons d'une chronologie relative de la céramique du Haut Moyen Age

Cadre historique

Quelques découvertes ponctuelles confirment les déductions des historiens¹ selon lesquelles il y eut, dans la vallée du Hoyoux, une installation peu importante au cours du III^e siècle; elle reste cependant encore mal définie, aussi bien au point de vue de son étendue que de son type d'implantation. L'agglomération née à son confluent avec la Meuse ne prend son essor qu'à partir du V^e siècle. La population est jusqu'alors concentrée autour du *vicus* d'Amay, où la voie reliant Arlon à la chaussée Brunehaut enjambe le fleuve. Poussées par le climat d'insécurité, cette population et celle des *villae* avoisinantes se réfugient dans un site protégé, au pied de l'éperon fortifié dominant la Meuse. Là, un simple passage d'eau ou un gué permet le développement de noyaux pré-urbains de part et d'autre du fleuve. L'association de facteurs favorables, comme la topographie, la vitalité de la rivière, les ressources naturelles des régions proches, provoque l'épanouissement de multiples artisanats, y compris la frappe de monnaies. Un important développement commercial, politique et religieux entraîne la naissance de la ville.

L'archéologie urbaine à Huy: état de la question

De nombreuses observations et fouilles de sauvetage ont été effectuées depuis 1962 par les membres du "Cercle Archéologique Hesbaye-Condruz", puis par "Archéologie Hutoise". La collaboration entre le

CAHC et le Service National des Fouilles a permis la fouille de deux sites en 1985 et 1986². Depuis 1993, les recherches d'une équipe du Service des Fouilles de la Région wallonne s'associent aux travaux du cercle local.

En 1970, les travaux d'aménagement du quartier de "Batta" permettent la mise au jour de 2 fours de potiers mérovingiens³. Depuis, plusieurs fours désignés comme fours de potiers ont été signalés par les chercheurs amateurs⁴. Cette interprétation est peu étayée dans les publications: le contexte est insuffisamment décrit, les fours ont de très petites dimensions, des "rebuts de cuisson" sont signalés, mais le terme n'est pas justifié et ils ne sont pas quantifiés. Sans nier l'existence d'une production évidente à l'époque mérovingienne et peut-être au Moyen Age, une analyse complète du matériel découvert et une meilleure description du contexte permettraient de faire le tri dans cette "production hutoise" des V^e-VI^e siècles et de l'époque carolingienne. Pour cette dernière, il faut souligner l'importance des deux niveaux stratigraphiques déterminés suite aux fouilles de l'ASBL "Archéologie Hutoise" rue d'Amérique⁵.

Le site, les contextes

La parcelle fouillée rue Sous-le-Château est un site de consommation dont la stratigraphie va du V^e au XVI^e siècle⁶. Les céramiques du Haut Moyen Age proviennent de plusieurs contextes: dépotoirs, sols associés à des restes d'habitat, ateliers ou annexes utili-

¹ JORIS A., *La Ville de Huy au Moyen Age. Des origines à la fin du XIV^e siècle*, Paris, 1959.

² TILKIN-PETERS C., Fouilles dans le quartier d'Outre-Meuse à Huy, *Archaeologia Belgica* II, 1986, 81-84. TILKIN-PETERS C., Le site médiéval de la place Saint-Séverin à Huy, *Archaeologia Belgica* III, 1987, 205-212.

³ WILLEMS J., *Le quartier artisanal gallo-romain et mérovingien de "Batta" à Huy*, *Archaeologia Belgica* 148, 1973.

⁴ WILLEMS J., Huy 1976. Rebuts de productions de poterie mérovingienne rue des Augustins, *Bulletin du Cercle Archéolo-*

gique Hesbaye-Condruz XIV, 1975-1976, 133-146. WILLEMS J., Fours de potiers du Bas-Empire et mérovingien à Huy-Petite, *Vie Archéologique* 12, 1984, 48-51.

⁵ WILLEMS J., L'occupation carolingienne du quartier d'Outre-Meuse à Huy. La fouille de la rue d'Amérique en 1990 (première partie), *Vie Archéologique* 36, 1990-1991, 4-38.

⁶ WILLEMS J., L'occupation carolingienne du quartier d'Outre-Meuse à Huy. La fouille de la rue d'Amérique en 1991 (deuxième partie), *Vie Archéologique* 37, 1990-1991, 21-43.

taires, couches de remblai volontaire visant à rehausser le niveau d'un sol trop humide ou carrément inondé.

La céramique est abondante mais très morcelée. La succession des couches d'occupation et des remblais permet un classement chronologique relatif. Cette chronologie n'est cependant pas continue. Des hiatus peuvent exister et correspondre à des périodes d'abandon, dues à l'impraticabilité du terrain ou à une régression de l'agglomération lors de périodes troublées. En effet, le site est en périphérie d'habitat et il ne sera inclus au périmètre protégé par les remparts qu'à la fin du XII^e siècle. Les périodes d'abandon du terrain que l'on devine actuellement pourront être précisées par comparaison avec les niveaux et le matériel provenant d'autres fouilles, notamment du site de la place Saint-Séverin, beaucoup plus proche du *portus* et du noyau primitif (église Notre-Dame, marché...) ou grâce à d'autres recherches prévues dans ce quartier.

Notre chronologie relative ne pourra se situer sur une ligne du temps que par comparaison avec un matériel mieux daté comme des monnaies ou autres objets métalliques (en piteux état dans ce milieu humide et acide), des objets en os ou bois de cervidés ou des verres. Les céramiques connues, importées d'autres régions ou provenant de sites datés peuvent aussi permettre d'affiner la chronologie.

La démarche

Dans un premier temps, nous avons choisi d'établir une chronologie relative sur base d'ensembles de céramiques provenant de structures closes et bien définies en stratigraphie. Ce schéma de base servira de fil conducteur dont les données pourront être aménagées et complétées au fur et à mesure de l'avancement de l'étude.

Les niveaux⁷

Niveau 1

Le niveau 1 est représenté par le matériel provenant d'une couche d'occupation située au sommet des limons en place dans la partie nord-ouest du site. Ce niveau n'apparaît que localement car la partie orientale du site était occupée à l'époque par la rivière. Il est caractérisé par une terre très noire, charbonneuse et très humique où les matières organiques sont particulièrement bien conservées. La couche affleure, encore aujourd'hui, avec la nappe phréatique. Les structures présentes sont un empierrement irrégulier, installé dans le but d'assécher le sol et un petit four domestique.

Niveau 2

Le matériel issu du niveau 2 fait partie d'une concentration de rejets domestiques, céramique et ossements animaux, comblant une dénivellation dans le sol formé par l'ancien bras de rivière, dans la zone sud-est du site. Cet ensemble est associé à une autre zone de rejets à caractère artisanal: déchets de forge et de travail du verre, et à une série d'aménagements de pierres ou de bois alignés, trop partiellement dégagés pour permettre une interprétation.

Niveau 3

Le niveau 3 est constitué du matériel incrusté dans un empierrement placé intentionnellement en périphérie d'un fond de cabane dont le plan rectangulaire est délimité par un solin de pierres irrégulières. Ni le sol intérieur, de terre battue, ni le petit foyer circulaire aménagé le long d'une paroi, n'ont livré de matériel. Par contre, à l'extérieur, la terre humique et par endroits charbonneuse recouvrant l'empierrement, contenait une grande quantité de déchets de faune et de céramique, et quelques témoins du travail de l'os et du bois de cervidé. Le niveau 2 est séparé de l'empierrement du niveau 3 par un remblai d'une trentaine de centimètres d'épaisseur constitué de terre et de pierres de petit calibre, accumulé lors d'une période d'abandon de la zone et nivelé pour l'occupation suivante.

Niveau 4

Le niveau 4 comprend le matériel issu d'une couche humique surmontant un sol tassé, dans la partie sud-ouest du site. De même nature que les dépôts des niveaux 1 et 3, ce type de formation, ou "couche noire", qui peut parfois être très épaisse pour une seule période, est toujours extérieure à une zone d'occupation proprement dite, avec structure construite. Ici, l'exiguïté du sondage ne permet pas de reconstituer un plan à partir des quelques trous de pieux dégagés, par contre, elle permet de sélectionner un ensemble de céramiques propice à cette première approche, pris entre une couche livrant des céramiques identiques à celles du niveau 3 et une autre dont les types appartiennent au début du Moyen Age, à la première période de la classification de la céramique d'Andenne⁸.

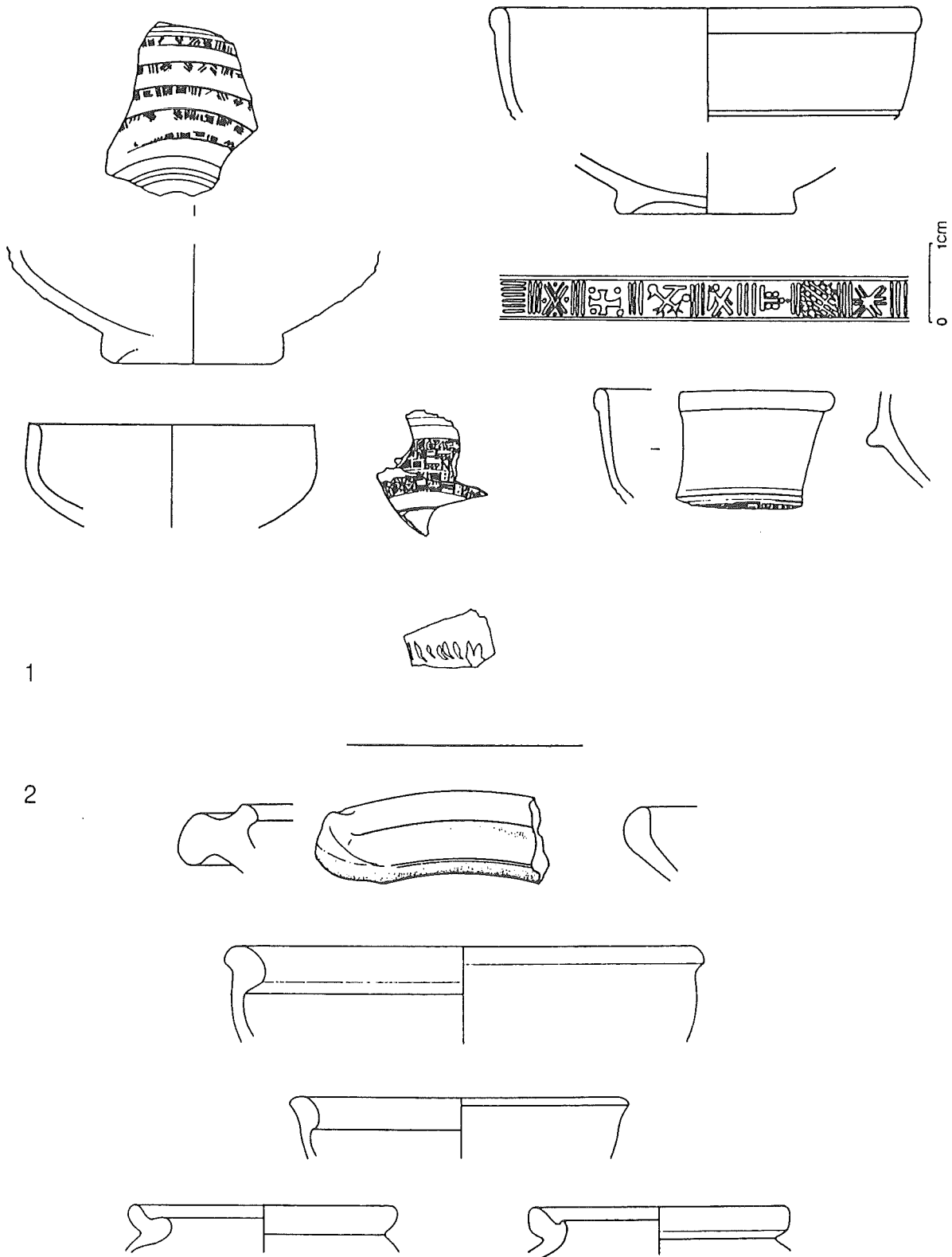
Les céramiques

Niveau 1

Céramique sigillée tardive, type sigillée d'Argonne (fig. 1: 1)

Ce type forme un ensemble de 100 tessons. La plupart présente une pâte orange clair et un engobe légère-

Fig. 1. - Céramiques du niveau 1. Céramiques sigillées tardives, type sigillée d'Argonne. Céramiques communes, rugueuses.



⁷ Voir l'article général sur la fouille de la rue Sous-le-Château dans ce même ouvrage. Dans cet article, le niveau 1 de notre classification se situe en 3 sur la fig. 3; le niveau 2, en 5 sur la fig. 3; le niveau 3, en 1 sur la fig. 4 et le niveau 4, en 6 sur la fig. 4.

⁸ BORREMANS R. & WARGINAIRE R., *La céramique d'Andenne. Recherches de 1956-1965, 1966.*

ment plus foncé. Quelques uns ont un coeur gris, plusieurs tessons d'un même bol ont la pâte stratifiée gris et orange et l'engobe brun très foncé. En général, cette céramique est de mauvaise qualité, fragile. Soit l'engobe est simplement usé, soit la surface s'écaille et se détache par plaques.

Plusieurs fragments permettent de reconnaître la forme du bol 320 de Chenet⁹ ou une forme dérivée. Certains portent un décor à la molette. 7 fragments proviennent d'un ou deux bols et sont ornés d'une variante de la molette 382 de Chenet, déroulée en neuf registres parfois superposés, également répertoriée par Wim Dijkman¹⁰. 2 tessons du même bol portent la molette 122 de Chenet déroulée en cinq registres. 6 autres portent un décor à la molette géométrique peu imprimée ou dont l'état de conservation ne permet pas la lecture.

2 fragments de bords permettent de reconnaître deux dérivés du plat à marli type 313 de Chenet, 3 fragments de coupelles ont un bord court comme le type 304 de Chenet, tandis que 2 bols ont le bord droit et la carène arrondie du type 9 d'Alzei¹¹. On dénombre également 2 fragments de terrine (Chenet 324), 6 fragments de fonds à pied annulaire, 2 fragments de couvercle et 1 fragment de forme indéfinissable portant la trace foncée laissée par un décor à la barbotine.

Céramique commune lisse

Cette catégorie n'est représentée que par 3 fragments de céramique de couleur orangée:

- 1 bord de mortier à bec verseur et inclusions de quartz abrasif,
- 1 fragment de bec trèflé de cruche type Alzei 18,
- 1 tesson de panse.

Céramique commune rugueuse (fig. 1: 2)

Elle forme un ensemble de 90 tessons. Ce sont des céramiques à pâte très cuite, dure, résonnante, à paroi mince ou épaisse. Les parois minces appartiennent à des formes plus hautes. La coloration des pâtes montre un mélange constant des cuissons oxydante et réductrice, aussi bien dans le coeur qu'à la surface, brune ou rouge brique. Souvent, la surface extérieure est noircie à l'usage par un dépôt de suie parfois très épais. Le dégraissant le plus fréquent est le quartz, parfois associé à la coquille, parfois à d'autres particules minérales noires très brillantes.

Les formes reconnaissables sont dans la plupart des cas des formes ouvertes: terrines ou plats de type Alzei 28 et 29 sont représentés respectivement par 6 et 7 exemplaires. 11 fragments de fonds plats d'où la panse s'évase relativement droite appartiennent plutôt au second type. On dénombre également dans cette catégorie 1 bord de mortier, 2 fragments de bords d'urnes proches du type Alzei 27, 4 fragments

de lèvres arrondies et déversées paraissant appartenir à des urnes et 1 fragment de lèvre de récipient à col étroit, type bouteille.

Niveau 2

Céramique fine à cuisson oxydante imitant la sigillée (fig. 2: 1)

Ce groupe rassemble 23 fragments d'écuelles imitant la sigillée d'Argonne mais fortement abâtardie. Certaines sont encore engobées mais cet engobe, de mauvaise qualité, est quasi transparent, souvent très usé. Dans d'autres cas, il s'agit de céramiques simplement lissées, à pâte fine et orange pâle, ou montrant un dégraissant bien visible, de chamotte ou de petites pierres. La forme la plus courante est l'écuelle carénée, avec ou sans épaulement, à lèvre parfois renflée vers l'extérieur, à pied court et fond plat.

Céramique fine à cuisson oxydante (fig. 2: 2)

27 fragments proviennent de vases n'imitant plus les types romains. Ce sont soit des écuelles, soit des urnes à panse arrondie ou carénée. Lorsqu'il y a un décor, il se situe sur la partie supérieure, entre la carène et le col. Certains tessons portent un lissage propre aux urnes bicôniques trouvées dans les sépultures mérovingiennes.

Céramique fine à surface noire, lissée (fig. 2: 3)

Cette catégorie est représentée par 94 tessons. La pâte est beige clair à gris foncé, le dégraissant est peu apparent. Le lissage est parfois rudimentaire.

Plusieurs formes sont définissables: les urnes bicôniques à carène nettement marquée ou adoucie jusqu'à disparition, à col court, déversé, parfois souligné d'un bourrelet; les écuelles à col droit. Font partie de cet ensemble: 7 fragments de fonds plats, sans pied; 2 anses plates asymétriques et 1 goulot trèflé. 53 fragments sont décorés à la roulette, au peigne ou au cachet.

Céramique commune, rugueuse (fig. 3)

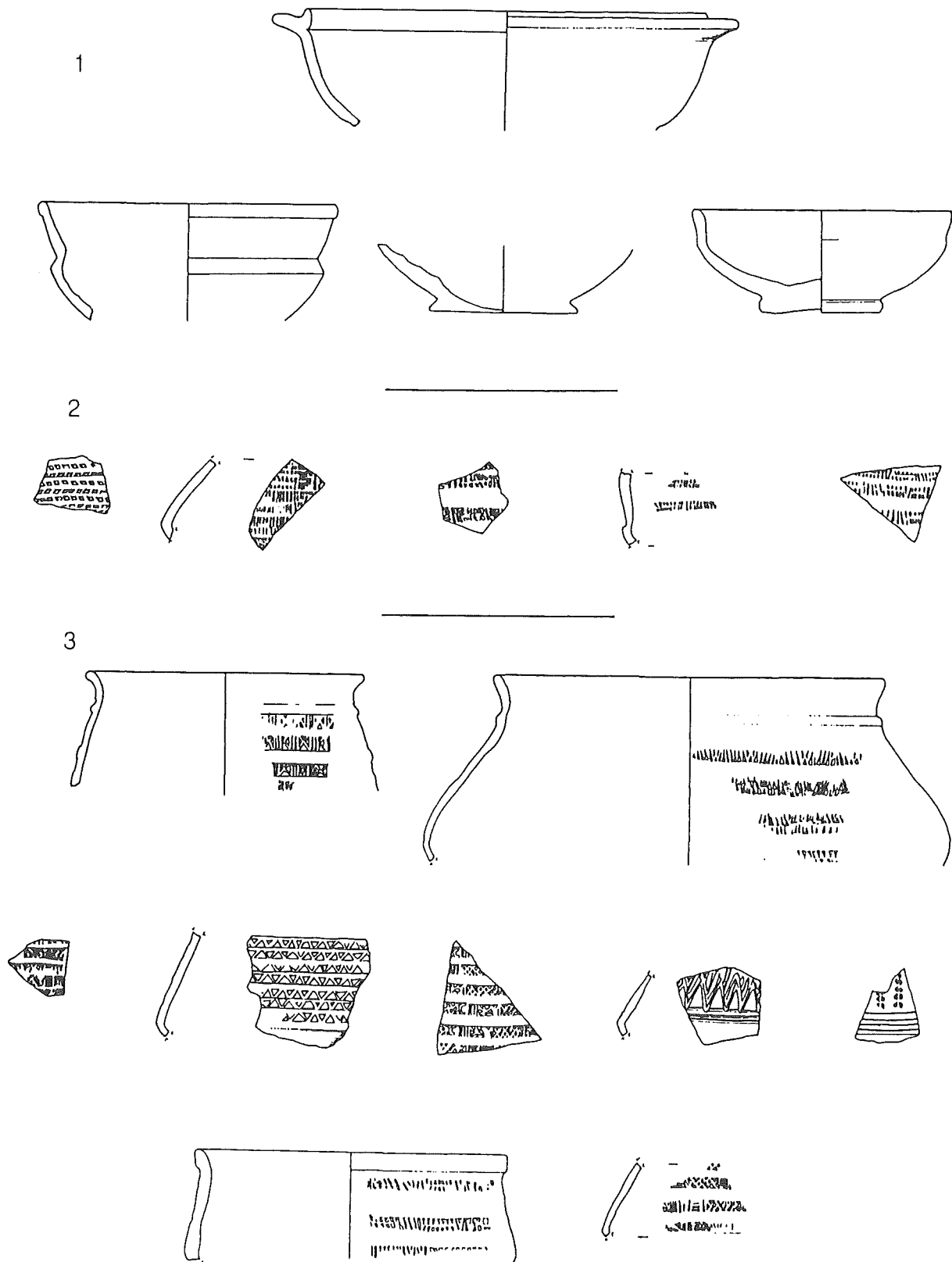
3 fragments classés dans cette catégorie se distinguent par la finesse de leurs parois. Ils appartiennent à une écuelle carénée et à une cruche à bec trèflé et anse asymétrique.

⁹ CHENET G., *La céramique gallo-romaine d'Argonne du IV^e siècle et la terre sigillée décorée à la molette*, Mâcon, 1941.

¹⁰ DIJKMAN W., *La terre sigillée décorée à la molette à motifs chrétiens dans la stratigraphie maastrichtoise (Pays-Bas) et dans le nord-ouest de l'Europe*, *Gallia* 49, 1992, 129-172.

¹¹ UNVERZAGT, *Die Keramik des Kastells Alzei*, Frankfurt am Mein, 1916.

Fig. 2. - Céramiques du niveau 2. Fines, à cuisson oxydante, imitant la sigillée. Fines, à cuisson oxydante. Fines, à surface noire, lissée.

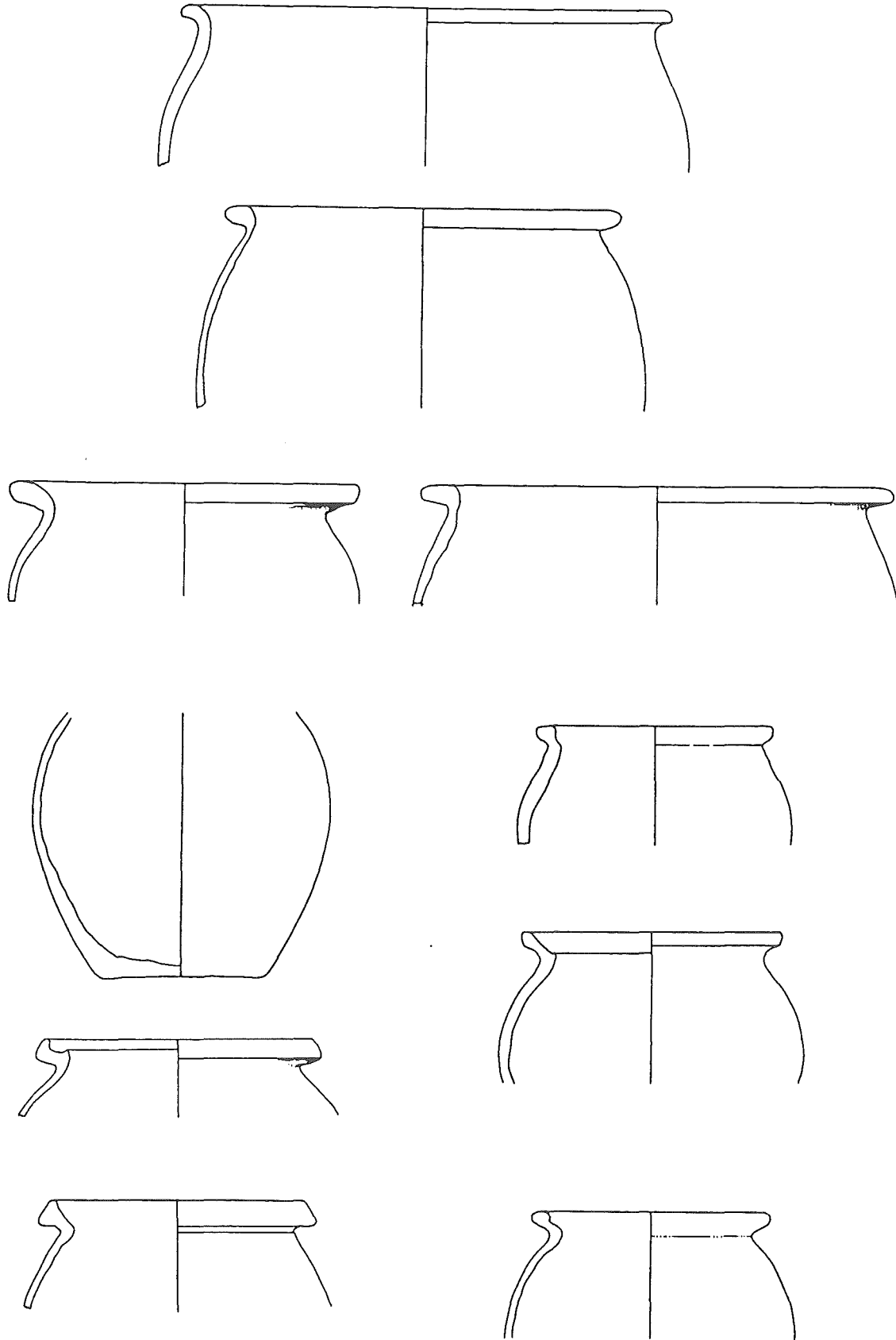


Le reste, 274 tessons de panses, 65 tessons de bords dont 3 avec anse plate asymétrique et 36 tessons de fonds différents appartiennent à un type de forme fermée, à fond plat, panse ovoïde ou globulaire, col court, lèvre déversée simple, à replat ou

en creux. L'épaisseur des parois est proportionnelle à la taille des vases.

La couleur des pâtes varie du blanc au noir, parfois stratifiée. Le dégraissant est principalement minéral, sableux ou de gros calibre (certains galets

Fig. 3. - Niveau 2, céramiques communes, rugueuses.



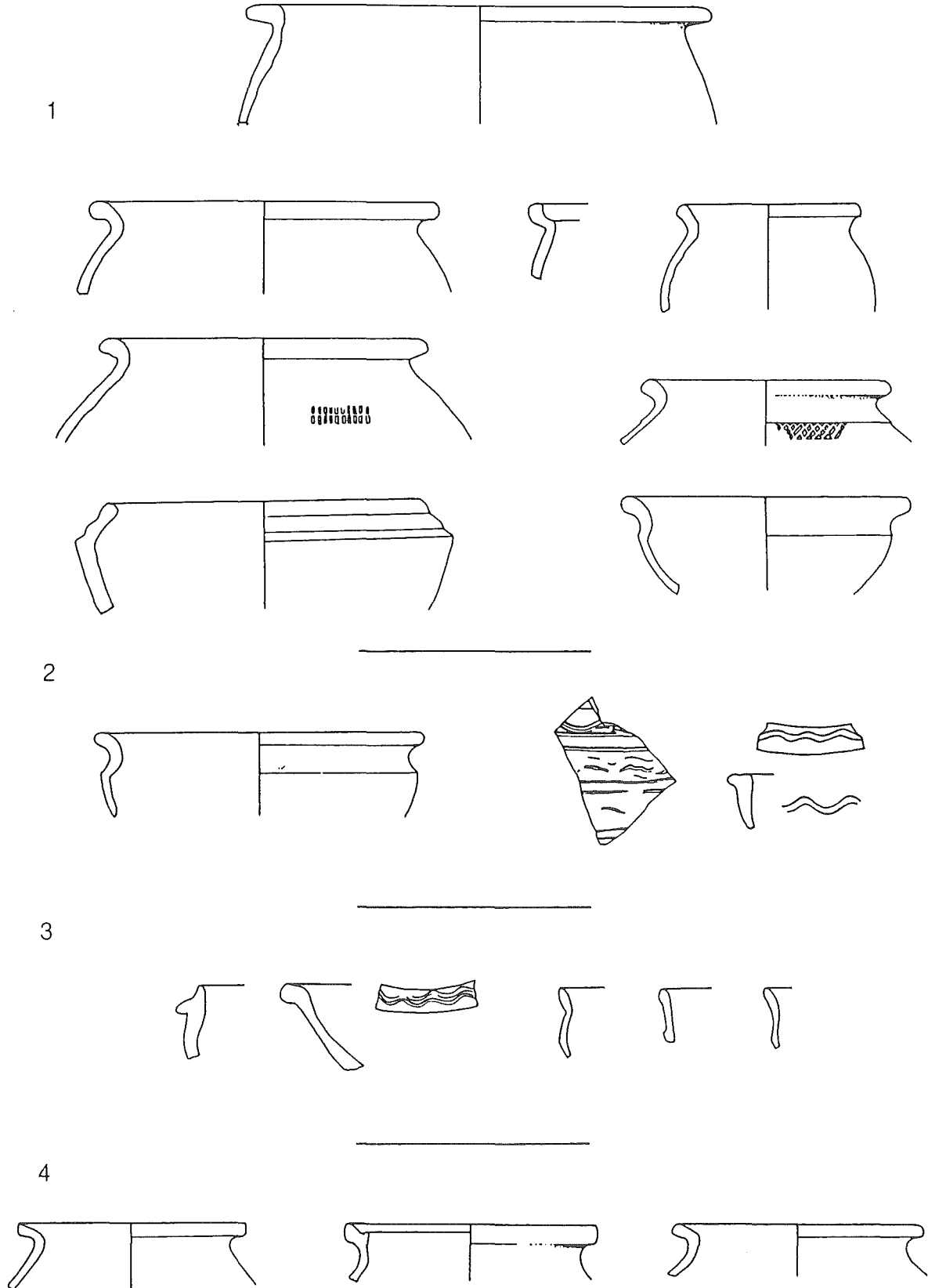
ont 4 mm de diamètre). Dans quelques cas, un dégraisant coquiller laisse la surface piquetée de blanc. La couleur des parois varie du brun au gris foncé ou noir, sans décor, certains ont un aspect argenté, métallisé, probablement intentionnel.

Niveau 3

Céramique commune, rugueuse (fig. 4: 1)

Dans cette catégorie se rangent 507 tessons dont la majorité provient de vases cuits en atmosphère

Fig. 4. - Céramiques du niveau 3. Communes, rugueuses. Lissées. Fines à cuisson oxydante. Fines de type mosan ou andennais.



réductrice. Ils sont proches de la catégorie rugueuse du niveau 2.

La plupart des tessons ont un dégraissant sableux peu perceptible, mais certains fragments présentent, comme au niveau précédent, un dégraissant de petits

galets allant jusqu'à 3 mm de calibre. Le cœur de la pâte est généralement clair, blanc, gris ou beige, les surfaces grises à noires, quelques uns ont une coloration beige-rosé à brique.

Les fonds sont plats (74 tessons), certains ont un

pieu court aux angles adoucis (9 t.), les cols sont courts, avec une lèvre déversée, simple, renflée (41 t.) ou présentant un creux pour la pose d'un couvercle (8 t.). 2 tessons ont une lèvre de section carrée. 15 fragments appartiennent à des écuelles à col court, droit ou légèrement déversé, séparé de la panse par un épaulement ou une carène légèrement marquée, parfois simplement arrondie. Une d'entre elles a un col rentrant, ondulé.

19 tessons sont décorés. Ils appartiennent à la partie supérieure de grandes urnes. Les décors sont dérivés de ceux présents au niveau 2 sur la céramique lissée, il s'agit principalement d'impressions à la roulette de simples ou doubles rangs de petits carrés, rectangles ou losanges sur pointe, de lignes ondulées séparées par des sillons horizontaux.

Céramique commune lissée (fig. 4: 2)

94 fragments de vases de mêmes types que les précédents ont la surface extérieure de la paroi lissée avec un soin fort variable, cette technique appliquée au niveau 2 à une vaisselle raffinée est ici utilisée sur des vases de moins bonne qualité. Le lissage a parfois été exécuté après le décor, estompant ce dernier. Ils appartiennent à tous types de cuisson, leur couleur varie du gris foncé au noir en surface avec pâte clair ou du gris à l'orange pâle. 16 tessons portent les mêmes décors que dans la catégorie précédente, il faut signaler en outre la présence de 2 goulots tréflés

Céramique fine à cuisson oxydante (fig. 4: 3)

13 fragments de couleur beige-orangé ou blanche appartiennent à des écuelles carénées, à lèvre mince fort semblables à celles du niveau 2. 2 fragments de coupelles à bord évasé portent un décor ondulé sur le replat de la lèvre. 1 écuelle a le bord rentrant pourvu d'une courte ailette.

Céramique fine de type mosan ou andennais (fig. 4: 4)

Cette catégorie rassemble des vases globulaires ou ovoïdes à fond plat ou lenticulaire. La pâte est le plus souvent claire, beige ou beige-rosé, le dégraissant sableux très fin est à peine perceptible. La surface extérieure est claire ou grise, "fumée", la surface interne est plus claire.

On dénombre 530 tessons de panse sans décor, 34 tessons de fond, 10 bords déversés à replat horizontal et court bandeau droit, 13 dont le replat est légèrement creux, 4 bords simples déversés avec glaçure jaune, 1 bord concave avec peinture dans le creux. Signalons aussi 5 fragments de goulots tubulaires et ondulés (tournés?) en pâte très claire, dont l'embouchure est sciée ou façonnée; ainsi qu'un fragment d'anse asymétrique.

6 tessons portent de petites taches de glaçure jaune et 15 tessons sont entièrement glaçurés (glaçure épaisse avec bulles, craquelures ou taches brunes ou métalliques), ce qui ne veut pas dire que le vase l'était en entier; 2 tessons portent une glaçure sur ruban appliqué et repoussé; 22 tessons ont un décor de peinture ferrugineuse, sous forme de lignes légères ou très nettes, ondulées, coulées ou formant des motifs aléatoires; enfin 4 tessons sont ornés de rubans plats appliqués et repoussés.

Céramique fine très cuite, de type "protogrès" (fig. 5: 1)

71 tessons proviennent de vases à fond lenticulaire, panse globulaire ou ovoïde, col court et lèvre déversée, mince, arrondie, formant replat ou de section carrée. D'un des bords part une anse courte et plate.

Ces tessons sont très cuits, durs et résonnants. Un dégraissant ocre jaune mélangé à des particules brillantes les distingue de la catégorie précédente, de même que leur couleur, brun foncé à brun-rouge.

Cet aspect très différent tend à faire penser qu'il s'agit d'une production importée d'une autre région.

Céramique fine d'importation rhénane (fig. 5: 2)

64 tessons faisaient partie d'une même amphore ovoïde de très grande taille caractéristique de la production des environs de Badorf. La pâte est bicolore, rose vers l'intérieur, blanche vers l'extérieur du vase, la surface extérieure est crème. Elle porte un décor de rubans appliqués larges et épais imprimés à la roulette de deux rangs de motifs carrés.

2 fragments de bords de vases sans doute importés de la même région présentent un décor particulier: un déroulement de roulette simple sur la lèvre même du vase et qui se prolonge sur sa panse. L'un a la pâte et la surface beige-rosé, l'autre crème.

Niveau 4

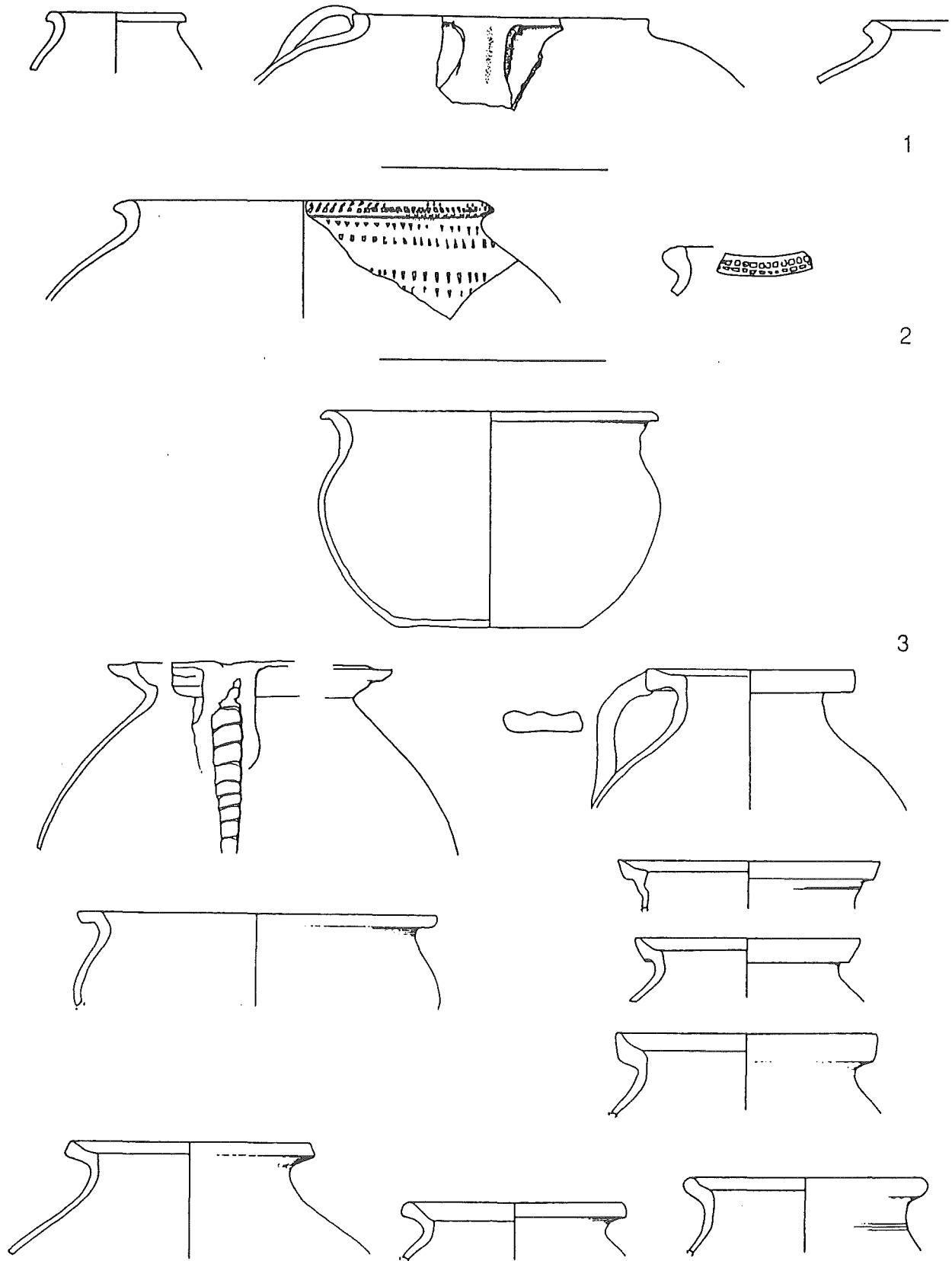
Céramique fine de type mosan ou andennais (fig. 5: 3; fig. 6: 1 et 2)

Dans cette catégorie ont été dénombrés 1800 tessons de panses, à parois parfois très minces. La pâte et la surface sont le plus souvent claires, blanches, beiges ou roses, la surface extérieure peut cependant être grise à noire. Il s'agit en majorité de vases globulaires ou ovoïdes et, en très petite quantité, d'écuelles carénées.

115 tessons de fonds lenticulaires appartiennent à une centaine de vases différents.

92 fragments de bords d'urnes possèdent une lèvre déversée simple, creuse sans bandeau, creuse avec bandeau oblique et arrondi ou bandeau droit. 6 ont

Fig. 5. - Niveau 3, céramiques très cuites ou protogrès. Niveau 3, céramiques importées. Niveau 4, céramiques fines de type mosan ou andennais.



une anse plate asymétrique dont deux sont décorées d'un ruban appliqué et repoussé. On compte également 11 fragments d'anses isolées dont 2 avec bandeau repoussé, 1 peinte et 1 avec bandeau pincé et

recouverte de glaçure jaune. 3 goulots tubulaires ont le bout scié.

Il faut encore signaler 10 bords d'écuelles et 1 bord de bol droit.

15 tessons portent un décor à la roulette identique à ceux de la céramique commune, épaisse et rugueuse du niveau 3.

65 tessons portent une glaçure jaune, plombifère dont la qualité est variable. Elle est souvent craquelée, elle peut présenter des bulles, un piquetage d'impuretés minérales et des taches de couleur brune ou une coloration verdâtre, la paroi est souvent déformée par les manipulations. Plusieurs techniques sont associées à la glaçure: ondes tracées, mamelons appliqués, rubans, bossettes repoussées de l'intérieur, décor à la roulette.

22 tessons portent un décor de simples rubans appliqués, larges ou étroits, parfois très épais (jusqu'à 8 mm), toujours repoussés, c'est à dire formant une série de vagues en relief, perpendiculaires au ruban. Ils sont appliqués verticalement ou en oblique.

108 tessons sont peints. Les motifs sont souvent aléatoires, parfois organisés: lignes parallèles, ondulées, entrecroisées, cercles. La peinture est rouge, orange ou brune, elle orne aussi bien les cols, que les panses, les goulots ou les anses. Elle est dans un cas associée à un ruban appliqué et repoussé.

Céramique fine surcuite, de type "protogrès"

Ce sont des vases à parois très fines, panse globulaire, fond lenticulaire, col court, lèvre mince, déversée plate ou creuse, à bandeau court ou arrondi. La pâte est très dure, résonnante, très cuite, toujours claire au coeur, foncée vers l'extérieur. La surface externe est ocre, rousse ou brun foncé, granuleuse. Le dégraissant utilisé est un sable très fin qui donne à la surface un aspect moucheté jaune pâle ou gris foncé. Cet aspect moucheté, constant au niveau 4, est rare pour ce type de céramiques du niveau 3, dont les parois sont plus épaisses. La cuisson est parfois tellement forte que la surface devient brillante

9 tessons présentent un décor sommaire à la peinture qui ressort mal sur la couleur du vase. On compte 12 fragments de fonds lenticulaires, un fragment d'anse plate asymétrique appliquée à la lèvre, 22 bords de vases différents.

Céramiques communes, rugueuses

40 tessons de cette catégorie importante du niveau 3 ne sont plus caractéristiques du niveau 4, ce type assez grossier est donc petit à petit remplacé par une céramique plus fine.

La situation chronologique des niveaux

Le niveau 1 présente un matériel qui paraît bien contemporain. Sans entrer dans le détail, les comparaisons avec les typologies de référence comme

celles de Chenet et d'Unverzagt permettent dans un premier temps de conclure que ce niveau appartient à la fin du IV^e ou au début du V^e siècle.

Le niveau 2 est plus difficile à dater car faute de forme complète, la typologie des décors apporte peu de précision. L'association d'écuelles à pâte rouge et d'urnes noires lissées existe durant toute la période mérovingienne, les écuelles se retrouvent d'ailleurs aussi à l'époque carolingienne. Les vases communs sont un critère encore moins parlant. La comparaison avec le matériel des fours de Batta montre peu de points communs. L'absence de céramique surcuite, le peu de décors présents sur les écuelles et la technique de l'engobe encore utilisée, tendraient à placer ce niveau au début de la période, au VI^e siècle, ce qui semble être confirmé par la typologie des verres trouvés dans le même contexte. Notons la nette différence typologique entre la vaisselle commune des deux premiers niveaux et l'apparition des urnes lissées bicôniques, seules les imitations d'écuelles rouges montrent un rapport éloigné entre les niveaux 1 et 2.

Le niveau 3 est carolingien car les nombreux fragments de l'amphore de Badorf trouvés éparpillés dans la couche ne peuvent être intrusifs. C'est ce vase, essentiellement, qui permet de situer le niveau entre le début du IX^e siècle et le début du X^e siècle, en attendant de préciser cette datation par d'autres comparaisons, par exemple pour les céramiques très cuites, de type "protogrès".

Si la datation du second niveau est exacte, une rupture nette se marque entre les niveaux 2 et 3. L'étude de l'ensemble du matériel permettra peut-être de combler ce vide ou de l'expliquer. Sur le plan typologique, la céramique commune rugueuse n'a pas beaucoup évolué, ce qui tendrait à prouver qu'il s'agit d'une fabrication locale. Seul le lissage des céramiques fines a subsisté mais en faible quantité. L'apparition des céramiques de type mosan et des "protogrès" marque quant à elle un net changement au niveau 3.

Le niveau 4, période post-carolingienne, montre une présence dominante de ces céramiques de type mosan ou andennais, à pâtes claires, qui apparaissent déjà en bon nombre au niveau précédent. Il semble, de ce fait, qu'il y ait continuité entre ces deux niveaux. Les céramiques communes rugueuses sont en train de disparaître. Nous situons ce niveau 4 entre le début ou le milieu du X^e siècle, et le début du XI^e siècle, juste avant la première phase de la classification de Borremans-Warginaire, qui débute la période médiévale proprement dite.

Les niveaux 3 et 4 ont des ressemblances typologiques certaines avec les deux niveaux carolingiens déterminés par J. Willems rue d'Amérique, datés entre la fin du VIII^e et le début du X^e siècle.

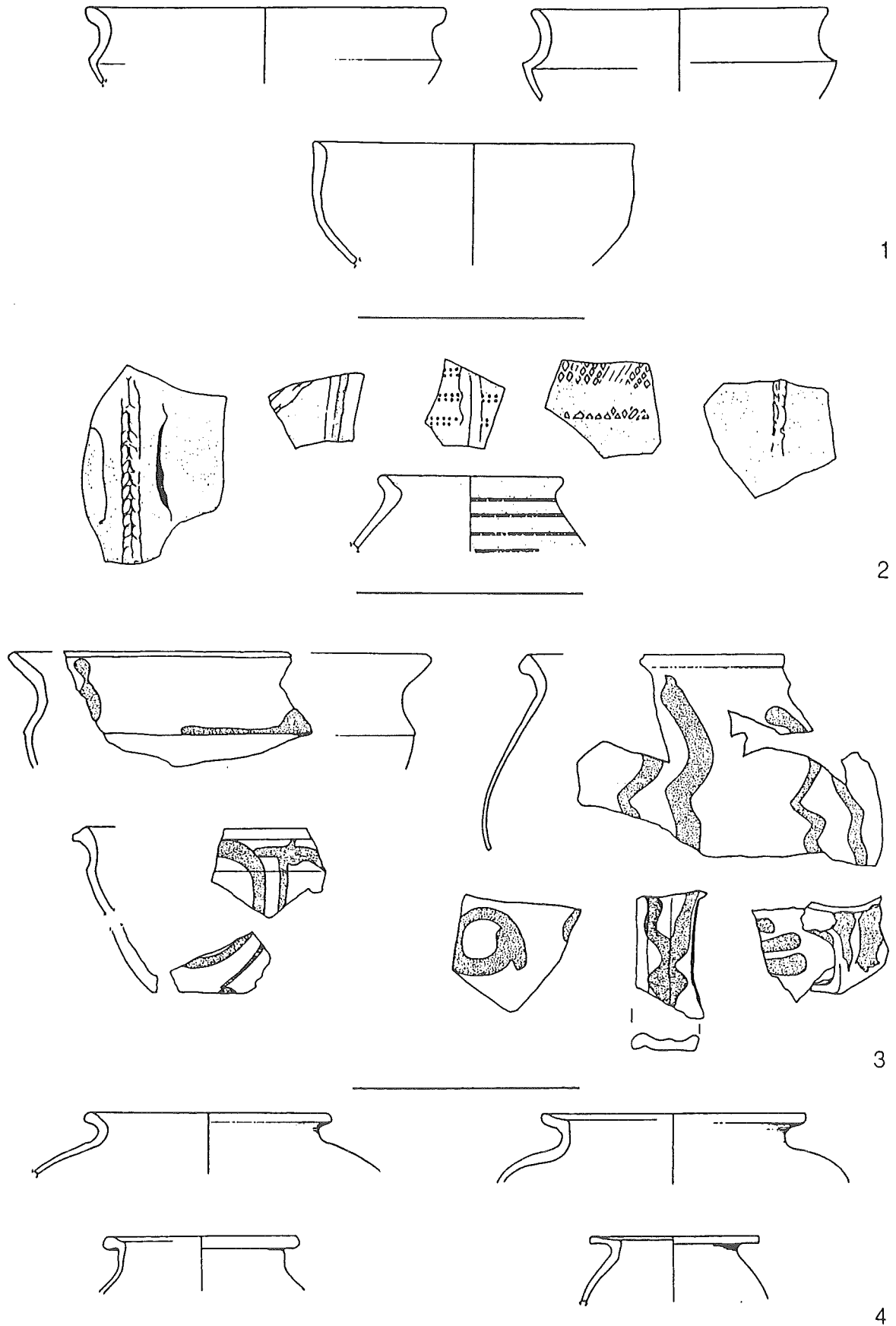


Fig. 6. - Céramiques du niveau 4: type mosan. Ecuellen et bols. Tessons recouverts de glaçure. Tessons peints.

Perspectives de l'étude

Cette approche préliminaire ouvre bon nombre de possibilités.

Il est nécessaire maintenant d'élargir l'étude à l'ensemble du matériel céramique récolté sur ce site, afin de vérifier s'il n'existe pas de sous-niveau ou de partie de niveau non recensé, nous pensons ici à une seconde phase pour la période mérovingienne. Des tableaux statistiques pourront être réalisés à partir des comptages. La détermination de la fonction des vases est également au programme.

Pour affiner les datations, le rapport avec le matériel autre que la céramique est aussi nécessaire, de même que l'utilisation de sciences annexes. Quelques analyses 14C ont été réalisées et appuient déjà la datation de certaines couches (niveau 2), d'autres sont en cours. Nous attendons aussi les résultats de l'étude archéomagnétique des fours dégagés.

Recenser la totalité des formes, des décors mais aussi analyser les pâtes avec plus de précision quant à l'origine des argiles et des dégraissants, permettra de former des groupes de fabrication, peut-être d'identifier des ateliers ou au moins de déterminer les groupes de céramiques importées, je pense notamment aux céramiques très cuites de type "protogrès", ou aux céramiques peintes, parmi lesquelles nous avons pu observer de nettes différences de qualité.

Sur le plan local et socio-économique, il est aussi indispensable d'étudier en parallèle les découvertes de plusieurs sites de consommation fouillés dans des quartiers différents de la ville. Le niveau social du quartier joue un rôle dans la qualité de la vaisselle utilisée, les proportions entre les différents types, par exemple, entre céramique commune et céramique fine décorée, peuvent varier d'un site à l'autre. Une telle différence a notamment pu être observée entre des fouilles de la place Saint-Séverin et celle dont il est question ici.

Sur le plan régional, la comparaison du matériel découvert à Huy, surtout des productions dites "mosanes" ou "andennaises" avec les découvertes faites dans d'autres localités, en site de consommation ou de production, pourra aider à affiner les datations et à cerner les zones de fabrication, en attendant la découverte de nouveaux ateliers.

Il serait intéressant également de recenser les découvertes de ce type de céramique à l'étranger afin de dessiner l'éventail des exportations et d'aider à la connaissance des voies commerciales de l'époque.

L'étude de ce matériel fera partie de la publication intégrale d'une série de sites médiévaux urbains fouillés à Huy depuis plus de dix ans.

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Bracelets en verre découverts en Roumanie

Les bracelets en pâte de verre sont connus chez nous dès la période géto-dace: on peut mentionner un fragment inédit provenant d'un bracelet en verre (daté aux I^{er} siècle av. J.C. et I^{er} siècle apr. J.C.), bleu foncé, décoré d'un motif incrusté, découvert par Dinu V. Rosetti dans l'entre-deux-guerres, à Bucarest¹ et la découverte de Transylvanie, à Ghirbov (I^{er} siècle av. J.C.-I^{er} siècle apr. J.C.).²

Pour les II^e-III^e siècles on peut mentionner deux fragments découverts sur le territoire des "*villae romanae*" en Dobroudja³ à Capaclia (en pâte de verre bleu foncé, décorée par torsion de minces fils rouges, bleus et dorés) et à Niculitel – ce qui prouve que cette catégorie d'ornement était très peu utilisée.

A partir du IV^e siècle les bracelets connaissent une large diffusion, ce dont témoigne le nombre accru de découvertes, mais aussi l'aire géographique plus large où ils sont rencontrés: habitats (Isaccea, Argamum, Capidava) et nécropoles⁴ (Mangalia, Piatra Frecatei) de Dobroudja, habitats du Banat⁵ (Greoni, Moldova Veche) ou bien en Transylvanie, dans la nécropole n° 1 de Bratei⁶. Ils seront utilisés jusqu'aux VI^e-VII^e siècles (parmi les découvertes les plus tardives nous

signalons la pièce de Sucidava - VI^e siècle)⁷ quand, à la suite de l'invasion dans le Bas-Danube des Slaves et des Bulgares, les liaisons avec l'Empire byzantin seront perturbées pour une longue période.⁸

L'année 971 marque le moment d'une nouvelle étape, quand les armées byzantines commandées par l'empereur Jean Tzimiskes reconquerront la Dobroudja.⁹

La présence byzantine au Bas-Danube assure des conditions favorables pour l'importation des bracelets produits dans les ateliers de l'Empire byzantin, pièces qui seront bientôt confectionnées aussi dans quelques ateliers locaux de Bulgarie, Russie, Dobroudja etc.: les recherches de surface ou les fouilles archéologiques dans les centres fortifiés situés sur le limes danubien ont confirmé le fait que l'utilisation des bracelets en pâte de verre était très répandue parmi la population des habitats suivants: Capidava,¹⁰ Harsova,¹¹ Cernavoda,¹² Piatra Frecatei,¹³ Macin,¹⁴ Troesmis,¹⁵ Tulcea,¹⁶ Dunavatul de Jos.¹⁷

Dans les centres qui ont été longtemps étudiés – Garvan,¹⁸ Isaccea,¹⁹ Nufaru²⁰ – le nombre (plus de mille fragments et bracelets par habitat) et la variété de la pâte et du décor sont impressionnants.

¹ Les bracelets découverts appartiennent aux collections du Musée de la ville de Bucarest.

² Al. ALDEA, *Apulum* X, 1972, 14, fig. 10/2-3.

³ Capaclia: V.H. BAUMANN, *La ferme romaine de Dobroudja*, Tulcea, 1983, 165, anexe A/7; Niculitel: Gh. MANUCU-ADAMESTEANU, *Peuce* IX, 1984, 242, note 42.

⁴ C. PREDĂ, *Callatis. La nécropole romano-byzantine*, Bucarest, 1980, 52-53.; Piatra Frecatei: A. PETRE, *A.I.E.S.E.E., Bulletin* XVII-XVIII, 1987, 23, fig. 56c, p. 38, fig. 106, b1, b2; les matériaux découverts dans les habitats sont inédits.

⁵ M. TEICU, *A.M.N.* XVIII, 1981, 493-494, note 8.

⁶ Ligia BARZU, *La continuité de la population autochtone en Transylvanie pendant les IV^e-Ve siècles*, Bucarest, 1973, 69-70.

⁷ D. TUDOR, O. TOROPU, C. TATULEA & M. NICA, *Materiale*, Tulcea, 1980, 362.

⁸ R. VULPE & I. BARNEA, *Sur l'histoire de Dobroudja, vol. II. Les Romains au Bas-Danube*, Bucarest, 1968, 439-445.

⁹ I. BARNEA & St. STEFANESCU, *Sur l'histoire de Dobroudja, vol. III. Byzantins, Roumains et Bulgaires au Bas-Danube*, Bucarest, 1971, 71-97.

¹⁰ Gr. FLORESCU, R. FLORESCU & P. DIACONU, *Capidava* I,

1958, 237-238.

¹¹ Matériaux inédits appartenant aux collections du Musée de la Ville de Bucarest et du Musée de Constantza.

¹² Matériaux inédits appartenant aux collections du Musée de Constantza.

¹³ Matériaux inédits appartenant aux collections du Musée de Tulcea.

¹⁴ Matériaux inédits découverts pendant des recherches de surface effectuées par Gh. Manucu-Adamesteanu.

¹⁵ Gh. MANUCU-ADAMESTEANU, *Peuce*, VIII, 1980, 234-238.

¹⁶ I. VASILIU & Gh. MANUCU-ADAMESTEANU, *Peuce* IX, 1984, 149.

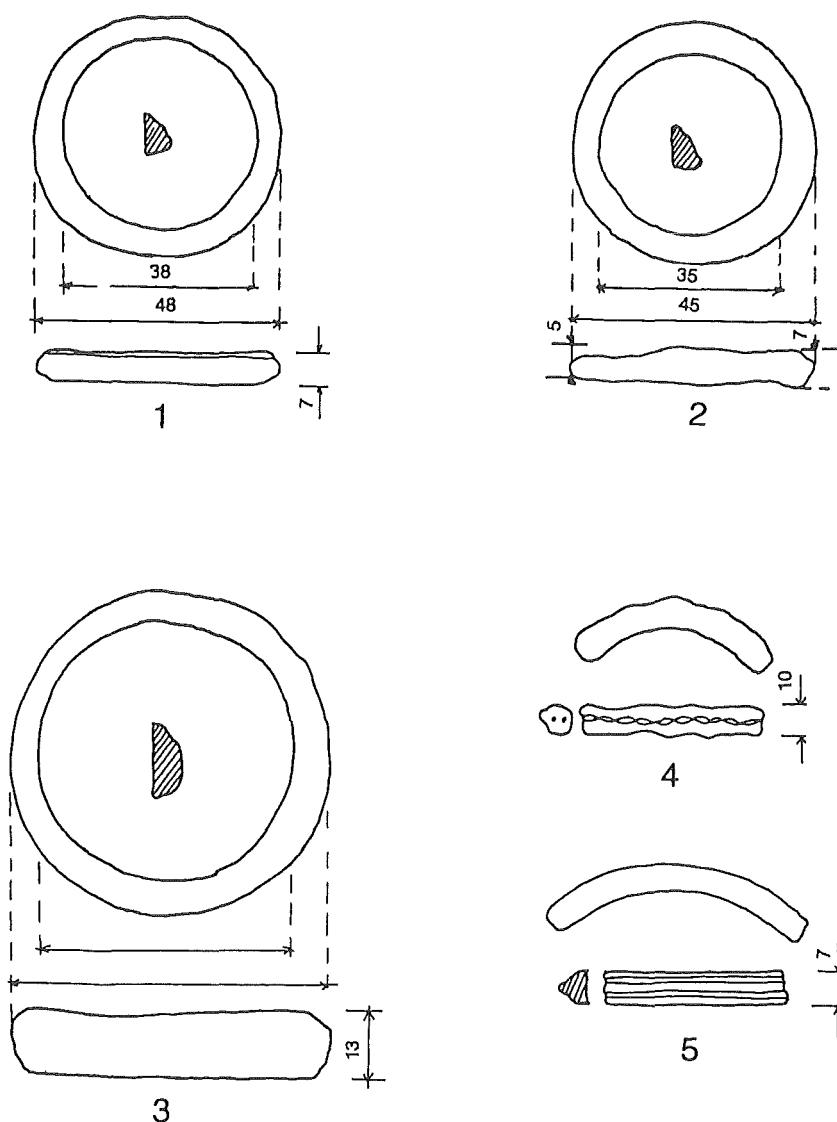
¹⁷ Voir la note n° 14.

¹⁸ Gh. STEFAN, I. BARNEA, M. COMSA & E. COMSA, *Dinogetia* I, Bucarest, 1967, 302-315.

¹⁹ I. BARNEA & N. ANGHELESCU, *Materiale* IV, 1957, 167; I. Vasiliu, *Peuce* IX, 1984, 110-111; Gh. MANUCU-ADAMESTEANU, *Peuce* IX, 1984, 241-242.

²⁰ S. BARASCHI & N. MOGHIOR, *SMMIM* 14-15, 1981-1982, 80-81, fig. 10; Gh. MANUCU-ADAMESTEANU, *Peuce* X, 1992, 515; O. DAMIAN, *SCIIVA*, 44, 1993, 1, 96-98.

Fig. 1. - Bracelets de Flamanda (1-2),
Vacaresti (3), Nufaru (4) et Braila (5).
Ech. 2:3.



Exceptionnellement, ces parures sont utilisées aussi par les habitants du milieu rural (une seule pièce découverte à Murighiol²¹ et une autre à Faclia, près de Medgidia,²² toutes les deux datant du XI^e siècle).

Les découvertes du Banat nous offrent une image différente: le nombre de pièces est réduit (seulement quelques dizaines) mais elles sont répandues de manière plus équilibrée, par habitats – Gornea,²³ Moldova Veche-Rat,²⁴ Cladova,²⁵ Cenad²⁶, et nécropoles – Pescari,²⁷ Sopotu Vechi,²⁸ Caransebes,²⁹ Cuptoare-Sfocea.³⁰

Les exemplaires du Banat semblent provenir de deux ateliers³¹ au moins, qui approvisionnaient le sud et le nord de la province et sont totalement différents par la pâte en verre et le décor, par rapport aux bracelets découverts en Dobroudja.³² Ils n'ont en commun que la chronologie – Xe-XIII^e siècles; après cette date on ne signale plus au Banat de bracelets en pâte de verre.

Les territoires voisins – Crisana (deux fragments provenant de fouilles plus anciennes de la cité de Biharea)³³ ou Transylvanie (un seul fragment de

²¹ Gh. MANUCU ADAMESTEANU, *Peuce* X, 1992, 367.

²² E. COSA, *Materiale* IV, 1957, 330.

²³ I. UZUM, *Banatica* 4, 1977, 220-221, 224, fig. 1/4-6, 6; IDEM, *Banatica* 5, 1979, 215-224, fig. 6; IDEM, *Banatica* 7, 1983, 261-262.

²⁴ *Ibidem*, 250.

²⁵ Pièces inédites.

²⁶ D. TEICU, *AMN* 17, 1981, 491, note 6.

²⁷ Pièces inédites.

²⁸ D. TEICU, *Crisia* XXI, 1991, 307-310.

²⁹ E. IAROSLAVSCHI, *Banatica* 3, 1975, 361.

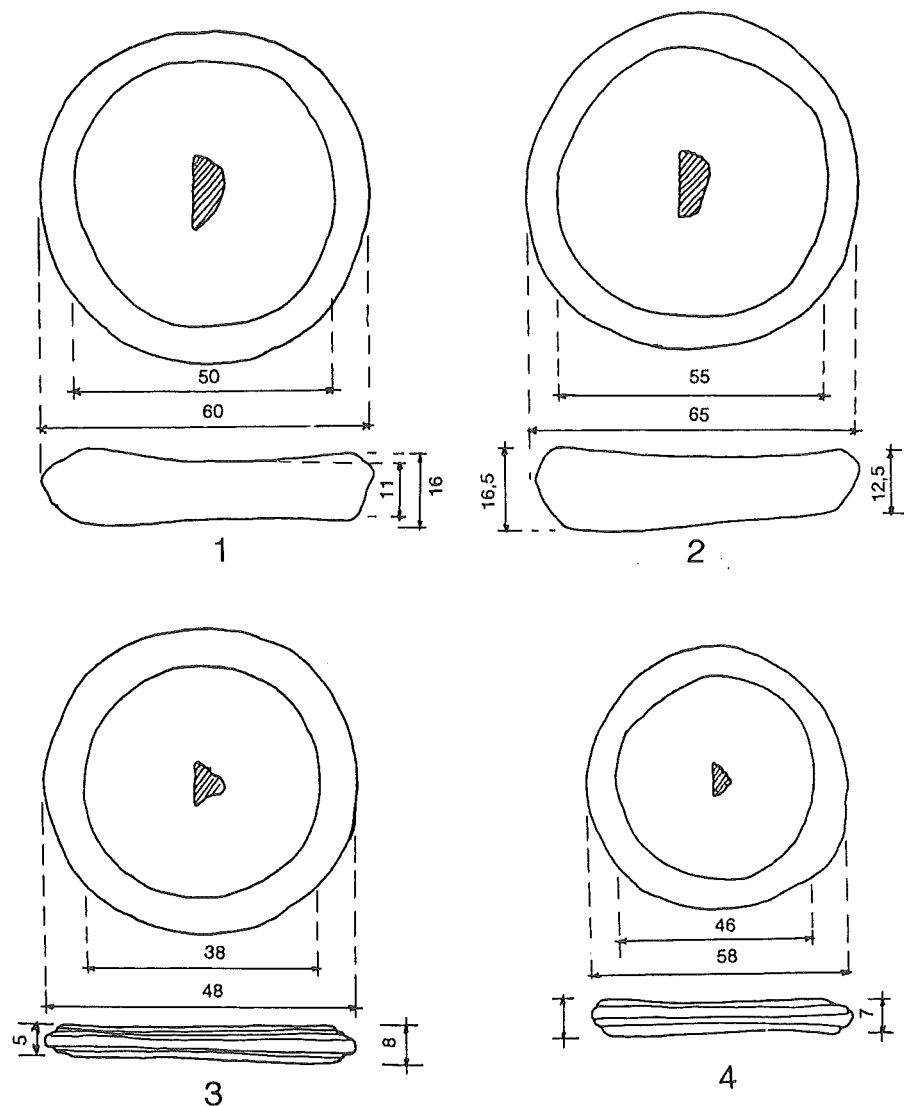
³⁰ I. UZUM, *Banatica* 4, 1977, 220-221; D. Teicu - pièces inédites.

³¹ Idem, *AMN* XVIII, 1981, 495; I. UZUM, *Banatica* 7, 1983, 262.

³² Les bracelets en verre qui se trouvent au Musée de Resita sont totalement différents par rapport aux exemplaires trouvés en Dobroudja.

³³ Deux fragments de bracelets se trouvent dans les collections du Musée National de l'Histoire, Bucarest.

Fig. 2. - Bracelets de Domnesti (1-3) et Grosavesti (4). Ech. 2:3.



Dabâca)³⁴ ne semblent pas avoir connu l'utilisation de ce type de parure.

Nous rencontrons une situation presque semblable en Moldavie³⁵; quelques découvertes isolées – Dodesti³⁶ (un fragment des Xe-XIe siècles), Nicolina-Iassy³⁷ (un fragment du XIIIe siècle) et sur la place de la Cour princière de Iassy³⁸ (un bracelet "aux bouts écartés", caractéristique du XIIIe siècle, mais découvert dans un niveau du XIVe siècle) et qui reste l'unique découverte de ce type signalée sur le territoire roumain. Cette situation est bien surprenante puisque dans ce lieu on rencontre beaucoup d'importations byzantines ou de Russie, et la seule explication qu'on en donne – l'insuffisante connaissance des habitats et des nécropoles de cette période (XIe-XIIIe siècles) – n'est pas du tout satisfaisante.

En synthétisant les informations dont nous disposons, on peut affirmer que les bracelets en verre sont signalés de nouveau aux Xe-XIe siècles et qu'ils connaissent une vraie mode aux XIe-XIIe siècles (au Banat et surtout en Dobroudja) pour disparaître pendant le XIIIe siècle. Les pièces découvertes dans les territoires voisins – Bulgarie (où l'on estime que leur utilisation a commencé au IXe siècle),³⁹ Serbie, Mace-

34 Fragment inédit.
 35 M.M. POPESCU, *Parures médiévales des Pays Roumains*, Bucarest, 1970, 23, signale la découverte de quelques bracelets en verre à Suceava, mais ils proviennent, en fait, du nord de Bucovine, cf. V. SPINEI, *Moldavie aux XIe-XIVe siècles*, Bucarest, 1982, 100, note 147, fig. 16.
 36 D.Gh. TEODOR, *La continuité de la population autochtone à l'est de Carpathes pendant les VIe-XIe siècles*, Iassy, 1984, 111, 113, 117, fig. 61/14-15.
 37 Une pièce inédite découverte, pendant les fouilles archéologiques, par V. Spinei.
 38 Al. ANDRONIC, E. NEAMTU & M. DINU, *AM* 5, 1967, 198; V. SPINEI, *loc.cit.*, note 148.
 39 Pour une datation plus tardive, voir P. DIACONU & D. VALCEANU, *op.cit.*, 151-152.

Composition des bracelets en verre découverts dans les nécropoles de Bucarest (XVIII-XIXe siècles)

Éléments	Grozavesti	Domnesti 1	Domnesti 2	Domnesti 3	Eglise Flamanda 1	Eglise Flamanda 2	Monastère Vacaresti
Additifs	Cu,Ca,Fe Fe,K	Cu,Pb,Ca, Fe,K	Cu,Bb,Ca Fe,K	Cu,Pb,Ca	Cu,Ca,Fe	Cu,Ca,Fe	Cu,Ca,Fe,K
Traces	K,Mn, Pb, Ti,Sr,Zn,Au	M,Ti,Zn,Sr	Mn,Ti,Zn,Sr	Mn,Ti,Zn,Sr	K, Ti,As,	K,As,Mn, Mn,Sr,Rb	Mn,Pb,As Sr,Pb,Rb

Composition des bracelets en verre découverts dans les habitats de Roumanie (XVIII-XIXe siècles)

Éléments	Braila 1	Braila 2	Nufaru 1	Nufaru 2
Additifs	Cu,Ca,Fe,K	Cu,Ca,Fe,K	Ca,Fe,Pb,Co	Ca,Fe,Pb,As
Traces	Mn, Pb,As,Au	Mn,Pb,As,Au	K,Cu,Mn,Zn,Sr,Rb,Ti	K,Cu,Mn,Zn,Sr,Rb

doine,⁴⁰ Russie,⁴¹ Hongrie – ont été placées dans le même intervalle (les dernières pièces connues proviennent du XIIIe siècle).

Après une longue absence, les bracelets en verre réapparaissent dans les XVIIIe-XVIIIe siècles. Parmi les pièces médiévales, on signale deux fragments découverts à Giurgiu,⁴² deux fragments inédits découverts à Braila, dans un contexte archéologique des XVIIIe-XIXe siècles (bracelets en verre bleu, à section triangulaire et à nervures saillantes), plusieurs fragments découverts dans les niveaux d'habitation des XVIIIe-XIXe siècles, dans l'habitat rural de Nufaru (département de Tulcea) – la plupart sont identiques aux bracelets de Braila mais il y a aussi un fragment en pâte de verre blanche, transparente, faiblement torsionnée et à l'intérieur avec un fil mince en couleur bleue.⁴³ Au même endroit (département de Tulcea) on peut signaler une découverte isolée (un bracelet pareil à ceux de Braila et de Nufaru) sur le territoire de la commune de Beidaud,⁴⁴ ou bien les bracelets déposés dans les tombeaux des cimetières de Niculitel⁴⁵ (cinq exemplaires bleus et noirs, dont quelques-uns avec des nervures saillantes, datés du XVIIIe siècle) ou d'Isaccea⁴⁶ (deux bracelets bleus, provenant d'un tombeau dérangé, datés des XVIIIe - XIXe siècles).

L'habitude de déposer les bracelets en verre dans les tombeaux est présente aussi sur le territoire de la ville de Bucarest.

La première mention à cet égard se rapporte à la nécropole de Ordoreanu,⁴⁷ sur la rivière de l'Arges, en bordure du lac de Mihailesti; là, autour d'une église, il y avait une nécropole en état jusqu'à la fin du XIXe siècle: dans un tombeau on a découvert un bracelet en verre bleu décoré de pastilles en verre appliquées dans la pâte, pièce qui reste une exception parmi les découvertes de notre pays, mais qui a des équivalents parmi les pièces découvertes en Hongrie.⁴⁸

Un autre bracelet a été découvert pendant les fouilles de sauvetage au monastère de Vacaresti⁴⁹: dans le tombeau no 2 on a découvert un bracelet en pâte de verre bleue, à section semicirculaire.

En 1974, suite aux fouilles à l'église de Flamanda, de Bucarest,⁵⁰ on a découvert 21 tombeaux différemment datés: les monnaies de provenance ottomane, autrichienne et roumaine permettent de conclure qu'on y a effectué des enterrements jusqu'à la seconde moitié du XIXe siècle (les dernières étant des émissions roumaines de 1867).⁵¹ A 0,40 m de profondeur on a trouvé deux bracelets en verre bleu qui semblent avoir fait partie de l'inventaire funéraire

⁴⁰ D. MINIK, L'apparition et la diffusion des bracelets en pâte de verre dans les localités de fouilles médiévales en Yougoslavie, in: *Verre médiéval aux Balkans (Ve-XV siècles)*, Belgrad, 1975, 71-78.

⁴¹ P. DIACONU & D. VALCEANU, *op.cit.*, 152-154.

⁴² I. BARNEA, P. CERNOVODEANU & C. PREDA, *Materiale IV*, 1957, 235.

⁴³ C'est l'unique cité de Roumanie où on a trouvé ce type de bracelet.

⁴⁴ Gh. MANUCU ADAMESTEANU, *Peuce IX*, 1984, 242-243.

⁴⁵ L. BATRANA & A. BATRANA, *RMMMA XVII*, 1986, 2, 85-86.

⁴⁶ I. VASILIU, *Peuce XI*, 1995, 384.

⁴⁷ A. STEFANESCU, *CAB IV*, 1992, 257.

⁴⁸ A. GYURKY KATALIN, *Uvegek a kozepkori magyaror szagon*, Budapest, 1991, 17-18, 132, pl. XLVI/4.

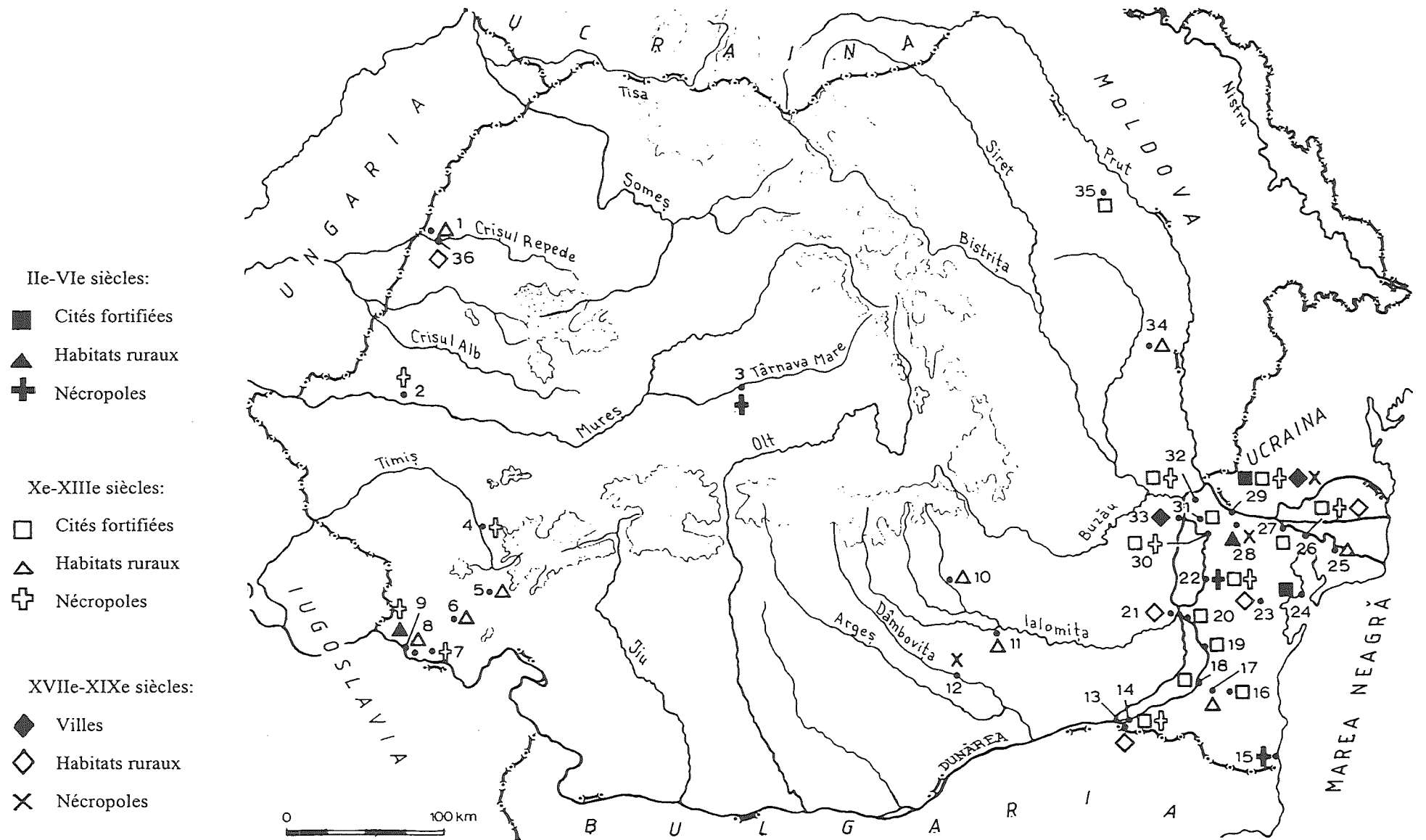
⁴⁹ C. TICO, *CAB III*, 1981, 251-252, fig. 4/7-8.

⁵⁰ Matériaux inédits.

⁵¹ M. GRIGORUTA, *MIM X*, 1981, 212-213.

Fig. 3. - Carte de répartition des découvertes de bracelets en verre sur le territoire de la Roumanie:

1. Biharia, 2. Cladova, 3. Brateiu, 4. Caransebes, 5. Cuptoare, 6. Sopotu Vechi, 7. Gornea, 8. Pescari, 9. Moldova Veche, 10. Bucov, 11. Dridu, 12. Bucuresti, 13. Ostrov, 14. Pacuiu lui Soare, 15. Mangalia, 16. Medgidia, 17. Faclia, 18. Cernavoda, 19. Capidava, 20. Harsova, 21. Piuva Petrii, 22. Piatra Frecatei (Beroe), 23. Beidaud, 24. Jurilovca, 25. Murighiol, 26. Nufaru, 27. Tulcea, 28. Niculitel, 29. Isaccea (Noviodunum), 30. Troesmis, 31. Macin, 32. Dinogetia, 33. Braila, 34. Dodesti, 35. Iasi



d'un tombeau d'enfant dérangé par les enterrements ultérieurs (ces bracelets n'ont que 45 mm de diamètre, la section semicirculaire et ils sont assez négligemment travaillés dans une pâte bleue).

En 1988 I. Panait a fait des recherches à la vieille église de Domnesti, près de Bucarest, lors desquelles on a découvert plusieurs tombeaux dans le cimetière constitué près de l'église: dans le tombeau no 4 on a trouvé trois bracelets en pâte de verre bleue, assez rudement travaillés dans une barre de verre de largeur et d'épaisseur variables: l'un d'eux seulement a été travaillé avec plus de soin, étant décoré des nervures saillantes. Dans le tombeau on a trouvé encore 5 monnaies: deux en argent, dont l'une illisible, l'autre provenant de l'atelier de Prague et battue par Ferdinand Ier d'Autriche en 1840⁵², et trois pièces en bronze, roumaines (deux pièces de 5 bani et une autre de 10 bani), toutes émises en 1867.

Le dernier bracelet dont nous pouvons faire mention a été découvert à Grozavesti (Bucarest) en 1995.⁵³ Dans le tombeau no 5 on a découvert un bracelet en verre bleu, travaillé sans soin: à partir des découvertes de monnaies dans les tombeaux – des pièces autrichiennes de 2 et 6 kreutzers (de 1849, 1851) et des pièces roumaines de 10 bani (de 1867) – ce bracelet peut être daté du XIXe siècle.

A l'évantai de nécropoles de Bucarest et de Dobroudja on peut ajouter un site isolé dans le sud de la Moldavie. Les recherches entreprises à l'église Precista (Galati) ont révélé l'existence d'un cimetière à enterrements successifs aux XVIe-XIXe siècles, leurs inventaires funéraires comptant également des bracelets en pâte de verre.⁵⁴

En faisant la synthèse des découvertes connues pour les XVIIe-XIXe siècles, on peut constater que les bracelets en pâte de verre apparaissent en nombre plus réduit et sur une aire plus restreinte par rapport à la période du haut féodalisme (Xe-XIIIe siècles).

Les bracelets sont présents dans des habitats urbains (Giurgiu, Braila) ou ruraux (Nufaru, Beidaud – département de Tulcea), mais aussi dans des nécropoles – la plupart des nécropoles étant concentrées dans la zone de Bucarest, deux en Dobroudja et une en Moldavie. Le bracelet à section triangulaire et à nervures saillantes semble le type caractéristique,

qui apparaît dans toutes les zones géographiques: Braila, Bucarest, Nufaru, alors que dans les nécropoles on trouve des bracelets travaillés sans soin, leur facture grossière suggérant qu'ils étaient destinés à être déposés dans les tombeaux et non pas à être portés comme parure par les vivants.

Une catégorie à part est représentée par quelques fragments (dont deux verts et un bleu) découverts lors des fouilles de la cité d'Oradea⁵⁵ (XVIIe siècle): ils sont soigneusement travaillés, décorés de motifs peints qui continuent en plein Moyen Age une excellente tradition de facture byzantine; les bracelets trouvent leurs pendants dans des découvertes analogues sur le territoire de la Hongrie.⁵⁶

Les bracelets en verre se retrouvent aussi dans certaines nécropoles de Bulgarie – dans deux tombeaux à l'intérieur de l'église arménienne Saint-Etienne de Provadia (XVIIe siècle),⁵⁷ à Gabrovo (XVIIIe-XIXe siècles)⁵⁸ ou sur le territoire de la Serbie.⁵⁹

Puisque dans les documents historiques nous n'avons pas rencontré de références pour l'exécution des bracelets, et que d'autre part, il existait des analogies parfaites des exemplaires provenant de différents lieux (Bucarest, Braila, Nufaru), nous avons essayé d'obtenir des informations supplémentaires à l'aide d'analyses de la composition du verre.⁶⁰ On a utilisé la technologie de fluorescence de rayons X (FRX) à dispersion énergétique. Cette méthode non destructive, consiste en l'irradiation de la surface de l'échantillon à analyser par un faisceau de rayons X et la détection des rayons X secondaires caractéristiques des éléments constitutifs par le biais d'un détecteur. Dans ce cas on a utilisé une source de Am-241, un détecteur de Si(Li) et un analyseur multichaînes type Canberra 80. Cette méthode permet la mise en évidence et le dosage des concentrations des éléments-traces, tels que Ca, Ti, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Ag, Sn, Sb, Au, Pb etc.

A la suite des analyses par fluorescence de rayons X (FRX) nous avons établi que les bracelets découverts dans les nécropoles situées sur le territoire de la ville de Bucarest appartenaient à trois compositions différentes. On rencontre aussi bien des bracelets de composition identique mais d'aspect différent que,

⁵² *World Coins*, 1985, 100, no 189.

⁵³ Gh. MANUCU ADAMESTEANU, *La chronique des fouilles archéologiques en Roumanie. La campagne 1995*, Braila, 1996, 18.

⁵⁴ Matériaux inédits.

⁵⁵ A. RUSU, *Crisia XXIII*, 1993, 59-84.

⁵⁶ Voir la note n° 48.

⁵⁷ A. MARGOS, *Izvestia Varna XII*, (XXVII), 1976, 137, pl. III/1-3.

⁵⁸ K. KOJCEVA, *Godisnik na Muzeite ot Severna Balgaria*, Varna, XIV, 1988, 68, 70-72, fig. 12e.

⁵⁹ T.P. BOICEVIC, *Starinar III*, 1908, 164, fig. 1; cf. L. BATRANA & A. BATRANA, *op.cit.*, 86, note 42.

⁶⁰ Jusqu'à présent, en Roumanie, les seules analyses chimiques sur des bracelets en verre ont été faites à Cluj, sur quelques pièces découvertes au Banat, cf. E. Stoicovici, *AMN XVII*, 1980, 495-500.

au contraire, des bracelets identiques d'aspect mais qui ont une composition différente, ce qui indique leur exécution dans plusieurs ateliers.

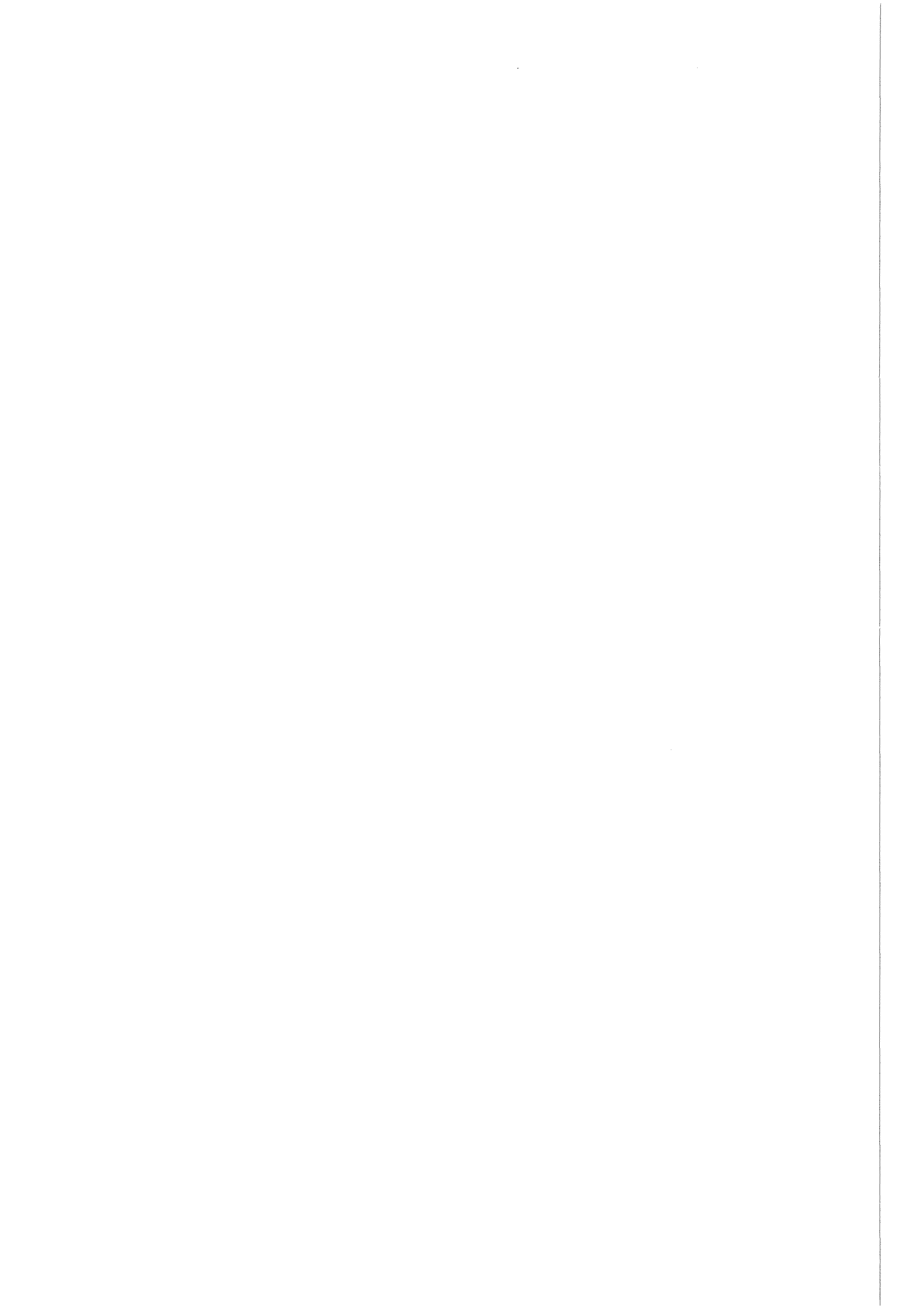
Ces observations nous aident pour essayer de localiser quelques centres de production des bracelets en verre, de Valachie (Muntenie) et de Dobroudja. A Bucarest, les documents signalent pour la seconde

moitié du XVIIIe siècle l'existence d'un atelier de verrerie, mais on ne connaît pas quelles sortes de produits qui y étaient exécutés.⁶¹ Les seuls lieux attestés par les documents pour la production de bracelets en verre, sont les localités de Dobroudja, Ostrov et Nufaru, où ce métier existait jusqu'au début du XXe siècle.⁶²

⁶¹ *L'histoire de Roumanie*, III, 1965, 644, note 1; *L'histoire de la ville de Bucarest*, 1965, I, 139-140.

⁶² Gh. STEFAN, I. BARNEA, M. COMSA & E.COMSA, *op.cit.*, 313; Gh. MANUCU ADAMESTEANU, *Peuce* IX, 1984, 243.

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Looking through Glass Recent Glass Finds and Material Culture in Medieval Turku, Finland

Finnish archaeology has traditionally focused on prehistory, *i.e.* the period before the 13th century. Until the 1980s it was rare for sites from historically documented times to be documented with other than so-called ‘building-archaeological’ methods. Because of this, medieval material recovered as excavated or stray finds has remained limited. Accordingly, the number of known medieval glass finds was extremely small before 1990. Publications contained illustrations of less than ten fragments of glass vessels. The only exception is a late-fourteenth-century pruned beaker from the castle of Kastelholm, of which several fragments are known¹. In the archival material of Finland, which is extremely limited in comparison with other European countries, the first reference to glass beakers dates from as late as 1549².

Fragments of 13th- to 15th-century glass vessels are also rare in the published material from Sweden, to which Finland belonged in the Middle Ages. As late as 1990, Lars G. Henricsson noted that on the part of Sweden ‘finds of (medieval) glass beakers (are) very few in number’³.

After 1990, however, information on the use of glass vessels in medieval Finland has definitely changed. Before the 1990s, it was believed that glass objects were a rare luxury in Finland even as late as the turn of the 16th and 17th centuries. Extensive excavations at Vanhakaupunki, the old site of Helsinki, have forced experts to change their views. Here, glass sherds constitute one of the quantitatively largest categories of finds. Glass vessels were not only luxury items but also everyday ware for the Renaissance and Baroque period burghers of Helsinki⁴.

An even greater surprise was encountered when analyses were begun of the glass finds from the Aboa

Vetus museum site excavations (1992-1995) in the old centre of Turku (Swedish Åbo). This material revealed an ensemble of fragments of almost 50 glass objects of the 14th and 15th centuries. Originally, an art museum was to be built at the site of the present Aboa Vetus and Ars Nova museums in Turku, but construction work revealed a well-preserved section of the old town with numerous finds, at a distance of slightly less than 400 metres from Turku Cathedral. The original plans were therefore altered and the Matti Koivurinta Foundation, a private organization, included a museum of medieval archaeology in its building plans⁵ (Fig. 1).

In the Late Middle Ages, Southwest Finland – or Finland Proper – belonged to the core area of the Swedish realm. The centre of Finland Proper was Turku, Finland’s largest and most important medieval town. Turku came about in the second half of the 13th century around the same time as most of the towns of Middle Sweden, such as Stockholm, Söderköping, Uppsala, Västerås and Örebro⁶. In European perspective, Turku was a small town of the northern periphery. Its late medieval population has been estimated at around 1,500⁷.

Glass finds from the Aboa Vetus Museum site

Excavations at Aboa Vetus revealed the ruins of several 15th-century buildings of stone and masonry in addition to stone-built cellars. The structures were left in place and the museum was built around them. Beyond the foundation structures are also remains of older timber structures. The stratigraphy of the excavations still remains to be completely analysed. Investigations concerning the site have to contend with the disturbances of the cultural layers caused by numerous phases of building and construction at the site. The dating of the oldest finds is facilitated by a large and uniform timber structure from the eastern part of the excavated area. Beneath this structure was an undisturbed feature of cultural layers (R49) that had formed during the 14th century. A dendrochron-

¹ Törnblom 1982, 123, 125.

² Gardberg 1979, 93-95.

³ Henricsson 1990, 109.

⁴ Haggrén 1994.

⁵ Aboa Vetus & Ars Nova Magazine No 1, 8-9.

⁶ Broberg & Hasselmo 1994, 24-26; Gardberg 1971.

⁷ Nikula 1987, 125.

