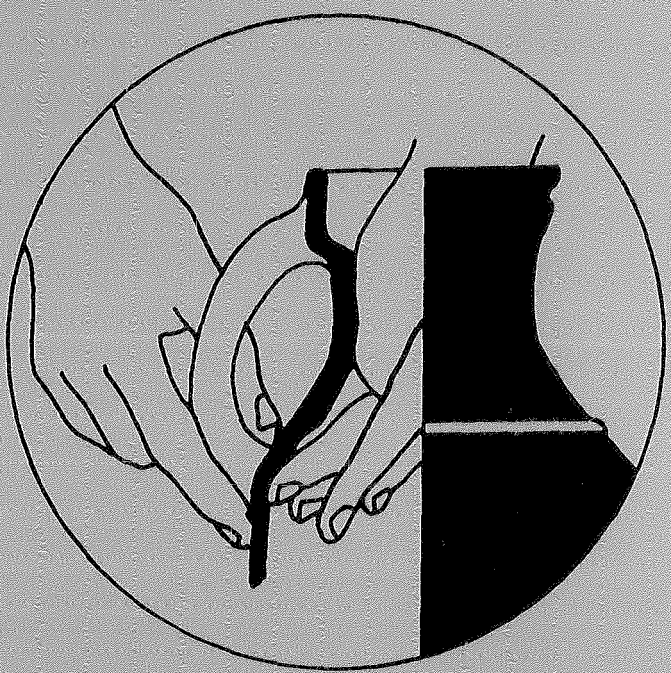
NEWSLETTER

Department of Pottery Technology

VOLUME 6 — 1988



UNIVERSITY OF LEIDEN — THE NETHERLANDS

NEWSLETTER

DEPARTMENT OF POTTERY TECHNOLOGY

volume 6 - 1988

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REPORT ON THE ACTIVITIES OF THE WORKING GROUP ON MESOPOTAMIAN POTTERY DURING THE YEARS 1987 AND 1988

Below we will report on certain activities which were carried out in the context of the preparation by the Working Group on Mesopotamian Pottery of the first part of the Corpus of Mesopotamian Pottery. This study will discuss the second millennium B.C. ceramics from a number of archaeological sites in Iraq (see Newsletters nos. 3, 4 and 5). The following report will consecutively refer to the continuation of the technological pottery research in Iraq; the participation to the Pottery Workshop in the Smithsonian Institution at Washington D.C., and the study of pottery from Nippur, housed in the Oriental Institute, Chicago, and in the Dickson Mounds Museum, Lewistown (U.S.A.). The technological pottery research in Iraq was carried out at Tell ed-Deir and Nippur from 10th October to 19th November, 1987, and at Isin and Baghdad (Iraqi Museum) from 16th April to 2nd May, 1988. The visit to the United States took place from 9th to 22nd July, 1988.*

Continuation of the technological pottery research

In 1985 and 1986 attention was primarily focused on the Old Babylonian period. In 1987 the emphasis changed somewhat as technological pottery research at Tell ed-Deir dealt with the ceramics dated to the Kassite period. The form techniques which were reconstructed previously by us, were again studied, as far as the verification experiments in Leiden provided reason to do so. In addition, some supplementary information was collected. In order to test whether the form technique of the beaker-shaped pots (goblets) was really different from that used during the Old Babylonian period, as previously stated on the basis of a study of a limited number of

Kassite-period goblets (see Newsletter 5:39-53), a much larger number (100) of goblets from the Kassite period were cut through. From the profiles of the cut-through goblets it was clear that the bases of the major part of the vessels had been preventively strengthened with clay which was tempered with extra organic material. This clay was thus, during the manufacturing process, added to the base before the walls of the rest of the pot were raised. This was done to prevent the appearance of cracks in the base during the drying process. Of the pots from the Old Babylonian period which were cut through in 1986, only a small number showed this strengthening of the base. During that period, cracks which emerged during the drying process were filled in with extra tempered clay just before the firing of the pot in the kiln.

On the basis of the cut-through pots we thus gained the impression that during the Old Babylonian period, potters started to search for a technique to prevent drying and firing cracks in the bases of the goblets. During the Kassite period, the above described manner was generally accepted.