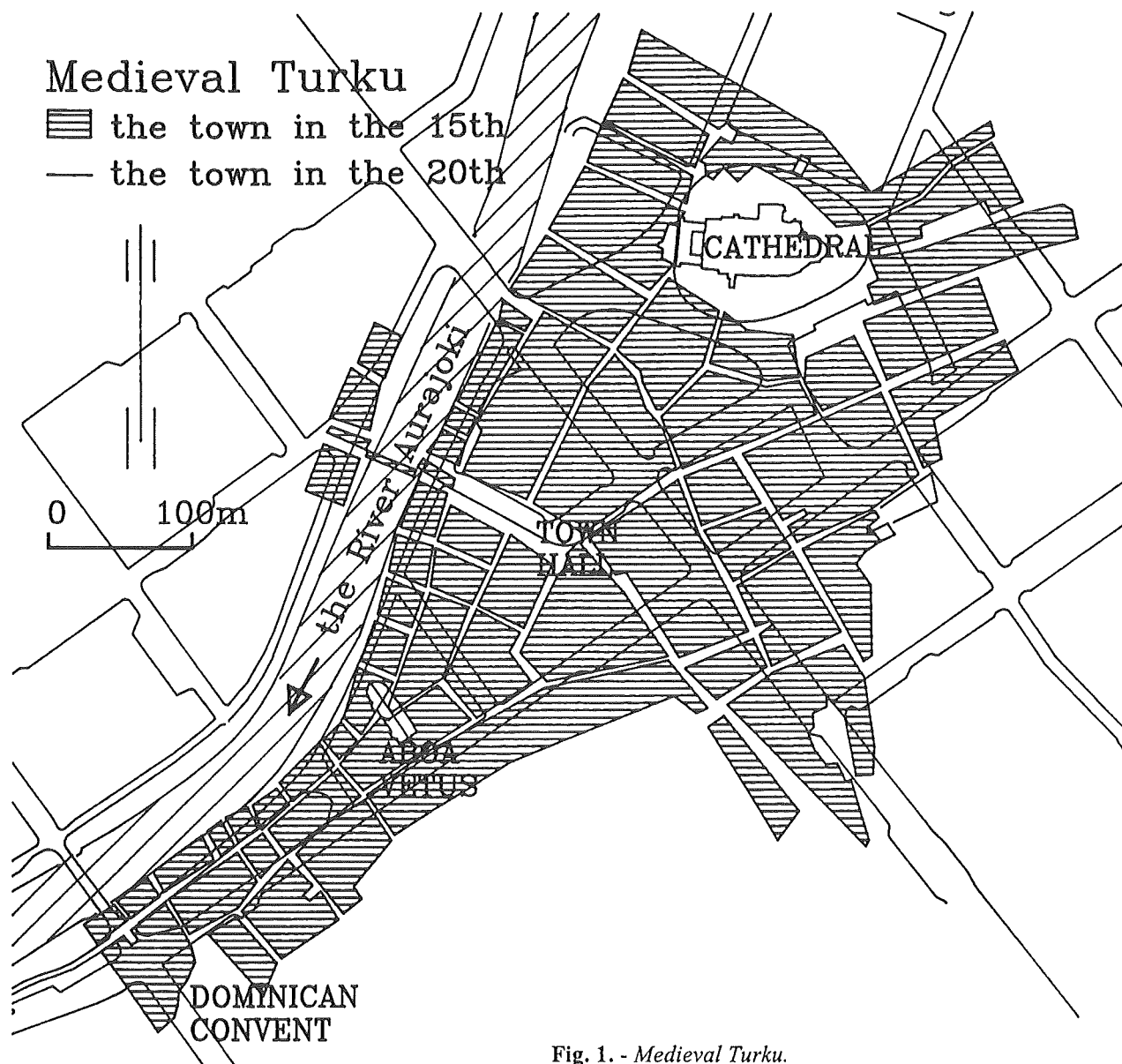


Fig. 1. - Medieval Turku.

logical dating of the timber structure shows that the youngest of the five samples was of a tree felled in the last quarter of the 14th century at the latest⁸. The fragments from feature R49 contribute to the dating of other glass material from the area in addition to complementing to the general typology and chronology of medieval glass in Finland.

Enamel-ornamented glass and the so-called Schaffhäuser beakers

The finds include fragments of two vessels of enamel-ornamented uncoloured glass. One of these

was a so-called *Syro-Frankish beaker*, represented by four fragments. The upper part of this cylindrical beaker was encircled by a text, of which the letters ... TE ...E... can be discerned. The text was carefully painted with white enamel paint. Yellow, pink and red enamel were used to decorate the outer surface in addition to white. Moreover, the inner surface bore ornamentation painted in red (Fig. 2). According to present studies⁹, this object of very high standard glass was most probably made at Murano in Venice in the late 13th or early 14th century.

The other enamel ornamented vessel was a convex beaker or flask with plant motifs painted in yellow, white and red on the outer surface (Fig. 3). Both objects were analysed in terms of element content by scanning electron microscopy (SEM) with an energy-dispersive spectrometer (EDS) and proton-induced X-ray emission (PIXE). The results for the *Syro-Frankish beaker* corresponded to the results of anal-

⁸ Dendrochronological dates from The Aboa Vetus Museum site (Pentti Zetterberg, Lic. Phil., University of Joensuu); Minna Sartes, Mag. Phil. (The Aboa Vetus Museum), pers. comm.

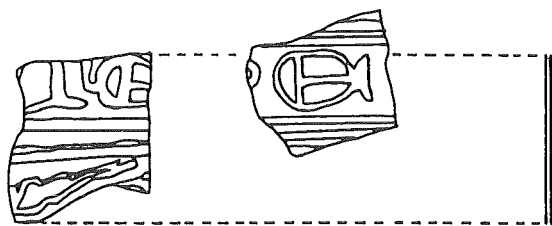


Fig. 2. - Fragments of a Syro-Frankish beaker.

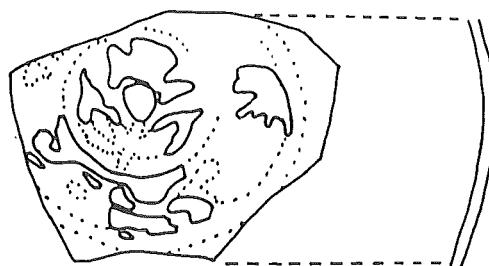


Fig. 3. - A fragment of an enamelled Islamic(?) glass vessel.

yses of similar artefacts of the same type. On the other hand, the relatively high calcium and low manganese content of the other, apparently 14th-century, enamel-ornamented beaker point to an Islamic origin¹⁰.

In addition to the enamel-ornamented beakers, the fragments subjected to element analysis included only two other sherds of soda glass. These well-preserved turquoise fragments are probably from a pruned so-called *Schaffhäuser beaker* of the 14th century or the very beginning of the 15th century¹¹. Both fragments are from the lower part of the object. They are almost identical in element content, but the design of the glass band encircling the bottom on both differs slightly. The fragments are probably of two vessels with the same origin.

Bohemian/North German beakers

The most typical glass finds from Aboa Vetus are, however, various beakers blown from uncoloured, usually slightly greenish or yellowish potash glass. They are decorated with uncoloured or blue glass thread and have a foot made of wound glass thread. This group includes rim fragments from at least 27 different objects and base fragments from at least 26 beakers. Of these, 16 rims, 17 base edge fragments and 21 decorated wall fragments were selected as samples for SEM-EDS and PIXE analysis. The material was too large to permit the analysis of all sherds. At present, it has not yet been possible to establish, on the basis of element content, which fragments belonged to the same objects. It can be noted, however, that the analysis included the fragments of some 40 objects. The material is uniform with respect

to element content, but can nevertheless be divided into three sub-groups¹². Typical of all three is high potassium and calcium content and a very low sodium content, which would point to Bohemian or possibly North German origin¹³.

The potassium-calcium glass group contains at least four artefact types:

1. Beakers with applied vertical glass ribs and decorated with small droplets of blue glass (*Fadenrippenbecher*),
2. Beakers with horizontal or
3. Zigzag glass threads, and
4. Bohemian '*Stangenglasses*' or pruned beakers.

The material includes at least nine *Fadenrippenbechers*. Among the analysed potassium-calcium glass objects, these all belong to the same sub-group in terms of element content. One of these beakers could be reconstructed except for its lower part. This was a cylindrical beaker, in which the part beneath the rim is encircled by a blue glass thread beneath which are twelve vertical drop-shaped glass bands decorated with blue droplets of glass (Fig. 4). Beakers bearing this type of decoration usually have a rim opening outwards, as in at least two specimens found also at Aboa Vetus. According to present studies these objects, blown in Bohemia or Northern Germany, are from the period ranging from the close of the 13th to the beginning of the 15th century¹⁴. At Aboa Vetus some of the fragments of these beakers were recovered from the undisturbed 14th-century layer R49. These beakers have a large number of parallels particularly from Bohemia, Göttingen and Lübeck¹⁵. There are also individual finds from Eastern and Northern Germany (Braunschweig, Erfurt, Halle, Höxter, Leipzig, Rehna, Rostock, Stralsund, Thorn), the northern Netherlands (Kampen, Gronin-

⁹ Baumgartner & Krueger 1988, 126-128; Verità 1995, 83-87, 98.

¹⁰ Verità 1995, 90; Pirkko Kuisma-Kursula, Lic. Phil. (University of Helsinki), pers. comm.

¹¹ Baumgartner & Krueger 1988, 210.

¹² Kuisma-Kursula 1997 (in print).

¹³ Fryda 1990, 19; Pause 1993, 10; Golebiewski 1993.

¹⁴ Baumgartner & Krueger 1988, 290; Dumitrache 1990, 14-15; Fryda 1990, 20-22.

¹⁵ Dumitrache 1990, 14-15, 34-36, Abb. 10-12; Fryda 1990; Hejdova & Drahotova 1989, 16, 18, 24-25, 35, 163-164; Schütte 1976, 103., 1982, p. 135-136, 143.

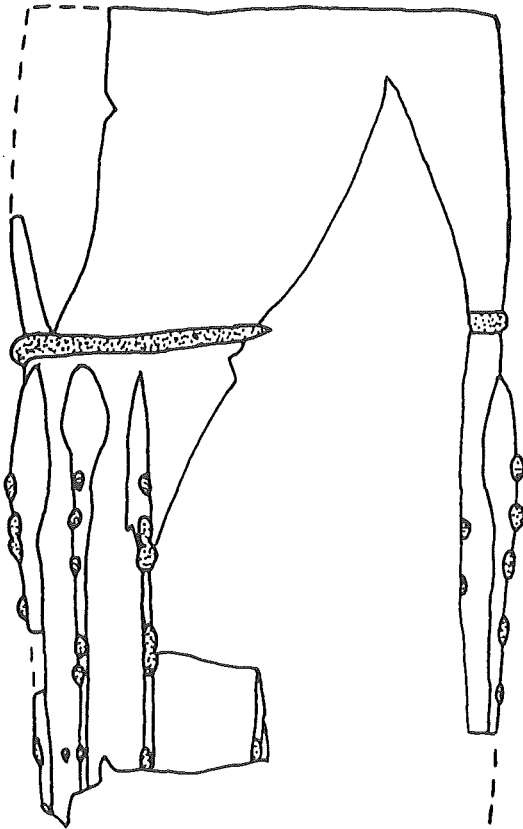


Fig. 4. - A fadenrippenbecher.

gen), and from Skanör, Lund, Lödöse and Uppsala(?) in Sweden, Tartu in Estonia, and Novgorod in Russia¹⁶ (Fig. 5).

The second group among the potassium-calcium glass objects consists of fragments from cylindrical beakers encircled by horizontal blue glass thread decoration. None of the objects of this type from Aboa Vetus can be completely reconstructed, but several sherds of a beaker decorated in this manner were recovered in 1990 from the excavation of a sewer in a street adjacent to the site. This was a cylindrical object with the mouth part opening markedly outwards. There are parallels to the beaker from at least the Middle Rhine area and from Tartu, Estonia¹⁷.

The third group of potassium-calcium glass objects from Aboa Vetus bears a meandering zigzag ornament of clear glass thread. At least two of these

objects are also encircled by horizontal blue glass threads, and at least two were probably tapering, convex 'Stangenglasses' or lower beakers, with parallels from e.g. Lübeck and Elbing. An alternative artefact type would be the low *Scheuer*, which, however, has not been found elsewhere in the Baltic regions¹⁸ (Fig. 6). One of the 14th-century fragments from feature R49 bears a vertical zigzag ornament. It is probably from a beaker opening outwards at the mouth.

The fourth group of potassium-calcium glass objects consists of three pruned sherds, possibly from high Bohemian 'Stangenglasses'. The edge of one was encircled by a blue glass thread (Fig. 7). This object has parallels particularly among 14th- and early 15th-century Bohemian finds and among those from Lübeck, Elbing in present-day Poland and Kalmar and Skanör in Sweden¹⁹.

Other medieval glass objects from the excavations at Aboa Vetus

Other glass finds include fragments of two *Kuttrolfs* or small flasks with several necks. In Germany the *kuttrolfs* are typical medieval finds, although rare elsewhere²⁰.

The medieval glass finds from Aboa Vetus are mostly from the late 14th and early 15th century. On the other hand, there are very few fragments of very late medieval glass objects, which, moreover, are from mixed layers of fill. An exception is a *Krautstrunk*, of which there are so many sherds that the object has been reconstructed (Fig. 8). The other finds are fragments of individual *Krautstrunks* and late medieval optically decorated beakers. However, there are no fragments of *Meigeleins*, which were blown en masse during the Middle Ages. Excavations in the early 1980s at other sites in Turku, including the town hall, revealed fragments of late medieval glass objects along with glass finds of the 14th and early 15th centuries.²¹

Most of the late medieval cultural layers at Aboa Vetus were most probably destroyed by later construction. However, research in other medieval towns in Scandinavia shows that a distinct change occurred

¹⁶ Baumgartner & Krueger 1988, 290; Möller 1994, 217-218, 221; Pause 1993, 9; Golebiewski 1993, 121-122; Henken 1994, 42-43; Arbman 1960; af Ugglas 1931, 548; Svensson 1984, 68-69; Mäesalu 1990, 448, Taf. XXXII; Vissak 1994, 75, Taf. XXVII.

¹⁷ Baumgartner & Krueger 1988, 189; Mäesalu 1990, 448, Taf. XXXII; Vissak 1994, 75, Taf. XXVII.

¹⁸ Dumitrache 1990, 47, Abb. 30; Golebiewski 1993, 121-122;

Baumgartner & Krueger 1988, 235-236.

¹⁹ Fryda 1990; Hejdova & Drahotova 1989, 16-20, 27-30, 38-39, 42, 176-178; Dumitrache 1990, 16-17, 45-47, Abb. 27-32; Golebiewski 1993, 111-113; Hofrén 1962.

²⁰ Baumgartner & Krueger 1988, 316-325, 418; Henken 1994, 115-116.

²¹ Aki Pihlman, Lic. Phil. (Turku Provincial Museum), pers. comm.

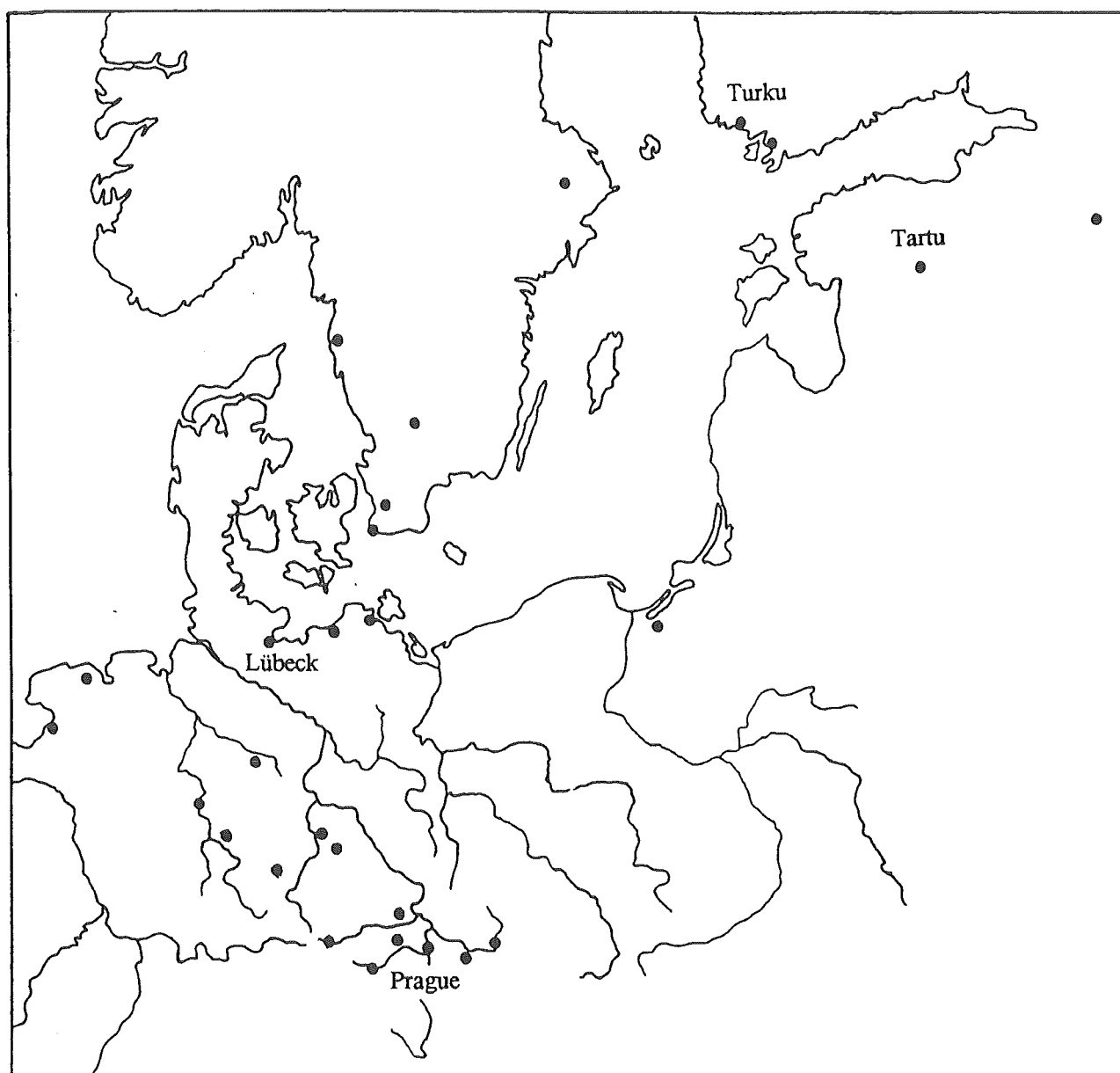


Fig. 5. - Fadenrippenbecher finds in Europe.

in urban waste disposal during the 15th century. In these towns, cultural layers older than this are thick and rich, whereas the late medieval layers are thin and poor in finds²². With regard to Aboa Vetus, it should be noted that the analysis of the cultural layers is still in progress.

The glass finds from Aboa Vetus in European perspective

Until the 1980s, it was generally felt that glass objects were expensive and rare luxury items in the Middle Ages not only in Scandinavia but throughout Europe. This view, however, has changed, particularly because of new archaeological finds. Along with the growth of general interest in medieval archae-

ology, urban excavations have increased and field methods have become more precise²³. At the same time archaeologists have begun to recover small, fragile glass fragments, which are often difficult to identify. Particularly with regard to material culture and the history of everyday life, medieval archaeology has proven to be a treasure-trove which has added to and often changed the picture provided by historical sources.

As late as 1982 Sven Schütte observed that medieval glass objects were among the rarer finds of excavations in medieval towns (*'Gläser des Mittel-*

²² Andren 1986, 260-262.

²³ On the rarity of glass objects and on excavation methods, see e.g. Harden 1975, 35.

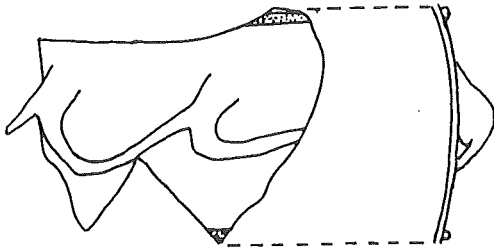


Fig. 6. - A piece of a vessel ornamented with zigzag glass threads.

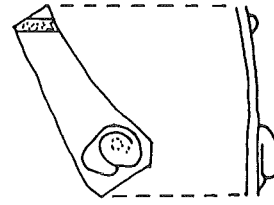


Fig. 7. - A piece of a Bohemian Stangenglas or pruned beaker.

alters gehören bei Ausgrabungen in mittelalterlichen Städten zu den selteneren Funden'). He estimated the number of medieval glass vessels that had been discovered until then at only a few hundred²⁴. A turning-point in medieval glass research is represented by the numerous finds from excavations conducted in Nuremberg in 1982 and 1983. The considerable finds of late 14th- and 15th-century glass changed views of the role of glass in medieval households. Glass beakers turned out to be common drinking vessels for wine²⁵. Following this, it was no surprise to discover for example at Pilsen, near the major Bohemian glass producing areas, that glass objects were not only used by upper-class households in towns but also by the middle classes²⁶. An integrated picture of the results of research around the close of the 1980s was provided by *Phoenix aus Sand und Asche*, a major exhibition of medieval glass, in which this category of the medieval material was given its due role²⁷.

Northern Germany and the areas that were under the control of the Teutonic Order are important points of comparison for Sweden and Finland in view of glass objects and other aspects of material culture. Lübeck was for a long time regarded as poor in glass finds, but this view has been changed by Marianne Dumitrache's extensive publication of glass finds from the city²⁸. Also to be mentioned are rich finds from present-day Estonia, and from the city of Tartu in particular, which were under the rule of the Teutonic Order. Finds from Tartu include Europe's largest hitherto known ensemble of *Syro-Frankish beakers*, nine in all²⁹.

In terms of the history of research, the recent finds of glass from Turku are part of the European trend. Medieval glass has been found where experts have learnt to look for it. This will also be the case in

Sweden. The finds from Aboa Vetus have also made it possible to find medieval glass from other sites in Finland, such as castles and manors³⁰.

What do the glass finds from Aboa Vetus tell us?

The oldest glass finds from Aboa Vetus are enamel-ornamented objects of the 14th century. *Syro-Frankish beakers* have been discovered in almost all parts of Europe, though mostly in castles, monasteries and the upper-class sections of towns. These, apparently Venetian, beakers are regarded as expensive luxury items in all parts of Europe. Almost one hundred individual objects are represented by these beakers or their fragments in finds from Europe and the Middle East³¹. Together with another enamel-decorated beaker, the *Schaffhäuser beakers* and other numerous glass finds, the *Syro-Frankish beaker* from the Aboa Vetus site points to the existence of an affluent burgher household near the site. A large house of masonry is known to have been built at the site in the early 15th century³². This was exceptional in Finnish conditions, where a solid tradition of timber architecture predominated.

The glass finds of the 14th and 15th centuries from Aboa Vetus tell of active trade with the Hanseatic league and possibly also with the Teutonic Order. With the exception of soda glass objects blown in the Mediterranean region, the origin of the Aboa Vetus finds in terms of typology and chemical content is to be found in Northern Germany and Bohemia. Thus, for instance, the Turku material is clearly different from the medieval finds of Southern and Western Germany and the Netherlands³³. On the other hand, artefacts of similar type have been discovered in

²⁴ Schütte 1982, 133.

²⁵ Kahsnitz 1984, 8-9.

²⁶ Fryda 1990, 16.

²⁷ Baumgartner & Krueger 1988.

²⁸ Dumitrache 1990.

²⁹ Mäesalu 1990, 446.; Vissak 1994.

³⁰ Mökkönen 1997 (in print).

³¹ Steuer 1982, 29-33; Verità 1995, 83.

³² Minna Sartes, Mag. Phil. (The Aboa Vetus Museum), pers. comm.

³³ Cf. Kahsnitz 1984; Krueger 1984; Prohaska-Gross 1992; Prohaska-Gross & Soffner 1992, pp. 299-310; Schmaedecke *et al.*

Northern Germany in a zone running along the River Elbe into Bohemia and along the Weser (Lübeck, Stralsund, Erfurt, Leipzig, Pilsen, Prague) and also along the coast of present-day Poland (Elbing, Kolberg, Stettin, Thorn). Also Estonian finds of glass resemble those from Turku³⁴.

During the 14th and 15th centuries, Turku was one of the most important towns of the Swedish realm, but it was nevertheless small in European perspective. Despite this it has revealed rich finds of glass in comparison with other European towns which are easily comparable to those from Lübeck and Nuremberg. The best explanation for this high standard of material culture is suggested by profitable trade. In the 14th century, Lübeck and Tallinn were the main trading partners of Turku, and in the following century trade with Danzig in particular grew in volume. Furs were Finland's only truly valuable export item, and the 14th century was the heyday of the fur trade. During this period tens or possibly hundreds of thousands of furs were exported yearly. For example Peter van dem Berghe, a burgher of Turku, had 300,000 Finnish furs in Tallinn in 1391³⁵. Some of the affluence brought about by foreign trade has now come to light in Turku.

The main items of medieval trade such as fabrics, furs, salt, grain and fish, as indicated by historical sources, have disappeared centuries ago, and cannot be recovered archaeologically. But glass and ceramics offer a completely different picture. These items were usually not listed separately in medieval or early post-medieval customs records. Both glass and ceramics were classed among cheap goods that are almost impossible to identify through archival studies. The most valuable glass beakers and ceramic tankards were, however, almost the only luxury items that were worthless and irreparable upon breaking, which meant that they were discarded. Glass and ceramics are highly important to archaeology, because, once discarded, they will survive for millennia in the soil – and when found can tell a great deal about the culture and history of their own day.

translated by Jüri Kokkonen

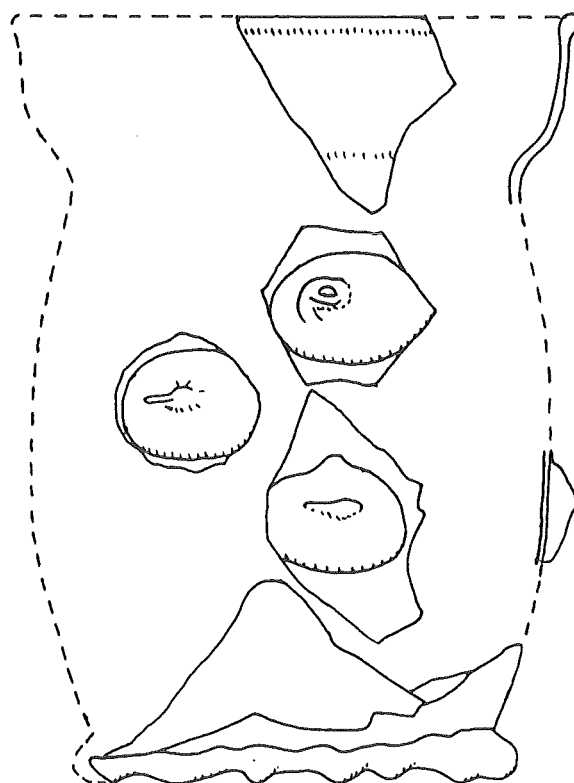


Fig. 8. - A Krautstrunk.

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Composition of 15th- to 17th-century glass vessels excavated in Antwerp, Belgium

Abstract

Antwerp, one of the most important ports of Europe in the beginning of the 16th century, was a major centre for the manufacture and import of glassware and is especially known for its trade in Venetian and ‘façon de Venise’ glass vessels. Archaeological excavations have yielded an important number of glass finds from the 15th until the 17th century, probably due to the import and trade of glass objects and of raw materials as well as the local manufacture of glassware. Within the extensive collection of finds, several distinct typological categories can be identified. In this work, a representative set of 87 of these glass vessels is analysed by means of EPXMA (electron probe X-ray microanalysis); the correlation between object composition and type is discussed. Special emphasis is placed on the composition of the ‘façon-de-Venise’ and/or Venetian glass objects and its relation to that of other glass of the same typological category found in other locations in Europe.

1 Introduction

In the first thirty years of the 16th century, the city of Antwerp (Belgium) became one of the most important ports on the European continent. Antwerp was also an important centre for the manufacture and/or trade of Venetian and ‘façon-de-Venise’ glassware. The history and chronology of the ‘dynasty’ of Antwerp glassmakers in the 16th and the 17th century has been thoroughly investigated by Denissen (1985). The earliest historical documents referring to local glassmakers taking up residence in Antwerp date from 1537. The first Italian glassmaker, Cornachini, started up his workshop in 1542. A monopoly regarding the manufacture of Venetian or crystalline glass was conferred upon J. De Lame, a merchant living in Antwerp but born in Cremona, Italy in 1549. Seven years later, the latter handed this privilege over to Giacomo di Francisco, of Venetian origin and master

of a glassworks in Antwerp. In his turn, in 1558, the latter turned over the privilege to Jacomo Pasquetti, from Brescia, not a glassmaker himself but a very skilled tradesman. Under his impulse, the glass trade in Antwerp flourished to such an extent that he is regarded by his successors as the first real manufacturer of fine ‘façon-de-Venise’ glass in Antwerp. He owed his success partially to the fact that he did not allow any competition. On his request, all import into Antwerp of imitation Venetian glass was prohibited while he obtained the exclusive right to sell glassware in the city. After his death in 1578/79, Pasquetti was succeeded by his nephew Pedro di Pedralis, together with Ambrosio de Mongardo, also of Italian origin. The latter came into possession of the enterprise as single owner in 1581. After his death in 1595, his widow Sara Vinckx expanded the company. She remarried in 1598, with Phillippo Gridolphi. During the time of Gridolphi, the glass manufacture in Antwerp experienced its most important expansion. In 1608, Gridolphi entered into a partnership with Jan Bruyninckx, provider of glassware to the royal court; probably as a result of these connections, the privilege of the Antwerp glassmakers to sell imitation Venetian glass was extended to include the exclusive right to import real Venetian glass into the Spanish Low Countries. After the death of Gridolphi, the glass manufacture is taken over by various people of Italian or local origin, with different degrees of success.

As a result of all above-mentioned activities – which are assumed to include both the import and trade of ‘real’ Venetian glass objects, the import of raw materials and the local manufacturing of glass ‘à-la-façon-de-Venise’ – archaeological excavations in the City of Antwerp have yielded an important number of glass finds from the 15th to the 17th century. Within this extensive collection of finds, next to objects, which with respect to form and colour can be categorised as forest or fern glass and which are likely to have been imported into the city during the 15th-17th century, an important collection of Venetian and or ‘façon-de-Venise’ glassware of different shapes and types are encountered, some of which

may have been imported, but the majority of which is assumed to have been manufactured locally.

A representative series of 96 glass objects from different excavation sites in the centre of Antwerp was selected for major element analysis by EPXMA (electron probe X-ray microanalysis). In a second phase these objects were also analysed for their trace element content by means of SR-XRF (synchrotron radiation induced X-ray fluorescence analysis).

The present paper offers a brief typological description of the series of glass objects which were subjected to analysis, together with some background information. Next, the analytical procedures and instruments used for the major, minor and trace element analysis of the glass samples are briefly outlined, after which the structures which may be discerned in the major element data are discussed. The groups of objects thus found are correlated/contrasted to the historical information which is conventionally associated with the different types of glassware present in the series. Trace element information is used to gain a clearer insight into the (dis)similar aspects of certain typologically linked groups of glass vessels. Finally, the major element data obtained for the various sub-groups of 'façon-de-Venise' and filigrain glass are compared to data from the literature on glass vessels of the same type excavated in or originating from other locations in Europe.

2 Analysed glass samples

Table I provides an overview of the typological categories which the analysed objects belong to.

A large number of excavated glass vessels were recovered during archaeological research in the 'Zwartzustersstraat'. A very rich collection of artefacts was found in a cesspit in which an important collection of glass vessels was found, next to a substantial amount of ceramics. Within the collection of glass objects, two groups could readily be discerned: a first group which can be dated to around 1500 and a second group corresponding to the middle of the 17th century or somewhat later. The first group contains an important collection of different kinds of beakers, dating from a period in which glass was not a commodity article. Vessels made from green glass (probably forest glass) and objects fashioned in colourless or straw-coloured glass (assumed to be soda or fern glass) are present. The 17th-century glass vessels consisted mainly of beakers and goblets of colourless glass, assumed to be soda glass (Veeckman 1996).

The excavation of another cesspit in the 'Kaasstraat' also yielded a rich ensemble of domestic uten-

sils, among which a large number of glass vessels. The material of this cesspit can be dated to the end of the 16th and the beginning of the 17th century. It includes a wide typological range of (probably imported) forest glass objects, as well as a number of 'façon-de-Venise' vessels, assumed to have been produced locally (Denissen 1984).

During restoration works in the palace of the Bishops of Antwerp (at the 'Schoenmarkt'), archaeological excavations were carried out and a number of archaeological complexes containing domestic waste were recovered, dating from the late medieval period to the 20th century. At this site, a number of very luxurious glass vessels were found. A large selection of 'façon-de-Venise' and filigrain glass vessels from this site were included in the analysed series of objects (see Table I).

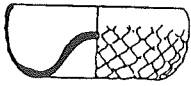
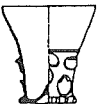
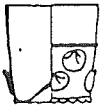


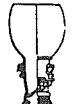
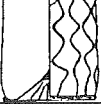


The remaining vessels originate from emergency excavations carried out at different locations in the historic town centre.

The selection was made with the aim of obtaining an overview of the composition of the glass the different typological categories of Antwerp glass finds are made of. Accordingly, a limited number (*e.g.*, 4-10) of representative examples from each typological group were selected for analysis. Table I provides a summary of each group, the time period the vessels are dated to, the number of analysed vessels, a drawing of a representative object and the general type of glass the vessels were assumed to be made of judging from their outlook and colour, *i.e.* prior to the analyses. These 'conventional' compositional categories (soda glass, fern glass, forest glass) are those attributed to the various typological forms in the comprehensive overview by Henkes (1994) on archaeological glass in the Low Countries and by the references therein (see below).

As can be seen from Table I, the analysed glass vessels span the period from the end of the 15th to the beginning of the 17th century. The earlier periods (13th century and to a lesser extent 14th century) are much poorer with respect to glass finds: in these periods in Western Europe, the use of glass as drinking commodities was restricted to the nobility or high clergy and glass tableware was a rarity. During the period 1450-1550 however, glass drinking vessels were again reaching a wider public in Antwerp (and the rest of Western Europe). They are generally assumed to have been imported from Germany, where the basic raw materials, as well as wood for ovens and as a source of potash, were quite plentiful (Wedepohl 1993). On the whole, the quality of the forest glass (*Waldglas*) produced in this period is, however, inferior to that of glass produced during the previous, late-medieval period.

Table I.

Overview of the typological categories of glass vessels.

Typical Shape	Category	Time Period	Assumed Glass Type	Analysed Glass Type	Number of Objects
	Magelein	late 15 th , early 16 th	forest	calcic	5
	Maigel-beaker				2
	Berkemeier	1 st half 16 th	forest	calcic	5
	Prunted beaker	1 st half 16 th	forest	calcic	4
	Ribbed beaker	early 16 th	fern	sodic	12
	Beakers on folded foot	1 st half 16 th	fern	sodic	13
various shapes	Façon-de-Venise vessels Filigrain objects	16 th	soda	sodic	33
	Roemers	1 st half 17 th	forest	calcic	4
	Mesh-work beakers	1 st half 17 th	soda	potassic	1
	Stackable beakers	17 th	soda	potassic	8
	Façon-de-Venise goblets	17 th	soda	potassic	8

Generally speaking, within the series of analysed objects, two groups can be discerned. The first group consists of objects made of forest glass, characterised by their green colour. The second group comprises all the uncoloured glass vessels; this group can further be subdivided into late 15th- to early 16th-century glass vessels and late 16th- to 17th-century glass objects.

Forest glass objects

The earliest analysed objects are the *mageleins* and *maigel-beakers* (Denissen 1982). Thick-walled low cups ('mageleins') and beakers ('maigelbecher') both commonly of green glass and decorated with a ridge-pattern were blown in large numbers in Germany (Bremen 1964), but also in the Southern Netherlands (Chambon 1955). Around 1500, German glass blowers also produced *Stangengläser*, *i.e.*

cylindrical vessels adorned with applied prunts, encircling glass threads and other decorations (Henkes 1994, 75, 80). The *Krautstrunk* ('cabbage stem'), a high beaker decorated with pointed prunts, was also in demand in the Low Countries (Denissen 1982, 117). The *Krautstrunk* vessels evolved into *prunted beakers* and *berkemeiers* (a prunted beaker with conical form) (Denissen 1982, 1988, 1989). An noteworthy evolution during the period 1550-1650 is the transition of the *berkemeier* into the *roemer*, which proved to be a wine-glass much favoured by citizens during the 17th century (Henkes 1994, 190). *Roemers* differ from *berkemeiers* by having a convex bowl. Until shortly before 1650, both *berkemeiers* and *roemers* retained pointed prunts although already prior to 1600 the first vessels with raspberry shaped prunts were being made; the latter gradually decorated an increasing number of *roemers* (Henkes 1994, 189). The *berkemeiers* on the other hand retained their pointed prunts. The pincer notched foot-ring, used for both types of glass vessels, disappeared before the middle of the 17th century because it was gradually replaced by a foot consisting of fused coiled glass threads. Probably, *roemers* were made in Germany as well as in the Netherlands.

Colourless glass objects

As mentioned above, this group can be subdivided into two large categories. The first consists of ribbed beakers and beakers on a folded foot; both date from the end of the 15th until the beginning of the 16th century. The second subgroup comprises all colourless vessels glass from the second half of the 16th and from the 17th century.

Mould-blown *ribbed beakers* are the continuation of the 14th-15th-century vessels of similar shape. These vessels are dated to the late 15th or the early 16th century; by the end of the 16th century, they have disappeared. These cylindrical beakers are thought to have been blown from fern glass and are assumed to result from the French glass-making tradition (Henkes 1994, 93-94); they were probably made in the Southern Netherlands or Northern France. The ribs usually take up 2/3 or 3/4 of the lower part of the vessel. Most excavated examples are thin-walled and colourless or very lightly tinted (straw-coloured).

The *beakers on folded foot* were probably also produced in the same period and geographical area as the ribbed beakers. These type of vessels are made from one single piece of glass which, after softening, is blown into a bowl by means of a blow pipe. The folded foot is then produced by pushing in the con-

stricted lower part of the glass bowl while evacuating the air inside (Henkes 1994, 96). A characteristic double-walled foot is the result of this operation. This form appears both in the French and in the German glass-making tradition (e.g. Baumgartner & Krueger 1985; 1988). The beakers made from forest glass are assumed to have been produced in Germany, the French beakers are thought to have been made of high-quality fern glass (colourless or lightly straw-coloured) and manufactured in Momignies-Beauwelz, near the Belgian-French border (Chambon 1955, 299). Some of these beakers are decorated with enamel paint (dots, lines, ...).

As mentioned in the introduction, in the beginning of the 16th century Italian glass-makers started to manufacture glass vessels in Antwerp, but the type and composition of these early products are largely unknown. Finds of the second half of the 16th century include beakers and goblets, with or without decorations. The vessels of Netherlandish origin from this period are often difficult to distinguish from the genuine Venetian products on the basis of their shape alone. The decoration techniques used with the 'façon-de-Venise' glass were the same as those previously developed in Venice, such as the use of applied lion head masks or Neptune masks, possible combined with the application of decorative threads (*vetro-a-filigrano* or filigrain glass). When blowing 'vetro-a-filigrano' vessels, white or differently coloured strips of glass play an essential role. Three subtypes can be distinguished (Henkes 1994, 170):

- (a) *vetro-a-fili* glass which is made with multiple strips of glass which originally are oriented vertically next to each other in order to form a rectangular sheet of glass; after blowing and remoulding, vessels can be produced from these sheets showing bent, parallel bands in the glass wall;
- (b) *vetro-a-retorti* in which white and colourless glass-strips are first molten together and twisted into a spirally pattern. The resulting strips are then used as with *vetro-a-fili*;
- (c) *vetro-a-retricello*, a meshed type of glass in which two glass layers of type (a) and (b) are superimposed.

As a result of the production process of 'vetro-a-fili' vessels, glass 'marbles' showing the uneven ends of the coloured glass strips are obtained as a waste product (Henkes 1994, 170, 174). One such 'glass marble' has been excavated in Antwerp; until now it is the only direct indication of Venetian-like glass production in Antwerp; it also was included into the series of analysed objects.

In the 17th century, the delicate and elegant Venetian or 'façon-de-Venise' goblets of the previous

period evolved into unrefined drinking glasses and the excavated *goblets* have a heavier look.

A last category of analysed objects are the stackable beakers and meshwork beakers, both made in colourless glass and dating from the 17th century. The first group are beakers with horizontal ridges which originally could fit one into another (Denissen 1985, 1988). A beaker decorated with a mesh-work pattern was equally analysed.

Both goblets and relief-blown beakers are assumed to be made of soda glass and remained in use until the end of the century when they were supplanted by English lead glass and Bohemian potash-lime glass.

3 Methods of Analysis

Cross sections of glass fragments a few mm² in size were embedded in an acrylic resin. The surface of the glass fragments was ground and polished with diamond paste up to 1 µm of grain size. The resulting resin blocks each containing up to 10 glass fragments were covered with a carbon coating for the EPXMA-measurements to prevent charging of the glass surface. No coating was necessary for the µ-SRXRF-measurements.

A Jeol JSM 6300 SEM (Scanning Electron Microscope) equipped with a Si(Li)-energy-dispersive X-ray detector was used for the determination of the bulk composition. The X-rays produced by interaction of an electron beam with the matter, can be used to obtain information about the major chemical composition of the examined glass (Reed 1975). For this study the X-ray spectra were collected for 100 seconds with an electron beam current of 1 nA, an accelerating voltage of 20 kV and a magnification setting of about 700 X. The net elemental X-ray intensities were calculated with the program AXIL (Analysis of X-rays by iterative least squares) and they were quantified by means of a ZAF-program (Schalm 1997).

These SEM studies were supplemented with SR-XRF (synchrotron radiation induced X-ray fluorescence analysis) measurements for the determination of the trace elements. During these measurements, an X-ray beam instead of an electron beam is used to induce the production of characteristic X-rays in the irradiated sample. The SRXRF measurements were performed at Beam Line L, DORIS III (Hasylab, DESY; Hamburg). The beamline covers X-ray energies in the 5-100 keV range and it is operated in polychromatic excitation mode. The quantification was done by a fundamental parameter quantification approach (Vincze 1995). Because of the use of X-ray photons rather than electrons as

primary means of excitation, a far lower background continuum is present in SRXRF-spectra than in the electron-induced spectra, allowing trace elements down to 10 ppm level to be determined within a measurement time of 300 sec.

4 Results

4.1 Major element composition of the glass vessels.

Table II presents the average composition of the various typological groups which were analysed. On the whole, most type-groups proved to have a reasonably homogeneous composition, although in a few groups, outlier objects were found having a significantly deviating composition, often similar to the average composition of another typological group (see below). The average values in Table II were obtained after removal of these outlier objects (if any) from each group. When the major element data on all the glass samples is subjected to principal component analysis (PCA; Wold 1987), the score plot and loading plot of Fig. 1 are obtained. In the score plot, three large compositional groups can be distinguished:

- (A) a Ca-rich group, featuring glass with 15 to 22 % CaO, little Na₂O and 4 - 11 % K₂O,
- (B) a K-rich group, containing 13±1 % K₂O, considerably less CaO (5 ± 1 %) than group A, and more Na₂O (6 ± 1 %) and
- (C) a Na-rich group, showing 14 ± 2 % Na₂O, 9 ± 1 % CaO and a K₂O content lower than 8 %.

In the loading plot of Fig. 1a, it should be noted that the elements Ca and Si have a high but opposite loading on the first principal factor; this indicates that in the data set, Ca and Si are negatively correlated (*i.e.* samples with a lot of Ca contain less Si and *vice versa*). In a similar way, the elements K and Na are associated with the second principal factor; since they also have a positive loading on the first principal factor, this suggests that the Ca-poor samples will also be richer in Na₂O and/or K₂O. Also, K appears to be correlated with Pb, Na with Cl and Ca with divalent and/or trivalent elements such as Al, P, Mg, Mn, Fe and Ba. (The K-S correlation is probably a measurement artefact due to the unresolved overlap of the S-K and Pb-M peaks in the EPXMA spectra.).

As is shown in Table II, groups A and C (resp. the calcic and sodic glass objects) show sub-groups which may be distinguished from each other by means of the abundance of the minor constituents.

The Ca-rich group. In group A, containing all forest glass object groups, the K₂O content is especially distinctive, showing a significant difference bet-

Table II

Average composition of (a) potassium-rich, (b) sodium-rich and (c) calcium-rich objects.

(a) Ca-rich glass							
Type	Magelein	Roemer	Miscellaneous	Berkemeier	Berkemeier*	Printed Beaker	Roemer*
Number	7	3	4	3	2	4	1
Na ₂ O	1.4 ± 0.3	1.6 ± 0.4	0.0 ± 0.0	5.1 ± 0.4	5.8 ± 0.1	4.5 ± 0.7	4.4
MgO	4.1 ± 0.5	3.2 ± 0.5	3.7 ± 0.3	3.4 ± 0.2	3.6 ± 0.0	3.5 ± 0.1	1.8
Al ₂ O ₃	3.8 ± 0.7	3.7 ± 0.2	2.2 ± 0.7	2.4 ± 0.1	3.2 ± 0.0	2.3 ± 0.1	2.5
SiO ₂	56.1 ± 2.2	60.4 ± 1.5	60.9 ± 2.2	61.5 ± 1.7	61.8 ± 0.2	60.0 ± 0.5	64.6
P ₂ O ₅	3.4 ± 0.3	1.9 ± 0.1	2.5 ± 0.8	1.2 ± 0.1	1.1 ± 0.0	1.2 ± 0.0	1.1
SO ₃	0.1 ± 0.0	0.1 ± 0.0	0.3 ± 0.1	0.2 ± 0.1	0.1 ± 0.1	0.2 ± 0.0	0.1
Cl	0.3 ± 0.1	0.4 ± 0.1	0.0 ± 0.0	0.2 ± 0.1	0.3 ± 0.0	0.1 ± 0.0	0.3
K ₂ O	6.0 ± 0.7	4.1 ± 0.7	6.1 ± 0.3	9.6 ± 1.3	5.5 ± 0.0	11.5 ± 0.8	9.3
CaO	21.8 ± 1.9	22.4 ± 0.8	21.9 ± 2.2	14.4 ± 0.1	15.5 ± 0.1	14.7 ± 0.4	14.5
MnO	1.8 ± 0.6	1.1 ± 0.0	1.4 ± 0.3	0.9 ± 0.2	0.9 ± 0.0	0.9 ± 0.0	0.7
Fe ₂ O ₃	0.8 ± 0.2	0.6 ± 0.0	0.4 ± 0.1	0.7 ± 0.1	0.8 ± 0.0	0.7 ± 0.0	0.4
BaO	0.3 ± 0.1	0.4 ± 0.1	0.4 ± 0.1	0.3 ± 0.2	0.3 ± 0.0	0.2 ± 0.1	0.2
PbO	0.2 ± 0.1	0.2 ± 0.0	0.2 ± 0.1	0.2 ± 0.0	1.1 ± 0.1	0.4 ± 0.1	0.2

(b) K-rich glass			
Type	Stackable Beaker	Goblet	Mesh Beaker
Number	8	8	1
Na ₂ O	5.8 ± 1.4	6.2 ± 0.7	6.3
MgO	1.3 ± 0.4	1.6 ± 0.2	1.7
Al ₂ O ₃	1.3 ± 0.1	1.3 ± 0.0	1.4
SiO ₂	69.2 ± 2.4	68.2 ± 2.3	65.4
P ₂ O ₅	0.1 ± 0.1	0.1 ± 0.0	0.1
SO ₃	0.1 ± 0.1	0.1 ± 0.0	0.1
Cl	0.4 ± 0.1	0.4 ± 0.0	0.4
K ₂ O	14.3 ± 2.2	13.5 ± 1.5	12.9
CaO	4.4 ± 0.8	5.2 ± 0.5	6.5
MnO	0.3 ± 0.1	0.2 ± 0.1	0.4
Fe ₂ O ₃	0.4 ± 0.1	0.3 ± 0.0	0.4
BaO	0.0 ± 0.0	0.0 ± 0.0	0.0
PbO	2.2 ± 2.3	2.9 ± 2.1	4.6

ween e.g., the mageleins on the one hand (6.0 ± 0.7 % K₂O) and the printed beakers and berkemeiers on the other (resp. 11.5 ± 0.8 and 8 ± 2 % K₂O). Three of the four roemers, in their turn, although typologically evolved from the berkemeiers (Henkes, 1994), show an overall composition resembling that of the mageleins (i.e., Na₂O < 2%, Al₂O₃ : 3.7 ± 0.2%, K₂O < 6%, Ca₂O > 20%) although the composition of the fourth roemer is more similar to that of the average printed beaker or berkemeier. Also in group A, a sub-group of miscellaneous typological forms is present with a fairly homogeneous, calcic glass composition. These are 'outlier objects' removed from the other groups: one 'façon-de-Venise' vessel, two

(c) Na-rich glass											
Type	Beaker on Folded Foot	Ribbed Beaker	FdV-I	FdV-II	VaF-I	VaF-II	VaF-III			Glass marble	
Number	11	12	8	15	3	1	1	1	1	1	
Na ₂ O	14.4 ± 0.8	14.7 ± 1.2	13.2 ± 0.7	15.7 ± 0.6	15.0 ± 0.7	15.0	15.4	13.5	17.4	11.4	15.8
MgO	2.4 ± 0.4	2.0 ± 0.3	3.0 ± 0.1	2.9 ± 0.6	4.2 ± 0.1	3.4	2.5	2.1	2.0	2.9	1.9
Al ₂ O ₃	1.4 ± 0.2	1.2 ± 0.2	1.5 ± 0.1	1.4 ± 0.1	1.3 ± 0.1	1.5	1.6	4.5	1.4	1.8	1.6
SiO ₂	66.1 ± 2.8	68.2 ± 1.2	62.7 ± 0.4	63.3 ± 2.1	65.3 ± 1.0	62.1	65.8	58.6	68.0	64.2	65.4
P ₂ O ₅	0.9 ± 0.3	0.7 ± 0.1	0.3 ± 0.1	0.3 ± 0.0	0.3 ± 0.1	0.3	0.3	5.5	0.3	0.4	0.4
SO ₃	0.1 ± 0.1	0.0 ± 0.0	0.1 ± 0.0	0.2 ± 0.1	0.2 ± 0.0	0.1	0.1	0.3	0.2	0.1	0.1
Cl	0.9 ± 0.1	1.0 ± 0.1	0.6 ± 0.0	0.7 ± 0.1	0.7 ± 0.0	0.5	0.7	0.8	1.0	0.5	0.9
K ₂ O	2.9 ± 0.4	2.4 ± 0.5	7.4 ± 0.5	4.8 ± 1.0	2.2 ± 0.1	6.5	4.6	2.4	3.4	6.9	3.4
CaO	9.7 ± 2.3	8.5 ± 1.1	10.4 ± 0.6	9.8 ± 1.0	10.1 ± 0.5	9.7	8.1	6.9	5.2	10.5	9.4
MnO	0.8 ± 0.3	0.8 ± 0.4	0.3 ± 0.0	0.4 ± 0.2	0.2 ± 0.0	0.4	0.3	0.3	0.4	0.5	0.5
Fe ₂ O ₃	0.4 ± 0.1	0.3 ± 0.1	0.4 ± 0.0	0.4 ± 0.1	0.3 ± 0.1	0.4	0.4	0.3	0.4	0.6	0.5
BaO	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0	0.0	0.0	0.1	0.1	0.0
PbO	0.1 ± 0.1	0.1 ± 0.1	0.1 ± 0.1	0.2 ± 0.1	0.0 ± 0.1	0.1	0.2	0.2	0.3	0.1	0.1

beakers on folded foot and one straight beaker, *i.e.* all objects which, judging by their shape and outlook, would normally be considered to belong to the sodic group of glass vessels (C).

The K-rich group. Although they are listed as two separate sub-groups in Table II, the major composition of the 17th-century stackable beakers and of the 'façon-de-Venise' goblets are significantly different, showing intermediate values for the abundances of Na₂O and CaO (resp. ca. 6 ± 1 % and 5 ± 1 %) and a K₂O concentration of 13 ± 2 %. The composition of the meshwork beaker is also very similar.

The Na-rich group. As with group A, also with the soda-glass group, the K₂O content can be used to differentiate between on the one hand the beakers on folded foot and the ribbed beakers (K₂O : 2.5 ± 0.5 %) and on the other hand (most of) the 16th-century 'façon-de-Venise' vessels (K₂O > 3 %). All Na-rich subgroups contain 13-16 % Na₂O and 8-10 % CaO. The major compositions of the two beaker types are very similar to each other. The 'façon-de-Venise' vessels can be further sub-divided into three groups: one containing 7.5 ± 0.5 % K₂O (subgroup FdV-I) and another featuring 5 ± 1 % K₂O (subgroup FdV-

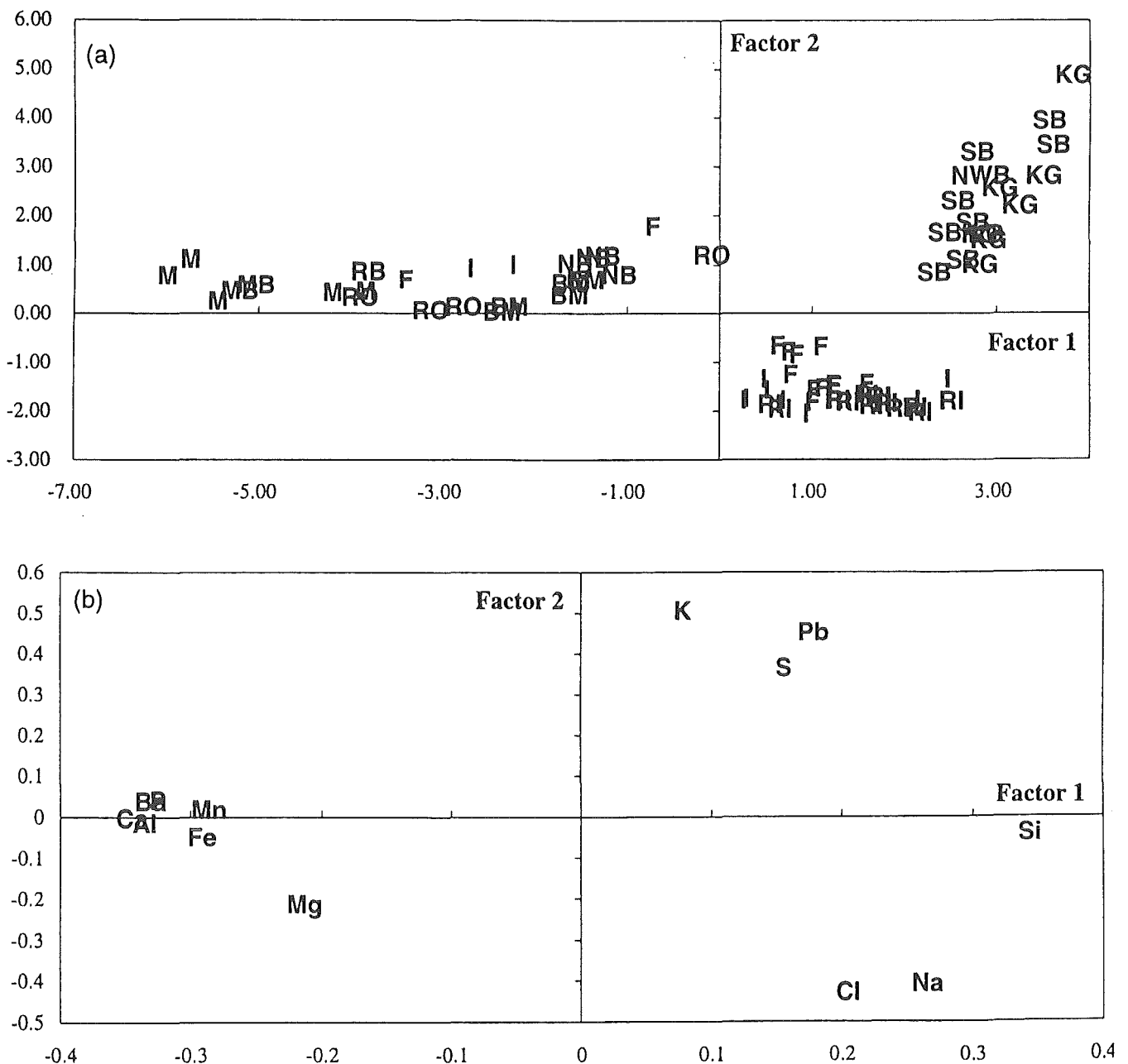


Fig. 1. - (a) Score plot and (b) Loading plot obtained by principal component analysis.

M = magelein, MB = maichel beaker, BM = berkemeier, NB = pruned beaker, F = Façon de Venise and Filigrain, I = beaker on folded foot, RI = ribbed beaker, SB = stackable beaker, KG = goblets, NWB = meshworkbeaker.

II); both groups feature a MgO concentration of about 3 %. In Table IIc, the composition of the filigrain objects is listed separately from that of the 'facon-de-Venise' groups. Within the 8 filigrain objects, a small group of three (subgroup VaF-I) can be considered which show a distinctly lower K₂O content (2.2 ± 0.1 %) and a higher MgO abundance (4.2 ± 0.1 %) than the FdV-I and FdV-II groups. The distinction between FdV-I/II and VaF-I becomes clearer when the K₂O content of the Na-rich glass objects is plotted against their Na₂O abundance (see Fig. 2). Although the subgroups FdV-I and FdV-II can clearly be separated from one another in this plot, the data points of both groups are (more or less) oriented along the same straight line. Foy (1985) and Barrera & Velde (1989) have reported similar relations for sodic glass vessels of the 13th-16th century excavated in the South of France. The linear and negative correlation between the concentration of the two monovalent cations Na⁺ and K⁺ in this case appears to be the consequence of the fact that in the objects involved, the sum of the Na₂O and K₂O concentrations is more or less constant ($\text{Na}_2\text{O} + \text{K}_2\text{O} \approx 21$ %), since the concentration of the other major constituents (SiO₂ and CaO) do not show a large variation within group C. The composition of the glass marble is similar to that of the FdV-II group. Remarkably, however, the glass vessels of the VaF-I subgroup do not follow the above-mentioned linear trend between Na₂O and K₂O; here, the Na₂O concentration varies between 14 and 16 % while the K₂O level does not vary a lot. In contrast to the 3 VaF-I objects, two other 'vetro-a-fili' objects (subgroup VaF-II) do show a composition similar to that of subgroups FdV-I/II and follow the negative Na/K correlation trend shown in Fig. 2. In this figure, also the data points pertaining to three outlier 'vetro-a-fili' vessels are plotted (VaF-III); one object shows unusually high Al₂O₃ and P₂O₅ concentrations (both 5 % vs. normally 1.4 % for Al₂O₃ and 0.3 % for P₂O₅) while the other two feature either a very high or a very low Na₂O abundance (17 % and 11 % vs. the normal 15 %). The Na₂O and K₂O data derived from the beakers on folded foot (BFF) and the ribbed beakers (RB) are also plotted in Fig. 2. As can be seen, these vessels are similar to the VaF-I objects in the sense that their Na₂O abundance varies independently from that of K₂O. However, the low MgO content of the BFF and the RB ($\text{ca. } 2.0 \pm 0.4$ %) clearly distinguishes them from the VaF-I objects in which MgO is present at a fairly high level (4.2 ± 0.1 %).

When one considers the chronological occurrence of the various glass compositions, again a clear distinction between the green glass objects (always calcic

in composition) on the one hand and the colourless vessels (mostly made from sodic or potassic glass) on the other becomes apparent.

Throughout the period which was investigated, calcic objects of various shapes are found in Antwerp; these are usually assumed to be imported wares, originating in the German *Waldglas* tradition. All 'forest glass' objects turned out to be of calcic or potasso-calcic composition (see below); however, a few colourless or straw-coloured objects of different shapes (see Table IIa, miscellaneous group) were also found to have a similar calcic composition; these objects may have been manufactured locally by recycling of (broken) forest glass objects or they may be imitation products, directly manufactured in the same (German) glass workshops that were producing green glassware, after suitable decolourisation of the wood-ash based glass, probably with MnO.

Within the group of high-Ca glass objects (see Table IIa), two distinct compositions, featuring on the one hand ca. 22 % CaO and 6 % K₂O (composition A1, calcic glass) and ca. 15 % CaO, 10 % K₂O and 5 % Na₂O (composition A2, potasso-calcic glass) on the other are found. The calcic glass vessels show CaO/(CaO+K₂O) ratios in the range 0.75-0.85 which is very close to the value of 0.8 typical for ash derived from beech wood burning (Barrera & Velde 1989). Composition A1 was also obtained by other authors who have analysed late medieval vessels. Golebiewski (1993) analysed Stangengläser, pruned beakers and roemers from the North of Poland and found vessels with either a very high CaO content (19-21 %), almost no Na₂O and a K₂O level between 4 and 11 %, and objects with a more comparable CaO and K₂O levels (resp. in the range 16-17 % and 8-16 %) but did not encounter objects which also contained up to 5 % Na₂O as in composition A2. Wedepohl (1993) analysed about 150 late-medieval glass objects from different locations in Germany and distinguishes 6 compositional types; one of these (the wood-ash chalk glass type) having 23 ± 2 % CaO and 5 ± 1 % K₂O is similar to composition A1; however, nothing similar to the A2 composition was found in this extensive survey of German forest glass either. Since the type of vessels concerned here (pruned beakers and berkemeiers from the first half of the 16th century) were not only manufactured east but also west of the Rhine (Klingenfus 1990), e.g. in Beauwelz (close to what is now the Belgian-French border) (Chambon 1955; Henkes 1994, 1991), a possible explanation for the origin of the objects with potasso-calcic composition A2 could be that these vessels were made in (the northern part of) France instead of in Germany. Indeed, in their very extensive survey of the composition of archaeological glass vessels from

various locations in France dating from the 10th to the 18th century, Barrera and Velde (1989) identify a type of potasso-calcic glass having a ratio of $\text{CaO}/(\text{CaO}+\text{K}_2\text{O})$ in the range 0.4-0.8, a Na_2O content of 0.5-3.4% and an MgO content of 2.6-8.0% as being typical for the west of France for the period 1600-1700. Since the composition of this glass is intermediate between that of calcic forest glass and of fern glass (see below), they suggest that this glass type might have been manufactured by using mixtures of (Ca-rich) beech and (K-rich) fern ash.

In order to explain the overwhelming presence of soda-glass objects in 16th-century Antwerp (Table IIc), either soda or sodium-rich ash (and possibly the other raw materials for glass making), soda-glass in bulk and/or finished glass vessels must have been imported in considerable quantities from the Mediterranean (either from Northern Italy, Spain or more eastern locations). In view of the presence of the port, the cheapest and safest transportation route from *e.g.* Venice, Alicante or the Middle-East to Antwerp undoubtedly would have been by sea. The import of Levantine ash ('lume') from different locations in the Middle East (in Syria and Egypt) by the Venetians is well documented (Ashtor & Cevidalli 1983); Genoese traders in some cases also transported the soda-rich ash directly to Flanders and England (Ashtor 1978). An alternative source area of (lower quality) ash might have been the region of Alicante, Cartagena

and Malaga, Spain (Marazza 1907), although these ashes were reputed to yield a bluish type of glass (Neri 1612, Cap. I).

Whereas the majority of the 16th century colourless glass vessels (both tableware for daily use and luxury items) are made of soda-glass, it appears that only potassic glass vessels were being used in Antwerp in the 17th century, even for typological categories such as the goblets which are assumed to have evolved from 'façon-de-Venise' or Venetian 16th-century predecessors. When one considers the ratio $\text{CaO}/(\text{CaO}+\text{K}_2\text{O})$ for the potassic glass, values in the range 0.17-0.33 are obtained which are reasonably close to the corresponding value of 0.20 for fern ash (Barrera & Velde 1989). It is tempting to attribute this sudden transition from soda to fern glass which appears to have occurred around 1600 to the economic and political crisis which took place in Antwerp and its vicinity as a result of the invasion of Spanish troops, their siege and conquest of the city in 1585 and the separation of the (catholic) Southern Low Countries from the (protestant) United Provinces in the north. Since after 1585, the newly established Dutch state closed the River Scheldt for all naval traffic, it can be surmised that the import by sea of ash, soda and/or soda glass into Antwerp also ceased and that the local glass workshops were forced to find alternative (and more local) sources of raw materials. On the other hand, the changeover may have occurred simply be-

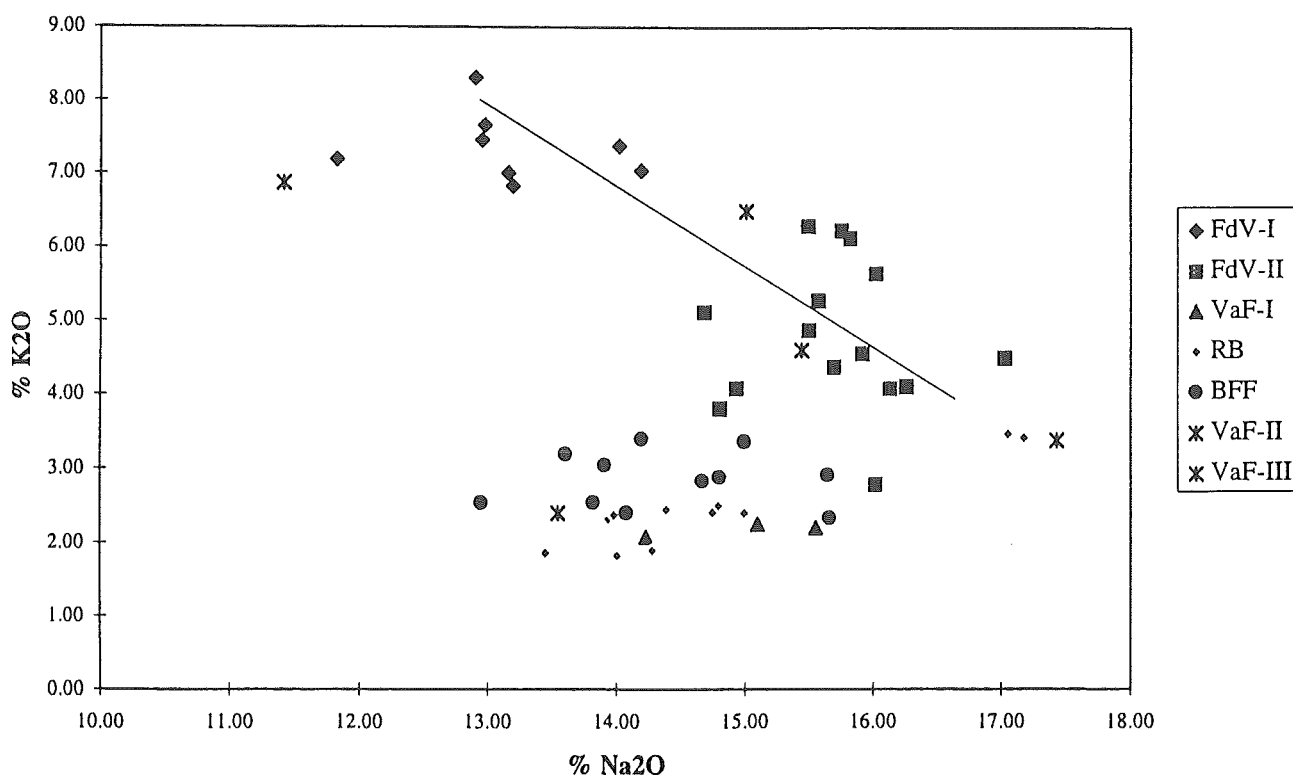


Fig. 2. - Scatterplot of the amount of sodium against the potassium oxide content.

cause it became possible in the 17th century to produce colourless glass using the much cheaper fern ash rather than imported soda-rich ashes. It is interesting to note that several of the analysed objects made from this 'new' type of potassic glass also contain appreciable amounts of Pb (> 1 %) in contrast to the calcic and sodic glass vessels (see Table II). The fact that the 17th-century glass vessels are made of potassic glass, which is harder to work than sodic glass, is in accordance with the fact that these vessels in general have a heavier, thicker walled look than their 16th-century counterparts.

4.2 Trace element composition of the glass objects

As can be seen in Table II, within each of the large compositional groups (A, B and C), (sometimes small) variations in the minor constituents appear to be present. Most of these (more subtle) compositional distinctions appear to coincide with differences in the shape of the objects and therefore can be meaningful. However, because of the variation in the data within each subgroup, it is sometimes difficult to evaluate objectively whether all of these typological groups have a significantly different composition or not. To establish whether some of the differences are due to erratic variations in the glass manufacturing process or rather are caused by differences in the (origin of the) raw materials which were used, it is relevant, next to the major composition data shown in Table II, to consider also the pattern of trace element abundances of each of the glass objects.

As an example, Fig. 2 shows a plot of the strontium content of all analysed objects against their rubidium abundance. The scatter plot of these trace elements emphasises the difference and resemblance in composition of the various typological categories. From this plot (and from a consideration of the other trace element abundance levels) it can be concluded that all 17th-century objects (*i.e.* the goblets 'à-la-*façon-de-Venise*' and the stackable beakers) were produced from the same raw materials since they feature not only a very similar major and minor composition, but also nearly identical trace element signatures. In this respect, it is interesting to mention the elevated level of Sb which was found in all the 17th century potassic glass vessels; the use of Sb, next to Mn, as decolorizing agent ('glass-makers soap') is well documented, especially in the Roman period. Whereas in the sodic and calcic vessels, the Sb abundance is always below the detection limit (~ 5 ppm in this case), for the K-rich vessels shown in Table IIb, an average concentration of ca. 550 ppm is found. This Sb abundance is quite variable however: within

the series of 17 potassic glass vessels analysed, it varies from 20 ppm up to 2000 ppm in some cases. The presence of Sb in the potassic glass may explain how these glass vessels acquired their nearly colourless outlook and were assumed to be made of soda-glass. The potassic glass does not contain any Sn but high levels of Pb (see Table IIb). Van der Wee (1987) also found a high level of PbO (~8 %) in one '*façon-de-Venise*' goblet of the same period.

The two categories of 16th-century ordinary glassware (ribbed beakers and beakers on folded foot) show the same trace elemental pattern, indicating the common origin of both glass types; however, as is illustrated in Fig. 2 for Sr and Rb, their trace element pattern is distinctly different from that of the FdV and VaF groups. Although they show (slightly) different major element compositions, all the '*façon-de-Venise*' objects (FdV-I and FdV-II) as well as the VaF-II and VaF-III objects (see Table IIc), form one large cluster in Fig. 2. This group, however, does not include the three filigrain objects (VaF-I) on account of their higher Sr abundance (800-1200 ppm). The difference in Sr abundance between the VaF-I objects on the one hand and the ribbed beakers and beakers on folded foot on the other hand emphasises the different origins of these vessel types, even if they show nearly the same major composition (see Table IIc). A similar distinction can be made by means of the Sn abundance: the two beaker types show average concentrations of resp. 60 and 80 ppm while the FdV-I and FdV-II groups feature average concentrations at the 300 and 1200 ppm level. The VaF-I objects contain ca. 500 ppm Sn. The elevated concentrations of Sn in the FdV and VaF groups is not surprising since Sn was used as opacifying agent for the production of white opaque glass ('*lattimo*') which was frequently used to decorate these types of glass vessels; the Sn may have entered the colourless soda glass as a contaminant or may have been deliberately added in small quantities as decolorizer.

In the high-Ca group of glass vessels, the three roemers with calcic composition are remarkable; next to having a (nearly) identical major composition as the mageleins, the roemers also feature the same trace element pattern (except for their copper and zinc abundance), although in time they are separated from the mageleins by about a century. This may be an indication that the 17th-century roemers were manufactured from recycled 16th-century (or earlier) forest glass similar or identical to the mageleins. As can be seen in Fig. 2, the difference in origin between the berkemeiers and pruned beakers on the one hand and the mageleins, maichel beakers and roemers on the other hand is confirmed by the trace element data. Fig. 2 also appears to indicate that the group of 5

berkemeiers might be divided further into a first subtype (labelled Berkemeier* in Table IIa) very similar to the pruned beakers and having a Rb concentration between 400 and 600 ppm, and a second subtype with lower Rb abundance (~200 ppm) showing similarities to the fourth roemer (labelled roemer* in Table IIa). However, a larger series of vessels of this type should be analysed in order to confirm the validity of such a sub-division.

4.3 Comparison of the major composition of the 'façon-de-Venise' objects with that of other Venetian glass

In view of the above, it is interesting to compare the compositional data from the Antwerp filigrain and 'façon-de-Venise' glass objects with published analysis results of glass of the same type and period

and of well-known origin. Table III provides an overview of published major element compositions of Venetian and 'façon-de-Venise' glass from different locations in Europe and compares it to the FdV-I, FdV-II and VaF-I average compositions.

The first comparison group is 'cristallo', i.e. a transparent and colourless soda-glass which was fabricated in the middle of the 15th century in Venice (Verita 1985). Its name was derived from rock crystal, to which it resembled in purity, brightness and homogeneity. The composition of 'cristallo' was reputed to be very constant in time and was kept a secret. Another group consists of Venetian objects made of 'Vitrum Blanchum', which are dated from the 14th to the 16th century. This is also soda glass but of inferior quality, probably due to the lower purity of the raw materials employed for its production (Verita 1985). Brill analysed fragments of six Venetian glass objects excavated from the (16th-century)

Table III

Comparison with other Venetian and 'façon-de-Venise' glass of definite origin ¹(Verita 1985), ²(Brill 1973), ³(Bronk, personal communication), ⁴(Fonatine 1992), ⁵(Ulitzka 1994).

	Cristallo ¹ Venice			Venetian ² Gnallc Wreck			FaV-I Antwerp			Vitrum Blanchum ¹ Venice			Venetian ³ Lido/Venice			Venetian ³ Lido/Venice		
	Mean	Range		Mean	Range		Mean	Range		Mean	Range		Mean	Range		Mean	Range	
Na ₂ O	16.90	14.30	19.20	12.90	12.30	13.70	14.96	14.2	15.55	13.00	11.2	14.90	13.24	10.50	15.30	19.55	18.90	20.50
MgO	1.80	1.10	2.35	2.20	1.76	2.58	4.24	4.17	4.32	3.40	1.15	5.10	2.80	1.57	3.40	2.10	1.02	3.18
Al ₂ O ₃	0.70	0.48	0.90	1.30	1.76	2.58	1.34	1.24	1.50	1.10	0.70	1.95	0.98	0.65	1.38	0.87	0.60	1.22
SiO ₂	70.90	68.50	73.00	71.20	71.00	72.00	65.33	64.6	66.47	67.50	63.4	70.00	68.54	65.40	73.60	65.45	62.10	69.80
P ₂ O ₅	0.14	0.09	0.25	-	-	-	0.33	0.29	0.38	0.36	0.20	0.50	0.73	0.39	0.97	0.48	0.35	0.57
SO ₃	0.31	0.23	0.42	-	-	-	0.25	0.22	0.27	0.27	0.15	0.40	-	-	-	-	-	-
Cl	1.00	0.90	1.20	-	-	-	0.65	0.61	0.69	0.82	0.75	1.00	-	-	-	-	-	-
K ₂ O	2.80	2.30	3.25	2.60	2.36	2.88	2.18	2.08	2.25	2.50	1.45	3.00	3.60	2.41	6.03	2.18	0.96	3.34
CaO	4.90	3.90	6.40	7.80	6.53	8.86	10.12	9.54	10.48	9.50	8.20	11.90	9.04	5.08	10.60	8.30	6.35	10.30
MnO	0.30	0.21	0.58	0.60	0.50	0.94	0.23	0.22	0.24	0.50	0.25	0.95	0.61	0.33	0.82	0.52	0.25	0.73
Fe ₂ O ₃	0.24	0.17	0.38	0.60	0.39	0.75	0.32	0.26	0.41	0.36	0.22	0.48	0.44	0.25	0.71	0.35	0.21	0.60
BaO	-	-	-	0.01	0.01	0.01	0.02	0.01	0.03	-	-	-	-	-	-	-	-	-
PbO	-	-	-	0.19	0.07	0.28	0.04	0.01	0.11	-	-	-	0.02	0.00	0.14	0.19	0.00	0.61
	FdV ⁴ Grezoiceau			FdV I Antwerp			FdV II Antwerp			Veste Coburg ⁵ Hall/Innsbruck			Veste Coburg ⁵ Spain I			Veste Coburg ⁵ Spain II		
	Mean			Mean	Range		Mean	Range		Mean	Range		Mean	Range		Mean	Range	
Na ₂ O	13.70			15.71	14.68	17.02	13.15	11.8	14.19	12.70	12.00	13.20	11.70	10.60	11.90	10.29	9.50	11.60
MgO	1.00			2.90	1.98	3.77	2.99	2.87	3.13	3.10	1.25	4.13	3.40	2.70	3.85	1.10	0.91	1.75
Al ₂ O ₃	1.30			1.38	1.25	1.54	1.51	1.39	1.57	1.00	0.76	1.67	1.70	1.01	2.41	1.10	0.74	2.51
SiO ₂	63.90			63.31	59.99	65.88	62.74	62.0	63.44	68.00	65.00	79.50	67.40	65.50	69.20	67.30	63.40	69.30
P ₂ O ₅	-			0.30	0.20	0.35	0.31	0.22	0.43	0.46	0.29	0.61	0.60	0.53	0.87	1.00	0.83	1.20
SO ₃	-			0.16	0.07	0.26	0.10	0.07	0.15	0.34	0.26	0.42	0.31	0.21	0.36	0.23	0.16	0.31
Cl	1.00			0.69	0.57	0.82	0.57	0.52	0.62	-	-	-	-	-	-	-	-	-
K ₂ O	5.50			4.79	2.78	6.28	7.35	6.83	8.31	3.00	2.21	5.86	3.50	3.10	6.75	6.90	4.92	9.02
CaO	10.60			9.81	8.27	11.33	10.42	9.69	11.40	10.20	5.39	12.46	9.80	7.97	12.45	9.80	8.91	12.70
MnO	1.00			0.38	0.16	0.72	0.28	0.23	0.35	0.46	0.17	0.74	0.60	0.46	0.96	1.40	0.72	1.61
Fe ₂ O ₃	0.85			0.40	0.29	0.53	0.42	0.37	0.48	0.43	0.30	0.63	0.70	0.43	0.96	0.60	0.48	0.65
BaO	-			0.03	0.01	0.06	0.02	0.00	0.07	-	-	-	-	-	-	-	-	-
PbO	-			0.16	0.01	0.41	0.13	0.01	0.28	0.01	0.00	0.50	0.01	0.00	0.02	0.02	0.00	0.70

Gnalic shipwreck and belonging to the collections of the Narodni Museum in Zadnar (Brill 1973). About 20 goblets dated to the late 16th, early 17th century from the Lido of Venice were analysed by H. Bronk (pers. comm.); within this series, a distinction can be made between a group containing about 14 % Na₂O, resembling *Vitrum Blanchum* and a few objects containing up to 19 % Na₂O. Closer to Antwerp, a small oil/vinegar bottle dated to the late 16th century was found in Grez-Doiceau (Belgium), made 'à-la-*façon-de-Venise*' and decorated with filigrain (Fontaine 1992). Ultizka (1994) analysed 15th- to 19th-century Venetian and '*façon-de-Venise*' glass vessels from the collection of the '*Veste Coburg*', Austria. He distinguishes three compositional groups, two of Spanish origin and one with objects from Hall and Innsbruck, Austria. The latter group shows an average composition resembling to that of *Vitrum Blanchum*. It is historically proven that the Venetian glassmakers in Innsbruck were allowed to bring along or import their raw materials from the North of Italy. The '*façon-de-Venise*' objects of Spanish origin probably were made from glass manufactured using ash from local saline plants as sodium source, which are reputed to contain much less Na than their counterparts growing in the Middle-East (Ashtor & Cevidalli 1983, 493). This might explain the relatively low Na₂O abundance in these vessels (10-12 %) and the higher K₂O level (7 %).

The two Antwerp '*façon-de-Venise*' groups (FdV-I and FdV-II) show no immediate resemblance to any of the comparison groups. Although the FdV-I and II groups feature a Na₂O content which is bracketed by the Na₂O ranges of resp. '*Cristallo*' and '*Vitrum Blanchum*', the abundance of K₂O in both groups (and of CaO in the case of FdV-I) is too high relative to that of the corresponding Venetian groups. The K₂O levels found for the two Antwerp groups (5-7 %) are also quite high relative to the other groups; approximately the same level is found in the object from Grez-Doiceau and in the group Spain-II of Ultizka. This could be an indication that the local glass production in Antwerp was employing soda of variable Na/K content or of a mixture of two distinct sources of soda, one with high Na₂O and low K₂O content (maybe of Levantine origin, as used in Murano) and one of lower Na₂O and higher K₂O abundance (possibly Spanish in origin). The use of this kind of alkali source, in a fixed proportion to the amount of sand and chalk used, might explain the negative Na₂O/K₂O correlation shown in Fig. 2. In contrast to the FdV groups, the VaF-I group composition appears to resemble that of the *Vitrum Blanchum* glass quite well; it also is similar to the first group of goblets from the Lido of Venice. Considering the complex shape of these objects, it may be that they are the only ones actually imported as finished products from Venice within the analysed series.

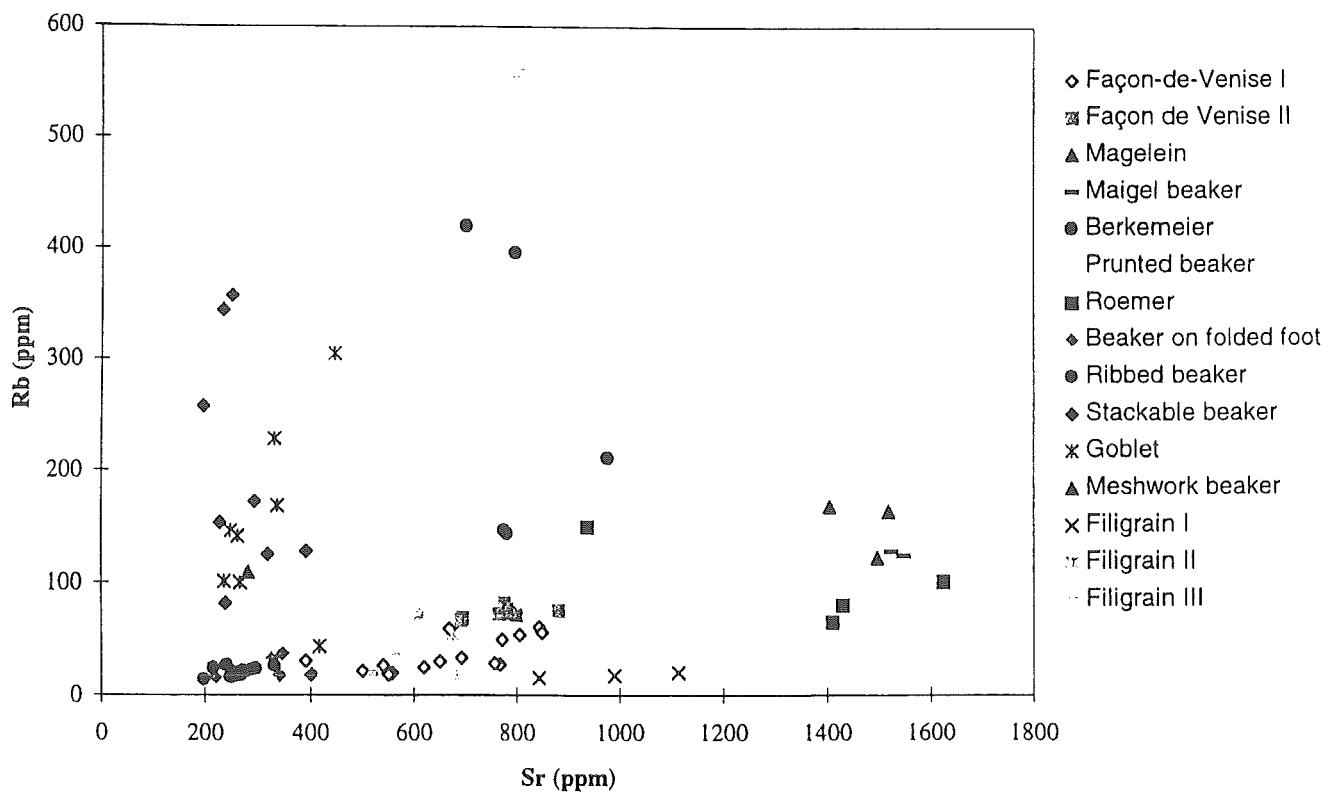


Fig. 3. - Scatterplot of strontium vs. rubidium in ppm.

6 Conclusions

The chemical analysis of about a hundred 15th- to 17th-century glass objects excavated in Antwerp revealed the existence of three glass compositions. A first group covers glass from the late 15th until the early 17th century: mageleins, berkemeiers, pruned beakers and roemers. All these glasses are characterised by a high content of calcium oxide. There is a distinction between these typological groups when the minor elements and the amount of CaO are considered. It should be noticed that the roemers, although typologically evolving from the berkemeiers, have a major and trace composition similar to that of the mageleins and are different from the berkemeiers and pruned beakers. The second group are the sodic glass objects. This type includes all 16th-century objects, *i.e.* the ribbed beakers, the beakers on folded foot and the 'façon-de-Venise' and filigrain glass vessels. The first two typological groups feature similar major as well as trace compositions. The 'façon-de-Venise' objects can be further subdivided considering the major composition, but no such distinction is revealed in their trace composition. Among these soda glass objects, only a few filigrain glass objects have a composition resembling that of the Venetian '*Vitrum Blanchum*' glass. A third group consists of all the 17th-century objects (a meshwork beaker, stackable beakers and goblets 'à-la-façon-de-Venise'). All these objects have a similar major and trace compositions and are made in potassium-rich glass decolorized with Sb, although in the literature, they are expected to consist of soda glass. The abrupt changeover from the sodic glass of the 16th century to the potassic glass of the 17th century objects may be connected with the blockade of the River Scheldt by the newly established Dutch State at the end of the 16th century or may be the result of the introduction of the use of Sb as decolorizing agent for glass made from fern ash.

Special emphasis was placed on the 16th-century 'façon-de-Venise' objects. The central question in this respect is whether there was local production of these kinds of glass vessels in Antwerp and how this local production can be distinguished from 'real' Venetian wares. Therefore, the analysis results of the 'façon-de-Venise' group of vessels were compared with compositional data of glass of well-known origin. It appears that, except for three filigrain objects, the Antwerp glass vessels show no resemblance to the other groups. On the other hand, the filigrain objects have a composition similar to *vitrum blanchum*, a typical product from Venice. In order to obtain a clearer insight into the significance of these differences and to establish with a higher degree of

confidence whether most of the 'façon-de-Venise' objects show a typically 'Antwerp' kind of soda-glass composition, the extension of the present programme of analyses is planned. On the one hand, this extension will involve the analysis of a larger number of 'façon-de-Venise' glass objects excavated in Antwerp, but on the other hand it will also involve comparison of the 'Antwerp' soda glass composition to that found on other sites in Western Europe.

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Materiali metallici di una città medievale

Nel corso delle indagini archeologiche che dal 1994 si susseguono con ricorrenza annuale, allo scopo di dissotterrare i resti della città di Leopoli-Cencelle, situata a nord di Roma, tra le moderne Civitavecchia e Tarquinia, fondata dal papa Leone IV alla metà del IX secolo, per proteggere gli abitanti di *Centumcellae*, minacciati dalle scorrerie delle flotte saracene, che infestavano le coste laziali, abbandonata a partire dal XV secolo¹, sono venuti alla luce numerosissimi oggetti metallici².

Si tratta di manufatti in ferro e bronzo, oggetti legati all'edilizia, elementi di serrature, parti dell'arredo interno delle case, suppellettile domestica ed utensili, attrezzi da lavoro, armi ed armature, finimenti da cavallo, accessori del vestiario ed oggetti di ornamento personale³.

Oggetti legati all'edilizia (Fig. 2: 1-4)

Come materiali da carpenteria sono attestati prevalentemente chiodi e grappe, di tipologie molto comuni, destinati alla connessione di travi del tetto⁴.

Elementi di serrature (Fig. 2: 5-8)

Piuttosto numerosi, consistono in chiavi in ferro di dimensioni notevoli, con anello circolare, gambo a sezione cilindrica e ingegno dentato, del tipo comunemente denominato “chiave bernarda”⁵. Sono ben note in contesti medievali e serravano porte di legno, inserendosi in piastre rettangolari, in ferro, dotate di congegno di scatto ancora conservato⁶.

Molto numerose sono le copiglie, con bietta a sezione rettangolare e testa rozzamente circolare, singole o inserite l'una nell'altra, oppure in un anello, per agevolare ogni movimento di rotazione⁷, secondo una tipologia comunemente attestata in contesti di XIII-XV secolo⁸.

¹ Sulla città di Leopoli-Cencelle si vedano: Lauer 1900; Toti 1988; Nardi 1993; Toti 1993; L. Ermini Pani, in Leopoli-Cencelle 1996, 21-23. Della città L. Ermini Pani ha trattato anche durante una seduta dei Seminari di Archeologia Cristiana a Roma (Ermini Pani c.s.a) e al VII Congresso Internazionale su *Castrum*, nel mese di ottobre 1996 a Roma (Ermini Pani c.s.b). Si veda anche in questi stessi *Atti*. Sino ad ora sono state effettuate tre campagne di scavo, sotto la direzione scientifica di L. Ermini Pani, condotte dall'Università di Roma I “La Sapienza”, dall'Università di Chieti “G. D'Annunzio”, dall'Università di Viterbo, dall'Ecole Française de Rome, a cui hanno partecipato anche allievi dell'Università di Cagliari, cattedra di Archeologia Medievale. I primi risultati sono stati presentati nel corso di una mostra itinerante a Roma, Civitavecchia e Tarquinia negli anni 1995-1996 e pubblicati nel Catalogo Leopoli-Cencelle 1996.

² I materiali metallici sono stati classificati nel corso di un Seminario di studi nell'ambito dell'insegnamento di Archeologia Medievale, presso la I Scuola di Specializzazione in Archeologia, Università di Roma I “La Sapienza”, coordinato da chi scrive. In particolare si ringraziano per aver messo a disposizione i risultati del proprio lavoro C. De Amicis, D. Camardo e P. Zander, autori anche di alcuni disegni che si allegano al presente contributo. Una prima presentazione dei rinvenimenti è avvenuta nel corso della mostra già citata alla nota 1, seguita da una relazione preliminare in Leopoli-Cencelle 1996, 77-81, curata da G. Albertini, E. Cirelli, M.I. Marchetti e F. Zagari, insieme alla sottoscritta. I metalli rinvenuti a Cencelle saranno oggetto di un intervento alla Conferenza sul tema “Archaeometallurgy in the Central Europe”, che si terrà ad Herl'any, presso Košice in Slovacchia, dal 9 all' 11 settembre 1997, organizzata dal Department of Ferrous and Foundry Metallurgy Faculty of Metallurgy Technical University, a cura del Prof. Ing. L'ubomir Mihok. Inoltre si veda Martorelli c.s.

³ Leopoli-Cencelle 1996, 77.

⁴ Leopoli-Cencelle 1996, 77-78. Si veda a titolo di esempio Gambaro *et alii* 1990, figg. 32, 36 e 80.

⁵ Esempi simili provengono da Rocca San Silvestro (Francovich *et alii* 1985, tavv. II, 15, 18-19, 21; VII, 2-3) e da Monte Zignago (Cabona *et alii* 1985, tavv. VIII, 26; IX, 34; Gambaro *et alii* 1990, figg. 1942, 62).

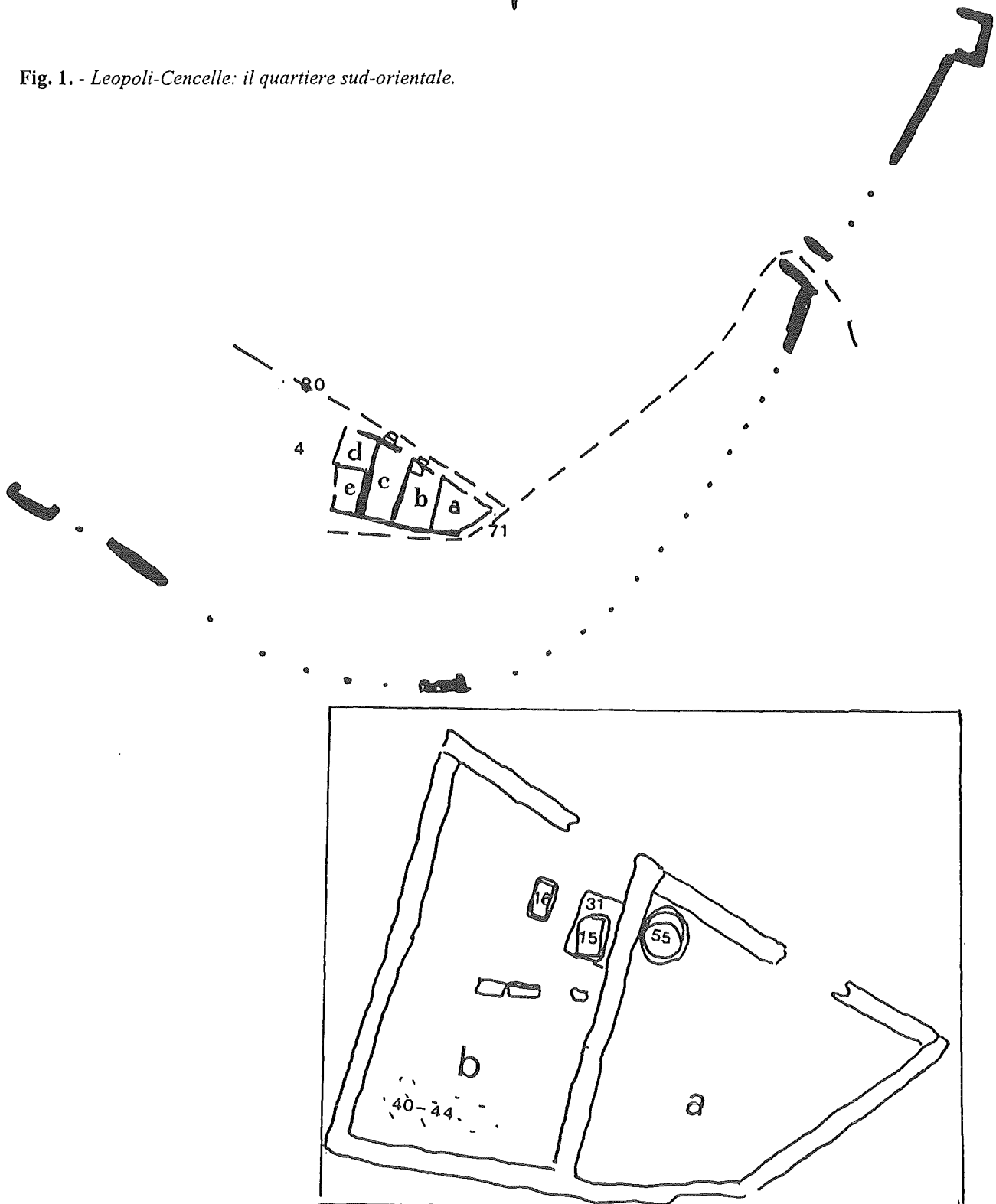
⁶ Leopoli-Cencelle 1996, 78. Cfr. inoltre Demians D'Archimbaud 1980, fig. 449, 2-4; Francovich *et alii* 1985, tav. II, 9; Cabona *et alii* 1985, tav. VII, 6, 8; Gambaro *et alii* 1990, figg. 31, 34-35, 63, 68 e 74.

⁷ Leopoli-Cencelle 1996, p.78.

⁸ A Rocca San Silvestro (Francovich *et alii* 1985, tavv. VII, 7, 10, 13, 15), nel Castello di Ripafratta, presso Lucca (Amici 1989, 466), nel villaggio di Monte Zignago (Cabona *et alii* 1985, tav. VIII, 24; Gambaro *et alii* 1990, figg. 21-23, 77) e nella Torre Civica di Pavia (Ward-Perkins *et alii* 1978, fig. 12.11).



Fig. 1. - Leopoli-Cencelle: il quartiere sud-orientale.



Un tipo di manufatto (rinvenuto in almeno quattro esemplari) si presentava a prima vista inusuale: si tratta di un "tripode" in ferro, con testa piatta, da cui hanno origine tre barrette verticali⁹. E' riprodotto più volte su pitture parietali che decorano edifici religiosi

dell'Armenia, risalenti al XIII secolo, laddove compare insieme a congegni di chiusura di porte, come

⁹ Leopoli-Cencelle 1996, 78.

elemento inserito nel cardine, in cui i tre piedi funzionano come una sorta di molla che consente di fissare le due parti del chiavistello¹⁰.

Arredo interno (Fig. 2: 9-11)

Alcuni reperti appartengono all'insieme degli oggetti utilizzati per l'arredo della casa. Tra questi possono annoverarsi alcune placchette, che rappresentano quanto sopravvive del rivestimento di un mobile, o forse di un cofanetto ligneo¹¹. Una lamina in bronzo, in particolare, dotata del meccanismo di chiusura e del chiavistello, presenta una guarnizione "a giorno", che disegna archetti trilobati, in cui si inseriscono rosette, riecheggiando i modi decorativi dell'età gotica¹².

Sono state rinvenute anche alcune lucerne per l'illuminazione degli edifici, di tipo globulare, che richiama modelli di tradizione tardoantica¹³, o a serbatoio aperto, con fondo piano a disco e sistema di sospensione, che funzionava per combustione dell'olio o del sego (grasso animale)¹⁴.

Suppellettile e utensili (Fig. 3: 1)

Altri oggetti dovevano essere destinati alla vita quotidiana, come parti di recipienti in metallo, o utensili. Tra questi i coltelli, che risultano solitamente fra i rinvenimenti più numerosi, talvolta attribuibili alla suppellettile domestica, talaltra all'equipaggiamento militare, ma più spesso di incerta destinazione. La tipologia rimane invariata nel tempo, sia nella lama ad un profilo tagliente, che nell'impugnatura, anche perché se ne conserva generalmente il codolo, perduta l'immanicatura che potrebbe costituire l'unico elemento caratterizzante; pertanto è spesso arduo qualsiasi tentativo d'inquadramento cronologico¹⁵.

Attrezzi da lavoro (Fig. 3: 2-7)

Il maggior numero degli attrezzi da lavoro è da porre in relazione all'attività agricola e alla lavorazione del legno. Sono stati trovati, infatti, falcetti¹⁶ e zappe¹⁷, per mietere grano e diserbare, insieme a roncole¹⁸ ed asce¹⁹, per tagliare i rami e i tronchi degli alberi. Si tratta di strumenti in uso in contesti medievali, che non presentano una particolare evoluzione tipologica nei secc. XII-XV²⁰.

Attestano invece un'attività artigianale di tessitura aghi da cucito²¹ e ditali, in bronzo, dalla struttura troncopiramidale, con superficie punzonata²², oggetti tipici nell'ambito dei rinvenimenti ascrivibili al suddetto arco cronologico²³.

Accessori del vestiario (Fig. 4: 1)

Pochi sono gli oggetti del vestiario, limitati prevalentemente alle fibbie di cintura, del tipo ad anello circolare di piccole dimensioni, a sezione cilindrica o convessa, oppure rettangolare²⁴, tipologie note ed ampiamente diffuse nei secc. XIII e XIV, utilizzate per cinture molto sottili, adottate sia dell'abito civile che militare²⁵.

Al costume della stessa epoca sembrano pertinenti anche alcuni bottoncini in bronzo a doppia calotta emisferica²⁶.

Oggetti di ornamento personale (Fig. 4: 2)

Molto scarsi, quasi inesistenti, sono rappresentati solo da un anello digitale a verga sottile, con castone centrale sopraelevato di forma piramidale, che contiene una pietra dura²⁷. Anche in questo caso si tratta di un oggetto che trova riscontri nel XIII e XIV secolo²⁸.

¹⁰ Schiemenz 1993, 169-180.

¹¹ Leopoli-Cencelle 1996, 78-79.

¹² L'archetto trilobato 'a traforo' ricorda il coronamento della loggia del Palazzo dei Papi a Viterbo o analoghi motivi nella scultura del sec. XIII (Romanini *et alii* 1988, 379 e 401).

¹³ Leopoli-Cencelle 1996, 78. Cfr. inoltre De' Spagnolis & De Carolis 1983, 59 (tipo XI,1) e Sfligiotti 1990, 523. Analisi effettuate su uno di questi reperti hanno permesso di verificare che si tratta di un manufatto in ottone. Si ringrazia dell'informazione V. La Salvia.

¹⁴ Leopoli-Cencelle 1996, 78. Cfr. inoltre Sfligiotti 1990, 523.

¹⁵ Leopoli-Cencelle 1996, 78. Cfr. per i coltelli: Ferrando Cabona *et alii* 1978, tav. XIII.64-66; Amici 1989, 466; Giannichedda 1989, fig. 5; Gambaro *et alii* 1990, fig. 2.

¹⁶ Leopoli-Cencelle 1996, 79. Cfr. per confronto: Francovich *et alii* 1985, tav. IX, 4; Gambaro *et alii* 1990, figg. 55-56.

¹⁷ Leopoli-Cencelle 1996, 79. Cfr. inoltre Gambaro *et alii* 1990, fig. 52.

¹⁸ Leopoli-Cencelle 1996, 79.

¹⁹ Leopoli-Cencelle 1996, 79. Cfr. Gambaro *et alii* 1990, fig. 49.

²⁰ Cfr. *supra*, note 18 e 19.

²¹ Leopoli-Cencelle 1996, 79. Cfr. inoltre: Gambaro *et alii* 1990, fig. 4.

²² Leopoli-Cencelle 1996, 79. Si veda anche: Amici 1989, 466 (quattro esemplari).

²³ Cfr. *supra*, note 21 e 22.

²⁴ Leopoli-Cencelle 1996, 79-80.

²⁵ Sulla tipologia delle fibbie di cintura cfr. Fingerling 1971, tav. VIII, 14. Numerosi sono i rinvenimenti. Cfr. Andrews *et alii* 1978, tav. 14; Cabona *et alii* 1985, tavv. VIII, 18 e IX, 31; Francovich *et alii* 1985, tavv. IV, 8 e VIII, 14; Redi *et alii* 1986, tavv. 5, 1, 4; Amici 1989, figg. 7-10; Gambaro *et alii* 1990, fig. 46; Di Gangi *et alii* 1993, 468-469, nn. 1-2. Per il costume nei secc. XIII-XV cfr. Levi Pisetzky 1964, vol. II, 77, 133, 279, 378.

²⁶ Rinvenuti nella campagna del 1996, sono ancora inediti. Per un confronto si veda: Cabona *et alii* 1985, tav. IX, 37 e Redi *et alii* 1986, tav. 5, 9-11. Cfr. Levi Pisetzky 1964, vol. II, 136.

²⁷ Leopoli-Cencelle 1996, 79-80.

²⁸ Sfligiotti 1990, 545, fig. C.8.

Finimenti (Fig. 4: 3-4)

Numerosissimi i ferri di cavallo e di mulo delle tipologie note, che conservano ancora alcuni chiodini della ferratura²⁹.

Armi e armature (Fig. 4: 5-8)

Le armi di offesa sono rappresentate da alcune spade con manico in osso, da pugnali con impugnatura "a T"³⁰, le cd. balesarde, diffuse nell'Alto Lazio fra XII e XV secolo³¹. Numerose anche le cuspidi di freccia a foglia di salice e le quadrelle da balestra³². Alcune placchette in ferro, con forellini, farebbero pensare a corazze metalliche³³.

Tali oggetti erano concentrati soprattutto nell'area sud-orientale del colle, mentre si registrano presenze molto più scarse nella casa-torre al centro della collina³⁴.

Nella zona meridionale sono emersi i resti in alzato di quattro ambienti contigui, costruiti in momenti diversi, ma probabilmente molto vicini fra loro, che costituiscono un'unica unità edilizia (Fig. 1: 4), cui si accedeva da nord, dalla strada US 80, la via che dalla porta est della città conduceva alla sommità del colle³⁵.

Il complesso sembra aver origine dal vano 4b, di forma rettangolare, in grossi blocchi di trachite messi in opera in maniera abbastanza regolare, direttamente sul piano della roccia geologica, che presenta degli avvallamenti piuttosto marcati. All'interno, tre blocchi monolitici in pietra, allineati in direzione est-ovest, sembrano voler separare la metà sud da quella nord, che risultano adibite ad usi diversi.

La parte nord, priva di qualsiasi tipo di pavimentazione, ma certamente dotata di un tetto di tegole (crollato al suo interno), mostra nella superficie ondulata della roccia alcune piccole buche dalla bocca più o meno ampia e dalla profondità variabile da m.0,20 a m.0,50 (US 40-44). Esse contenevano, mescolati a terriccio di riempimento, residui di argilla concotta, che conferiva un colorito rossiccio, insieme a carboncini, scarti di metallo fuso e resti di

laminette sempre in metallo. Uno solo di questi presunti "focolari" (US 42) era dotato anche di una sorta di piano di posa in mattoni, adagiati in posizione orizzontale.

L'altra metà dell'ambiente, invece, piano inferiore e seminterrato dell'edificio, che qui presenta un secondo livello accessibile dall'esterno, conserva un articolato impianto di vasche: una di ampie dimensioni, in muratura, scavata nella roccia (US 31), ad un certo momento colmata di terra mista a cenere, sormontata da un'altra vasca monolitica (US 15), in trachite, parallela al muro di delimitazione est dell'ambiente, in collegamento con un canale scavato nel predetto muro, evidenziato da una mostra in pietra (US 21). Parallela, ma assolutamente indipendente, la vaschetta monolitica US 16³⁶.

Al lato occidentale di questo ambiente si addossa un altro vano, simile per forma e dimensioni, pavimentato in grossi blocchi solo in prossimità dell'entrata e della scala che doveva condurre al piano superiore, al quale si appoggia ad ovest un ambientino quadrangolare di modeste dimensioni, che non presenta elementi connotanti.

Ad est, invece, un altro vano trapezoidale viene innalzato quando già la zona era frequentata, poiché è l'unico a non fondare direttamente sulla roccia, bensì su un piano di calpestio in terra e scaglie, forse una sorta di giardino. La sua struttura anomala dovette essere condizionata dalla strada US 71, che corre obliqua, assecondando l'andamento della cerchia muraria.

All'angolo nord-ovest giace, caduto dalla sua collocazione originaria, presumibilmente durante il crollo dell'edificio, un manufatto in trachite, di forma circolare (US 51). Sul fondo, non perfettamente piano ma digradante verso una parte, si riconosce un'impronta circolare all'interno, che si prolunga con due appendici in forma ellittica. E' possibile che in origine fosse un crogiolo per la lavorazione dei metalli³⁷, anche se certamente dovette essere collocato in questa posizione con una destinazione diversa, poiché mostra un foro quadrangolare,

²⁹ Leopoli-Cencelle 1996, 80. Cfr. inoltre Francovich *et alii* 1985, tav. II, 20 (Rocca San Silvestro); Amici 1989, 473 (Castello di Ripafratta, Lucca); Ferrando Cabona *et alii* 1978, tav. XIII, 67-68; Cabona *et alii* 1985, tav. IX, 32; Gambaro *et alii* 1990, figg. 40-41 (Monte Zignago).

³⁰ Leopoli-Cencelle 1996, 79.

³¹ Leopoli-Cencelle 1996, 79-80. Cfr. anche Sfligiotti 1990, 535, n. 700.

³² Leopoli-Cencelle 1996, 79-80. Cfr. inoltre Milanese 1978, tav. II, 8-9; Ferrando Cabona *et alii* 1978, tav. XIII, 49; Gardini & Maggi 1980, figg. 9-10; Francovich *et alii* 1985, tav. II, 12-13, VIII, 9, IX, 6-7; Amici 1989, figg. 1-9; 15-19; Gambaro *et*

alii 1990, figg. 5 e 64.

³³ Leopoli-Cencelle 1996, 79-80. Cfr. Amici 1989, figg. 1-10 e Sfligiotti 1990, n. 707, 537. Sull'armatura dei secc. XIII-XIV cfr. Levi Pisetzky 1964, vol. II, 20.

³⁴ Sulla casa-torre si veda Giuntella *et alii* in Leopoli-Cencelle 1996, 72-76.

³⁵ Per la descrizione del complesso cfr. Leopoli-Cencelle 1996, 54-58 e Martorelli c.s.

³⁶ Per le vasche cfr. Tylecote 1962.

³⁷ Un'impronta dello stesso tipo è presente sul fondo di una vasca rinvenuta a Brandes-en-Oisans, in Francia. Cfr. Bailly-Maitre 1993, 446.

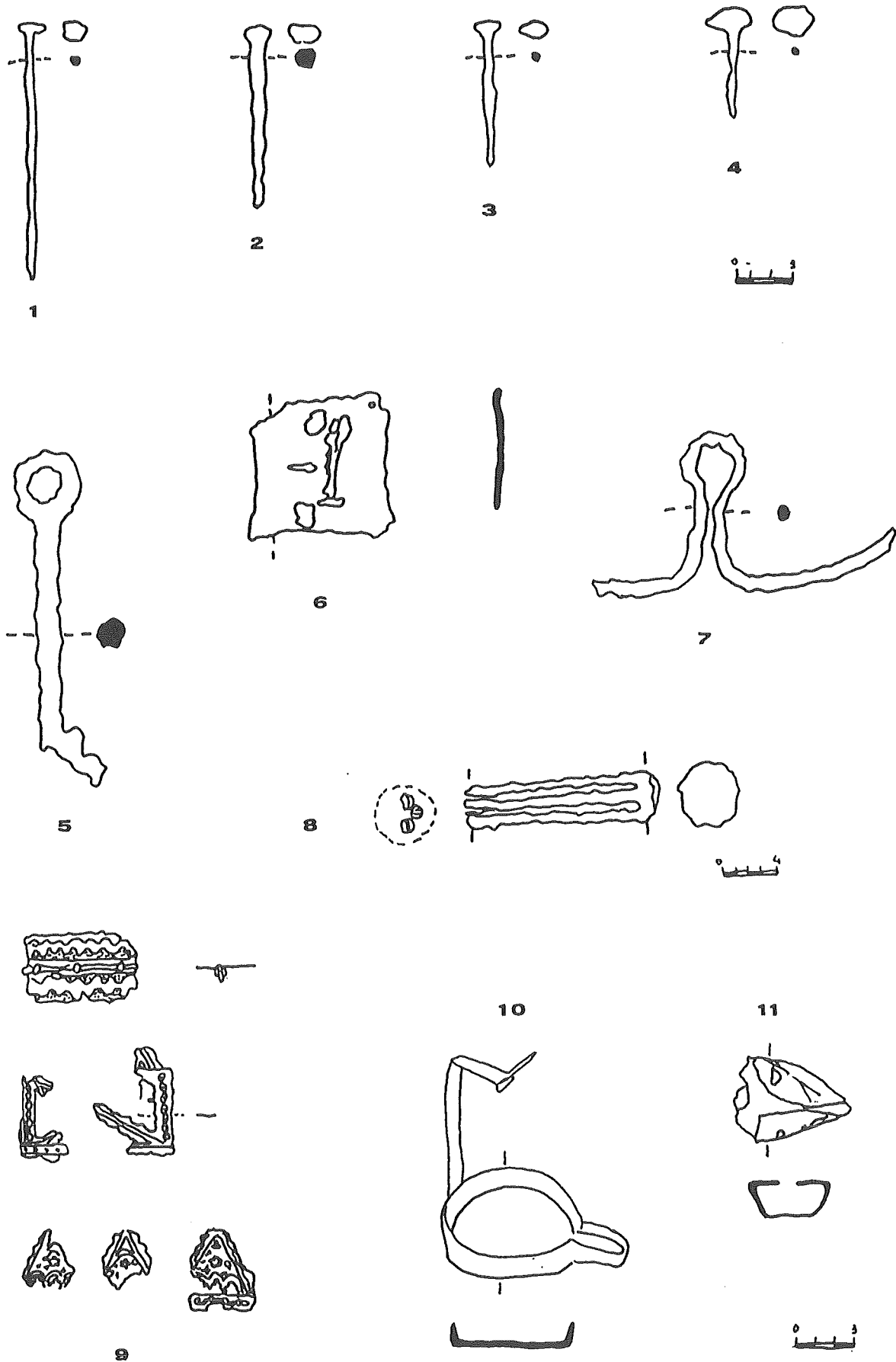


Fig. 2. - Oggetti legati all'edilizia: 1-4; elementi di serrature: 5-8; arredo interno: 9-11.

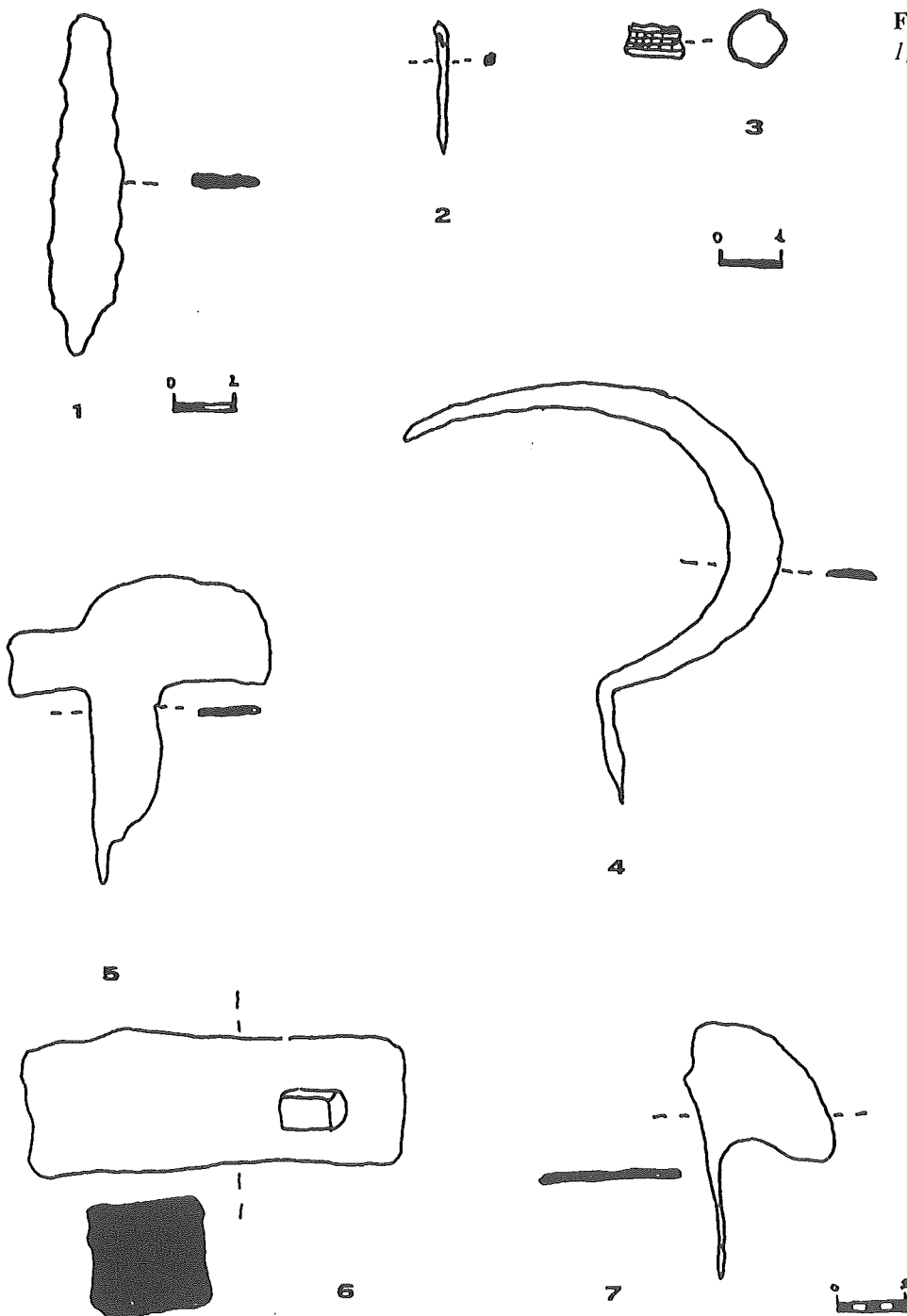


Fig. 3. - *Suppelettile ed utensili:*
1; *attrezzi da lavoro:* 2-7.

tagliato malamente, ma perfettamente aderente ad un altro ricavato nel muro adiacente, limite est dell'ambiente contiguo, non previsto in fase di costruzione. Collocando il manufatto in modo da far coincidere le due aperture, esso risulterebbe in posizione sovrelevata rispetto al pavimento del vano ed anche alla vasca US 15 dell'ambiente vicino, a cui esso così si collega mediante il canale aperto nel muro. Ne deriva di conseguenza un impianto per il passaggio dell'acqua che, dapprima raccolta nella vasca circolare, discende poi in quella rettangolare, sfruttando il principio dei vasi comunicanti. Il vano, ben pavimentato in blocchi squadrati di basalto,

presenta in alcune zone piani in malta piuttosto compatta, di forma approssimativamente circolare, con un avvallamento centrale.

Pur nella successione costruttiva degli ambienti, il complesso può essere considerato il risultato di un unico intervento edilizio, caratterizzato da una tecnica muraria omogenea, in grossi blocchi di trachite squadrati, tenuti insieme da strati di malta disposti in letti orizzontali e verticali, che nel suo insieme si addossa ad una massiccia struttura quadrangolare edificata invece in nenfro, del tipo usato per la fase più antica delle mura e di alcuni edifici³⁸.

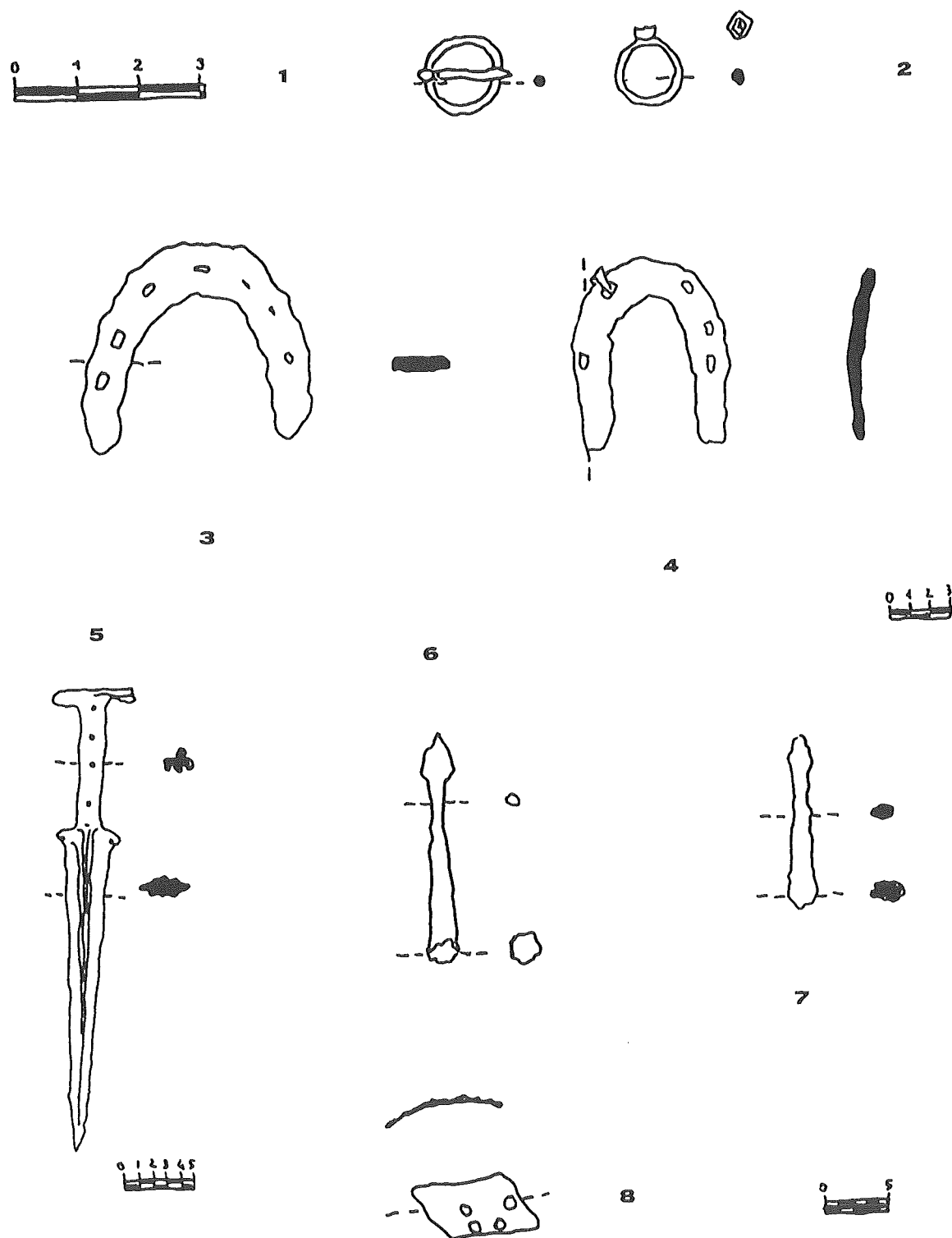


Fig. 4. - Accessori del vestiario: 1; oggetti di ornamento personale: 2; finimenti: 3-4; armi ed armature: 5-8.

Sia la sequenza stratigrafica, che i caratteri costruttivi impongono un'attribuzione ad un'epoca che non può essere molto antica, sostenuta inoltre dalla presenza – come materiale di riuso – di frammenti

marmorei decorati ad intreccio, ascrivibili almeno alla metà del IX secolo (anche per la stretta affinità tipologica e tecnica con la scultura incisa sull'epigrafe dedicatoria di Leone IV³⁹), pertinenti alla suppellettile architettonica di una chiesa che ad un certo momento viene quantomeno restaurata⁴⁰.

Tutto sembra dunque orientare verso il XIII secolo, allorché la città vive forse il momento del suo maggior splendore⁴¹.

³⁸ Cfr. De Minicis *et alii*, in Leopoli-Cencelle 1996, 90-94.

³⁹ Leopoli-Cencelle 1996, 103-104.

⁴⁰ Sull'edilizia religiosa cfr. Leopoli-Cencelle 1996, 7.

⁴¹ Toti 1993, 22-36.

I reperti metallici giacevano negli strati di terra relativi all'ultima fase di frequentazione di questi ambienti e pertanto aggiungono un ulteriore contributo alla cronologia del sito, che converge come i precedenti verso un'utilizzazione che non può essere anteriore al Duecento e che si protrae sino all'abbandono nel XV secolo⁴².

La rilevanza numerica, unitamente all'ampia casistica dei reperti, ha destato subito dei sospetti circa una destinazione di tali materiali agli edifici stessi in cui erano stati ritrovati. Ad esempio, gli elementi di serrature risultavano eccessivi rispetto all'unica porta esistente in ogni ambiente.

Ciò ha indotto ad ipotizzare che il complesso avesse una funzione artigianale, verosimilmente legata alla lavorazione dei metalli. Scorie abbondanti di fusione sono state recuperate durante le indagini effettuate in questi anni nello stesso sito dall'*équipe* dell'Ecole Française de Rome, in una fossa di grosse dimensioni ricavata nella roccia in uno degli ambienti del complesso edilizio situato in prossimità della porta (Fig. 1: 1)⁴³.

Dunque è verosimile che il metallo subisse un primo processo di riduzione in questi ambienti, per poi essere, una volta raggiunto lo stato grezzo, lavorato nel complesso edilizio 4 ed essere trasformato in prodotto finito. Ammorbidito mediante la tecnica del "bassofuoco" nei focolari US 40-44, forse veniva lasciato decantare nelle vasche US 15 e 16, alimentate dall'acqua depositata nel serbatoio US 51, per essere liberato dalle impurità ancora presenti e successivamente forgiato sull'incudine e il martello, quando non veniva fuso e direttamente colato negli stampi⁴⁴.

Contrasta con la rilevanza numerica dei reperti, prevalentemente in ferro, molto meno in bronzo, la scarsità degli accessori di vestiario, o ancor più dei gioielli, la cui realizzazione non è improbabile avvenisse altrove, forse in vere e proprie gioiellerie. Inoltre, è da supporre che ad esempio i monili venissero eseguiti su precisa commissione e quindi non rimanessero in giacenza, mentre si può pensare che chiodi, elementi di serrature, ferri di cavallo, attrezzi da lavoro fossero prodotti in forniture di serie.

Il *Liber Pontificalis* ricorda la fondazione della città di Leopoli, legandola al fantasioso racconto di un sogno premonitore, nel quale si indicava allo stesso pontefice il sito più adatto ad un insediamento umano, che rispondesse alle esigenze della popolazione: in una posizione naturalmente difendibile e fornito di mezzi di sostentamento (quali l'acquedotto per l'approvvigionamento idrico). Il papa, inoltre, che munisce il pianoro con una cinta muraria con sette torri e tre porte – i cui resti hanno resistito quasi soli al trascorrere del tempo – e dedica tre chiese, si pone il problema di costruire una città che abbia in sé gli elementi urbanistici essenziali, dai poli politico-religiosi, alle infrastrutture di servizio⁴⁵.

Poco si conosce dell'evoluzione di Cencelle nei secoli successivi, se non il fatto che viene politicamente coinvolta nelle vicende della vicina Viterbo⁴⁶. La città rimane sempre nell'orbita dell'organizzazione ecclesiastica, in virtù forse di questa sua fondazione⁴⁷, ma dal XII secolo assume la connotazione quasi di un comune, mantenendo un'indipendenza amministrativa, pur conservando come referente ultimo la Chiesa⁴⁸. Al XV secolo risalgono le ultime testimonianze documentarie relative al sito, che comunque risulta già deserto e da questo periodo si può pensare ad un lento e progressivo abbandono del pianoro da parte della popolazione, che recupera l'antica *Centumcellae*, denominata *Civitas Vetula*⁴⁹.

Fin dal IX secolo, dunque, la città doveva avere una sua struttura organizzata, con una ben definita distribuzione degli spazi al suo interno.

L'impianto artigianale, che si presenta di proporzioni non indifferenti, doveva rispondere alle esigenze della popolazione locale, secondo un sistema organizzativo tipico della città medievale, dove ogni centro – non solo urbano, ma anche rurale – assolveva alle proprie necessità⁵⁰. Sebbene le conoscenze attuali sull'artigianato di metalli siano incomplete, le scoperte archeologiche di questi ultimi anni hanno restituito complessi con dispositivi artigianali che presentano numerose analogie con il caso di Cencelle⁵¹.

Il cronista Bonvesin de la Riva attesta che nella Milano del Duecento erano attivi molti fabbri, che producevano armi. Conta ben cento fabbricanti di

⁴² Cfr. *supra*, nota 1.

⁴³ Leopoli-Cencelle 1996, 67.

⁴⁴ Importanti notizie sul funzionamento degli impianti per la lavorazione del metallo, dall'estrazione del minerale alla produzione dell'oggetto, si ricavano dal testo cinquecentesco di Giorgio Agricola: Angel 1989. Inoltre, per un panorama delle fonti nell'Alto Medioevo cfr. Braunstein 1990.

⁴⁵ *Liber Pontificalis*, a cura di L. DUCHESNE, II, 131-133. Cfr. inoltre Pani Ermini 1992, 520-523.

⁴⁶ Toti 1993, 21-23.

⁴⁷ Toti 1993, 20.

⁴⁸ Toti 1993, 23.

⁴⁹ Toti 1993, 40-41. L. Ermini Pani in Leopoli-Cencelle 1996, 7.

⁵⁰ Guidoni 1991, 216-218.

⁵¹ Cima *et alii* 1984; Farinelli & Francovich 1994 (con bibliografia di riferimento).

corazze con molti operai, che realizzano inoltre scudi ed armi di ogni genere. A quell'epoca Porta Nuova era denominata Ferrea e vicino era la Posterula dei Fabbri demolita nel 1900, perchè nei suoi pressi si trovava il quartiere artigianale⁵².

E' possibile dunque ipotizzare che quest'area periferica della città di Cencelle, che ormai nel XIII secolo doveva estendersi fin quasi alle mura, fosse destinata alla lavorazione dei metalli, attività artigianale che viene spesso relegata ai margini dell'abitato per ovvie ragioni di sicurezza, dal momento che implica un uso abbondante e frequente del fuoco⁵³.

Senza allontanarsi di molto, in Toscana a Rocca di S.Silvestro la situazione sembra analoga sotto diversi aspetti⁵⁴, così come all'isola d'Elba⁵⁵. A Viterbo, alla metà del XIII secolo, vigono precise disposizioni legislative, che regolano l'attività dei fabbri⁵⁶.

Che a Cencelle vi fosse un artigianato del metallo si può desumere dal trattato di alleanza con Viterbo, stipulato nel 1220, sotto Onorio III, a Cencelle nella chiesa di S.Pietro, a cui partecipano, tra gli altri, Matteo di Alessio fabbro, Benincasa fabbricante di scudi, Ranuccio di Giovanni fabbro ferraio, Guarnerio fabbro⁵⁷.

Dunque, i reperti metallici e le strutture riportate in luce durante gli scavi si rivelano di notevole interesse per la conoscenza dell'organizzazione interna della città, non solo sotto il profilo urbanistico, ma anche sotto l'aspetto sociale. Le considerazioni sin qui esposte, scaturite dall'analisi dei primi dati acquisiti nel corso degli scavi, aprono dei quesiti su problematiche che investono più generalmente la dislocazione dei quartieri nella Cencelle altomedievale e medievale, nell'ottica di una ricostruzione della vita quotidiana degli abitanti, problematiche che andranno approfondite con il proseguimento delle indagini.

⁵² Bonvesin DE LA RIVA, *De magnalibus Mediolani*, ed. critica a cura di G. Pontiggia e M. Corti, Milano 1974, 153 e nota 63. Cfr. inoltre Guidoni 1989, 350 e AA.VV. 1993, 151.

⁵³ Ad esempio a Rocca S.Silvestro (Francovich & Wickham 1994).

⁵⁴ Francovich & Wickham 1994.

⁵⁵ Una situazione molto simile al vano 4b è nota all'Isola d'Elba, dove è stato riportato in luce a Monte Serra un ambiente rettangolare diviso in due parti da tramezzi, con focolari solo in una zona, ricavati direttamente nel piano geologico. Cfr. Martin 1994, 237-244.

⁵⁶ *Statutum Viterbii*, in I. CIAMPI (a cura di), *Cronache e statuti della città di Viterbo*, Firenze 1872, 451-653.

⁵⁷ Toti 1993, 56-57.

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Oggetti per il Gioco nel Lazio medievale

Introduzione

Con il presente lavoro si è tentata una prima sistemazione degli oggetti per il gioco di età medievale rinvenuti nel Lazio¹. La ricerca si è basata, a parte rare eccezioni, su materiale edito, per il quale purtroppo si deve lamentare la lacunosità nella trattazione.

E' doveroso premettere che questo studio, appena all'inizio, è stato reso particolarmente difficoltoso dal numero esiguo dei materiali e dalla provenienza di questi o da collezioni private o da strati di riempimento, scarsamente indicativi ai fini della comprensione storica e dell'inquadramento cronologico degli stessi. Pur con limiti così evidenti, si è tuttavia cercato di non cadere nella trappola delle classificazioni tipologiche, guardando ai giochi non come meri oggetti, bensì come significativi elementi di vita materiale e culturale.

Ci si è orientati sostanzialmente in due direzioni: da una parte verificare la distribuzione di questi oggetti nel territorio, con particolare attenzione ai luoghi (città, campagna, etc.) e ai contesti specifici di rinvenimento (ambito funerario, abitazioni, etc.); dall'altra analizzare i reperti segnatamente nei loro aspetti tecnologici, oltre che tipologici.

Come le altre epoche anche l'età medievale ebbe i suoi giochi, alcuni anche di un certo pregio, che rappresentano tracce tangibili della vita quotidiana. Attraverso l'esame dei reperti archeologici si è cercato di capire quali fossero i giochi preferiti nel Medioevo e in che rapporto si ponessero con i giochi di età romana, che in diversi casi ne sono i modelli.

I Dadi

I.1 Introduzione

Per dadi intendiamo piccoli cubi di diverso materiale, con sei facce, parallele due a due, e con i punti, da uno a sei, segnati su ciascuna faccia.

I dadi, che nelle fonti letterarie ed iconografiche risultano essere tra gli oggetti da gioco più diffusi nel Medioevo, sono poco presenti nelle relazioni di scavo e, quando sono segnalati, mancano spesso di riferimenti alle dimensioni ed al numero esatto degli esemplari. Risulta pertanto ancora lontana la possibilità di realizzare una carta di distribuzione dei ritrovamenti che abbia una qualche validità. La pianta da noi presentata ha il solo scopo di essere l'inizio di un lavoro che speriamo possa essere più ampio ed il mezzo per rendere nota a tutti la posizione geografica dei luoghi che menzioneremo (tavv. 1 e 2).

I.2 Luoghi di ritrovamento

a) tipo di abitato

I dadi sono stati rinvenuti in due tipi di centri di popolamento: città e castelli. Tra i primi, troviamo Roma che, come si è più volte constatato, risulta essere nuovamente “un caso a parte”. Dal suo centro storico-monumentale provengono infatti gli unici esemplari – tra quelli a nostra conoscenza – di sicura datazione altomedievale. A Roma, abbiamo anche l'unica occasione di poter constatare la continuità di questo tipo di oggetto tra età romana ed epoca medievale: gli esemplari, provenienti da “butti”/mondezari o da strati di abbandono situati nei ruderi degli edifici romani – come nel caso del Palatino² –, sono datati al IV-V secolo e costituiscono l'anello di congiunzione con i dadi altomedievali (VII secolo) della Crypta Balbi³.

Gli altri dadi pubblicati provengono invece da strati tardomedievali (XIII-XV secolo) di castelli (Montagliano⁴), di centri che, dopo aver avuto una prestigiosa fondazione come *civitas*, vengono ridi-

¹ Per la ricerca si sono rivelate particolarmente preziose le informazioni gentilmente forniteci dai dott. O. Mazzucato, M. Ricci e dai sigg. E. Cirelli e R. Luzzi, a cui rivolgiamo i nostri ringraziamenti.

² Hostetter *et alii*, 1991, 47-74.

³ Sagui 1993, 415-416.

⁴ De Minicis & Hubert 1991, 525.



Tav. 1. - Lazio: carta distributiva dei rinvenimenti.

mensionati (Cencelle⁵) o di città come Roma, con la Crypta Balbi⁶ (contesti della seconda metà/fine del XIII secolo).

Infine, l'unico dato che si può osservare dalla carta dei ritrovamenti è quello di una diffusione omogenea all'interno della regione.

b) ubicazione all'interno dell'abitato

All'interno degli abitati, la possibilità di individuare i siti dove si svolgevano i giochi dei dadi risulta ostacolata da un'alta percentuale di ritrovamenti in "mondezzari" (Crypta Balbi, Palatino) o in strati di abbandono (Palatino, Cencelle). Inoltre, il ritrovamento presso strutture coperte, di tipo privato (*domus* del Palatino, Cencelle III) o pubblico (Cencelle IV), ed in zone aperte (Montagliano) potrebbe indicare la mancanza di un luogo canonico per il gioco dei dadi. Ovviamente, questo discorso vale per un tipo di gioco di carattere estemporaneo che esclude le taverne e le osterie. Infatti, secondo gli Statuti, esse sarebbero state i luoghi privilegiati per un gioco più organiz-

zato, sia con i dadi che con le carte. Nel 1403, l'oste Domenico di ser Fazio di Canepina ottiene il permesso dai priori di far giocare i clienti nella taverna "ad schacos et ad tabulas dum venditur vinum". Poco più di cinquant'anni dopo, un bando vieta di "iocare a zara...e qualunque alto jocho prohibito, tanto di dadi quanto di carte, a pena di un ducato d'oro".⁷

I.3 Tipologia morfologica

a) materiali

Il 90% dei dadi rinvenuti è in osso, anche se non mancano attestazioni, letterarie o archeologiche, di dadi in legno, terracotta, corno di cervo e ambra. Questi ultimi due materiali sono attestati in Polonia, ma anche in Italia non possiamo escludere l'esistenza di dadi in corno, terracotta o in legno. Purtroppo, per gli ultimi due materiali, è più difficile il rinvenimento a causa di una maggiore fragilità (la terracotta) e deperibilità (il legno). Infatti, là dove si è avuta la fortuna di favorevolissime condizioni di conservazione, come nel caso del sito francese di Colletière a Charavines (Isère), l'uso del legno è risultato essere rilevante anche nell'ambito degli oggetti da gioco.⁸ Accanto ai materiali sopra menzionati, in epoca romana, esistevano dadi estremamente raffinati, realizzati in cristallo, di cui si ha testimonianza archeologica nella collezione del British Museum e, letteraria, nel *Satyricon* di Petronio.

Nei siti da noi indagati, sono segnalati anche dadi in avorio, provenienti da strati di abbandono di una bottega di artigiano (?) che nel IV-V secolo occupava i resti di una *domus* sul Palatino nord-orientale. Questo ci porta ad ipotizzare una distinzione dei materiali, a seconda della posizione socio-economica degli acquirenti o dei committenti.

b) misure

I dadi da noi osservati sono manufatti estremamente semplici sia per quanto riguarda la materia prima che per la lavorazione: gli spigoli non sono arrotondati e le facce non sono perfettamente parallele tra di loro. Piero Guarducci nota giustamente che i difetti di esecuzione incidono fortemente sulla regolarità del gioco poiché i dadi non rotolavano bene. Lo stesso autore propone poi una divisione tra dadi di 9-10 mm, da adulti, e dadi di 6 mm, per ragazzi. In realtà, l'impressione che abbiamo è che questi ultimi fossero utilizzati, proprio per i loro difetti, per un tipo di gioco estemporaneo e senza pretese, indifferentemente da adulti o da ragazzi.⁹ Infatti, tutti i "nostri" dadi sono di questa dimensione (6 mm) e sono stati rinvenuti anche in edifici pubblici, forse luoghi di guardia (Cencelle, IV).

⁵ AA. VV. 1996, 110, fig. 4.

⁶ Sfligiotti 1990, 550, fig. 164, 23.

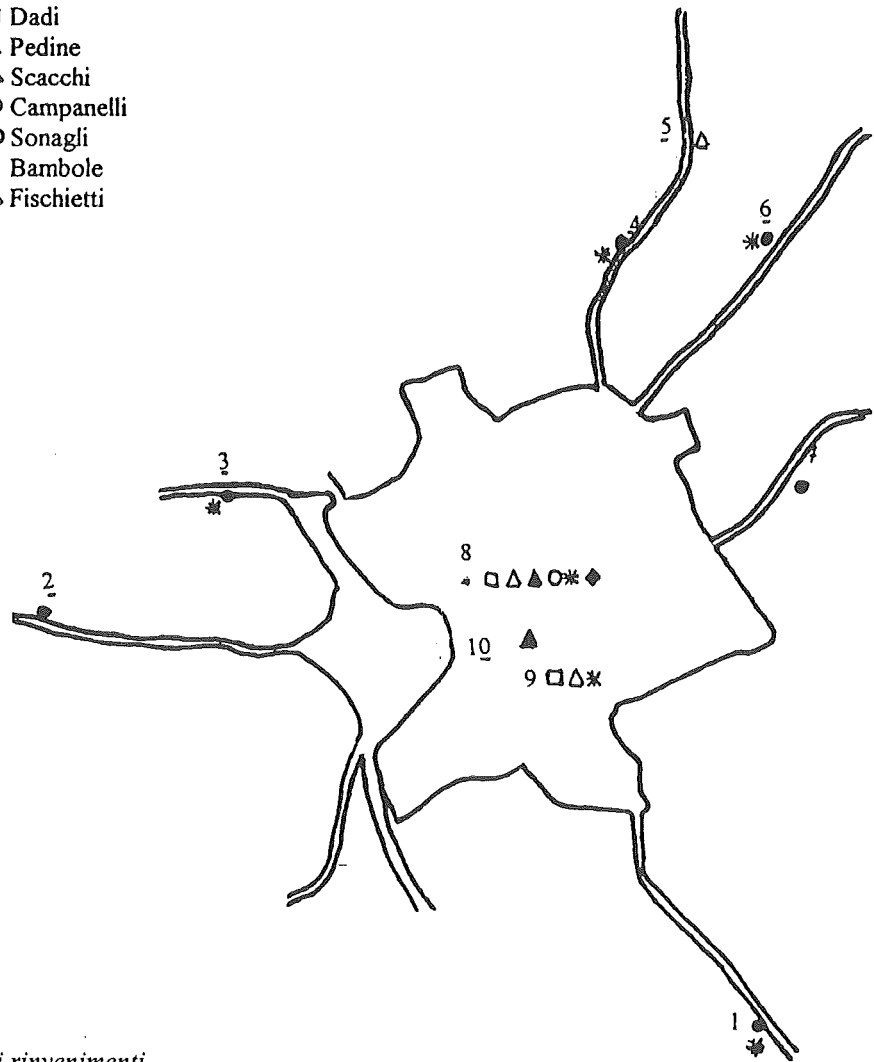
⁷ Carosi 1979-81, 24.

⁸ Colardelle 1980, 167-269.

⁹ Guarducci 1986, 42.

- ROMA
1. S. Sebastiano
 2. Calepodio
 3. Vaticano
 4. Trasono
 5. Priscilla
 6. S. Agnese
 7. Verano
 8. Crypta Balbi
 9. Palatino
 10. Vico Iugario

- Dadi
- △ Pedine
- ▲ Scacchi
- Campanelli
- Sonagli
- * Bambole
- ◆ Fischietti



Tav. 2. - Roma: carta distributiva dei rinvenimenti.

1.4 Produzione

a) esecuzione

Grazie al rinvenimento, presso gli scavi di S. Petronio a Bologna e della torre civica di Pavia, di parallelepipedi d'osso (lunghezza di 5-6 cm) e di dadi non finiti, è stato possibile ricostruire il procedimento di lavorazione dei dadi.¹⁰ La materia prima veniva ricavata da bovini od equini, da ossi che, avendo un certo spessore ed una certa compattezza, consentivano di ricavare dadi anche di non piccolissime dimensioni. Nello scavo bolognese abbiamo la fase intermedia della lavorazione: parallelepipedi di 5-6 cm di lunghezza, a sezione pressoché quadrata. Si spianava una faccia base, poi le altre due perpendicolari alla prima e, infine, la quarta opposta sempre alla faccia base. Dai parallelepipedi così lavorati venivano tagliati diversi cubetti che, rifiniti gli ultimi due piani, erano pronti a ricevere i segni

che indicano il valore. Doppie cerchi concentrici, eseguiti con il punzone, o semplici punti, ottenuti con il punteruolo, erano i metodi più usati per indicare il valore. I pezzi laziali da noi presi in esame hanno tutti il primo tipo di punti che, proprio per la vasta diffusione in questo ambito, viene chiamato "occhio di dado". Bisognerebbe inoltre approfondire l'esame dei manufatti per cogliere eventuali tracce di colore in corrispondenza dei valori, usato per dare maggior risalto ad essi.

b) luoghi di produzione

La facilità della lavorazione, i pochi strumenti necessari e la facile reperibilità degli scarti di macellazione di bovini rendono altamente probabile una lavorazione di tipo estemporaneo. Vi sono due luoghi di produzione, individuati per il ritrovamento di strumenti e di scarti di lavorazione, che, per la quantità e per la qualità di dadi e di altri oggetti simili, differiscono dal panorama generale. Ci riferiamo ai due siti romani accomunati anche dalla datazione tra tardo antico (IV-V secolo) ed alto Medioevo (VII secolo): la *domus* sul Palatino e la Crypta Balbi.

¹⁰ Gelichi & Merlo 1987, 188-189; Ward Perkins *et alii* 1973, 138.

Infatti, dadi in avorio dal primo sito ed il rinvenimento, nel secondo, di un dado di forma ancora rettangolare – gentilmente comunicatoci da M. Ricci – ci inducono ad ipotizzare che si possa parlare di produzione di manufatti per il commercio. Ovviamente, pur essendo installazioni estremamente semplici e non indirizzate all' esclusiva produzione di dadi, è interessante notare che tali dadi venivano prodotti, oltre che in modo estemporaneo, anche in piccole botteghe dedite alla lavorazione dell'osso/avorio (Palatino) o di diversi materiali, come per il caso della Crypta Balbi. Secondo gli studi più recenti, quest'ultimo sito dovrebbe la sua straordinarietà alla particolare situazione di Roma nel panorama alto-medievale.

1.5 Tipo di giochi

I giochi nei quali venivano impiegati i dadi possono essere divisi in giochi da adulti e giochi da ragazzi solo in pochi casi come la "zara" ed il "tric-trac", per adulti, ed il "coderone" per ragazzi. Sulla zara, abbiamo testimonianze della "pericolosità" del gioco che spesse volte aveva portato al fallimento i giocatori che la praticavano. Sul tric-trac, invece, riportiamo quanto scritto da R. Gööck¹¹: "il gioco si fa con una particolare scacchiera nella quale sono segnati degli spazi (detti "frece"). I due giocatori hanno rispettivamente quindici pedine e, gettando i dadi, le fanno avanzare del valore corrispondente lungo gli spazi della scacchiera. Se troverà nello spazio da occupare una pedina avversaria potrà "mangiargliela" e qui è determinante l'abilità del giocatore nel saper spostare le sue pedine sempre in coppia (detta "corda") perché in tal caso l'avversario non può "mangiare". Naturalmente vince chi riesce a far l'intero percorso con il maggior numero di pedine".

Tra i giochi infantili, il più citato è quello delle "tavole", con diverse varianti più o meno semplici che potevano essere utilizzate sia da adulti che da bambini. Sempre Guarducci in proposito dice: "Il gioco delle tavole era così detto perché vi si adoperavano le pedine. Non si sa bene in quanti modi si potesse giocare; ma pare che almeno in certi casi si muovessero le pedine secondo le combinazioni di dadi che si gettavano nella scacchiera o tavoliere, come oggi a Tavola Reale".¹² Esistevano anche giochi che non utilizzavano pedine o "scacchiere", nei quali vinceva chi raggiungeva il punteggio più alto; giochi che possiamo immaginare essere praticati sia da adulti che da ragazzi.

I dadi potevano essere agitati nel pugno o in vasetti di terracotta che avevano la stessa funzione dei bossoli

nell'antichità. Il fatto che i bossoli non siano stati rinvenuti in contesti medievali potrebbe indicare che non siano stati riconosciuti o che se ne facesse a meno, soprattutto in ambito estemporaneo, o che si adoperassero quei piccoli contenitori di ceramica che, nelle relazioni di scavo, vengono spesso indicati come "microvasetti".

1.6 Conclusioni

Ripercorrendo gli argomenti fin qui esaminati, vorremmo sottolineare la continuità di produzione, dall'età romana al tardo Medioevo; il riscontro di una misura standard (6 mm ca.) e la produzione di ambito domestico o ad opera di piccole botteghe che non sembrano essere state specializzate in un unico tipo di oggetto. Gli impianti che sembrano distaccarsi da una produzione di tipo domestico sono i già citati casi romani della *domus* del Palatino e della Crypta Balbi. Sull'entità del mercato al quale facevano riferimento non possiamo essere più precise ma, dalla qualità e dalla quantità dei pezzi, possiamo ipotizzare essere stato di non limitata portata (soprattutto per la Crypta Balbi). Un dato per noi interessante è l'aver potuto constatare che, anche in questi contesti produttivi, i dadi sono stati rinvenuti insieme ad altri manufatti (come le bambole articolate), inducendoci a ritenere che i dadi fossero un solo aspetto dell'attività di officine che avevano come unica specializzazione il tipo di materiale lavorato. Nel caso del Palatino, siamo infatti di fronte ad una produzione in osso/avorio; mentre per la Crypta Balbi, dovevano esistere una o più botteghe che, a stretto contatto, si occupavano di lavorare materiali diversi (osso/avorio/metalli/vetro).

Oltre al rinvenimento di dadi, non è infrequente trovare in contesti archeologici scacchiere incise su pietra/marmo, sulle quali si muovevano le pedine a seconda del "responso" dei dadi. Esistono poi delle scacchiere realizzate su cassette di legno, particolarmente ricche nella decorazione, appartenute a persone di alto rango sociale. Esempio è il caso della cassetta conservata al Museo di Cluny, a Parigi, sulla quale compare una tavola per il tric-trac ed una scacchiera. L'uso di cassette anche in strati più poveri è testimoniato dai dipinti (Bruegel il Vecchio "I giochi dei bambini").

¹¹ Gööck 1970, 259-260.

¹² Guarducci 1986, 44, nota 47.

II Pedine e scacchi

II.1 Introduzione

Le pedine e gli scacchi sono quegli oggetti di piccole dimensioni e di materiale vario che servono a segnare la posizione di ciascun giocatore sulla scacchiera, nel corso dei giochi da tavolo. Esistevano anche usi impropri delle stesse, per i quali non erano necessarie le scacchiere.

Esamineremo nello stesso capitolo le pedine e gli scacchi poiché entrambi venivano usati come segnaposto nei giochi da tavolo. Vi sono però delle innegabili diversità: le pedine, sia per utilizzazione che per ambito cronologico, sono più vicine a quanto detto sui dadi, anziché agli scacchi che compaiono in Occidente soprattutto nella seconda parte del Medioevo e che non prevedevano l'uso dei dadi.

Come premessa metodologica, segnaliamo le specifiche difficoltà riscontrate nello studio di questo tipo di oggetti. La difficoltà per le pedine sta soprattutto nel riconoscimento poiché i materiali in cui erano realizzate sono vari e spesso figurano delle pedine "di fortuna" (frammenti di vasi di ceramica o di vetro) o altri oggetti usati "impropriamente" al posto dei classici dischetti di osso, corno, avorio, ceramica e vetro creati *ad hoc*, come le monete d'oro e d'argento usate da Trimalcione nel gioco del tric-trac (*Satyricon*). La frammentarietà degli oggetti, insieme alla mancanza di una forma canonizzata, è invece il maggior problema per l'identificazione degli scacchi.

Le pedine rinvenute sono nove e provengono dalla Crypta Balbi, Tuscania, Macchiatimone e Cencelle, mentre gli scacchi sono sei (Crypta Balbi, Vico Iugario, Rascino). Segnaliamo infine l'ancora non definita datazione degli esemplari provenienti da Macchiatimone e da Rascino, pezzi che comunque sembrano appartenere a contesti tardomedievali.¹³

II.2 Luoghi di ritrovamento (tavv. 1 e 2)

a) tipo di abitato

Il dato più interessante è che nei luoghi dove sono stati rinvenuti dadi non mancano le pedine: il Cicolano, Cencelle e Roma (Palatino e Crypta Balbi) sono stati già segnalati nel capitolo precedente. Il constatare tale dato è un'ulteriore verifica del legame tra questi manufatti poiché si tratta di oggetti spesso utilizzati nei medesimi giochi.

Le uniche situazioni ad essere modificate sono quelle di Tuscania¹⁴ e di Roma: il primo centro non compariva per i dadi; mentre, per Roma, ai due siti già segnalati si aggiunge quello del vico Iugario¹⁵ dove sono stati rinvenuti tre scacchi. La modifica è

però di carattere esclusivamente quantitativo poiché anche questo sito si trova nell'antico centro storico-monumentale. Gli altri scacchi sono stati segnalati in scavi di un secondo castello del Cicolano (Rascino) e, all'interno di Roma nella Crypta Balbi (contesti del XII e del XVI secolo ca.)¹⁶.

b) ubicazione all'interno dell'abitato

Per la localizzazione dei rinvenimenti all'interno dei siti, si rimanda alla medesima situazione descritta per i dadi, con l'unica eccezione di una continuità di rinvenimenti per la Crypta Balbi, dove sono segnalate pedine del VII secolo e pedine della prima metà del XII e seconda metà del XIII secolo. Gli altri oggetti sono, infatti, decontestualizzati perché rinvenuti in pozzi (Tuscania).

Per gli scacchi, il discorso non varia, anche se si hanno i rinvenimenti effettuati sulla stratificazione dell'XI secolo del vico Iugario, databili al XII-XIII secolo. Tali rinvenimenti saranno importanti per ipotizzare i luoghi dove si svolgevano questi giochi. La rilevanza del dato potrebbe essere confermata anche dai ritrovamenti nel Cicolano (Macchiatimone e Rascino) dove le pedine e gli scacchi sono stati individuati in aree apparentemente prive di edifici e a ridosso delle mura, similmente a quanto già riscontrato per il dado di Montagiano.

II.3 Tipologia morfologica

Le pedine medievali sono di forma circolare ed hanno una tipologia nota almeno dall'età romana imperiale; tipologia che si manterrà fino alla fine del Medioevo. Tra i manufatti laziali ci sono, infatti, le pedine della Crypta Balbi, risalenti alla prima metà del XII ed alla seconda metà del XIII secolo (Fig. 3: 1). Anche al di fuori dell'Italia, i dischetti in osso/corno/avorio, decorati con centri concentrici incisi, si diffusero parallelamente alla cultura romana e pertanto vengono designati come "pedine romane". Esse si trovano anche nei secoli successivi alla fine dell'Impero romano, come nel caso dell'Inghilterra.¹⁷

Per gli scacchi, il discorso è diverso perché il gioco, forse originario della Cina e comunque diffusissimo in India e poi in Persia, sarebbe stato introdotto in Occidente solo dagli Arabi. In Italia,

¹³ Beavit & Christie 1993, 436-450.

¹⁴ Ward-Perkins *et alii* 1973, 131, fig. 36, 66-67.

¹⁵ Maetzke 1988, 399-405.

¹⁶ Dalle Luche & Tesi 1989, 97, fig. 39, 9.

¹⁷ Mac Gregor 1985, 132-141.

tra le prime attestazioni, vi è la lettera di San Pier Damiani a papa Alessandro II, del 1061/1062.¹⁸ In questa lettera si parla di una penitenza inflitta dal Santo ad un vescovo di Firenze, non meglio identificato, a causa della passione di quest'ultimo per il gioco degli scacchi. Anche in paesi lontani dal Mediterraneo, come l'Inghilterra, troviamo scacchi dall'XI secolo, con un tipo di morfologia e di decorazione che spesso risentono ancora dell'origine orientale (motivi islamici ed indiani). Solo nel secolo successivo si assiste ad un allontanamento da tale tipologia, per passare ad esemplari naturalistici, come testimoniano i famosi pezzi in avorio dell'isola di Lewis (XI-XII secolo).

Nel 1985, A. Sanvito ha messo in discussione l'opinione comune secondo la quale gli scacchi avevano, originariamente, forme figurative e che solo con gli Arabi – a causa delle proibizioni del Corano relative al culto della figura – si siano avuti dei pezzi astratti. Infatti, in seguito a nuovi rinvenimenti, si potrebbe ipotizzare che già dall'origine, in ambito orientale, siano esistiti scacchi naturalistici e scacchi di forma astratta e che questi ultimi – per le ragioni religiose prima citate – furono portati in Occidente dagli Arabi.¹⁹

Nella nostra ricerca abbiamo individuato sei elementi (di cui uno a livello di ipotesi), tutti di un periodo compreso tra il XII ed il XVI secolo. Nei casi dei castelli del Cicolano, la datazione non è stata ancora definita con precisione, anche se sembrerebbe essere di fronte ad oggetti tardomedievali. Questi sei pezzi appartengono in maggioranza (cinque su sei) al tipo meno naturalistico, pur essendo attribuiti ad un periodo avanzato. Si potrebbe, quindi, concludere che, nel Lazio medievale, non ci sia stata una divisione cronologica tra tipologia astratta e quella più naturalistica. La differenza, dopo un primo periodo di circa un secolo in cui sembra comparire solo il primo tipo citato, parrebbe di qualità e non di ordine cronologico poiché una fattura accurata indica un prodotto qualitativamente elevato e forse di rappresentanza.

Risulta invece difficile identificare i pezzi raffigurati, ad eccezione di un esemplare della Crypta Balbi, datato alla seconda metà del XVI secolo, che rappresenta in modo naturalistico, anche se non accurato, un cavallo (Fig. 3: 7). Uno degli esemplari, purtroppo frammentario, proveniente dalla stratificazione medievale del vico Iugario, nella sua forma cilindrica con due solchi paralleli alla base, sembra avere stretti legami con i "pedoni" (Fig. 3: 3). Gli altri due pezzi

provenienti dallo stesso sito sono anch'essi frammentari e la loro forma irregolare è scarsamente indicativa. Alla seconda metà del XIV secolo-inizi del XV è datato un cilindretto della Crypta Balbi (Fig. 3: 8), che, probabilmente, apparteneva ad uno scacco: poteva essere parte di un "re" (estremità superiore), come quello ligneo più o meno coevo (XIV secolo) di Colonnata, o un pedone. Notevole è la somiglianza con un pezzo non identificato di Colletière (Fig. 3: 9). Per il manufatto di Rascino (tardo Medioevo), potrebbe invece trattarsi di un alfiere oppure di un cavallo (Fig. 3: 4). Verso la prima ipotesi sembra condurre la presenza di due cordonature sulla protuberanza superiore – ricordo delle zanne degli elefanti che originariamente venivano rappresentati per questo pezzo – mentre, verso l'identificazione con un cavallo, porta la presenza di un'unica protuberanza. L'indecisione nell'attribuzione può essere compresa osservando le somiglianze con il cavallo (Fig. 3: 5) e con l'alfiere (Fig. 3: 6), entrambi provenienti da Colletière.²⁰

a) materiali

Anche i materiali usati per le pedine sono quelli più facilmente reperibili: la ceramica e l'osso. Per quest'ultimo materiale probabilmente si tratta di ossa lunghe di bovino o di equino. Gli esemplari più lussuosi erano invece in avorio. Da Marco Ricci ci è stato ancora una volta gentilmente comunicato il rinvenimento nella Crypta Balbi, a dire il vero eccezionale per tutto il VII secolo, di pedine ed altri oggetti in corno di cervo irlandese. Tale scoperta ha una certa importanza perché sarebbe così testimoniata sia la persistenza di scambi a vasto raggio sia il ruolo di primo piano di Roma, nella produzione di oggetti di lusso. Tra i materiali più pregiati troviamo il vetro: le pedine venivano realizzate *ex novo* oppure rilavorando frammenti di vasellame. A Tuscania, infatti, abbiamo una pedina realizzata appositamente, in vetro blu opaco, a forma di disco con sezione "piano-convessa" (pozzo 2), e quattro pedine (pozzo 1) ricavate dal piede di coppe o ciotole (Fig. 3: 2). Probabilmente, queste pedine non dovevano essere molto rare, anche se sono difficili da trovare per la nota tendenza, in tutte le epoche storiche, a recuperare i frammenti di vetro per abbassare la temperatura di fusione della miscela vetrosa.

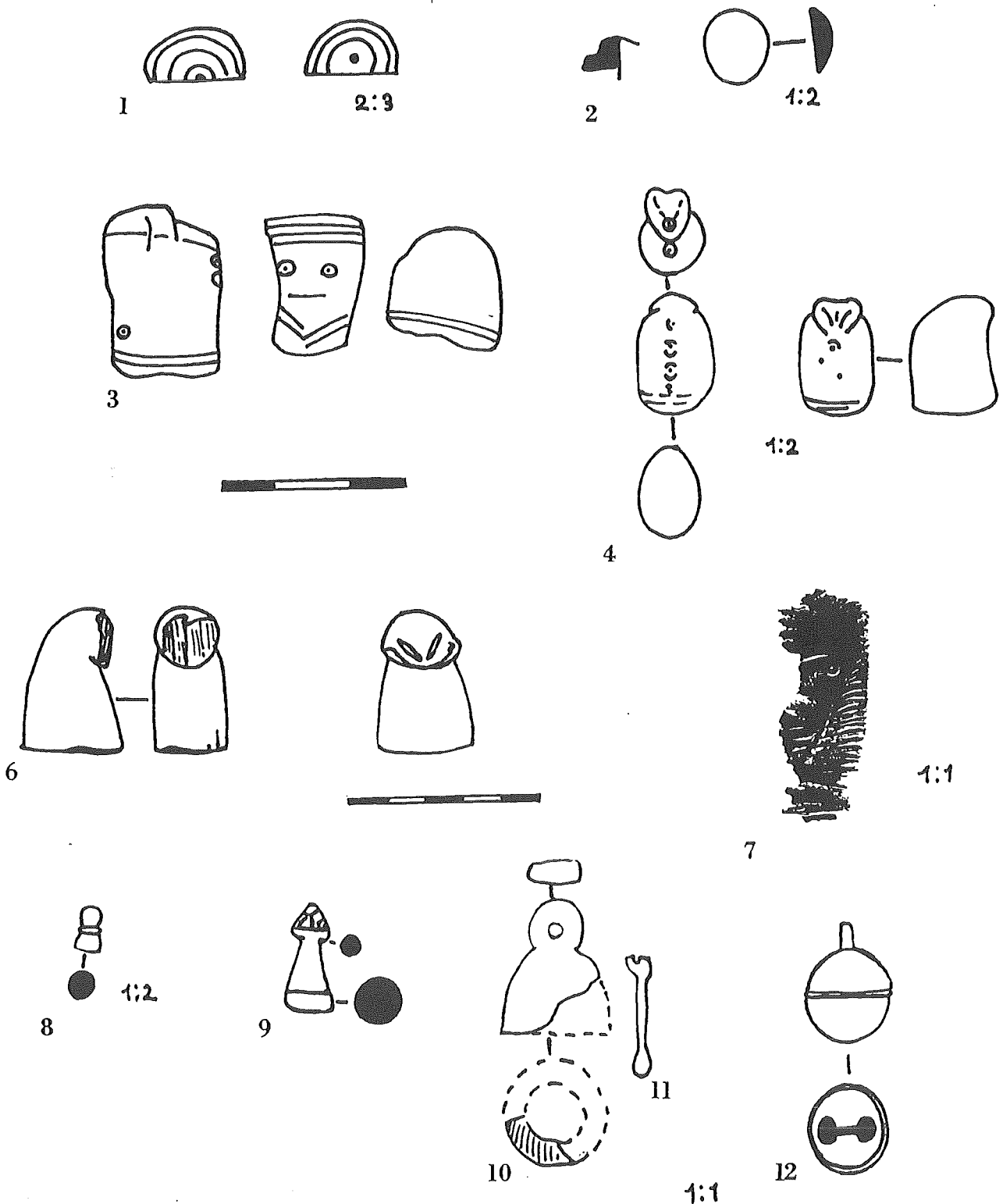
Anche per gli scacchi, il materiale usato non varia di molto rispetto a quello dei dadi perché, al legno dei pezzi di Colletière e della villa Villorosi di Colonnata (Sesto Fiorentino), all'osso/corno degli esemplari da noi esaminati, vanno aggiunti esemplari in avorio (isola di Lewis), sicuramente più raffinati e curati. Il legno, comunque, doveva essere il materiale più usato ma, essendo scarsamente conservabile, ne abbiamo

¹⁸ Chicco *et alii* 1985, 5-6.

¹⁹ Chicco *et alii* 1985, 23-24.

²⁰ Colardelle 1980, 167-269.

Tav. 3. - 1-2. *Pedine*: 1. Roma - *Crypta Balbi* (Sfligiotti 1990), 2. *Tuscania* (Ward Perkins et Alii 1973); 3-9. *Scacchi*: 3. Roma - *Vico Iugario* (Maetzke 1988), 4. *Rascino* (Beavitt, Christie 1993), 5-6, 9. *Colletière* (Colardelle 1980), 7-8. Roma - *Crypta Balbi* (Dalle Luche, Tesi 1989; Sfligiotti 1990); 10. *Campanello*, 11. *Battaglio*, 12. *Sonaglio*: *Tuscania* (Ward Perkins et Alii 1973).



attestazione quasi esclusivamente in campo letterario, come testimonia Petrarca nel “*De remediis utriusque fortunae*” (dial. XXVII).

b) misure

Le pedine da noi esaminate sono tutte di forma

pressoché circolare, con un diametro che si aggira intorno al centimetro/centimetro e mezzo oppure sui 3 cm. Le dimensioni sono indipendenti dal materiale, in quanto il diametro di 3 cm si trova in pedine di osso (*Crypta Balbi*) o di ceramica (*Macchiatimone*) ed il diametro di circa 1,5 cm in pedine di ceramica

(Cencelle) o vetro (Tuscania). Crediamo che le dimensioni dipendano dal tipo di scacchiera utilizzata e dalla disponibilità del materiale e, avendo ravvisato questi due gruppi di dimensioni, è quindi possibile ipotizzare due tipi di scacchiere: una con spazi più piccoli ed una con spazi più grandi. Nei rinvenimenti segnalati per il Lazio medievale, sono più numerose le pedine circolari con un diametro intorno ai 3 cm, come testimoniano i casi dei castelli del Cicolano (in ceramica ed in osso) e le pedine frammentarie della Crypta Balbi (prima metà XII; seconda metà XIII secolo). I diametri delle pedine di età imperiale si aggirano intorno a 1,5 cm-2,5 cm. Esistono, però, esemplari più grandi come la pedina in osso/avorio, forse del IV secolo, proveniente dalle catacombe romane di Priscilla e forse, per le tracce di calce, impiegata come segnacolo su un loculo²¹. Il diametro di 7,2 cm potrebbe anche essere un'eccezione, considerati i valori della maggior parte delle pedine romane e medievali, che si attestano intorno ai 3 cm.

Le misure degli scacchi rinvenuti sono in gran parte inutili per ricostruire le dimensioni reali dei pezzi poiché sono, in gran parte, frammentari. Dai pezzi più completi che abbiamo – il cavallo della Crypta Balbi, della prima metà del XVI-1580 circa, e l'alfiere (?) di Rascino – è attestata l'altezza di circa 4 cm e mezzo. Anche il diametro originario è difficile da stabilire, non tanto per la frammentarietà dei pezzi – perché nei nostri esempi il diametro è completo –, ma perché i pezzi integri avevano sicuramente variazioni di diametro nell'ambito dello stesso oggetto. I valori da noi registrati vanno dal centimetro e mezzo-due centimetri, degli esempi frammentari del vico Iugario, ai 3,4 cm (diametro massimo) del pezzo di Rascino. Inoltre, la mancanza di una canonizzazione delle forme rende più difficile la ricostruzione morfologica dei pezzi.

II.4 Produzione

a) esecuzione

I nostri esemplari risultano essere tutti in osso ad eccezione del caso dubbio (osso/corno) di uno scacco trovato a Rascino, dei pezzi del vico Iugario, di cui non è segnalato il materiale, e delle pedine in vetro da Tuscania.

La realizzazione di pedine e di scacchi richiedeva strumenti complessi come il tornio, soprattutto per le estremità cilindriche di questi ultimi e per i cerchi concentrici delle prime. Nello stesso periodo, esistevano anche delle pedine più semplici, come quella che risulta essere ricavata dalla parete di un boccale in maiolica arcaica (Cencelle, prima metà del XIV secolo) o dai piedi di ciotole e coppe vitree (Tusca-

nia). Con tutta probabilità, quindi, realizzare pedine da gioco poteva essere uno dei modi di reimpiegare i vasi rotti. Come si può immaginare, in particolare per la ceramica, bastava un qualunque materiale abrasivo – anche una semplice pietra – per arrotondare ed allisciare lo spessore di questi dischetti. Le facce superiori ed inferiori risultavano invece essere già pronte perché costituite dalla superficie interna ed esterna del vaso. La ceramica usata poteva essere rivestita (vetrina, maiolica, ingobbio) o nuda; il primo tipo era sicuramente preferito per la decorazione. Non escludiamo l'esistenza di pedine in ceramica realizzate appositamente, con tornio o stampi, pur non avendone attestazioni in scavi laziali. Del resto, esistono anche pedine di vetro realizzate appositamente (Tuscania), forse utilizzando gli stampi così comuni nella produzione del vetro in Italia centrale, a partire dal XIV secolo.

Le pedine e gli scacchi potevano essere ulteriormente rifiniti tramite intagliatura o incisione. Tra i tipi di decorazione rinvenuti più frequentemente, troviamo i cosiddetti "occhi di dado", cioè puntini con centri concentrici, eseguiti con il punzone. Estremamente frequenti sono anche i cerchi concentrici (tre/quattro) sulle facce delle pedine "romane" a forma di disco e, sovrapposti, presso le estremità degli scacchi. Tali decorazioni sono a volte funzionali alla caratterizzazione del pezzo rappresentato dallo scacco – come gli occhi realizzati tramite gli "occhi di dado" (Fig. 3: 7) – oppure sono puramente ornamentali. Un altro elemento ornamentale era sicuramente il colore, come è evidente soprattutto negli esemplari in ceramica (ceramica comune o maiolica arcaica) ed in vetro (blu e verde).

B) luoghi di produzione

Per questi oggetti occorre fare una distinzione: le pedine in osso/avorio, quella in vetro blu da Tuscania e gli scacchi, da una parte, e, dall'altra, le pedine in ceramica ed in vetro, realizzate con frammenti di vasellame.

Nel primo caso non abbiamo attestazioni precise, ma possiamo ipotizzare che la già citata "officina" della Crypta Balbi abbia prodotto, per lungo tempo, anche le pedine in osso/avorio. Infatti, le pedine qui rinvenute presentano la medesima tipologia di quelle di età romana, ancora alla seconda metà del XIII secolo. Essendo inoltre attestati anche due pezzi di scacchi, datati tra la fine del XIV secolo ed il XVI secolo, sembrerebbe esserci stata una continuità, nella zona della Crypta Balbi, di produzione in osso/

²¹ Morey 1936, 51-52.

avorio/corno dall'alto Medioevo sino alla fine di esso. Del resto è ipotizzabile che anche la pedina in vetro blu sia stata realizzata sul posto, dato il rinvenimento di numerose scorie di vetro.²²

Per le pedine in ceramica (Cencelle e Macchia-timone) ed in vetro (Tuscania, pozzo n. 1) da noi prese in esame, non si può parlare di produzione per il commercio, ma, semplicemente, di casi sporadici ed occasionali di riutilizzo, forse anche ad opera degli stessi giocatori, dei recipienti che si rompevano. Erano invece probabilmente prodotte insieme ai vasi e destinate al commercio quelle pedine in ceramica realizzate al tornio o in stampi, non attestate per il Lazio medievale.

Attraverso le fonti sappiamo che, nella Firenze del XV secolo, era comune acquistare scacchi e scacchiere presso i merciai e possiamo pertanto ipotizzare l'esistenza di una analoga rete commerciale, nel Lazio, anche se forse a breve raggio.²³

Avendo dati appartenenti solamente ai secoli XII-XIV, non siamo in possesso della tipologia alto-medievale delle pedine; possiamo però sottolineare la somiglianza, estremamente spiccata, con quelle di età romana. La collezione del British Museum e gli esemplari rinvenuti in diverse province dell'Impero romano testimoniano una diffusione capillare delle pedine con incisioni concentriche, contemporaneamente all'espansione politico-culturale di Roma. Il fenomeno è così evidente che tali pedine vengono definite, in pubblicazioni inglesi, come "tipiche pedine romane" poiché differiscono sostanzialmente da quelle di periodi precedenti e successivi.²⁴

II.5 Tipo di giochi

Le pedine venivano usate come segnaposto in giochi da tavolo tra i quali è attestato soprattutto il "gioco delle tavole" che, come abbiamo visto per i dadi, era praticato sia da adulti che da ragazzi poiché ne esistevano varianti più o meno complesse. Non possiamo escludere l'esistenza di giochi nei quali venivano impiegate le sole pedine ma, secondo le testimonianze letterarie, dovrebbero aver costituito un'eccezione.

Mentre siamo sicure dell'utilizzazione delle pedine sia da parte dei ragazzi che da parte degli adulti, per gli scacchi, siamo di fronte ad un gioco che, per la complessità delle regole, era destinato soprattutto agli adulti.

Da testimonianze letterarie, iconografiche ed archeologiche risulta che i pezzi venivano conservati in sacchetti (stoffa/pelle) o in cassette. Per il secondo caso, ci troviamo in ambiti dove il gioco era praticato regolarmente (osterie, posti di guardia). F. Pratesi,

per Colonnata, ipotizza che la cassetta fosse posta in una nicchia, ricavata nello spessore del muro della torre, dove alloggiavano le guardie.²⁵

Concludiamo la presente sezione segnalando che sugli scacchi, in altri contesti, sono state individuate tracce di colore, probabilmente per distinguere una "squadra" dall'altra oltre che per motivi decorativi. Per gli scacchi che abbiamo esaminato, non sono segnalate tracce di colore né piccole lesioni superficiali, eventualmente causate da vernici. In Europa, i colori usati erano il bianco ed il nero, sostituiti, nei pezzi di pregio, da ebano ed avorio. La stessa cosa, d'altra parte, è attestata anche per le pedine dei giochi da tavolo al fine di distinguere un giocatore dall'altro, visto che questi giochi contemplavano la possibilità di essere praticati anche da più di due persone contemporaneamente. In ambito più quotidiano, si sarà forse sopperito alla medesima necessità utilizzando nella medesima partita pedine anche morfologicamente diverse, sino ad arrivare ai casi di sostituzione delle pedine con piccoli oggetti di tipo "povero" (sassolini, legumi).

II.6 Conclusioni

Tracciando le linee generali di questo capitolo, ci sembra di essere di fronte ad un panorama nettamente diviso in due: le pedine da una parte e gli scacchi dall'altra. Le prime, infatti, avevano nel Medioevo già una lunga tradizione romana alle spalle, ben radicata anche in paesi nei quali la "romanizzazione" fu parziale.

Per gli scacchi, invece, mancando una tradizione precedente, in un primo momento, si sono utilizzate forme geometriche più o meno semplici e non canonizzate e si è poi passati ad una singola forma per ciascun pezzo. Questo riguardò forse un ambito sociale medio-alto nel quale si trovano sempre più spesso, andando avanti con i secoli, vere e proprie mini sculture naturalistiche; per i giochi delle classi più povere, possiamo immaginare scacchi tipologicamente meno canonizzati e qualitativamente meno ricchi (per materia prima e per lavorazione) e pedine di fortuna, anche di materiale e di forma diverse per il medesimo gioco. A quest'ultimo ambito abbiamo ipotizzato di poter attribuire i piedi di coppe vitree ed i dischi di ceramica ricavati da "cocci", sottraendoli alla ricorrente dicitura "oggetti di dubbia utilizza-

²² Ward-Perkins *et alii* 1973, 117.

²³ Chicco *et alii* 1985, 12.

²⁴ Mac Gregor 1985, 132-141.

²⁵ Chicco *et alii* 1985, 19-21.

zione". Con questo vogliamo dire che tali dischetti potrebbero essere stati utilizzati anche (ma non solo) come pedine da gioco.

III Sonagli e campanelli

III.1 Introduzione

In questo capitolo prenderemo in esame due tipi di oggetti, diversi sia per materiale che per forma. Da una parte risultano i sonagli, campanelli a bottone di materiale metallico; dall'altra, le campanelle, aperte e svasate. Congiuntamente alla forma ed al materiale, diversa è anche la funzione, o meglio, l'impiego di questi manufatti.

I "nostri" campanelli sono in bronzo e dieci provengono da ambiti funerari romani (Felicita, piazzale del Verano, Calepodio, S. Sebastiano)²⁶, mentre uno proviene da Tuscania (Fig. 3: 10), come un battagliaio, forse pertinente allo stesso campanello (Fig. 3: 11)²⁷. Per sonagli, intendiamo dei globetti cavi di bronzo, rame o altro metallo, con due fori collegati da una fessura, contenenti una piccola sfera di ferro – o di altro metallo – che urtando contro le pareti tintinna. Tra di essi, abbiamo potuto analizzare nove "campanelli-bottoni" in bronzo della Crypta Balbi²⁸ – da contesti che vanno dalla prima metà del XIII alla prima metà del XV secolo; due "bubboli" tardo-medievali in bronzo dal pozzo n. 2 di Tuscania (Fig. 3: 12)²⁹ e un "sonaglio" di rame dalla discarica di Castelnuovo di Porto (XV-XVIII secolo). Come si può vedere c'è ancora molta disparità nei nomi usati per designare tali manufatti, indice anche di una difficoltà nella definizione d'uso.

III.2 Luoghi di ritrovamento

a) tipo di abitato

Roma, con la Crypta Balbi e le aree funerarie suburbane già citate, un castello della campagna romana (Castelnuovo di Porto) ed un centro del Viterbese (Tuscania) sono i nostri unici siti segnalati. Resta solo da sottolineare il ruolo, come abbiamo già visto più volte, eccezionale del centro romano che presenta un'impressionante continuità di ritrovamenti anche di oggetti diversi.

b) localizzazione nell'abitato

Ancora una volta i nostri oggetti sono stati rinvenuti in strati di abbandono o in pozzi/discariche (Tuscania, Castelnuovo di Porto) e risultano pertanto poco indicativi per identificare i luoghi da cui provenivano. A tale situazione è da aggiungere il contesto

funerario (IV secolo) che, però, presenta gli stessi limiti sopra citati per i rinvenimenti decontestualizzati. Come nei casi di Tuscania e di Castelnuovo di Porto, infatti, essi testimoniano semplicemente la presenza di tali oggetti da gioco nell'ambito della vita quotidiana; per la Crypta, invece, si può forse parlare di produzione.

III.3 Morfologia e caratteristiche

Abbiamo già dato la definizione di sonagli e vogliamo sottolineare che quelli da noi esaminati risultano rispondere perfettamente a tale definizione e sono molto simili tra di loro. Le diversità attengono esclusivamente alla presenza o meno di una fascetta di metallo in corrispondenza della giuntura delle due valve – fascetta che si potrebbe essere persa con il tempo – ed alle dimensioni dell'appicagnolo. Infatti, i due esemplari di Tuscania (uno è frammentario) si differenziano solo per l'appicagnolo che, nel pezzo intero, misura circa mezzo centimetro, mentre, nell'esemplare frammentario, raggiunge solo i tre millimetri. Tale diversità non parrebbe dipendere dallo stato di conservazione poiché anche la forma è diversa: più squadrata nel primo esemplare, più arrotondata nel secondo. Risulta particolare anche la valva inferiore del sonaglio di Castelnuovo di Porto, dove la fessura, generalmente compresa tra due fori, è sostituita da un terzo foro. Tale espediente per migliorare il suono ha una morfologia che sembrerebbe simile ai sonagli contemporanei, a cui si aggiunge la datazione più tarda (tra XV e XVIII secolo).

I campanelli ed i sonagli ("crepundia") sono noti sin dall'età romana, quando erano soprattutto figurine in terracotta, con sassolini all'interno, cerchi con anelli metallici attaccati o semplici campanelle con battagliaio. Di questo tipo di oggetti abbiamo solo i campanelli bronzei, datati al IV secolo, ritrovati in contesti funerari romani e quello di Tuscania, unico tra i campanelli tardo-medievali. La forma di quelli di IV secolo è a calotta, mentre l'esemplare di Tuscania ha una forma allungata, più simile a quella delle campane medievali. Sembrerebbe, quindi, che i campanelli, pur avendo un'origine almeno di età romana, fossero rari nel tardo Medioevo, quando potrebbero essere stati utilizzati materiali (ceramica) o forme, diversi. Infatti, quasi tutti i nostri esemplari sono

²⁶ Salvetti 1978, 117-118.

²⁷ Ward-Perkins *et alii* 1973, 135, fig. 38, 1-2.

²⁸ Sfligiotti 1990, 46, tav. LXXXII, 748.

²⁹ Ward-Perkins *et alii* 1973, 135, fig. 38, 3-4.

sonagli e presentano una tipologia che, essendo molto simile, potremmo definire tardomedievale, visto che, indipendentemente dal metallo usato, le medesime forme sono attestate almeno dal XIII secolo sino ad oggi.

a) materiali

I sonagli sono di bronzo (Crypta Balbi e Tuscania), con l'unica eccezione di quello proveniente da Castelnuovo di Porto, in rame, che è di datazione più tarda (tra XV e XVIII secolo).

Per i campanelli il discorso non varia poiché il bronzo viene usato sia per la calotta che per il battaglio, nell'esemplare di Tuscania, e forse anche per i campanelli delle catacombe romane.

b) misure

I sonagli hanno diametri che vanno da 1,5 cm ai 2 cm, con una maggiore attestazione intorno al centimetro e mezzo (Tuscania). La quasi identità delle misure è legata al fatto che questi oggetti venivano prodotti in serie e che, probabilmente, se ne utilizzavano più di uno per volta. La misura di 2 cm è attestata per l'esemplare di Castelnuovo di Porto che, come abbiamo visto, presenta numerose diversità rispetto agli altri esemplari laziali.

Per i campanelli siamo in possesso delle sole dimensioni del manufatto di Tuscania che ha un'altezza di circa 2,5 cm ed un diametro intorno ai 2 cm.

III.4 Produzione

a) esecuzione

I sonagli da noi esaminati sono tutti composti da due valve, pressoché emisferiche, sicuramente eseguite a stampo. La calotta inferiore presenta una fessura con alle estremità due piccoli fori circolari. Tale accorgimento serviva (e serve tuttora) a rendere migliore il suono del sonaglio stesso. La calotta superiore è caratterizzata dalla presenza dell'appicagnolo di cui si parlerà nel paragrafo dedicato al tipo di giochi svolti con questi oggetti. Esso era realizzato con una sottile fascia di metallo, le cui estremità appuntite venivano fatte passare attraverso due fori praticati nella calotta superiore e venivano, poi, appiattite lungo le pareti interne della stessa. Prima della saldatura delle due valve, veniva posta, all'interno della sfera, una pallina di metallo. Generalmente, infatti, si preferiva realizzare una pallina di metallo perché il suono, metallo contro metallo, fosse più squillante e forse per evitare rapidi danneggiamenti da usura – come con palline di terracotta –. Nel caso della Crypta Balbi si usavano sferette di ferro. Un elemento non indispensabile, ma presente sull'esemplare intero di

Tuscania, era una fascetta di metallo posta in corrispondenza dell'attaccatura delle due valve, forse per rafforzarla e per coprirla.

Un discorso a parte merita la campanella di Tuscania che avrà reso necessaria una lavorazione più complessa: alla probabile fusione in stampo seguiva l'attaccatura del piccolo battaglio, anch'esso eseguito in metallo.

b) luoghi di produzione

Abbiamo già ipotizzato, nel paragrafo sui luoghi di rinvenimento, la possibilità che i nove sonagli trovati nella Crypta Balbi appartenessero alla produzione dell'officina – o officine? – che si trovava in quell'area e che si occupava della lavorazione di osso/avorio/corno e probabilmente del metallo. Non possiamo, per ora, essere più precise né ipotizzare l'entità di un eventuale commercio.

III.5 Tipo di giochi

La presenza dell'appicagnolo ci fa ritenere che tali sonagli non costituissero di per loro un oggetto da gioco, ma che fosse necessario un elemento di sostegno. In questo senso crediamo sia opportuno parlare di oggetto facente parte di un giocattolo. La questione dell'utilizzazione di tali sonagli è ulteriormente complicata dal fatto che, con tutta probabilità, non sempre essi venivano utilizzati per giocattoli: è, infatti, attestato l'uso come bottoni³⁰ e di cucirli sui cappelli e sui vestiti dei giullari per attirare l'attenzione e per provocare il riso.

Tra i possibili usi nei giocattoli, ricordiamo il cerchio e la girandola, ambedue i casi attestati iconograficamente nel quadro di Bruegel il Vecchio "Giochi di bambini". Per il primo giocattolo si tratta di un'asta, tenuta orizzontalmente, alla cui estremità anteriore è attaccato un bastoncino con due alette quadrate; correndo, le alette ruotavano. Questa struttura fondamentale poteva essere abbellita da sagome di uccellini o da, appunto, i nostri sonagli.³¹ Sempre nel dipinto del XVI secolo, si può osservare il gioco del cerchio, posto perpendicolarmente al terreno e fatto avanzare tramite un bastoncino. Entrambe le parti di questo gioco erano realizzate in legno/giunco e, per questo, non sono attestate negli scavi. Sono stati rinvenuti invece i sonagli che potevano adornare il gioco, assicurandogli, al contempo, un accompagnamento sonoro. Anche in questo caso siamo di

³⁰ Sfligiottu 1990, 546.

³¹ Guarducci 1986, 68.

fronte ad un giocattolo di per sé "concluso" che poteva essere adornato dai sonagli che erano, quindi, un "optional".

Non escludiamo la possibilità che, a somiglianza dell'età romana, i sonagli fossero utilizzati per i neonati, confermando l'impressione che essi, quando erano impiegati nei giochi, fossero destinati soprattutto a far divertire bambini piuttosto piccoli. Come del resto ai bambini sembrerebbero destinati i campanelli, probabilmente agitati per essi dagli adulti o dai fratelli maggiori, dato il materiale fragile (ceramica) o duro (metallo) di tali manufatti. Per gli stessi campanelli fu sicuramente presente la credenza superstiziosa, poi entrata nella religione cristiana, che allontanassero, con il suono, le forze del Male. Ancora oggi, infatti, non è raro che il suono di campanelli accompagni processioni religiose, come nel caso di Acquapendente.

III.6 Conclusioni

Con i sonagli ci troviamo in un contesto ludico completamente diverso da quelli precedenti: risulta infatti più arduo classificare tali giochi; la fascia d'età alla quale erano in prevalenza indirizzati sembrerebbe essere la prima infanzia; non costituiscono di per sé stessi dei giocattoli. Infatti, innanzi tutto, l'unico elemento comune nella varietà delle possibili utilizzazioni di essi è costituito dall'elemento sonoro che doveva contribuire a coinvolgere il bambino anche con l'udito. Tale caratteristica ci rimanda al mondo della prima infanzia, quando per calmare o distrarre il neonato si è tuttora soliti utilizzare sonagli. Ovviamente, ciò non toglie che il medesimo suono potesse essere utilizzato per altri scopi (vd. giullari). Infine, la diversità sta nel fatto che essi costituiscono, non tanto parte di un gioco (come pedine e dadi), ma degli accessori per giocattoli, al pari di un elemento decorativo che aveva, però, una propria e ben precisa funzione sonora.

IV Bambole

IV.1 Introduzione

Quello con le bambole era un gioco, com'è noto, praticato da tempi remoti, come le testimonianze delle civiltà passate hanno mostrato. Quelle erano rappresentate per lo più da esemplari snodati. Di questa tipologia, nota segnatamente per le bambole greco-romane, abbiamo attestazioni anche in età tarda e nel Medioevo.