During the 1987 season the coordination between the technological research and the studies of the form typology went much smoother than during the preceding years. In this respect thanks are especially due to the cooperation of Karen Minsaer, student in archaeology at Leuven University. She categorized the pottery on the basis of shape as soon as the ceramics were excavated, and noted down the frequency of occurrence. The sampling for the technological research was carried out in close consultation with her. To prepare herself for this work at the site, she had trained for two weeks at the Department of Pottery Technology, Leiden, prior to going out to Iraq.

In the environs of Nippur and Isin some clay samples were collected for further study in Leiden (for instance for workability tests). The form technique of the pottery from both sites which was of relevance to the first part of the

corpus was studied on site. In addition, studies were carried out on some of the pottery from Isin which is housed in the Iraqi Museum of Baghdad, and on the second millennium B.C. pottery from Isin which is now in the Oriental Institute, Chicago, and in the Dickson Mounds Museum, Lewistown. The basic techniques used by the second millennium B.C. potters from Nippur and Isin turned out not to be different from those used by their colleagues at the contemporary site of Tell ed-Deir. At Isin, the non-plastics included in a number of sherds were studied macroscopically.

The Pottery Workshop

On the invitation of the Smithsonian Institution, the members of the Working Group on Mesopotamian Pottery and a number of pottery researchers from the Smithsonian Institution and other institutions met at the Smithsonian Castle, Washington D.C., on July 9th, 1988, for a 'Pottery Workshop'. During the morning session discussions centred on a concept proposal concerning the establishment of the Corpus of Mesopotamian Pottery on the basis of a model. This proposal was initiated by A. van As, L. Jacobs and K. Karstens. This particular model will be described below, together with a summary of the relevant discussions in Washington. During the afternoon session, there was an excursion to the Conservation and Analytical Laboratory of the Smithsonian Institution, where several papers were presented about pottery studies carried out at this laboratory.

Corpus of Mesopotamian Pottery

Pottery can be classified in a number of different ways, depending upon the intended objective. While pottery research of previous generations of archaeologists was primarily directed towards a classification in space and time on the basis of parallels and differences of the excavated ceramics, currently more attention is being paid towards the

relationship between pottery as a segment of the material culture of a society and the society itself. Such relationships may relate to practical aspects, such as the technique and function, or to the symbolic or stylistic aspects of pottery. As regards the latter we should think about different styles which belong to specific groups in society. It is possible that a style difference in a specific context may be used to indicate a group difference (cf. Hodder 1982; 1987).

The Working Group on Mesopotamian Pottery intends to compile a pottery corpus which on the one hand can be used by archaeologists as a reference system for pottery shapes for dating and comparative purposes, and on the other hand will indicate the technical relationships between the various types of ceramics. The Corpus should be based on a system which can easily be used, and which will present in a clear manner the technological and archaeological information of the pottery. It should also indicate the relationship between form and technique. Neither simply an archaeological or a technological classification would answer the double objective of the Corpus. An archaeological classification is not applicable as a reference system because in addition to the shape, other site or researcher related criteria also play a role. In other words, an archaeological classification is not purely based on morphological information. This point also applies to the pottery classifications drafted by the individual archaeologists from the sites which are involved in the project, namely those working at Tell ed-Deir, Sippar, Isin and Nippur. A technological classification, which presents the degree of technical relationship between the pottery types, is difficult to use as a reference system because not all archaeologists recognize the craft aspects of the pottery. Shapes which at first sight do not belong to one group, may in such a classification be placed together, while identically shaped pottery may belong to technically divergent categories.

Without observing the technical aspects of the ceramics it is not always possible to class the shape into one of the technical categories. This cannot solely be done on the basis of shape.

The objective of the meeting of the Working Group on Mesopotamian Pottery was to reach an agreement as to the presentation system for the Corpus which would answer both of the above mentioned purposes. In a preparatory meeting in Paris on June 21, 1988, certain members of the Working Group decided to present for discussion in the plenary meeting in Washington D.C. a morphological classification system designed by K. Karstens (University of Munich), as the reference and presentation system of the Corpus. It was agreed that in Washington an example would be shown to illustrate how the archaeological classification of a certain category of pottery can be re-classified on the basis of technological and morphological criteria. Subsequently it needs to be studied whether the archaeological, technological and morphological information as regards the pottery could be clearly presented in the final results (see scheme below). The example was meant as a model for the pottery corpus. In Washington D.C. it proved impossible, as yet, to reach a definite agreement on this model. However, below we would like to discuss this point in some detail, because during the discussions about this

Archaeological classification

Technological classification

Morphological classification

Final results

problem a number of points were brought forward which are of essential importance to the realization of the Corpus of Mesopotamian Pottery.