Vanno innanzitutto sottolineate l'esiguità dei ritrovamenti e una duplice limitazione di questi sia da un

punto di vista temporale – rimontano tutti ad un periodo alto (IV-VII sec. d.C.) – sia per quanto riguarda la distribuzione nel territorio – essendo stati i medesimi rinvenuti solo nella città di Roma.

IV.2 Luoghi di ritrovamento (Tav. 2)

a) tipo di abitato

Per quanto riguarda l'ambito laziale, i rinvenimenti a tutt'oggi sono stati registrati nella sola città di Roma. I contesti di ritrovamento, purtroppo non numerosi, sono sostanzialmente di due tipi: quelli funerari, cristiani e non, sia subdiali (sarcofago di S. Sebastiano), sia ipogeici (catacombe di S. Agnese, di Trasona, etc.), ascrivibili tutti al IV sec. d.C., mentre per i secoli immediatamente successivi le uniche testimonianze ci sono offerte dai ritrovamenti del Palatino (IV-V sec. d.C.) e della Crypta Balbi (VII sec. d.C.).

b) ubicazione all'interno dell'abitato

Abbiamo già detto che alcune bambole furono trovate nei loculi dei cimiteri cristiani di Roma. Il rinvenimento di alcune bamboline infisse nella calce presso le tombe dei fanciulli si spiega con la funzione di *signacula*, poichè poste per segnalare la presenza di bambini. Com'è noto, nella calce fresca dei loculi si usava affondare oggetti di vario tipo, monete, gioielli, ma più spesso oggetti particolarmente cari al defunto, e quando si trattava di bambini, quelli non potevano che essere i loro giochi, come appunto le bambole. Essi, peraltro, dovevano facilitare il riconoscimento del sepolcro dei propri cari all'interno delle numerose gallerie delle catacombe.

Un'altra bambola è stata rinvenuta in ambito funerario non ipogeico, cioè in un sarcofago intatto scoperto nel 1939 sul fianco sinistro della basilica di S. Sebastiano sull'Appia.

Ancora in ambito sepolcrale subdiale altro rinvenimento di un certo interesse è costituito dalle due bambole eburnee appartenenti al ricco corredo di accompagnamento della sposa di Onorio, nonchè figlia di Stilicone, Maria, morta verso il 398 d.C. (Fig. 4: 1-2)³². Questo rientra nel diritto riservato alle fanciulle nubili dell'antichità classica di conservare le proprie bambole da cui avrebbero dovuto dividersi alla vigilia delle nozze, offrendole alla divinità. La tomba di Maria, venuta alla luce nella metà del XVI sec., durante i lavori nella Basilica Vaticana, faceva parte del mausoleo eretto per Teodosio ed Onorio e per i membri della famiglia imperiale.

³² Boldetti 1720, tav. 496 e Salza Prini Ricotti 1995, 58-59.

Scavi sul Palatino hanno invece reso noti quattordici frammenti ceramici pertinenti a delle bambole, nel settore N/E, nelle adiacenze dello scarico di una *domus*, risalente ad un periodo compreso tra il secondo quarto del IV sec. e la prima metà del secolo successivo. Questi frammenti costituiscono il *trait d'union* tra le bamboline da contesti funerari e quella di età altomedievale rinvenuta nella Crypta Balbi. Questi ritrovamenti rivestono un ruolo particolare perchè pertinenti ad un ambito artigianale, identificato attraverso evidenze dirette quali scarti di lavorazione e strumenti per l'esecuzione di oggetti in osso.

IV.3 Tipologia morfologica

La tipologia delle bambole individuate appartiene a quella delle bambole snodabili, già largamente nota per l'antichità classica, di cui riprendono lo stesso tipo di articolazione realizzata con dei perni che consentivano il movimento ai quattro arti. Trattasi di pupattole con le membra unite da articolazioni al busto, in genere figure nude ritte in piedi. Ma queste potevano essere rappresentate anche vestite, come è stato ipotizzato per la bambola eburnea rinvenuta nel sarcofago di S. Sebastiano, sulla quale sarebbero stati individuati i resti di una veste aurea; ma non è da escludere che quei segni fossero i resti di una sorta di sudario che avvolgeva la defunta.³³

L'articolazione e i materiali utilizzati, quali l'osso e l'avorio, per loro natura abbastanza resistenti, indicano con una certa sicurezza la destinazione ludica.

La resa delle bambole esaminate è alquanto schematica sia nel viso sia nel busto; scarse sono infatti le notazioni di superficie. Come tutte le bambole antiche anche quelle di età tarda non rappresentano bambine, bensì giovani donne.

a) materiale

Le più antiche bambole, come del resto altri giocattoli, furono eseguiti in terracotta e in osso, materie più resistenti del legno all'azione dissolvente della terra e dell'umidità. Mentre in Grecia aveva trovato largo uso la terracotta, nell'antica Roma i materiali utilizzati di preferenza per la realizzazione di tali manufatti ludici erano l'osso e l'avorio. Non doveva essere estraneo neanche il legno, che però all'infuori di casi eccezionali non sopravvive alle ingiurie del tempo. Per alcuni esemplari ritenuti lignei si è invece visto che erano realizzati in avorio, come la già citata

bambola di S. Sebastiano, erroneamente ritenuta d'ebano a causa del colore scuro che invece l'avorio tende ad assumere col passare del tempo. E' inoltre possibile che il colore originario fosse bruno, ottenuto con bagni di sostanze particolari.³⁴

Quanto alle testimonianze di bambole in terracotta, le uniche note per il Lazio sono costituite dai frammenti provenienti dal Palatino.

b) misure

Occorre precisare innanzitutto che le poche bambole note mancano degli arti inferiori e del capo; perciò le misure rilevate sono chiaramente parziali. L'altezza originaria doveva aggirarsi sui 15 cm. ca., se si considera che i busti residui misurano ca. 10 cm.

IV.4 Produzione

a) esecuzione

Non potendo certo limitare il lavoro ad un mero catalogo, si è ritenuto doveroso rivolgere la giusta attenzione agli aspetti propriamente tecnologici, quindi al tipo di lavorazione, agli strumenti utilizzati, al fine di ricostruire i processi di produzione di queste bambole. In quest'ottica vanno denunciate talune lacune nella trattazione di oggetti per il gioco, generalmente relegati nel capitolo dei *varia*, dei quali si fornisce una descrizione alquanto sommaria, senza prestare attenzione ai particolari della lavorazione e alle dimensioni. Il tutto complicato poi da apparati grafici e/o fotografici, quando ci sono, tutt'altro che esaustivi.

Ipotizziamo che la prima fase di lavoro consistesse nel realizzare il busto comprensivo di testa, mentre a parte venissero modellati gli arti che poi sarebbero stati agganciati per mezzo di perni o di fili metallici o di cordoncini (noti, questi ultimi, per la bambola di età romana rinvenuta a Grottarossa)³⁵.

I perni e i legamenti dovevano garantire la mobilità. L'esistenza dei perni è evincibile dai fori presenti nel busto delle bambole, sia nella parte superiore per le braccia, sia nella parte inferiore per le gambe, poichè per le bambole rinvenute a Roma non è stata trovata traccia di elementi che ne consentissero l'articolazione³⁶. E' stato inoltre osservato che a differenza di quelle romane (basti il noto esempio di Creperia Tryphena), le bambole esaminate non hanno l'articolazione di braccia / gomiti e gambe / ginocchia. Questo discorso non va

³³ Bordenache Battaglia 1983, 116.

³⁴ Bordenache Battaglia 1983, 115.

³⁵ Bordenache Battaglia 1983, 134.

³⁶ L'unica testimonianza relativa ai legamenti è quella della bambola di Maria raffigurata nella tav. 496 pubblicata in Boldetti 1720.

assolutamente generalizzato, dal momento che di alcune di queste bambole non si sono conservati tutti e quattro gli arti.

Non è da escludere la presenza di colore – di cui l'umidità delle tombe avrebbe impedito la conservazione – su alcuni particolari di queste bambole tarde, situazione nota sempre in ambito romano per la bambola della vergine Cossinia.

Gli strumenti utilizzati erano quelli propri della lavorazione del materiale prescelto (osso, avorio, etc.): il trapano, ad es., doveva essere utilizzato per l'ombelico segnato da un foro (bambola della Crypta).

Disponiamo di qualche elemento in più sulla resa e quindi sulla esecuzione della capigliatura di una delle bambole, quella proveniente dal cimitero di S. Agnese, per cui l'editore³⁷ si sofferma a dire che i capelli erano segnati da tratteggi e da incisioni, mentre un foro ottenuto col trapano indicava l'ombelico.

Per quanto concerne la lavorazione delle bambole in ceramica del Palatino, l'editore non fornisce informazioni in merito.³⁸ Ignoriamo, quindi, se quelle fossero state ottenute a matrice, almeno per il busto, ovvero se modellate manualmente.

b) luoghi di produzione

Detti manufatti erano prodotti da *ateliers* che si occupavano della produzione di vari tipi di oggetti, non esclusivamente di giocattoli, poichè ci parrebbe difficile credere che una bottega potesse sostenere un'attività economica alimentando una produzione destinata a soddisfare una fetta di mercato alquanto ristretta quale poteva essere quella infantile. Questo poi è inequivocabilmente suffragato da evidenze dirette quali gli scarti di lavorazione pertinenti a diverse categorie di oggetti (Crypta Balbi).

IV.5 Conclusioni

Abbiamo quindi avuto modo di constatare che, nonostante si presuma che le bambole fossero abbastanza comuni, stando per lo meno a quanto riportano le fonti, i casi noti per il Lazio sono di numero irrisorio e, forse eccetto per il caso del Palatino e della Crypta, non inquadrabili in un contesto di vita quotidiana.

Dal confronto con le età precedenti, segnatamente quella romana, parrebbe legittimo esprimersi in termini di continuità, limitatamente alle bambole esaminate in questa sede. E' opportuno tuttavia sottolineare che nelle bambole romane l'imitazione delle forme muliebri è migliore di quelle di età tarda, nelle quali la resa appare meno fine e accurata. Dal punto di vista propriamente funzionale, come in età romana, anche nelle età successive, la bambola era un

giocattolo. Oltre all'originaria funzione ludica, è stato peraltro evidenziato il riuso di alcune bambole o come oggetti di corredo funerario di giovani spose o come tristi segnalatori di sepolcri di bambini

E' da sottolineare l'importanza del ritrovamento della Crypta, prima di tutto sotto il profilo cronologico, perchè parrebbe essere la bambola di età più bassa nel panorama laziale. L'altro motivo che rende il rinvenimento di indubbio interesse è dato dal contesto di tipo artigianale, cioè l'ambito di una bottega specializzata nella produzione di oggetti in osso, tra cui figurano anche manufatti di chiara destinazione ludica, quali bambole e pedine. Sull'importanza dell'ubicazione di un'officina nel centro storico di Roma ci si è già soffermati nelle pagine precedenti.

Possiamo quindi fare delle valutazioni in merito all'età tardoantica e altomedievale sulla base degli scarsi reperti appartenenti alla categoria delle bambole. In ragione dell'assenza di attestazioni in età medievale piena³⁹ è ragionevole pensare all'esistenza di bambole realizzate in materiali deperibili, quali stoffa, paglia, fibre vegetali, che per la loro natura erano inesorabilmente destinate a non lasciarci alcuna traccia. Per la loro modestia dovevano essere economicamente accessibili a tutti. Queste bambole "povere" sono testimoniate dal celebre quadro di P. Bruegel il Vecchio, "Giochi di bambini" (1560, Wien, Kunsthistorisches Museum). Ma queste bambole erano destinate anche ai rampolli dei ceti sociali più elevati, o forse per questi esistevano dei manufatti più elaborati? Al momento per il Lazio medievale non è possibile andare oltre il campo delle congetture.

V Statuine e fischietti

V.1 Introduzione

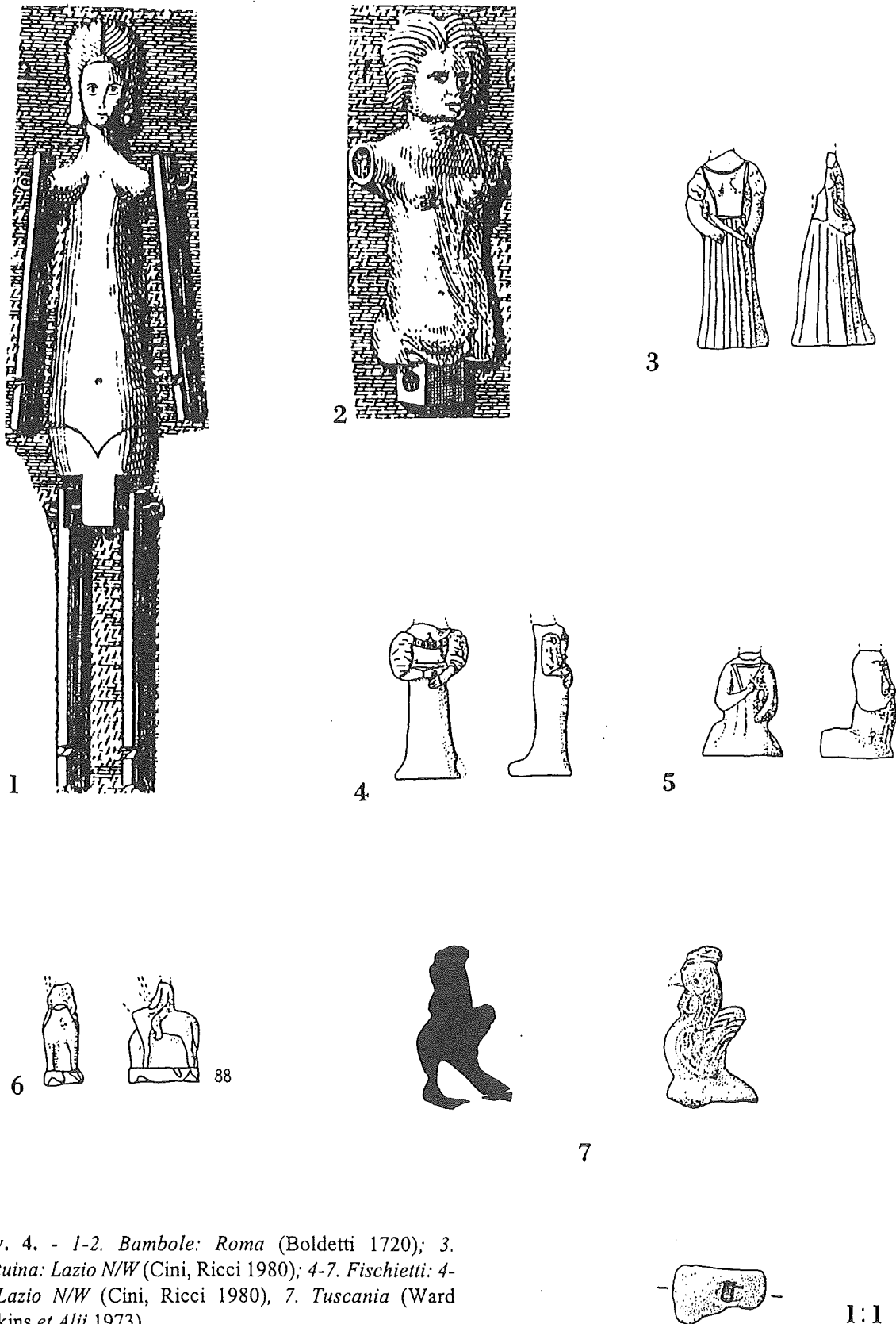
In questo capitolo verranno presi in esame assieme le statuine e i fischietti perchè, pur destinati ad attività ludiche differenti, risultano assimilabili dal punto di vista morfologico e provengono per lo più dalle stesse aree.

Le statuine sono dei manufatti in terracotta di dimensioni miniaturistiche riproducenti figure umane e animali riferibili a piena e bassa età medievale, destinate ad un gioco "mimetico" quale poteva essere quello delle bambole.

³⁷ Salvetti 1978, 109-110.

³⁸ Hostetter *et alii* 1991, 51-52.

³⁹ Per il basso Medioevo è attestata l'esistenza di piccoli bambolotti in terracotta in varie parti d'Italia.



Tav. 4. - 1-2. Bambole: Roma (Boldetti 1720); 3. Statuina: Lazio N/W (Cini, Ricci 1980); 4-7. Fischietti: 4-6. Lazio N/W (Cini, Ricci 1980), 7. Tuscania (Ward Perkins et Alii 1973).

Per quanto riguarda invece i fischietti, trattasi di oggetti in terracotta provvisti di un'apertura per soffiarvi all'interno, cioè dei giocattoli sonori. Le attestazioni sono numerose in Emilia Romagna, in

Umbria e in Lazio. Ma erano abbastanza noti anche in Europa in età medievale, specialmente quelli zoomorfi.

V.2 Luoghi di ritrovamento (tavv. I e II)

a) tipo di abitato

Gli scavi archeologici hanno restituito per il Lazio un numero esiguo di statuine: provengono da centri minori dell'Alto Lazio, quali Tuscania e Farnese. Anche i fischietti sono attestati, eccetto un caso a Roma, nell'Alto Lazio, in centri come Viterbo – dove sono tuttora prodotti –,⁴⁰ Tuscania,⁴¹ Leprignano, che ha reso note le testimonianze più tarde, risalenti cioè all'inizio del XVII sec. e qui citati come testimonianza di una tradizione tutt'altro che esaurita dopo l'età di mezzo.

b) ubicazione all'interno dell'abitato

In generale i contesti di ritrovamento sono assai poco significativi dal punto di vista stratigrafico e quindi cronologico, in quanto si tratta di "butti" o pozzi.

Per quanto riguarda Tuscania⁴² alcuni esemplari sono stati rinvenuti nel corso dello scavo del pozzo n.2 (il *terminus post quem* parrebbe essere il XIV sec.).

Anche il caso di Farnese non è particolarmente significativo, dal momento che il contesto di rinvenimento è un pozzo⁴³. E non fa eccezione neanche Cava delle Sparme (Farnese), i cui reperti sono venuti alla luce dallo scavo di una discarica.

Quanto ai fischietti, a Roma ne è stato trovato uno nella Crypta Balbi risalente ad un periodo abbastanza avanzato, cioè fine XV-prima metà XVI sec.:⁴⁴ il rinvenimento è avvenuto in uno strato assai poco significativo quale può essere quello di uno scarico. Anche a Leprignano il contesto di ritrovamento è quello di un "mondezzaro" all'interno del borgo⁴⁵. E da Tuscania due esemplari provengono dal pozzo n.2. Ma è una collezione antiquaria privata che offre i rinvenimenti più consistenti: di questi gli editori⁴⁶ indicano come area di provenienza il Lazio N-W, non potendo, per le ragioni che una simile raccolta lascia supporre, precisare meglio la provenienza.

V.3 Tipologia morfologica

Sia statuine sia fischietti sono riconducibili sostanzialmente a due categorie tipologiche: statuine di figure umane, per lo più maschili, e statuine di animali. La tipologia di alcune forme risale ad età

antica: si ha infatti notizia di figurine animali in ceramica a Roma, ma non conosciamo fischietti da contesti sicuri. Le statuine antropomorfe maschili sono rappresentate da cavalieri – tipologia comune anche a degli esemplari rinvenuti in Polonia sempre di piena età medievale (XIII-XIV sec.) e sempre di terracotta. Da Tuscania proviene una statuina maschile di cui residua solo il torso, raffigurata con le mani sull'addome, tipologia, questa, frequentemente riconoscibile tra le statuine fischietto femminili del Lazio.

Quanto alle statuine femminili, queste sono rappresentate ritte e riccamente panneggiate (Fig. 4: 3). Uno dei pochi esemplari superstiti proviene dal pozzo n. 2 di Tuscania: è una statuina acefala, con abito lungo, stante su una solida base.⁴⁷

All'altra tipologia individuata appartengono figurine rappresentanti animali domestici, quali cavalli (Farnese) e galletti, riprendendo una tradizione già attestata per l'età romana.

Per i fischietti è valida la stessa distinzione operata per le statuine: sono note sia figurine antropomorfe (tra cui donne, cavalieri, ecclesiastici) sia zoomorfe, ancora cavalli e galletti.

Tra i fischietti antropomorfi femminili sono presenti in quasi tutti i contesti analizzati numerose figurine che indossano delle vesti panneggiate con le mani sul ventre (gravidanza o valenza apotropaica?) di cui si ha testimonianza anche in Toscana⁴⁸ (Fig. 4: 4-5). Tra i fischietti di figure femminili, è presente anche una figura di orante (Valentano, inedita). Le figure maschili rappresentano segnatamente cavalieri (Fig. 4: 6). Per quanto concerne i fischietti zoomorfi, tra questi si segnalano cavalli e galletti. Per tipi come il galletto è stata riconosciuta la somiglianza con quelli conservati nel Museo di Mainz (Römisches-Germanisches Zentralmuseum).⁴⁹ Da Tuscania proviene un galletto su una base recante lo strumento sonoro modellato a mano (Fig. 4:7). Tutti i fischietti, sia antropomorfi sia zoomorfi, presentavano generalmente una base ingrossata nella quale era sistemato il fischio. A volte tuttavia nei cavallini il fischio era collocato nella coda. Esempi di fischietti a forma di uccello sono noti e tuttora prodotti in Provenza, per i quali però era previsto l'inserimento dell'acqua che, mista alla forza dell'aria, doveva produrre un suono simile al verso degli uccelli.⁵⁰

⁴⁰ La tradizione dei fischietti è attualmente viva anche in Italia meridionale.

⁴¹ Ricci-Portoghesi 1972, 226, foto n. 3.

⁴² Ward-Perkins *et alii* 1973, 151, fig. 46, 13 e fig. 47, 14.

⁴³ AA.VV. 1991, 57, fig. 87.

⁴⁴ Dalle Luche & Tesi 1989, 98, fig. 39, 8.

⁴⁵ Bocconi & Messineo 1995, 64-65.

⁴⁶ Cini & Ricci 1980, 522.

⁴⁷ Ward-Perkins *et alii* 1973, fig. 47, 14.

⁴⁸ Francovich 1982, 255.

⁴⁹ Salza Prini Ricotti 1995, 26, fig. 14.

⁵⁰ Thiriotti 1981, 59 ss.

a) misure

Va innanzitutto osservato che gli esemplari noti non sono purtroppo integri e che non per tutti sono state indicate le dimensioni. Le altezze residue dei cavallini di Farnese e Cava delle Sparme, le uniche note, oscillano sui 6 cm. ca. Quanto ai fischietti, quelli antropomorfi, spesso acefali, raggiungono l'altezza di 10 cm., quelli integri a forma di galletto arrivano a 8 cm.

*V.4 Produzione**a) esecuzione*

Per realizzare sia statuine sia fischietti si modellava manualmente l'argilla o la si spianava in uno o due stampi (fischietto della Crypta Balbi) – di ceramica o altro materiale –, dopodichè si procedeva alla fase di cottura. Nel caso di modellazione a mano, questa doveva essere completata da una rifinitura a stecca, che comunque poteva essere contemplata anche nella esecuzione a matrice per una migliore definizione dei contorni. Per quanto concerne i fischietti i due tipi di modellazione suddetti riguardavano solo la rappresentazione plastica del fischietto, perchè la parte strumentale prevedeva una modellazione a mano. Nella parte posteriore della figurina veniva sistemato un fischietto d'argilla, sfruttando come camera di risonanza l'interno cavo; l'aria usciva da un'apertura praticata nella base o all'altra estremità della statuina. La parte propriamente strumentale era costituita da un condotto che portava l'aria verso un'apertura obliqua. L'artigiano che praticava detta apertura doveva avere una certa abilità, perchè il funzionamento del giocattolo dipendeva esclusivamente da quest'operazione; l'apertura doveva infatti avere una determinata inclinazione verso la cavità di risonanza.⁵¹

Sia statuine sia fischietti potevano essere ingobbiate (fischietto di Valentano), invetriati, smaltati (statuina di Farnese)⁵² oppure ricevere un trattamento di colorazione a freddo (Toscana e Leprignano), in certi casi utile per sottolineare certi dettagli.

Il ricorrere di medesime dimensioni e forme conforterebbe l'ipotesi di una produzione di questi manufatti eseguita in serie. Questo tipo di lavorazione poteva essere favorita dall'ausilio delle matrici che doveva assicurare un ritmo produttivo più rapido. Peraltro l'uso di matrici consentiva una resa migliore nella raffigurazione.

b) centri di produzione

Allo stato attuale delle ricerche potremmo ipotizzare solo a Toscana, per le statuine, un centro di produzione, sulla base del ritrovamento della statuina maschile che nella parte tergale non appare finita.

Quanto ai fischietti (ma questo potrebbe essere ipotizzato anche per le statuine), in base ai dati a nostra disposizione, in assenza di evidenze dirette come gli scarti di lavorazione, non abbiamo avuto la possibilità di evidenziare alcun centro di produzione. Inoltre non trattandosi di beni di prima necessità, ci riesce difficile ipotizzare l'esistenza di artigiani e botteghe specializzati esclusivamente nella produzione di simili manufatti. Ci sembra ragionevole pensare che le officine ceramiche riservassero una parte della loro attività alla produzione di statuine e fischietti, per relizzare i quali ci si avvaleva delle conoscenze tecniche che un ceramista possedeva.

V.5 Conclusioni

Per quanto concerne il Lazio, allo stato attuale delle nostre conoscenze, mancano testimonianze di statuine e fischietti relativi ad età tardoantica e alto-medievale. Abbiamo avuto occasione di constatare che i fischietti erano molto diffusi in età medievale e segnatamente in quella bassomedievale dal punto di vista geografico. La fortuna di cui dovettero godere doveva essere favorita dalla presenza dell'elemento sonoro: il richiamare l'attenzione con i rumori è tipico dei giochi infantili.

La produzione standardizzata ipotizzata per questi giocattoli doveva consentirne un'ampia diffusione e un costo più che ragionevole, diffusione favorita altresì dalla scarsità generale di giocattoli allora disponibili per i più piccoli.

Conclusioni

Col presente capitolo non si intende nè riassumere nè dar senso ai dati esposti, perchè ciò è già stato fatto nelle conclusioni parziali, bensì ci si propone di individuare la trama del presente studio, basato essenzialmente sui dati di scavo.

L'impressione generale è che ci siano stati giochi praticati dall'antichità sino al tardo Medioevo, mentre altri invece tipicamente medievali. Tra i primi figurano i dadi, le pedine, i campanelli e le figurine in terracotta, mentre tra i secondi gli scacchi, i sonagli ed i fischietti. A queste due grandi categorie resta da aggiungere il discorso sulle bambole articolate che

⁵¹ Cfr. Cini & Ricci 1980 per la descrizione dettagliata della sistemazione dell'elemento fischiante.

⁵² Cfr. Gelichi & Merlo 1987, 189, fig. 18, 95 per un cavallino smaltato ascrivibile all'ultimo quarto del XVI sec. proveniente dall'Emilia.

vengono trovate ancora in contesti tardo-imperiali, mentre mancano in strati medievali. Possiamo quindi ipotizzare che i giochi, tra età romana e Medioevo, siano rimasti pressochè gli stessi, pur verificandosi alcune variazioni nella tipologia degli oggetti, come testimoniano i casi delle bambole e dei campanelli-sonagli.

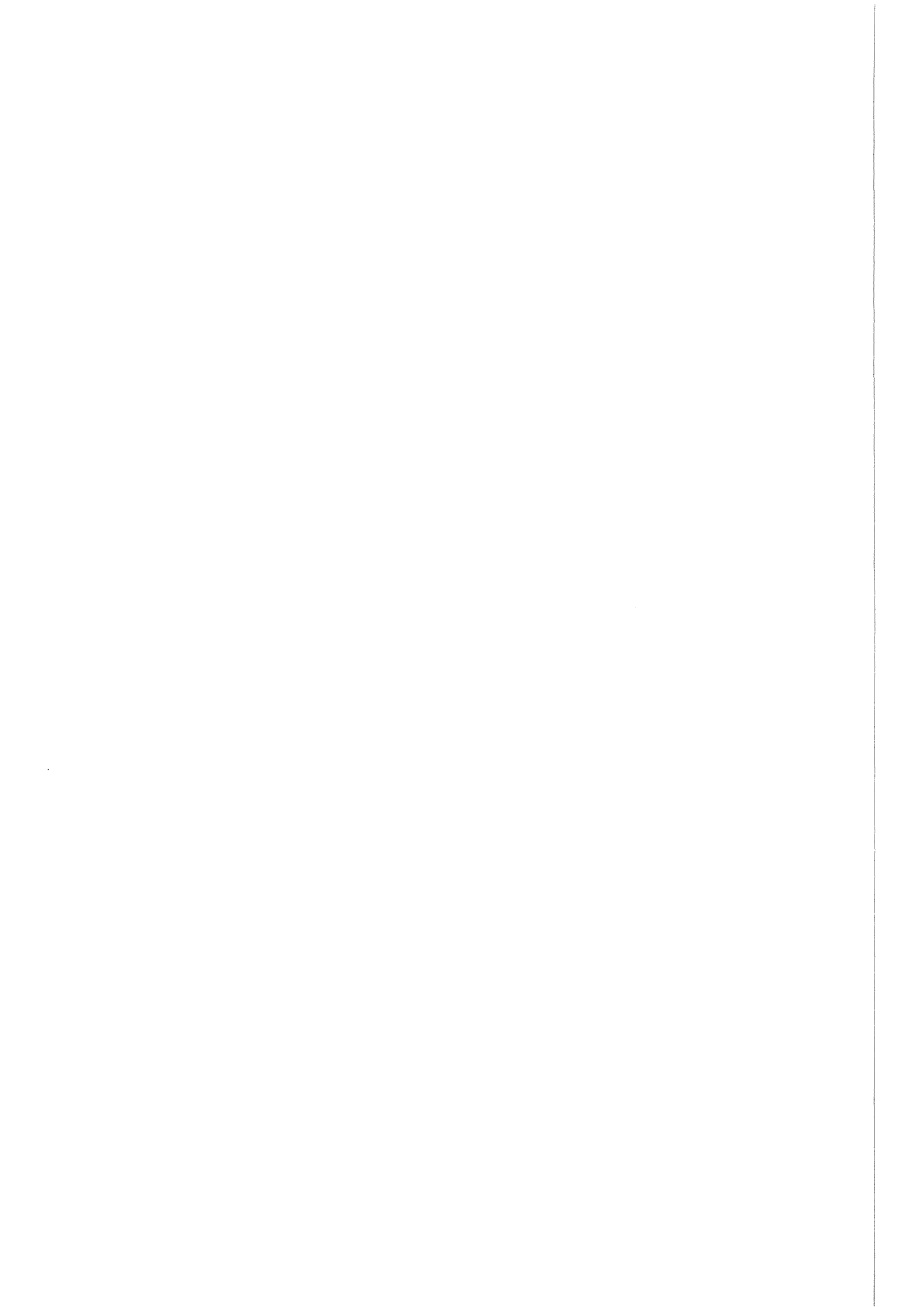
Altro argomento importante è quello della cronologia degli oggetti da gioco segnalati nel Lazio: ad una concentrazione nel Tardoantico di manufatti tipologicamente legati all'età romana (bambole articolate, campanelli, pedine), segue un'evidente penuria di dati per l'alto Medioevo – con la sola eccezione della Crypta Balbi – e un nuovo addensamento di manufatti per la fine del Medioevo. Sul significato da dare a questo *trend* si potrà – e si dovrà – ulteriormente discutere, ma, allo stesso tempo, è importante ipotizzare delle risposte. Proponiamo due dati, di cui il primo è più che altro una premessa metodologica e l'altro una possibile risposta: la difficoltà di individuare siti – o fasi – altomedievali e una minore attenzione al gioco nell'alto Medioevo.

Più volte, nel corso della presente relazione, abbiamo sottolineato che quanto da noi scritto ha il valore di un'ipotesi di lavoro e non di una risposta definitiva, poichè si tratta di un lavoro *in fieri* che speriamo possa arricchirsi di nuovi contributi. Lo scopo è stato, infatti, quello di prendere in esame gli oggetti da gioco come una qualsiasi altra testimonianza della cultura materiale, in grado, quindi, di fornirci informazioni sulla vita quotidiana, la cultura, la produzione, gli scambi, i commerci e i consumi del Lazio medievale.

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Annemarieke Willemsen

Medieval Children's Toys in the Netherlands Production, Sale, and Trade

Summary

The author is working on a PhD-thesis on Children's Toys in the Netherlands, 1100-1550, in which archaeological finds are combined with depictions in medieval art and written sources. In this paper, an overview is presented of children's toys found in Holland and Flanders and dated before ca. 1600. Although many finds are unique, the focus is on toys of which series of examples have been found, for they provide hints as to the way these things were produced and traded. The help of iconographical sources is called in for the sale of toys. As a conclusion, both the quantity and quality of excavated toys point at a relatively joyful position of children in medieval society.

Introduction

Children at play must have been a common and daily sight in medieval times. However, the present information on toys and games is very limited, mostly because this aspect of culture has never been subjected to an interdisciplinary investigation. The objects themselves have never been studied thoroughly, and neither have pictures of play and references to it. In medieval texts and pictures, toys and play are used to characterize childhood. Therefore toys, being material culture directly related to children, can be used as a valuable key to both the culture of play and the position of children in medieval society.

With this general goal in mind, research on medieval children's toys has been carried out since the beginning of 1994 at the Department of Art History of the University of Nijmegen (The Netherlands)¹. In this research, archaeological, iconographical and textual sources are explicitly combined, in order to arrive at a broad and differentiated view of children's toys in the Northern and Southern Netherlands from the 12th to the 16th century. This view is

then used as a way to come as close as possible to the child in this region and period.

The archaeological half of the inventory was carried out mainly by visiting almost every archaeological service and depot in the main (medieval) cities of Holland and Flanders, along with a number of private collections, asking for any find that may have been a toy. The material thus collected was then sorted, and relevant find-places were studied in greater detail. Among the main results is the grouping of series of objects, most of which were considered unique by their excavators or possessors. Within these groups, finds from professional excavations which have repeatedly been dated reliably can provide a global date for the rest of the group, including the many objects for which no additional information whatsoever is available.

In this paper, a representative part of these groups is presented, as they play a leading part in studying aspects of production and trade. The ways toys were produced, sold and traded in turn give important information on the time, energy and money that was spent by adults in providing toys for the children; therefore, they also give an idea of the position of those children and the relation between them and adult persons in society.

Medieval Toys from the Netherlands

Because this paper will focus on groups of objects, it is important to note that many of the children's toys from medieval times were unique, having been made spontaneously (for instance carved from wood or sewn together in textile or leather). It must also be realized that most toys which existed at the time will not have been preserved, for they were indeed made of wood, leather or textile, materials that are suitable for toys – easy to get hold of, easy to work, not very expensive, not very fragile – but which usually perish easily. The present image of medieval toys is therefore strongly biased in favour of those made of earthenware and metal. Indeed, the fair

¹ Supervisor: Prof. dr. A.M. Koldeweij.

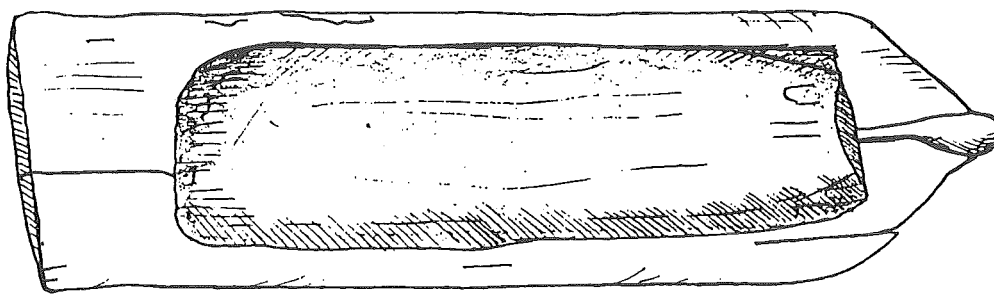


Fig. 1. - *Wooden boat found at Hoorn, 16th century, l=13 cm. Hoorn, Westfries Museum (no inv.nr.).*

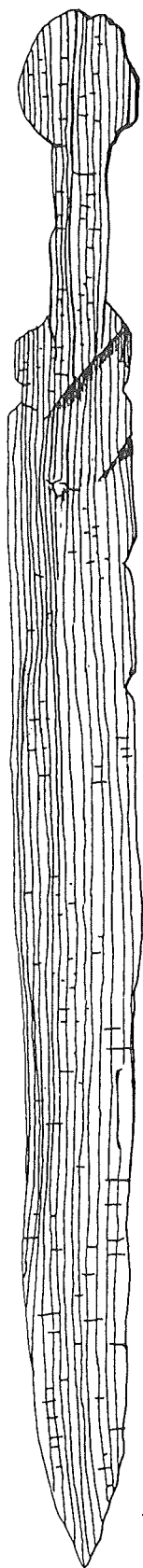


Fig. 2. - *Wooden sword, found at Vlaardingen, 14th century, l=65 cm. Vlaardingen, Archaeological Service 1.2-006. Scale 1:3.*

Drawing: Archaeological Service, with thanks to Jeroen ter Brugge.

number of wooden toys that have been preserved – although the preservation circumstances throughout the whole process of use, deposition, excavation and conservation have then been highly favourable – proves that very many wooden toys must have existed.

Compared with other sources, archaeology always gives a ‘low’ impression of the studied society, for in most cases we are dealing with medieval waste. Thus, the finds give only a fragmentary picture of the objects in use. But this also means that archaeological finds provide a view of all layers of medieval society, whereas art and written information in many cases only account for the highest social classes.

Wooden toy-boats and small wooden weapons like swords and bows are presented here as examples of toys that were made quite spontaneously, maybe even by a child, and were not part of any organized production (Fig. 1 and 2)².

Spinning Tops

Also made of wood, and one of the most frequent types of toys, are spinning tops. The numbers in which they are found not only prove that they were a popular pastime – this is also indicated by the large amount of depictions of tops, mostly in medieval manuscripts – but also that they were produced on a reasonably large scale. Most of the tops are turned on a lathe, easily traced by the horizontal ridges around the base. Afterwards, an iron pin was hammered into the end of the top. The two main categories are pegtops (Fig. 3) and whipping tops (Fig. 4). The first is used when – while turning – trying to kick another top out of a circle drawn on the ground. It is a high top with a long pin. The second is to be kept turning as long as possible, and has to come with a whip, although a whip is sometimes also used with the pegtop. The whipping top has a more thick-set shape and the pin is usually shorter and blunter. The measurements of excavated tops vary from 2 to 11 cm in height, but most are between 5 and 7 cm high and 4 to 5 cm in diameter. Whips are found seldomly,

² Drawings by author, unless mentioned otherwise; all on scale 1:1 except nr. 2 and nr. 14.

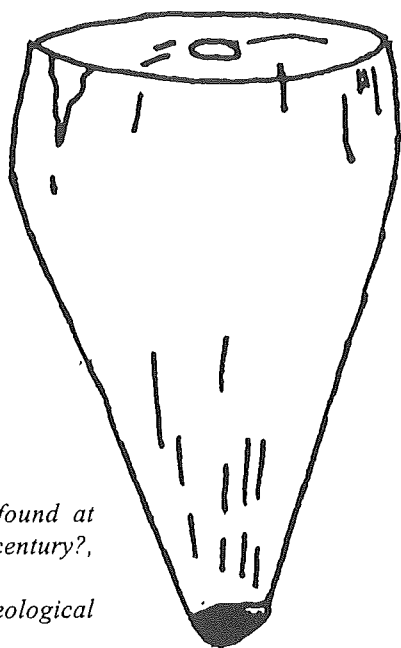


Fig. 3. - Pegtop, found at Amsterdam, 15th century?, $h=8.2$ cm. Amsterdam, Archaeological Service Wey-34-1.

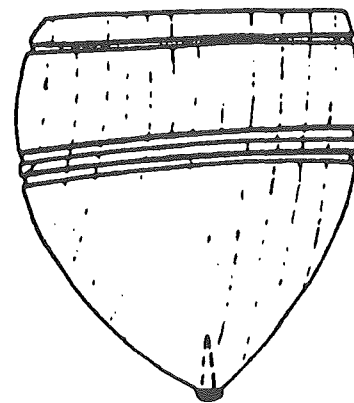


Fig. 4. - Whipping top, found at castle of 'De Voorst', before 1362, $h=5$ cm. Zwolle, Provinciaal depot. Drawing from: A.D. Verlinde, *Archeologische kroniek van Overijssel over 1982-1984* (ROB-overdruk nr.269) p.219.

but a 16th-century top and whip were found together in a ditch in Langweer near Leeuwarden (Friesland)³. The presence of the top was the reason why the quite ordinary looking stick was also preserved; a closer look at the stick revealed a clear narrowing at one end, with traces of cord bound around it, and a hole pierced through it at the other end; at the latter end a cord or wire could be used to attach the whip to the wrist.

The uniformity in the forms of tops, clearly divided into a limited number of favoured types, indicates that woodworkers turned series of tops apart from their regular production. Spinning tops are found relatively often in places where there used to be water, like ditches, canals⁴ and castle-moats⁵. They share this feature with finds such as balls and knucklebones, which are objects that were also thrown. Therefore, they got lost – at a distance – more easily than 'on site'-toys such as dolls and miniature utensils. When found in cess-pits or other concentrations of waste, pegtops in many cases are split in two fragments or miss a segment, which identifies them as loser's pieces.

Rattles

Among the most usual attributes for small children is the rattle, of which two groups of ceramic ones have been identified. Rattles were among the production of the 'early' ceramic centres at Brunssum-Schinveld (Limburg, Netherlands)⁶ and Andenne (Belgium), and may be regarded as the first mass-produced playthings. The specimens from Limburg are more or less spherical in shape with a handle (Fig. 5); they measure 7 to 12 cm in length and 3 to 6 cm in diameter. They are produced in white-firing clay and are decorated with strokes of coloured paint. They are found mostly in Limburg, as the production of these centres was quite local/regional in scope. This is not the case with the so-called Andenne-rattles (Fig. 6), that have been turned – as can be seen from the ribs – from white clay and lead-glazed in a light or vivid yellow colour characteristic of the production in the region of Andenne. They measured ca. 8 to 12 cm, with ca. 3 to 5 cm for the handle. Examples have been found at for instance Antwerpen and Gent⁷, but also at Leiden and Geldrop⁸, which is con-

³ Top and stick, length 6,2 and 22 cm resp. Leeuwarden, Fries Museum inv.nr. FM 1981-IV-6a and b.

⁴ E.g. the excavation near the Sint Olofspoort in Amsterdam. See: J.M. BAART & L.H. VAN WIJNGAARDEN-BAKKER, *Spelen bij de poort*, in: H.H. VAN REGTEREN ALTENA, *Vondsten onder de Sint Olofkapel*, Amsterdam, 1972, 28-33.

⁵ E.g. at the castle of Eindhoven. See N. ARTS (ed.), *Het Kasteel van Eindhoven, Archeologie, ecologie en geschiedenis van een heerlijke woning 1420-1676*, Eindhoven, 1992.

⁶ See A. BRUIJN, *Die mittelalterliche keramische Industrie in Schinveld*, *Berichten ROB* 10-11, 1960/61, 462-507; A. BRUIJN,

Die mittelalterliche keramische Industrie in Südlimburg, *Berichten ROB* 12-13, 1962/63, 357-459; A. BRUIJN, *Nieuwe vondsten van middeleeuws aardewerk in Zuidlimburg*, *Berichten ROB* 14, 1964, 133-149; A. BRUIJN, *Een middeleeuwse pottenbakkersoven te Nieuwenhagen, Limburg*, *Berichten ROB* 15-16, 1965/66, 169-184.

⁷ See T.OOST, *Rammelaars in z.g. Andenne-aardewerk*, *Stads-archeologie* (Gent) 4-3, 1980, 9-14.

⁸ See H.L. JANSSEN & W.A.B. VAN DER SANDEN, *Middeleeuws aardewerk uit Geldrop (11e-12e eeuw)*, *Brabants Heem* 37-4, 1985, 151-159, ill. 2 (p. 156).

Fig. 5. - Rattle found at Schinveld, 11th-12th century, l=7 cm. Present location unknown (probably at Amersfoort, ROB).

Drawing from: De Bruijn 1964 (see note 5) p.148.

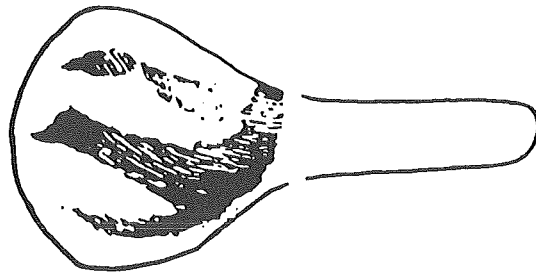
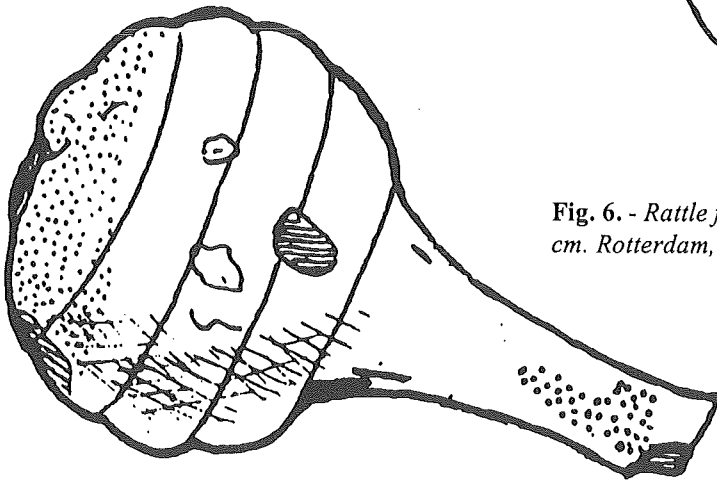


Fig. 6. - Rattle from Andenne, found in Leiden, date unknown, l=8.3 cm. Rotterdam, Museum Boijmans Van Beuningen F537.

sistent with the broad market of the other products in Andenne ceramics. The popularity of these rattles is not only indicated by the large number of pieces and fragments found and the distances that they crossed to be bought, but also by the imitation of such rattles in local earthenware as found in Utrecht⁹. In passing it may be mentioned that complete rattles are rare and usually fragments are found in form of only a sphere or a loose handle, which shows that the major reason for their disposal was the breaking off of the handle, which made the rattle unusable.

Apart from these, open-work circular rattles, made of lead-alloy and with bells inside are also known¹⁰. The 16th century came up with lots of bone 'tinklebells' with a flute at one end and a piece ('teat') for nibbling at the other, with bells attached in the middle¹¹. The gold and silver rattles that would become very popular on 17th-century paintings and in highly valuable collections are found for the first time in excavations of 16th-century sites. These were occasionally imitated in less expensive materials like again lead-alloy¹², and an occasional wooden rattle¹³

corresponds with images of rattles in paintings of the late Middle Ages¹⁴.

Dolls

A few wooden parts of dolls with moveable arms and/or legs have been found¹⁵, as was an occasional moveable arm made of the soft alloy of pewter and lead¹⁶ used for most miniatures.

A group is formed by some ten small doll's heads made of baked clay, hollow at the back and with a hole in the neck, which shows that they could be placed on a stick (Fig. 7). Sometimes they also have a small hole in the top of the head, making it possible to place head-gear set on a small pin there. A few of the heads also came with the upper part of the torso, with a usually crude indication of breasts. They measure ca. 5 to 6 cm maximum; the hole is ca. 1 cm in diameter and tapers upwards. Showing clear similarities in form, they were found throughout the Netherlands, including discoveries from the flooded land in Zeeland¹⁷ and the

⁹ Rotterdam, Museum Boijmans Van Beuningen, inv.nr. F8756. See: A. WILLEMSSEN, *Kinderspeelgoed in de Middeleeuwen, het combineren van verschillende soorten bronnen*, *Ex Tempore* 41, 1995, 89-102, ill. 2 (p. 93).

¹⁰ E.g. Brugge, Archaeological Service inv.nr. BR90/WI/L.V. and Middelburg, Provinciaal Depot van Bodemvondsten inv.nr. Mdb-kou-92-374.

¹¹ E.g. collection of Stichting H. Keijser, Amsterdam. See: CH. DE MOOIJ *et al.* (red.), *Kinderen van alle tijden*, Zwolle, 1997, 100.

¹² Eindhoven, Archaeological Service inv.nr. EHV-RD-92-21.1.

¹³ Den Haag, Archaeological Service inv.nr. BIR94-126.2.

¹⁴ E.g. the rattle held by Judas Thaddeus in the Holy Kinship by an anonymous South-Netherlandish Master, dated ca. 1510. Cologne, Wallraf-Richartz-Museum inv.nr. 416.

¹⁵ E.g. Amersfoort, Rijksdienst voor het Oudheidkundig Bodemonderzoek inv.nr. DVR 51-7-10 (missing).

¹⁶ Diksmuide, Instituut voor het Archeologisch Patrimonium, no inv.nr. (from Damme).

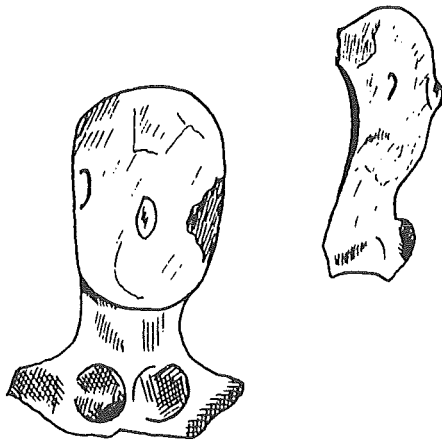


Fig. 7. - Doll's head with torso, found at Delft?, ca. 1500, h=5.4 cm. Rotterdam, Museum Boijmans Van Beuningen F8745.

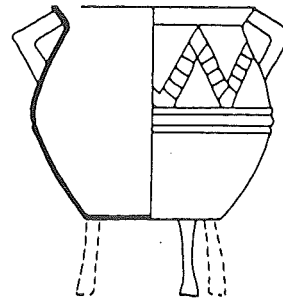


Fig. 8. - Cooking pot, found at Eindhoven, 1225-1275, h=3.8 cm. Eindhoven, Archaeological Service EHV-HE-89 sp 14.72.1. Drawing from: N. Arts (ed.), *Sporen onder de Kempische stad, Archeologie, ecologie en vroegste geschiedenis van Eindhoven 1225-1500*, Eindhoven 1994, 233.

Scheldt¹⁸. Finds from Eindhoven¹⁹ and the castle at West-Souburg (Zeeland)²⁰ date the group in the 15th and the first half of the 16th century.

Reconstruction leads to interpreting them as dolls on sticks, with a ceramic head with sometimes part of the torso; they were to be completed with a garment tied to this head and – if so wished – with a hat put on top of it. Maybe the garment was equipped with hands and feet made of wood or ceramics, but there is no certainty about that. Some of the heads show traces of paint, which also explains the very superficial way the face is modelled. As to their function, all characteristics point to these dolls on a stick to have been used as puppets – whether or not as the medieval predecessors of Punch and Judy – known from depictions²¹.

Miniature Utensils

Utensils such as like kitchenware, dinner-services and furniture in miniature, form a large part of the excavated objects regarded as toys. Their function has been – and still is – the subject of discussion at all levels, but may be summarized as follows²². Miniatures were certainly also used as toys. It is not clear to what extent some of these objects functioned as

decorative items on display or had a place in private dealings with religion, for instance in domestic altars.

Miniatures of wood and glass are known but scarce²³. Miniatures of earthenware and metal are, however, abundant throughout the Middle Ages, peaking in the second half of the 16th century and leading to a real hype in the 17th and 18th centuries up to the present day. The ceramic miniatures mostly represent cooking and dinner type objects, whilst they pewter and lead alloy ones cover the whole known range of daily life, from plates, strainers and pots over chairs, boardgame-tables and scissors to chalices, shrines and monstresances. Both the ceramic objects and the metal ones were clearly mass-produced. While the ceramic objects may still have been a side-product of potters, the miniatures in lead-alloy must – considering their sheer quantity – have been a specialization on the part of pewterers. For most things 'loosening' moulds have been used, which shows that their way of production is closely related to that of badges. Even larger and three-dimensional objects are composed of parts cast in flat moulds, parts that are ingeniously folded and put together.

A few examples of groups within these categories of metal objects have been selected for presentation. A quite early example is the three-legged miniature cooking pot with angular handles and linear deco-

¹⁷ E.g. Zierikzee, private collection. See: F. BEEKMAN & H.J.E. VAN BEUNINGEN, *Het verdronken Westenschouwen*, Zierikzee, 1995, cover photograph.

¹⁸ Antwerpen, Archaeological Service inv.nr. A103/21/W1.

¹⁹ Eindhoven, Archaeological Service inv.nr. EHV-RD-90 sp. 19.1.176.

²⁰ Middelburg, Provinciaal Depot van Bodemvondsten inv.nr. 1972-WS.

²¹ E.g. in the border of page 54 r of '*Li Romans du boin roi Alixandre*', Oxford Bodleian Library ms Bodley 264, illuminated in Bruges in the 1340s.

²² See A. WILLEMSEN, *Kinder-spel en poppe-goet, 17de-eeuwse miniatuur-gebruiksvoorwerpen en hun functie*, *Antiek* 28-9, 1994, 392-399.

²³ Wooden plate: Rotterdam, Museum Boijmans Van Beuningen inv.nr. F5821; glass basket: Eindhoven, Archaeological Service inv.nr. EHV-19.1.79.

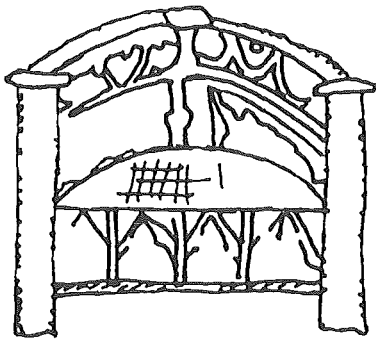


Fig. 9. - Semicircular chair, found at Amsterdam, beginning of 14th century, h=3.3 cm. Archaeological Service Rok1-23.

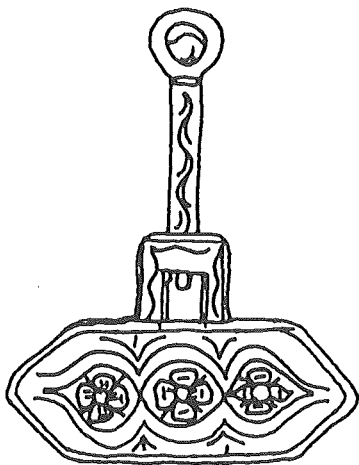


Fig. 10. - Dripper, found in Brugge, 15th century, l=6,0 cm. Brugge, Archaeological Service BR90/WI/71.



Fig. 11. - Plate with rose, found in Holland, 16th century, w=3.7 cm. Rotterdam, Museum Boijmans Van Beuningen OM405.

ration (Fig. 8). It measures ca. 3.5 cm in height and 3 cm in diameter and can be dated between 1250 and 1350. This group date is based mainly on reliably dated finds from for instance the castle of 'De Voorst' near Zwolle²⁴ and the *Verdronken Weiden* ('Flooded Meadows') site at Ieper (Ypres, Belgium)²⁵.

Another example is the chair with semicircular back and seat (Fig. 9), a good example and indicator for the way three-dimensional objects were made out of a flat mould. These chairs measure ca. 3 by 5 cm and can be dated in the 14th century, a chronology again based on dated finds from reliable contexts such as the Ieper site²⁶ and those from the town-centre excavations at Amsterdam²⁷.

Groups of drippers (Fig. 10), plates (Fig. 11) and jugs (Fig. 12) be regarded as indicators of the really large scale of production of these items in the later 16th century. For that period, sites such as the tracks of the railway-tunnel in Rotterdam²⁸ and the Amsterdam underground²⁹ and the municipal waste-belts as found in Middelburg (Kousteensedijk)³⁰ produce masses of hundreds and hundreds of these small metal miniatures, which closely imitate every single item known in 'adult format'.

Horsemen

Among these miniatures, one type still stands out. I refer to the many small horsemen in metal (Fig. 13), found for the major part at the Flooded Meadows site in Ieper³¹. They vary in height between ca. 3 and 5.5 cm. There are no two identical riders, but they clearly form a functional group. The one characteristic they have in common, apart from representing riders, is that they have some form of a (foot-)stand, which shows that they were meant to be set up in some way. It is not certain that these are the medieval – indeed, 14th-century – predecessors of the later tin soldiers. However, it is known from depictions in medieval art that small tournaments were put out on tables³², and

²⁴ See *Het kasteel Voorst, Macht en val van een Overijsselse burcht circa 1280-1362 naar aanleiding van een opgraving*, Zwolle 1983, ill. 16a and 16b (p. 43).

²⁵ Ieper, Stedelijk Museum (no inv.nr.) and Zellik, Instituut voor het Archeologisch Patrimonium inv.nr. 93-IVW-31B/180.

²⁶ Diksmuide, Instituut voor het Archeologisch Patrimonium inv.nr. 92-IVW-11.

²⁷ E.g. Amsterdam, Archaeological Service inv.nr. Rok1-23 and Rok1-43.

²⁸ See: A.J. GUIRAN, *Sporen door het verleden: archeologisch onderzoek tijdens de aanleg van de Willemsspoortunnel door Rotterdam*, *Westerheem* 38-6, 1989, 265-273; E. VAN GINKEL, *Waar Rotta ophield*, *begon Rotterdam*, *Scarabee* 2, 1992/93, 6-10.

²⁹ See J.M. BAART *et al.* (red.), *Opgravingen in Amsterdam, 20 jaar stadskernonderzoek*, Amsterdam, 1977, 61-66.

³⁰ See R.M. VAN HEERINGEN *et al.* (red.), *Geld uit de belt, Archeologisch onderzoek in de bouwput van de gemeentelijke parkeerkelder en het belastingkantoor aan de Kousteensedijk te Middelburg*, Vlissingen, 1994.

³¹ Most examples are now at the Stedelijke Musea in Ieper or in the Instituut voor het Archeologisch Patrimonium, Zellik and their depot in Diksmuide.

³² E.g. on page 3 of the *Trachtenbuch* of Matthäus Schwarz, Braunschweig, Herzog Anton Ullrich Museum inv.nr. H27- 67a.

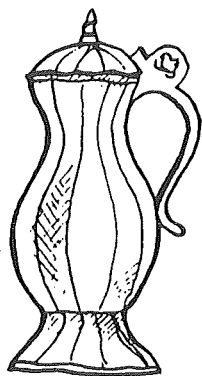


Fig. 12. - Jug with lid, provenance unknown, 15th-16th century, h=4.8 cm. Delft, Private collection.



Fig. 13. - Knight on horseback. Ieper, before 1383, h=3.6 cm. Ieper, Stedelijke Musea (no inv.nr.).

the small tin horsemen may well have been elements of this, whether or not with tin spectators like in the small 'gallery' also found at Ieper³³ and whether or not watched by children. It is encouraging that a group of ceramic horsemen, with adjustable weapons, as found in the region of Konstanz (utmost south of Germany) in combination with many female statuettes, led to the same hypothesis³⁴.

Production, Sale and Trade

Although some 'once-in-a-lifetime' unique objects occur among the most beautiful of the excavated toys, a reasonable part of the inventory consists of objects produced on a larger scale. This production has two 'faces'. One is the series of ceramic rattles made aside by potters at Andenne and traded along with their other products, and the other the pewter-and-lead drippers, mass-produced in 'fast' moulds and obviously sold and traded in an organized way. The production methods of these objects is revealed by the characteristics of their form, and thus detectable by a close look at them. Of great help here are occasional finds of production waste *in situ*. The way toys were traded is betrayed by the places where they were excavated, which allow us to identify trade contacts and export systems.

The way these objects were sold is less easily detected, at least when using only archaeological sources. Here, we need help from texts and iconographical sources such as the depiction of a stand with items for sale in a painting by Pieter Aertsen, dated ca. 1550³⁵ (Fig. 14). In this painting, showing a feast on occasion of the return of a few of the villagers from a pilgrimage, the artist painted a small stand covered with cloth. In it, everything that was popular on such an occasion is put up for sale: vases with an image of the saint for pilgrims and supporters, household utensils such as plates, personal items such as knives, and toys for the children. Small wooden cross-bows, painted red and white, are hung from the tarpaulin, as are wooden drums, and before



Fig. 14. - Stand with cross-bows, drums, windmills and a hobby-horse. Detail from Pieter Aertsen, *Return of a pilgrimage to St. Anthony*, ca. 1550. Brussel, Koninklijke Musea voor Schone Kunsten 7542.

³³ See M. DEWILDE & A. ERVYNCK (eds.), *De thuiskomst van Michiel Quaetjone*, *Archeologie in de Verdrongen Weiden van Ieper*, Ieper, 1995, p.16 (bottom right).

³⁴ See J. OEXLE, *Minne en miniature - Kinderspiel im mittelalterlichen Konstanz*, in: *Stadtluft, Hirsebrei und Bettelmönch, Die Stadt um 1300*, cat. Zürich/Stuttgart, 1992/1993, 392-395.

³⁵ Pieter AERTSEN, *Return of a Pilgrimage to St. Anthony*. Brussel, *Koninklijke Musea voor Schone Kunsten*, inv.nr. 7524.

the stand a basket is shown with windmills and hobby-horses for sale. None of these sorts of toys have yet been excavated. At this fair market, they were sold – and also bought – for in addition the painting shows a woman who has just bought one of the child-size cross-bows, and a woman leading two small boys by the hand. One of the boys is holding a toy windmill, the other got a vane and a hobby-horse. Both are not really playing with these things, but merely holding and showing them, which indicate their newly-received status. Depictions like this give hints as to the frequent selling of toys at markets and fairs, and of them being used as presents for children. Moreover, they give information on the nature and look of toys not preserved in an archaeological way, as depictions and texts always do.

Conclusion

The quantity of found medieval toys, along with the organized production, sale and trade, prove that toys were a recognized need or wish of children in this period, and that adults were ready to put time, energy and money into handling this special feature of children. This is one of the many indicators that the position of children in medieval times was much more favourable than has been thought. This idea is supported by the quality of unique items made so carefully, the quantity of depictions, and the way toys are used in the works of medieval artists and writers.

It all goes to show that sitting in an archaeological depot, with a worn and half-decayed wooden top in hand, might be the closest we will ever get to a common child in a medieval town.

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Children’s Pastimes in Past time – Medieval Toys found in the British Isles (with observations on some excavated dice)

Introduction

Exhibitions in London in 1996 and Stratford upon Avon in 1997 have provided an opportunity to draw attention to what is probably the largest single collection of excavated medieval and later toys (i.e. miniatures intended for children’s play) with an assessment of the significance of these finds, which are mainly from London, against the wider picture in Britain and continental Europe (Egan 1996). This particular collection comprises over 75 identifiable playthings from c.1300 to c.1600, the three-hundred year period considered in the present paper, as well as many more from the 17th and early 18th centuries. Spinning tops are included below, on the grounds that they are more likely to have been for children than adults (the same claim cannot be made for balls, marbles etc., which were probably used for recreation at any age). Whereas on the Continent medieval toys have long been recognised in publications (e.g. Gay 1887), translated German and Dutch books (Gröber 1932; Verster 1958) have been prominent in what was up to quite recently a very limited literature on the subject available in England, and the result was that there has been little expectation that toys of medieval date would turn up on excavations in that country (cf. S. Keene 1990).

Since the archaeology of childhood seems currently to be a popular subject, it is intended in this paper to look at medieval toys and possible toys of wood and bone that have been found in the British Isles, as well as those of metal, which, in England at least, are now beginning to be more widely recognised. The London collection, along with other finds of early toys from formal excavations in the same city, is heavily biased towards metal miniatures, and medieval toys in England are so far overwhelmingly concentrated in the capital. Some likely differences in the production, distribution and survival of playthings of the various categories will be discussed.

Individual Manufacture versus Mass Production

Mass production of multiple, identical goods, while possible for toys of bone, antler and wood (particularly lathe-turned tops) is clearly attested in England by mould-produced playthings of lead/tin from at least c.1400. The labour invested in cutting the moulds, usually of stone for lead/tin products, presupposes repeat production. Towards the end of the middle ages a very limited range of copper-alloy playthings also seem to have been mass marketed (no moulds are known for these, but clay would probably have been used). Wooden toys might be expected to decay in many soils apart from where there has been continual waterlogging – the conditions which are also most conducive to the survival of playthings of lead/tin.

Ceramic toys, which would not have decayed, seem markedly underrepresented in Britain, and although it is possible to suggest at a general level where some could perhaps be identified among excavated finds, it remains surprising that this easily worked material does not include a series of recognised playthings produced as sidelines by the ceramic industries.

Toys of pottery may be represented in Britain by a series of small jugs, as has long been suggested for similar finds on the Continent (e.g. Herteig 1969, pl. 59: finds from Bergen in Norway). In clear contrast to the situation on mainland Europe, virtually no figures of humans or animals have been identified in Britain as the equivalents of the many miniature horses, men and women toys known from Scandinavia and Russia, through Germany and Switzerland, to the Czech Republic and Hungary (e.g. *ibid.*; Schutte 1982; Oexle 1992; Petényi 1994, 86-104). Toys of bone, too, are remarkably elusive for a readily available and easily worked substance that usually survives well, with only one possible category from the very end of the period considered so far identified, and one other possible plaything in antler is the earliest discussed here.

Apart from an apparent three-dimensional representation of a house in chalk, found in a medieval pit

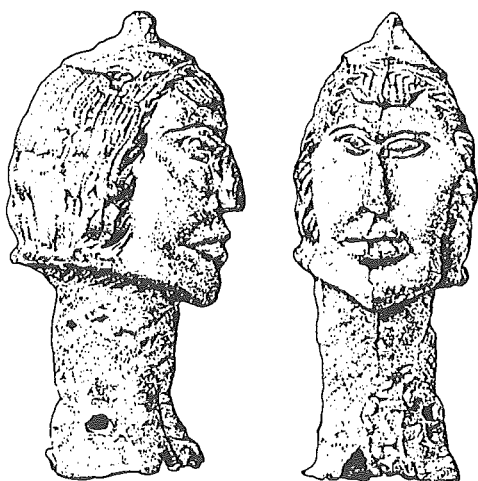


Fig. 1. - Lead/tin head for a doll or puppet, slightly enlarged (from Museum of London 1986; MoL acc. no. 1984.240/4).

in London (Egan forthcoming a, frontispiece) no possible toy miniature of stone has been suggested in Britain (for another miniature stone house thought to be from the late 11th century, excavated at Saint Denis, see Meyer 1979). It is probable that this generally refractory material was only exceptionally used for playthings (miniatures), apart perhaps from occasional stones in which the natural shape might have suggested the form of an animal etc. – recognition of such a phenomenon in the archaeological record would be a matter for unresolvable debate in each case. A rare instance (not strictly of toys in the sense used in this paper) notable for their isolation among finds published in England is a group of four small flint balls and one of clay, which are described as marbles, attributed to the late 13th/early 14th century, from Alsted in Surrey (Opie 1976). These could be children's playthings, but their apparent uniqueness at

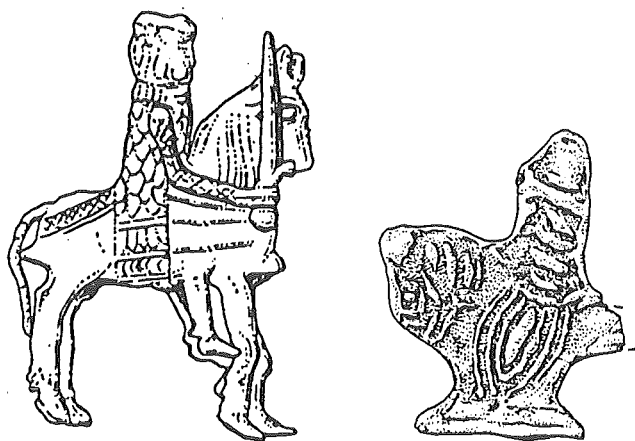


Fig. 2. - Lead/tin & ceramic mounted knights, 1:1 (private collection & MoL acc. no. 84.408/1 - drawings Nick Griffiths and from Pearce & Vince 1988, fig. 103).

such an early date remains worrying (Courtney is probably right to suggest that similar dating put forward for another of ceramic found at Beeston Castle is unreliable and the object was intrusive in the deposit to which it is attributed; 1993, 156, fig. 107, no.25).

The new branch of manufacture of mass-produced lead/tin toys seems likely to have developed from the casting of pilgrims' souvenirs and secular trinkets like brooches of lead/tin. Ampullae (containers for holy water), which had been available from at least the 12th century at various pilgrim shrines and which were necessarily cast hollow, may well have furnished the production technology that first made cheap, three-dimensional metal playthings commercially viable. Many of the earliest toys of lead/tin could have ended up being recycled in the melting pot.

Medieval Toys, mainly from London

An incomplete figure of a bearded man of antler, making clever use of the tines as limbs (and overall, presuming an original symmetry, similar in some ways to the peg dolls of the recent past) may be the earliest of London's medieval playthings. It was excavated in a building from the mid 11th / mid 12th century (MoL GYE92 site acc. no. 3942)¹.

A male head of lead/tin, 54 mm high and with attachment holes in the neck, may be part of a puppet (Fig. 1) perhaps for mounting on a stick or a more-realistically carved wooden body. Since the headgear could perhaps represent the characteristic funnel-shaped cap worn by Jewish men in Europe (Metzger & Metzger 1985, 145-146), this object need not have been intended only for children (who manuscript illustrations suggest were a major audience for some puppet shows – e.g. *Romance of Alexander* 1933, fols. 54v. & 76r., the latter showing adults too – from the late 14th / early 15th century). It might instead have been used in religious or morality plays, possibly representing a specific character such as Judas Iscariot. Whether or not this was for children, it is the earliest mould-produced candidate for a toy so far recognised from medieval London. It can probably be attributed probably to the 13th century, right at the beginning of the mass market in metal playthings. A second possible puppet head from a late 13th / early 14th-century context in London has spiky hair and is slightly more grotesque (Egan 1996, fig. 7; idem forthcoming a, no. 930).

¹ MoL = Museum of London (accession numbers refer to MoL items unless indicated otherwise).



Fig. 3. - Lead/tin miniature jugs (drawings: two at left Nick Griffiths, second right Tracy Smith, all private collection; right distorted vessel restored to shape - Humber Archaeology Partnership, copyright reserved) and cauldron with legend inverted (drawing Ralph Mills; MoL acc. no. 90.245) all 1:1.

The earliest definite toy of this broad category is a lead/tin mounted knight (Fig. 2 left) datable according to staff of the Royal Armouries within ten years either side of 1300. This was followed by a series of miniature versions of table jugs, the most decorative full-sized vessels in most homes at that time (Fig. 3). Few of these toys are from very closely datable contexts in Britain but a London find is from a deposit attributed to the late 14th century (Egan forthcoming a, no. 932). One part of a stone mould for casting toy jugs has been excavated in Hereford (Shoemith 1985; Egan 1996, fig. 4); although this is a cathedral city, it has never been anywhere near the economic first rank of English towns. That playthings were mass produced there says much about how widespread demand for them had become. Another important indicator in the form of a single find is a miniature jug from Sigglesborne, a small village in the rural north of England (Didsbury 1989) – this toy parallels one from London (the two on the right in Fig.3).

Further knights are known in the capital from the 14th and 15th centuries. Some of them are hollow – these include a rare instance at this date of exact duplicates – and others were cast in a T shape and folded out to give three dimensionality (Egan 1996,

figs. 5-6), but what is so far lacking in England is any ‘flat’ version, like those of which three are known on the Continent – one found in Paris, one excavated in the Netherlands and another in a collection in Belgium (Gay 1887, 62 & 69; Baart 1988, 102; Garratt 1971, 25, fig. 6). It was the flats which, being produced from less metal and simpler moulds than three-dimensional versions, came to dominate the more developed mass market by the end of the medieval period (e.g. the ship in Fig. 7).

A single, rather poorly made mounted knight found in London but made at a Surrey kiln probably in the 14th century (Fig. 2 right; Pearce & Vince 1988, 51-2, fig. 103, no. 402) so far seems from what

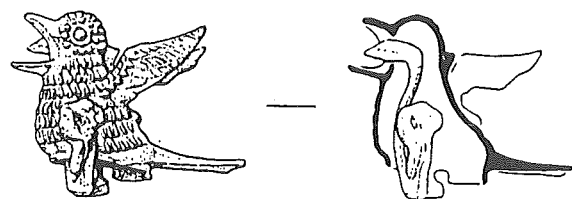


Fig. 4. - Lead/tin bird, originally pivoting, 14th century, 1:1 (MoL BWB83 acc. no. 136, drawing Nick Griffiths).



Fig. 5. - Lead/tin female & male dolls, 16th century, 1:2. (Private collections, drawings from Terry Shiers).

has been published to be the sole response by potters to the developing market in medieval toys in England. This very crude figure (which has erroneously been suggested to be a chess piece) is from a two-part mould – a further contrast with most Continental ceramic toys, which appear to have been modelled freehand – and though the workmanship is feeble, multiple production must have been envisaged. Possibly a few of the fragmentary figures usually thought to be from knight jugs and aquamanili will on re-examination prove to be parts of freestanding playthings. Some ceramic animals (e.g. stags), humans and also representations of trees found in Southern England are from elaborate if enigmatic lobed cups made in Surrey (*ibid.*, 50 & 66-67, figs. 33-34, 100 & 119, nos. 388 & 514-518) but there is scope for potential toys among other figures. By the mid 16th century a variety of stoneware and pipeclay human figurines from Germany, presumably toys, were coming into London, as a small number of finds illustrate (e.g. MoL BIG82 acc. no. 2190; Ward Perkins 1940, 293, pls. 91-92).

Animals, apart from horses with knights on, are, from a modern standpoint, surprisingly unusual among medieval toys in Britain. A hollow-cast bird or fledgling from a late 13th / early 14th-century deposit in London (Fig. 4) is an exceptional plaything in several ways at such an early date (Egan forthcoming a, no. 931). It is the first surviving English toy to have had (originally) moving parts – the body rocked on a pivot and the tongue, which was fixed to the legs, would have appeared with the motion to go in and out.

Food preparation came into the toy ambit in England perhaps in the late 15th century, with a series of cooking-cauldron miniatures in pewter and also, for the first time in popular playthings, in copper alloy too (Egan 1996, fig. 14). From around the same time are a couple of mazers or 'flat cups' for drinking (*ibid.*, fig. 13). Fish on griddles are known in several versions from the 1500s (*ibid.*, fig. 28).

There is also a range of standing hollow-cast human figures, both male and female from the late 16th century (Fig. 5), several with their dress repre-

sented in some detail. These are among the most immediately prepossessing of all the early playthings. At least three versions each of the men and women are known of what must have been very desirable toys. They vary in quality from accomplished, accurate representations to perfunctory, derivative copies, the latter having, in the case of the men particularly, highly improbable vital statistics. These could be the 'babies' (i.e. dolls) listed at six shillings and eight pence customs import duty per gross in the Books of Rates (1582, 6 and (?)1609, unpaginated – cf. Egan 1996). The pleated dresses of the female dolls are similar to fashions in south Germany, a hint that these toys may perhaps have been imported from there (Nuremberg is the most likely manufacturing centre) or based on originals produced in that area. Appropriately for the location of the conference for which this paper is written, a published reference to the import to London of one gross of babies in 1568 reveals that they were shipped from Bruges (Dietz 1972, 78, no. 491). Furthermore, this consignment was liable for a very heavy import duty of £11. 10 shillings (almost one shilling and eight pence each) – desirable toys indeed if they were taxed at that level, and virtually certainly much more elaborate than the pewter ones as in Fig. 5 (the expensive dolls could have been the ones dressed in fashionable clothes, reproduced using appropriate fabrics in precise detail – the 'fashion dolls' sometimes depicted in the hands of aristocratic girls in contemporary paintings, e.g. Arnold 1973, 95).

The 16th century also saw the introduction of miniature furniture in England – benches, chairs and chests, with at least four varieties of display cupboards available perhaps by 1600 (Egan 1996, front cover & figs. 21-23). The latter are very elaborate miniatures – they were presumably children's toys despite their flimsiness. They are made of flat panels fastened together with tabs put through slots and folded, and some parts were soldered in place. The cupboards have openable doors, a display of rich vessels – plates and ewers – on the top, and probably brass foil inside to help show up the openwork (Fig.

6). Freestanding jugs, which by this date imitated full-sized ones of metal rather than ceramic, had openable lids (*ibid.*, inside front cover). Separate toy plates, starting probably around 1500, were almost certainly imitating real tableware of pewter and brass (both of which were becoming much more commonly available); the elaborate cross and a little later rosette designs on the playthings bear no obvious relation to decoration on full-sized plates (*ibid.*) – this tendency for toy flatware to have an entirely different repertoire of motifs continued for more than two centuries.

Miniature warships, of which two datable to the late 16th century have been found in London, seem also to begin in this century (Fig. 7; see Egan 1988). These are the first known versions of a line of playthings which continued essentially little changed into the 20th century, though the details were of course kept up to date. Their earliest appearance in the Tudor period seems to echo the transfer of the status of pre-eminent contemporary fighter from the dry-land mounted knight to the maritime vessel of war at just this time.

Four miniature carved-bone blades, three found in London and one excavated in a 17th-century deposit at Norwich (Fig. 8), despite minor differences in detail, are sufficiently similar to be recognisable as a single basic type of object (MoL acc. nos. A582, A26775 & private collection; Margeson 1993, 70-1 fig. 38 no. 445). All of them have the handles broken off at the narrowest point just above the blade. These are almost certainly what are described in contemporary Books of Rates as 'daggers of bone for children' (1582, 21 & (?)1609, unpaginated). Although the triangular section of the blades does not conform with those of weapons of the time, which were flattish-diamond in shape, the overall form and details such as a representation of the ricasso on a couple of the playthings fit well with English and Continental dagger styles of c. 1600 (Graeme Rimer, Royal Armouries, pers. comm.). Although these might look at first sight to be unlikely products of mass manufacture, their flat section represents economic use of the cattle longbones from which they were made, and this may well be put in perspective by the large scale of production implied by the Books of Rates, which list the toy daggers at 10 shillings import duty the gross in 1582 and 12 pence the dozen in the early 17th century. Such playthings were presumably imported by the hundreds in the late 16th century, with a decline by the end of the first decade of the 1600s. Their place of origin has still to be established, as has whether there was any response in the form of local manufacture from bone carvers in England – this would be one explanation for the sug-

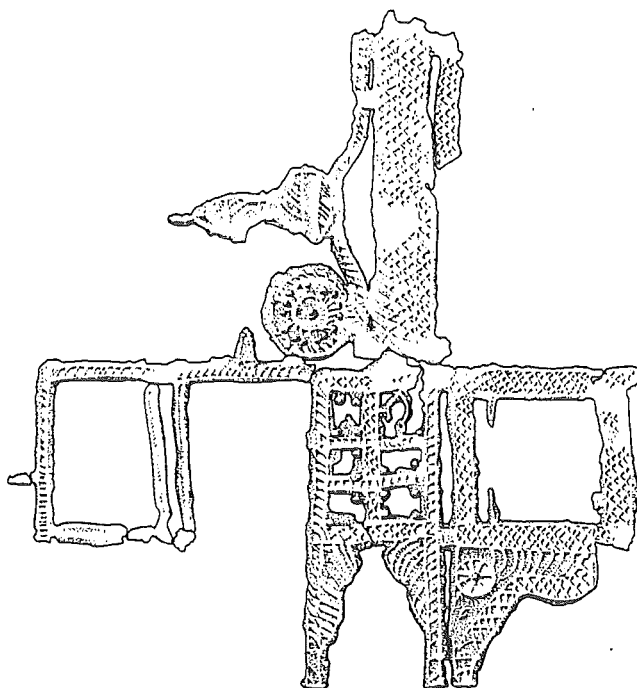


Fig. 6. - Lead/tin miniature cupboard, incomplete & in unfolded state - plate & (?)ewer on top, parts of back, side & (with pivots for door) front below, 16th century; 90%; (private collection; drawing Helen Bridson)

gested decline in imports, unless the toys themselves were for some reason becoming less popular. These bone daggers and a toy sword of copper alloy (below) seem, in the absence of wooden toy swords as on the Continent (e.g. Herteig 1969, pl. 58) to be the earliest identifiable playthings of a category new, at least in England – an implement to be wielded by the child (?specifically a boy) in the way adults used the real thing. Previous toy swords had been held by toy knights, as in Fig. 2 left; a few miniature tools of copper alloy from London may be earlier, but it is not certain that these actually were toys, and their dating is not yet established beyond doubt (Egan 1996, fig. 46). The incomplete state of all four of these finds so far recognised is unlikely to have resulted directly from rough dagger play, which might perhaps show up in knocks on the edges of the blades. One of the

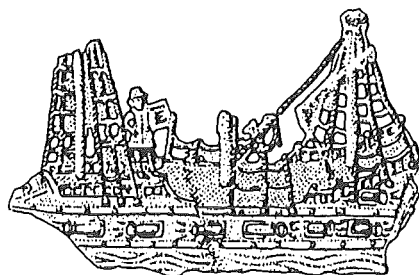


Fig. 7. - Lead/tin Elizabethan warship, 1:1 (private collection; after Egan 1988, drawing Nick Griffiths)

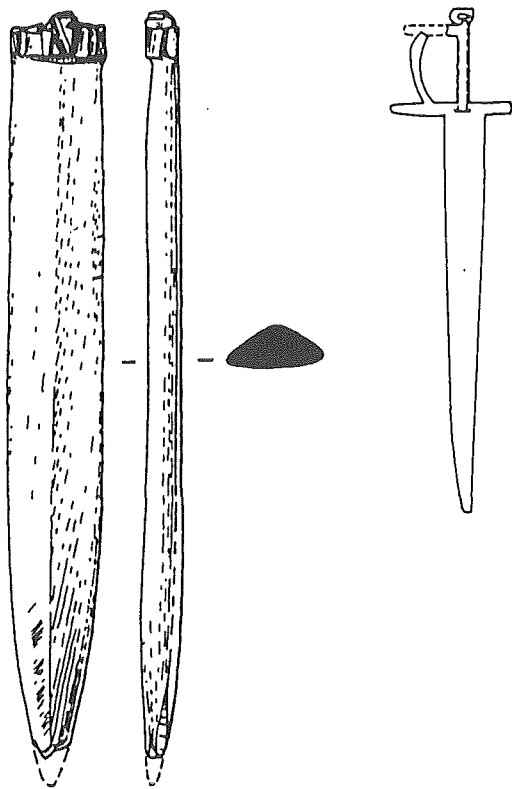


Fig. 8. - Left: bone dagger, (?)late 16th/early 17th century, 1:1 (from Margeson 1993, fig. 38; Norfolk Museums Service copyright reserved).

Right: sheet copper alloy sword, found crumpled - represented straightened out (the separate, dashed piece is presumed originally to have been arched), 16th century; 1:1 (Herbert Museum & Art Gallery collection; from Woodfield 1981, drawing by Paul Woodfield).

London finds has had the point resharpened, probably after the tip broke off (acc. no. A582). This is one of the very few recognised instances (despite the fragility of the majority of the surviving pieces) of making good a damaged medieval plaything.

Toys made of cut metal sheeting are unusual throughout the period considered. They were probably only made on a one-off basis, for children related or at least known to the producers. A possible example is a lead figure of a bird with a central hole, perhaps so that it could be put on a stick, excavated in a late 12th-century deposit in London (Egan 1996, fig. 1). A miniature sheet copper-alloy sword from a 16th-century school building in Coventry (Fig. 8 – Woodfield 1981, 96-97 & fig. 6, no. 97) uses tabs and folding to make (before crumpling) a three-dimensional hilt of a form known from the early 1500s. The only other possible early sheeting toy known to the writer from an English milieu is a very rough human figure in lead from the frontier of the 17th-century world, in a fort in north-east Canada (Kenyon 1986, 38 & 118, pl. 68). There the remoteness of the

community may perhaps explain such a plaything's otherwise anomalous existence at a time when the toy market in Europe had become quite sophisticated in its products (it is alternatively possible that this object owes its existence to the recycling of European materials by native Americans – cf. Jacobs & Dickinson Shattuck 1995, 106, cat. no. 61).

The few medieval wooden toys identified so far in Britain are confined to less than a handful of categories. Remarkably, not one has been identified from the extensive excavations along the London waterfront. There are two spinning tops, both with iron spindles and one painted red, from 9th/10th century deposits at Coppergate in York (Morris forthcoming; the identification of a medieval object from Winchester published by D. Keene 1990 as a top is doubted by Carole Morris – pers. comm.), a toy sword of Viking form and a 'toy horse' of the early 11th century both from Dublin (Lang 1988, 33 & 79, fig. 51, no. DW 88, and 34 & 79, fig. 54, no. DW 90), and also three miniature boats from Viking to (?)early 13th-century and also from Dublin (Christensen 1989, 19-21, figs. 8-9 & pl. 4; Lang, 79-80, fig. 94, no. DW 91), with a long hiatus to another from the (?)late 17th century found at Poole in southern England (Heal 1992).

Conclusions & Further Work

Although the numbers of recognised survivals are at this stage few, it has been established that there was a popular market for mass-produced toys in England from c.1400. This market extended beyond the towns, as the discovery of a jug in a village in northern England shows, and a mould for the manufacture of another version at Hereford suggests a significant level of customer demand from a fairly small local population. Even so, most of the finds so far noted are from major urban centres. Each century seems to have added more to the available repertoire of mass-produced playthings, with entirely new categories like workable firearms and watches coming in during the 17th century, after the period considered in this paper. Only contemporary or very near-contemporary objects and people seem to have been reproduced as toys, which were responsive to major changes in society at large – thus mounted knights apparently vanish from the repertoire at the time when the institution of men in armour fighting from horseback was declining in military importance. A hint that rival makers may have been copying successful products comes with the different versions of the late 16th-century male and female dolls.

International trade in mass-produced toys is suggested by closely comparable if not precisely similar

medieval finds in England and on the Continent. It remains to be established whether in the 14th and 15th centuries this was actually due to the movement of traded goods or it simply represents the influence of popular lines in producing imitations in new locations. Trade from the Continent in toy dolls and daggers is documented in the late 16th century and both categories have arguably been identified in the archaeological record (the latter only during the preparation of this paper). Several categories of miniature vessels and furniture seem on present evidence to begin slightly earlier in the Low Countries than in Britain (Annemarieke Willemsen pers. comm.) – further closely dated playthings may help gauge the accuracy of the present view.

Now that early English toys have begun to be published as such it is hoped that more will be recognised and a fuller picture built up of this aspect of past childhood.

Observations on Some Excavated Dice

Dice are not uncommon among finds on medieval excavations, and some effort has been put into categorising varieties, based on the placement of the number dots on each face relative to the others. An important division between what will here be termed 'regular' dice (that is, those in which the numbers on opposite sides total seven) and 'non-regular' ones (those in which there are different arrangements) has been established (e.g. Brown 1990, 192-194, his types A & B). This brief excursus is primarily intended to draw attention to a contribution originating in the antipodean scientific world (Potter 1992) that should help achieve a clearer understanding of the range of varieties of regular dice (there are 16), and also to suggest from some finds in England how this may lead to further inference about the past perception of these gaming pieces on the part of some contemporary users. The three faces with dots that make numbers having symmetry on two rather than four planes (i.e. the 2, 3 & 6 rather than the 1, 4 & 5) determine which of the 16 variants a particular dice is (Fig. 9).

The convention of showing all six sides unfolded remains useful for publication, but there has hitherto been a wide diversity of orientation and placement of the numerals in illustrations. Sometimes two dice of the same variety have been orientated and opened out differently from each other on the same page, so that detailed comparison leads to the presumption that they are different (see Margeson 1993, 216-217, fig. 164, nos. 1767-8, both of which are variety 16 in Fig. 9 in this present paper). Brown's system confronts the problem of trying to make illustrations consistent

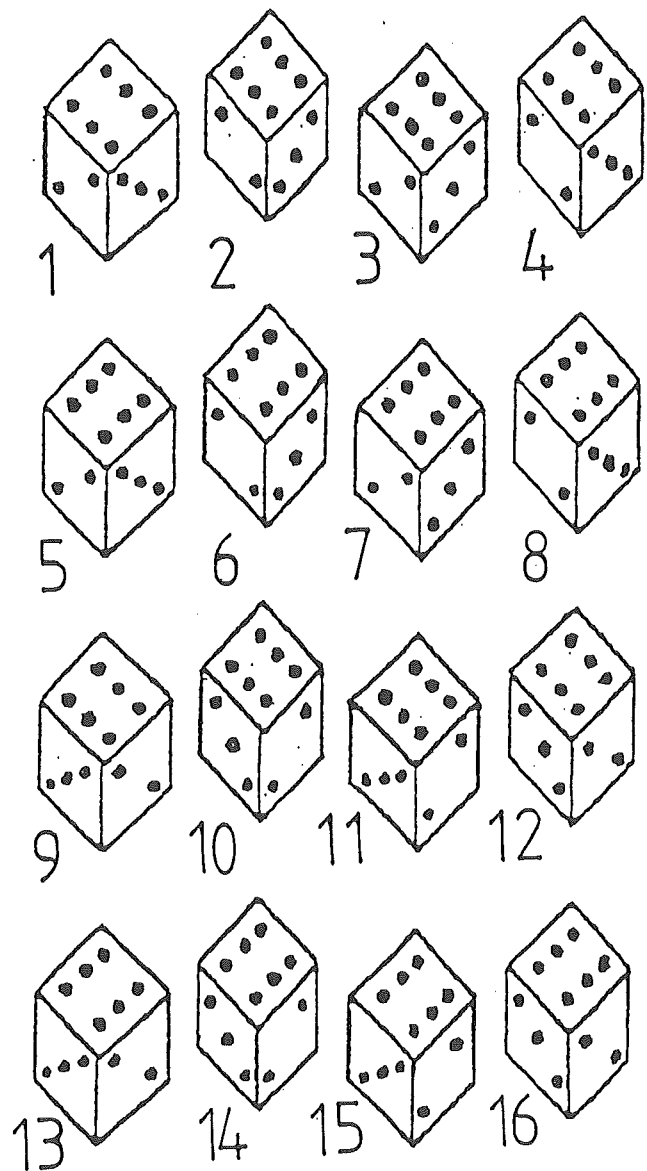


Fig. 9. - The possible varieties of 'regular' dice (from Potter 1992).

(1990, 692-693 & 700, fig. 193). His convention for categorising regular dice has two subdivisions, Ai and Aii, but these respectively combine Potter's varieties 13 with 14 and 1 with 3. That is, although the former's convention for unfolded drawings of dice with the 4, 6 and 3 always running vertically downwards on the right brings a measure of consistency, it does not take account in these pairs of variants of different orientations of the 3s and 6s.

As has been noted elsewhere, both regular and non-regular dice are found in the medieval period. Although the number of excavated dice for which the appropriate information is readily available is small, a rapid survey of those to hand or with sufficiently detailed illustrations to allow them to be categorised as above reveals some unexpected points of interest. In London a significant change apparently comes in

during the 16th or early 17th century, with non-regular dice virtually disappearing. Furthermore, some 90% of later excavated ones from the metropolitan area are of just one of the varieties in Fig. 9 – number 16. A similar chronological pattern is emerging among finds from several other English towns. The apparent move, with sixteen variants possible, towards a single format in parts at least of that country can hardly have been mere coincidence. No explanation has been located in contemporary written sources. What could have been happening, with more people taking gambling seriously, as legislation against dicing suggests, was a new demand for reliable dice that could be immediately recognisable as true, as opposed to the false ones with biases for falling on one side or duplicated numbers, which occasionally turn up (e.g. Spencer 1985 for a late medieval group from London; others are known on the Continent – de Boer & Franssen 1990 on 14th-century dice from Amersfoort). The writer unconsciously developed the ability immediately to recognise regular dice of variety 16 through handling a range while researching this subject. It seems plausible that habitual users of dice in the 16th/17th centuries too would have acquired this skill, and insisted when stakes mattered on a trusted, standard format.

Potter's definitive system now allows variations and repeated patterns in layout in groups of regular dice readily to be pinpointed. It is recommended that all publications of dice should include full, unfolded illustrations with the six centrally positioned (if one tries, with three dimensions shown in two like this, to keep the sixes' dots consistently orientated vertically some variants will have definable differences blurred); for regular dice an accompanying sketch of the appropriate variety as per Fig. 9 seems to be the readiest way of clarifying the configuration.

Points raised here are discussed further in Egan forthcoming b. It seems unlikely in view of the extent of possible diversity that quite as simple a system as Potter's could be devised for defining varieties of irregular dice, and though a cumbersome and complicated rehearsal of every last possibility is feasible, it is improbable that this would produce significant new information.

Acknowledgements

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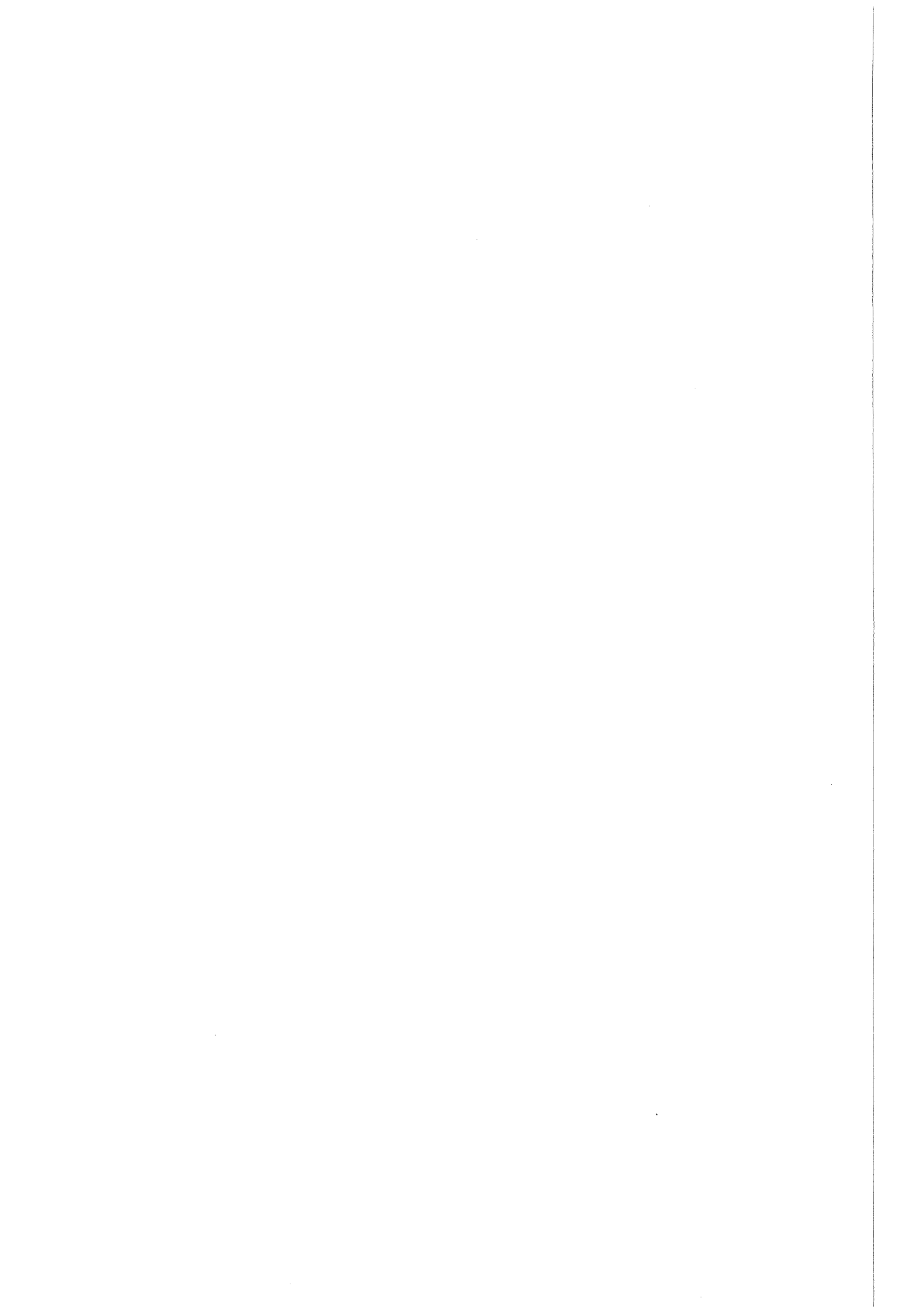
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Materiali, tecniche e strutture edilizie nel Medioevo a Pisa: dall'estrazione dei materiali alla realizzazione del progetto architettonico

Primi risultati di una ricerca sulla produzione e sul consumo
dell'edilizia storica

L'analisi degli edifici medievali superstiti a Pisa e della documentazione archivistica e archeologica, che sto sviluppando da oltre un ventennio, ha fornito i dati per l'elaborazione di una storia urbana dall'età romana fino al Rinascimento e di una tipologia dell'edilizia civile medievale di recente pubblicazione¹. E' quasi pronta la sintesi dei dati materiali per un secondo volume, del quale anticipiamo alcuni risultati in questa sede. Gli edifici medievali superstiti presentano, infatti, numerose varietà di materiali e di tecniche costruttive dalle quali è possibile risalire all'individuazione dei giacimenti originali, siano essi le cave di pietra sparse nel territorio, le fornaci dei laterizi, le calcare; è possibile trarre anche utili osservazioni sull'organizzazione del lavoro, sui sistemi di trasporto e sulle comunicazioni, sugli strumenti e sulle tecniche edilizie, sui rapporti fra committenze e maestranze, sulle modalità di produzione e di consumo delle strutture edilizie.

1 Materiali: caratteristiche, provenienza, trasporto, cronologia

I materiali che risultano impiegati negli edifici medievali pisani appartengono essenzialmente al gruppo delle pietre silicee, cioè le quarziti biancorosa, quelle zonate e quelle scistose, dette Verrucano, la Breccia di Asciano, alcune varietà di granito e di arenaria, e al gruppo dei calcari, cioè il calcare selcifero, quello massiccio, quello cavernoso, quello ceroide, quello nero e quello rosa, i grezzoni, la breccia calcarea, il marmo apuano, il tufo calcareo detto Panchina livornese. Oltre al materiale litico è abbondante il laterizio e, sia pure scarsamente conservato a causa della sua deteriorabilità, il legno nelle diverse essenze: quercia, castagno, pino, abete, pioppo.

Per quanto riguarda il materiale litico si riscontrano pietre di diversa durezza e lavorabilità, in ordine decrescente dal verrucano e dal granito all'arenaria e al tufo calcareo, estratte da stratificazioni naturali di piccola potenza, come il calcare selcifero, o di media e grande potenza, come tutti gli altri. Sono

attestate anche la pratica frequente e più antica della raccolta superficiale, come per il verrucano e qualche tipo di calcare, e quella dello sfaldamento a scaglie, come per lo scisto verrucano. A parte il tufo calcareo e il calcare selcifero, che per ovvie ragioni di consistenza e di potenza non consentono pezzature rilevanti, tutte le altre pietre sono presenti in un'ampia gamma di misure fino a quelle di architravi, stipiti, colonne. La scelta dei materiali, piuttosto che dipendere da diversità funzionali e d'impiego, sembra legata ad altri fattori variamente distribuiti nell'arco cronologico di nove secoli, sia pure con concentrazione fra il X e il XV secolo. Monoliti di ampiezza notevole, per architravi e stipiti, possono trovarsi, infatti, sia di verrucano sia di calcare; colonne monumentali sono in prevalenza di granito, ma anche di calcare.

Senza dubbio le qualità cromatiche e il grado di levigabilità o comunque di trattamento delle superfici e dei contorni furono fattori di non poca rilevanza, ma le ragioni della preferenza di alcuni materiali su altri furono diverse, e molto moderatamente influì la distanza dei giacimenti dei materiali. Infatti, a parte il granito dell'Arcipelago Toscano (isole d'Elba e del Giglio) e della Sardegna, particolarmente preferito per la realizzazione di colonne e colonnine, e il marmo apuano, impiegato per la statuaria e con parsimonia nei paramenti murari più recenti e nelle modanature dei monumenti principali della piazza del Duomo e di altre chiese cittadine, la grande massa del materiale da costruzione litico proviene da località praticamente equidistanti da Pisa, entro un raggio di 10-15 chilometri (vedi tav.I). Procedendo in senso orario, da nord-ovest a sud-ovest, incontriamo infatti le cave di Vecchiano e Avane per il calcare massiccio e per il calcare nero, quelle di Filettole per il calcare rosa e per l'arenaria-macigno, quelle di Rigoli per il calcare

¹ F. REDI, *Pisa com'era: archeologia, urbanistica e strutture materiali (secoli V-XIV)*, (GISEM, Europa Mediterranea, Quaderni 7), Napoli, 1991.

Tab. 1

Testimonianze diacroniche dell'impiego dei diversi materiali da costruzione

Epoca	Edifici	Materiali
sec.V-VI	Battistero ottagonale	mattoni con stilobate e nucleo di calcare
sec.VIII-IX	S.Zeno (1.a fase) edifici civili di piazza Dante	verrucano, calcari, spogli verrucano, scarsi calcari, spogli
sec.X-XI	S.Cristina S.Matteo (1.a fase) S.Zeno (2.a fase) S.Michele in Borgo (1.a fase) S.Stefano di Oltrozzeri (1.a fase) S.Pietro in Vincoli (1.a fase) S.Frediano (1.a fase) S.Isidoro (1.a fase)	calcari, panchina, spogli calcari, panchina, spogli panchina,verrucano,calcari, spogli verrucano, calcari,panchina, spogli panchina, e altro verrucano, panchina, spogli verrucano, panchina, spogli verrucano
sec.XI-XII	Cattedrale buschetiana S.Sisto S.Pietro in Vincoli (2.a fase) S.Frediano (2.a fase) S.Andrea Forisportam (1.a fase) (2.a fase) S.Tommaso (1.a e 2.a fase) (S.Nicola) S.Paolo a Ripadarno S.Ilario S.Silvestro S.Marco in Calcesana S.Sepolcro (1.a fase) S.Cecilia S.Agata varie torri civili	calcare nero e ceroide, granito, spogli verrucano, panchina,spogli verrucano, calcare nero, panchina verrucano, panchina, spogli verrucano, calcari panchina,verrucano calcare massiccio e ceroide, scarsa panchina verrucano, calcare ceroide e altro verrucano, panchina,calcare ceroide e altro verrucano, panchina, spogli verrucano, calcari verrucano, panchina verrucano mattoni con stilobate di calcare mattoni con stilobate di calcare verrucano, panchina, scarsi calcari
2.o 3.o quarto sec.XII	Cattedrale rainaldesca mura urbane (1.o lotto) (3.o lotto) (4.o e 7.o lotto) Battistero di Diotisalvi Campanile pendente (1.a fase) S.Sepolcro (2.a fase) S.Zeno (ampliamento)	calcare ceroide panchina calcare selcifero, panchina calcare selcifero, calcare massiccio e cavernoso calcare ceroide, altri calcari, granito calcare ceroide, altri calcari, granito verrucano, calcare ceroide, mattoni, calcare nero calcari, panchina
sec.XII-XIII	S.Matteo (1.a fase) S.Paolo all'Orto S.Andrea Forisportam (3.a fase) S.Michele degli Scalzi campanile di S.Nicola campanile di S.Sepolcro (1.a fase) torri e case-torri civili	verrucano, calcare ceroide,calcare nero calcare ceroide, altri calcari verrucano calcare ceroide, altri calcari, verrucano verrucano, calcari, panchina verrucano verrucano, scarsi calcari e panchina, scarsi mattoni
1.a metà sec.XIII	edilizia civile mura urbane (2.a fascia) Canonica Nuova del Duomo S.Cecilia (2.a fase)	calcari, mattoni, verrucano, breccia breccia, calcari, e grezzoni mattoni con stilobate di calcari e grezzoni mattoni con stilobate di calcare
2.a metà sec.XIII	edilizia civile Battistero di Nicola e Giovanni Ospedale Nuovo Camposanto (1.a fase) campanile pendente (2.a fase) mura urbane (completamento 2.a fascia) S.Caterina S.Francesco	mattoni, calcari, breccia, verrucano calcare ceroide, altri calcari mattoni con stilobate di calcari e breccia calcare ceroide(esterno), mattoni (interno) calcare ceroide e breccia breccia e Tersana mattoni con stilobate di calcare mattoni con stilobate di calcare
1.a metà sec.XIV	mura urbane (3.a fascia) Camposanto (completamento) Battistero(completamento)	breccia calcare ceroide, marmo apuano, mattoni calcare ceroide,marmo apuano, mattoni

	edilizia civile S.Martino S.Caterina (facciata) S.Maria della Spina S.Michele in Borgo (facciata) S.Maria Vergine	mattoni, calcari mattoni con stilobate di calcare, facciata di calcare ceroide calcare ceroide calcare ceroide calcare ceroide verrucano e calcari
2.a metà sec.XIV	Palazzo Gambacorti S.Domenico rinforzi delle fortificazioni edilizia civile	mattoni,arenaria,verrucano mattoni, arenaria mattoni, calcari mattoni, calcari

cavernoso, quelle di S.Giuliano per il calcare selcifero e il calcare ceroide, quelle di Asciano per la breccia quarzifica, gli scisti filladici e i grezzoni, quelle di Crespignano per il Verrucano, quelle di Caprona per il calcare cavernoso, quelle di Uliveto-Carcaiola-Noce per il calcare massiccio, quelle di Vicopisano e Buti per tutte le varietà del Verrucano e per un tipo più pregiato di scisto grigio², quelle, infine, del versante settentrionale delle Colline livornesi (Vicarello-gronda dei Lupi) per il tufo calcareo o Panchina livornese.

La pianura alluvionale al centro della quale sorge Pisa, con la presenza di tre fiumi (Arno, Auser, Serchio) e con la fitta rete di fossi (Barra a Vecchiano, Ozzeretto a S.Giuliano, Vicinaia a Caprona, Torale e Caligi a sud, favoriva naturalmente il trasporto dei materiali da costruzione dalla periferia verso il centro per mezzo di imbarcazioni, riducendo non poco le difficoltà e i costi derivanti dalla gestione e dalla capienza del vettore: una imbarcazione non ha bisogno di animali da traino perché sfrutta la corrente del corso d'acqua, regolata da un sapiente sistema di chiuse³, più vantaggiosamente della pur eccellente rete stradale del territorio; inoltre una zattera o una barca contengono un carico maggiore di quello di un carro. L'Arno attraversava Pisa e l'Auser la lambiva a nord; fossati di derivazione a est e a ovest della città collegavano i due fiumi, come il Caligi di Oratoio e il Caligi della Vettola facevano a sud fra il bacino del Porto Pisano, a est di Livorno, e l'Arno stesso. Il suo corso poteva essere risalito dal mare fino alla città

consentendo il trasporto delle colonne impiegate per la Cattedrale, per il Battistero⁴ e per le altre chiese cittadine dalle isole dell'Arcipelago Toscano e dalla Sardegna. Anche il marmo apuano seguiva lo stesso percorso, prima marino poi fluviale, ma inverso, da nord anziché da sud. La calce, prodotta in abbondanza con il calcare di S.Giuliano alle falde del Monte Pisano, e il legname da costruzione seguivano lo stesso percorso d'acqua delle pietre, con gli stessi mezzi di trasporto o per fluitazione⁵. Gli scali per lo sbarco dei materiali potevano quindi coincidere con quelli degli altri generi commerciali, ma anche essere specializzati allo scopo specifico o approssimarsi al sito di destinazione. Per un più agevole trasporto del materiale da costruzione per la realizzazione delle mura urbane per mezzo di imbarcazioni dalle cave del Monte Pisano alla città, per una distanza di circa 5 km, nel 1157 il Comune di Pisa faceva scavare appositi fossati, e nel 1159, per raggiungere più comodamente le cave di panchina delle Colline livornesi, lo stesso Comune faceva scavare una fossa lunga circa 4,5 km dalla cava alla fossa Torale⁶. Le fornaci per i laterizi, al contrario delle cave di pietra che erano situate ai margini della pianura alluvionale pisana sui rilievi collinari che la circondano, si trovavano nei sobborghi della città, tutto attorno e generalmente in corrispondenza delle porte urbane per una più facile commercializzazione dei prodotti, laddove abbondanti erano i giacimenti limosi della materia prima, che poteva essere estratta direttamente sul posto con semplici fosse di escavazione.

² Cfr. C. LUPI, La casa pisana e i suoi annessi nel Medio Evo, *Archivio Storico Italiano*, serie V, XXXII, 1903, 90.

³ Nel 1305 l'Operaio del Duomo chiedeva l'autorizzazione di erigere una chiusa per innalzare il livello dell'Auser a nord della città in modo da trasportare più agevolmente con imbarcazioni da S.Giuliano alla piazza del Duomo "*lapides marmoreos quos habet apud Montem Pisanum*" (cfr. G. NISTRI, *San Giuliano, le sue acque termali e i suoi dintorni*, Pisa 1875, 689).

⁴ Cfr. B. MARAGONE, *Annales Pisani*, ediz. a cura di M. Lupo Gentile, in *Rerum Italicarum Scriptores*, VII2, Bologna,

1937, 14, 18; cfr. anche l'elogio funebre dell'architetto della Cattedrale, inciso nel marmo del sarcofago contenente le sue spoglie mortali, inserito nella facciata del Duomo.

⁵ Negli Statuti Comunali di Pisa, del 1313-1337, si faceva divieto di affidare alle acque del Serchio cataste di legname che avrebbero potuto danneggiare nel loro percorso le pile del ponte di Albavola, l'ultimo verso la foce (cfr. F. BONAINI, *Statuti inediti della città di Pisa dal XII al XIV secolo*, Firenze, 1854-1857, II, 383).

⁶ MARAGONE, *cit.*, 16, 18.

Tab. 2
Distribuzione cronologico-quantitativa dell'impiego dei materiali

epoca	verrucano	calcare			marmo	granito	breccia Asc.	panchina	arenaria	lat-	spogli
		s.	c.	a.							
sec. V-VI				x						xx	
sec. VIII-IX	xx			x							x
sec. X-XI	x			x			xx				x
sec. XI-XII	xxx		x	xx		x	xx			x	x
2.o-3.o quarto sec. XII	xxx	xx	x	xx		x	x				x
sec. XII-XIII	xx		xx	xx		x	x				x
1.a metà	x		xx	xx			x			xx	
sec. XIII											
2.a metà	x		xx	xxx	x		xx			xxx	
sec. XIII											
1.a metà	x		x	xx	x		xx			xxx	
sec. XIV											
2.a metà	x		x	xx	x		x		x	xxx	
sec. XIV											

Per la trattazione specifica di dettaglio rimando a un mio intervento recente, in corso di pubblicazione⁷.

Non dobbiamo trascurare anche l'incidenza del fenomeno del riuso del materiale litico e di laterizi di spoglio di età romana, di diversa provenienza, frequente specialmente dal X al XIII secolo, e quello generalizzato della raccolta del materiale proveniente dalle demolizioni, che in ogni periodo caratterizzano la dinamica insediativa di ciascuna città. Il primo fenomeno è attestato materialmente e da un noto documento compilato dall'abate Bono nella prima metà del sec. XI⁸; il secondo, oltre che materialmente, è abbastanza frequente nella documentazione archivistica dei secc. XII-XV⁹.

Se il memoratorio dell'abate Bono attesta, come abbiamo detto, nella prima metà del sec. XI l'uso di raccogliere materiale di spoglio classico in località distanti, come Roma, esso contiene anche precisi riferimenti ad altre provenienze per materiali diversi, molto probabilmente di primo impiego: cerro per le celle del monastero, che dopo dieci anni furono ricostruite di castagno fatto venire per mare da Luni, marmo lunense e granito elbano per le colonnine del

chiostro abbaziale, edificato qualche tempo dopo "a pietra et calcina" in sostituzione delle stesse celle di legno. Da questo interessantissimo documento possiamo prendere le mosse per una periodizzazione cronologica dei diversi materiali da costruzione, che risale però archeologicamente al V-VI secolo, al periodo cioè a cui viene attribuito il Battistero ottagonale rinvenuto nel 1936 all'interno del Camposanto monumentale¹⁰. Le strutture dell'edificio sono costituite da un paramento interamente di mattoni, spessi circa cm 5, fatta eccezione del sodo murario, a scapoli di calcare, e dello stilobate dei muri e dei pilastri angolari, a conci di medio-piccole dimensioni riquadrati e ripianati con cura discreta, di calcare cavernoso e, così sembrerebbe, di grezzoni o affini. Nel V-VI secolo, quindi, troviamo l'associazione di pietra calcarea con paramenti accurati di mattoni. Dobbiamo risalire alle strutture più antiche della chiesa di S. Zeno (secc. VIII-IX)¹¹ per rinvenire paramenti di verrucano e scarso calcare, ai quali nelle fasi costruttive successive (secc. X e XI) si preferiscono conci di panchina livornese con sporadici marmi e mattoni di spoglio. Questa associazione, con preva-

⁷ F. REDI, I laterizi nell'edilizia medievale a Pisa e a Lucca: produzione, impiego, cronologia, in: *Colloque international La brique antique et médiévale. Production et commercialisation d'un matériau*, Centre d'histoire urbaine et de l'ENS de Fontenay/Saint-Cloud, Ecole française de Rome, (Saint-Cloud 16-18 novembre 1995), in corso di stampa.

⁸ M.L. MAGNANI, *I monasteri pisani dalle origini al 1076*, Tesi di Laurea, Pisa, a.a. 1964-1965, rel. Prof. C. Violante, doc. 3.

⁹ Cfr. BONAINI, *cit.*, I, 456-457; LUPI, *cit.*, XXIX, 1902), 213, nt. 4; XXXI, 1903, 391, nt. 5; XXXII, 1903, 78, nt.; 81 nt., 6; 82, ntt. 1, 2, 3; 91, ntt. 4, 5; 93, nt. 1.

¹⁰ Cfr. L. PANI ERMINE, L'insula episcopalis a Pisa nell'Alto Medioevo: appunti per una ricerca, in: L. PANI ERMINE & D. STIAFFINI, *Il battistero e la zona episcopale di Pisa nell'Alto Medioevo*, Biblioteca del Bollettino Storico Pisano, Collana storica 30, Pisa, 1985.

¹¹ REDI, *Pisa com'era, cit.*, 77-80.

Tab. 3

Associazione materiali-strumenti di lavoro

Strumenti	Materiali						
	verrucano selcifero	calcare ceroide	calcare cavernoso	calcare Asciano	breccia	panchina	arenaria
mazzetta	x	x		x			
picconcello	xx		x	x	x		
martellina	x	x	x	x	x	x	x
ascettino	x	x	x	x	x	x	x
polka			xx	x	x		
subbia	x		x	x			
scalpello da taglio	xx		xx	x		x	
gradina			xx	x	x		
sega						xx	
mannarina						xx	

lenza di tufelle ricavate probabilmente dalle macerie degli edifici urbani di epoca classica¹², è caratteristica di edifici del X-XI secolo, come le chiese di S. Matteo e di S. Stefano di Oltrozzeri, mentre in altre, come S. Michele in Borgo, prevale ancora il verrucano, e in altre, come S. Cristina, prevale il calcare¹³. Per un più completo panorama di riferimento si rimanda alla tabella 1, nella quale sono indicate

cronologicamente le presenze e le associazioni dei diversi materiali da costruzione, escluso il legno, negli edifici databili per mezzo di indicatori cronologici attendibili; nella tabella 2 sono espressi cronologicamente i rapporti quantitativi complessivi fra i diversi materiali.

2 Tecniche di produzione: strumenti, lavorazione, apparato; specificità e cronologia

Come è noto, dall'osservazione diretta dei litotipi è possibile ricavare la cognizione degli strumenti e delle tecniche di lavorazione; altri dati concernono la tecnica di composizione dei paramenti murari e le conoscenze empiriche delle maestranze in materia

¹² La chiesa di S. Zeno sorge infatti in un'area già occupata dalla città in età romana e nel Medioevo denominata "alle Grotte" e prossima a quelle chiamate "in Civitate vetera" e "Petricio" (cfr. REDI, *Pisa com'era, cit.*, 45-46 e ss.).

¹³ Per un inquadramento cronologico di queste chiese, cfr. REDI, *Pisa com'era, cit.*, 348-352 e ss.

Tab. 4.

Associazione materiali-tecniche murarie

MATERIALI	TECNICHE									
	1	2	3	4	5	6	7	8	9	10
verrucano	xx	x	x	x	xx	xx		x	xxx	xx
calcare selcifero					xx	x	x			
calcare nero						x		x	x	
calcare ceroide								x	xx	x
calcare massiccio	x	x		x	x	xx	x	xx		
calcare cavernoso		x			x	xx		xx		
grezzoni					x	xx		xx		
breccia di Asciano						xx		xxx		x
panchina								xx	x	x
arenaria										x
marmo apuano									x	x

Pietre:	Località:	Gesso:
1 - verrucano A - "Petraia" presso Crespignano		14 - Limone, Oliveto, Pian di Porto
2 - calcare selcifero B - "Petraia de Monte Pisano"		Argilla:
3 - calcare ceroido C - "Balneo de Carcaiola"		15 - "teglaria" di Rosso di Teglaria
4 - calcare massiccio D - "Petraia" presso Noce		16 - "teglaria" di Palavigino di Torre
5 - calcare cavernoso E - "Monte Bianco" (S.Giuliano)		17 - "teglaria" fuori della Porta del Parlascio
6 - calcare nero F - "Monte Bianco" (Noce)		18 - "teglaria" fuori della Porta dei Lecci
7 - calcare rosa G - "Monti Bianchi" (Uliveto)		19 - "teglaria" di Punta di Sabbatino o di Ognissanti
8 - grezzoni H - "Petraia de Tufi"		20 - "teglaria" di Sano di Gherardo
9 - breccia di Asciano		21 - "teglaria" fuori della Porta S.Gilio
10 - arenaria		22 - "teglaria" in località Teglaria
11 - panchina livornese		
Calce:		
12 - fornace della Degazia del Mare		
13 - fornace della Porta del Parlascio		

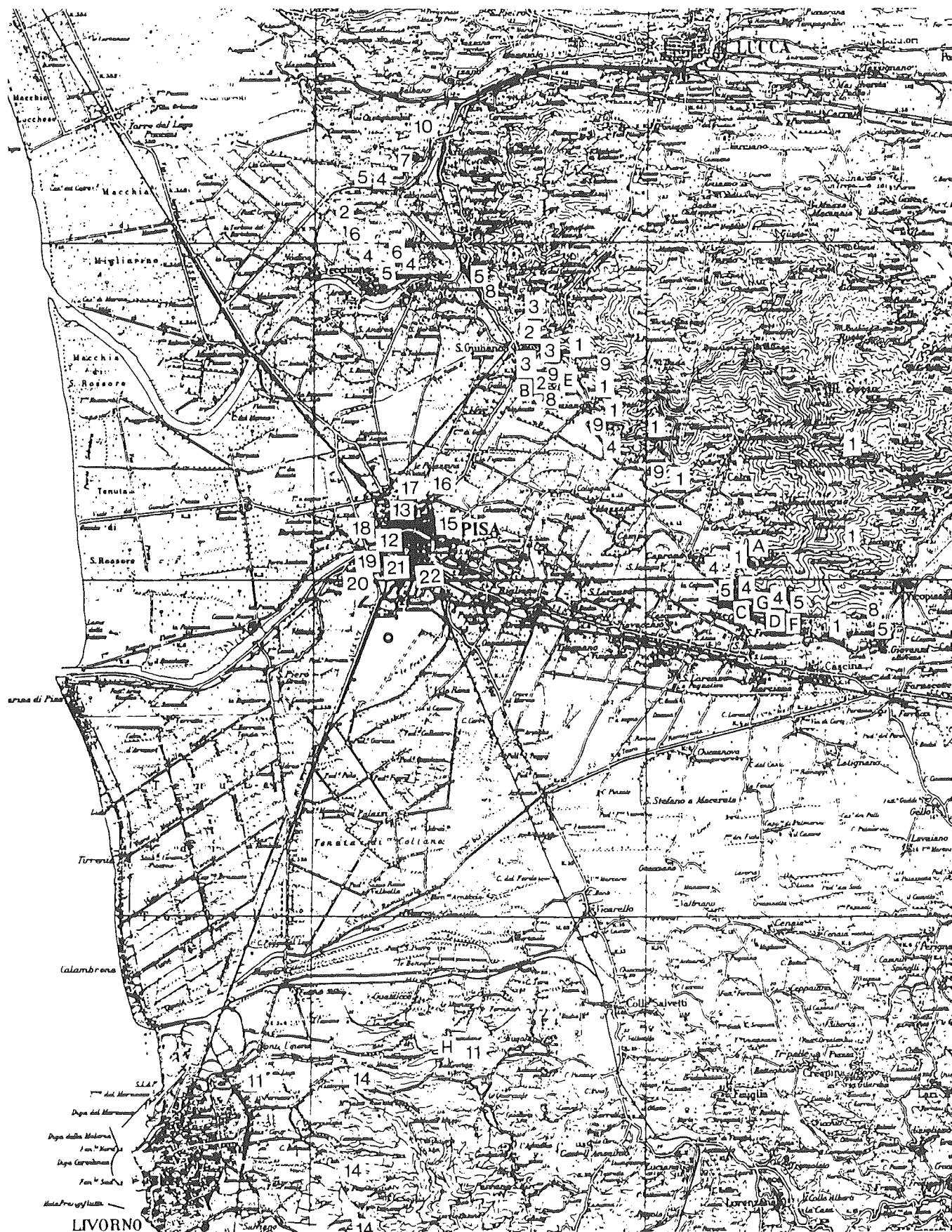
edilizia. Dall'analisi di oltre 600 unità architettoniche medievali ancora esistenti a Pisa è stato possibile individuare le tracce lasciate sul materiale litico dalla mazzetta, dal picconcello, dalla martellina dall'ascettino e dalla polka, nonché dagli scalpelli corrispondenti: la subbia, lo scalpello da taglio, la gradina,

ovviamente con diverse ampiezze del taglio e con diversa dentatura. Per usi particolari venivano impiegati anche la sega e la mannarina. Il materiale litico ha restituito anche informazioni sulle diverse forme di approvvigionamento mediante raccolta di superficie, per spietramento dei campi o dalle falde di

Tab. 5

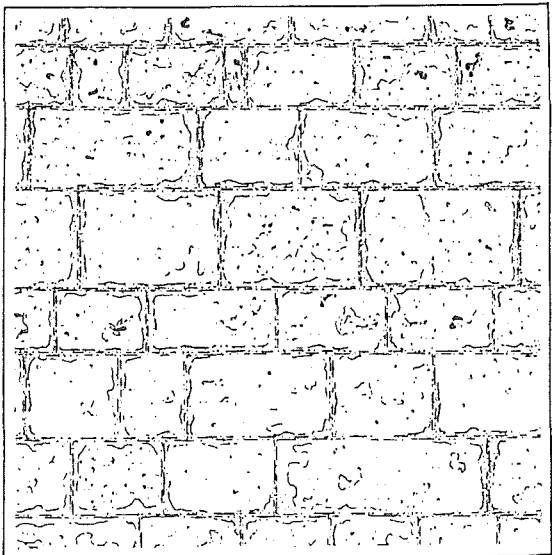
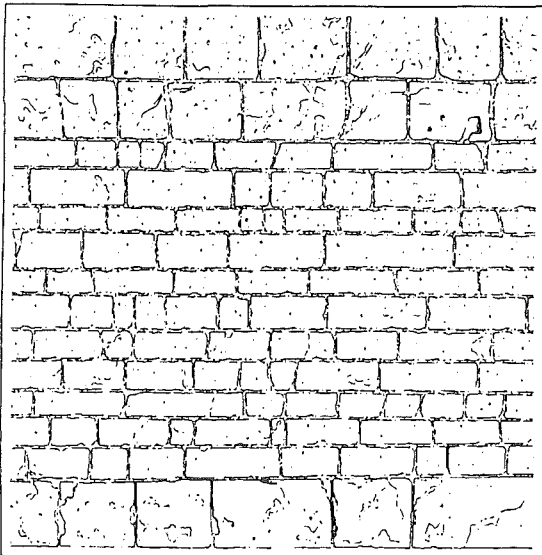
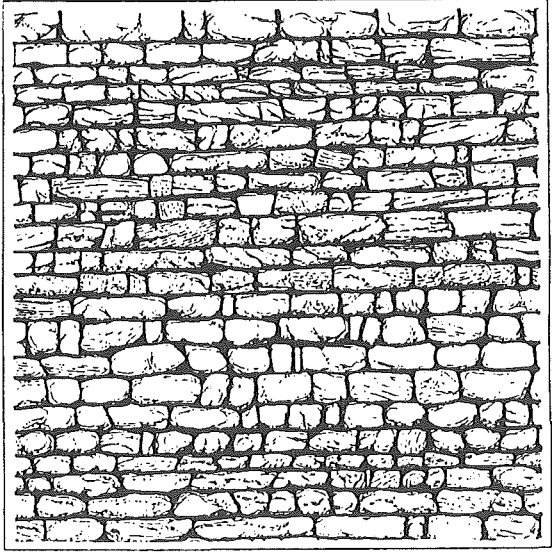
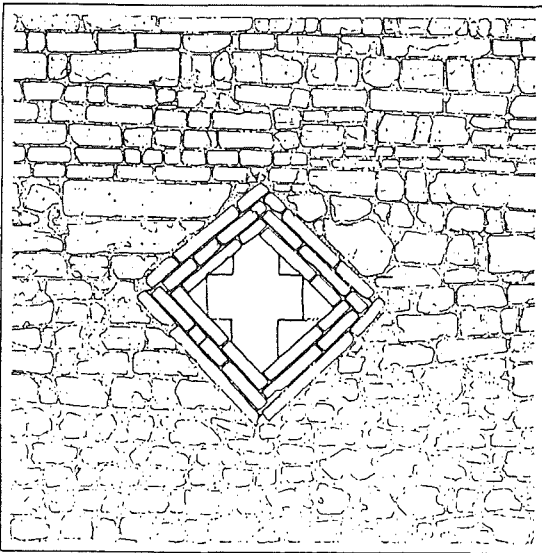
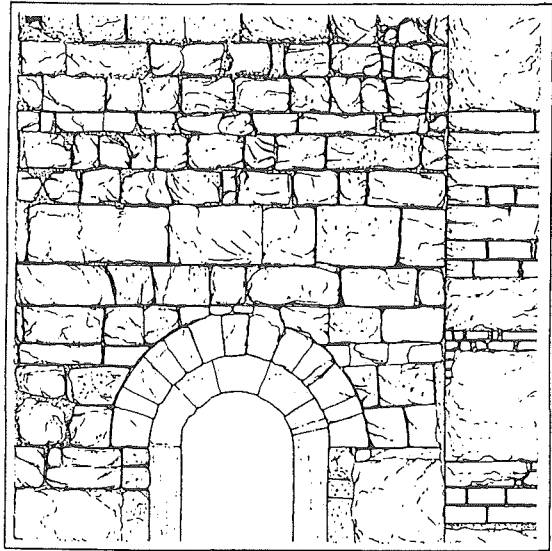
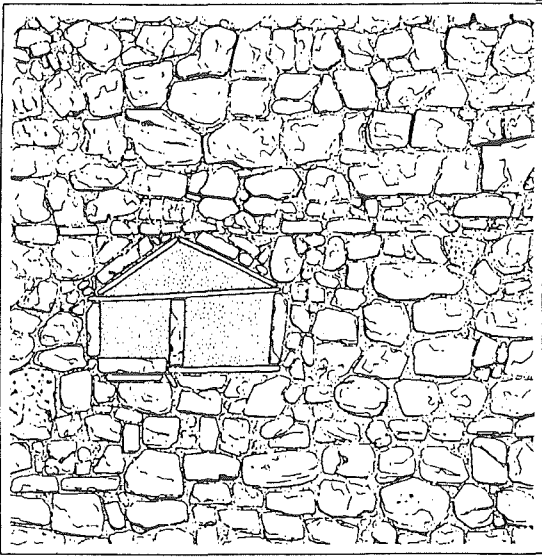
Rapporto fra materiale litico e laterizi per unità immobiliari e fasi costruttive

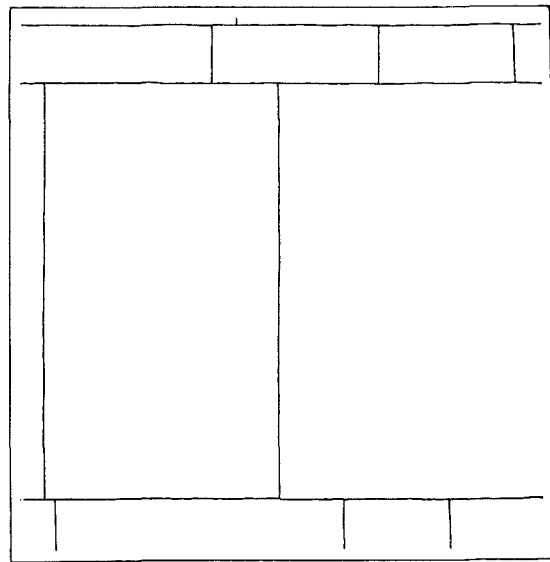
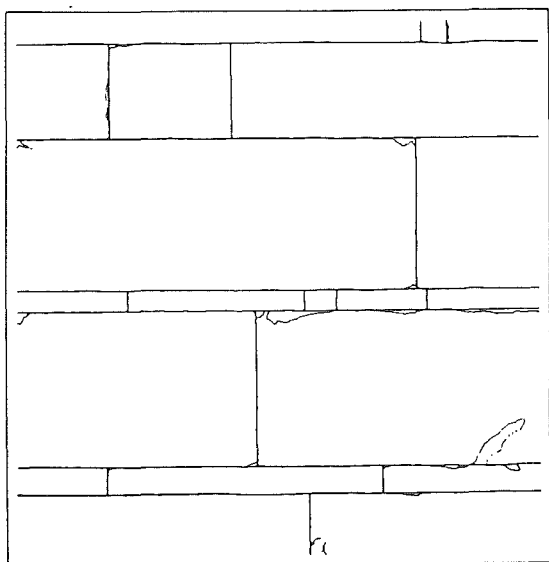
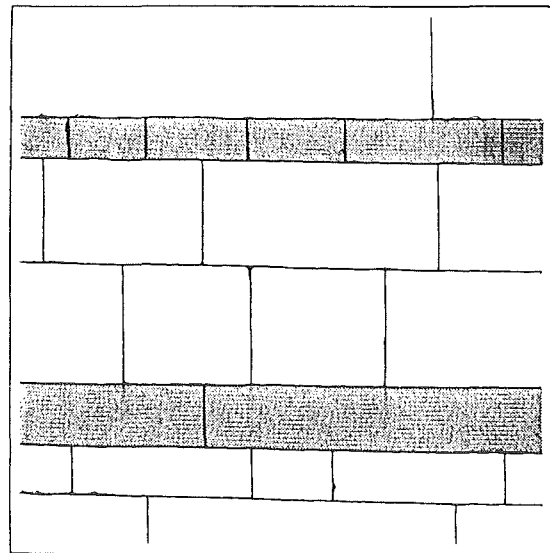
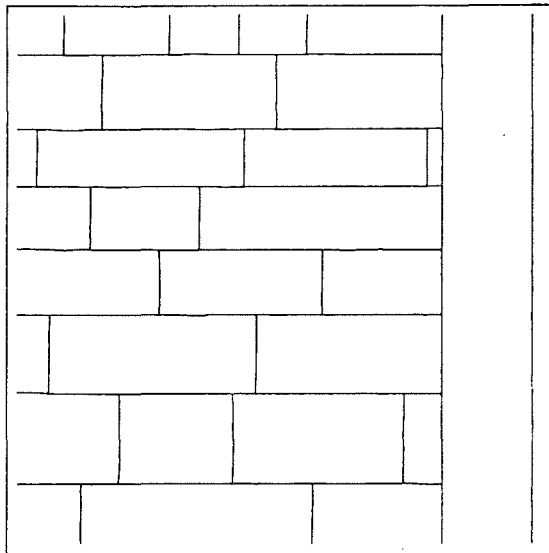
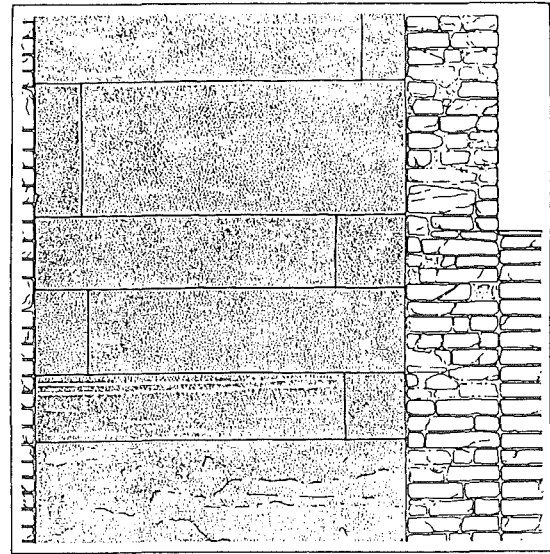
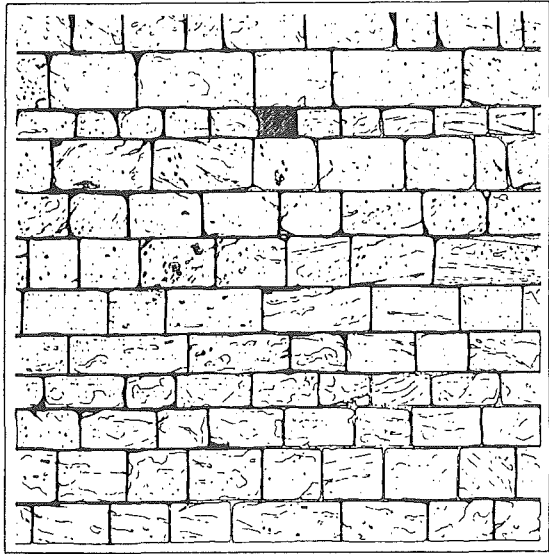
Epoca	Edilizia civile						Edilizia ecclesiastica					
	Pietra		Cotto		Misti		Pietra		Cotto		Misti	
	n.	%	n.	%	n.	%	n.	%	n.	%	n.	%
sec.X-XI							6	5,77				
sec.XI 1.a metà							6	5,77				
sec.XI 2.a metà							12	11,53				
sec.XI-XII	43	7,50										
sec.XII 1.a metà							14	13,46	2	1,92		
sec.XII 2.a metà							9	8,65	2	1,92	2	1,92
sec.XII-XIII	73	12,74	5	0,87	8	1,39						
sec.XIII 1.a metà							3	2,88	9	8,65	4	3,84
	117	20,42	178	31,06	88	15,35						
sec.XIII 2.a metà							3	2,88	6	5,77	2	1,92
sec.XIII-XIV	3	0,52	28	4,88	11	1,92						
sec.XIV 1.a metà							5	4,80	9	8,6	5	4 3,84
	4	0,69	9	1,57	6	1,04						
sec.XIV 2.a metà							2	1,92	3	2,88		
sec.XV 1.a metà							1	0,96				
Totali parziali	240	41,87	220	38,38	113	19,70	61	58,62	31	27,87	12	11,52
Complessivi	573						104					



Tav. I. - Localizzazione delle cave o degli affioramenti e delle strutture di trasformazione dei materiali da costruzione del territorio pisano.

Tav. II. - *Campionatura delle tecniche murarie.*





Tab. 6
Cronologia delle tecniche murarie

TECNICA											
EPOCA	1	2	3	4	5	6	7	8	9	10	later.
sec.V-VI								x			xx
sec.VIII-IX	xx	xx	x	x	xx						
sec.X-XI		x			xx	xx	x				
sec.XI-XII					x	xx		xx	xx	x	x
2o-3o quarto sec. XII					xx	xx	x	xx	xxx	xx	
sec.XII-XIII						xx		xx	xxx	xx	x
1.a metà sec. XIII						x		xx	xx	xx	xx
2.a metà sec. XIII						x		xx	xx	x	xxx
1.a metà sec. XIV								xx	xx	x	xxx
2.a metà sec. XIV								x	x	x	xx

dirupi e dal letto dei torrenti, oppure da cave che utilizzavano stratificazioni geologiche di piccola potenza o a banchi.

Il trattamento dei litotipi poteva essere pressoché inesistente od ottenuto per spaccamento in due metà di ciottoli fluviali o per spaccamento e sommaria sagomatura di pietre più ampie, ma anche, più frequentemente e successivamente, consistere in squadrature, sagomature e spianature da più sommarie a sempre più perfette e regolari, da più piccole a più grandi, con strumenti di lavoro via via più minuti e più precisi. Le pezzature rinvenute riguardano conci compresi fra i valori minimi di cm 16x11 e massimi di cm 178x48, o 146x62.

La composizione dei paramenti murari risulta raggruppabile in 10 tipi per le pietre e uno per i mattoni, con un numero di varianti talvolta elevato, attribuibile alla casualità e alla prassi degli operatori. In sintesi possiamo così raggruppare i tipi di apparato rinvenuto:

1 a corsi sub-orizzontali con ciottoli fluviali o pietrame erratico grezzi o appena adattati con mazzetta o con martellina, con giunti evidenti ed eccedenti, talvolta spatolati e stilati;

2 a corsi sub-orizzontali con pietrame grezzo o appena adattato con mazzetta o con martellina, con zeppe di pietra, talvolta di laterizio, con giunti evidenti ed eccedenti, raramente spatolati e stilati;

3 a spina-pesce, con ciottoli di fiume interi o dimezzati con martellina o ascettino, insieme con pietrame o con laterizio, con giunti evidenti, spatolati e talvolta stilati;

4 irregolare, a bozze o blocchi spaccati con mazzetta o martellina e picconcello, ma non squadrati, con corsi di orizzontamento a intervalli irregolari, con zeppe di ripianatura e verticali, con giunti evidenti ed eccedenti, talvolta spatolati;

5 a corsi sub-orizzontali e paralleli, con sdoppiamento, con o senza zeppe, a bozze o pietre sommariamente squadrate e spianate con martellina o ascettino e picconcello, con giunti evidenti ed eccedenti, talvolta spatolati e stilati;

6 a corsi orizzontali e paralleli, "a filaretto", con conci di altezze variabili non perfettamente squadrati e spianati con martellina o ascettino e picconcello, parzialmente rifiniti con subbia o scalpello da taglio, con giunti evidenti ed eccedenti, talvolta spatolati;

7 a corsi orizzontali, sub-paralleli, con bozze anche in sequenze verticali, sommariamente squadrate e spianate con mazzetta o martellina e picconcello, parzialmente rifiniti con subbia o scalpello da taglio, con sdoppiamenti, con o senza zeppe, con giunti evidenti ed eccedenti, talvolta spatolati;

8 a corsi orizzontali e paralleli, con conci riquadrati e spianati con discreta precisione con martellina e picconcello e rifiniti con ascettino o scalpello da taglio o polka, con giunti sottili, appena evidenti;

9 a corsi orizzontali e paralleli, di diversa altezza o "pseudoisodomi", con conci perfettamente riquadrati, sagomati e spianati con martellina o ascettino e rifiniti con scalpello da taglio lungo il perimetro e con picconcello o subbia, o con polka o gradina, sulla superficie, con giunti impercettibili;

10 come il precedente, ma a corsi di altezza uniforme, o "isodomi";

11 limitatamente ai laterizi è generalizzata la tecnica detta "senese", cioè con mattoni disposti in piano, di lato in alternanza irregolare con altri disposti di testa.

Come risulta dalle tabelle 3 e 4, sono state individuate associazioni specifiche fra strumenti, tecniche di lavorazione, materiali e apparati murari, pur con aree di interferenza più o meno estese e flessibili, a

causa di una certa indifferenza e intercambiabilità di alcune di esse.

Se analizziamo la tabella 5 sulla quale sono rappresentati diacronicamente i rapporti fra l'uso esclusivo della pietra, quello del mattone e quello misto in singoli edifici o in singole fasi costruttive di ciascuno di essi, ci accorgiamo che la differenza fra il totale delle costruzioni interamente di pietra e quelle esclusivamente di mattoni è minima, a vantaggio delle prime, e che forte è la presenza di edifici nei quali compaiono, specialmente a partire dal sec. XIII, associazioni equivalenti di pietra e laterizi, mentre in precedenza riscontriamo una più forte presenza di edifici esclusivamente di pietra, con molta probabilità associati ad altri di legno, purtroppo non pervenuti.

Abbiamo rintracciato inoltre una gerarchia fra le tecniche murarie e fra i materiali dipendente dal diverso grado di lavorabilità, di compattezza e di capacità di carico, di durezza, e inoltre da fattori estetici e dall'incidenza dei costi di trasporto a seconda della pezzatura dei litotipi e della distanza delle cave. Ne consegue una diversa scala di valore e di costo dei materiali e delle tecniche murarie. Ad esempio, specialmente nell'edilizia civile dell'aristocrazia, è evidente la differenza di valore, espressa in scala decrescente, del verrucano, lavorato in grossi litotipi perfettamente riquadrati e spianati con picconcello "a scorza d'arancia" e rifilati "a nastrino" con lo scalpello da taglio, e assemblati con tecnica muraria tipo 9 o 10, con impiego prevalente, in bella mostra, nei prospetti principali, comunque al piano terra e nei solai inferiori, mentre nei lati e in sequenza verso l'alto riscontriamo tecniche via via meno raffinate, tipi 8, 6, 5, con lo stesso materiale o, più frequentemente, in progressione di valore decrescente, con calcare ceroido, calcare massiccio, grezzoni o breccia di Asciano, panchina livornese. Quest'ultima però viene impiegata nei solai superiori per motivo della maggiore leggerezza e della migliore maneggevolezza piuttosto che per ragioni strettamente economiche. La stessa gerarchia sussiste fra paramento esterno e paramento interno, con evidente risparmio dei costi, sia essendo le pareti interne destinate a intonacatura o scialbatura sia in conseguenza della minore durezza richiesta per i paramenti interni in quanto non esposti agli agenti atmosferici. Mi sembra evidente quindi che nella

scelta dei materiali e dei diversi tipi di apparato murario il problema dei costi fosse prevalente, ma non minore attenzione venisse rivolta alle gerarchie statiche ed estetiche, specialmente dovendo distinguere fra pietra e laterizi in edifici a muratura mista. È significativo che in essi la pietra sia usata nelle facciate piuttosto che nei lati, all'esterno piuttosto che all'interno, nelle nervature principali piuttosto che nei sodi murari, cioè nelle strutture dell'edificio più a vista, e quindi più rappresentative, o di maggiore impegno statico, e quindi più importanti architettonicamente. Un esempio evidente del maggior valore simbolico ed estetico, anche in conseguenza di quello commerciale, attribuito dai contemporanei alla pietra concia rispetto al mattone è espresso dal documento del 1337 che contiene la committenza di dipingere "ad cantones", cioè a finto paramento a conci di pietra, il prospetto dell'Ospedale Nuovo, interamente di mattoni, che si affacciava sulla piazza del Duomo, nella quale campeggiavano strutture monumentali di calcari bianchi¹⁴. Con materiali e tecniche più poveri, e quindi più economici, si producevano surrogati o imitazioni di altri più costosi e più rappresentativi. Ragioni di praticità affini a quelle della panchina e di effettiva economia dipendente dalla maggiore vicinanza dei giacimenti, dai più semplici sistemi di estrazione della materia prima e di confezione degli elementi da costruzione, dalla serialità e dalla modularità di produzione e d'impiego di questi, dalla fine del XII secolo a tutto il XIV fecero gradualmente affermare come materiale da costruzione i laterizi. Dapprima essi vennero impiegati nelle parti superiori degli edifici dell'aristocrazia e nell'edilizia minore o seriale, successivamente nelle costruzioni ecclesiastiche monumentali degli ordini monastici e assistenziali, nelle opere difensive e di pubblica utilità, negli stessi palazzi signorili, con una vera e propria rivoluzione della mentalità e del mercato. Per la tecnologia dei laterizi rimando a un mio intervento al Convegno di Parigi del novembre 1995, in corso di stampa¹⁵. Per la cronologia delle diverse tecniche murarie si controlli la Tabella 6.

¹⁴ Cfr. L. TANFANI CENTOFANTI, *Notizie di artisti tratte dai documenti pisani*, Pisa, 1897, 123; F. REDI, *Pisa. Il Duomo e la piazza*, Cinisello Balsamo (MI), 1996, 174-178.

¹⁵ Cfr. *supra*, nt. 7.

La producción de ladrillos en la Toscana medieval

1 Introducción

La industria de la arquitectura puede ser considerada sin ninguna duda uno de los principales sectores productivos del período medieval, en modo particular en aquellas zonas como la Toscana, que alcanzaron un desarrollo urbano de grandes dimensiones. En efecto, son varios los autores que han reflexionado sobre la importancia de esta actividad al lado de sectores productivos más conocidos – como la seda en Luca o la lana en Florencia por su particular incidencia exterior, resaltando el significado económico interno de los sectores productivos de materiales de construcción y de las corporaciones de albañiles, canteros y carpinteros. De forma particular merecen señalarse los estudios de R. Goldthwaite (1984, 1996) sobre Florencia en el período bajomedieval y renacentista, donde son muchas las páginas dedicadas al estudio de la producción y distribución de los materiales de construcción (idem 1984, 249-348).

Un aspecto de esta problemática histórica que alcanza cierta relevancia, es la producción y consumo de ladrillos en la arquitectura medieval y post-medieval toscana. La expansión de este producto se ha visto favorecido tanto por la potencialidad ofrecida por la configuración física de la región, como por la necesidad de reperir en breve tiempo una considerable cantidad de materiales constructivos en pleno auge urbano. El siglo que va del 1150 al 1250 ha sido definido como “il secolo della crescita” (Hyde 1977, 105 ss.), y en este período se asiste a un crecimiento urbano de enormes proporciones, que alcanza una de sus puntas máximas justamente en Toscana (Malamina 1983, 238); en particular los años transcurridos entre 1155-1220 ven la ampliación del recinto amurallado de casi todas las principales ciudades toscanas (Pisa, Florencia, Luca, Siena,...), testimoniando este crecimiento.

El papel jugado por el ladrillo en esta expansión urbana es de gran interés para conocer el desarrollo de la industria constructiva medieval. A pesar de que existe un uso diferencial de los diversos materiales a

disposición en los diversos centros toscanos, podemos indudablemente afirmar que buena parte de las ciudades medievales toscanas han sido realizadas en gran medida con arcilla cocida, y el aprovisionamiento y control de los precios de estos productos era una de las ocupaciones cotidianas de las Comunas.

Desde hace algunos años la naciente arqueología de la arquitectura y la arqueología de la producción (Mannoni & Giannichedda 1996), han prestado particular atención a este problema específico, centrándose tanto en los aspectos productivos, mediante la excavación de centros artesanales, así como en la utilización, decoración y características de los productos. Como resultado de este interés, contamos con una serie de datos que nos permiten delinear, si bien aún de forma preliminar, la historia del ladrillo medieval y de sus características materiales y variaciones en un espacio de tiempo comprendido entre los siglos XII/XIII al XX. En este trabajo se presenta una síntesis sobre los estudios realizados y sobre las líneas de investigación seguidas, señalando aquellas líneas sobre las que se trabaja actualmente con mayor intensidad.

2 La aparición del ladrillo medieval en Toscana

¿Existe una discontinuidad entre las producciones de ladrillos romanos y los medievales? Si bien una respuesta definitiva no se puede dar para toda la región, con los datos con que tenemos debemos excluir una continuidad en las estructuras y tradiciones productivas, después del abandono de la producción de ladrillos en época tardorromana (quizá en el siglo V) en Toscana (Parenti 1994). Es más, contamos con elementos para creer que la reaparición después del año 1000 de producciones de ladrillos se deba a una importación tecnológica procedente de un área todavía sin definir.

Es necesario empezar definiendo la diferencia principal existente entre ladrillos antiguos y los medievales. Se trata principalmente de una diversidad dimensional, o sea, del módulo empleado para la

realización de los ladrillos: en un momento aún no determinado de la Alta Edad Media se abandonan las típicas producciones romanas (sesquipedal, Adam 1984, 157 ss.), adoptándose un módulo de un pie por medio pie (30-28 x 15-13 x 4-6 cm.), que se ha conservado hasta la actualidad (Mannoni & Milanese 1988). Este cambio hay que ponerlo en relación con la discontinuidad productiva, ya que no se advierte una modificación progresiva o situaciones intermedias entre ambos tipos de producciones.

Esto no quiere decir que la desaparición de las producciones de ladrillos en la alta edad media fuese generalizada en toda Italia: en la zona de dominio bizantino como Ravena (Novara 1994, 37 ss.), en áreas de Lombardía (Fiorilla 1985-1986; Blake & Fleming 1983), o en grandes centros monásticos como S. Vincenzo al Voltorno o S. Cornelia (Christie 1991), se documenta la continuidad productiva siguiendo los módulos romanos (Parenti 1994, con bibliografía) hasta bien entrada la alta edad media. Por desgracia carecemos de secuencias continuas que nos permitan analizar diacrónicamente esta transformación. Los primeros ejemplos fechables que presentan un módulo medieval son del siglo IX y proceden de la zona de Milán y Brescia, pudiéndose quizás anticipar un siglo en Cividale (Parenti 1994, 31)¹.

En Toscana, por otra parte, debemos esperar hasta mucho después para poder documentar la presencia de ladrillos de módulo medieval en las construcciones. Es importante precisar que de todas formas, otro tipo de productos como las tégulas no han dejado de producirse, y aparecen citadas al menos desde el siglo X en los pergaminos de Luca (Quirós Castillo en prensa).

El análisis de edificios de los siglos XI y de la primera mitad del XII (salvo excepciones) que emplean ladrillos en su construcción ha mostrado como se trata de productos reaprovechados procedentes de edificios más antiguos y adaptados a las nuevas exigencias (Parenti & Quirós Castillo en prensa).

Hay que esperar a los primeros decenios del siglo XII para encontrar edificios fechados que presenten ladrillos con módulos medievales. La introducción de estos nuevos productos tiene lugar de modo progresivo en la región, penetrando en primer lugar en las zonas vinculadas a las principales vías de comunicación interregional y reservándose a edificios de cierto relieve; sólo en un segundo momento se produce una extensión generalizada en el resto de la región y se difunden a todos los niveles constructivos.

Son dos las áreas principales donde ha sido posible documentar la presencia de los primeros edificios fechados: en primer lugar, probablemente prece-

diendo al resto de la región, la ciudad de Pisa; en segundo lugar, el área toscana interesada por el trazado de la Via Francigena.

Pisa es sin ninguna duda el principal puerto de la Toscana en la Edad Media abierto a todos los contactos mediterráneos, y no es por lo tanto extraño que justamente en el área pisana se puedan situar los ejemplos más antiguos de nuevas técnicas adquiridas en el curso de estos siglos, como puede ser la cerámica revestida de esmalte a partir del segundo cuarto del siglo XIII (Berti 1995), o de las técnicas constructivas escuadradas (Quirós Castillo en prensa).

En cambio, la gran vía de comunicación terrestre que conectaba Roma con el norte de Italia y el centro de Europa – la vía Francigena – supone otra área privilegiada, que ve el desarrollo de una intensa actividad comercial y la aparición de numerosos centros de notables dimensiones, que contribuyen a definir las características protoindustriales y comerciales de la región en la baja edad media.

Se puede, pues, sostener la presencia de *magistri* itinerantes que recorren las principales vías de comunicación construyendo los hornos a pie de obra, sin crear en esta primera fase fábricas estables. Los primeros edificios construidos con ladrillos son iglesias, y al menos en el caso de Pisa, torre campanarias. Los ejemplos de S. Sisto, S. Andrea, S. Frediano, S. Stefano extra moenia se pueden fechar en el siglo XII gracias a la presencia de “bacini”, o sea, cerámicas colocadas en las fábricas con función decorativa (Berti & Tongiorgi 1981, 70-96).

En el mismo período, o quizás un poco más tarde, contamos con los ejemplos situados en la vía Francigena, como la plebanía de S. Giovanni de Monterappoli fechada en el año 1165, S. Salvatore de Fucecchio fechable a finales del siglo XII, así como el Duomo de S. Miniato (Barbucci, Campani & Giani 1993). Otros ejemplos de cronología menos clara se encuentran en los centros de Altopascio y Luca, que parecen fecharse a finales del siglo XII y principios del siglo siguiente, así como otros casos en el Valdelsa. En otros centros de una cierta relevancia aparecen producciones reservadas a edificios de prestigio, como puede ser la reconstrucción del palacio episcopal de Pistoia en los años 1166-1220.

A partir del XIII, y en modo particular en la primera mitad comienzan a aparecer tanto referencias documentales como edificios fechados en amplias zonas de la región, excluyendo las zonas más interiores y de montaña. Es justamente en los

¹ Un estado de la cuestión se ha realizado en el reciente encuentro “*I laterizi nell’Alto Medioevo italiano*” (Ravena, 18 abril 1997), actualmente en prensa.

decénios centrales del siglo cuando se advierte como una tecnología autóctona y extraña a las tradiciones constructivas locales se adopta en la región.

Lo que nos interesa resaltar aquí es como ha tenido lugar el proceso de introducción de estos productos en Toscana. Un primer elemento que hay que señalar es como se trata de una introducción repentina, sin experimentación precedente. Además aparece casi de forma contemporánea en varias zonas de la región, presentando características muy similares. Los ladrillos del siglo XII y principios del XIII presentan dimensiones grandes (30/29-13/12-5/6 cm) y motivos decorativos unificados. Además dimensionalmente los contextos estudiados presentan en todos los casos desviaciones estadísticas relativamente amplias (1-1,5 cm.), testimoniando el empleo de hornos ocasionales sobre los que no existe un control exhaustivo de la cocción.

Pero además, todas estas características se han identificado de la misma manera en la vecina región de Liguria (Pittaluga & Quirós Castillo en prensa). Las dimensiones y las desviaciones son muy similares, y los primeros contextos fechables hay que situarlos en los últimos decénios del siglo XII. Faltan en este caso los ladrillos decorados, y llama la atención el relativo retraso de las producciones genoveses, otro gran puerto abierto al Mediterráneo, y que en este caso parece menos receptivo a este tipo de aportaciones externas.

Todos estos indicadores permiten hablar pues de una "revolución" en el bagaje tecnológico local, tal como había sucedido anteriormente con las técnicas escuadradas (Cagnana 1994, 45). Además es posible afirmar que se trata de un proceso productivo ya maduro y perfectamente elaborado, reproducido en Toscana de forma ocasional.

Es un proceso análogo a cuanto sucede con la introducción del ladrillo en la España septentrional, donde ha sido posible observar la presencia de mudéjares, portadores en territorio cristiano de técnicas constructivas conservadas en el mundo islámico, si bien el proceso esté aún por estudiar de forma detallada (Quirós Castillo 1997).

La pregunta que surge espontánea es saber cuál es el área de procedencia de estos conocimientos. Los historiadores del arte hace tiempo que han puesto el acento sobre los paralelos estilísticos existentes entre estas iglesias realizadas en ladrillo y la arquitectura lombarda (Sanpaolesi 1939): es una hipótesis que encuentra puntos de apoyo. En el arquitrabe de la plebanía de S. Juan de Monterappoli, situada en la provincia de Florencia cerca del trazado de la Francigena, se encuentra un inscripción fundacional en la que se cita el *magister* autor de esta iglesia en ladrillo, denominado "*maister Bonseri*", del que se

precisa "*Vir probus ex gentes Lombarda*" (Moretti & Stopani 1982, 335 ss.). No obstante, no contamos aún con estudios sistemáticos en Lombardía que permitan aceptar de forma definitiva esta teoría. Expectativas análogas se tenían en relación con los maestros canteros de Como, los probables introductores de las técnicas escuadradas en Génova, desmentidas por los estudios realizados sobre este territorio (Cagnana en prensa). No se puede pues excluir tampoco otras influencias externas que pudieran, via marítima, haber importado estas técnicas. Más difícil resulta pensar en la interacción casi contemporánea de polos de origen distinto. No obstate nuevos estudios permitirán definir con claridad la problemática.

3 La producción de ladrillos en la baja edad media

Solamente a partir del siglo XIII tiene lugar la difusión y generalización del ladrillo como material constructivo, en relación con la consolidación del proceso de crecimiento urbano ya indicado. A partir de mediados de siglo se observa una nueva fase de construcción de murallas en aquellas urbes de mayor entidad en la península, como el caso de Florencia en Toscana (Hyde 1977, 229). En el resto de ciudades se advierte un fuerte crecimiento fuera de los recintos amurallados con la creación de burgos exteriores.

Si el siglo XII se puede considerar en Toscana como siglo de la arquitectura en piedra, gracias a la difusión capilar de canteros, el siglo XIII es el de la arquitectura en ladrillo, y así proseguirá al menos hasta la peste negra, cuando la actividad constructiva sufrirá un calo de grandes proporciones (Quirós Castillo 1997).

Un factor nuevo de gran interés en el paisaje urbano del siglo XIII es la aparición de grandes edificios eclesiásticos por parte de las nacientes órdenes mendicantes, que constituyen un importante eslabón en el proceso de desarrollo de la industria productiva del ladrillo. Los conventos franciscanos y dominicos, levantadas en torno a los decénios centrales del siglo frecuentemente fuera de las murallas, precisan de una gran aportación de materiales constructivos, adoptando prevalentemente el ladrillo (en Pisa, Luca y Siena las dos iglesias en ladrillo; en Pistoia, Prato y Arezzo una en ladrillo y otra en piedra y sólo en el caso de Florencia se realizan exclusivamente en piedra). Estas construcciones constituyen pues un indicador muy útil para comprender como en el curso de la primera mitad del siglo XIII, las primeras producciones ocasionales y privilegiadas, restringidas a modelos constructivos empleados en edificios de prestigio, se han generalizado y difundido en el ámbito urbano. Se puede hablar, al menos en los

centros mayores, ya de fábricas estables y permanentes que suministrarán materiales no ya a iglesias, sino también a murallas (en Siena), palacios públicos (Luca o Siena) y arquitectura civil.

Como se observa de las citas precedentes, no todas las ciudades hacen el mismo uso del ladrillo, siendo posible establecer al menos dos grandes grupos de centros urbanos: Siena, Luca y Pisa son las principales centros de consumo del ladrillo en Toscana, mientras que Florencia, Arezzo, Pistoia y Prato mantienen una gran tradición de la construcción en piedra. Lógicamente esta división se refleja en el tipo de producción, en el desarrollo de la industria local, así como en los controles que cada Comuna realiza del mercado interior.

De hecho, ya desde el mismo siglo XIII comienzan a aparecer en las disposiciones reglamentarias de cada ciudad normas de control de las calidades, precios, disponibilidad del producto, etc., que constituyen una fuente de gran importancia para el conocimiento de esta industria en el período medieval y postmedieval (Quirós Castillo 1996b). Naturalmente tratándose de fuentes normativas reflejan una situación estática y en cierto modo irreal; en las ocasiones en que ha sido posible confrontar estas fuentes con contratos o protocolos notariales ha sido posible observar la divergencia existente entre ambos registros, como por ejemplo en lo referido a los precios de los ladrillos en Toscana (Parenti & Quirós Castillo en prensa).

No obstante, estas fuentes muestran algunas de las principales preocupaciones de las ciudades en estos momentos de expansión (Quirós Castillo 1996b). Los reglamentos y estatutos recogen al menos tres aspectos distintos (Fig. 1, 3):

- Existe un gran interés en asegurar la disponibilidad mínima de materiales constructivos, para garantizar el abastecimiento regular, tanto a los privados como sobre todo a la comuna. Cuando es la ciudad la que debe afrontar obras de una cierta entidad estas normativas se refuerzan de forma evidente: es el caso de Pisa cuando reconstruye el astillero medieval a finales del siglo XIII y requiere de una gran cantidad de material constructivo. Otra razón de peso es la intención de la comuna de protegerse de la especulación de los empresarios edilicios, que en ciertos casos como el florentino parece haber sido muy importante (Goldthwaite 1984).
- Otro aspecto que aparece documentado de forma específico es el control sobre el precio de los productos en venta en el mercado urbano. Se trata igualmente de un sistema de control contra la especulación.
- Los mayores esfuerzos de control y reglamentación se concentran en las características de los

ladrillos y tejas, insistiendo particularmente en la calidad, las dimensiones y el peso, y estableciendo diversos precios en relación a las varias calidades presentes. La necesidad de garantizar el aprovisionamiento de buenos productos y de dimensiones normalizadas en el mercado urbano se debe fundamentalmente a la tendencia generalizada, registrada tanto arqueológica como documentalmente, de los fabricantes a intervenir en el proceso de producción para obtener mayores beneficios. Una ligera reducción en las dimensiones de las gradillas permitía aumentar la capacidad numérica de cada hornada. Frente a estas pretensiones la autoridad ciudadana estableció continuos controles sobre las gradillas y sobre los productos ya cocidos. La presencia de numerosas disposiciones muestra la generalización de este tipo de prácticas.

Hasta el momento se ha tratado exclusivamente el ámbito urbano, donde se consolidan fábricas estables que prácticamente de forma ininterrumpida producirán ladrillos durante la edad media y moderna de forma continua. Es necesario preguntarse, si bien de forma breve, que sucede en el espacio rural. Los estudios con los que contamos son aún limitados y se reducen al sector nordoccidental de la región, pero tenemos con una serie de indicios que permiten trazar un primer cuadro de la situación.

Tal como se ha indicado, ya desde el siglo XII, de forma ocasional y puntual, se comienzan a construir edificios de culto que emplean el ladrillo. Probablemente se construyen hornos provisionales y exclusivos para la realización de cada edificio, sin dar lugar a ninguna continuidad productiva. Luego son las ciudades quienes concentran las primeras industrias estables, y desde ese punto de vista el ladrillo aparece en el siglo XIII (sobre todo en la primera mitad) como producto ciudadano y de cierta relevancia.

A partir de mediados del siglo XIII las ciudades mayores desarrollan una política de creación de pueblos nuevas (*terre nuove*), creadas principalmente para contrastar las señorías rurales y reorganizar administrativamente el condado. En estos casos se asiste a la creación de un modelo arquitectónico y urbanístico, y en pocos meses se levanta completamente un centro de medias dimensiones (Friedman 1996). Se recurre pues a técnicas y materiales constructivos pobres pero de fácil accesibilidad, donde el tapial y el ladrillo juegan un papel determinante. En las pueblos nuevas creadas por Luca (Castelfranco di Sotto: Abela 1996; Camaiole o Pietrasanta: Buselli 1970), el empleo de ladrillos es muy significativo. Siguiendo en el ámbito de Luca, en 1333 la ciudad reconstruye un castillo en Vivinaria, denominándolo Montecarlo, y una de las primeras cosas que hace es

Fig. 1. - Tipología de sistemas de control de la producción de ladrillos en Toscana y paralelos con otras ciudades italianas.

1. Reglamentación métrica	Dimensiones:	Pisa: 1286, 1313-37 Luca: 1308, 1331 Florencia: 1325, 1348, 1544 Siena: 1262, 1309, 1708 Volterra: 1453-6 Bagnoreggio (VT): 1373	
	Peso:	Pisa: 1319 Luca: 1539 Fuhecchio: 1308 Pescia: 1339	
2. Comparación con muestrarios públicos	Muestrario expuesto:	Florencia, Fuhecchio	Positivo (Asis)
		(Padua, Reggio Emilia, Piacenza, Módena, Urbino, Verona, Vicenza, Mantova, Brescia, Bérgamo, Rávena, Viterbo, Alatri, Aosta, Bassano, Novara)	Negativo (Bologna, Ascoli Piceno)
	Ladrillos:	Savona: 1342	
	Muestrario depositado ayantamiento	Pistoia: 1296, 1340, 1767 Siena: 1261 Pisa: 1286	
3. Autenticación de gradillas	Florencia: 1325, 1574 Pisa: 1313-37 Roma: 1484		

construir los hornos que permitirán la realización del castillo (Seghieri 1988, 103). Igualmente en torno a la ciudad de Luca, en su distrito inmediato, se documenta la presencia de la arquitectura en ladrillo desde mediados del siglo XIII. La conclusión es evidente: solo en aquellas zonas estrechamente vinculadas con la ciudad y que participan de modelos arquitectónicos urbanos o de iniciativas constructivas urbanas, que emplean *magistri* provenientes del centro urbano, ven la incorporación del ladrillo en la arquitectura medieval.

El resto del territorio queda completamente al margen de este proceso. Desde este punto de vista, la presencia de centros de producción de ladrillos constituye un elemento diferencial de las zonas más vinculadas a la ciudad.

En el curso del Renacimiento, nuevos centros ven la aparición de la arquitectura en ladrillo, y generalmente son centros de vicarias o de distritos administrativos de los estados modernos (Granducado de Toscana, República de Luca). Por último sólo en los siglos XVIII-XIX los centros principales de los

territorios más marginales (de montaña, lejanos de las ciudades y las principales arterias de comunicación), introducirán la arquitectura en ladrillo (Quirós Castillo 1997).

5 Mensiocronología de ladrillos en Toscana y en Italia.

El desarrollo en los últimos veinte años de la arqueología de la arquitectura y de la arqueología de la producción en Italia han permitido el incremento de estudios arqueológicos dedicados al estudio de la industria del ladrillo. Una de las principales líneas de estudio ha sido la realización de modelos mensiocronológicos (Fig. 2), que permitiesen fechar las evidencias arquitectónicas conservadas (Quirós Castillo en prensa)².

² Los estudios mensiocronológicos se basan en la observación de la tendencia progresiva a la disminución del

La Liguria, y en particular la ciudad de Génova, han sido los centros pioneros de esta línea de investigación en la península, basada en el análisis de las variaciones dimensionales en los siglos medievales y postmedievales, con el fin de construir modelos estadísticos capaces de fechar contextos de ladrillos a partir de sus medidas. Con la cuarta curva mensiocronológica ligura avalorada por más de 50.000 mediciones, se obtienen cronologías con errores estadísticos de 10-20 años (Pittaluga & Quirós Castillo 1997).

Un interés creciente por el desarrollo de nuevos indicadores cronológicos³ de ámbito local se ha traducido en la construcción de nuevos modelos mensiocronológicos en zonas de Italia septentrional, tal como muestran los estudios sobre Brescia (Recchione 1996) o Parma (Rota & Sartori 1996), a los que hay que añadir los de Venecia, Alessandria, Acqui (Pittaluga & Ghislanzoni 1992), Bolonia y otros.

Los primeros estudios mensiocronológicos realizados sobre los ladrillos medievales toscanos comenzaron en los años 80 promovidos por la Universidad de Siena. A finales de esta década fue posible construir la primera curva mensiocronológica de esta ciudad (Corsi 1988-89), mostrando ciertas variaciones y singularidades respecto a las experiencias ligures. Nuevos estudios realizados en los últimos años en la zona nordoccidental de la región, tanto en zonas urbanas como rurales, han permitido delinear diversos modelos locales y establecer algunas de las características de la producción y comercio de ladrillos en ámbito regional (Quirós Castillo 1997).

El panorama que se obtiene de todos estos estudios es la enorme fragmentación de los mercados de consumo de ladrillos. Tratándose de un producto sujeto a grandes costes de transporte, la tendencia presente en Toscana es la creación de numerosos centros productivos de pequeñas dimensiones y ámbito reducido, de forma que no conocemos fábricas mayores centralizadas. Son pocos los datos que tenemos relativos al desplazamiento de materiales constructivos, salvo en casos de áreas de fuerte integración socioeconómica. Un caso significativo de este proceso tiene lugar en la llanura de Luca, zona vinculada directamente a la ciudad. En ocasión de la construcción de las murallas renacentistas de esta ciudad, los centros de aprovisionamiento de ladrillos

se sitúan en Borgonuovo, Vallebuia y Monte S. Quirico, distribuidos en la periferia o a pocos kilómetros de la ciudad (Martinelli & Puccinelli 1983, 45). El resto del territorio rural de Luca no participa del intercambio directo de materiales constructivos, y el control urbano sobre estos mercados es muy reducido. Como resultado de esto, no es posible realizar un modelo mensiocronológico único para toda la Toscana, ni siquiera para cada ciudad. La numerosa presencia de fábricas en cada ciudad, en cada territorio, justifica la presencia de tales particularidades que impiden la creación de modelos unitarios.

Este modelo toscano no es el único presente en la península, y se puede contraponer con el de Liguria. En esta región ha sido posible crear una curva mensiocronológica que permite fechar estructuras en ladrillo desde Ventimiglia hasta La Spezia, incluso en ámbitos rurales, si bien no hay que excluir tampoco aquí la presencia de pequeños centros productores en las zonas más marginales que presenten variaciones dimensionales discordantes con la tendencia general regional. La razón de esta unificación dimensional, y por tanto mercantil, se debe a la existencia de un continuo traslado de materiales combinado con un férreo control político de Génova (Pittaluga & Quirós Castillo en prensa). Liguria es una región larga y estrecha a las orillas del Mediterráneo, en la que el tráfico marítimo ha jugado un importante papel tanto en ámbito local como internacional.

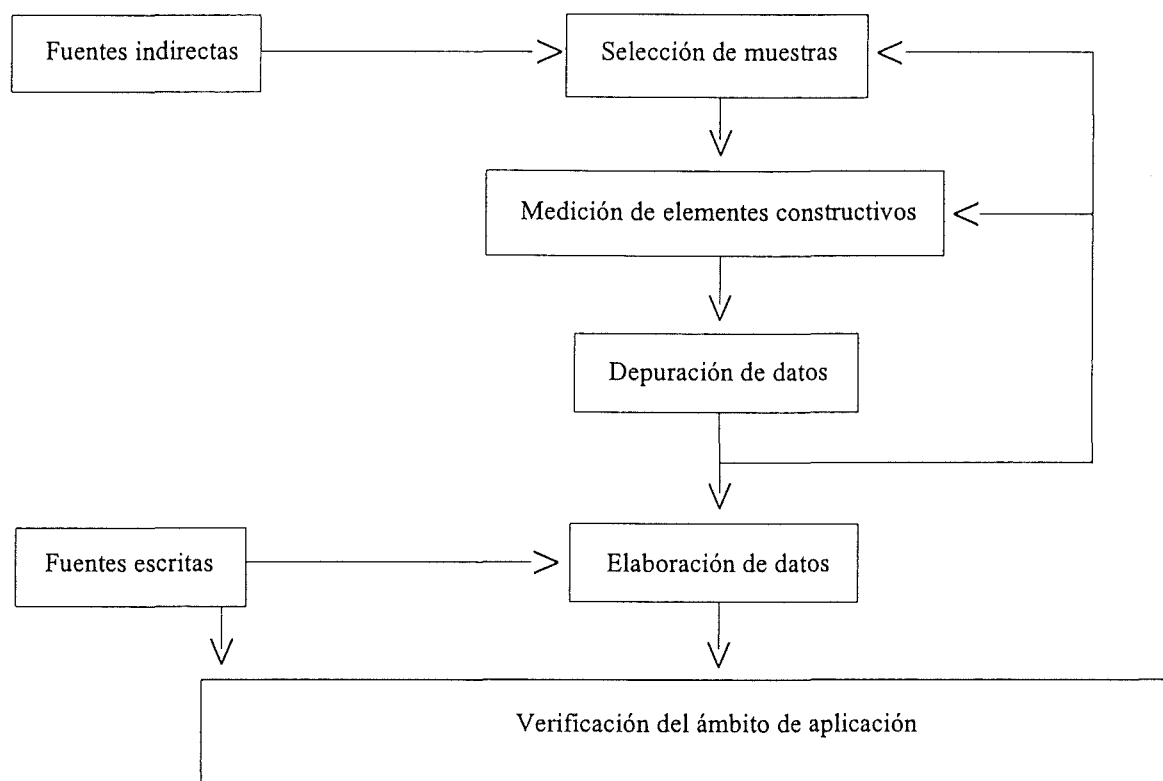
Por contra, la situación toscana es distinta, tanto a nivel morfológico y comercial, como a nivel político. Son pocos los ríos navegables, y las principales ciudades, salvo Pisa, se sitúan tierra adentro. Los medios de transporte privilegiados son vía terrestre, por lo que el precio del transporte incide de forma muy elevada sobre los costes finales. Además son varias las ciudades comunas que administran autónomamente amplios territorios, y la lenta expansión de Florencia no permite crear una hegemonía paragonable a la establecida por Génova en Liguria. Las conquistas de Pistoia (1331), Arezzo (1380), Pisa (1406), Siena (1550), Luca (1849) son los hitos de un largo y complicado proceso de expansión territorial que se extiende por varios siglos.

En Liguria las dimensiones del ladrillo tienden a disminuir de forma progresiva entre los siglos XIII-

ladrillo en el período comprendido entre los siglos XIII-XIX. Tratándose de un producto sujeto al mercado en el que se adquiere en orden numérico, tiende a disminuir debido al interés del productor por obtener en cada hornada mayor cantidad de unidades y un coste menor en la elaboración del ladrillo,

reduciendo ligeramente las dimensiones de la gradilla en el que venía formado (Mannoni-Milanese 1988).

³ Sobre los indicadores cronológicos en la Arqueología de la arquitectura, Mannoni 1984 y Parenti 1988.

Fig. 4. - *Proceso de elaboración de una mensiocronología (Quirós Castillo en prensa).*

XIX (disminuyen largo y espesor, mientras la anchura fluctúa, Pittaluga-Ghisaltoni 1992). En Toscana la situación es mucho más compleja, y mientras en Siena las dimensiones crecen (siempre el ancho y el espesor, mientras que el largo fluctúa, Corsi 1988-89), en Pisa, Luca y Pistoia disminuye el volumen del ladrillo, pero a una disminución del espesor se contraponen un aumento de la anchura (Quirós Castillo 1997). Esta última tendencia se registra igualmente en Bolonia y Parma (Rota & Sartori 1996, 295).

En las zonas rurales toscanas, salvo en las zonas más vinculadas a la ciudad (como la llanura de Luca, pero no así por ejemplo la periferia de Pistoia) que participan del mercado urbano, la ausencia de fábricas estables y la existencia de mercados muy fraccionados dificultan o impide la creación de modelos mensiocronológicos como en las ciudades.

Considerando, por último, los datos con los que contamos en su conjunto, es posible observar algunas tendencias que aparecen reflejadas en amplias zonas de la península. Se ha podido observar que los ritmos de disminución de las dimensiones del ladrillo no son homogéneos en todos los períodos, sino que existen momentos de aceleración y retroceso. Se ha establecido cuatro grandes períodos, en los que se observa una primera fase (1200-1350) de aceleración, seguida de una segunda fase de estabilidad

(1350-1450/1500), y una nueva aceleración en el tramo que va entre los años 1550-1650, seguido de una nueva fase de estabilidad. Es interesante concluir la relación existente entre los períodos de mayor actividad constructiva y de aceleración de la disminución de las dimensiones, y viceversa: frente a una mayor demanda de materiales constructivos se acentúa la disminución de las gradillas, mientras que un consumo más reducido mantiene estable el mercado. Este proceso se ha podido documentar tanto en Liguria (Pittaluga & Ghislanzoni 1991), como en Toscana septentrional (Quirós Castillo 1997), careciendo de informaciones relativas al resto de los centros estudiados.

5 Conclusión

El estudio arqueológico de los ladrillos permite una aproximación analítica a la arquitectura medieval, indagando los aspectos socioeconómicos de la producción y construyendo instrumentos de datación de las estructuras materiales.

Son muchos los problemas aún abiertos y que precisan ulteriores estudios. El origen del ladrillo con módulo medieval, los mecanismos de difusión territorial, así como el análisis de las situaciones locales en relación con las coyunturas socioeconómicas y

políticas del territorio, sin olvidar las tendencias generales que trascienden las particularidades locales. Es necesario, no obstante, aumentar de forma considerable los centros analizados para crear una base crítica de un análisis que permita extender geográficamente las valoraciones ya presentadas.

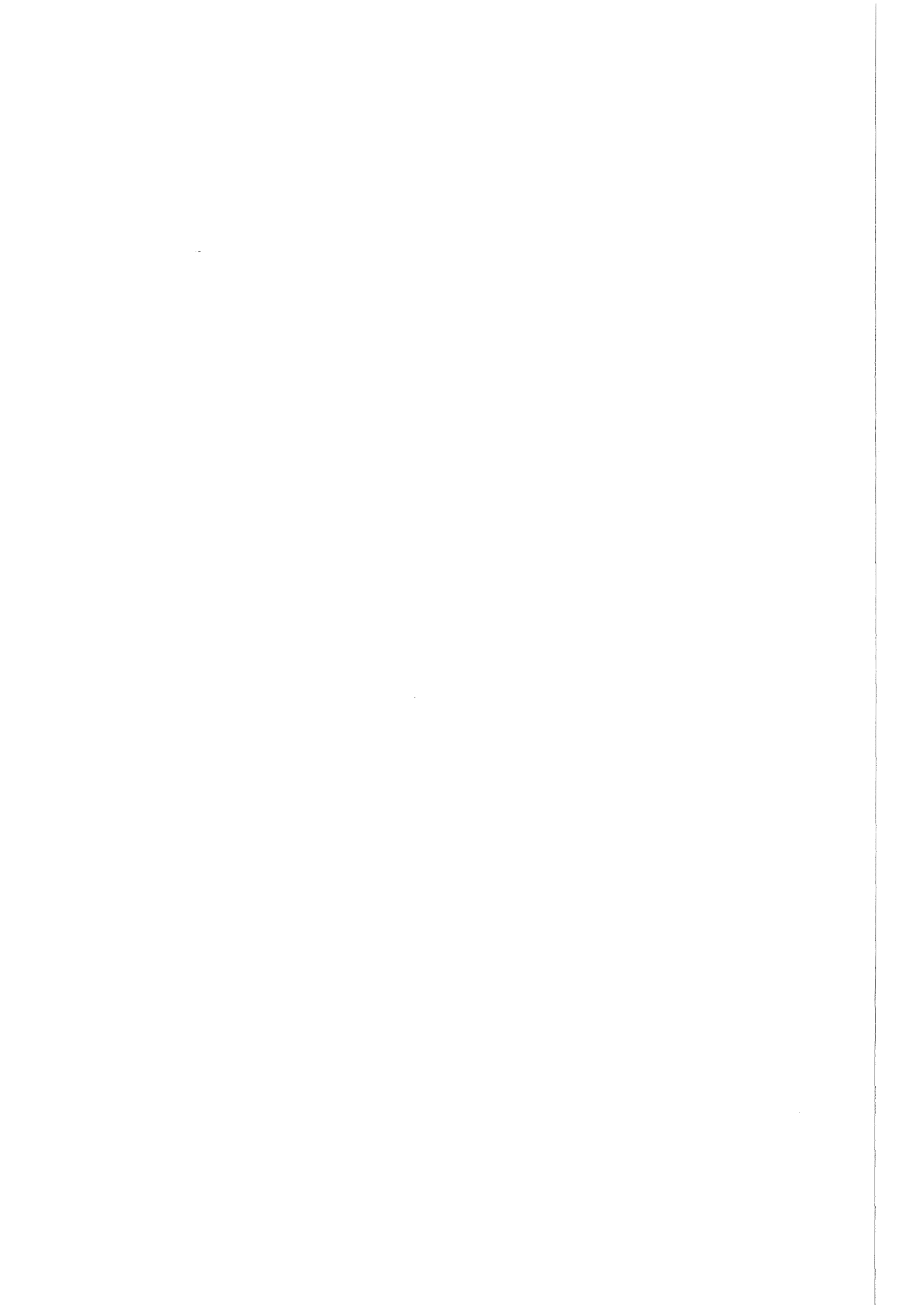
Una primera reflexión comparada entre la situación toscana y ligure recientemente presentada (Pittaluga & Quirós Castillo 1997) abre nuevas perspectivas en cuanto se refiere al análisis de problemas teóricos y metodológicos sobre el tratamiento de la información y la estrategia de análisis. No obstante, parece que nos encontramos en un área que vive, al menos en un principio, de las influencias técnicas y morfológicas que recibe de la llanura del Po. En esta zona el ladrillo es el material dominante en muchas ciudades durante toda la edad media, si bien los estudios arqueológicos con los que contamos son demasiado escasos y puntuales. El estudio de esta región abrirá nuevas perspectivas para la comprensión de este complejo problema histórico en el resto de la península.

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La brique dans l'architecture préromane et romane de Normandie

L'utilisation de la brique dans la construction est bien attestée dans l'Antiquité romaine et son emploi en chaînages alternant avec des rangs de pierre est une méthode courante à partir du troisième siècle. Des monuments comme les Thermes de Cluny à Paris ou les fortifications antiques du Mans témoignent de ce type d'appareillage à l'époque gallo-romaine. Le principe s'en est maintenu souvent au cours du haut Moyen Age et l'insertion de rangs de briques et d'éléments décoratifs dans le même matériau se voit dans des monuments aussi célèbres que le Baptistère de Poitiers dont le premier état remonte au VII^e siècle. A l'époque carolingienne l'appareillage des arcs constitués de claveaux alternés créant un effet bicolore implique souvent l'utilisation de briques et Saint-Philibert de Grandlieu en offre un exemple.

Pour la Normandie, il a été admis longtemps que la production de briques cessait à la fin de l'Antiquité et ne reprenait qu'au XII^e siècle¹ et que, même pour les toitures, les tuiles n'étaient utilisées souvent que comme éléments de faitage. La présence de briques dans l'appareil des monuments diversement datés mais situés généralement soit vers l'an mille, soit à l'époque carolingienne, était interprétée comme la preuve de remploi. Dans le cadre d'un Corpus actuellement en cours de réalisation et concernant les édifices de la fin du Xe et du début du XI^e siècle², l'ampleur de l'utilisation de la brique dans les monuments ne laisse cependant pas de poser problème. Par ailleurs certaines sources textuelles méritent également d'être considérées. Le présent article vise à faire le point sur l'utilisation du matériau à la fois dans la construction et dans le décor et à préciser certains modes de construction propres à l'aube des temps romans en Normandie: méthodes traditionnelles ou méthodes importées?

1 La brique comme élément de construction

Un certain nombre d'églises, en majorité de petites paroisses rurales, recèlent dans leur appareil des éléments de briques. Il s'agit le plus souvent d'un système de coinages faisant alterner trois rangs de briques longues et plates avec une série d'assises de petits moellons plus ou moins réguliers, ou avec un "opus spicatum" grossier fait de pierres plates noyées dans le mortier. Cet appareil mural est en général associé à de petites fenêtres dont les arcs sont soit constitués d'une alternance de claveaux de briques et de pierres, le tout étant souligné par un rang de briques étroites marquant l'extrados des claveaux, soit entièrement réalisés en briques. Un groupe d'édifices est identifiable autour de Lisieux, avec Ouilley-le-Vicomte, Saint-Jean-de-Livet, Saint-Martin-de-la-Lieue, Hotot-en-Auge et surtout Vieux-Pont-en-Auge, plus complexe et particulièrement bien conservée en dépit de malencontreuses restaurations au XVII^e et au XIX^e siècles. Il faut y ajouter l'église disparue de Fierville-la-Campagne, bien étudiée au XIX^e par A. de Caumont. Ces édifices ont déjà fait l'objet de recherches de la part de L. Musset et surtout de C. Maneuvrier et de M. Cottin³ qui en avaient effectué un préinventaire en se penchant sur le problème précis de l'utilisation de la brique. Ailleurs les exemples sont plus disséminés mais tout aussi significatifs: c'est le cas d'Ecajeul et de la nef de Tilly-sur-Seulles (Calvados), de Rugles (Eure), de Saint-Jean-Ie-Thomas (Manche), proche du Mont-Saint-Michel.

Parmi les grandes constructions plus prestigieuses que ces sanctuaires de campagne, citons Notre-Dame-sous-Terre au Mont-Saint-Michel où les arcs sont constitués de claveaux de briques, et le mur externe des tribunes romanes de la nef de la cathédrale de Coutances conservées derrière le rhabillage gothique.

¹ C'était l'opinion de M. DE BOUARD, *Manuel d'archéologie médiévale. de la fouille à l'Histoire*, Paris, 1975, 55.

² Corpus des églises rurales proches de l'an mille en Normandie, sous la direction de M. Baylé, CRAM, Caen.

³ M. COTTIN & C. MANEUVRIER, L'utilisation de la brique dans les premiers édifices romans du Pays d'Auge: matériau médiéval ou matériau de récupération?, *Histoire des traditions populaires*, Janvier 1992, n° 33, 31-36.

Il convient aussi de remarquer certaines utilisations précises de blocs de brique dans la partie supérieure des trous de boulin laissés par l'enlèvement des échafaudages: le matériau est employé ici comme un support de bois. Enfin, dans certains édifices comme OUILLY-le-Vicomte, un rang de briques a été placé au faite du mur goutterot, et une fois de plus remplace une poutre faîtière. Cela est maintenant d'autant plus évident que l'église a été surélevée et que ce rang tranche sur le reste du mur.