The model

The discussion model refers to some pottery trays, taken from Hermann Gasche's archaeological classification of pottery excavated at Tell ed-Deir and dated between 1650 and 1630 B.C., according to the middle chronology (Fig. 1). We will not enter here into details as to the exact archaeological criteria for the classification of these pottery trays. When the whole archaeological classification is taken into consideration, then it is clear that form was an important criterion. On the basis of a technological analysis, the same pottery trays were again classified (Fig. 2). When the archaeological classification (Fig. 1) is compared to the technological classification (Fig. 2), then it is evident that the two arrangements are more or less identical. This is not remarkable, since shape and technique are closely related. Although in principle it is possible that more or less identically shaped pottery should, on the basis of technological analyses, be classified in different technical categories, this work shows that in the case of the studied second millennium B.C. pottery, this is not always necessary. Only a limited number of trays have been differently categorized. These are the nos. 19, 20, 42 and 43. In the technological classification the trays which are illustrated in Fig. 2, under I, are made by hand with the help of an turn-table. The trays illustrated under II, III and IV of Fig. 2 are wheelmade. Under II the trays are grouped which are made with the help of a rib. The exterior of the bases was in these cases scraped while resting on the hand, just like the bases of the handmade trays under I. The trays under III show an exterior of self-slip. In such cases the base was scraped after the object had been turned upside down on the wheel. The

trays shown in Fig. 2, under IV, have a relatively high wall. Using a somewhat faster turning wheel, the wall was raised somewhat higher, while in most cases the rib used by the potter was held against the interior of the wall. These trays therefore have a more taut appearance. The exterior of the base and the bottom part of the wall were subsequently scraped while turning, the tray being placed upside down on the wheel. It was at this stage that the ringbase was made.

At the production of all the trays shown in Figure 2, the potter started by flattening a large lump of clay. Both in the case of handmade and wheelmade ware, a coil of clay was subsequently laid upon this slice of clay and firmly affixed. In the case of wheelmade ware, this was done on the wheelhead of the potter's wheel or on the bat placed on the wheel. Subsequently the wheel was set in motion and the base was finished and the rim section was made.

The potters did not throw the trays from one single piece of clay, because the material was not plastic enough. Throwing the tray from one piece of clay would have caused problems during the forming of the tray. Also the affixion of the clay to the wheelhead would have created difficulties. A large base thrown from one piece of clay also has the tendency to crack. When a base is made of a flattened lump of clay there is no such danger. One of the properties of the clays which were used by these potters was a lack of cohesive strength. Such clay cracks easily during the forming of the tray and also during the drying process. In this respect the clay was somewhat improved by adding a quantity of chopped straw. The applied form technique and the form itself were co-determined by the quality of the used raw material. Strongly accentuated curves in the wall were avoided and larger pots were made in segments.

In Figure 3 the same pottery trays are shown, this time classified according to the morphological criteria developed by K. Karstens. Karstens distinguishes: 1. species of vessels;

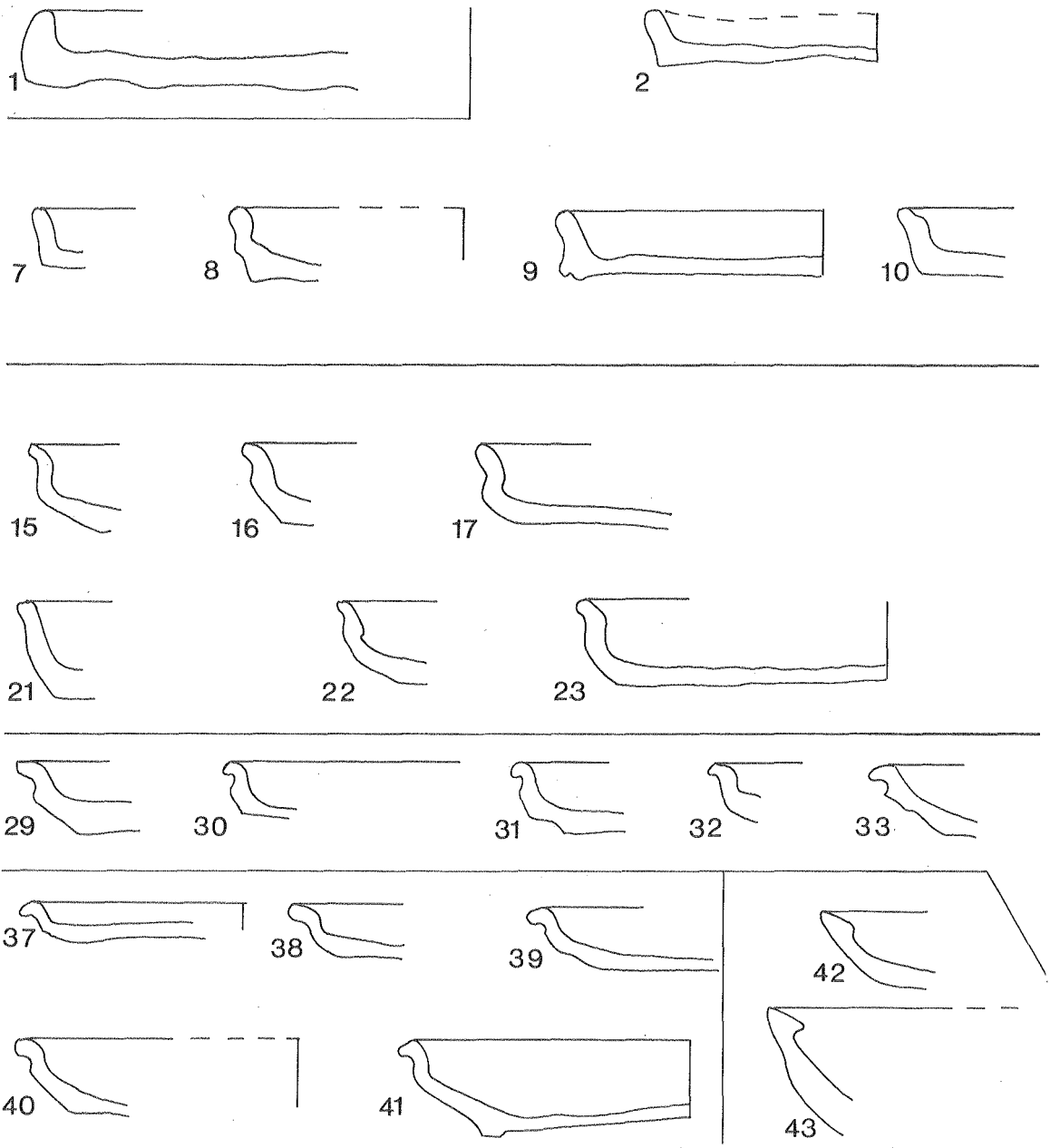
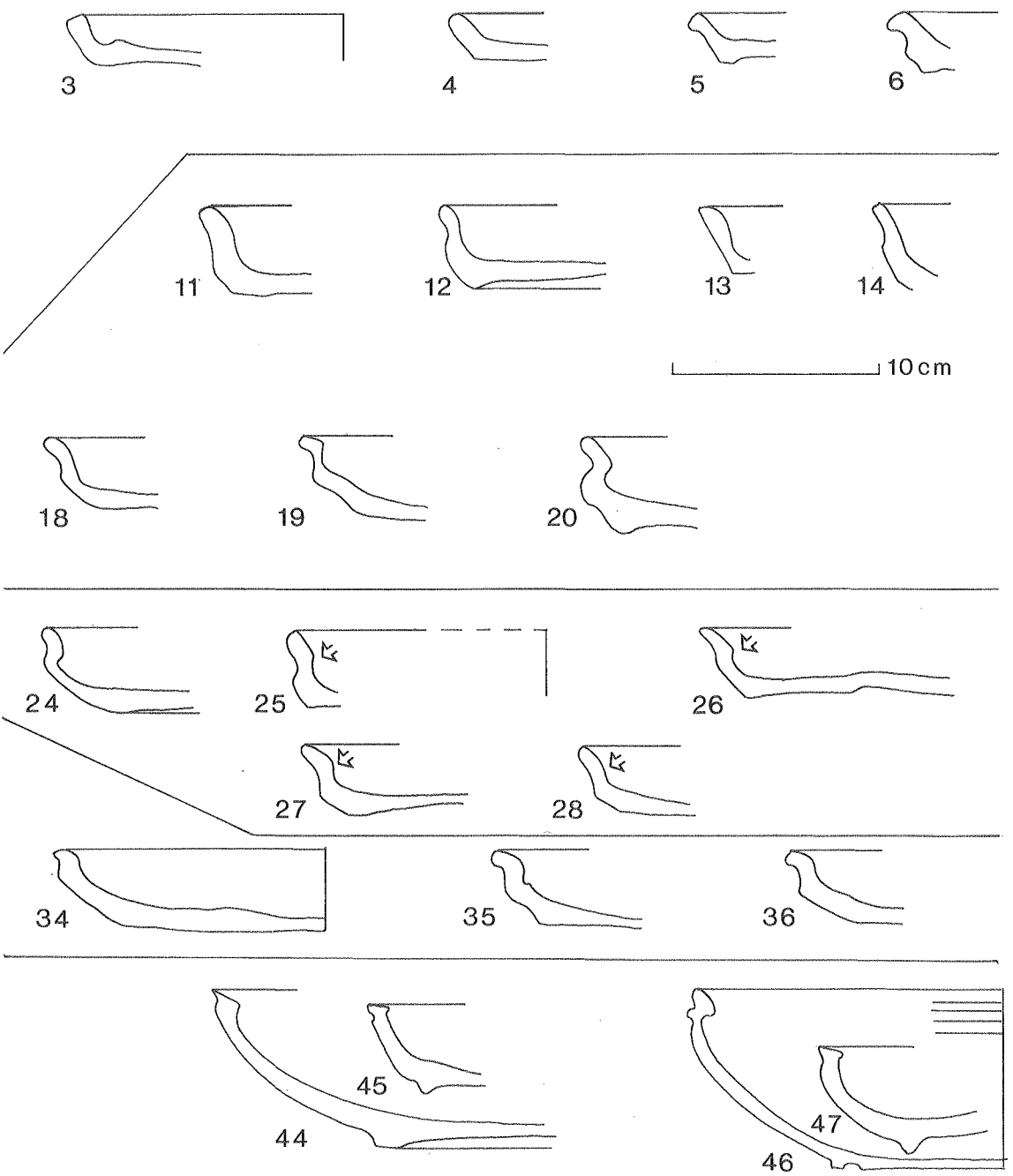