2 La brique comme élément de décoration architecturale

Outre cette utilisation de briques plates comme matériau de construction, les bâtisseurs de cette époque ont volontiers utilisé la brique comme élément décoratif. Ils la pilent souvent et la mêlent au mortier pour obtenir un effet de joints colorés. Cela est bien visible au niveau inférieur du clocher de Blay, petit village proche de Bayeux et au dessus de la porte primitive de Vieux-Pont, maintenant masquée par l'adjonction d'un clocher légèrement plus tardif: claveaux de briques et de pierre sont disposés en une alternance ornementale, avec des joints colorés jouant avec les différences d'épaisseur des différents éléments. De même un claveau retrouvé dans les fouilles de Caudebec et conservé au musée de cette ville offre d'intéressants indices: incisé en triangle dans sa partie supérieure il est partagé verticalement en son centre par une insertion de mortier pilé de brique donnant un effet de faux-joint. En juxtaposant de tels claveaux, on obtient l'un de ces arcs à chevrons chers aux constructeurs des années 1100 et suivantes. Cependant le matériau inhabituel du claveau, du plâtre, sa découverte sur le site vraisemblable de l'ancienne abbaye préromane du Logium⁴, suggèrent une date plus haute, vers l'an mille, lors de la première reconstruction du duché par Richard Ier et Richard II, ou même à l'époque carolingienne. Cette recherche d'effet ornemental à l'aide de la brique remonte en effet à une haute époque en Normandie: l'ancienne abbaye de Pental à Saint-Samson-sur-Risle⁵ comportait dans son église tout un système

d'incrustations ornementales dans des cavités découpées soigneusement afin de recevoir différents motifs de briques. Les dates de l'une des séries sont bien attestées grâce à une inscription remontant au VIII^e siècle d'après sa graphie⁶. Les autres éléments semblent grosso modo contemporains des précédents et particulièrement intéressants par le nombre et la diversité des incrustations qu'ils attestent. L'absence d'autres vestiges comparables est compréhensible en raison de l'extrême fragilité des moulages de briques surtout lorsqu'ils sont élaborés en tiges et palmettes végétales comme l'un des motifs de Pental. Mais il est très probable que ce mode d'ornementation fut longtemps à l'honneur en Normandie.

3 Datation des vestiges

Le problème le plus épineux réside dans la datation des vestiges conservés. Pour Saint-Samson-sur-Risle, l'inscription conservée sur l'une des briques atteste l'époque carolingienne. Les petits éléments en pétales et médaillons appartenant aux collections du Musée d'Evreux peuvent également avoir fait partie d'un décor mural préroman. La question est plus complexe pour les nombreux édifices à appareil de moellons réguliers et chaînages de briques. On a vu récemment la question soulevée par l'analyse au C14 d'un charbon de bois trouvé dans le mortier des arcs appareillés en brique et pierre de la grande salle du château de Mayenne, traditionnellement situé au XI^e siècle: le résultat, provisoire il est vrai, obligerait à reporter la date de cette salle au IX^e siècle⁷. Pour la Normandie, nous disposons d'un certain nombre d'éléments d'appréciation. Le premier concerne Vieux-Pont. Si l'édifice n'est mentionné qu'à partir de 1068, une inscription insérée dans le mur est du clocher et nommant le constructeur de l'église, "Ranoldus, de la race des Francs", offre par sa graphie un point de repère certain: la rareté des onciales, les caractères des lettres comparées à celles des textes épigraphiques de Poussy-Ia-Campagne, de Troarn, et de la pierre tombale de la Reine Mathilde à la Trinité de Caen (1083) ne permet pas de situer cette construction au delà de 1040-1050, et plus vraisem-

⁴ J. LE MAHO, Note sur l'abbaye mérovingienne de Logium à Caudebec-en-Caux (Seine Maritime), *Revue d'Histoire de l'Eglise de France* LXXXII, 1996, 5-40.

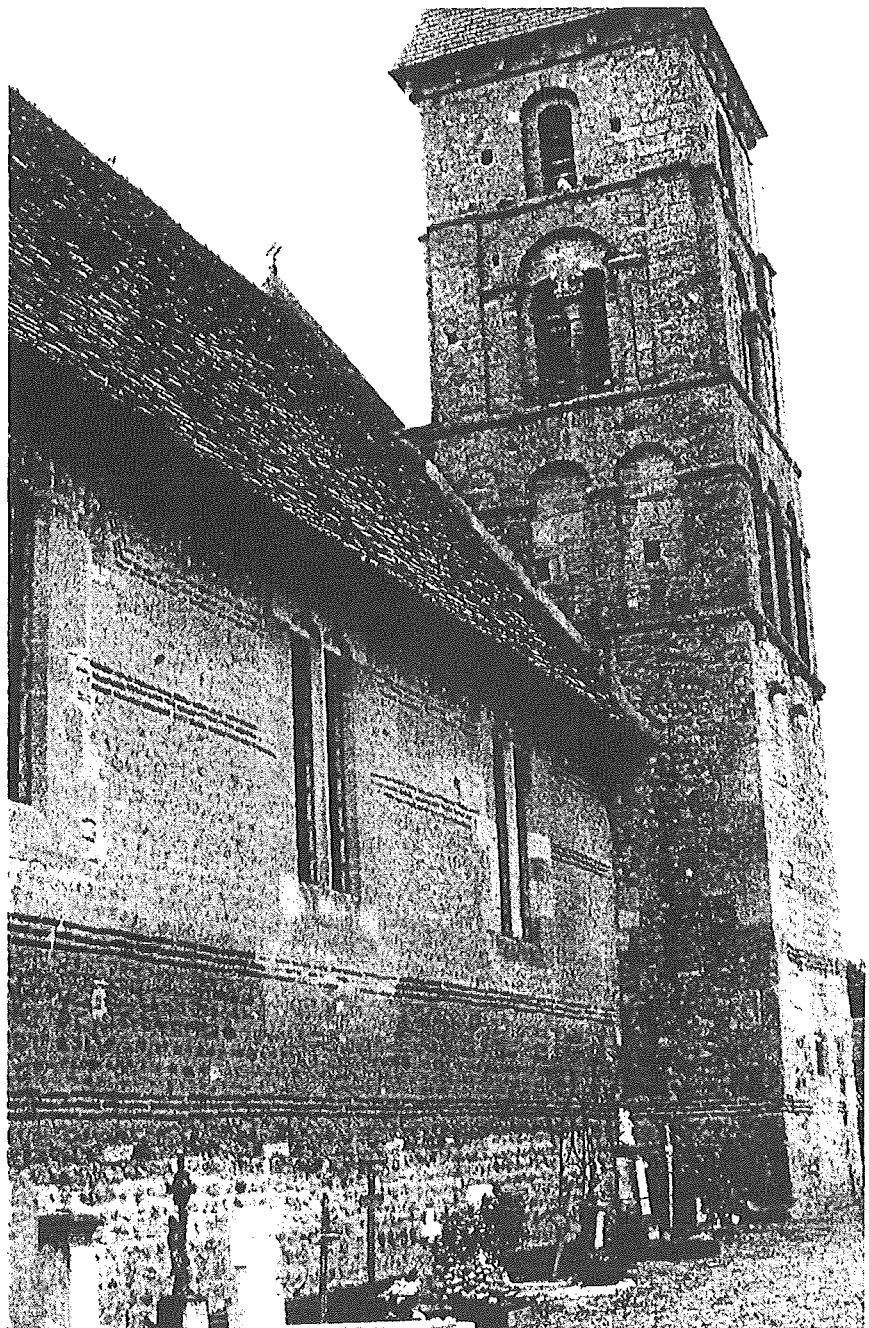
⁵ Voir l'état des questions in M. BAYLÉ, *Les origines et les premiers développements de la sculpture romane en Normandie*, No spécial d'*Art de Basse-Normandie*, Caen, 1992, 42-43 et fig. 44-52 et le catalogue des briques et éléments d'incrustation dans N. COULTHARD & F. DELACAMPAGNE, *Pavés et plates-tombes. Collection de la Société des Antiquaires de Normandie*, Cahier

des Annales de Normandie 27, Caen, 1995, 210-213. Voir également M. BAYLÉ, La sculpture préromane en Normandie et ses prolongements jusqu'au début du XI^e siècle, *Cahiers archéologiques* 38, 1990, 37-62.

⁶ M. BAYLÉ, *op.cit.* note 5, 42-43 et fig. 47.

⁷ Une étude archéologique d'ensemble regroupant des équipes d'archéologues français et anglais est en cours pour déterminer la place de l'édifice et il convient d'attendre ses résultats pour se prononcer définitivement.

Fig. 1. - *Vieux-pont-en Auge.*
Mur sud de la nef.



blement quelques décennies plus tôt. Par ailleurs l'analyse du clocher, adjonction plus tardive que le reste de l'église, est également un indice précis. La souche est encore construite en briques et pierres, mais appareillée de manière un peu différente: les briques sont plus courtes et semblent d'une série et d'une fabrication différente; au dessus de cette souche, un échafaudage a été inséré et l'on a commencé à construire en moyen appareil très régulier d'un type répandu dans la Normandie romane. Le deuxième niveau ainsi bâti comporte des baies à colonnettes et chapiteaux, ces derniers d'un type étroitement lié à ceux de la nef et de la croisée du transept de la Trinité de Caen, vers 1060-1070. La partie supérieure du clocher remonte ainsi aux envi-

rons de 1060 et tranche nettement avec la construction inférieure plus ancienne, elle même postérieure à la nef qui se place logiquement dans le premier tiers du XIe. Cette situation chronologique convient vraisemblablement à Saint-Jean-le-Thomas, localité existant dès l'époque de Guillaume Longue Epée et dont l'église est mentionnée dès 1040. Les autres édifices sont moins bien documentés, mais leur appartenance à la période de réorganisation contemporaine des premiers ducs et notamment à la période allant de Richard Ier à Robert le Magnifique semble logique et correspondre à la réorganisation paroissiale discernable à travers les chartes de cette période.

Une dernière indication textuelle de poids nous est fournie par le récit de l'édification de la collégiale

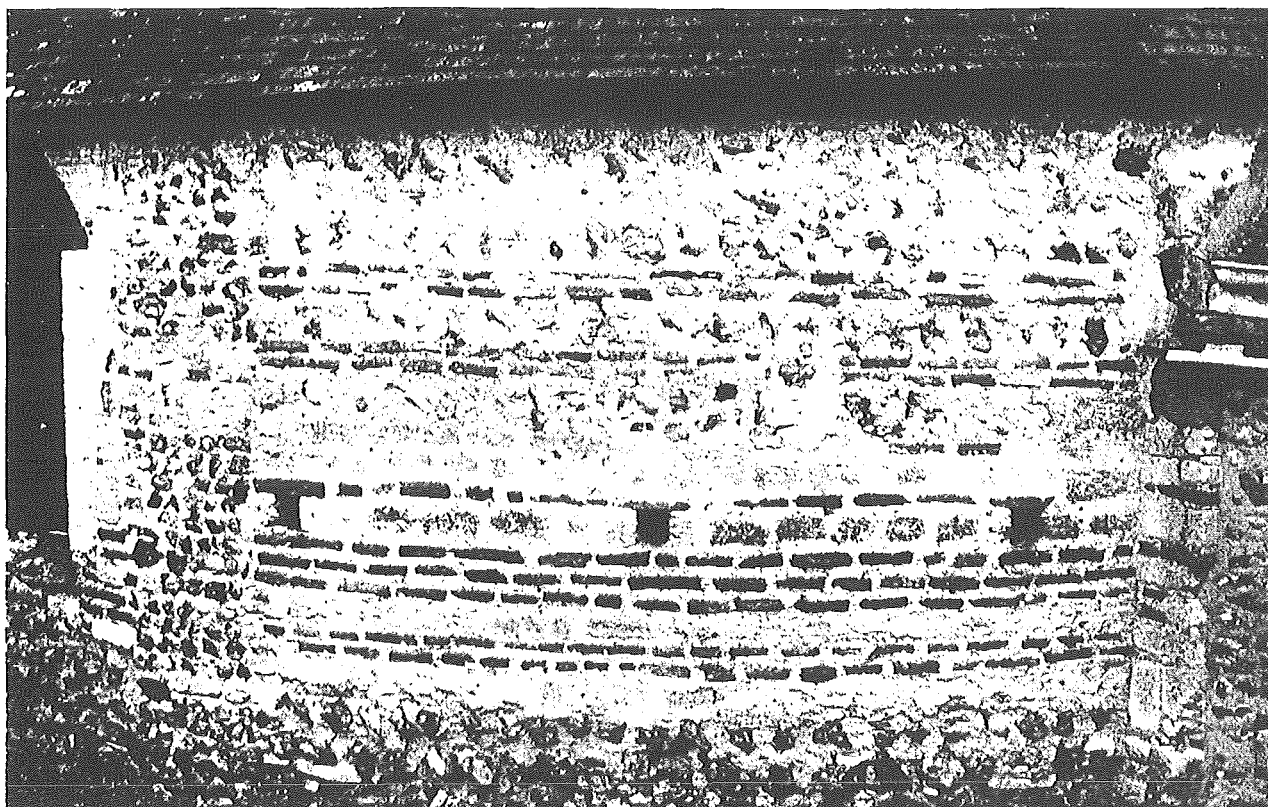


Fig. 2. - Rugles. Détail de l'abside.

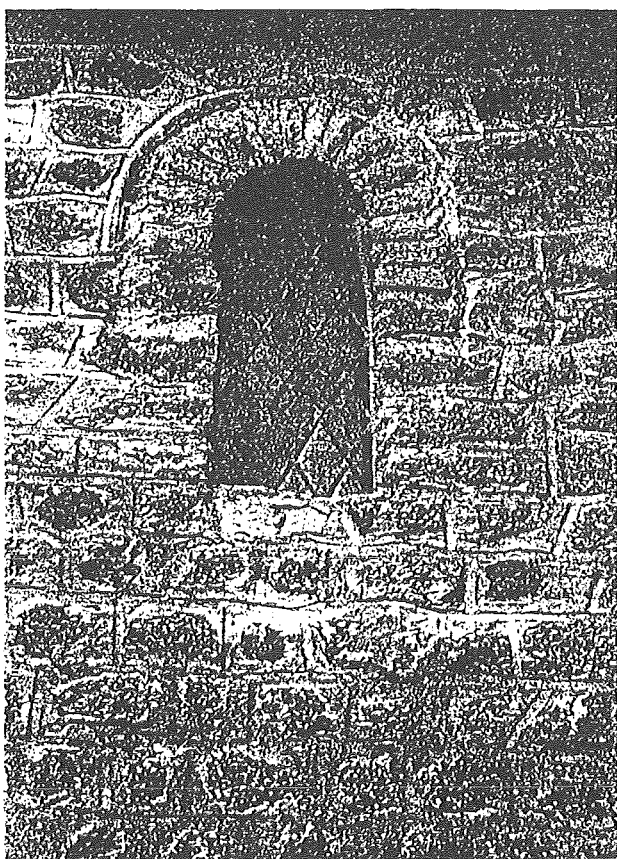


Fig. 3. - Saint-Jean-le-Thomas: fenêtre cernée de briques (mur nord du chœur).

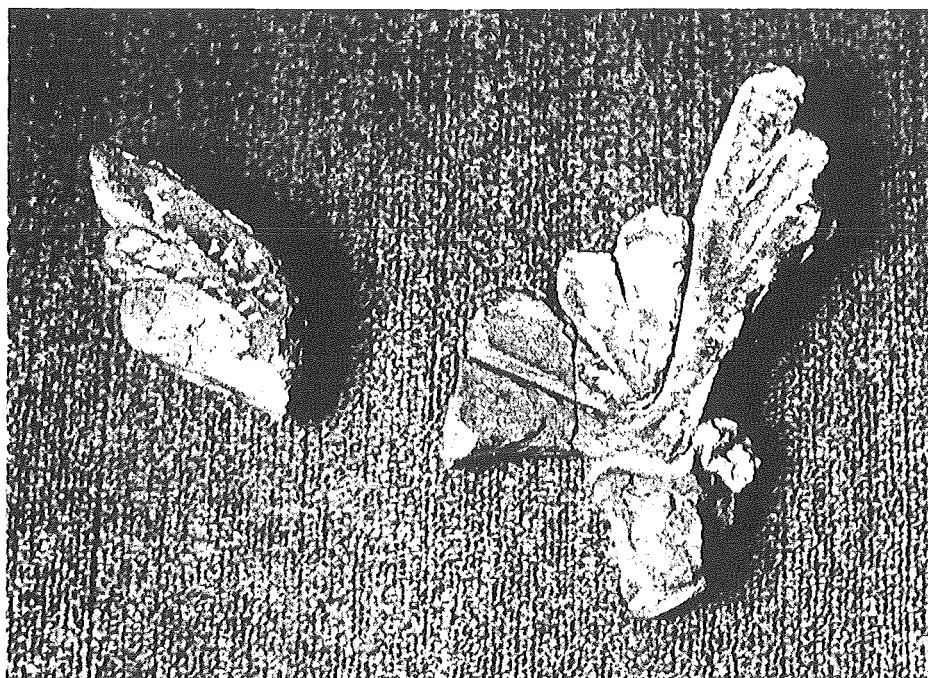
de la Trinité de Fécamp avant 990. Les recherches d'Annie Renoux ont montré l'existence d'une fabrication de briques sur le chantier fécampois de la fin du Xe siècle et l'utilisation de ce matériau pour la collégiale en construction; Dudon de Saint-Quentin le précise très clairement⁸. Tout concorde ainsi à montrer que ce mode de construction est à l'honneur à la fin du Xe siècle et au début du XIe en Normandie.

4 Relations avec d'autres régions: tradition préromane locale ou apport extérieur?

Vers cette époque la Normandie n'est pas la seule région à offrir de tels monuments. Les éléments de comparaison sont manifestes si l'on regarde dans deux directions. La première est le Beauvaisis où la Basse-Oeuvre de Beauvais offre des fenêtres cernées de rangs de briques et aussi un petit appareil de moellons réguliers très fréquent dans les constructions normandes précitées. La seconde orientation de recherche concerne le Maine et l'Anjou. Les arcs à claveaux faisant alterner brique et pierre sont bien visibles à la croisée du transept de Saint-Martin

⁸ A. RENOUX, *Fécamp, du palais ducal au palais de Dieu*, Paris, éditions du CNRS, 1991, 453-455. DUDON DE SAINT-QUENTIN, *De moribus...*, ed. J. LAIR, Mémoires de la Société des Antiquaires de Normandie XXIII, Caen, 1865, 290-291.

Fig. 4. - Élément d'imbrication provenant de Saint-Saumon-sur-Risle (Pental). Société des Antiquaires de Normandie.



d'Angers vers 1020, au Lion d'Angers un peu plus tard. On peut se demander, comme l'avait suggéré jadis L. Musset si l'influence de l'Anjou et du Maine ne fut pas déterminante dans la première reconstruction normande⁹. C'est d'autant plus vraisemblable que les édifices cités sont en majorité situés sur des routes menant vers ces régions. Cependant ils sont aussi placés à proximité de grandes cités gallo-romaines dont les ruines devaient offrir des modèles et aussi du matériau de récupération susceptible d'influencer le choix du mode de construction. Il semble que les deux facteurs – rapport angevin et la tradition locale aidée par la présence de modèles antiques – aient joué dans des proportions variables selon les cas. Cependant la question est complexe car dans le même esprit, la comparaison entre les agencements de claveaux et ceux de St. Nicholas de Leicester ou de la nef bien connue de Brixworth posent la question de traditions préromanes à l'oeuvre des deux côtés de la Manche et des lacunes dues aux destructions vikings en Normandie. Le problème de l'utilisation de la brique s'insère en fait dans un cadre plus vaste où les différents modes d'appareillage doivent être pris en considération. Dans l'état de nos connaissances, il semble que l'apport angevin et manceau se soit greffé sur un sol propice dû aux traditions régionales antérieures.

5 Récupération ou fabrication de briques?

C'est la question que posaient en 1993 le regretté M. Cottin et C. Maneuvrier dans un article peu diffusé traitant des édifices en brique et pierre du Pays d'Auge¹⁰. En effet le texte de Dudon de Saint-Quentin infirme l'opinion jadis admise d'une interruption totale de la fabrication de la brique entre le Bas-Empire et le XIIe siècle. De même que la brique inscrite de Pental et toute la série qui lui est associée prouvait l'emploi de tels éléments à l'époque carolingienne, de même nous savons que des briques avaient été fabriquées pour la Trinité de Fécamp à la fin du Xe siècle. S'il devait être aisé de récupérer une certaine quantité de matériau dans les ruines antiques de Lisieux ou d'Avranches, on est frappé cependant par l'ampleur et la constance du mode de construction dans tous ces édifices. Certes l'existence de vestiges antiques sur les sites de OUILLY-IE-VICOMTE et de Vieux-Pont est bien attestée par des témoignages anciens. Mais dans ces deux édifices et aussi dans l'église disparue de Fierville d'après les dessins publiés par A. de Caumont¹¹ on est frappé par l'existence de deux séries de briques. L'une, constituée d'éléments de grandes dimensions (environ 41 cm de long) s'oppose à l'autre où les briques ne font pas plus de 25/28 cm. La seconde est systématiquement utilisée dans les deux rangs supérieurs du clocher. Une analyse en cours devrait tenter de montrer si la composition des briques diffère¹². A OUILLY existent deux séries similaires, faisant respectivement 41 et 26 cm. Ces dernières correspondent d'ailleurs au module des assises des rares vestiges de contreforts romans d'OUILLY. Dans ce dernier cas, le

⁹ L. MUSSET, Les problèmes de l'église de Vieux-Pont-en-Auge, *Le Pays d'Auge*, Février 1967, 3-12.

¹⁰ M. COTTIN & C. MANEUVRIER, *op. cit.* note 3. Voir également A. RENOUX, *op. cit.* note 8.

¹¹ A. DE CAUMONT, *Statistique monumentale du Calvados IV*, Caen, 1859, 398-402.

module choisi n'est pas un hasard et s'accorde avec la hauteur des rares pierres d'appareil utilisées pour les enforts d'angle et les contreforts. La même correspondance existait à Fierville. Et pour la façade de Hotot-en-Auge, sans doute un peu plus tardive que le reste, les briques sont toutes de petit module ce qui confirmerait, sous réserve, un format en usage dans la fabrication des années proches de l'an mille. On est tenté d'attribuer la première série à un stock de récupération et la seconde à une fabrication autochtone des environs de l'an mille. Cela s'accorderait à la documentation textuelle concernant Fécamp et cela suggérerait que ce mode de construction était extrêmement répandu, à une époque où l'architecture romane n'avait pas encore défini ses caractères et où l'on reconstruisait en se fondant sur les traditions antérieures.

6 Rôle fonctionnel de la brique dans la construction. Son influence sur l'architecture des XIe et XIIe siècles

Au delà de l'aspect ornemental des murs à chaînages de briques, il faut rappeler que ces chaînages avaient une fonction de raidisseurs. Il est permis de se poser la question des rapports éventuels entre ce mode de construction et la construction en pans de bois plus tardive à l'honneur notamment en Pays d'Auge. On remarquera d'ailleurs que dans certains édifices et en particulier à Vieux-Pont, les rangs de briques sont parfois remplacés sur de courtes surfaces par des pierres plates de dimensions exactement semblables. De même l'utilisation des briques au dessus des trous de boulins nous ramène à un équivalent brique/bois. Nous avons également posé ailleurs la question de relations éventuelles entre ce mode de construction et l'utilisation d'étroites lésènes formant raidisseurs dans l'architecture anglo-saxonne antérieure à la conquête de 1066¹³. De même l'appareillage de claveaux étroits et allongés est une méthode traditionnelle du haut Moyen Age et nous avons cité quelques exemples anglo-saxons bien connus auxquels il faudrait ajouter le portail de Wendens Ambo (Essex)¹⁴ et le cas tardif de St. Albans.



Fig. 5. - Claveau. Musée de Caudebec.

Il convient enfin de remarquer que, dans certains cas, l'habitude d'utilisation de la brique a influencé certains aspects de la construction en pierre et le phénomène de taille de pierres plates d'un module identique à celui des briques, déjà visible à la façade et du côté nord de Vieux-Pont est parfois repris plus tard. C'est le cas notamment dans les vestiges de la première campagne de Thury-Harcourt. Cette église actuellement étudiée par C. Prédal¹⁵, recèle dans son clocher des baies aux arcs appareillés de pierres étroites et plates exactement comparables à une construction en briques (la teinte rouge donnée à la pierre par un très ancien incendie accentue encore l'illusion). On remarque le même type non loin de la Normandie, au portail de la chapelle Saint-Eloi en Pléchâtel (Ile-et-Vilaine). Par ailleurs, l'alternance de claveaux de matériau différent créant un effet rouge (ou roux) et blanc se revoit au XIe et au XIIe siècles, par exemple à l'église d'Avernes-Saint-Gourgon (Orne) et reste évoquée par les peintures murales (Saint-Céneri-le-Géréi: arcs de la croisée du transept).

Il serait intéressant d'approfondir l'enquête sur l'impact des savoir-faire traditionnels utilisant la brique dans les formes de construction et d'appareillage de la pleine époque romane et des débuts du gothique, notamment pour les petits édifices ruraux ne bénéficiant que partiellement de l'impulsion donnée par les grands chantiers.

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¹² Analyse des fragments de brique appartenant respectivement aux deux séries par le laboratoire de Céramologie du Centre de Recherches Archéologiques Médiévales de Caen.

¹³ Voir entre autres sur ce sujet H.M. TAYLOR & J. TAYLOR, *Anglo-Saxon Architecture*, 3 vol., Cambridge, 1965. Les exemples comme Barton-on-Humber ou Barnack sont célèbres.

¹⁴ *Id.*, II, fig. 605.

¹⁵ C. PRÉDAL, Maîtrise en préparation sur Thury-Harcourt. M. Prédal a fait au sujet des agencements de l'appareil interne de la tour des remarques inédites et très intéressantes.

Nicola Coulthard & Florence Delacampagne

Pavés de terre cuite du Bessin et du Pays d'Auge (Normandie, France) Commercialisation et diffusion XIVE-XVIIe s

Introduction

Les premiers pavés de terre cuite en Basse-Normandie apparaissent dès l'époque gallo-romaine. Ce sont généralement de simples carrés de terre cuite non décorés. Ils ont souvent été négligés par les érudits qui leur préféraient des pavements mosaïques plus rares, mais autrement plus spectaculaires. Récemment, plusieurs pavés ont été découverts lors de la fouille d'un établissement rural gallo-romain en 1994, à Manneville-la-Pipard, dans le Pays d'Auge (Calvados) (Coulthard & Saint-Jores de 1994).

Pendant le haut Moyen Age, les sols des bâtiments sont essentiellement constitués de sols de terre battue ou de bois. Dans le département du Calvados, les pavés datés comme étant les plus précoces pour le Moyen Age sont ceux de Saint-Désir-de-Lisieux, carreaux de terre cuite s'emboîtant les uns dans les autres pour imiter des mosaïques de pierre (Cottin 1986, 295-300 et 1992, 39; Deshayes 1996, 23-38).

A partir de la fin du XIIe et le début du XIIIe siècles, on retrouve l'utilisation des pavés de terre cuite dans les édifices religieux de l'Europe de l'Ouest, notamment dans les monastères. De fabrication artisanale, ces pavés "mosaïque" ou parfois en "relief", correspondent à des commandes particulières. Des ateliers temporaires sont certainement installés à proximité du bâtiment en construction, et sont probablement gérés par des artisans itinérants, aidés par les religieux de l'établissement (Eames 1992, 4-6).

Pendant la deuxième moitié du XIIIe siècle, les pavés "bicolores" deviennent des éléments à part entière du décor architectural de l'édifice. Au départ, la diffusion de ces pavés est encore limitée aux grands édifices religieux, mais au fur et à mesure que le savoir-faire est acquis, de simples églises ont pu se doter de pavements décoratifs.

Vers la fin du XIIIe-début du XIVe siècle, des centres de productions régionaux apparaissent, développant chacun leur style. Dans le Calvados, les centres du Bessin et du Pays d'Auge dominent le marché. La production du Bessin, qui a connu son

apogée avant celle du Pays d'Auge, était destinée essentiellement aux édifices religieux. Dans le Pays d'Auge, la technique employée permettait une production très importante, diffusée également dans les grandes maisons bourgeoises et les manoirs ruraux.

En dehors de quelques rares édifices (l'église de Grandouet à Cambremer, la salle capitulaire de la cathédrale de Bayeux, le château du Pré d'Auge...) qui possèdent encore des lambeaux de pavements médiévaux et les apports de récentes fouilles archéologiques, il faut signaler tout particulièrement l'importante collection de pavés de la Société des Antiquaires de Normandie en dépôt depuis 1983 au Musée de Normandie, qui a fait l'objet d'un corpus (Coulthard & Delacampagne 1995). C'est à partir de ce fonds documentaire que nous abordons l'étude suivante.

On ne peut parler des pavés de terre cuite sans évoquer une production originale et très localisée dans sa diffusion: les plates-tombes. De grands carreaux de terre cuite composaient grandeur nature, par la technique de l'estampage ou du *sgraffiato*, un gisant dont l'assemblage des plaques recouvrait la sépulture. Cette production des XIIIe et XIVe siècles semble localisée dans l'ouest de la France et plus spécifiquement en Basse-Normandie. Elle s'adresse à une catégorie très élitiste de la population (abbés, chevaliers, dames de la noblesse). Ces carreaux sont de facture soignée et si aucun atelier n'a encore été mis au jour, le ramassage de surface réalisé dans le Bessin dans des zones de production de pavés médiévaux a révélé de nombreux fragments de carreaux de plates-tombes (fig. 1)..

Méthodes de travail

Pour mener à bien un travail cohérent sur ces pavés, nous avons adopté quelques principes de base nous permettant un enregistrement identique afin de pouvoir traiter les informations de chacun d'entre eux selon des critères comparables.

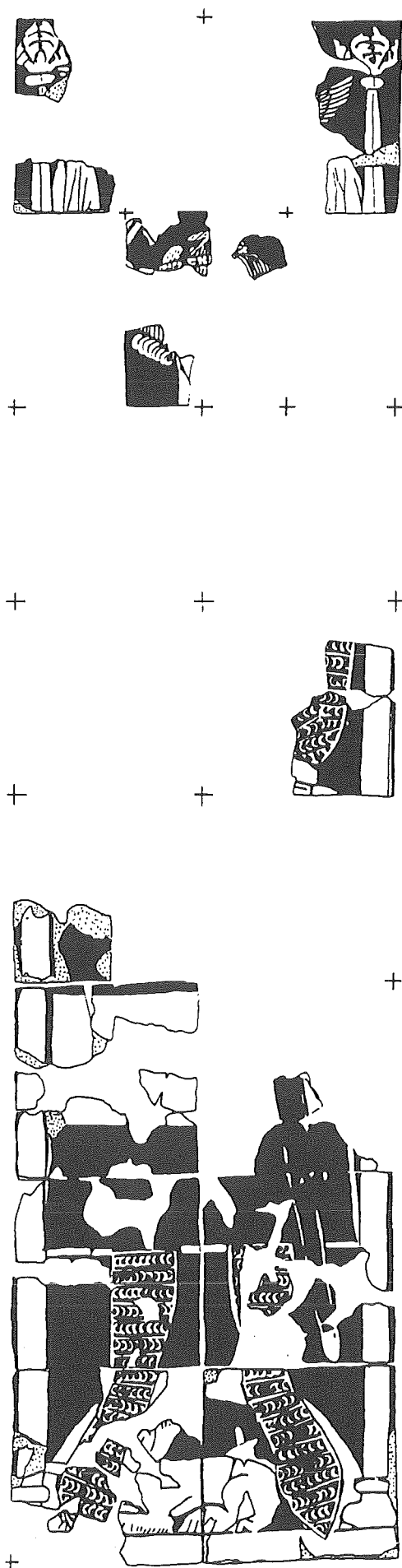


Fig. 1. - Plate-tombe n°1.

Tout d'abord les pavés sont triés par motif et par type de pâte. Tous les recollages possibles sont effectués permettant ainsi de compléter des motifs mais également de réduire le nombre de dessins à réaliser. Chaque motif différent de pavé est dessiné à l'échelle 1/1 à l'encre de Chine. Parfois plusieurs pavés d'un même motif sont nécessaires à la compréhension globale du décor. Puis pour les pavés au motifs altérés par l'usure, des restitutions du motif sont effectuées lorsque l'assurance d'avoir tout le motif du pavé est sûre.

Cette première approche des pavés faite, une fiche type peut être établie comprenant toutes les caractéristiques du pavé: format, technique de production, motif, couleur, provenance pour les pavés identifiés ou préalablement publiés (essentiellement ceux provenant des fouilles du prieuré de Deux-Jumeaux). Dans un premier temps, pour être testées, les fiches sont remplies à la main puis l'ensemble est informatisé permettant des tris, des regroupements et des recouvrements plus aisés.

Parallèlement, un très important travail de dépouillement bibliographique a été entrepris regroupant les articles anciens parus sur quelques lots de la collection mais également sur l'ensemble de la documentation publiée existante, traitant des pavés médiévaux et modernes en France mais aussi essentiellement en Grande-Bretagne.

A cela s'est ajoutée une recherche iconographique à travers des plans du XIXe siècle conservés au service des archives des Monuments Historiques, mais également des dessins aquarellés réalisés par des érudits locaux au début de ce siècle.

Ensuite on a pu entreprendre un travail comparatif, à partir des caractéristiques techniques enregistrées sur les fiches et de l'étude stylistique. Il était relativement facile de constituer des groupes de types de pavés (définis par un ensemble de caractéristiques), correspondant sans doute à différentes productions, car chaque type de carreaux a été découvert dans une zone géographique limitée. Les deux groupes les plus importants de la collection sont des pavés estampés bicolores. Deux groupes de pavés en relief ont été identifiés, ainsi qu'un groupe de pavés estampés à décor incrusté, et des pavés faïencés.

Afin de mener à bien l'étude stylistique, il a été parfois nécessaire de compléter sur le terrain nos essais de restitutions de motifs. Pour cela, nous nous sommes rendues sur plusieurs lieux de découverte ou de stockage de pavés semblables, dans des maisons privées ainsi que dans des musées de manière à apporter des comparaisons aux motifs déjà répertoriés dans la collection.

Décor

La fabrication des pavés découverts dans le département du Calvados relève de quatre techniques différentes qui sont les pavés uni-monochromes, les pavés à décor en relief, les pavés bicolores et les pavés faïencés. A l'intérieur de chacun de ces groupes, on peut distinguer plusieurs variantes qui témoignent de productions d'ateliers différents, ou bien, en ce qui concerne les pavés bicolores, d'une évolution des techniques dans le temps.

Pavés uni-monochromes

Les pavés étaient recouverts par une glaçure plombifère. L'application d'une glaçure directement sur le pavé pouvait produire un effet très décoratif par son aspect brillant, et par les différences de couleur créées par les variations d'inclusions dans la glaçure, et par les changements de couleur de la pâte et de la glaçure selon la cuisson.

Pratiquement toutes les glaçures ainsi produites contiennent du fer. La glaçure présente dans ce cas une teinte légèrement jaune. Par l'ajout d'un peu de limaille de cuivre, on pouvait produire une glaçure verte. L'aspect variait ainsi entre un jaune assez clair, et un vert foncé selon la cuisson du pavé. La glaçure est plus ou moins translucide selon le degré de température de cuisson, les températures relativement basses produisant des glaçures plus opaques. La glaçure pouvait également être posée sur une couche unie d'engobe blanche, éclaircissant ainsi le pavé.

Pavés à décor en relief

Un décor en relief était produit en appliquant une estampe en bois dans laquelle le motif choisi avait été ciselé. La glaçure sur les pavés fabriqués selon ces techniques est plus épaisse dans les creux, accentuant les motifs. Plusieurs pavés décorés de ce type (par estampe en contre-empainte) proviennent du prieuré de Deux-Jumeaux (Calvados).

Pavés bicolores

Le motif se dessine en argile blanche posée sur le fond foncé de la pâte, ou plus rarement par un motif foncé sur un fond blanc. La surface plane du pavé est recouverte par une glaçure. Plusieurs techniques de production sont connues pour cette catégorie de pavés.

1. Pavés estampés, à décor incrusté: c'est la méthode la plus ancienne. Une matrice en relief crée un motif en creux dans la surface du pavé. Ces creux, profonds de 3 à 5 mm, sont remplis par une pâte argileuse blanche épaisse.

2. Pavés estampés, avec décor à l'engobe: la profondeur des creux est moins marquée et un engobe

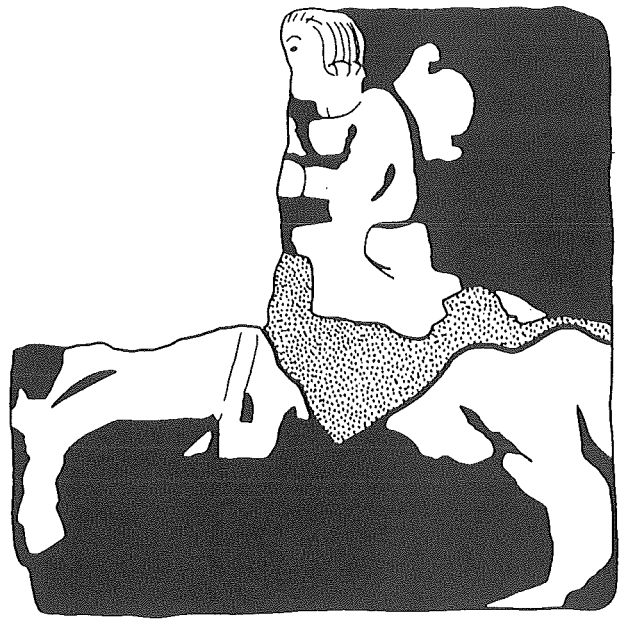


Fig. 2. - Pavé en technique sgraffiato. Echelle 2:3.

d'argile blanche remplit les impressions. Recouverts d'une glaçure, l'aspect des pavés incrustés ou estampés était semblable, mais l'usure des carreaux à décor à l'engobe beaucoup plus rapide.

En général, les impressions dans les pavés fabriqués dans le Bessin sont plus marquées (les pavés sont donc mieux conservés) que celles des pavés fabriqués dans le Pays d'Auge. Des différences de qualité à l'intérieur d'une production peuvent être le résultat de types de commandes différents. Un motif commandé en plusieurs centaines d'exemplaires pour décorer une salle, n'aura pas fait l'objet des mêmes soins de fabrication que des pièces uniques ou rares

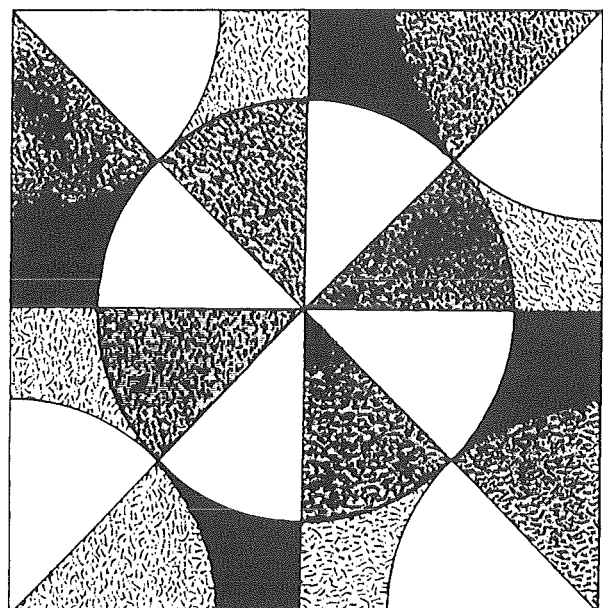


Fig. 3. - Un carreau faïencé. Echelle 2:3.

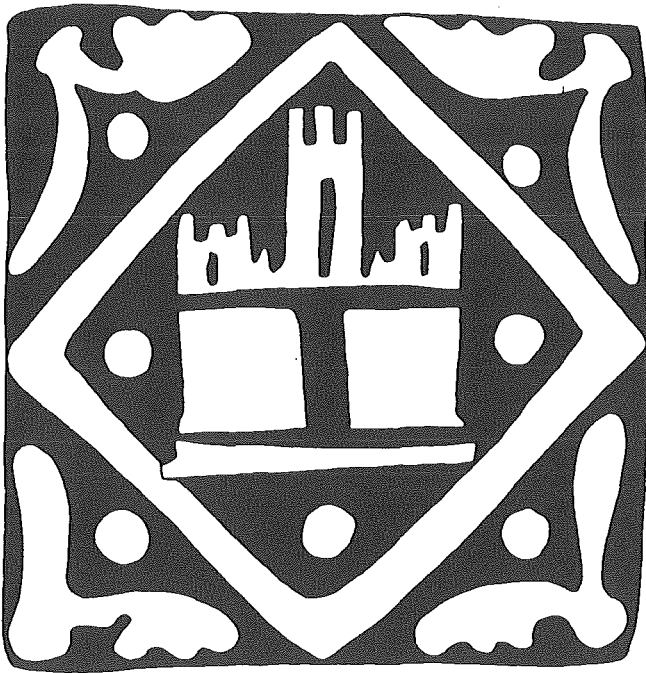


Fig. 4. - Atelier de production du Bessin: motif à Château de Castille. Echelle 2:3.

commandées pour compléter l'entourage d'une plate-tombe. On remarque des qualités de facture variables à l'intérieur des productions du Bessin et du Pays d'Auge.

3. Sgraffiato: pour des pièces exceptionnelles, une autre technique pouvait être employée, le *sgraffiato*. Les contours du motif et les détails étaient inscrits à travers une couche d'argile blanche qui recouvrait toute la surface du pavé. Ensuite l'excédent de cette



Fig. 5. - Atelier de production du Bessin: motif à poisson. Echelle 2:3.

argile est enlevé avec une gouge (Eames 1992, 35). Il en résulte une très bonne définition des motifs ou des figures, légèrement en relief par rapport à la surface originelle du pavé. Cette technique nécessitait un travail long et soigneux, mais les pavés ainsi fabriqués étaient d'une grande qualité (fig. 2).

Pavés faïencés

La production de carreaux faïencés appelée "pavés de Lisieux" ou "pavés de Joachim" est très importante à partir du XVIIe siècle. Ces pavés, de taille très régulière, étaient moulés. Après la pose d'un engobe blanc qui recouvre toute la surface, les contours des motifs sont tracés avec une pointe (Cottin 1985, 41). La régularité de ces formes suppose l'emploi d'un gabarit. Les motifs, souvent assez élaborés, sont ensuite décorés par la juxtaposition d'émaux de couleurs différentes, délimités par des incisions (fig. 3).

Ateliers de production

Le Bessin

Depuis le XVIIIe siècle, les érudits normands et anglais se sont beaucoup intéressés aux carreaux qu'ils observaient dans de nombreux édifices religieux de la région bas-normande. Ils attribuaient à l'époque le lieu de production de ces pavés à la commune du Molay (Calvados). L'appellation "Bessin" semble mieux convenir, car ce centre de production n'a pas encore été localisé, et les gisements d'argile dépassent largement les limites de Molay.

Les pavés mesurent de l'ordre de 115 à 132 mm de côté et de 23 à 31 mm d'épaisseur. La pâte est brun-rouge, la glaçure jaune. Les pavés sont souvent fortement cuits, ce qui modifie leurs couleurs; la pâte devient brun-violacé, parfois grise à l'intérieur, et la glaçure tire au vert-foncé. Les pavés bicolores sont à décor à l'engobe. La technique *sgraffiato* a également été utilisée sur quelques pièces uniques.

Les ateliers, qui ont dû fonctionner au moins à partir de la fin du XIIIe et pendant tout le XIVe siècle, ont produit un très grand nombre de pavés diffusés essentiellement dans les établissements religieux de la région (L'abbaye Sainte-Marie-de-Longues, l'abbaye de Cerisy-la-Forêt, l'abbaye-aux-Hommes à Caen, la cathédrale de Bayeux, le prieuré de Deux-Jumeaux, la léproserie Saint-Nicolas-de-la-Chesnaie à Bayeux).

La variété de motifs est remarquable, environ une centaine. Les blasons sont largement représentés. D'autres motifs courants sont la fleur de lys, le château de Castille, et la coquille Saint-Jacques. Un poisson dans une navette disposé diagonalement, est un thème

peu commun, caractéristique de cette production (Norton 1992, 63). Certains motifs composaient un module à 4 carreaux, (des thèmes floraux inscrits dans des quarts de couronne), ou plus rarement une grande rosace ou labyrinthe, comme dans la salle capitulaire de la cathédrale de Bayeux. La production du Bessin était en mesure de produire de grandes quantités de pavés à partir d'estampes de motifs populaires, mais elle effectuait aussi un travail de conception et de réalisation d'une très haute qualité (fig. 4 et 5).

A la fin du XIXe siècle, la tuilerie de Bavent (Calvados) a reproduit un certain nombre de motifs des ateliers médiévaux du Bessin à partir de moules neufs. Les carreaux réalisés étaient sensiblement de mêmes dimensions mais d'épaisseur moindre.

Le Pays d'Auge

Regroupés sur la commune du Pré-d'Auge près de Lisieux (Calvados) et sur certaines communes proches, plusieurs ateliers ont produit des carreaux en terre cuite pendant au moins deux siècles. Attestée avec certitude depuis le XVe siècle, l'activité potière est sans doute plus ancienne. Au XVIIe siècle, la production de pavés faïencés représente l'évolution logique de cette activité traditionnelle.

La taille des carreaux est très variable, de 100 à 130 mm de côté, et de 23 à 26 mm d'épaisseur. On observe parfois un motif "tronqué" sur des carreaux de petite taille; le pavé était paré après la pose du décor en fonction de la taille désirée.

La pâte est brun-rouge, fine, la glaçure jaune ou verte. Les carreleurs intégraient des blocs de couleurs différentes dans les schémas de décor au sol. Les glaçures n'étaient pas de bonne qualité, elles sont presque toujours très usées. Les pavés bicolores étaient décorés à l'engobe après estampage.

On remarque que pendant toute la durée de la production, rares sont des décors pouvant former à eux seuls un décor complet (blasons, fleurs de lys isolées...). Les motifs se complètent plutôt à 4 ou à 16 carreaux. Ces motifs sont souvent floraux ou végétaux, apparemment plus élaborés pendant le XVIe siècle, où l'on voit également des volutes et des palmettes, parfois intégrées dans des motifs inspirés de "la ferronnerie" (Montier 1902, 183).

Comme pour la production du Bessin, la tuilerie de Bavent (Calvados) a également reproduit à la fin du XIXe siècle, un certain nombre de motifs des ateliers du Pays d'Auge (fig. 6 et 7).

A ce jour, aucun site n'a livré ensemble des pavés du Bessin et du Pays d'Auge. Ces deux productions se distinguent donc, par des caractéristiques techni-

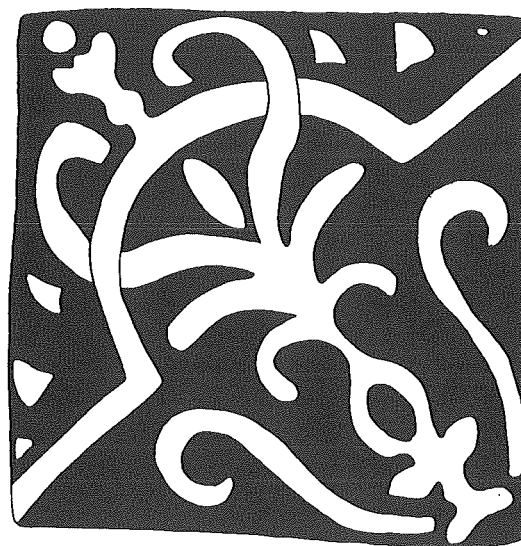


Fig. 6. - Atelier du Pays d'Auge. Echelle 2:3.

ques et par le style des motifs ainsi que par leur zone géographique de diffusion. Il est important toutefois de rappeler qu'à ce jour aucun atelier correspondant à ces centres de production n'a été fouillé.

Diffusion

L'étude de la diffusion de ces deux centres de production doit intégrer de nombreux paramètres: la fourchette chronologique de chacun des centres, l'aire géographique constituant leur marché, les caractéristiques de chacun de leurs produits, l'iden-

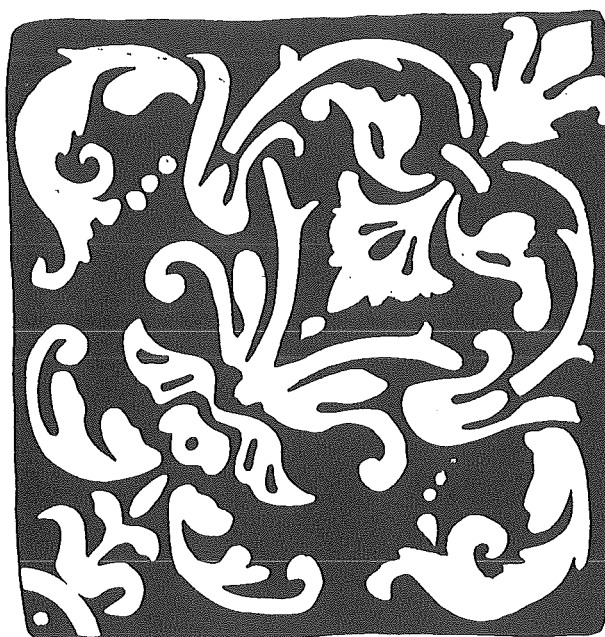


Fig. 7. - Atelier du Pays d'Auge: motif vegetal. Echelle 2:3.

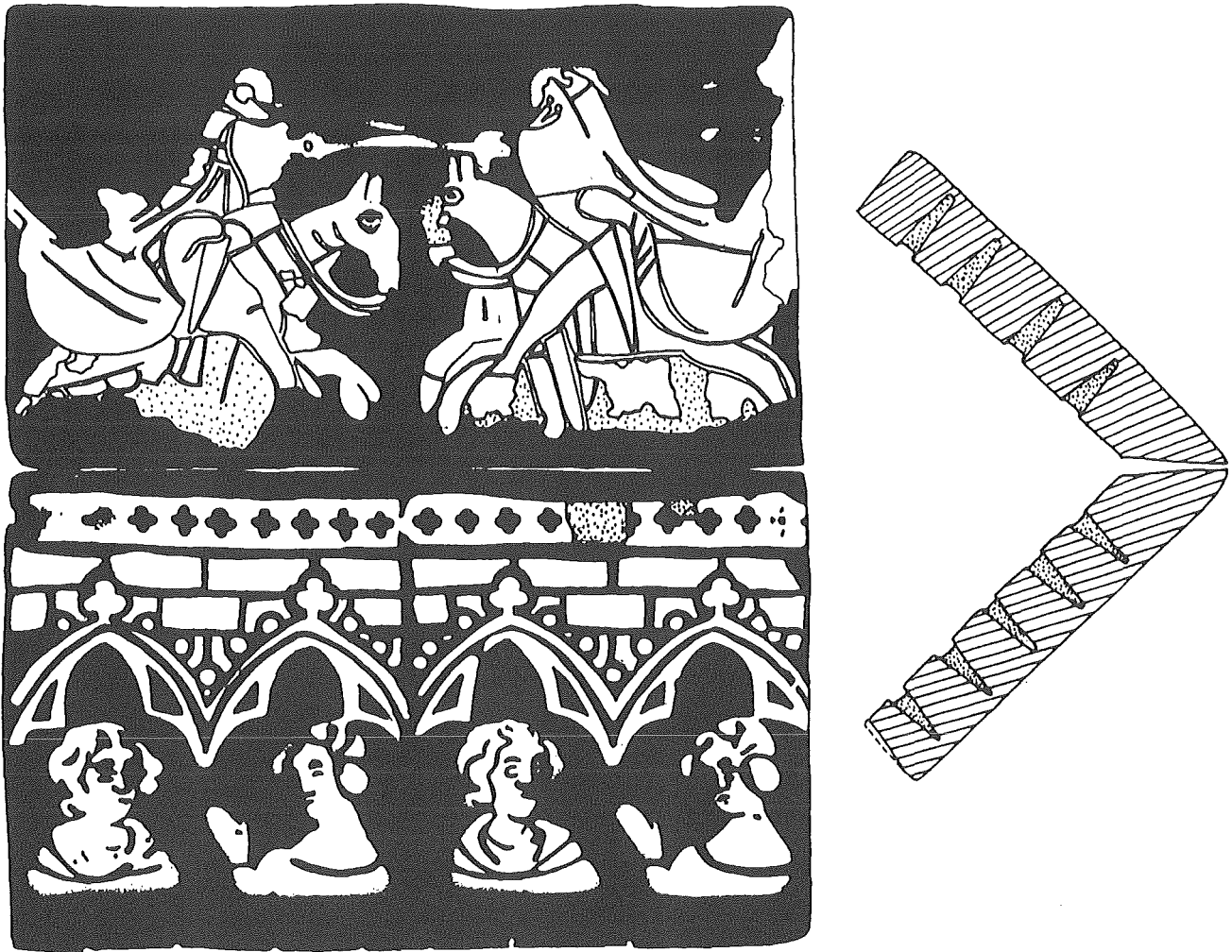


Fig. 8. - Scène de tournoi représentée sur la marche de Saint-Louet-sur-Vire (Musset 1992, 65-67). Echelle 80%.

tité des commanditaires ainsi que la concordance entre la nature de la commande et celle de son lieu d'affectation.

a. Pour la production du Bessin, le recensement des lieux de découverte des pavés montre actuellement une distribution géographique essentiellement régionale. En effet la plupart des sites se situe dans un rayon d'environ 50 km autour de la zone de production. On peut signaler deux cas particuliers dont l'un sort vraiment de l'aire géographique citée précédemment. Tout d'abord, une plate-tombe récemment découverte à l'abbaye du Voeu à Cherbourg (Manche) (Broine 1996) datée de la fin du XIII^e siècle dont les analyses chimiques révèlent précisément un gisement d'argile situé sur la commune du Molay dans le Bessin (renseignements Dufournier, Laboratoire de Céramologie, Centre Michel de Bouard, UMR 6577). D'autre part, il faut souligner la découverte d'une tombe dans l'ancienne cathédrale de Hambourg. Il s'agit de la sépulture du pape Benoît V, mort en exil à Hambourg à la fin du Xe siècle et dont

les restes furent rapatriés à Rome entre 983 et 988. Pour garder la mémoire de son séjour à Hambourg, les hambourgeois, quatre siècles plus tard (avant 1340), lui élevèrent un cénotaphe. Celui-ci se traduit par une plate-tombe en plaques céramiques vernissées. Les caractéristiques de l'inscription figurant sur le pourtour de la plate-tombe sont très proches de celles utilisées sur des plates-tombes normandes. Les alentours de la plate-tombe ne sont pas non plus sans rappeler la Normandie. En effet des carreaux représentent des scènes de tournoi telles celle représentée sur la marche de Saint-Louet-sur-Vire (Musset 1992, 65-67). Peut-être faut-il voir dans cette exportation, le caractère spécifique et très exceptionnel de cette commande (fig. 8).

b. Dans le Pays d'Auge les pavés sont fabriqués autour de la commune du Pré d'Auge. Quoique la technique de décor à l'engobe ait été utilisée comme pour les pavés du Bessin, elle s'en différencie aisément. La production du Bessin étant plus limitée dans le temps, ses motifs et son style nous paraissent donc

plus homogènes comparés à ceux du Pays d'Auge, qui a évolué pendant plusieurs siècles. Il faut noter que les pavés faïencés, fabriqués dans le Pays d'Auge au XVII^e s., sont la suite logique d'une production régionale vieille d'au moins trois siècles.

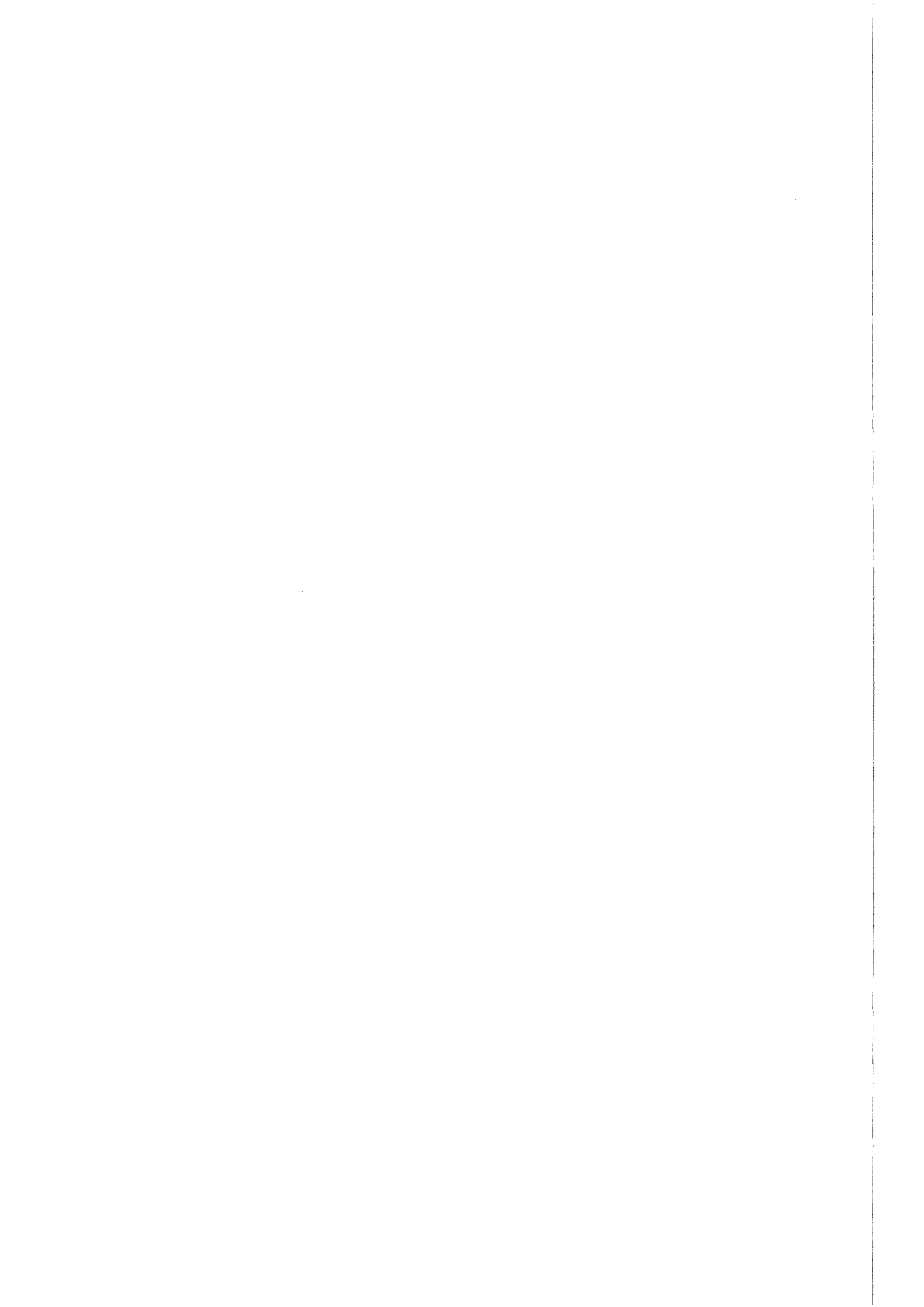
La longévité de la production dans le Pays d'Auge, et l'apparente "démocratisation" de l'emploi des carrelages font que des centaines de motifs avec toute une série de variantes ont été fabriqués et vendus également aux nombreux manoirs et maisons bourgeoises des alentours (le château du Pré d'Auge, le château de Saint-Germain-de-Livet, le manoir de la Pipardière à Livarot, le manoir Le Valois, le manoir des Mathurins à Lisieux...). Il est très difficile d'attribuer des périodes "stylistiques" à une chronologie. La diffusion des pavés bicolores semble se situer essentiellement à l'est de la Dives.

Vers la fin du XVI^e siècle, l'apparition des pavés faïencés fabriqués dans le Pays d'Auge apporte un renouveau dans la fabrication régionale. Ces pavés sont inspirés des techniques de la faïence de Rouen. La diffusion devient alors plus large et dépasse le cadre régional.

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Der Kachelofen Ein Gegenstand der Wohnkultur im Wandel - kulturgeschichtliche Aspekte anhand historischer Bildquellen

Einleitung

Ofenkachel, Kachelofen, Wohnkultur – mit dieser Dreierheit läßt sich ein ebenso komplexes wie interessantes Feld der historisch ausgerichteten, interdisziplinären Sachkulturforschung umschreiben:

- Einzelne Ofenkacheln, häufig nur fragmentarisch erhalten, werden bei fast allen stadarchäologischen Untersuchungen geborgen. Mit Kachelfragmenten lassen sich archäologische Schichten datieren, können Fragen der Handwerkstechnik thematisiert und stilgeschichtliche Frage erörtert werden.
- Komplette historische Kachelöfen sind in weit geringerem Maße erhalten geblieben. Wenn auch aus diesem Grund manche Hypothese über Detailfragen der Ofenarchitektur oder der Standorte von Öfen fraglich bleiben, so können anhand historischer Öfen mitunter wichtige Aussagen etwa zum Bildprogramm erarbeitet werden.
- Der Versuch, das Bedeutungsumfeld des Stichworts Wohnkultur mit wenigen Worten beschreiben zu wollen, wird an dieser Stelle erst gar nicht unternommen, denn schließlich ist das Phänomen des Wohnens ähnlich komplex und wird entsprechend kontrovers diskutiert wie der Begriff der historischen Alltagskultur.

Eines steht jedoch außer Frage: daß das eine (nämlich die Wohnkultur) ein Bestandteil des anderen (nämlich der Alltagskultur) ist; der Kachelofen – als Bestandteil der Wohnkultur – ist somit ein wesentlicher Aspekt Kulturgeschichte des mitteleuropäischen Alltags.

Bei der Erforschung des Kachelofens stützte sich die Forschung bislang vornehmlich auf überlieferte Realien. Hingegen wurden bildliche Darstellungen von Kachelöfen bislang nicht in ausreichendem Maße auf ihren Quellenwert für kulturwissenschaftliche Fragestellungen der Kachelforschung hin untersucht¹. Die folgenden Ausführungen können diese Forschungslücke nicht schließen – es ist vielmehr ein anregend-reflektierender Charakter intendiert.

Das Bild als Quelle

Historische Bilder sind Untersuchungsgegenstand der kunstgeschichtlichen Forschung – historische Bilder als Quelle für weiterführende Fragestellungen zu nutzen, ist hingegen eher ein Feld volkskundlicher Forschungen. In diesem Fach hat die Analyse historischer Bilder bereits eine längere Tradition. Seitdem sich die Mittelalter-/Neuzeitarchäologie etabliert hat, wird auch von dieser Sparte aus häufiger auf historisches Bildmaterial als Quelle zurückgegriffen². Analog zu anderen Quellengattungen, bedarf es bei der Analyse bildlicher Darstellungen gleichermaßen einer bisweilen jedoch vernachlässigten Kritik³.

Zu einer bewußten Reflexion des Quellenwertes von Kunstwerken für die Erforschung der Sachkultur ruft Elisabeth Vavra auf. Sie betont, daß „politische und soziale Umstände, geistige und künstlerische Traditionen, Auftraggeber und Verwendungszweck“ in jedem Kunstwerk ihren Niederschlag finden (Vavra 1980, 196). Bildliche Darstellungen – insbesondere der Hochkunst – besitzen demnach einen tendenziösen Charakter. Damit können die dargestellten Gegenstände und Handlungen den Charakter

¹ Eine bis heute wichtige Zusammenstellung bildlicher Quellen leistete Konrad Strauß mit seinem Aufsatz von 1968. Rosemarie Franz berücksichtigte im Rahmen ihrer Studie bildliche Quellen eher am Rande (vgl. Franz ²1981). In der Literaturliste findet sich eine kurze Aufstellung mit einschlägigen Titeln zur Kachelforschung.

² Vgl. dazu Stephan (1991) mit seiner Studie über die Kacheln aus dem Werraland; sowie den Beitrag von Erdmann (1989) über die Authentizität historischer Bildquellen im Hinblick auf die Darstellung von Gefäßkeramik.

³ Im positiven Sinne bemerkenswert ist in dieser Hinsicht der Beitrag von Erdmann (1989) über die Authentizität historischer Bildquellen im Hinblick auf die Darstellung von Gefäßkeramik.



Abb. 1. - Gent, um 1510 (HANSEN W., *Kalenderminiaturen der Stundenbücher. Mittelalterliches Leben im Jahreslauf*, München, 1985, Abb. 18).

von *Leitbildern* erlangen; ein Umstand, der auch bei der Analyse von Fragen der Sachkulturforschung zu berücksichtigen ist.

In vielfacher Hinsicht dürfte es sich bei historischen Darstellungen also um gesellschaftliche bzw. schichtspezifische *Idealbilder* handeln, die über das Bild als *Kommunikationsmedium* popularisiert wurden. Die gesendete *Bildbotschaft* wird in einem *Code* verschlüsselt, der es dem zeitgenössischen *Empfänger* ermöglicht, die *Botschaft* zu verstehen. Dieser Aspekt spricht für ein hohes Maß an Wiedererkennbarkeit – und damit an *Authentizität der Abbildung* im Detail; läßt den Gesamtzusammenhang der Darstellung jedoch in einem anderen Licht – nämlich dem der *Idealisierung* bzw. *Stilisierung* – erscheinen.

Als These im Hinblick auf die Darstellungen von Kachelöfen in historischen Abbildungen wäre dem-

nach zu formulieren, daß die dargestellten Räumlichkeiten einem zeitgenössischen *gesellschaftlichen Leitbild* entsprachen. Die Tradition dieser *Leitbilder* findet ihren Niederschlag in der Verwendung von Kachelöfen als *Bildbausteinen*. Die Abbildung eines Ofens also als *Sinnbild* für Wohnlichkeit, als konstituierendes Element und *Erkennungszeichen* der Stube? Diese Fragen beschreiben den erkenntnisleitenden Horizont der folgenden Überlegungen.

Ein Kaleidoskop möglicher Fragestellungen

Für eine auf Fragen der Kachelöfenforschung zentrierte Auswertung historischer Bildquellen läßt sich ein Katalog von Fragen formulieren, der von der

Abb. 2. - Brügge, um 1520
(Hansen 1985, Abb. 13)



Detailanalyse bis hin zu einem kontextorientierten Diskurs der historischen Wohnforschung reicht:

Themenzentrierte Fragen im Hinblick auf den Kachelofen:

- der Standort des Ofens innerhalb des Raumes
- die Ofenarchitektur
- die Verwendung unterschiedlicher Kacheltypen beim Aufbau des Ofens
- die Gestaltung einzelner Kacheltypen

Fragen zum Bereich der historischen Wohnkultur-forschung:

- das dargestellte Raumgefüge
- bauliche Ausstattungsmerkmale und Einrichtungsgegenstände der Stuben
- die Art der dargestellten Handlungen
- Rückschlüsse auf Funktion und Nutzungsmuster der ofenbeheizten Räumlichkeiten⁴

Schließlich sind auch quellenimmanente Fragestellungen zu formulieren:

- Frage nach der Intention der Abbildung
- Frage nach der Authentizität der Darstellungsinhalte
- Frage nach der Darstellungsweise – z.B. dem Grad der Abstraktion

Der zuletzt genannte Fragenkomplex ist zweifellos ein Bestandteil der Quellenkritik. Anhand des folgenden Beispiels soll die oben vertretene These der Verwendung von Bildbausteinen verdeutlicht werden:

Die durch ihre detaillierte Ansicht sehr authentisch wirkende Darstellung eines kaminbeheizten Raumes (Abb. 1) verliert an Individualität durch das dieser Abbildung nachempfundene Pendant, das zehn Jahre später geschaffen wurde (Abb. 2). Die Qualität der Bildbotschaft (=Darstellung eines kaminbeheizten Raumes mit einem 'typischen Handlungsmuster') wurde von dem nachfolgenden Künstler offensichtlich so hoch eingeschätzt, daß dieser ihn als *Bildbaustein* übernahm und in seinen Bildaufbau integrierte. Dieses Beispiel zeigt deutlich, daß für die Vermittlung von Darstellungsinhalten *Bildbausteine* Verwendung finden können.

Die Quellen

Den Hintergrund für diese Studie bildet ein Sample von insgesamt 100 historischen Bildquellen mit der Darstellungen von Kachelöfen, die im Rahmen dieses Beitrages jedoch nur anhand von ausgewählten Beispielen besprochen werden können⁵. Es sich vornehmlich um Erzeugnisse der populären Druckgraphik⁶.

Eine sichere regionale Zuschreibung der bildlichen Quellen kann an dieser Stelle nicht geleistet werden, da es sich meist um anonyme druckgraphische Erzeugnisse handelt, bei denen der Druckort der Publikation apriori nicht mit dem Entstehungsort der Graphik gleichgesetzt werden darf, da druckgraphische Erzeugnisse allzeit ein hohes Maß an Mobilität besaßen (Stichwort: Bilderhandel /

⁴ Bei *Funktion* und *Nutzungsmuster* handelt es sich um zwei sachverwandte Kategorien, die jedoch eine jeweils unterschiedliche Reichweite besitzen: Während die Frage nach der Funktion auf die reine Verwendung einer Räumlichkeit im Hinblick auf das Handlungskonglomerat des 'Wohnens' abzielt, können mit der Kategorie der Nutzungsmuster weiterführende Merkmale wie Nutzungsdauer oder saisonale bzw. soziale Unterschiede im Gebrauch von Räumlichkeiten beschrieben werden.

⁵ Dieser Umstand erklärt sich aus dem Entstehungszusammenhang der hier vorgetragenen Gedanken, einer volkskund-

lich-archäologischen Studie über die Entwicklung des Kachelofens im vorgenannten Zeitraum auf der Basis von Hildesheimer Quellen (Germany, lower saxony). Vgl. Henkel (1997, im Druck). Der Zeitrahmen der Untersuchung umfaßt das 13. bis 18. Jahrhundert und damit die Frühzeit des Kachelofens, er schließt die kunstgeschichtlich besonders interessanten Phasen der Renaissance und des Barock ein und endet mit der Zeit des Rokoko.

⁶ Die niederländische Genremalerei kennt im Gegensatz zu den reichlich vertretenen Küchenszenen m. W. keine Darstellung einer ofenbeheizten Räumlichkeit.



Abb. 3. - Würzburg, 1250/1259 (Hansen 1985, Abb. 10).

Kolportage). Aus diesem Grund sollen mit den folgenden Ausführungen weniger spezifisch regionale Entwicklungen nachgezeichnet als vielmehr allgemeine Tendenzen aufgezeigt werden.

Der Kachelofen als *Bildbaustein*

Bemerkenswert ist, daß bei fast einem Drittel der Darstellungen der Ofen lediglich bis zu 50 Prozent zu erkennen ist und der Rest der Öfen durch Archi-



Abb. 4. - Zürich, um 1340 (TAUBER J., *Herd und Ofen im Mittelalter. Untersuchungen zur Kulturgeschichte am archäologischen Material vornehmlich der Nordwestschweiz (9.-14. Jahrhundert)*, Olten, 1980, Abb. 256.

tekturteile, Einrichtungsgegenstände oder Personen verdeckt wird⁷. Mitunter ist der Ofen so postiert, daß er in wesentlichen Teilen dem Blickfeld des Betrachters entzogen ist. Gerade solche Beispiele stützen die Hypothese, daß dem Ofen eine besondere *Funktion* innerhalb der jeweiligen Abbildung zukommt. Das Objekt Kachelofen kann demnach als Bildbaustein interpretiert werden, dessen *Sinngehalt* sich aus unterschiedlichen Aspekten zusammensetzt. Die Botschaft muß auch dann für einen zeitgenössischen Betrachter verstehbar gewesen sein, selbst wenn es sich lediglich um die bruchstückhafte Darstellung eines Ofens gehandelt hat. In der kunstgeschichtlichen Forschung ist für die Beschreibung unterschiedlicher Bedeutungsebenen das Konzept der „Sinnschichten“ entwickelt worden⁸. Der Bildbaustein Kachelofen dient in seiner „primären Sinnschicht“ als Darstellung einer Wärmequelle eines Raumes; in seiner „sekundären Sinnschicht“ ist er mit bestimmten, den Zeitgenossen vertrauten Konnotationen belegt. Welche können dies sein?

Durch die Darstellung des Ofens erfolgt eine Spezifizierung der Räumlichkeiten bzw. der dargestellten Handlungen.

Durch die Ofendarstellung werden beim Betrachter bestimmte Assoziationen, Wünsche oder Empfindungen geweckt.

In der überwiegenden Zahl der Abbildungen kann man vom heutigen Standpunkt aus angenehme Assoziationen bei der Betrachtung der Bilder vermuten: Der Kachelofen als *Sinnbild* für Wohnlichkeit, für Ruhe, für Kontemplation. Dieser Eindruck verstärkt sich durch das übrige Inventar der Räumlichkeiten, insbesondere durch die Sitz- und Ruhemöbel: Der Kachelofen also als *konstituierendes Element* und *Erkennungszeichen* der Stube. Die Interpretation des Kachelofens in der *Funktion eines Bildbausteines* führt direkt zu der Frage, mit welchem Grad an Authentizität bei den Abbildungen gerechnet werden kann.

Als These läßt sich formulieren, daß bei bildlichen Darstellungen der *Bildbaustein Kachelofen* zumindest derartig gestaltet sein muß, daß er von einem zeitgenössischen Betrachter als solcher erkannt werden kann. Der *Sinngehalt* eines abgebildeten

⁷ Als 100 Prozent wird die Wandungsfläche eines Ofens angenommen, die sich über der Hälfte der Grundfläche des Ofens erhebt.

⁸ Vgl. dazu Vavra (1980, 215f.), die sich mit ihren Ausführungen auf die mittelalterliche Tafelmalerei bezieht. Meines Erachtens kann dieses Konzept jedoch auch auf die hier zur Diskussion stehenden Quellen übertragen werden. Panofsky (1979, 185ff.) unterscheidet die Kategorien „Phänomensinn“, „Bedeutungssinn“ und „Dokumentsinn“.

Abb. 5. - Konstanz, 14. Jh.
(HOLCIK St., Stredoveké kach-
liarstvo, *Kniznica priateľov*
vytvarného umenia Zväzok
29, 1978, Vorsatzblatt).



Ofen ist – dies läßt die oben angedeutete Darstellungsweise mit den in der Regel nur teilweise sichtbaren Kachelöfen vermuten – weniger auf die primäre als vielmehr auf die sekundäre Sinnschicht fokussiert und zielt damit auf die mit dem *Bildbaustein Kachelofen* verbundenen Konnotationen: auf die Funktionsspezifikation eines Raumes, auf die Beschreibung einer Handlung, auf die Stimulation von bestimmten Assoziationen beim Betrachter.

Im Gegensatz dazu sind etwa die keramischen Modelle von Kachelöfen, die in einiger Zahl überliefert sind, als überaus authentische Miniaturen zeitgenössischer Öfen zu interpretieren, da man mit einiger Berechtigung davon ausgehen kann, daß sie u.a. als (verkaufsfördernde) Modelle für potentielle Kunden eingesetzt worden sind. Die Notwendigkeit der Aktualität bzw. Modernität und Abbildungstreue ist hier also ungleich höher, da die Intention für die Entstehung der Ofenmodelle eine völlig andere gewesen ist.

Die angesprochenen Aspekte mögen als quellenkritische Vorbemerkungen genügen, denn zweifellos besitzen auch gerade die bildlichen Quellen eine Aussagequalität und ein Aussageprofil, das von anderen Quellengattungen nicht in gleicher Weise

abgedeckt wird. Um diese Hypothese zu untermauern, wird anhand von elf exemplarischen Analysen das oben umrissene Kaleidoskop von Fragen im folgenden ausgelotet.

Beispiel 1

Für die Erforschung der Ofenkeramik sind die frühen Abbildungen von Kachelöfen aus dem 13. und 14. Jahrhundert ebenso wichtig wie problematisch, da für diesen Zeitraum bislang außer Ofenkachelfunden selbst nur wenig aussagekräftige archäologische Befunde vorliegen, die als Korrektiv für die aufgestellten Hypothesen im Hinblick auf das äußere Erscheinungsbild von Kachelöfen herangezogen werden können.

Bei allen drei Öfen (Abb. 3 bis 5) ist eine deutlich gegliederte Architektur erkennbar, die im wesentlichen durch die plastische Gestaltung der Lehmwandung hervorgerufen wird. In die Ofenwandung sind in regelmäßigen Abständen Ofenkacheln mit rundem Mündungsdurchmesser eingesetzt. Näherer Aufschluß über die Gestaltung der einzelnen Kacheln ist aufgrund der Darstellungen nicht zu erlangen.



Abb. 6. - 1532 (VOLKER A., WESTPHALEN TH. & ZUBECK P., Kachelöfen in Schleswig-Holstein. Irdenware - Gußeisen - Fayence, *Kleine Schleswig-Holstein-Bücher* 40, Kiel, 1990, Abb. 1).

Da keine der Kacheln angeschnitten abgebildet ist, handelt es sich vermutlich um jeweils kubische Ofenteile. Bei dem Ofen in Abb.3 ist deutlich das zimmerseitige Feuerungsloch zu erkennen, an dem sich die Person die Füße wärmt. Damit wird deutlich,

daß es sich bei diesem Ofen nicht um eine Hinterladerkonstruktion handelt.

Bei den beiden anderen Öfen (Abb. 4 und 5) ist der trichterförmig gestaltete Ofenabschluß bemerkenswert, der in der Forschungsgeschichte bereits zu

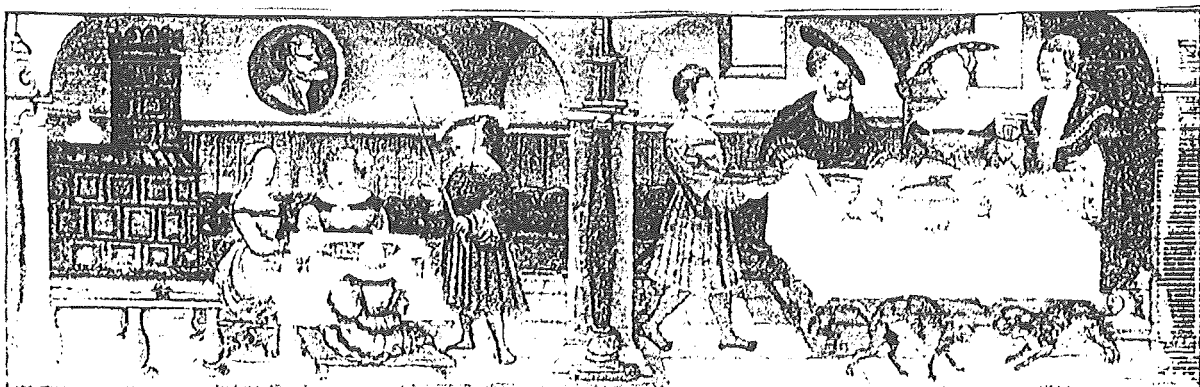


Abb. 7. - Nürnberg, 1535 (Hansen 1984, Abb. 23).

Abb. 8. - Frühes 17. Jh.
(BRÜCKNER W., *Populäre
Druckgraphik Europas.
Deutschland, vom 15. bis
zum 20. Jahrhundert*, Mün-
chen, 1969, Abb. 71.



kontroversen Diskussionen Anlaß gab. Neuere archäologische Funde aus Göttingen legen nahe, daß es sich weniger um ein schmückendes sondern vielmehr um eine konstruktives Element handelt. Danach wäre der trichterförmige Aufsatz eher als Rauchabzug anzusprechen, durch welchen die Verbrennungsgase an die Raumluft abgegeben werden. Auch Abb. 3, bei der kein solcher Rauchabzug dargestellt ist, legt die Konstruktion einer „Rauch-Stube“ nahe, da an einem Deckengestell über dem Ofen Lebensmittel im Rauch hängen. Diese These steht im Gegensatz zu der bislang geläufigen Forschungsmeinung, daß die Einführung des Kachelofens in Mitteleuropa quasi automatisch gleichbedeutend ist mit einer rauchfrei beheizbaren Räumlichkeit, der Stube.

Im übrigen lassen die drei genannten Abbildungen nur geringe Aussagemöglichkeiten hinsichtlich der Raumgestaltung und -ausstattung zu. Die dargestellten Handlungen können allgemein dem Handlungsstrang „Ruhe/Kontemplation“ zugeordnet werden.

Beispiel 2

In Abb.6 und Abb.7 sind im Gegensatz zu den vorgenannten Bildquellen in wesentlich umfangreicherem Maße auch die ofenbeheizten Räumlichkeiten mit ihrer Gestaltung und Ausstattung wiedergegeben. Dargestellt findet sich in Abb. 6 eine sprichwörtlich ‘gute Kinderstube’ in der eine ganze Anzahl von Kleinkindern beim Spielen zu beobachten ist bzw. sich die Kinder der Körperpflege unterziehen müssen. Im anderen Fall (Abb. 7) handelt es sich um die Darstellung eines festlichen Tafelmahls, bei dem die Speisen durch einen Diener an den Tisch der Gastgeber gereicht werden, während die Jugendlichen und Kinder an einem separaten Tisch in der Nähe des Kachelofens sitzen.

In beiden Abbildungen nehmen die Öfen eine den Raum deutlich mitbestimmende Position ein. Sie sind als Hinterlader konstruiert und mit einer umlaufenden hölzernen Ofenbank versehen. Während

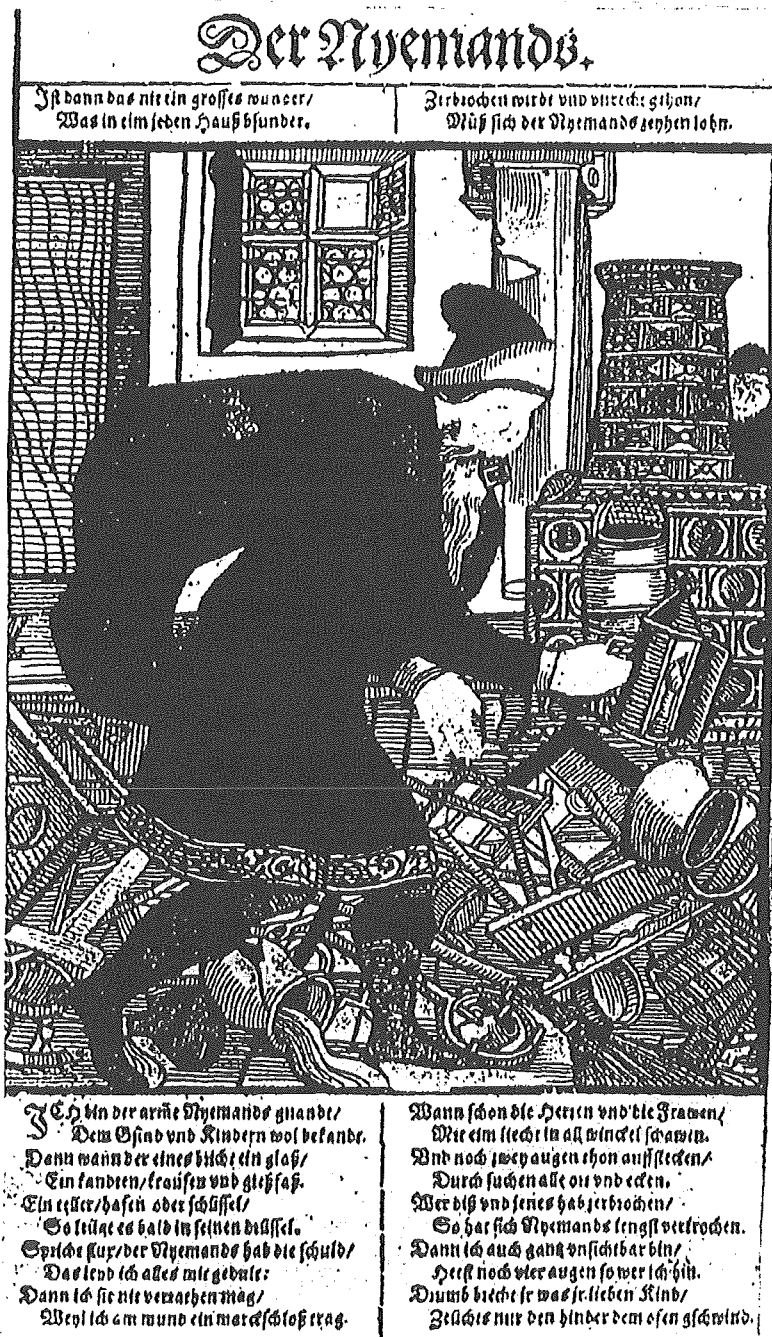


Abb. 9. - Undatiert (WÄSCHER H., *Das deutsche illustrierte Flugblatt*, Band 1, Dresden, 1955, Abb. 12.

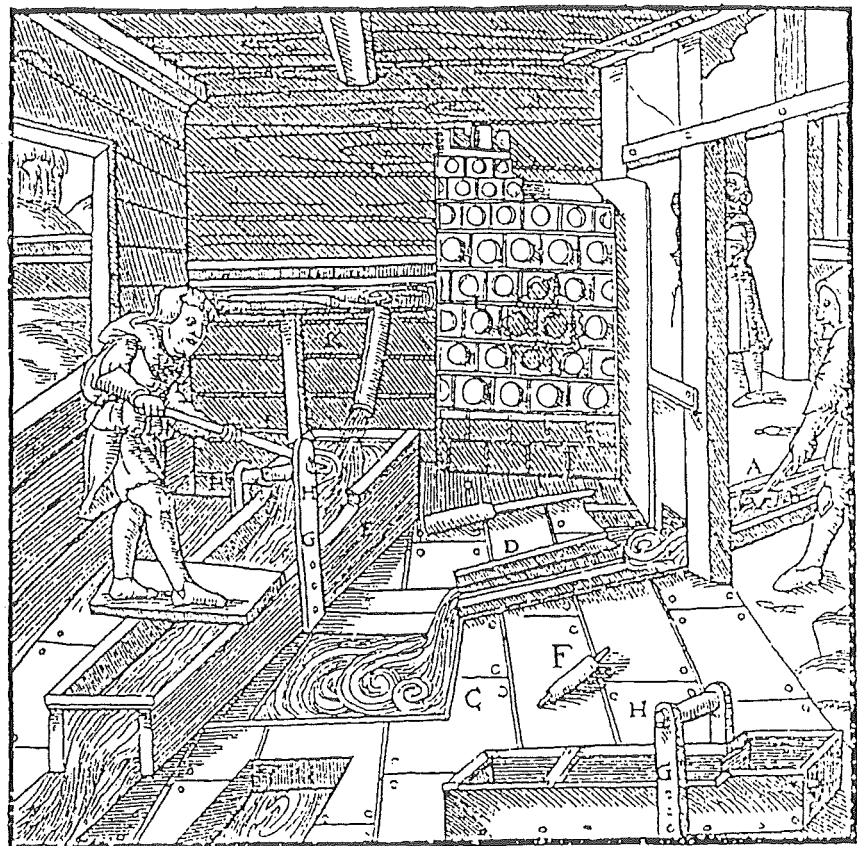
der Ofen in Abb. 7 einen langrechteckigen Feuerungskasten besitzt, weist der Ofen in Abb. 6 einen mehr kubischen Unterofen auf. Für die Oberöfen legen die beiden Darstellungen einen runden Grundriß nahe.

In seiner äußeren Erscheinung ist der Ofen in Abb. 7 wesentlich weiter entwickelt: er zeichnet sich sowohl durch Gesimskacheln als auch eine Reihe von Bekrönungskacheln aus. Demgegenüber wirkt der Ofen in Abb. 6 eher schlicht und funktional; ein Eindruck, der auch durch das hölzerne Trockengestell verstärkt wird.

Weitere Ausstattungsmerkmale der Stuben – im einen Fall ein Fliesenboden und eine auf Pfeilern

ruhende, steinerne(?) Gewölbedecke, im anderen Fall ein Dielenboden und eine verbretterte Decke – sind deutlich erkennbar. Während in Abb. 6 die Befensterung eine Bleiverglasung mit Flügelfenstern aufweist, sind in Abb. 7 zwar die Fensteröffnungen unverglast, jedoch wird der repräsentative Charakter des Raumes einerseits durch die reich gedeckte Tafel mit Tischtuch und durch das an der Wand hängende antikisierende Profilportrait unterstrichen. In beiden Räumen fällt die geringe Möblierung auf, die sich – abgesehen von einem in Abb. 6 dargestellten Wandschrank und einer Wandnische – im wesentlichen auf Sitzgelegenheiten und Tische beschränkt.

Abb. 10. - 1556 (AGRICOLA G.,
Zwölf Bücher vom Berg- und Hüt-
tenwesen, (lat. Original von 1556)
Deutsche Ausgabe, achtes Buch,
Berlin, 1974.



Beispiel 3

Bei Abbildung 8 und 9 handelt es sich jeweils um allegorische Darstellungen. In Abb. 8 wird das Resultat einer lasterhaften Haushaltsführung drastisch dargestellt: die Bestrafung der Hausfrau durch den Hausherrn. Bei der zweiten Bildquelle handelt es sich um die Darstellung des sogenannten „Niemand“, der als Sündenbock für alle Schäden im Haus verantwortlich gemacht wird. In beiden Bildern werden demgemäß 'zentrale Themen' des häuslichen Lebens und der häuslichen Sorgfaltspflichten angesprochen; in beiden Abbildungen findet sich jeweils ein Kachelofen. Der sorgfältige Unterhalt des Ofens ist insbesondere zur Winterszeit als Eckpfeiler des häuslichen Wohlbefindens zu interpretieren – die Wichtigkeit dieses Elementes der Wohnkultur ist durch die Abbildung des Ofens eindeutig repräsentiert.

Über diese Bedeutungsebene hinaus lohnt auch ein genauerer Blick auf die dargestellten Öfen: Mit hoher Wahrscheinlichkeit handelt sich in beiden Fäl-

len um Hinterladerkonstruktionen. Der Ofen in Abb. 8 ist im wesentlichen aus Blatt-Napfkacheln aufgebaut, weist darüber hinaus aber auch eigens gestaltete Eckkacheln sowie plastisch reich gestaltete Bekrönungskacheln auf⁹. Der Ofen ruht auf schlanken, tordierten Eisenfüßen. Im Bereich des Feuerungskastens ist statt der breiten Holzdielen eine Fliesenlage in den Boden eingelassen¹⁰.

Der Ofen mit der Darstellung des 'Niemand' weist einen ebenfalls aus Blatt-Napfkacheln aufgebauten Feuerungskasten auf, hat demgegenüber aber einen runden Oberofen, der aus andersartigen Kacheln gebildet wird. Bemerkenswert ist insbesondere das sog. Wasserschiffchen, das zur Bereitstellung von Warmwasser in die Ofenwandung eingelassen ist. Zweifellos war gerade dieses Bauteil besonders sorgfältig zu pflegen, da ein Rißbildung im Wasserbehälter zweifellos aufwendige Reparaturarbeiten nach sich zog¹¹.

Bei der Darstellung in Abb. 10 handelt es sich nicht um einen Wohn- sondern um einen Werkraum. Der Ofen selbst ist im wesentlichen aus Blatt-Napf-

⁹ Die zwei am oberen Abschluß des Feuerungskastens angebrachten ründlichen Applikationen erinnern sehr stark an die eigentlich nur bei eisernen Byleggern üblichen Messingknäufe.

¹⁰ Entsprechende Bauanweisungen, die als Brandschutzmaßnahme zu werten sind, liegen auch aus der technologischen Li-

teratur dieser Zeitepoche vor.

¹¹ Derartige Wasserschiffchen waren noch im frühen 20. Jahrhundert zum Beispiel bei eisernen Kochmaschinen in Gebrauch. Allerdings bestanden hier die Schiffchen überwiegend aus Kupfer.

kacheln aufgebaut und von hochrechteckiger Gestalt. Er weist einen rudimentär ausgebildeten Oberofen auf, der aus schlichten, zinnenförmigen Kacheln besteht. Bemerkenswert ist die Schraffur in der Mitte der Ofenwandung, die als Hinweis auf eine nicht professionell ausgeführte Reparatur interpretiert werden kann. Der massive Sockel des Ofens scheint aus einfachen Backsteinen aufgebaut zu sein. Besonders aufschlußreich ist der Wandanschluß des Ofens, da die teilweise verbretterte Wand des Werkraumes mit einer Platte vor der Hitze des Ofens geschützt wird. Insgesamt vermittelt der Ofen einen zusammengeflackten Eindruck. Er könnte als bildlicher Beleg für die vereinzelt in Schriftquellen belegte Sitte gelten, daß alte Öfen (oder Teile von Öfen), nachdem sie in Repräsentationsräumen abgebrochen worden waren, in andere Räume mit geringerem Prestigewert umgesetzt worden sind.

Resümee

Zweifellos läßt diese an einigen wenigen Exempeln dargestellte Bildquellenanalyse keine umfassende Bewertung historischer Abbildungen als Quellen für die Erforschung der Ofenkeramik, des Kachelofens bzw. der Wohnkultur zu. Es konnte jedoch gezeigt werden, daß historische Bildquellen eine ganze Reihe von Anhaltspunkten liefern, die durch andere Quellengattungen nicht in gleicher Weise abgedeckt werden können.

Die nun zum Abschluß herangezogene Abbildung eines Kachelofens auf einem Adventskalender von 1996 soll die bereits oben formulierte These, daß der Kachelofen in bildlichen Darstellungen als *symbolisch überhöhter Bildbaustein mit Bedeutungsgehalt* zu interpretieren ist, weiter unterstützen.

Der dargestellte Ofen mit seinem massiven Sockel, dem zimmerseitigen Feuerungsloch und Aschefall sowie den nachempfundenen Blatt-Napfkacheln im Oberofen entspricht eher dem Aussehen eines Ofens aus der zweiten Hälfte des 19. Jahrhunderts, der seinerseits wiederum als zeitgenössische Adaption eines Renaissance-Ofens (auf dem Kenntnisstand des 19. Jahrhunderts) zu interpretieren ist. Gerahmt wird der Ofen von einem Familienidyll mit zahlreichen Versatzstücken, bei denen jedoch keine Anzeichen des 'real existierenden Multimedia-Haushaltes' an der Wende zum dritten Jahrtausend zu erkennen sind.

Diese Bildkompilation belegt eindeutig, daß für das Weihnachtsfest 1996 emotionale Anknüpfungspunkte zu einem idealtypischen Drei-Generationenhaushalt und damit zu einem romantischen Familienbild des späten 19. Jahrhunderts aufgebaut werden. Das Schokoladen-Verfallsdatum vom 08. Mai 1998



Abb. 11. - 1996 (Schokoladen-Adventskalender).

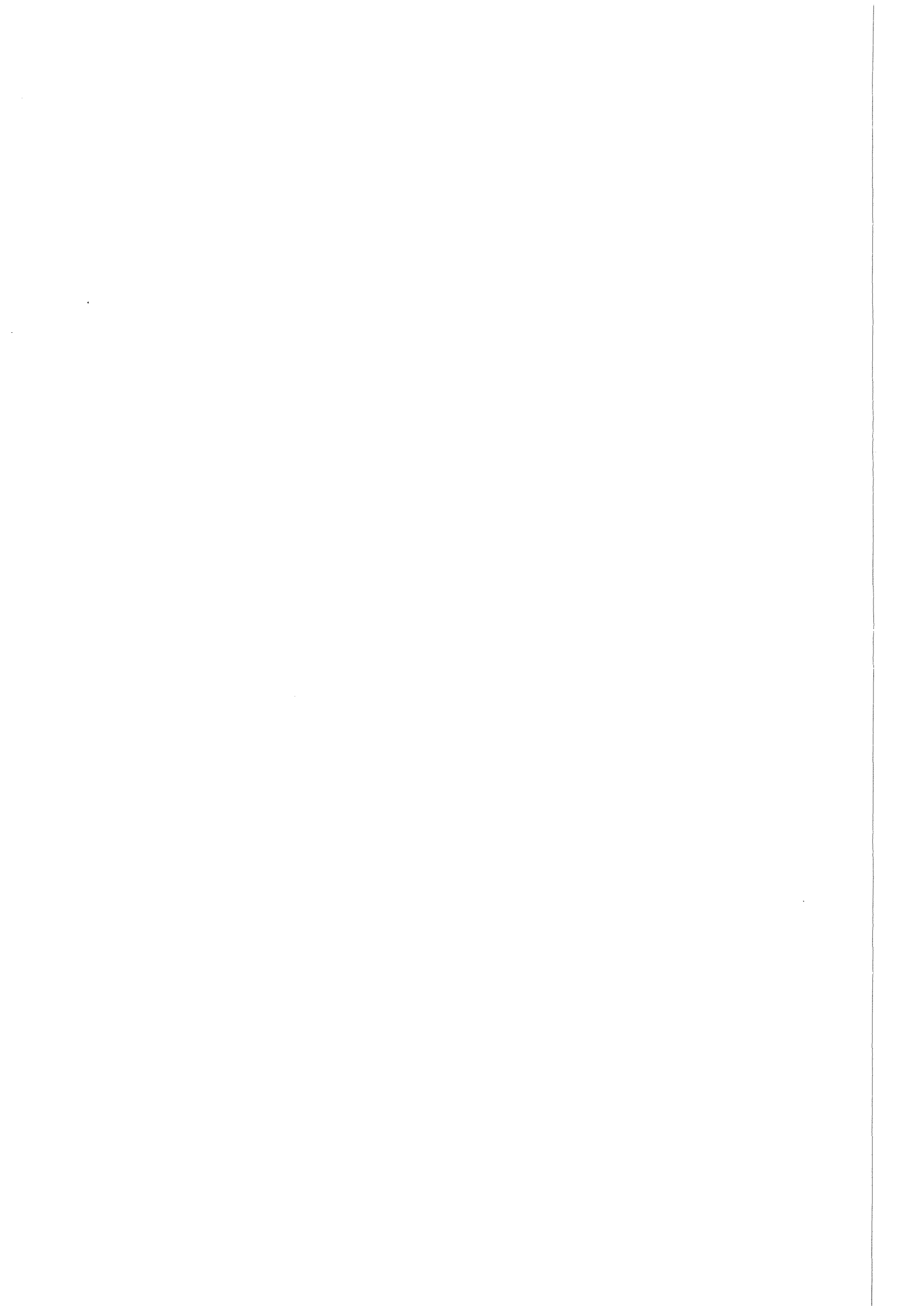
wirft ein deutliches Schlaglicht darauf, mit welchen Laufzeiten und mit welchem Maß an Ungleichzeitigkeit man bei der Untersuchung von *Bildbausteinen* rechnen muß. Gleichwohl, und dies soll mit aller Ausdrücklichkeit betont werden, bieten bildliche Quellen ein reichhaltiges Spektrum an Aspekten, die – quellenkritisch gehoben – zu einer vertieften Erkenntnis kultureller Wandlungsprozesse führen.

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Ofen und Wohnkultur

1 Einleitung

Die Erforschung des Wohnens im Mittelalter beschäftigt schon lange die verschiedensten historischen Wissenschaften, wie Archäologie, Volkskunde, Geschichte und Germanistik. Meistens werden unterschiedliche Fragen gestellt und die Ergebnisse werden nicht miteinander verglichen.

Im Folgenden soll es darum gehen, einen wichtigen Teilaspekt mittelalterlicher Wohnkultur zu umreißen: Nämlich die Frage nach dem Zusammenhang von Wohnhaus und Kachelofen. Weitere Fragestellungen sind einfach formuliert und noch immer sehr allgemeiner Art: Warum gibt es Kachelöfen? Seit wann gibt es diese Heizform? Wie unterscheidet man sie von anderen Öfen? Wo gibt es Kachelöfen (geografisch und sozialtopografisch)? Wie sahen die Kachelöfen aus?

Zunächst ist festzuhalten, dass die konkreten Fragen nach Heizung und Wohnraum im mittelalterlichen Hausbau bis jetzt bestenfalls ansatzweise umrissen werden konnten. Von wenigen Ausnahmen abgesehen, wird ihnen primär innerhalb monografischer Grabungsauswertungen mit dem Ziel der Einordnung eines Einzelbefundes nachgegangen. Diese Vorgehensweise birgt nicht nur die Gefahr einer unkritischen Wiedergabe der Vergleichsbeispiele in sich, sondern kann auch den komplexen Fragen bezüglich der technologischen, formalen und künstlerischen Entwicklung in keiner Weise Rechnung tragen. Die Verallgemeinerungen und Vereinfachungen komplizierter Resultate werden oft unreflektiert als zusammenfassende und allgemeingültige Forschungsergebnisse übernommen.

Ich finde es daher angebracht, mich der Frage nach Kachelofen und Wohnkultur erneut grundsätzlich zu nähern und mich kritisch mit den konkreten Ergebnissen der Forschung auseinanderzusetzen. Mein wichtigstes Ziel ist es, schon vielfach gestreifte Fragestellungen zu gliedern und vielerorts formulierte Thesen zu strukturieren. Zudem möchte ich ein Überdenken alter, längst aufgeworfener Fragen bewirken und zum Offenlegen unserer Wissenslücken ermuntern.

Die Entstehungsgeschichte und Entwicklung des Ofens, bzw. des Kachelofens, soll weniger formal, als vielmehr anhand seiner beiden Hauptfunktionen – Heizung und Repräsentation – beleuchtet werden. Die primäre Funktion des Ofens als Wärmequelle für den umgebenden Raum wird im Zentrum der Betrachtungen stehen. Es ist deshalb wichtig, zuerst den Oberbegriff "Ofen" zu umreißen und seine verschiedenen Bedeutungsebenen einzubringen.

Die wichtigsten Erkenntnisse zur Frühgeschichte des Kachelofens sollen zusammengetragen und mit der Entwicklung des Wohnbaus verknüpft werden. Sinnvollerweise soll diese Betrachtung auch Resultate der Nachbardisziplinen einbeziehen.

Ich stütze mich natürlich auf zahlreiche Einzelstudien, sowie auf grundsätzliche Betrachtungen meiner Kolleginnen und Kollegen. Stellvertretend möchte ich hier lediglich Jürg Tauber nennen, der sich mehrmals und besonders eingehend mit den komplexen Zusammenhängen von Ofen und Wohnen beschäftigt hat¹. Ich werde mich, soweit es Forschungsstand und Quellenlage zulassen, auf die Verhältnisse im alpinen Raum und in Süddeutschland konzentrieren.

2 Der Ofen

Öfen sind geschlossene Feuerstellen, die man nach ihrer Hauptfunktion in Heizöfen, bzw. Produktions- und Veredelungsöfen unterscheiden kann.

So eindeutig diese Trennung in der Theorie vollzogen ist, so schwierig gestaltet sie sich in der archäologischen Praxis: Zum Einen ist gerade bei einfachen Feuerstellen eine Trennung nicht sinnvoll, weil diese multifunktional genutzt werden konnten. Zum Anderen sind die erhaltenen Restbefunde von einfachen und ummantelten Feuerstellen, von Kaminen und von Ofenfundamenten bezüglich ihrer Funktion oft kaum genauer zu deuten².

¹ Tauber 1980, und Tauber 1986.

² Vgl. zu folgenden Ausführungen grundsätzlich die

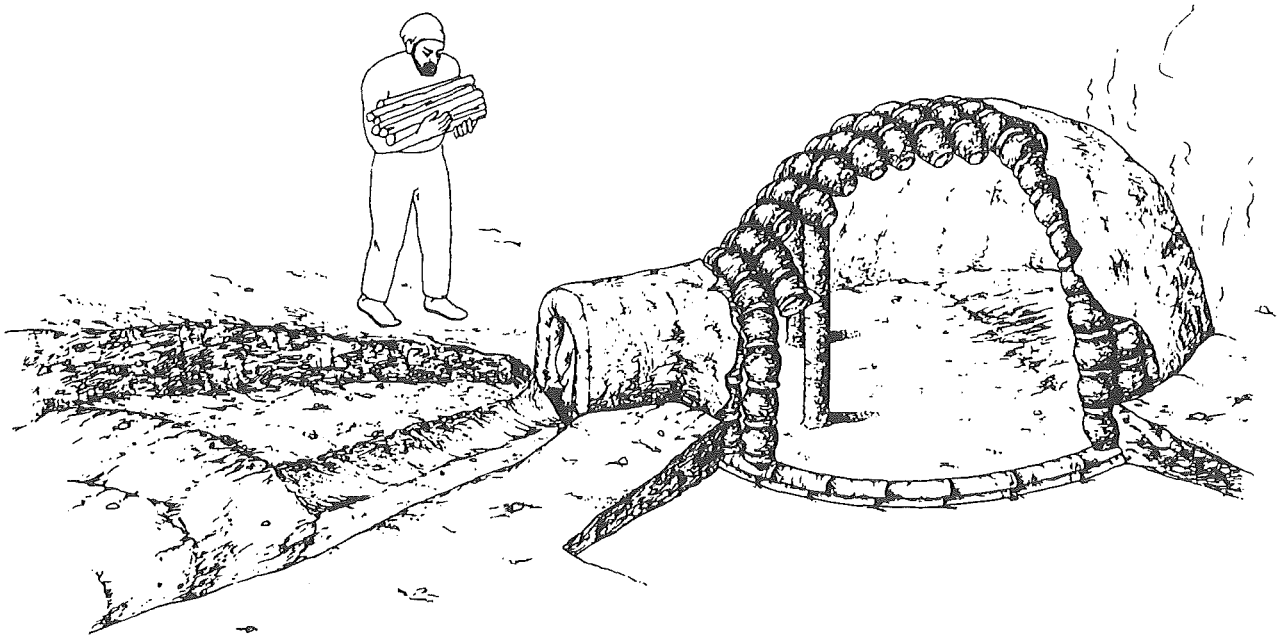


Abb. 1. - Winterthur, Untertor. Rekonstruktion eines Töpferofens des 14. Jahrhunderts (Reproduktion nach Lehmann 1992, Abb. 45).

Sichere Anhaltspunkte für die genaue Funktion einer Feuerstelle können uns allenfalls der zugehörige Baubefund, Produktionsreste und Funde geben:

- Die einfache Feuerstelle inmitten eines Wohnraumes ist gleichzeitig Herdstelle und Heizung. Zudem muss damit gerechnet werden, dass bei der einfachen Feuerstelle ein Backfach, oder ein kleiner Backofen vorhanden war.
- Die sogenannte Doppelfeuerstelle mit offenem Feuer als Herd, einer Trennwand und einem geschlossenen Feuer als Heizofen im Nebenraum vereinigt die beiden Funktionen in einem kombinierten Rauchabzug.
- Der Produktionsofen, sei es nun ein kleiner Schmelzofen für die Edelmetallverarbeitung oder ein Backofen, ist oft auch im Kontext eines Wohnhauses, sei es im Kellerraum oder im Hof, zu finden.
- Einzig Öfen mit spezifischer Nutzung, wie z.B. große Back-, Töpfer-, Glas- oder Ziegelöfen, befinden sich aus Gründen der Feuergefahr als freistehende Kleingebäude draussen.

Archäologische Funde, die eindeutig über die Funktion der Öfen Auskunft geben, sind einerseits Produktionsreste, wie Schlacken, Halbfabrikate und Fehlbrände bei Brennöfen. Andererseits sind es Ofenkeramik, Ofenlehm und eventuell auch Baukeramik als wichtige Bestandteile von Kachelöfen.

2.1 Der Kachelofen als Heizofen

Der geschlossene Ofen hat gegenüber der offenen Feuerstelle drei wichtige Vorteile: Der zu erwärmende Raum kann erstens rauchfrei, zweitens gleichmässig und drittens lang andauernd beheizt werden.

Da er als Wärmespeicher funktioniert wurden zur optimalen Abstrahlung der Wärme in der Ofenwand keramische Becher integriert³. Damit war der Kachelofen erfunden.

Technisch gesehen sind die meisten, heute bekannten Kachelöfen sogenannte Hinterlader, d.h. ihre Beheizung erfolgt vom Nebenraum her. Sehr häufig – vorallem in ländlichen Wohnhäusern – ist dieser Nebenraum die Küche, wo die Befuerung dann meist über die Herdstelle durch eine Öffnung in der Zwischenwand erfolgt. Der heisse Rauch wird im Idealfall innerhalb des Ofens durch die Züge geleitet und am Schluss über der Herdstelle abgezogen.

Seltener sind scheinbar die einfacheren Vorderladeröfen, die vom zu erwärmenden Raum her bestückt werden. Sie sind vor allem aus der Frühzeit des Kachelofens bekannt und tradieren sich im Stubenofen des einfachen Wohn- und Bauernhauses bis in die heutige Zeit⁴.

Selbstverständlich sind auch andere Formen der Beheizung zu jeder Zeit parallel zu Kachelöfen

Zusammenstellung der typologisch wichtigen Feuerstellen von Tauber 1980, 346 ff.

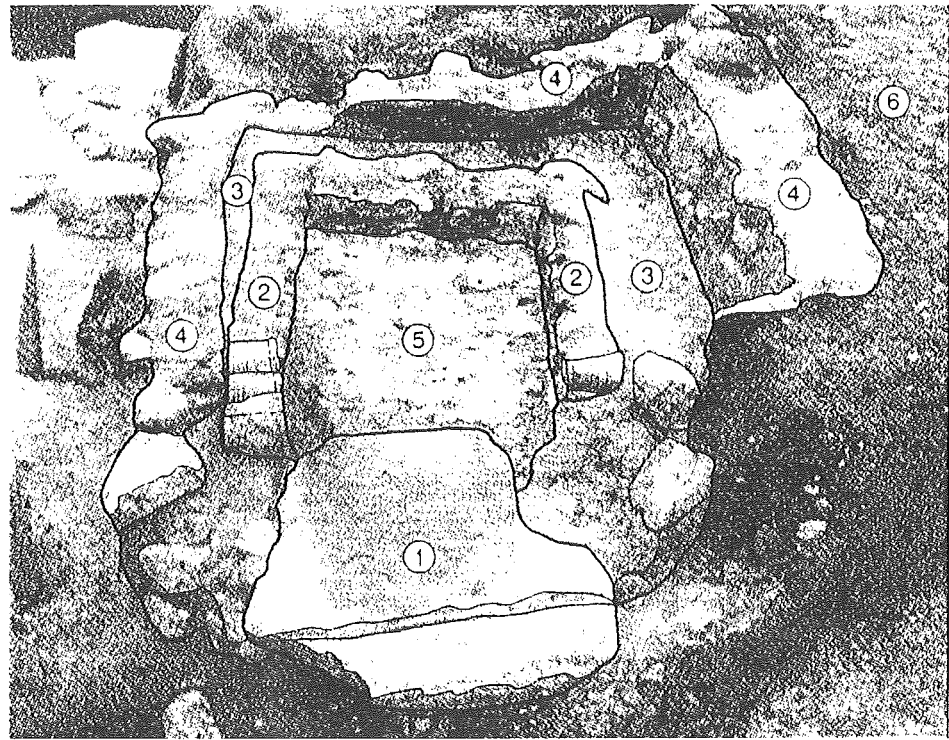
³ Verschiedentlich werden auch Topfformen als Ofenkacheln bezeichnet (so Tauber 1980, 293); hier wäre grundsätzlich zu

überdenken, ob der bauchige Topf technologisch überhaupt als Wärmeleiter in einer Ofenwand funktionieren kann.

⁴ Beispiele für frühe Vorderladeröfen: Als Wandmalerei aus dem Haus zum langen Keller in Zürich; als Fundamentbefund

Abb. 2. - Ulm, Münsterplatz. Schematische Umzeichnung des Grabungsbefundes.

Zeichnung: Archäologischer Dienst des Kantons Bern nach Oexle 1991, Abb. 15.



existierend denkbar und auch verschiedentlich belegt:

- Zu nennen sind Lehmkuppel- oder Steinöfen, die die Konstruktion der Backöfen aufnehmen und ihre Wärme in unterschiedlicher Intensität an die Umgebung abgeben. Badestuben waren oft mit einfachen Steinöfen beheizt: Auf den heißen Ofen konnten nasse Steine gelegt werden und damit wurde die Stube zum Dampf- oder Schwitzbad. Zu erwähnen sind auch die Glutkessel aus Ton und Metall, die bis heute als sogenannte "braccera" in Süditalien und Sizilien verwendet werden. Zudem gab es Warmluftheizungen, die auf der antiken Heiztechnik basierten und vor allem in Klöstern, auf Pfalzen und in Rathäusern eingebaut waren.

- Bis zur grossen Verbreitung gusseiserner Stubenöfen in der Frühneuzeit und zur Einführung der Zentralheizung war jedoch in weiten Teilen Mitteleuropas die Beheizung mittels eines offenen Kamins vorherrschend. Im uns interessierenden Zeitraum des hohen und späten Mittelalters sind Kaminfeuerstellen gleichermaßen in Klöstern, auf Adelsburgen und in städtischen Wohnbauten belegt.

2.2 Der Produktions- oder Brennofen

Im Gegensatz zum Heizofen besteht die Hauptfunktion des Brennofens darin, die erreichte Hitze nicht an die Umgebung abzugeben, sondern mit der gespeicherten Wärme das Brenngut zu schmelzen oder zu brennen. Die Konstruktion des Brennofens ist somit auf Hitzebeständigkeit und Isolation gegen aussen angelegt. Zu diesem Zweck wurden die Öfen vielfach in den Boden eingetieft und / oder möglichst massiv aufgebaut. Die Abdeckung der Öfen, bzw. die Ofengewölbe wurden sehr unterschiedlich, jedoch scheinbar durchwegs nach der Überlieferung spätantiker Traditionen, errichtet: Sie konnten aus einem Lehm/Rutengeflecht bestehen, mit Ausschussziegeln abgedeckt sein, oder mit ineinandergestapelten Töpfen ein Gewölbe bilden⁵.

Es kann hier nicht darum gehen, eine Geschichte des Produktionsofens zu entwerfen. Wohl aber ist es wichtig, sich mit jenen Beispielen auseinanderzusetzen, die aufgrund ihrer Konstruktion starke Berührungspunkte zu Heizöfen aufweisen: Es sind vereinzelte Beispiele mittelalterlicher Töpferöfen, die Keramikscherben, Töpfe und Ziegel in der Tradition spätantiker Wölbtechnik als Baumaterial in der Ofen- oder Gewölbekonstruktion eingebaut hatten. Hier erwähnt sei lediglich der Ofen des ausgehenden 14. Jahrhunderts aus Winterthur, der ineinandergestapelte Kochtöpfe als Gewölbekonstruktion aufwies, wie Peter Lehmann schlüssig aufzeigen konnte (Abb. 1)⁶.

im Haus III auf dem Münsterhof in Zürich (Schneider u.a. 1982) und als Restbefund im aufgehenden Mauerwerk auf der Burg Canova GR (Tauber 1980, Abb. 249).

⁵ Vgl. dazu die Zusammenstellung gallo-römischer Töpferöfen in Dufay 1996.

⁶ Lehmann 1992, 38 ff.: Dort auch weitere Beispiele von Ofengewölben mit keramischen Bauteilen.

Es ist meiner Ansicht nach durchaus denkbar, dass auch becher- und napfförmige Kacheln in dieser oder ähnlicher Art für technische Öfen verwendet wurden. Konische Becher- und Napfformen kann man, ebenso wie bauchige Töpfe, ineinander stapeln und als keramische Gewölberippen benutzen.

Daher wäre es ernsthaft zu erwägen, den oft zitierten, sogenannten "Kachelofen" aus dem 13. Jahrhundert auf dem Ulmer Münsterplatz als solche Konstruktion eines Produktionsofens zu interpretieren (Abb. 2)⁷. Dieser im Grundriss praktisch quadratische Ofen war in das Gelände (Abb. 2: 6) eingetieft und hatte einen zentralen Feuerraum, eine dreiseitige, zweischalige Wandkonstruktion und ein Schürloch: Die innere Wand (Abb. 2: 2) bestand aus horizontal und gegenständig liegenden, mit Lehm gefüllten Becherkacheln. Die äussere Wand (Abb. 2: 4), die nach einem kleinen, ungleich breiten Zwischenraum (Abb. 2: 3) direkt an das Innere anschloss, war aus Lehm und grob gebrochenen Kalksteinen errichtet. Der innerste Bereich (Abb. 2: 5) ist als Feuerraum anzusehen, da die Wand mit den Kacheln stark angeziegelt war und sich am Boden mehrere Ascheschichten erhalten hatten. Der Befund zeigt im weiteren eine Steinplatte mit Rille für die Ofentüre (Abb. 2: 1).

Aufgrund der isolierenden, äusseren Wand können die becherförmigen Kacheln der inneren Konstruktion keine wärmeabstrahlende Heizfunktion ausgeübt haben. Es handelt sich bei diesen Funden also nicht um Ofenkacheln, sondern um keramische Bauteile, obwohl man sie typologisch problemlos mit zeitgenössischen Ofenkacheln vergleichen kann.

3 Zur Frühgeschichte des Kachelofens

Umreist man die Frühgeschichte des Kachelofens, ist man auf wenige Spuren angewiesen. Was wir nach Jahrhunderten als Reste der mittelalterlichen Heizung im Boden noch antreffen, sind meistens keine eindeutigen Befunde, sondern verstürzte Haufen, oder aber einzelne Kacheln, die letztlich ohne einen zugehörigen Befund sehr schwierig zu deuten sind.

Eine oft zitierte These der volkskundlichen Forschung besagt, dass die Stube im Wohnhaus per definitionem beheizt ist⁸. Somit darf man im Prinzip aufgrund der Entwicklung im Hausbau, d.h. der

ersten Raumtrennung in Küche und Wohnstube, die Existenz von Öfen herleiten.

Umgekehrt gedacht, bedingt ein Heizofen zwingend einen zu erwärmenden Raum darumherum. Deshalb beweisen Kachelfunde eigentlich nur in Kombination mit Ofenbefunden oder einem Wohnraum die Existenz eines Kachelofens.

3.1 Frühe Kachelfunde und ihre Interpretation

Vergegenwärtigt man sich die bis jetzt ältesten archäologischen Funde, die als Bestandteile von Kachelöfen interpretiert werden, so ist man leider noch immer mit der Unsicherheit ihrer tatsächlichen Funktion konfrontiert:

Ich möchte hier nur die neusten Forschungen aus Strassburg, sowie die bekannten Stücke des Runden Berges bei Urach aus dem 10. Jahrhundert erwähnen. Da in beiden Fällen der zugehörige, archäologische Befund zu denken gibt, erlaube ich mir als Denkanstoss eine andere Interpretation anzuregen.

Auf dem Runden Berg bei Urach wurde eine prägnante Fundgruppe von becher- und topfförmigen, teilweise russgeschwärzten Gefässen geborgen⁹. Gemäss dem Vorbericht befanden sich die Funde in einem freistehenden Gebäude von ca. 2 x 4 m Grösse. Das Fundament bildet eine zweikammerige Anlage und wurde vorerst als freistehender Backofen interpretiert. Soweit es sich anhand des publizierten Materials ermitteln lässt, wies die Umgebung der Anlage keine Anhaltspunkte zu einem Innenraum auf. Es gibt daher aufgrund des Befundes keinerlei Hinweise, dort einen Heizofen zu interpretieren, wie es in der Folge wiederholt vorgeschlagen wurde. Es wäre meiner Meinung nach naheliegender, die erste Interpretation des Grabungsleiters wieder aufzunehmen und die Funde als keramische Bestandteile eines Produktionsofens zu sehen.

In Strassburg wurden in Abfallgruben sowie in Auffüllschichten des frühmittelalterlichen Stadtgrabens mehrere Hundert Fragmente einfacher Becherkacheln geborgen. Die Fundschichten werden je nach Interpretation Ende 7. Jahrhundert bis ins 10. Jahrhundert datiert¹⁰. Die Fragmente hatten offenbar ausschliesslich an den Aussenseiten deutliche Russspuren, nicht jedoch an den Böden. Wären die Kacheln, wie es unsere Kollegin vorschlägt, der Heizwirkung wegen mit ihrer Öffnung gegen aussen

⁷ Ich stütze mich hierbei auf den Vorbericht zu den Grabungen der Jahre 1988-1991 (Oexle 1991, 18 ff.).

⁸ Hähnel 1975 und Moser 1977; vgl. weiter unten.

⁹ Vorläufig: Milojcic 1975, 194, Abb. 11. Bis zur Schlusspublikation der entsprechenden Befundphase scheint dies die

genaueste Vorlage des Befundes zu sein. Die Funde selbst sind publiziert und kartiert bei Kaschau 1976.

¹⁰ Chatelet 1994: Zum Befund S. 482; zur Datierung S. 489 f, insbesondere Anm. 20 mit abweichenden Interpretationen der schichtdatierenden C-14-Daten.

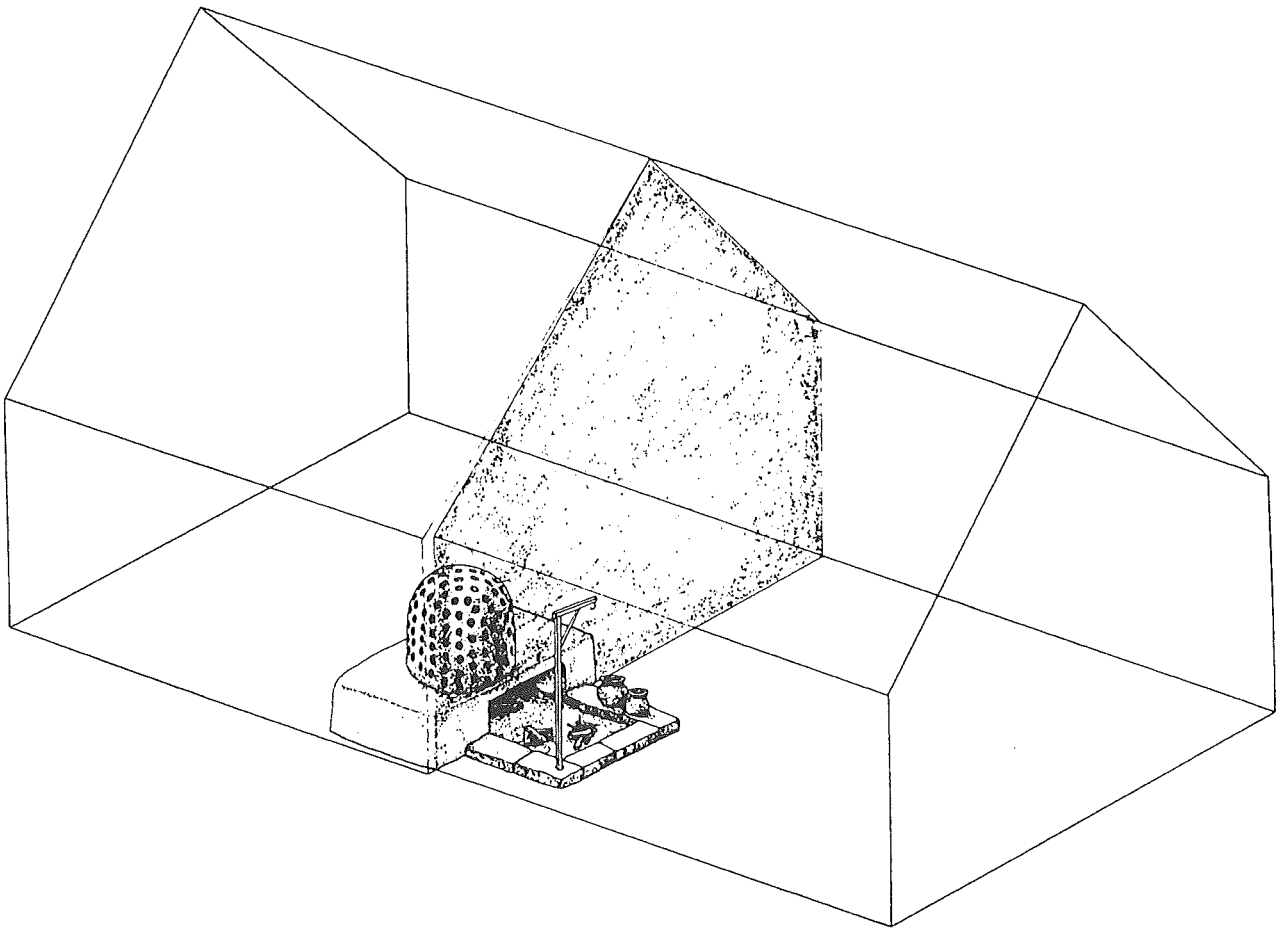


Abb. 3. - Trimbach, Frohburg. Rekonstruktion einer Feuerstelle mit Hinterlader-Kachelofen im angrenzenden Raum (Reproduktion nach: *Das Reich der Salier 1024-1125*, Katalog zur Ausstellung des Landes Rheinland-Pfalz, Sigmaringen, 1992, 216).

im Ofengewölbe eingelassen gewesen, so fände man nicht nur an der Wandung der Becher, sondern damit kombiniert auch an den Bodenunterseiten vereinzelte Russspuren. Gerade derart früh datierte Funde lediglich isoliert anzusehen und als Bestandteile von Kachelöfen zu interpretieren, erscheint mir aufgrund des fehlenden Befundes etwas einseitig. Stellt man sich die Becher nämlich analog zu den Gewölbetöpfen des Winterthurer Töpferofens ineinandergestapelt im Ofenmantel vor, so würden sie zumindest einseitig an ihren Aussenseiten starke Russspuren aufweisen (Abb. 1). Ich möchte also auch hier die Möglichkeit erwägen, die Becher nicht als Bestandteile eines Heizofens, sondern eines Produktionsofens zu interpretieren.

Früh- und hochmittelalterliche Keramikfunde, die typologisch nicht mit zeitgleicher Gebrauchskeramik übereinstimmen, müssen meiner Meinung nach nicht zwingend als Ofenkeramik interpretiert werden. Es wäre sinnvoller, diese neutral als "Baukeramik" zu bezeichnen und damit ihre Interpretation vorerst offen zu lassen.

Letztlich können uns einzig zugehörige Befunde über die ehemalige Funktion der Scherben Auskunft

geben. So beispielsweise bei jenen frühen Becherkacheln, die spätestens ab dem 12. Jahrhundert in der Nordwestschweiz, primär auf Burgen und ehemaligen Adelssitzen, mit zunehmender Regelmässigkeit einsetzen (s. unten). Zudem ist darauf hinzuweisen, dass auch die frühesten Schriftquellen über ofenbeheizte Räume nur wenig später einsetzen (s. unten).

Seit dem 13. Jahrhundert machen Fragmente von Becher- und Napfkacheln einen mengenmässig stetig steigenden Anteil archäologischer Fundkomplexe aus. Sie gehören nicht nur auf Burgen und Adelssitzen, sondern auch in städtischen Wohnbauten zum normalen Fundgut. Man kann mit Sicherheit daraus schliessen, dass sich der Kachelofen von da an grosser Popularität erfreute und in seinen verschiedenen Ausprägungen durchaus weit verbreitet war.

3.2 Frühe Ofenbefunde

Sucht man nach Bauspuren von Heizöfen, so stellt sich unweigerlich das bekannte Quellenproblem: Beheizte Zimmer, d.h. Stuben, befanden sich in unserem Gebiet meistens im Obergeschoss der

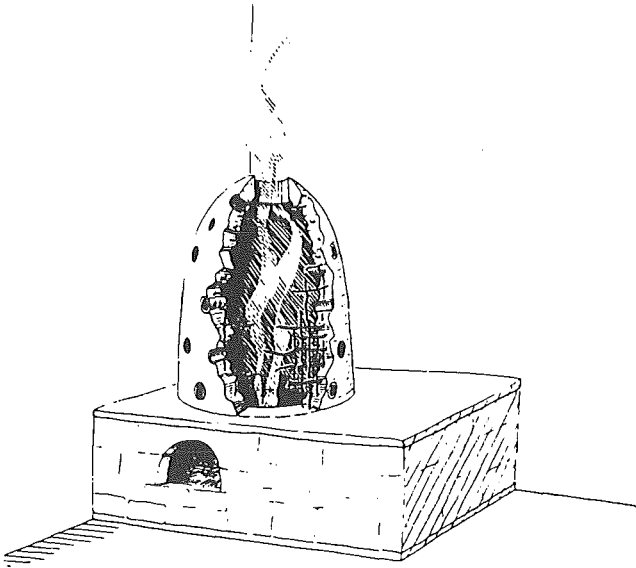


Abb. 4. - Zürich, Münsterhof, Haus III. Rekonstruktionszeichnung eines Vorderlader-Kachelofens (Reproduktion nach Schneider, Gutscher, Etter & Hanser 1982, Abb. 126).

Wohngebäude, sei dies im Palas der Burg oder im Stadthaus. Überreste von Kachelöfen sind daher allenfalls an aufgehenden Gebäudestrukturen, oder als verstürzte Haufen im Boden zu beobachten.

Oft fielen die Öfen während eines Brandes in das Erdgeschoss, oder in den Keller. Die darauffolgenden Planien oder Verfüllungen beinhalten deshalb häufig viele Ofenkacheln. Beispiele solcher verstürzter Öfen gibt es mittlerweile einige – der auffälligste ist vielleicht jener auf der Burg Niedergesteln (VS), oder das Depot eines Kachelofens aus der Kellerauffüllung auf dem Churer Martinsplatz (Abb. 5 und 6)¹¹.

Auch bei den vielzitierten Befunden auf Burgen der Nordwestschweiz handelt es sich meistens um Feuerstellen, deren aufgehende Gestalt letztlich unsicher bleiben muss. Am einleuchtendsten sind jene Befunde von sogenannten Doppelfeuerstellen, die – durch eine Wand getrennt – eine offene Feuerstelle mit einer Vorrichtung für die Kochkessel, sowie ein daran anschliessendes Fundament für einen Ofen aufweisen (Abb. 3): Zwei Beispiele, die von Jürg Tauber beide ins 11. Jahrhundert datiert werden, sind auf den Burgen Rickenbach (SO) und Frohburg (SO) untersucht worden¹². Während in Rickenbach keine zugehörigen Ofenkacheln zum Vorschein kamen,

konnte für die Frohburg anhand der zugehörigen Becherkacheln ein einfacher Hinterladerofen mit kachelbestücktem Oberbau rekonstruiert werden.

Unter den Ofenbefunden in städtischen Wohnbauten ist noch immer das Ofenfundament des Hauses III auf dem Zürcher Münsterhof eines der frühesten (Abb. 4)¹³. Die im Bereich des Ofenfundamentes gefundenen Becherkacheln hatten Lehmreste an Innenseiten und Rändern. Daraus haben die Archäologen jenen durchaus denkbaren Vorderladerofen rekonstruiert, wie er oft zitiert und abgebildet wird. Jedoch konnte auch hier letztlich nicht entschieden werden, ob die lehmummantelten Becherkacheln zwingend zum Ofenfundament gehörten. Es wäre möglich, dass die Kacheln während eines Brandes von einem oberen Stockwerk heruntergefallen waren.

Dass es im Erdgeschoss durchaus solche Kachelöfen gab, zeigen ein neuere Kachelofenbefunde aus Winterthur und Freiburg i.B.: An der Metzggasse 2 in Winterthur konnten 1996 die Reste eines mehrräumigen, eingeschossigen Holzhauses dokumentiert werden¹⁴. Als Befund erhalten waren nicht nur in der Raumecke das Fundament eines Hinterladerofens mit zugehörigen Kacheln, sondern auch teilweise der Bretterboden und die unterste Bohle der Hauswand. Die Anlage kann dendrochronologisch um 1208 datiert werden. Ein ähnlicher Befund aus dem 13. Jahrhundert mit einem Hinterlader – Ofenfundament, dem Lehmfußboden der Stube und den Balkenlagern für die Flechtwerkwände ist für den Steinhaus – Anbau (B V) im Harmoniegelände von Freiburg i.B. belegt¹⁵.

Eine weitere, allerdings jüngere Gruppe von Ofenbefunden liefern uns die Spuren am aufgehenden Baubestand, die von der Bauarchäologie und der Hausforschung untersucht werden. Dazu möchte ich einen Befund aus Esslingen streifen¹⁶: Die typische Heizanlage in der spätmittelalterlichen Stube konnte in einem Wohnhaus von 1395 am Esslinger Ottilienplatz dokumentiert werden, wo sich im 2. Obergeschoss eines Fachwerkhauses in der hölzernen Zwischenwand von Stube und Küche noch das originale Schürloch für einen Hinterladerofen erhalten hatte.

Unter den spezifisch ländlichen Bauten sind Befunde zu mittelalterlichen Stubenöfen noch sehr rar: So konnten in einer Untersuchung über die

¹¹ Keck 1993 und Janosa 1996.

¹² Vgl. Tauber 1986, 104 ff.

¹³ Datierung: 2. Viertel 13. Jahrhundert (Schneider u.a. 1982, Abb. 121).

¹⁴ Wild 1996, 153 ff. Ich danke Werner Wild für die freundlichen Auskünfte betreffend der noch nicht publizierten Einzelheiten zu diesem Befund.

¹⁵ Untermann 1995, 79 ff., Abb. 90, 93, 99 und 100.

¹⁶ Vgl. Bedal 1994, 93 ff.

ältesten Holzbauten der Innerschweiz, die zwischen 1287 und 1500 datiert werden, zwar mutmassliche Ofenstandorte ermittelt, jedoch keine Restbefunde mehr beobachtet werden¹⁷. Die Standorte lagen, wie es später für das neuzeitliche Bauernhaus zur Regel wurde, in einer Raumecke der grösseren Stube an der Rückwand zur Küche hin.

3.3 Schriftquellen zur Entstehung der Stube

Die Entstehungsgeschichte des Kachelofens hängt eng mit der Entwicklung der Wohnkultur im allgemeinen und mit der Entstehung der Stube im speziellen zusammen. In der Regel wird in der Forschung davon ausgegangen, dass spätestens mit dem Auftreten der ersten Stuben die Voraussetzungen und die Bedürfnisse für einen Kachelofen geschaffen sind. Insbesondere in der volkskundlichen Forschung besteht seit einiger Zeit die Theorie, dass Stube und Ofen kausal zusammenhängen¹⁸. Im Prinzip geht es darum herauszufinden, wo und wann man begann, ein einräumiges Haus in einen oder mehrere Wohnräume und in eine Küche zu unterteilen sowie wo und wann damit begonnen wurde, in diesem Wohnraum, eben der Stube, eine rauchfreie Heizung einzurichten.

Dieser enge Zusammenhang zwischen Heizung und Raum lässt sich, wie wir im weiteren sehen werden, sowohl ethymologisch als auch bauhistorisch belegen:

Die Stube als Wort lässt sich bis zum althochdeutschen "stuba" zurückverfolgen und ist seit dem 8. Jahrhundert mehrfach belegt. Das Wort wird im 8. Jahrhundert, sowohl in der Lex Alamannorum, als auch im Testament der Churer Bischofs Tello, erwähnt¹⁹. Jedoch scheint der Begriff in dieser frühen Zeit immer die Doppelbedeutung eines "heizbaren Gemaches" und eines "Baderaumes" innezuhaben.

Erst mit dem mittelhochdeutschen und frühneuhochdeutschen Wort "stube", das ab Mitte 12. Jahrhundert erstmals belegt ist, bedeutet der Ausdruck primär "heizbarer Wohnraum", in zweiter Linie auch Speisesaal (in Klöstern), kleines Wohnhaus und noch immer Baderaum. Über die Herkunft des Wortes sind sich die Ethymologen nicht einig, erklärt man doch das Wort einerseits vom lateinischen "aestivare = heizen" und andererseits vom germanischen "stieben = Funken stäuben, Dampf".

Ausgehend von dieser ethymologischen Herleitung hat sich die volkskundliche Forschung mit Hilfe der Schriftquellen der Frühgeschichte der Stube genähert. So belegt z.B. Hähnel, dass die eindeutige Interpretation des Wortes "Stube" als beheizbarer Wohnraum erst ab 1200 zu vertreten sei. Umgekehrt

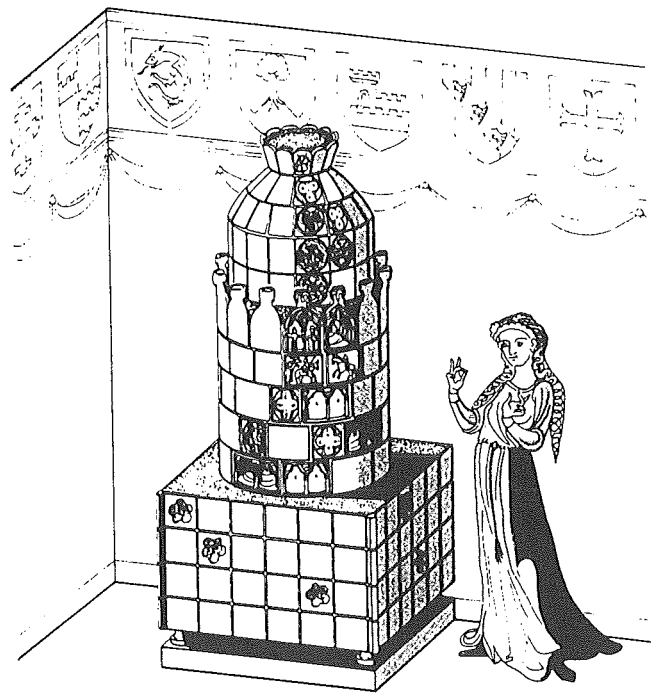


Abb. 5. - Niedergesteln, Gestelnburg. Rekonstruktionsversuch eines Kachelofens, 1330-1350 (Zeichnung: Atelier d'archéologie médiévale, Moudon).

könne man aber nicht davon ausgehen, dass die obengenannten früheren Nennungen nur als Baderstuben angesehen werden können.

Oskar Moser zitiert die frühesten, eindeutig auf beheizte Wohnräume bezogene Nennungen für die 1190er Jahre in Südtirol und Kärnten. Seine Aufstellungen zeigen, dass sich die ersten Nennungen jeweils auf Burgen oder Adelsitze beziehen, in kurzen Abständen gefolgt durch die Erwähnungen in Klöstern und Stadthäusern. Es bestätigt sich hier die immer wieder zitierte Annahme, dass die Stube (und damit wohl auch die Kachelöfen) zuerst in Wohnhäusern der sozialen Oberschichten zu finden sind. Im weiteren belegt Moser aber auch, dass Stuben in Land- und Bauernhäusern zwar mit zeitlicher Verspätung, jedoch für das gängige Bild des ländlichen Wohnhauses erstaunlich früh auftreten (ab 1300).

Aus den Veränderungen der ethymologischen Bedeutungen des Wortes Stube und aus den frühesten Nennungen in den Schriftquellen ergibt sich nach Oskar Moser folgende, meiner Meinung nach einleuchtende Definition: Die Stube ist ein kleiner, besonders qualifizierter und rauchfrei beheizbarer Wohnraum. Sie rechnet demgemäss mit dem kon-

¹⁷ Vgl. dazu Furrer 1988.

¹⁸ Ich stütze mich hier primär auf die Untersuchungen Oskar Mosers, 1977, und Joachim Hähnel, 1975.

¹⁹ Vgl. dazu Sennhauser 1979, 158 ff.

stituierenden Element eines Hinterladerofens. Im übrigen kann man aus den Schriftquellen auch schliessen, dass die Stube grundsätzlich eine hölzerne Stubendecke und in der Frühzeit nur spärliches Mobiliar aufwies. Der Ofen und die Decke sind insbesondere als Abgrenzung zur offenen Herdstelle in der Küche zu beachten²⁰.

4 Zum Wohnraum

Nicht nur die Schriftquellen zur Stube, sondern auch die frühesten, sicheren Ofenbefunde sprechen somit dafür, dass der Kachelofen in alpinen und oberrheinischen Gebieten spätestens im 12. Jahrhundert zur Wohnkultur der Oberschichten gehörte. Die Innovation eines mit keramischen Bestandteilen gefügten Ofens könnte jedoch schon früher anzusetzen sein, weil die wichtigen Konstruktionsmerkmale, wie wir gesehen haben, schon seit der Antike vorgezeichnet sind. Ich möchte der oft geäusserten Theorie über die enge Verknüpfung der Entstehung des Kachelofens mit hochqualifizierter Wohnkultur grundsätzlich nicht widersprechen. Im Folgenden soll es jedoch darum gehen, die Belege konkreter in räumlichen Zusammenhang zu stellen und herauszufinden, welche Räume denn eigentlich mit Kachelöfen beheizt wurden.

4.1 Klöster

Eine im Zusammenhang mit Öfen meistens nicht zitierte Quelle ist der St. Galler Klosterplan aus dem 1. Drittel des 9. Jahrhunderts. Zwar ist hier nirgends das Wort Stube erwähnt, jedoch ist den Forschern schon längst aufgefallen, dass sich in qualifizierten Wohnräumen, wie z. B. dem Abtshaus, jeweils in den Raumecken tropfenartige Strukturen befinden, die zum Teil als "*caminata*" bezeichnet werden. Mittelateinisch "*caminata*" heisst "heizbares Gemach, Klausen", kommt aber vom klassisch lateinischen "*caminus*" = Kaminfeuer, Zimmerherd. Es erscheint mir eigentlich sinnvoll, diese Strukturen in Wohnräumen als Kaminfeuerstellen zu interpretieren. Denkbar wären jedoch auch feste Heizöfen. Die

mutmasslichen Feuerstellen oder Öfen hatten wohl einen massiven Unterbau, insbesondere als es sich bei den übrigen, eingezeichneten Strukturen des Plans auch um feste Anlagen wie z.B. gemauerte Sitzbänke handelt. Ob diese Öfen jedoch Kachelöfen gewesen sein könnten, muss vorderhand noch offen bleiben.

Dass diese Interpretation durchaus einen realen Hintergrund hat, zeigen die noch laufenden Ausgrabungen in der karolingischen Anlage des Klosters Müstair²¹. Dort kamen ähnliche Fundamente zum Vorschein, die man teilweise als Kaminfeuerstellen, teilweise aber auch als geschlossene Feuerstellen interpretieren kann. So zeigt das im "Festsaal" des Westtraktes gefundene Fundament aufgrund seiner Lage, seiner Grösse und seiner gegen den Raum hin offenen Form sicherlich eine Kaminfeuerstelle an. Im Osttrakt hingegen, kam in einer Raumecke ein kleineres, allseitig geschlossenes Fundament mit Ascheschichten im inneren Bereich zum Vorschein. Dieses Fundament wird einstweilen widersprüchlich, einmal als Ofen und einmal als Herdstelle gedeutet²².

Hält man sich die Eckstrukturen des St. Galler Klosterplans vor Augen, so wäre es denkbar, dort einen geschlossenen Ofen anzunehmen, insbesondere sich an derselben Stelle im St. Galler Plan das – allerdings luftbeheizte – "*calefactorium*", d.h. der warme Aufenthaltsraum der Mönche, befand. Ein so beheizbarer Aufenthaltsraum im Kloster würde demnach die spätere Stube als geheizten Wohnraum funktionell vorzeichnen.

Aus den Beispielen der karolingischen Klosteranlage von Müstair und dem St. Galler Klosterplan kann man zudem ableiten, dass im Klosterbau die verschiedenen Heizsysteme nebeneinander existierten: Im grossen Festsaal von Müstair gab es an prominenter Lage ein Kaminfeuer und im Wohntrakt der Mönche ist möglicherweise mit der intimeren Heizform eines geschlossenen Ofens zu rechnen. Zudem gehört zur selben Anlage, im Südtrakt, eine Heissluft-Kanalheizung, deren zugehörige Raumfunktion noch nicht genau ermittelt werden konnte²³.

In mehreren Wohnräumen des St. Galler Klosterplans kann man geschlossene Öfen oder Kamine interpretieren, und im Wohntrakt der Mönche wird das *Calefactorium* – im Gegensatz zu jenem in

²⁰ Hier ist darauf hinzuweisen, dass die rauchfreie Beheizung der Stube weitgehend auch mittels eines Steinplattenofens, oder eines gemauerten Ofens ohne Kacheln zu erreichen ist. Da jedoch aus der Zeit der ältesten, schriftlich belegbaren Stuben im 12. und 13. Jahrhundert einfache Kacheln regelmässig im archäologischen Fundgut auftreten, kann man schon in diesen Räumen mit einfachen Kachelöfen rechnen.

²¹ Courvoisier & Sennhauser 1996 und Sennhauser 1996.

Freundliche Hinweise betreffend des noch unpublizierten Materials der karolingischen Klosteranlage in Müstair verdanke ich meinem Kollegen Armand Baeriswyl sowie Luzia Tonezzer, die die Öfen und Heizungen in Müstair im Rahmen einer Lizentiatsarbeit an der Universität Zürich bearbeitet.

²² Courvoisier & Sennhauser 1996, 29 f. bzw. Sennhauser 1996, 284 ff.

²³ Freundlicher Hinweis Luzia Tonezzer.

Müstair – sichtlich von einer Heissluftheizung versorgt. Je nach Funktion und Grösse des einzelnen Innenraumes wurde demnach im Kloster eine gemässe Heizform gewählt.

Dieses Prinzip lässt sich auch für den Burgenbau ableiten, wo man auf der Basis der vielen archäologischen Untersuchungen von Burgen des hohen Mittelalters heute sagen kann, dass sowohl die Kaminbefuerung, als auch der frühe Kachelofen durchaus gleichzeitig nebeneinander existierten.

4.2 Burgen und Adelssitze

Im Burgenbau ist zwischen den kleinen Sitzen des Dienstadels und den grossen Adelsburgen zu unterscheiden:

Die Kleinburgen, die in unserem Gebiet ab dem 12. und 13. Jahrhundert in grosser Anzahl gebaut wurden, bestanden meist aus einem steinernen Wohnturm, einer Ringmauer und einfachen, hölzernen Ökonomiegebäuden im Burghof. Heizöfen sind auf solchen Anlagen primär im Bereich des Wohnturmes zu suchen. Da im Wohnturm eine senkrechte Raumaufteilung mit Hocheingang, Küche, Wohnraum und Privaträumen vorhanden war, können wir nur in seltenen Fällen mit Baubefunden, wie Rauchabzügen oder Ofenfundamenten rechnen. In Nebengebäuden von Wohntürmen sind zwar bisweilen Reste von Feuerstellen vorhanden, jedoch fällt es schwer zwischen Herden, Kaminfeuern und Ofenfundamenten zu unterscheiden.

Differenzierter gestaltet sich das Bild anhand der Herrschaftssitze der Adelsgeschlechter: Diese Burgen, die in der Regel in ihrem Ursprung als Rodungsburgen bedeutend früher anzusetzen sind als die Kleinburgen, sind architektonisch mehrteilige Anlagen mit einem repräsentativen Palas, verschiedenen Ökonomiegebäuden, einer Burgkapelle, Türmen, Toranlagen, Zwinger und einer Ringmauer. Heizungen sind innerhalb des Palas, aber auch in einfacheren Gebäuden zu suchen.

Die Frühform einer solchen Grossanlage konnte auf der Frohburg (SO) mit den ins 11. und 12. Jahrhundert datierten Holzbauphasen gefasst werden²⁴. Für unsere Fragestellung interessant ist dabei, dass zeitgleich mit dem zweiräumigen, ofenbeheizten Holzhaus (Zone K) mehrere Steinbauten existierten. Darunter wies nur der quadratische, eingeschossige Saalbau (Bau 12) im Zentrum das Fundament einer Herdstelle oder eines Vorderladerofens (?) auf. Falls sich daraus Allgemeingültiges ableiten lässt, ist es

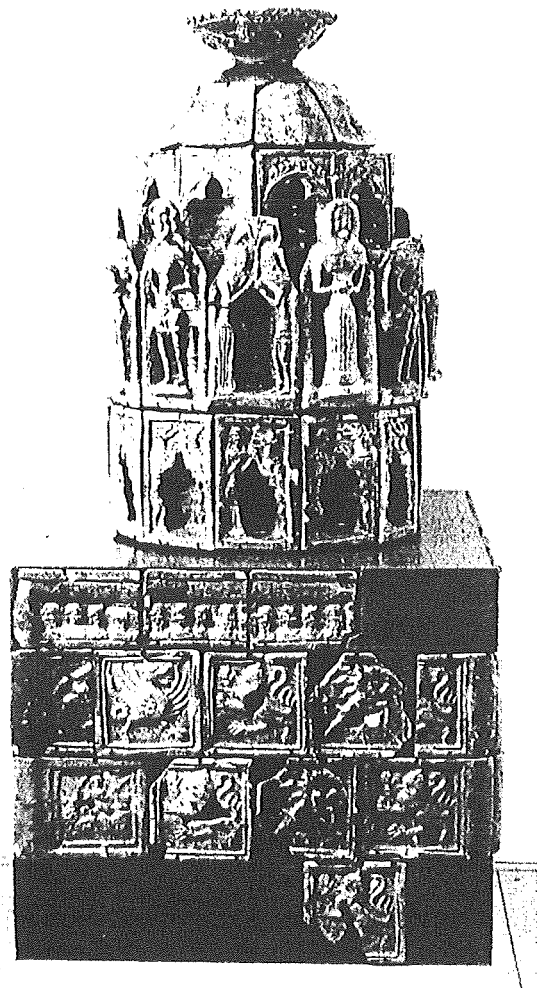


Abb. 6. - Chur, Martinsplatz. Rekonstruktionsversuch eines Kachelofens (Foto: Archäologischer Dienst Graubünden, Neg.Nr. 10'122-17).

immerhin bemerkenswert, dass sich in den Holzhäusern offensichtlich rauchfrei beheizbare Stuben befanden, jedoch im repräsentativen Saalbau bestenfalls ein Vorderladerofen.

Leider waren die Befunde der späteren Ausbauphasen der Frohburg hinsichtlich ihrer Beheizung nicht so ergiebig: Für die Zeit des mittleren 12. Jahrhunderts bis zum Niedergang im 14. Jahrhundert gibt es zwar Kachelfunde, jedoch keine Befunde oder verstürzte Öfen. Daraus kann man einerseits schliessen, dass sich allfällige Öfen nicht mehr im Erdgeschoss befanden. Andererseits ist anhand der Fundkartierungen auffällig, dass im Bereich des "Grafenhauses" (Bau 17), also des Repräsentativbaues, keine Kachelhäufungen auftreten. Vergleicht man die Fundkartierungen mit dem östlichen Bereich des "Rechteckhauses" (Bau 15), wo verschiedene Fundgruppen mehrerer Zeithorizonte zutage traten, so müsste man sich allein aufgrund der Fundverteilung im "Grafenhaus" vorwiegend Kaminfeuerstellen, im architektonisch einfacheren "Rechteck-

²⁴ Vgl. dazu Meyer 1989.

haus" hingegen mehrere Kachelöfen vorstellen. Daraus kann man folgern, dass die repräsentativen Räume und Säle auf der Frohburg nicht mit Kachelöfen, sondern mit Kaminen ausgezeichnet waren²⁵.

Betrachtet man andere, erhaltene Befunde zu Heizanlagen in Palasgebäuden, so fällt auf, dass es sich mehrheitlich um offene Kamine handelt. So weist z.B. der um 1200 in zähringische Zeit datierte Palas des Schlosses Burgdorf im "Rittersaal" eine mächtige Kaminanlage auf, während Spuren anderer Heizformen bis anhin fehlen²⁶. Dasselbe gilt für den zeitgleich datierten Wohnturm des Schlosses Thun.

Damit soll nicht etwa behauptet werden, dass auf grossen Adelsburgen nicht mit Kachelöfen zu rechnen sei. Die auf vielen Burgengrabungen zum Vorschein gekommenen Kachelfunde des 12. und 13. Jahrhunderts sprechen eine klare Sprache. Es scheint jedoch aufgrund der Befunde vorerst naheliegend zu sein, in repräsentativen Sälen einen offenen Kamin zu sehen, während der Kachelofen zu dieser Zeit den privateren Wohnräumen vorbehalten blieb.

Bezogen auf die Funktion eines Kachelofens bedeutet diese Überlegung, dass der Ofen um diese Zeit nicht zwingend in den am meisten ausgezeichneten Raum der Anlage gehörte. Damit war der Kachelofen noch immer primär als Heizofen für Wohnräume gedacht und besass als Objekt selbst keinen Repräsentativcharakter. Allein mittels seiner Heizfunktion und nicht seiner äusseren Form zeichnete er den Wohnkomfort des Raumes aus.

4.3 Die Entwicklung der Raumaufteilung im städtischen Wohnhaus

Obwohl die Erforschung des städtischen Wohnhauses im Mittelalter seit langem ein Schwerpunktthema der Mittelalterarchäologie ist, stellen sich für unsere spezifische Fragestellung nach der Raumaufteilung und der Ausstattung verschärfte Probleme der Quellenlage. Unter den zahlreichen Untersuchungen zum Wohnhaus in Städten des schweizerischen Mittellandes stiess man nämlich nur vereinzelt auf Befunde zur Beheizung und / oder der Herdstelle. Etwas häufiger sind die Aufschlüsse zum Innenraum und der Stockwerkeinteilung.

Man geht heute davon aus, dass mit dem Anwachsen der Städte im 12. und 13. Jahrhundert in der Regel eine bauliche Verdichtung der Flächen stattfand, die sich in der sogenannten "Versteine-

rung" der Bauten äusserte: Einräumige, höchstens zweistöckige Holzhäuser wurden immer öfter durch massive Steintürme ersetzt. Das städtische Wohnhaus des 13. Jahrhunderts hatte häufig einen massiven, manchmal mehrstöckigen Unterbau und darüber ein- oder mehrgeschossige Fachwerkkonstruktionen. Für das 13. und 14. Jahrhundert kann zudem in mehreren Städten eine zunehmende Parzellenbebauung dokumentiert werden: Wo vorher Freiflächen und Schuppen standen, wurde das Areal von beiden Seiten her allmählich dicht überbaut.

Diese städtebaulichen Entwicklungslinien lassen sich ansatzweise auch im "Mikrokosmos" des Wohnhauses nachziehen: Im einräumigen Holzhaus finden die vielfältigsten Tätigkeiten des täglichen Lebens nebeneinander statt. Eine funktionale Trennung der verschiedenen Lebensbereiche ist zumindest architektonisch kaum auszumachen. Auf die Beheizung bezogen bedeutet dies, dass die vielfach dokumentierte Feuerstelle die Doppelfunktion von Kochherd und Heizung innehat. Der ganze Raum wird so erwärmt. Erst mit dem Einbau von architektonisch abgetrennten Räumen (Stuben) war das Grundbedürfnis und die Möglichkeit zur effizienten Beheizung dieser getrennten Räume gegeben.

Mit der Entwicklung der spezifisch städtischen Wohnbauten geht eine funktionale Raumaufteilung einher: Über den als Hofdurchfahrt, Keller oder Werkstatt genutzten Erdgeschoss befand sich häufig der über eine Aussentreppe erschlossene Hocheingang. Mit der fortschreitenden Überbauung der Parzellen jedoch, wurden innen gelegene Treppen nötig. Das erste, oder oft auch erst das zweite Obergeschoss, war durch seine überdurchschnittliche Höhe und seine reich gestalteten Fenster und Türen als "*piano nobile*", also als Repräsentationsgeschoss ausgebildet. Oft findet man gassenseitig den Repräsentationsraum oder -saal. Er hatte nicht nur eine grössere Fensterfläche, sondern wies in der Regel auch Wandmalereien auf²⁷. Daneben, dahinter oder in den oberen, niedrigeren Geschossen kann man kleinere Wohnräume fassen, die ihrer Holzverkleidung wegen auch als Stuben angesehen werden. In der Nähe der Wohnstube und/ oder des Repräsentationsraumes ist auch die Küche zu sehen. Leider konnten bis anhin kaum Herdstellen oder Öfen bauarchäologisch nachgewiesen werden. In den oberen Geschossen befanden sich Schlaf- und Lagerräume.

Die heute vorliegenden Resultate über die Raumeinteilung des städtischen Wohnhauses sind somit für

²⁵ Diese Interpretation steht im Gegensatz zu der in der Grabungspublikation geäusserten Vermutung, wonach das "Grafenhaus" Zitat: "... grosszügig mit Kachelöfen und vielleicht auch mit

offenen Kaminfeuerstellen" ausgestattet war. Meyer 1989, 97.

²⁶ Schweizer 1985, 95 ff.

²⁷ Vgl. dazu Gutscher & Schmid 1982, 113 ff.

unsere Fragestellung noch zu wenig genau. Wir bedürften einer Zusammenstellung der sicheren Befunde zur Raumaufteilung im spätmittelalterlichen Wohnhaus.

Etwas besser orientiert sind wir in jenen Gegenden, wo der Fachwerkbau über dem massiven Sockelgeschoss häufiger vorhanden ist: In Baden-Württemberg konnten viele Bauten des 13. und 14. Jahrhunderts untersucht werden, die uns bezüglich der Raumaufteilung weniger im Dunkeln lassen: Die im Fachwerkbau baulich gut erkennbare Stube (Bohlenverkleidungen und Decken) liegt meist gassenseitig und hat rückwärtig die Küche mit der Herdstelle. Diese Grundrissaufteilung bildet auch im ländlichen Wohnhaus die Regel und wird im Prinzip daher abgeleitet.

5 Ofen und städtische Wohnkultur

Neben dem Fragenkomplex zur Entstehung und Geschichte des Kachelofens ist eine weitere Kernfrage, nämlich die nach der Verlagerung der Hauptfunktion von der Heizung zum Repräsentationsobjekt aufzuwerfen. Wir haben gesehen, dass die frühesten Anhaltspunkte für Kachelöfen zwar in Zusammenhang mit hochqualifiziertem Bauen, jedoch nicht eindeutig auf Repräsentativräume bezogen sind. Daraus kann man schliessen, dass die Erfindung und Entwicklung des Kachelofens an sich wenig mit Selbstdarstellung zu tun hatte.

Erst zeitgleich mit der zunehmenden Raumdifferenzierung, sei es im städtischen Wohnhaus oder im Palas der Burg, setzen die Funde von reliefierten Blattkacheln, die ein geschlossenes Bildprogramm am Ofen ermöglichen, ein.

Demgemäss möchte ich zum Schluss eine These formulieren, die die Entstehung des vollständig aus Kacheln gefügten Ofens, also des spätmittelalterlichen Turmofens, als funktionales Produkt einer zunehmenden Raumdifferenzierung der gotischen Wohnkultur ansieht. In einer Anlage mit mehreren, beheizten Wohnräumen ist es sinnvoll, zumindest einem dieser Räume Repräsentativcharakter beizumessen. Damit besteht direkt das Bedürfnis für einen Ofen mit szenischem Bildprogramm.

Umgekehrt ausgedrückt wird die Stube, oder der erwärmte Wohnraum, dank dem Einbau eines Prunkofens zunehmend öffentlich und repräsentativ.

Ein anderes, wichtiges Mittel zur Selbstdarstellung im Wohnraum ist die profane Wandmalerei, die parallel zu diesem entscheidenden Entwicklungsschritt im Kachelofenbau eine Hochblüte erfährt. Neben einem Festsaal, der beispielsweise Wandmalereien und einen Kamin aufweist, wird oft zusätzlich ein kleinerer, beheizbarer Repräsentativraum eingerichtet. Untersuchungen anhand der profanen Wandmalereien in Zürich weisen jedenfalls in diese Richtung: So konnte Charlotte Gutscher-Schmid ermitteln, dass die spezifisch repräsentativen Wandmalereien nicht ausschliesslich in grossen Festsälen zu finden sind, sondern auch in stubenartigen, kleinen Wohnräumen²⁸. Architektonisches Zeichen der Repräsentation scheint in diesen Beispielen des 14. Jahrhunderts zwingender in der Raumhöhe, als in der Raumgrösse zu liegen.

Stellt man sich die Ikonografie dieser Wandmalereien vor, die heraldische Wappendarstellungen, Minneszenen und Fabelwesen in Pflanzenfriesen beinhaltet, so erscheint einem die Ikonografie der Kachelöfen als ähnliche, verkleinerte Varianten der Themen aus den Wandmalereien. In beiden Räumen soll der Schein einer sorglosen, verspielten Welt inszeniert werden.

Eine Schlüsselstellung kommt aus mehreren Gründen dem zwischen 1330 und 1350 zu datierenden Ofen der Gestelnburg bei Niedergesteln (VS) zu (Abb. 5)²⁹. Einmal handelt es sich hier um den klaren Befund eines vom Obergeschoss des Palas hinuntergestürzten Ofens. Zudem kann man aus der Fundlage schliessen, dass er sich ursprünglich an einer Binnenwand und daher in einem – verglichen mit dem angrenzenden Saal – kleinen Raum befand. Einmalig ist jedoch das Fundensemble vor allem deshalb, weil daraus ein vollständig aus Blatt- und Nischenkacheln bestehender Ofen rekonstruiert werden kann. Die Rekonstruktion, die unsere Kollegin Gabriele Keck vorschlägt, lässt auch deutlich erkennen, dass bei diesem Ofen der wichtige Schritt hin zum vollständig mit Kacheln aufgeführten Heizkörper gemacht worden war.

Der Vergleich zwischen den wohl ältesten, erhaltenen Kachelöfen von Meran und Hohensalzburg sowie den frühen Ofendarstellungen des beginnenden 14. Jahrhunderts zeigt, wie grundlegend dieser Entwicklungsschritt für den Aufbau aller weiterer Kachelöfen war³⁰: Das Prinzip des spätgotischen Turmofens war kreiert. Doch nicht nur für die äussere

²⁸ Gutscher & Schmid 1982, 113 f.

²⁹ Zu folgenden Ausführungen vgl. Keck 1993, 340 ff.

³⁰ Die ältesten Bildquellen zu Kachelöfen sind eine Miniatur aus einer Würzburger Handschrift, die Fresken im Haus "zur

Kunkel" in Konstanz und im Haus "zum langen Keller" in Zürich, sowie das Wappen der Familie Stubenwyd auf der Zürcher Wappenrolle. Vgl. dazu den Beitrag von Mathias Henkel in dieser Publikation.

Gestalt des Ofens ist dies wichtig. Die eckigen Blatt- und Nischenkacheln mit ihren Reliefmotiven sind die Voraussetzung zur Schaffung eines Bildprogrammes am Ofen, und die Grundbedingung für eine repräsentative Funktion des Ofens. Der Ofen aus Niedergesteln war mit verschiedenen Szenen aus der Welt des Adels ausgestattet. Gabriele Keck kommt zum Schluss, dass mit den Reiterfiguren und den zuschauenden Paaren eine sogenannte Tjoste, also ein höfisches Turnier, dargestellt wurde. Mit grosser Wahrscheinlichkeit handelt es sich um ein Bildprogramm, das sich die Auftraggeberschaft nach ihrem Ideal eines höfischen Festes zusammengestellt hatte.

Die Frage bleibt, ob es sich bei diesem Ofen um eine Einzelschöpfung handelt. Die Ausführung, bzw. die Auswahl der teilweise individuell angefertigten Kachelmotive, ist mit Sicherheit engstens an die Auftraggeberschaft geknüpft. Die Idee jedoch, dem Repräsentationsbedürfnis nicht allein mit architekturgebundenen Mitteln, wie Raumhöhe (*"piano nobile"*), Bauplastik und Wandmalereien nachzukommen, dürfte nicht von einer einzelnen Person ausgegangen sein. Vielmehr ist, wie schon verschiedentlich geäussert wurde, die Wertschätzung der höfischen Kultur als Basis für den extremen Repräsentationswillen anzusehen. Es ist die Mentalität einer Gesellschaft, die dem höfischen Ritterideal romantisierend nachzuleben versucht.³¹ Der gotische Prunkofen als Spätprodukt der höfischen Kultur, also? Oder handelt es sich um eine spezifisch "alpenländische" Rezeption der höfischen Werte?

Die Motivserien früher Blattkachelöfen in den Städten des schweizerischen Mittellandes scheinen dafür zu sprechen: So sind offensichtlich nicht nur in den Hafnereizentren des 14. Jahrhunderts in Zürich und Bern Blattkacheln mit höfischen Minne- und Ritterdarstellungen gefertigt worden, sondern auch in zahlreichen Kleinstädten.³² Nennenswert ist in diesem Zusammenhang auch das Fundensemble aus einer Kellerverfüllung auf dem Churer Martinsplatz: Aus den ungefähr 70 Kacheln eines verstürzten Ofens konnte eine Rekonstruktion vorgelegt werden, die sowohl eindeutig höfische Motive, wie Liebespaare und Zuschauerreihen, als auch Fabelwesen vereinigt (Abb. 6)³³.

Die Entwicklung des Kachelofens in zwei, von der Funktion bestimmten Etappen zu sehen, könnte für die künftige Forschung heissen, weiterhin sehr unterschiedliche Fragestellungen und Ansätze zu

berücksichtigen: Für die Frühphase sind noch immer die Fragen nach Verbreitung und zeitlicher Einordnung die dringendsten Aufgaben. Für die Bearbeitung gotischer Prunköfen jedoch, wäre es momentan am sinnvollsten, die Zusammenhänge zwischen höfischer Kultur, mittelalterlicher Stadt und Kunsthandwerk zu beleuchten.

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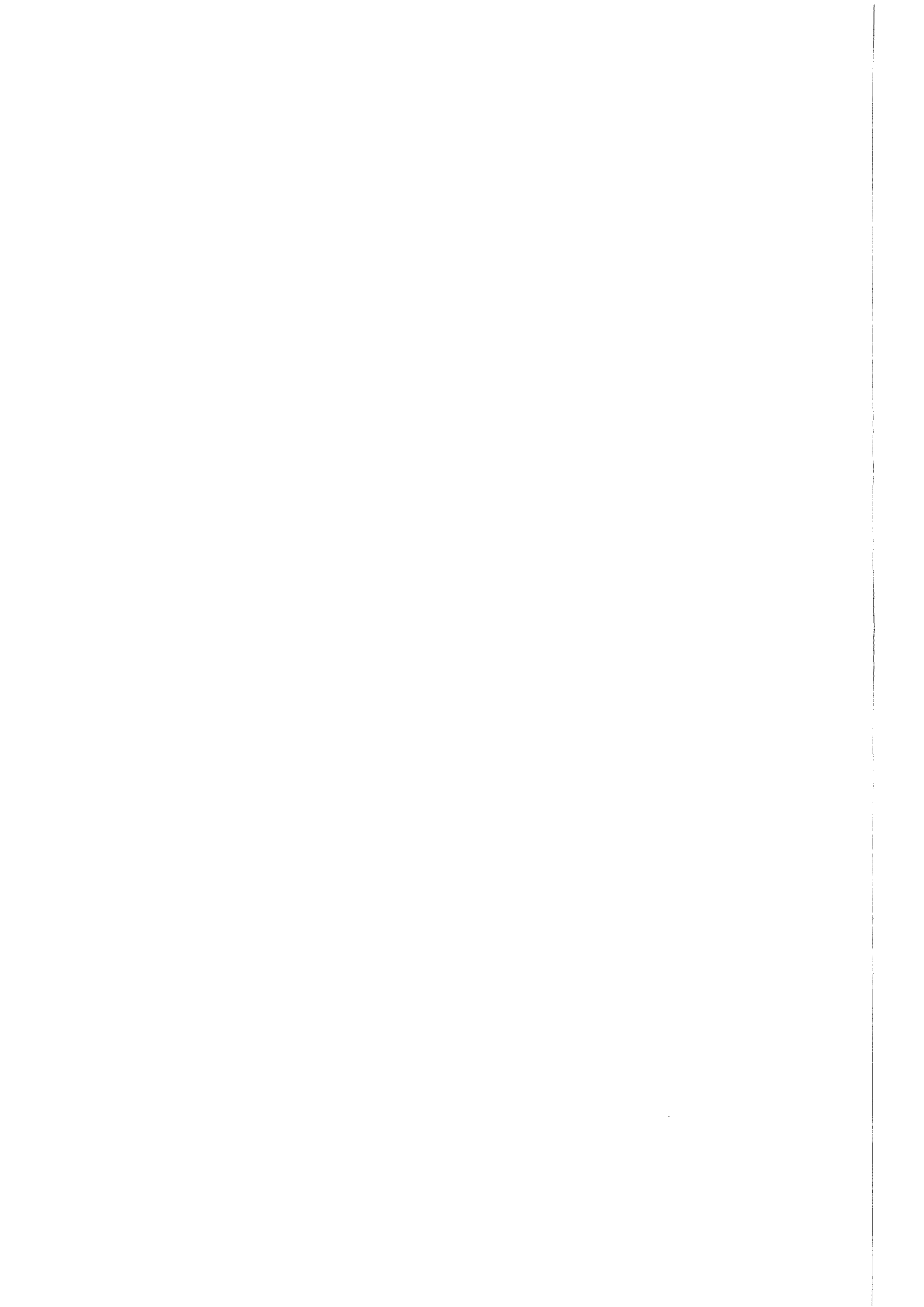
³¹ Vgl. dazu Claudia Brinker 1991 und Joachim Bumke 1986.

³² Zur Kachelproduktion in Zürich zusammenfassend: Schnyder 1992. Zu frühen Motivserien in Bern: Roth Kaufmann u.a. 1994, 60 ff.

³³ Vgl. Janosa 1996.

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The Disguise of Historic Brickwork Rediscovered

Summary

This paper sets out some of the methods used to depict imitation brick courses applied to plaster, wood or brick on internal and external surfaces. The courses are defined by using thin lines in either white, black or red paint depending on the base colour used. Alternatively, geometric designs are created with painted blocks, representing coloured bricks, arranged to make diaper patterns.

Two countries, England and Italy, are selected for both common and contrasting techniques. Italy retains much earlier evidence from the Roman period, which is considered as a possible influence for what followed during the medieval period. For the English evidence, a few of the account book entries from the Royal Taskworks are quoted to establish some of the historic terms used for this practice. Some contemporary paintings are cited for both countries where they show the effect of imitation masonry on painted walls.

Introduction

During the early 1980s I examined a number of 15th, 16th and 17th-century fireplaces in Suffolk houses which were being renovated. Suffolk is a southern English county to the north-east of London. The work on these fireplaces revealed that the original builders had covered much of the brickwork with red ochre paint. In many cases the effect was enhanced by adding white or black painted lines between the bricks, to create a sense of carefully-laid brick courses with even mortar joints. A paper was published in 1986 that also included some painted walls and ceilings, with a few examples from the Netherlands¹. In this, it was hinted that this form of decoration might be found outside England, and

might not be confined to interior walls alone. Since 1986, examples from several other European countries have been recorded and, in 1996 and 1997, with the help of a Winston Churchill Travelling Fellowship, these are being visited, to examine the evidence of similar methods being used elsewhere, and to attempt to discover whether the painting of brickwork can be traced back to the Roman period.

At the time of writing this paper, the travelling is incomplete so the findings presented here are provisional and confined to English and some Italian examples. By October, evidence from the other countries which have been visited will be included for the conference. These examples will come from Spain, Denmark, Poland, Germany, Holland, Belgium and Ireland.

The English evidence

The majority of fired bricks made in England before the late 17th century were relatively uneven in size and colour, so close jointing could not be guaranteed. The solution was to lay the bricks with wide mortar joints and finish off using a finer mortar or plaster, smearing this over any irregularities around the edges of each brick (fig 1). Before the finishing coat was dry, horizontal and vertical lines were scored between the bricks, and these often acted as a guide for thin painted lines in white or black. Before the lines were added the whole surface was painted over with a mixture of red ochre and size (the binder). The historic name of this paint is *Rodel* or *Ruddle* and it is sometimes referred to as *Red okering* or *Russetting*. English documents inform us that the size was made by soaking and boiling off-cuts of leather, particularly gloves' shreds². For an application internally this was a sufficiently strong binding medium, but

¹ EASTON T. 1986: The internal decorative treatment of 16th- and 17th-century brick in Suffolk, *Post-Medieval Archaeology* 20, 1-17.

² SALZMAN L.F. 1952: *Building in England down to 1540*, 158-159.

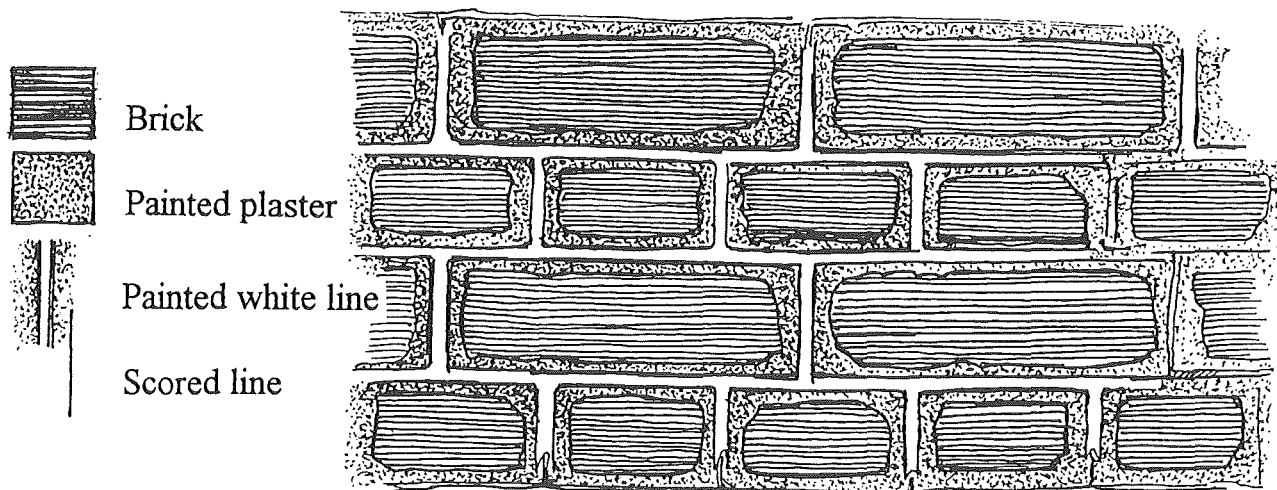


Fig 1. - Typical appearance of mortar or plaster smoothed around irregular shaped bricks with scored lines made ready to receive colour (ruddle) and thin lines (pencilling).

possibly an additional binder such as casein, might be added, for external treatment to help the paint stay in place longer.

If the ruddle was added while the finishing mortar was still wet, the colour would be absorbed in the same way as fresco (*intonaco*) and would last a long time. This is often seen in the surviving evidence where the size has degraded with a loss of paint from each brick, but the colour is clear to see staining the finishing mortar or plaster. For external finishes crushed tile or brick was frequently added to the mortar giving a background red colour, albeit a coarser finish, before the ruddle was applied.

During the 15th and 16th centuries the scored guide lines were added freehand with a trowel or a square iron tool, traditionally referred to in Italy as a *Ferro Quadro* (fig 2). By the mid 17th century these were more precisely ruled, often with a round iron tool

(*Ferro Tondo*), creating a U-shaped groove (fig 3). Apart from these two, there were another four main methods of finishing the joints before the colour was applied (figs 4-7). Figs 1,2 + 6 are the only ones which are likely to carry the thin painted lines. Fig 6 (beaked) is the method found mainly in the 16th century on high quality brickwork and requires even-sized bricks, without much warping, to ensure reasonably straight courses. The painted line is usually added, but to the lower inclined surface only.

The Delineation of the Brick Courses

The historic name given to the painting of white or black lines along the joints of ruddled brickwork is Pencilling (*Pencelling*; *Pynsellynge*). This is derived from the Latin term *Penicillum*, meaning a

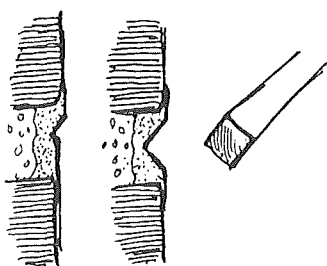


Fig 2. - Profile of scored lines made with a trowel or a square iron (*ferro quadro*).

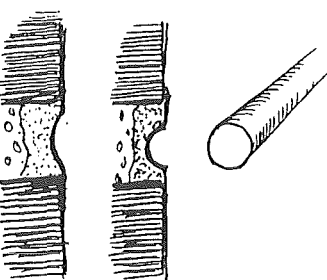


Fig 3. - Profile of round score lines (U-shaped grooves) made with a round iron (*ferro tondo*).



Fig 4. - Struck pointing sottosquadro.



Fig 5. - Reverse struck a scivolo.



Fig 6. - Beaked joint doppia inclinazione.



Fig 7. - Smoothed joint liscia-tura.

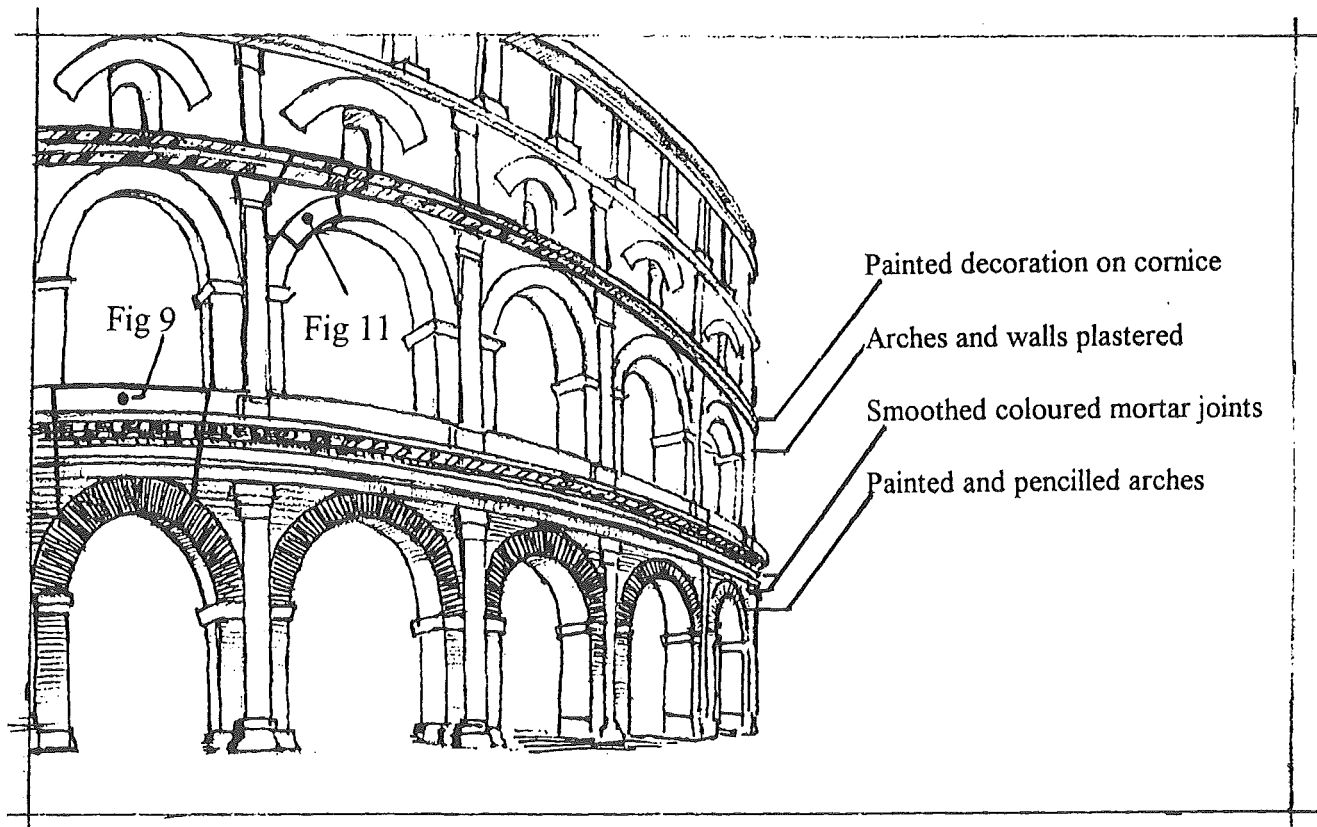


Fig 8. - Theatre, Ostia Antica. External 3rd-century walls with sections marked to indicate some of the variations of surface finish and decoration. Squared boxes show the type of section from which figs 9-12 are drawn.

'little tail' which was the name given by the Romans to an instrument which held selected animal hairs formed into a pointed brush to write or paint fine lines. A pencil is still the term given to a very fine sable brush used by artists and signwriters.

There are frequent references to the work carried out by bricklayers (and occasionally tilers and plasterers) to pencil internal and external walls, garden walls and the chimneys. The latter references are not only to the fireplace and side walls but all the way up to the top of the chimney shafts. Two examples are quoted here – the first is for the Palace of Greenwich in August 1533³:

Plasterers – 'Workyng aswell upon the colouryng with yolowe Oker the tymber worke off the galarye betwyne the quenes stole chamber and the privy Closett as upon the Rede okering & pynsellynge the bake Walles upon the stayres

goyng Forthe off the sayd galerey into the kynges garden....'

There could be two explanations for this task being given to the plasterers rather than the bricklayers. In the same Taskwork the gallery is described as new so after completing the plasterwork to a new timber-framed structure, which may have abutted an existing brick staircase, the plasterers are to paint the timberwork yellow ochre and the brickwork red ochre. Alternatively, the wooden frame surrounding the stairs was plastered, ruddled and pencilled to resemble brickwork⁴. One of the best examples of English pencilling can be seen inside the 15th-century mansion, Oxburgh Hall in Norfolk. Much of the brick walling and vaulted ceilings are painted in this way, and of particular note are the walls of the stairs leading to the King's chamber. Examination of the Oxburgh staircase clearly demonstrates the necessity for re-

³ University of Oxford, Bodleian M.S. Rawlinson D. 775, f85v.

⁴ Other examples of imitation brickwork on plaster survive on Suffolk buildings, but these are all 17th and 18th century and are intended to match adjoining brick walls. At Crow's Hall, Debenham, the external plaster walls of a wagon porch, attached to an earlier brick-fronted barn, were scored and red ochred to resemble brickwork. Nearby at No. 1 Gracechurch Street, Debenham, a 17th-century timber-framed porch has fragments of plas-

ter between the studs painted in a similar way to resemble brick-noggin of the earlier building to which it is attached. Occasionally, fictive brickwork survives painted over the wooden beams and studs, but again this is usually a secondary feature. For instance, the jettied side walls of a kitchen range, circa 1500, at Kentwell Hall, Suffolk, were to underbuilt around 1600. One side was too close to a moat, so the existing timber frame and brick-noggin were overpainted with horizontal courses of painted bricks to match up with adjacent brick buildings.

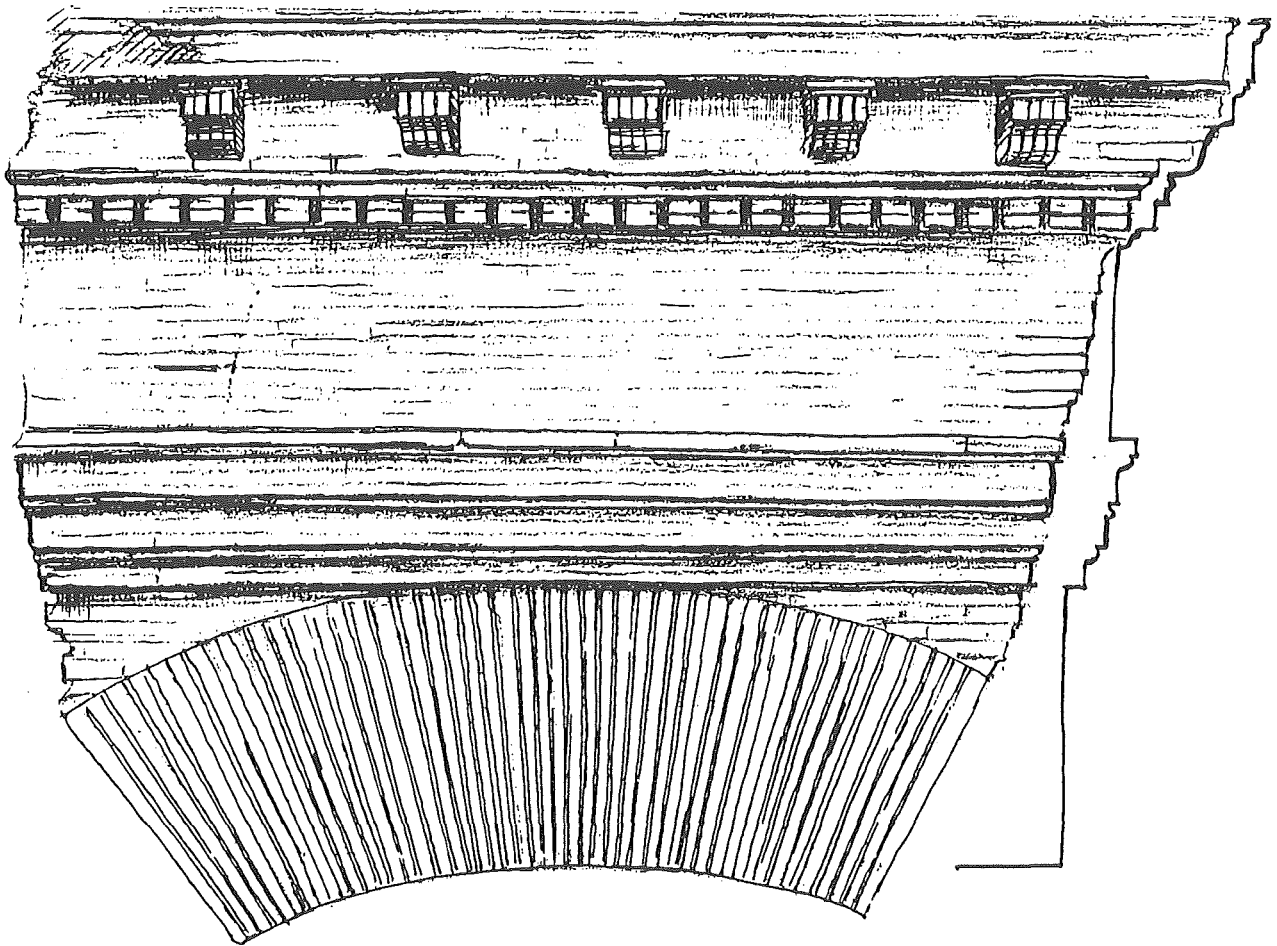


Fig 9. - Part of elevation belonging to semi-circular arched portico. The drawing is partly a reconstruction combining the arch from one fragment (9a) and the cornice from another (9b).

newing the pencil work over the years. The original set of white pencilling is overpainted with a red ochre wash so that the lines appear pale pink beneath the ruddle, with the next set of white pencilling (16th or 17th century) laid on top.