Fig. 1. Archaeological classification of some pottery trays from Tell ed-Deir (1650-1630 B.C.).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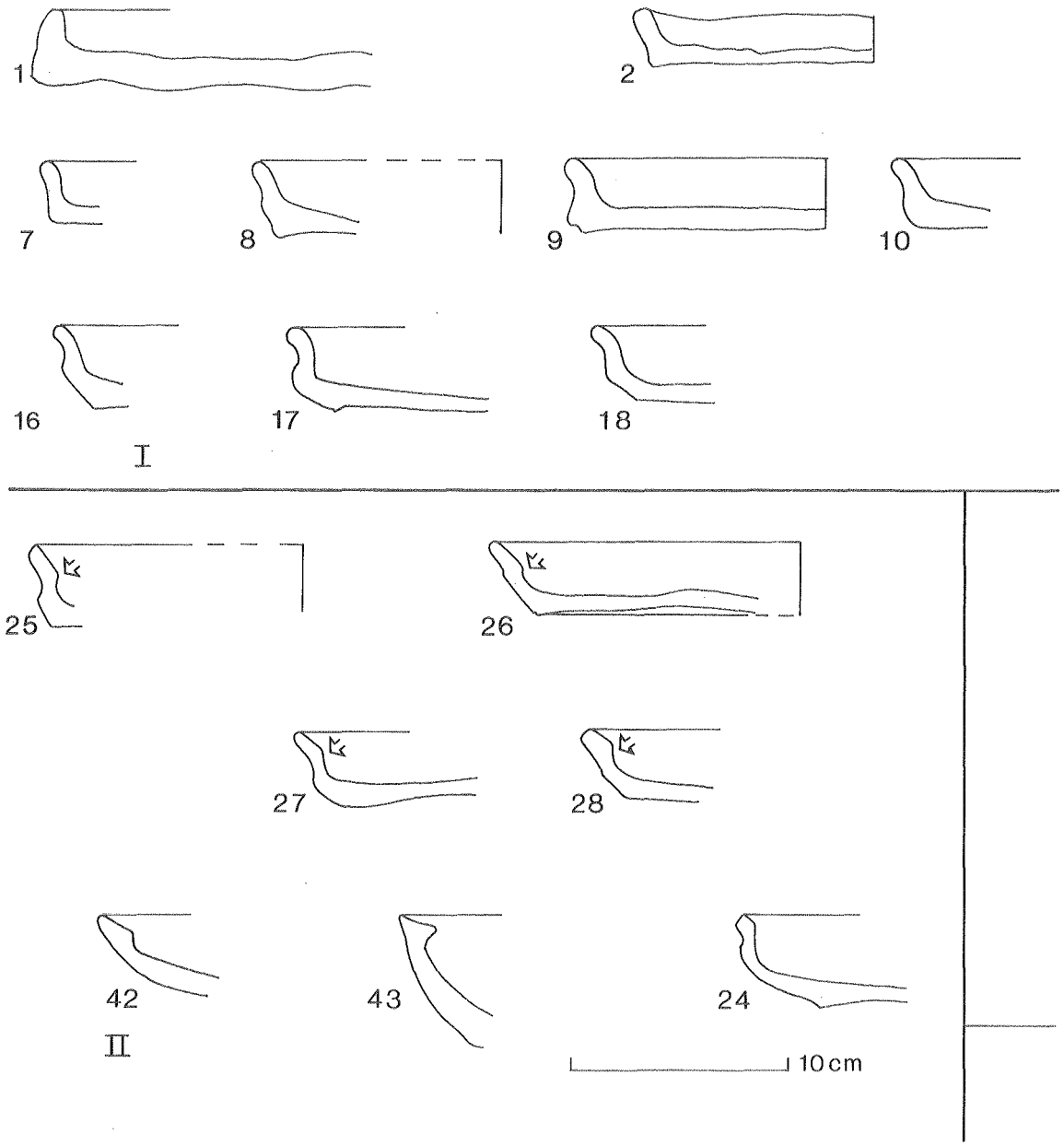