The second example given is for Somerset House, London in 1611-12⁵:

Jeremy Talcott Bricklayer for finishing w[i]th white mortar ashler waies the fronte of the house towards the garden and parte of the wharfe wall next to the Thamesat VIId the yarde

For pencillinge the said Fronte next the garden and the walles of the Terrasse in the garden the Inner side of the wharfe wall under the battlements

For pencillinge the new Copeinge of Brickwoorke in the Garden

For white finishinge ioyntheinge and pencillinge the stone wall on the backe side of the haul next the Garden.....

Here a bricklayer, the first to be officially appointed as the King's Master Bricklayer in 1609, is asked to pencil some new brick coping (the capping) to the top of an existing garden wall (possibly in stone). There

are a number of 16th and 17th century English paintings showing external pencilled brick walls, but the clearest is a painting by Robert Peake of c1610, in the collection of Parham Park in Sussex, with the young Henry, Prince of Wales, on horseback before a garden wall surmounted with a coping, all ruddled and delineated with white pencil work⁶. This is contemporary with the date of the Somerset House Taskwork and it is clear that Jeremy Talcott was expected to carry out similar finishing work either to stone walls, or to walls made in rubble or brick which were white-mortared over in imitation ashlar jointing. This illustrates that whether the walls were of brick or stone, they could all be classified as masonry, and their decorative treatment had much in common. For enhancing ashlar work, red ochre or black was pencilled along scored joints. With ruddled brick,

⁵ Public Record Office London E 351/3246 Somerset House, Taskwork: Jeremy Talcott (Taskwork is the annual summary of accounts submitted to either the Exchequer or Audit office).

⁶ JACKSON-STOPS G.J. ed. 1985: *The Treasure Houses of Britain*, 133.

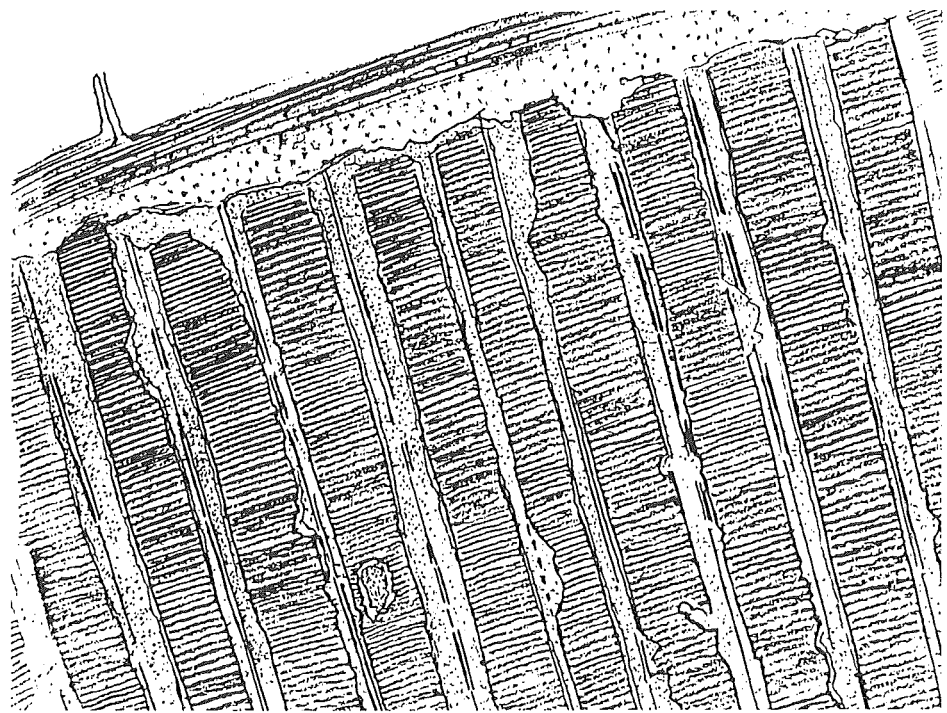
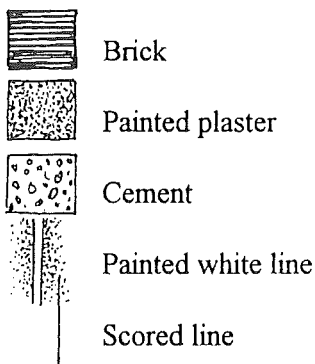


Fig 10. - A detail from the arch of portico showing painted, scored and pencilled surface.

white paint made from chalk and size was the most common colour for pencilling, but black was used, although the surviving evidence is less frequently found. The Hall at Hampton Court was pencilled in black in 1533 as the Taskwork entries confirm. Bristles were bought

‘servyng to pensell the hall abowtht’
and a load of hay

‘to be burnyd for pensellyng a bowght the hall’⁷.

Several other entries for the purchase of hay are also mentioned for Hampton Court in 1535⁸, and between 1536-38⁹.

In the British Isles it has not yet been possible to find examples of painted brickwork earlier than the middle of the 15th century, but there are many examples of white-mortared stone walls with red pencilling in cathedrals, churches and large palaces. A good 11th-century example is on the lowest level of the Norman stone walls at York Minster (this can now be seen in the crypt, although it was originally intended for external display).

⁷ P.R.O. E 36/237, f 296 and E 36/242, f 485 Hampton Court, Both are Taskwork entries for 1533.

⁸ P.R.O. E 36/243, f 372, Hampton Court, Taskwork.

⁹ P.R.O. E 36/244, ff 29, 335, 403, Hampton Court, Taskwork. It may seem curious that the black colour was achieved by obtaining bulky hay loads, rather than black pigments which were not expensive. Many types of black pigment are impure carbons which will effloresce when the paint is in contact with mortar. Alternatively, a pure carbon, like lamp-black, can be greasy and difficult to mix with a water medium.

Summing up the English evidence for pencilling

Pencilled brickwork was the standard finish on most brick buildings from circa 1450 to 1680. After the latter date, fine laid brick courses were made with accurate gauged and moulded bricks and paintwork was less of a necessity, but it was still used during the 18th and 19th centuries and is now used in some areas for delineating window and door surrounds. Although pencil work to brick has not been recorded earlier than the 15th century, it is part of a masonry tradition which goes back to the Roman period and there is no reason why it should not have been used on earlier brick buildings near coastal towns and ports, where the influence of continental brick building traditions prompted earlier examples.

Other forms of painted decoration on English brickwork

Apart from the use of selected vitrified-dark coloured headers, which are used to make decorative patterns, large areas of brick walls were also painted with imitation diaper patterns, but only a few examples have survived. If an external wall with real diapers was ruddled over, the colour would not adhere to the glazed surface of the bricks. The effect was intended to reduce the impact of the mortar joints and so create a unified surface to make the vitrified designs stand out: under these conditions, pencilling was not applied. With imitation (fictive) patterns, the

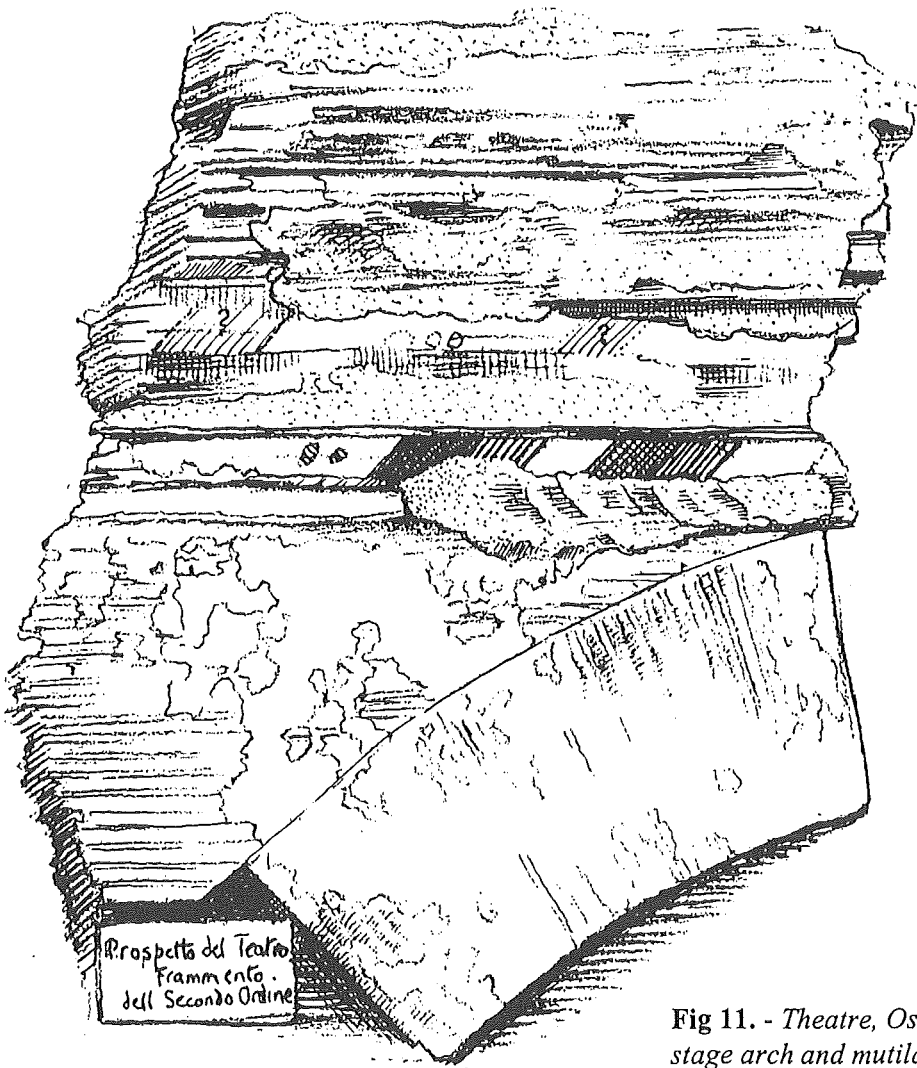


Fig 11. - Theatre, Ostia Antica. Fragment of second stage arch and mutilated cornice.

effect was very similar and at a distance would be hard to tell apart. However as the glassy surfaces of real diaper bricks reflect the light when seen from certain angles, and in particular at close quarters, these appear paler than the surrounding walling. The difference between the two methods was not a deterrent to rich clients and examples of fictive diaper work are found on buildings of high status. The known surviving examples come from palaces, great houses and university buildings, so this was not considered either as a temporary or a poor man's version of the real thing.

The chance survivals today of fictive diaper work on buildings such as the east wall of Cardinal Wolsey's chapel at Hampton Court¹⁰ or the original chimney stacks at Long Melford Hall in Suffolk¹¹ are due to early decisions to enclose these features, thus preserving the paint before it was eroded by rain. The frequency with which this practice was once employed can only be guessed at, because the majority have long ago disappeared from exposed walls, but this may well have been as common as the large number of surviving real diaper patterns. Perhaps it

was only occasionally used as an indoor decorative feature since only one example is known at present on the back of a late 15th-century brick stack at Panels Ash Farm, Pentlow, in Essex.

The historic necessity of renewing external painted brickwork

Because there was not a conscious effort to use anything like a true fresco method over external brickwork, it was expected that this would occasionally require retouching or a total repaint, as can be seen internally in parts of the scheme at Oxburgh Hall, Norfolk.

One good external example, which perhaps gives the clearest indication of the need for redecoration, is

¹⁰ CURNOW P. 1984: The east window of the Chapel at Hampton Court Palace, *Architectural History* 27, 1ff.

¹¹ Easton *op.cit.* and paper forthcoming with reconstructions of external appearance of Long Melford Hall stacks.

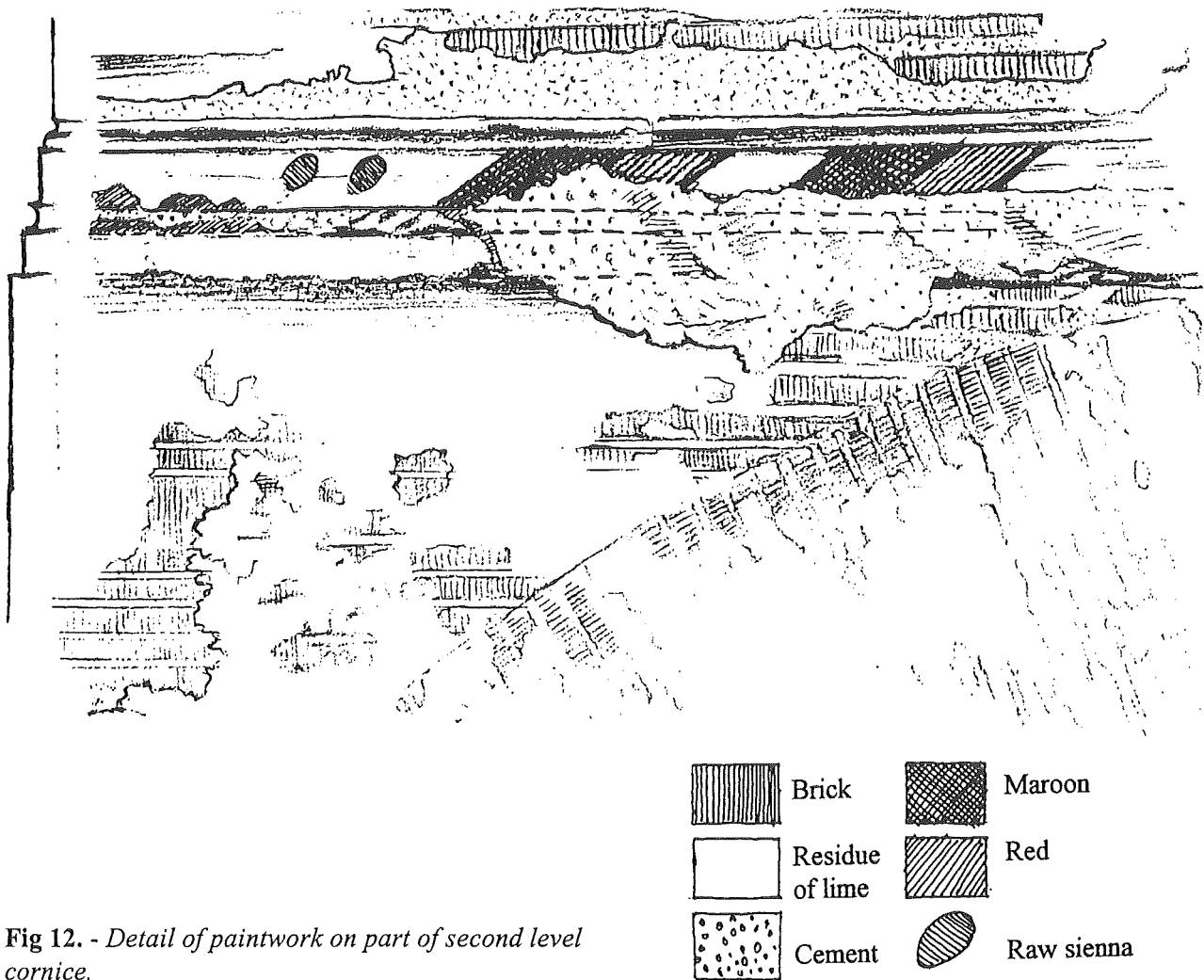


Fig 12. - Detail of paintwork on part of second level cornice.

on the painted panels of brick (brick-noggin) between the oak framing of a once large 16th-century country house, Badley Hall, Suffolk. Since the 17th century, the original exterior has been lathed over and plastered. Areas of this have broken away to reveal the original surface and the replacement layers of paint. These brick panels were painted three times in the space of about 100 years. The first pencil lines were in black on a red ground and the subsequent two schemes were made using white pencil lines. It should be emphasised that apart from reducing the effect of the pale mortar joints, the other main reason for selecting a pale pinky ruddle to overpaint walls was to unify the often quite dark varying colours of the bricks, and perhaps also to get nearer to the shade of the higher quality Flemish bricks, which were imported into the Eastern Counties of Britain, particularly in the 14th and 15th centuries.

A comparison with some late medieval painted brickwork in Italy

There is excellent visual documentary evidence of the painted surfaces of Venetian buildings in the closing years of the 15th century: this is contained within the group of paintings known as the Miracle of the Cross Cycle now housed in the Gallerie dell'Accademia¹² Many decorative schemes are depicted and all executed in fresco (*intonaco*). Amongst the designs using full scale figures, floral patterns and bands of colour, two other types are repeated with frequency: these are the use of white pencilled fictive brickwork (known today as *Regalzier*) and fictive diaper designs. Unlike the comparable English examples, these are all executed on a thin 'sacrificial' plaster. This is necessary on Venetian brickwork because the hostile environment encourages salts to come to the surface and crystallize (efflorescence): for this reason the surviving evidence is now fragmentary.

The tradition for the formation of *regalzier* is to score horizontal guide lines across the wet plaster with a round metal tool (*ferro tondo*) creating a U-

¹² Illustrated in NEPI G.S. 1991: *Treasures of Venetian Painting*.

shaped groove, apply ruddle and then add the white pencilling. The U-shaped groove (*concava*) appears much earlier in Italy than in England: it is found from the Roman period onwards. The vertical pencil lines are usually three times wider than the horizontals and do not generally use a scribed score line as a guide. One of the best examples of Venetian pencilled walling in situ is at the top of a side wing of the Palazzo Capello a Castello. This building features prominently in Gentili Bellini's Miracle of the Cross of the Bridge of San Lorenzo, circa 1500. The side wing with the surviving *regalzier* is obscured from view in the painting, but the matching wing on the main canal has an identical scheme of pencil work depicted. The recessed central block between the wings shows it to have been covered with imitation diaper patterns: this decoration does not appear to have survived. Many smaller sections of *regalzier* can still be viewed on the outside of the largest churches, notably the Basilica dei Friari and the Madonna dell' Orto. Scientific analysis of the upper walls of the latter church show that for some of the most intricate moulded brick decoration the colour was applied directly to the brick¹³.

Several Venetian churches have their internal walls covered with pencil work on a scored plaster base. Apart from depicting regular brick courses (Basilica dei ss Giovanni e Paola) the thicker vertical lines can be staggered in such a way that diaper patterns are formed (Basilica dei Friari). Nearly all of this internal painted walling in the great churches was totally renewed in the 19th and 20th centuries. A few fragments of earlier paint survive to indicate that these modern schemes probably reflect the original intentions of the 15th-century decorators.

The external method of depicting diaper work imitated painted brick patterns in maroon and white with pencil lines. These are seen in several of the paintings in the Miracle of the Cross Cycle, and survive restored at the Palazzo Contarini dei Cavalli a S Luca, and in unrestored condition under the eaves of a 16th-century speculative block of houses in the Corte Nova a Castello. Where the latter has been weathered, the darker colour 'bricks' have changed to variations of grey, brown, red and maroon, similar to the usual variations of colour in unpainted brickwork. Is this what Titian was depicting with the varying coloured decorative patterns on the brick building in the middle of his Presentation of the Virgin in the Temple, circa 1534-38? He is presumably using for his architectural model, local buildings which obscured the bricks.

Because Venice covered most of its brick walling with plaster, real diaper work does not exist as an ideal to be copied in a fictive version, as is seen in England. The patterns were clearly formed originally from textile designs, as the name *diaper* implies. The earliest model in Venice for this particular transition from textile patterns to architecture is the 14th-century stone-clad facade of the Palazzo Ducale, but as with the fictive pencilled brickwalling, Venetians seemed to have appreciated the appearance of brick, even though most of it was covered, and sought to represent diaper designs in various ways that replicated the hidden materials.

As was noted in the English evidence, white pencil work was used for the majority of fictive brickwork, and the same is true in Venice. Black pencil lines perhaps were only used to define door-ways and arches, such as the blocked courtyard doorway at the Palazzo Pisani a Samuele.

The Venetian evidence may be compared with the much higher survival rate of decoration in the neighbouring town of Treviso, which does not suffer from the same problem of efflorescence. Due to an enlightened policy of conservation over several decades, the substantial fragmentary evidence affords an overall picture from which to gauge the balance between the varying forms of decorated walls. Geometric diaper patterns, pencilled, and plain coloured walls seem to predominate over all other forms of decoration. There is one particular picture in the Miracle of the Cross Cycle, by Giovanni Mansueti which illustrates the many different types of imitation painted diapers and this evidence is endorsed by comparing the variations seen around Treviso. The painting is the Miracle of the Cross in Campo San Lio of 1494. Caution is perhaps needed about reading Mansueti's representation as a fact, since he has made considerable adjustments to the layout of the square and canal in his depiction, but he may nevertheless be indicating the frequency with which fictive diaper work might be displayed on buildings, particularly near prestigious squares or churches.

Once a decorative system, such as the Venetian tradition of *regalzier*, had proved itself to be long lasting, it is understandable that these methods were replicated in the surrounding towns and villages. Treviso certainly adopted these traditions on the outside of most houses, but examination of large buildings such as churches, externally as well as internally, indicates a shift in the method of completion. In the apsidal chapel, to the north of the chancel, of the Chiesa di San Nicolo the piers show that mortar was worked around each brick, with three methods of finishing the joints prior to decoration (figs 3, 4, 5). None of these would be expected if the bricklayers

¹³ Photographs and scientific evidence held in the chemical laboratories at Misericordia, Venice.

were originally intending to cover these with plaster, and these piers are ruddled and so would appear to offer a contrast to adjacent walls which are plastered.

Similar features are found in the Chiesa di San Francesco: with much of the mortar jointing finished by the *ferro tondo*, the colour is now mostly confined to the mortar joints. Also present on the south side is a restored area of painted diaper walling. The exterior of this south wall retains many small areas of painted plaster. The bricks used in the construction were imperfect, and smoothed plaster with colour would have covered the areas of deficiency. The thinness of the surviving plaster overlapping each brick may indicate that, like the interior of San Nicholo, this wall was never entirely plastered over. Sections of white pencil lines, still present, show that considerable care was given to the definition of the lower courses and probably up to the level of the eaves on the church.

A similar kind of external evidence can also be seen on the Cathedral Campanile (attached to the Romanesque Baptistery of St Giovanni), where 16th-century plaster has fallen away to reveal the original mortar joints finished with *ferro tondo* scribed lines. Perhaps because of the height of most campaniles these went largely unpainted and certainly unpencilled: the Venetian pictorial evidence seems to bear this out.

What connections were there between methods employed in Venice and England in the parallel periods?

Most forms of painted 'brick' designs in and around Venice and Traviso are painted on to a layer of plaster. For Venice this was an environmental necessity, but it had the advantage of providing a method (*intonaco*) which was much more long-lasting than that used in most north European methods, where paint was applied directly to the brickwork. For this reason the techniques used on Traviso's houses mirrored those in Venice, but when it came to decorating churches, the overall plaster layers were apparently considered less necessary and the individual characters of the bricks were seen through the paint layer. For the upper layers of these larger buildings, like the campaniles, paint may not have been employed, perhaps because of the difficulties presented with the maintenance.

There is as yet no direct evidence of any cross-influence between the methods used for pencil work and fictive diaper work in Venice and in England, although commercial contact, either at first-hand or indirectly, may have allowed similar approaches to filter through the craft industries in both regions. It is

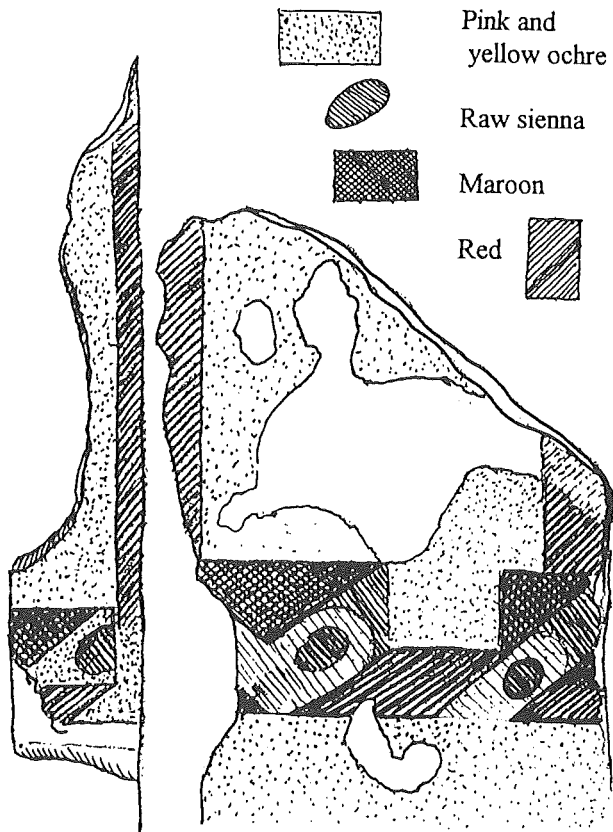


Fig 13. - Section of wallpainting from inside the Thermopolium (wine tavern). Geometric design for wall panels in four colours with similar elements to the designs used on theatre cornice (fig 11).

perhaps more likely that the response to defining and enhancing brickwork with paint, or paint on plaster, was arrived at through trial and error. However, it should be remembered that by the Renaissance, pencilled ashlar had been in use for at least 1400 years and may always have served as an example for the improvement to all other forms of walling that needed enhancement with pencilling methods. In England, by the 1530s, the role of the mason and the bricklayer had become less distinct. Christopher Dickenson, who was Master Mason for Windsor Castle, during the reign of Henry VIII, was also the master bricklayer employed at several other royal palaces¹⁴. As was also demonstrated in the accounts for Jeremy Talcott's work at Somerset House quoted above, he was expected to apply the same skill to pencilled ashlar as he was to pencilled brickwork. It is unlikely that the evidence for an unbroken use of ashlar from the Roman period to the medieval period, when much of it is quite common, will ever be established in England.

¹⁴ COLVIN H. M. (ed.), *The History of the King's works*, volume IV, 22.

The use of colour on Roman brickwork

There is so much fragmentary evidence of paint on brickwork of the 2nd and 3rd centuries in Ostia Antica that it is curious to find nothing written about it, and there appears to be a widely held belief that most Roman brickwork was plastered to obscure the bricks, except for rather exceptional examples.

One of the most notable architectural features in Ostia is on the facade of the *Horrea Epagathiana*: this is the portal with its carefully moulded and cut components that make up the pedimented entrance. The use of different coloured bricks helps to distinguish the Corinthian capitals from the semi-columns: the special thin close-bedded bricks of these look noticeably different from the adjacent courses of the facade walls with their wider mortar joints. It has long been thought that these bi-coloured features were left unplastered, but were they left unpainted? On both this portal and another almost opposite, traces of paint can be found near to or on the base of the semi-columns in the recesses where these abut the walls. The base of the left-hand column is mostly formed out of shaped yellow bricks to echo the capitals but the right-hand base is a mixture of red and yellow, and there are disparities in the bricks which make up the columns' faces and the semicircular arch, which a layer of paint would help to unify.

On the left side of the portico is a doorway to a stair and to the left of this again is another door leading to a passage, bypassing the side wall of the stair which is carried on a curved structural arch. The side of this arch is not plastered and the smoothed joints between the bricks still retain their red paint. There are also many external piers in the vicinity which have painted or coloured mortar surviving between the brick courses at the upper levels, particularly when a generous overlapping cornice has given some protection against the rain.

The most striking evidence for a facade that has been partly plastered to contrast with other brickwork, which is both ruddled and pencilled, is found on the early-3rd-century reconstructed exterior walls of the enlarged theatre (fig 8). On the east side, three large sections, that eventually toppled, remained covered until excavated in the early 1940s. Partly due to the inclined angle which helped protect one of them from the weather, the painted facade can be read more clearly than most other buildings in the town.

Two of the sections belonged to the lower level with the semi-circular arched portico, but only one of these has a section of the middle of an arch attached (fig 9). This is constructed with long tapering bricks approximately 22" (55 cm) long: the joints between them vary in width and are about 1" (2.5 cm) at the

top and 3/8"-1/2" (.94 cm - 1.25 cm) at the lower section (fig 10). A secondary red or pink mortar or plaster has been applied over the bonding mortar which is probably likely to get its colour from an admixture of crushed brick or tile. Over this is the final darker red colour which is extremely hard, so perhaps this is a thin slurried plaster administered like a layer of paint. Although some of the deficiencies on the outer faces of the bricks also contain the same colour, one does not get the impression that the character of the bricks would have been totally obscured, as they would have been if covered with a plaster layer. A scored line has been added along most of the joints, but this appears to be scribed through the painted surface. Using this as a guide, a white pencil line was made using a harder white paint than was usual in the later medieval period; perhaps this was done with a lime mixture¹⁵.

All the brick courses that make up the entablature over the arch have the secondary pinky mortar applied carefully between the bricks. Sometimes this layer has a fine gritty texture and in other areas it is comparatively smooth. This method of finishing unifies the entablature, allowing the mouldings and cornice brackets to form a striking horizontal band, supported by pilasters between the arches. Because the latter are made with long tapering bricks that have uneven mortar joints which vary considerably, the pencil lines are intended to correct and regularise the parts nearest to, and seen by, the ingoing customers. Often this means that the pencil line is away from the centre of each joint, but at a height of approximately 15ft, (4.57 m) the general effect would be reasonably convincing.

The external decoration on the set of arches that makes up the second stage of the theatre is treated differently, but a complete picture is slightly harder to read as some ancient repairs, done very badly, have partly obscured some of the features. The joints between the arch and horizontal courses do not have the smoothed pink mortar and are likely to have been plastered over up to the next band of cornice (fig 11). For some reason this has been hacked about and partly mortared over, but there is a flat zone which is thinly plastered and then scored diagonally to guide applied painted bands of colour (fig 12). Without scientific analysis it is not clear whether two or three colours are used, but it would appear that there are alternating sections of red and white, the red being twice as wide with a central scored line. One of the

¹⁵ It would be helpful to see some scientific analysis done here as no Roman samples are presently held amongst the 5000 samples in Rome's Istituto Centrale del Restauro.

off-white bands has one, or possibly two, dark yellow ochre spots painted on it and an interesting comparison can be found in the decorative scheme used inside the 3rd century *thermopolium* in the Via di Diana. Around an interior shelved counter are sections of the wall-painting which use the same form of slanting zoned colour with dark yellow ochre spots on the paler sections (fig 13).

The decorators of the wall on the second stage of the theatre were less particular about emphasising the brickwork, reserving its decoration for the painted cornice dividing the final two stages of walling. It is possible the next unit of moulding on this cornice was similarly decorated, but this also has cement applied over its mutilated mouldings. It might be interesting to consider, having seen this method of presentation, whether there could be an alternative interpretation of how the exterior of one of Rome's most prized possessions, the Pantheon, may once have appeared.

Atmospheric pollution makes reading the finish of many of Rome's early brick buildings by eye more problematic, but it is likely that Ostia's buildings imitated the decorative schemes found in the main city. Buildings such as Trajan's Market have much fragmentary evidence of both coloured plaster over brick and painted mortar with white pencilling.

Conclusion

The extent to which the evidence on the 2nd and 3rd century brick buildings of Ostia can be linked sequentially with the practice of paint enhancement found on brickwork through the medieval period has not yet been determined. As the standard of brick wall construction in Italy declined with the economy, until the re-emergence of some superb brickwork began again in the 11th and 12th centuries, it would be reasonable to expect that paint and plaster were used freely to improve and unify poor workmanship. It must be said, however, that the use of paint on brick and mortar should not just be thought of as a devious method of improving inferior work, because the nature of this craft is always likely to find some disparities in brick colour, as seen on the portal of the Horrea Epagathiana where a unifying paint would help to concentrate the eye on the whole, rather than the odd variations of brick colour.

Finally, remembering that white plastering, scoring and pencilling were used to improve or imitate stone walling from at least the Roman period onwards, the similar pencilled or plain coloured treatment given to brick walls, whatever the quality, should not come as such a surprise. The aesthetics

of using varying coloured bricks, with their unpainted mortar left on show, is a relatively modern phenomenon and with the 'truth to materials' philosophy being so strongly felt this century, a great deal of evidence has gone unrecognised. Commentators have often used the word 'gaudy' when imagining how colour might have looked on early buildings. Because brick and stone enhancement often used earth colour, chalk or lime, the effect could more accurately be described as 'immaculate'. Owners of buildings went to considerable trouble to keep these decorations looking pristine, until fashion dictated a different approach.

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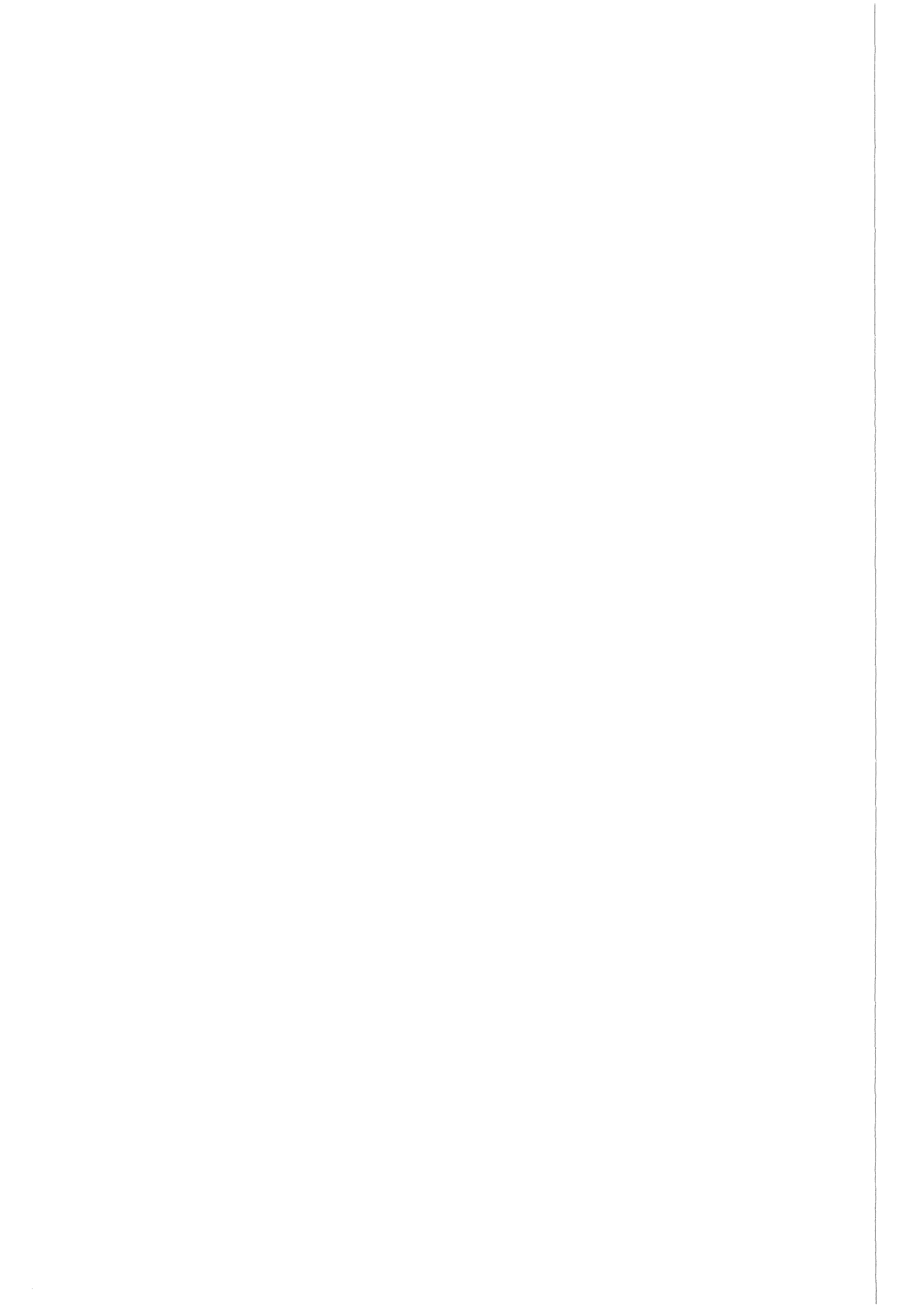
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Medieval and modern cesspits from four Dutch towns

1 Introduction

In 1968 the State Service for Archaeology in the Netherlands (ROB) commenced the project ‘Urbanisation of the River Area during the Medieval Period’. In the post-war era, much of the Netherlands was under reconstruction. The most heavily damaged or most rigorously redeveloping towns had been selected primarily to rescue important archaeological data from their town-centres. They are Dordrecht, Tiel and Nijmegen on the east-west river of the Rhine (called here the Waal or Merwede) and Deventer on the northern branch of the Rhine (called here IJssel).

2 ‘Deltaplan-project’, working on the backlog

After excavating the material from the four towns, some forty cubic metres of ceramics and glass awaited post-excavation analysis. In the Netherlands, as in many countries, this was not systematically financed and therefore not carried out. The hundreds of boxes of finds were the undiscovered and sometimes long forgotten treasures in State Service depot. In 1993, the Dutch Ministry of Cultural Affairs launched the so-called ‘*Deltaplan* for the Preservation of Culture’, a rescue operation from which many post-excavation-projects could be financed. The ‘*Deltaplan Afvalkuilen en Beerputten*’ (*Deltaplan* Rubbish Pits and Cesspits) of the Urbanisation Project started the same year. The project has been limited to the study of the most voluminous backlog; other parts of the investigation, such as the historical research, could not be carried out.

After a quick inventory, a working-policy was set up to tackle the common long-term project problems. Because the excavation techniques improved through the decades, not all cesspits were excavated in the same way. The field-recording and storage of finds became more advanced. The knowledge of the provenance of finds in the 1960s was much more limited than in the 1990s. Through improved research and the applied feedback to the field, a gap in the information from the older excavations developed. The goal of the project was to minimize the differences by applying the same standard to all of the material, so that in the end the assemblages studied could be compared and interpreted on the same level. An average standard was developed, by re-studying the excavations and the material.

Between 1968 and 1995, a total of 491 privies and pits with waste were excavated in the four towns¹. After examination of these assemblages in the period 1993-1996, 172 of them were selected because they complied with the criteria. The criteria for the cesspit-complex were that the timespan of use must be 50 years or less, at least the glass and ceramics must have been collected, and the location of the cesspit must be known². Of these 172 complexes, the ceramics, glass, metal, pipes and stove tiles were studied in the period.³

3 Method and recording in the ‘Deventer-system’

The archaeology of urban waste from privies is a popular subject which is studied world wide⁴. Apart from all the scientific arguments, the first reason is

¹ Deventer: 76 complexes excavated of which 21 could be studied in a representative way, Dordrecht, 197; 76, Nijmegen, 204; 67, Tiel, 14; 13.

² In the older excavations, bone and ecological material was not collected systematically. For some excavations, field-recordings are partially missing. In many cases, the stratigraphy has not been recognised or cannot have been present.

³ A privy can contain one or more assemblages. Five com-

plexes from Deventer had already been studied and published (Clevis & Kottman 1989).

⁴ Skumstrup, Danmark (Madsen 1991), Paris, France (Monnet 1992), Heidelberg, Germany (Lutz *et al.* 1992), Valladolid, Spain (Blanco 1991), Funchal, Isle of Madeira, Portugal (Tavares da Silva 1989), Cape Town, South Africa (Hall 1990), Sacramento, CA, USA (Praetzelis & Praetzelis 1997), Edo-Tokio, Japan (Koizumi 1996 *et al.*)

that cesspits yield 'goodies'. Complete finds of all kinds of material however give the archaeologists plenty of unappreciated competitors, which in most Dutch towns is the first practical level to overcome. The scientific argument for excavating complexes of waste is that more information about the users of the goods can be expected from the stratified layers behind or in a house than from anonymous waste levels elsewhere in the town. If the material is well-stratified in short term periods it is called a 'closed complex'. Cesspits are of course never as well sealed off as shipwrecks or 'Pompeii-cases'. If layers are well recognized and collected in a proper manner it is in some cases possible to limit the time span to such a short period that the waste can be assigned to the users. A match between the archaeological and historical record can be made. In some cases, as will be proved later on, this is much easier than in others.

In the Deltaplan, the ceramics and glass from the studied cesspits were recorded in the so-called *Deventer systeem*. The Deventer-system is named after the first location of its use, the town of Deventer⁵. The system has been applied only to the study of closed complexes from pits, privies and wasters of the late medieval and modern period, i.e. between ± 1225 and 1900⁶. The heart of the system is based on a three-fold mnemonic code combining ware-form-type. For every type-ware-group there is a general code, for example 'r' for common Dutch redwares. The second part of the code is a three-letter abbreviation of a form-name, such as 'gra' for grape, the Dutch tripod pipkin. The last part is a serial number starting from 1 to the last number given in the central database. The name of the first redware tripod pipkin will be r-gra-1⁷. The system is open ended, e.g. every time new types are found in a certain ware the central database gives a new number.

Within the Deventer-system, material from wasters are marked with a special code in front of the mnemonic code, giving the name of the town and the serial number of that particular waste complex in that particular town⁸. A code like 'DFT1.ir-the-3' is used for proto-industrial redware teapots of the third type found in the first published complex of production-waste in Delft. The location of the decoration can be seen in the code as well. A f-bor-2a means that the delftware plate (bor) of type 2 has a decoration in the centre, if it was a 'b' it would be the rim, 'c' is all over ornamented and 'd' is completely white. The codes tend to go towards the Periodic System of Elements and their application in chemistry. In the meantime, 19 publications have been released using the Deventer-system.

When a researcher starts using the system, the user has to file all the entries, now around 1.400 in ceramics and 550 in glass, that already exist in former Deventer-system studies. When a complex is being studied, every object is described in detail in a database-inventory where every object has its own record according to the Minimum Vessels (MV). In general, there are nine entries containing specific information about one object⁹. When recorded in a database-system with queries, it is easy to retrieve for example all delftware dishes from Nijmegen dated after 1700 that are white and exceed 21 cm in diameter. If done by hand with a paper recording system, this action would take much more time. In a publication, only the 'new' objects, i.e. those with a new 'name' or an unknown decoration, are published. This means that information is added instead of copied and that a national database starts to exist. The code of every object and the number of objects of that code are noted in a 'complex-list'. All researchers using the system use the same codes. The work can take place

⁵ In the series, 19 volumes are released from different towns, villages and manors (C = consumer site, P = Production site): Clevis & Kottman 1989 (Deventer C, town) Clevis & Thijssen 1989 (Kessel C, castle), Clevis & Smit 1990 (Kampen C town), Clevis & Kleij 1990 (Zwolle C, town), Thijssen 1992 (Nijmegen C, town), Bartels 1993 (Hasselt C, town), Krauwer & Snieder 1994 (Amersfoort C, town), Jacobs 1994 (Haarlem C & P, town), Bitter 1995 (Alkmaar C & P, town) Carmiggelt & Van Veen 1995 (The Hague C, town), Jacobs 1995 (Haarlem C & P), Kottman 1995 (Susteren C, town) Jacobs & Van Veen 1996 (The Hague C, town), Bult 1996 (Delft P, town) Kleij 1996 (Oosterhout P, village), Vreenegoor & Kuipers 1996 (Veere C, town), Kottman 1997 (Maarssen C, manor),

Bitter & Dijkstra 1997 (Alkmaar C, town) All unmentioned publications that are published in a similar way are non-Deventer-system (e.g. Amstelveen, Antwerp, Geertruidenberg, etc.)

⁶ For an exact description of the system see Bartels, Bitter *et al.* 1997 forthcoming.

⁷ When it has one handle, this will be r-gra-1a, two handles r-gra-1b, with a pan handle r-gra-1c and with a strap handle r-gra-1d.

⁸ See for example Jacobs 1995, HA2 = Haarlem waster 2. Bult 1996, DFT1 = Delft waster 1.

⁹ The nine are: 1: Label with excavation-code and complex-code, 2: Mnemonic code, 3: date (in some cases; date of complex, date of object), 4: dimensions (maximum diameter, height, diameter of foot, with occasionally cubic capacity, and weight of pot), 5: fabric within ware-group, glaze, decoration, 6: technical details, foot, handles, miscellaneous, 7: form and function, 8: place of production or provenance, 9: literature on identical objects from other closed groups.

in different towns at the same time. Approximately 60 complexes studied and published are now fully comparable to a certain extent¹⁰.

The inventory is the base of the 'complex-list'. In this list, the mnemonic code with a number of objects of that code is found. The list makes up the full inventory of ceramics and glass of a given complex. An extended complex-list contains provenance, weight and special remarks like function. Usually, because of lack of space, only the complex-list is published.

4 One of many cases. Rafting and trading, the late 14th-century imports into Nijmegen and Dordrecht from the Rhineland and Dieburg.

Within the Deltaplan, every complex tells its own story. From the lot, one series of assemblages has been selected to give an idea of the potential of the finds.

Every excavation in the Netherlands yields stonewares that have been made in Siegburg. They constitute the largest amount of ceramics imported from one single centre of production into the Lowlands. The town of Dordrecht in particular played a major role in the transit and trade of this material. In this town, there are jugs (s1-kan-x, s2 kan-x, s1-kru-x), pots (s1-pot-x, s2-pot-x), beakers (s1-bek-x), drinking-cups (s1-dri-x) galore. Not just on the bottom of the harbour or in the layers of urban waste, used to level the regained land, but also on the river as well as in the cesspits Siegburg stonewares make up 10 % to 70 % of the Minimum Vessels. Vessels of all qualities are found. First quality, complete, stable and upright forms comes together with second quality, unstable, with parts missing but not leaking. The third quality is rare. They are not fit to stand and sometimes even leak. This can be regarded as the result of buying stonewares by 'oven' or 'load' instead of per quantity-quality. The third quality may as well have been loaded as ballast or as material for road-, land- or dike construction. From the record, it is known that during the 16th century, the Siegburg pottersguild sold per form-quality-quantity in the cash-and-carry way¹¹. Unlike the 'Verlag-system'

Table 1

The distribution of Dieburger ware in Dordrecht, Heer Heyman Suysstraat (The cXXX numbers refer to Bartels 1998, forthcoming).

	s	g	r	w	Dj	Dp
1300, HHS, c126	36	13	23	1	0	0
1310, HHS, c133	76	18	52	5	0	0
1325, HHS, c136	39	10	30	1	1	0
1325, HHS, c124	70	9	22	4	1	0
1325, HHS, c125	22	10	8	0	0	1
1350, HHS, c120	61	17	33	0	0	1
1350, HHS, c138	19	4	15	1	0	0
1355, HHS, c137	48	20	39	4	0	0
1360, HHS, c122	30	11	35	1	0	0
1360, HHS, c127	13	2	17	0	0	0
1375, HHS, c131	24	4	5	0	1	0
1375, HHS, c134	24	10	17	0	0	0
1390, HHS, c128	15	11	53	1	2	0
1400, HHS, c119	7	2	9	1	0	0
1400, HHS, c121	7	4	17	0	0	0
1425, HHS, c118	9	4	20	0	0	0
1440, HHS, c129	16	4	61	0	0	0
1445, HHS, c132	5	1	10	0	0	0
1450, HHS, c115	18	4	29	1	2	0
1450, HHS, c117	21	2	75	3	0	0

s stonewares (Siegburg, Langerwerhe, etc.)

g local greywares

r local redwares

w Imported whitewares

Dj Dieburg Jug

Dp Dieburg pot

where the merchants instead of the producers owned the production, as in Frechen or Langerwehe, the Siegburg guild decided the prices and owned their own production¹². From the Rhineland area, whitewares were imported as well; for the stovetiles (wkat-x) this remains questionable.

Ceramics from the Middle Rhine area, south of Frankfurt, hardly arrived in the Low Countries. Only one kind of ware appears in two forms in four towns, Utrecht, Nijmegen and Dordrecht and Zutphen¹³. This is the *getauchte Irdenware* and the *helltonige Irdenware* made in Dieburg¹⁴. In the artisan area of

¹⁰ In the period between first use in 1989 and now, some adaptations were made and the system has become specific with every publication.

¹¹ This is the way to keep a closed market; the same system is still in use by the diamond magnate De Beers.

¹² Hernborn, Klinger & Schainberg, 1987, 94.

¹³ Utrecht, HEMA Steenweg 1976-12-23/a48 (loamslipped bottle with straphandle); Nijmegen: Thijssen 1991, no. 173, cookingpot; Dordrecht in this volume; Zutphen, 1997, cesspit

'Hof van Brockhorst' on the Lange Hofstraat belonging to the Count of Steinfurt, historically dated to 1433-1454. Twelve Dieburg jugs make up 8 % (!) of the complex.

¹⁴ I have to thank Uwe Gross (LA Baden-Württemberg) for identifying the wares and pointing out to me the comparison with the Dieburg kiln-material. I am greatly indebted to Peter Prüssing (Provincial archaeologist Kreis Dieburg, Hessen) and Gerlinde Prüssing for showing me the huge amounts of closed complexes of kiln-material and discussing the Dutch finds.

Dieburg, were in the 15th century around thirty workshops were allocated, many pots have been made. Over the last fifteen years, around forty wasters have been systematically excavated. The distribution of the ware in Germany is published and it can be said that Dieburg-wares in the Lowlands are far from home¹⁵. Most objects and forms have been found in 14th- and 15th-century Dordrecht. The small amount of objects and specific forms give the impression that the ceramics are nothing special. The flat-based *hell-toninge Irdenware* cooking pots (db-pot-1 and db-pot-2) without handles have the same function as Lowland redware tripod pipkins but are of a completely different form.

The buff to lightbrown fabric jugs from Dieburg have a spout, a vertical strap handle and a flat-based foot (db-kan-1 and db-kan-2). The entire jug or just up to half or one-third of its upper part is dipped in a loam-wash mixed with some iron ore. The availability of Dieburg wares must have been more limited than that of the better made and more durable Langerwehe and Siegburg material. There is no direct need for importing these. The Dieburg wares found in Dordrecht and Nijmegen are common wares, the more luxurious glazed forms do not appear¹⁶.

Why did these ordinary pots end up so far away? One might expect that commercial export of these wares, like Siegburg, would show higher amounts or a broader variation. The Dieburg wares appear in Nijmegen¹⁷ and Dordrecht in the artisan as well as in the mercantile districts, though the artisan area of the Heer Heyman Suysstraat in Dordrecht has the highest number (see Table 1). From the 14th century onwards, Dordrecht was not only the most important staple for ceramics and wine but also for wood. My hypothesis at this moment is that the Dieburg ware is one of the few remains of the massive transport of wood from the forests bordering the middle and southern Rhine¹⁸. The first rafts to arrive from Mainz in Dordrecht are recorded in the middle of the 13th century. In the 17th century, these rafts could meas-

ure between 300 m to 62 m in length and 45 m to 6 m in width, with a draw of 1.1 m to 1.9 m¹⁹. The voyage from the upper and middle Rhine region was made either to Nijmegen and Dordrecht depending on the political and economic situation²⁰. A raft could float at 15 km a day depending on the speed of the current. On the largest rafts up to 450 men were at work handling the 30 front and back rudders²¹. Because rafts could hardly be stopped, the community lived on the tree trunks, building log cabins, cooking their meals and drinking from their jugs²². On the larger rafts, whole raft kitchens supplied the raftsmen²³. Not just the wood itself was transported; the slow transport over water made it ideal for non-perishable commodities like glass, ceramics and iron. In the Low Countries, the rafts were dismantled and sawn to pieces, the raftsmen went home and left their pots. The traces they left behind are just some pots that were probably sold second hand or ended up in the districts where the craftsmen – probably builders or carpenters using the wood – lived.

Dieburg-ware has not been found in Flanders nor in London²⁴.

5 Discussion and conclusion

The study of the material contents of cesspits can add to the knowledge of daily life at that time. To carry out this research, some methods have to be standardized to make data comparable in order to achieve the real goal: the archaeological interpretation and comparison of data. The first step is that all cesspits and waste pits in an excavation are collected in an identical way, e.g. stratigraphically, sieved and sampled. The organic and non-organic components should be recorded in a standard way. The Deventer-system is a typochronological reference from closed complexes to record ceramics, glass and metal objects made for this purpose. By using the system, it extends itself because new objects are added to the

See also: Gross 1992, 397-400; Prüssing & Prüssing 1990, 9-11.

¹⁵ Gross 1992, 397-399; Prüssing & Prüssing 1990.

¹⁶ The excavations of the archiepiscopal court in Mainz showed for example the better glazed products (Peter Prüssing pers. comm.). However, the clear- and greenglazed stove-tiles produced in Dieburg in the 14th and 15th centuries are the spitting image of the late 15th and 16th century forms produced in Cologne. Without research of the ware, it cannot be said that the early stove-tiles found in Nijmegen and Dordrecht are from Cologne.

¹⁷ Thijssen 1991, 98, inv. no. 173. This pot comes from the cesspit of the mayor of Nijmegen.

¹⁸ From the 17th and 18th century, many examples are known of rafts leaving from the mouth of the Main, Neckar and Mosel

rivers for Dordrecht. See Prooijje 1990, 43-47.

¹⁹ Prooijje 1990, 42.

²⁰ De Vries 1994, 33-34 and 44; De Vries 1995, 110.

²¹ Prooijje 1990, 43.

²² The drinking of raftsmen while on the raft was already a serious problem in historical times. Even in the late 19th century the men were restricted to 4 litres of beer a day while binding the raft, and 5 litres a day while afloat. Keveloh & Keveloh 139, 141-142.

²³ Keveloh & Keveloh 1991, 136, for the 18th and 19th centuries.

²⁴ Oral communication Bieke Hillewaert (Bruges, B) and Lyn Blackmore (MOLAS, London).

collection. When these two steps, standardized collecting and recording, are taken, the historical context must be added. The archaeological and historical data add to background of the interpretation.

When these steps have been taken, the data must be ordered in a controllable way, i.e. all objects must be listed in such a way that they can be checked; the same is true for the historical research. In practice, this will mean endless amounts of references, so the information must be condensed to the necessary items. When these lists and the background are well recorded, inter-site, inter-urban and inter-regional comparison and synthesis can be carried out.

Like with the use of probate inventories to study households and material culture, this will only work when large amounts of inventory-lists are produced²⁵. Up to now, around 200 cesspits have been published in very different ways²⁶. The disadvantage that archaeologists have is that their archaeological questions are not directed by the availability of archives in a certain region, but by the rescue-excavations in a small area in a town or village.

Often, the issues in Dutch historical archaeology are not very clear²⁷. This is caused by the nature of archaeology in a densely populated country where a relatively young branch within the discipline has to work without the systematic backup, support and scientific guidance of a university or another specific scientific framework. Standard procedures do not exist, decisions are made within the possibilities of finance and staff. Financial support is often still up to the kindness of developers or local governments instead of to a law forcing the institutions to participate in the management of archaeological resources.

The services try to rescue data and in many cases have to forget about the further interpretation. The topics are directed by the location of excavations and the presence of cesspits with finds. Achieving an overall view by carrying out 'Lustgrabungen' for the sake of useful finds was acceptable in the period before 1940. This makes the collected data random and therefore scientifically useful on the one hand; on the other hand it leaves the archaeologists now and then with a load of material, which cannot fully answer the questions they have. So the small amount of material that is collected must be treated with care.

Starting to make identical the language we use in and the way in which we record finds, is a step

towards controllability and comparability of data from several towns. The interpretation can yet be made for some isolated cesspits or areas in single towns, as was shown above. The overall view will be answered, but only when enough data are recorded. Acquiring these data is a matter of good scientific policy and co-operation among administrative bodies and archaeologists.

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²⁵ Schuurman 1989, 1997.

²⁶ For an overview of the Babel-like way the Dutch and Flemish archaeologists record and publish their cesspits, see: Carmiggelt 1993.

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TL-age determination of the ‘Carolingian’ pottery workshops at Autelbas (Belgium, prov. Luxembourg)

During the last two decades several pottery kilns have been discovered at the village of Autelbas, located at 6 km from Arlon in the province of Luxembourg (Belgium). Nearby finds of pottery of the Autelbas type in the Grand Duchy of Luxembourg (Diekirch, Monderceng) and Germany (Trier-Hospital) indicate that this ware was traded on a regional scale (Bis-Worch 1995).

The archaeological findings did not yield precise information on the age of the Autelbas production centre and therefore a thermoluminescence (TL)-age determination was performed on a number of ceramic oven materials, originating from two ovens, namely oven Collard 1 and oven Collard 2 (resp. discovered in 1983 and 1986). From each oven two sherds and one fired clay lump were analysed (sample numbers are mentioned in Table 1). The TL-analyses were performed according to the standard procedures described by Aitken (Aitken 1985).

After removal of the outer layer, all samples were crushed and prepared following the fine grain technique (Zimmerman 1967) with separation of the 4-11 μm grains for TL-measurements. The palaeodoses ($=\text{ED}_\beta + \text{I}_0$) were determined with a Risø TL-DA-12 TL-reader using a HA-3 and Corning 7-59 filter com-

bination and a heating rate of 10°C/s. The β -addition and β -regeneration technique were applied resp. for ED_β and I_0 determination. The plateau temperature region was chosen comparing the shape of the natural and all β -irradiated glow curves. An a -value was determined by the α -addition technique, yielding ED_α ($a = \text{ED}_\beta / \text{ED}_\alpha$). For all laboratory irradiations an Elsec 9022 automatic irradiator system was used, equipped with a calibrated ^{90}Sr β - and ^{241}Am α -source.

All six samples yielded very low natural TL-signals. The β -addition experiments showed that this was caused by a very low TL-sensitivity of the ceramic material. The lowest TL-sensitivities were registered on the fired clay lumps. This inevitably lowered the precision of the analytical results obtained for ED_β -determination. The low sensitivity is thought to be due to the specific compositional characteristics of the base material used in the production of the Autelbas ware, which was a quartz-rich silt. A comparison of the intensity of the natural TL-signals and the shape of the glow curves, showed that the material found in the two ovens had quite similar TL-characteristics. In addition, a test on anomalous fading revealed a considerable signal loss for the samples AR4995 and AR5010 (resp. 14 and 10% in one month).

Table 1
Results of TL-analysis (° = sherd, * = fired clay lump)

	Plateau (°C)	ED_β (Gy)	I_0 (Gy)	Palaeodose (Gy)	$\frac{a}{a}$	Annual dose (Gy/ka)
<i>Oven 1</i>						
AR 4995 °	303-353	3.98	0.39	4.37	0.138	5.63
AR 5000 °	305-357	3.93	0.38	4.31	0.124	5.06
AR 5220 *	317-383	3.57	0.52	4.09	0.101	3.59
<i>Oven 2</i>						
AR 5014 °	309-387	3.40	0.43	4.42	0.098	4.69
AR 5010 °	333-408	5.93	0.28	6.22	0.262	7.56
AR 5224 *	292-351	6.54	0.80	7.34	0.181	6.27

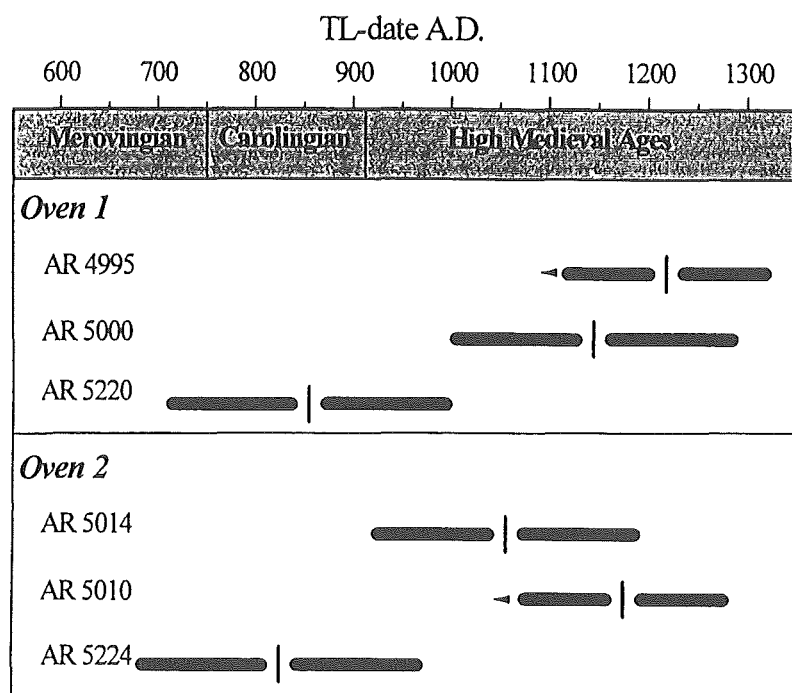


Fig. 1. - Overview of the obtained TL-dates (error bars are 1s). For samples AR4995 and AR5010 the arrows indicate that the TL-age determinations yielded minimum values.

The internal α - and β -dose rates absorbed by the samples were determined via α -counting and atomic absorption spectroscopy [Aitken 1985; Nambi & Aitken 1986]. For the determination of the external dose rate, on site measurements with a portable γ -spectrometer are normally performed. This could however not be done for the analysis of the Autelbas ware because the excavation site was not accessible anymore by the time the TL-research had started. Therefore, the external γ -dose rate was estimated at a value of 1 mGy/a, which is commonly taken as an average soil value. For all samples the porosity has been determined and a saturation factor of 0.8 was assumed for the calculation of their average moisture content during burial.

The results of the palaeodose, a-value and annual dose determinations are shown in Table 1. In Figure 1 the obtained TL-dates are presented.

As can be seen from the figure, the dates show a considerable scatter, ranging from 825 till 1220 AD. The oldest fragments are the fired clay lumps from both ovens while the sherd fragments appear to be much younger. As the lumps are fragments that are detached from the oven walls, their ages of 855 AD \pm 140a (oven 1) and 825 AD \pm 140a (oven 2) are thought to closely date the activity of both ovens and hence, it seems quite apparent that those were operational in Carolingian times. The much younger sherds, although they were found in the same context as the clay lumps, can hardly have been manufactured in the ovens. They have to be regarded as waste of ceramic ware that was manufactured in some other, nearby oven and that has been dumped in the ovens Collard 1 and 2 after they became out of service. Of these sherds, only two

yielded reliable ages (AR5000 and AR5014), the other two (AR4995 and AR5010) only yielded minimum ages because of the anomalous fading mentioned above.

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Material culture: production and consumption

Keynote lecture

The organisers of this section have clearly chosen their title with care to reflect new tendencies in the subject. A few years ago it might have been entitled ‘Artefacts: function, typology and manufacture’, and those dimensions of the study are by no means obsolete, as is proved by a number of excellent papers focused on these themes in this section. But ‘material culture’ is a phrase that has grown in meaning in the last decade, and signals that we must expect the study of objects to reveal a wide range of human experiences. We ought to examine the function of implements or pots or buildings, that is to regard them as utilitarian objects, but we can also gain from them insights into social organisation, whether in the work place or the home, and also hope to glimpse some of the ideas and outlook of the people who made and owned them.

The second part of the title reminds us that we should not, in our regard for the new study of ‘culture’ in the broadest sense, neglect the mundane practicalities that lie behind the artefacts. We should understand as much as we can the process of manufacture – the selection of raw materials and the methods by which they were obtained, and the techniques by which the materials were moulded, woven, beaten or in other ways changed into the desired form. The people involved in production also ought to be considered – were objects made by servants of aristocrats, or by independent artisans, working in their own household, or by the employees of an entrepreneur? Was the work force male or female, adult or child, rural or urban, full-time or part-time, trained or untrained?

The beginning of manufacture lay in the demand for the object, and we cannot fully appreciate the production process until we have investigated who wanted the goods, and for what purpose, and how the interaction between maker and consumer worked. Was the form of the object dictated by the consumer, or by the producer? We are all familiar with the modern scholarly debate about the design of medieval high status buildings such as churches: some emphasise the role of the patrons, and others the contribution of the masons who built them. Everyone agrees that

both played some part. The same dilemma needs to be recognised in the case of smaller objects also – there was a constant dialogue between the desires of the consumer and the practical needs of the makers. The initiatives of course did not always come from the consumer – a clever manufacturer, then as now, could create demand by presenting customers with a novelty. The study of consumption also requires us to know more about the mechanism by which goods were distributed and made available – through the market or some other means? Were they transmitted directly, or through middle men? Were pots, for example, bought from the potters, at a pot stall in a market, from a permanent shop, or from a travelling pedlar? Was the pot bought by a man or woman? In answering many of these questions geographical and economic conditions must have had very strong influence, but often a degree of choice was also being exercised.

Consequently, the agenda for this section is very wide – it covers many meanings that can be obtained from artefacts, and the complex processes involved in their manufacture, exchange, use, and eventual disposal.

Because these approaches to artefact studies are relatively new, there is no generally accepted intellectual framework to which the various detailed studies can be related, though a number of papers make reference to works such as Elias, Miller, Douglas and McCracken, which contain valuable insights, but which are not always fully applicable to the study of medieval artefacts.

I propose as a way into the subject to examine the notion of a ‘consumer revolution’, which is a fully developed interpretation of material culture in the modern period in England. I will outline its main elements, mention some criticisms, and then see whether it can help us analyse the medieval and post-medieval periods.

These briefly are some of the main arguments behind the ‘consumer revolution’ hypothesis:

1. That in the 18th century, or from the late 17th century, incomes rose as commercial life quickened,

and there were great concentrations of prosperous merchants and artisans, especially in London. Gains in agricultural productivity reduced the price of food, leaving money to spare for manufactured goods, housing etc.

2. In the new atmosphere of social mobility the old rigid hierarchies were eroded. Formerly subordinate social groups became wealthier and in an atmosphere of social competition sought to emulate the styles of life of their superiors. They bought fine clothes, furniture, utensils and ornaments. The urban upper middle class looked for models to the aristocracy; farmers sought to live like gentlemen; artisans imitated the merchants. The old elites, anxious to maintain their superiority, differentiated themselves by adopting new styles and acquiring even more luxurious goods.

3. The manufacturers and merchants responded by making more luxury goods – mirrors and clocks – for example, or cotton fabrics. The imports of tea, coffee, chocolate and sugar reflected demand from new social customs. The ‘consumer revolution’ paved the way for the industrial revolution.

4. A new emphasis on the individual and privacy influenced consumption patterns – in housing, for example.

5. The new consumerism was fuelled by an emphasis on innovation and rapid change, which responded to the demands of fashion. Advertising was invented to spread the news of changed styles, and modern shops open every day superseded occasional markets. Modern concepts of leisure developed.

This view of the 18th century has attracted some critical comment. For example, the incomes of large sections of society appear not to have increased greatly, so one wonders how they spared so much cash. Some of the changes simply involved substitution – tea for beer for example – not a great growth in consumerism. The whole concept seems to be based on a rather unlikely optimism that conditions always improve from one age to the next. A major deficiency of the method used lies in the almost universal reliance on written documents, and in particular inventories. A more balanced view of the period might have emerged if the material evidence had been considered, as is evident from the papers submitted to this section of our conference which make full use of archaeological, documentary, iconographic and ethnographic material.

Those attending this conference will be especially unsympathetic towards the protagonists of a ‘consumer revolution’ because of their dismissal of the medieval period. One commentator refers to the ‘medieval void’ in relation to consumption; another remarks on the ‘remarkably few goods’ owned by

medieval people, and a third dismisses the usual interpretation of early medieval commercial growth as ‘comically exaggerated’.

Such views clearly misrepresent our period but it seems worthwhile to see if we can revise and reconsider the whole concept of a ‘consumer revolution’ in the light of our longer time perspective. Let us begin by asserting that there was no ‘revolution’ after a ‘void’, but rather a series of phases in the development of material culture, in which the medieval period offers as many and complex changes as those which occurred after 1500. Let us take the example of tableware and vessels for eating and drinking which happen to bulk large in the papers submitted to this section. Here we find a succession of materials and forms for vessels for serving drink at table in northern Europe, with modestly prosperous households using glazed pottery jugs in the 13th century, stoneware in the 14th and 15th, pewter in the 16th and so on. In the case of glass goblets and beakers, the large scale production and use of which were once believed to have been an innovation after 1500, we can now see precursors in the 13th century, and a considerable expansion in the 14th and 15th centuries, and also the diffusion, initially of their use, and then of their manufacture, from southern to northern Europe. Innovations in the use of materials can be identified throughout our period, with, for example, the reintroduction of wheel-thrown pottery in many regions between the 7th and the 12th century, and the rediscovery of ceramic building materials – tiles and bricks – at various times but mostly between c. 1000 and 1200. The study of the materials and techniques of stone building can be shown to have gone through a series of developments, especially well analysed in the case of Pisa, between the 8th and 14th centuries. New technologies in timber building in northern Europe can be identified throughout the period, including the remarkably abrupt changes in methods of preparing timber around c. 1200 discussed in a paper on London in this section, as well as the better known introduction everywhere of stone foundations at about the same time. We can also see many developments in decoration, involving new technologies, like the glazing of pottery and tiles. In many cases also a commodity that had been confined to a privileged elite in the early middle ages, such as glass drinking vessels in northern Europe, or pewter table ware, became available to a wider section of society, even to peasants and lesser artisans. I will not go on with the examples of innovation and development, because they can be found in almost every paper in this section, and it would be unnecessary to labour such an obvious point, except that it has escaped the notice of some otherwise intelligent scholars. It is true that

until recently such changes were explained in terms of the priorities of manufacture – the introduction of new materials and techniques, or restraints imposed by shortages of materials or labour, or even by the influence of some vaguely defined ‘progress’. Now we can appreciate that almost every development owed something to the consumers, whose changing wealth, taste, social pretensions and ideas made new demands on the manufacturers.

However, while the advocates of the ‘consumer revolution’ are clearly mistaken in their chronological perspectives, they have suggested a potentially useful checklist of phenomena that might be associated with changes in material culture, and these five elements will be examined in turn to see if they can help us to understand our period.

1. *Growth in incomes and shifts in expenditure from food to non-food items.*

Archaeological evidence provides a very useful corrective to the assumption among some historians that medieval people were generally so poor that their income was absorbed entirely in feeding themselves. Excavation of rural sites where we would be most likely to encounter peasants who lived in a state of self sufficiency invariably delivers enough artefactual evidence to prove that the inhabitants were involved in some form of exchange enabling them to possess metal implements and ornaments, and stone millstones and whetstones. They would presumably have owned other items, such as articles of clothing, now decayed, made from organic materials. The quantity of goods used by peasants that they did not grow or make for themselves varied with period and region, but we can assert that normally peasants were buyers of manufactured and traded artefacts, and that in many cases they expended a considerable surplus of crops or labour to obtain these items. In the papers submitted to this section we encounter a rural potter of Einbeck in Saxony in c.1200, who grew grain, gardened, and reared animals as well as making pots, and acquired iron tools and horseshoes, and leather shoes. The number of horse bones found on the site provide an insight into a rural household’s needed for transport to local markets, and evidence for such journeys is by no means confined to rural households involved in industry. In addition, peasant houses in the early middle ages would have been self-built, but from quite an early date specialists, notably carpenters, were likely to be involved in even minor rural buildings, implying again a considerable expenditure beyond the food and drink of the household.

The crucial question for studies of material culture concerns the proportion of income that was left after satisfying food needs, and whether this was growing or declining at particular points in time. In the absence of precise data about incomes, we can observe the urbanisation of the early middle ages: the initial trading emporia in the north in the 7th and 8th and the rebirth at the same time of southern European cities, and the sustained and more widespread growth in towns in the 10th and 11th centuries.

This must have been accompanied by an increase in incomes in the country, where a surplus of food was produced to feed the urban population. Those who were attracted into the towns would have been lured by the prospect of a good living, and they stayed because the urban way of life fulfilled at least some of its promises. The next phase of more rapid urbanisation can be similarly interpreted as a sign of growth in incomes, although caution is needed about its last phase, in c. 1300, when there may have been a movement of poverty stricken marginals into the towns at the point when the whole expansion was running out of steam. In the next two centuries there is of course abundant evidence of higher incomes for individuals, even though the whole population and economy were shrinking. This was a period when many towns shrank in size, but so did the rural population, so they retained as large a proportion of the population as before. The spread of rural industries at this time suggests a high level of consumer demand for manufactured goods, especially textiles and metalwork. Not every social group and region prospered after the Black Death, but in part of this period, as at the time of the ‘consumer revolution’, food prices were stable and declining, giving capacity for expenditure on clothing, housing and consumer goods.

2. *Competition, emulation and differentiation.*

Contrary to received wisdom, the middle ages saw much social mobility, with competition between groups and a tendency for imitation and emulation of the elites. The aristocracy was constantly renewing its ranks from below as old families died out, and periodically large groups – the knights in the 10th-12th centuries, the *ministeriales* a little later, the 15th-century English gentlemen – were accorded noble status. Towns also received and eventually accepted ‘new men’, and underprivileged groups such as lesser traders and artisans agitated for a place in the governing elite. There were constant complaints in the later middle ages that the lower orders were getting above themselves and gaining more wealth and possessions than their rank justified. Whenever

we see evidence of rigidity and exclusive claims to status, such as the formal definition of noble or patrician privilege, we can be fairly sure that the upper classes felt threatened by ambitious groups from below. This impinges directly on the world of goods when sumptuary laws were passed, which far from demonstrating that there were strict distinctions between classes, and that the different strata were clearly distinguished by the quality of their clothing and jewels, reflects the fear of the elites that others were pushing too rapidly upwards. Sumptuary laws usually failed in their objectives.

So the 'consumer revolution' cannot be related to a break down of old social structures – the boundaries had been breached or shifted many times before. We see in material culture many imitations of the style and ideology of social superiors. The cultural hegemony of the landed aristocracy had a widespread impact on their inferiors, with merchants acquiring metalwork adorned with coats of arms, and decorating the walls with tapestries or painted cloths showing chivalric scenes. Peasants in England called the rooms in their houses 'halls' and 'chambers', separated by a screen, and arranged their eating in miniature echoes of aristocratic meals, with a single chair at the end of the table for the head of the family, and benches (forms) for family and servants. They apparently aspired to the ordered and stratified household organisation found among the lords. Within the aristocracy the knights and lesser gentry asserted themselves in the 13th century by surrounding their houses with moats, which were of limited practical value as defensive works, but demonstrated to the world that they had fortified houses. More significant for a study of emulation, some better-off peasants and parish clergy also dug moats.

The papers for this section of the conference show how prestigious objects like glass table ware was restricted to a wealthy minority in the 13th and 14th centuries, but a wider (and inferior) section of society sought and owned them in the 15th century, and rural labourers acquired cheap glass vessels by the 1580s. Of course lower grade consuming groups could afford these goods only through a cheapening of the product, and they lost prestige as a result. London artisans in the 15th century thought that by buying squirrel fur linings for their clothes they were catching up with the merchants and aristocrats, but needless to say, squirrel became unfashionable with the rich, who established their social distance (differentiated themselves) by switching to marten and sable, which were far too scarce and expensive for the craftsmen and their social climbing wives.

Another sign of emulation in material culture comes from the use of cheaper materials to imitate

prestigious goods, of which the best examples are the pottery which either in the form of rims and handles, or in their shiny finish, were intended to resemble much more expensive metal vessels. Only the very wealthy could afford a set of silver plate, so the aspirant artisans and peasants bought pewter which bore some resemblance to the precious metal. Pewter was sometimes called 'counterfeit' for this reason. Alternatively they would hope to possess a small quantity of silver, perhaps a few spoons. Copper alloy basins and ewers for washing hands before meals were not as expensive as silver ware, but it is especially significant that the lower orders acquired them, because they had a special place in the ceremonial of aristocratic eating.

In short, we can observe in the world of goods of the high and late middle ages the aspirations of the lower orders, social climbing, and attempts to maintain social distance. There was nothing new about these phenomena in the 18th century.

3. *Responses to demand from the producers.*

The first reaction of the producers was simply to increase the size of their operations. The papers submitted to this section reflect this in the scale of iron mining and smelting in Catalonia, Germany and the Netherlands. In addition to the thousands of tons of iron produced, we could add other operations, to produce tin (800 tons annually at the peak of the Devon and Cornwall industry), the large scale of copper and lead production, and so on. Dwarfing these industries in terms of the numbers employed, but leaving less trace in terms of material remains, was textile manufacture, with a labour force numbering millions at any one time. The great age of expansion for all of these industries lay in the 12th and 13th centuries, with a tendency for decline in the century or two after the Black Death. However, these are overall trends, and as regional industries tended to shrink and others rose to replace them throughout the middle ages we can find both declining and expanding production in particular localities. Even when total output declined – as in the tin industry after 1332, production per worker, and indeed per consumer, often rose, because of the general drop in population.

The need to satisfy consumer demands encouraged changes in the organisation of crafts. Small-scale industry in the early middle ages was often established near a high status residence, or in a monastery, suggesting that the smith, goldsmith, glassworker etc worked for an aristocratic patron. The link between producer and consumer was thus a very direct one, though not a simple case even

then of the customer dictating the nature of the work. The great change came with urbanisation, which helped to establish the independence of the artisan, working in a shop in the house, and engaging the efforts of the whole household. Now production was more specialised, and different processes could be co-ordinated between different workshops. Workers were now responding to the consumer through the mechanism of the market. It would be wrong to talk of mass production, because workers were rarely grouped in numbers larger than six, but in order to make large quantities of cheap goods the work could be streamlined and rationalised. This trend seems to have affected cloth making at a relatively early date, though it is argued in papers here that it was around 1400 that the button makers of Constance and those casting tin/pewter badges in London developed mass production, presumably to meet demand with as cheap a product as possible in a period of high labour costs.

Artisans are often accused of conservatism and protectionism because they belonged to exclusive guilds which guarded their interests and opposed expansion of output or the adoption of new methods. In fact many did not belong to such organisations, and in any case regulations should not be assumed to have been enforced. The very strict rules for training of apprentices, for example, suggest closely regulated crafts, but in fact training could be very informal – many women, for example participated in crafts, working alongside their fathers and husbands, or indeed independently in their own occupations, without having served an apprenticeship. Examples given here and others for which we have documentary and archaeological evidence suggest the sensitivity of artisans to consumer demand, and their willingness to innovate. No better examples could be found than the building industry, in which masons and carpenters were experimenting with new artistic schemes and technologies throughout our period. Metallurgical technology provides just one example of the adoption through trial and error ‘on the job’ of sophisticated methods, without any intervention from intellectuals, and long before they were recorded in written form.

Some industries meeting a high level of consumer demand required investment in heavy plant, such as the water-powered furnaces and hammers in the iron industry from the 13th century; or they depended on long distance trade to obtain their raw materials and sell their finished products, as in the case of the woollen cloth industry. In such cases entrepreneurs brought capital to the process and controlled labour and production, diminishing the independence of the artisans, or even reducing them to wage-earning employees. Capitalist industrial organisation was still

limited in scope before 1500, and indeed before 1700, but its influence can be seen in more uniform products, and sometimes in their more widespread distribution.

4. *Privacy and individualism.*

There is clearly some justification in the view of the advocates of the ‘consumer revolution’ that in the middle ages collective expenditure had a high priority, and so we find parish churches built from the contributions of the faithful to a much higher standard than their own houses. The enduring legacy of the middle ages often consists of public projects such as paved streets, bridges, harbours, hospitals and almshouses as well as churches. However, the choices of the individual consumer still played an important part in the economy. Even in villages where the inhabitants enjoyed a rough and ready equality according to official lists of tenants, there were subtle gradations of wealth, and houses and their contents were by no means uniform. There is a widespread notion that the strong collective sense of the aristocratic household was gradually eroded by ‘modern’ individualism, leading to the withdrawal of the lord and lady from the public hall to private chambers. This move is reflected in the buildings by the diminishing importance of the hall and the proliferation of smaller rooms, and in the early modern period the physical segregation of the servants from the family and their guests. On closer examination the criticism of the break down of the (imagined?) community of the hall proves to be one of those complaints voiced in every age, certainly from the 13th to the 18th century, and the arrangement of houses and the emphasis on individual possessions throughout the period suggests that there was always some degree of privacy at all social levels. Medieval people differed from us when they drew the dividing line between public and private life, but this did not prevent them from making individual choices about purchases, and therefore behaving as consumers.

5. *Fashion, advertising and shopping.*

Some aspects of the consumer world of the 18th century cannot be found in the middle ages. The signs erected outside shops in medieval towns, or the street cries of market traders and hucksters, can scarcely be compared with the advertisements made possible by the spread of cheap print. We can find, however, some forms of consumer behaviour well established long before 1700. Purchases may have been confined

to special occasions – markets and fairs – in the early middle ages, or by individual contracts between patrons and artisans. But certainly by the later middle ages shops were open every day, including Sundays, judging from attempts to prevent the practice, and customers could visit them, examine the stock, and negotiate a purchase. Changing fashions in dress were cause for comment in the eighth-century Carolingian Empire, and at regular intervals thereafter. The striking new fashion for short clothes and hose which was adopted by the royal courts in the 1340s spread down to the peasantry within a few decades. The recent work on shoes shows a series of major changes in shape, decoration and methods of fastening, which sometimes relate to methods of production, but are most commonly the result of innovations in fashion, which in some cases occasioned moralistic comment from contemporaries. Architectural and pottery studies show shifts in design, sometimes slow, but occasionally having a rapid impact. These may in turn be reflecting fashions in less durable aspects of material culture, in the case of pottery the introduction of new culinary methods, for example. Medieval fashion, like its modern equivalent, included some improvement on reality, even a little deception, such as the use of stucco and painted brickwork.

One belief among the advocates of the ‘consumer revolution’ is that cultures were relatively homogeneous until modern times, and that consumption was stimulated by the demands of different sections of society – for example, women are assigned a key role in changing tastes and customs. Childhood and youth are believed to have been invented in the 17th and 18th centuries. Previously children had been ‘little adults’, and there had been no distinct ‘youth culture’. The recent work on the written evidence for childhood, and the identification of toys and games, proves conclusively that young people had a distinct experience, and that their play included the imitative re-enactment of adult life, games such as spinning tops which were not shared with adults, and a fantasy life stimulated by dolls and models.

A further spur to changes in consumption patterns came from the regional traditions, and the influence that these had on their neighbours. The overall trend must be seen as a transition from the great variety of the earliest medieval centuries, when the material culture of the Lombards, Visigoths, Byzantines and so on are instantly recognizable, followed by a period of growing convergence in adjoining regions. This could simply be the result of local trade, or the migration of people, like the influence of the Flemish on north-east Germany. From the 13th century there seems to be a growing homogeneity in such objects as bricks and tiles, pottery, glass and metalwork.

International trade could bring Italian glass to Finland, or could encourage the local manufacture of a foreign product, such as maiolica in Antwerp. The aristocracy had established a universal culture, with a common acceptance of chivalry and romance in the 12th and 13th centuries, and the role of the church as a unifying force needs no emphasis, but for the rest of society also western Europe was acquiring certain common characteristics in its material culture by the 13th-15th centuries.

We can therefore find no ‘medieval void’ but rather a constantly shifting relationship between consumers and producers in medieval and early modern Europe. It would be a mistake to claim that consumer ‘revolutions’ can be identified in the centuries examined here, but there were significant periods when the range and quantity of consumer goods expanded – in the 10th and 11th centuries, in the 13th century, and in the next two centuries, especially perhaps in the 15th. The growth of consumption can be measured in the archaeological record from finds on sites where the inhabitants were unlikely to be manufacturing for themselves, such as rural settlements with a primarily agrarian economy, or by studies of specific products, as is well represented by the papers presented to this section, which show the ups and downs of traditional industries, and the introduction of new materials or goods. A full picture can only emerge, however, if account is taken of every type of source material, as we need to compensate for the under representation of organic materials, as, for example, more consumer spending was devoted to cloth than to any other product.

The ‘consumer revolution’ is primarily an economic concept, and work in the field has been rightly criticised for its lack of concern with ‘material culture’ in the full meaning of the term. The market had a growing importance throughout society, and we should not neglect its influence, but market forces alone are an inadequate explanation of developments in material culture at any period, but especially before 1700 when so much exchange was based on non-commercial motives. We can make some comments here on the ideas behind consumption, and its social roots.

Firstly, goods provided a means of non-verbal communication, by which individuals and groups could signal their relationships. The meal table, for example, with its serving dishes and jugs, provided an important meeting place around which the unity of the household could be celebrated, while at the same time the placing of the diners and the quality of their food and utensils demonstrated the social hierarchy within the group. Objects were often used as gifts to express social bonds in concrete terms. Early medieval kings gave out rings to their supporters, and

invested their warriors with arms. And gift exchange persisted into the later middle ages, with the granting of badges or liveries of clothes by great lords to their retainers. When peasants sealed a marriage agreement, the dowry often consisted of brass cooking pots and bedding. When will makers remembered their relatives and friends, they often bequeathed pots and pans, clothing, implements and animals rather than money, not always because they had no cash, but because the granting of goods signalled more powerfully the ties between the deceased and the survivors, and provided some lasting reminder of the donor.

Secondly, the emphasis on competition and emulation gives a rather one-sided picture of the role of goods in a world of social inequality. We should not presume that every person acquiring goods was seeking to emulate his superiors. To some extent medieval people could not escape from the all pervasive norms set by the aristocracy. To wash hands with a basin and ewer and to dry them on a linen towel was a domestic refinement common to all social groups, but was practised with greater elaboration by the elite. Peasants and artisans who carried out these small-scale rituals were not aspiring to be lords. They wanted their households to be decent and disciplined, and displayed these qualities at the meal table, but this did not mean that they subscribed to the whole package of noble virtue, chivalry, gentility and courtly love. Perhaps some aspects of material culture were expressing the self confidence of the group, who were content with their own culture, and had no aspiration to rise above their rank in the social scale. One thinks of the architecture of houses in towns, with their multi-storeyed structures, jetties, and distinctive arrangements of workshops and rooms. These were not entirely functional, and suggest that townspeople had developed a style of living appropriate to their circumstances. They were imitated in the country when peasants built jettied houses, presumably showing a regard for what they saw as a more sophisticated urban culture. Various papers in this section point to assemblages of pottery or metalwork which are characteristically urban. In the countryside perhaps the organisation of space, with its subtle balance between private enclosures and common facilities, is a typical product of peasant mentality, independent of aristocratic or urban influence. Some material goods may express the opposite of emulation and imitation. The knight jugs, for example, which English potters made in the 13th century, and which were widely used, depict knights in a less than dignified way – was there some element here of gentle mockery of aristocratic pretensions?

In the 18th century a puritan tradition objected to the pressure to consume, and criticised the profligate

habits of their contemporaries. In the same way a strand of medieval opinion resisted the moves to keep up with the new styles. We often presume that castles and houses of the 11th and 12th centuries survived rebuilding because their subsequent owners could not afford the work, but we know of a knightly tradition of asceticism which rejected the showiness of the new courtly chivalry of the later middle ages. Anthropologists tell us of the value of 'patina' in material culture, when age confers dignity and proves that a family has long ancestry and deep roots. What better way of proving that nobility was a matter of 'ancient riches' than living in an old house, or at least next to an old tower? Among the clergy also the Cistercians in their early days, believed in plain and simple styles of architecture, and again they and others in charge of church buildings did not always modernise in later centuries. Another version of the acquisition of 'patina' was the re-use of Roman buildings and materials, and the imitation of classical architectural forms, from the Carolingian period through to the renaissance.

Thirdly, the common assumption is that the rich in the middle ages, and especially the higher aristocracy, practised conspicuous consumption, by which they maintained their superiority and displayed their wealth by employing an army of servants, ate the finest food, dressed in luxurious imported textiles such as silks, and bought expensive plate and jewellery. Venetian glass in northern Europe epitomises this showy way of life: it was very expensive, immediately recognizable, exotic in origin, associated with the consumption of an expensive luxury, wine, and was breakable and irreplaceable – unusually among precious objects, it could not be recycled. The criticism implied by the term 'conspicuous consumption' is misplaced, if judged from the point of view of the magnate consumers. Their position in society and politics depended on securing the loyalty of subordinates, and their large and lavish households provided them with the means to win friends, and influence potential allies. If they lived in a restricted way, like the English king Henry VI who contemporaries said with disdain wore 'an old blue gown', they would lose their standing, and slide downhill. The expensive feasts and houses did not waste wealth, but were used to win honour for the lord in the eyes of equals and influential lesser aristocrats. If you lived in a society based on lordship and hierarchy, you had to adopt an appropriate style. All of this was done in a framework of moderation. Behind the apparent profusion of goods, freely given in a spirit of largesse, officials were carefully counting the cost and recommending prudent economies to keep within the budget.

The anthropologists tell us that an elite must be careful not to excite too much envy, and indeed talk of devices to 'deflect' the resentment of inferiors. The medieval aristocracy were careful not to appear self-ish, welcoming guests, and distributing alms to the poor. The whole point of the public life of the household was that it should include as many people as possible, not to be narrowly exclusive. Hunting resulted in the wasteful use of land for parks and forests, and restricted the consumption of others – but resentment was countered when a lord sent venison to a loyal peasant's wedding feast. The 'patina' of well-established families, who decorated the walls of old draughty halls with rusty weapons, helped to establish the legitimacy of their wealth and power, and counter criticism of their extravagance. In London and other cities the merchants in the later middle ages built splendid houses, but did not present an opulent face on to the public street, because they were surrounded by small shops.

Sometimes the phrase 'conspicuous waste' is used as an alternative to 'conspicuous consumption', and the behaviour of aristocracies has been characterised as profligate consumption for its own sake, even the wilful destruction of goods as part of the display of wealth. The disposal of rubbish suggests an absence of a 'throwaway' mentality in the middle ages, because goods often bear the marks of repair and re-use, and many types of object which we know existed in large numbers (silverware, cast bronze vessels, large iron implements such as ploughshares) are scarce in rubbish deposits because they were recycled. The deliberate disposal of valuable objects in the course of rituals – burial with the dead or deposition of weapons in rivers – seems to have died out in the early middle ages.

Fourthly, medieval consumers sometimes had choices whether or not to buy goods. Not every magnate spent his whole income as soon as it was collected, as is proved by cash sometimes discovered in private treasuries by their successors after their death. Saving was an option, and such objects as silver plate could have a double function of displaying great riches, and storing surplus wealth which could be converted easily back to coin if it proved necessary. Thrifty peasants and farmers spent on farm equipment, buildings and animals rather than 'consumer goods', so while lords spent only a small proportion of their income on investment in their estates, a peasant's cart might exceed in value all of the furnishings of his house. Preachers exhorted the giving of alms, and they were heeded, judging from the considerable commitment by communities and individuals to poor relief, which has left its tangible remains in the form of almshouses and hospitals.

Leisure provided an alternative means of disposing of a surplus. After the Black Death the increase in earnings made higher levels of consumption available to wage-earners. They could for the first time eat wheat bread and ample quantities of meat. Economists argue that they did not necessarily maximise their earnings in order to buy consumer goods because they had limited expectations in terms of material comforts, and preferred to earn enough to satisfy their modest needs, and then stopped work in order to enjoy their leisure. It was not worth the drudgery of extra work in order to buy spices or fine linen, or to live in a house with a tiled roof. I suspect that the evidence for material culture suggests otherwise: the greater variety and quantity of cheap dress accessories, and the large scale production of cloth of middling quality must surely be based on large-scale consumption of these goods by a large sector of society, including those wage earners who could only have afforded them if they worked long hours.

We should still regard leisure as an aspect of material culture, or at least as an alternative to the consumption of goods.

Talks such as these sometimes resemble sermons in which the preacher advocates a research strategy for the future, which I will resist, but I cannot avoid drawing some conclusion about material culture and its future study.

1. Naturally I would urge the combination of disciplines because the use of a number of approaches and sources of evidence is most likely to produce fruitful results. Scholars are sometimes defensive about their own subject, and resent the intrusion of an outsider. But having experienced these emotions, they should still hear what is being said, because a small part at least of another specialism may provide an insight or open up another dimension of their subject. The attraction of material culture is that it provides a point of contact between archaeology, anthropology, art history, history, technology etc.
2. Material culture and consumption reveals a great deal about social structures and social change. The world of goods helped to define social differences, but anyone who believes that medieval society was rigid, with sharply defined lines of demarcation will be quickly puzzled by the possession of inappropriate goods by the lower orders, and also by the degree of homogeneity, in which the same pots and building techniques were shared by lords and peasants.
3. Scholars are still rather reluctant to abandon old ideas about peasant self-sufficiency or the ethnic basis of culture, but they must accept that medieval society was gradually commercialised. As we have seen goods were exchanged by gift and often were not acquired

for their practical utility, but market forces still exercised much influence. Those who study the middle ages will not presume that the market always grows and that consumption always expands, because we see the remarkable step backward in the centuries after the fall of the Roman empire, when mass producing industries and a good deal of technical know-how went into abeyance. There may be shorter periods of declining consumption in later centuries.

4. Any one working on material culture learns that the obvious explanations rarely are found sufficient. Occasionally a change is the result of growing prosperity or a new invention, but usually there is some twist in the argument, related to symbolism or the side effects of some shift in society. We can usually find out about a new technical process or trade route, but questions of morality or leisure are less easily discovered.

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MATERIELLE KULTUR

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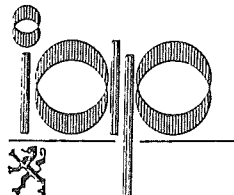
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