Fig. 2. Technological classification of some pottery trays from Tell ed-Deir (1650-1630 B.C.).


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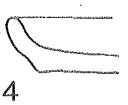
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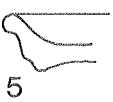
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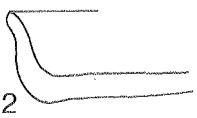
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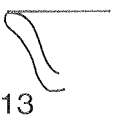
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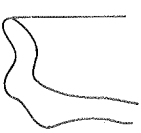
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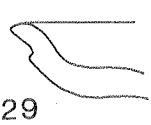
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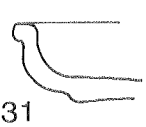
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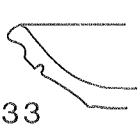
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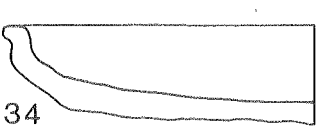
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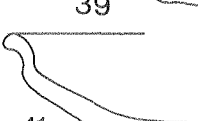
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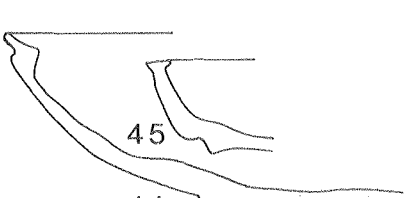
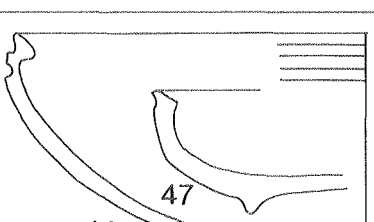




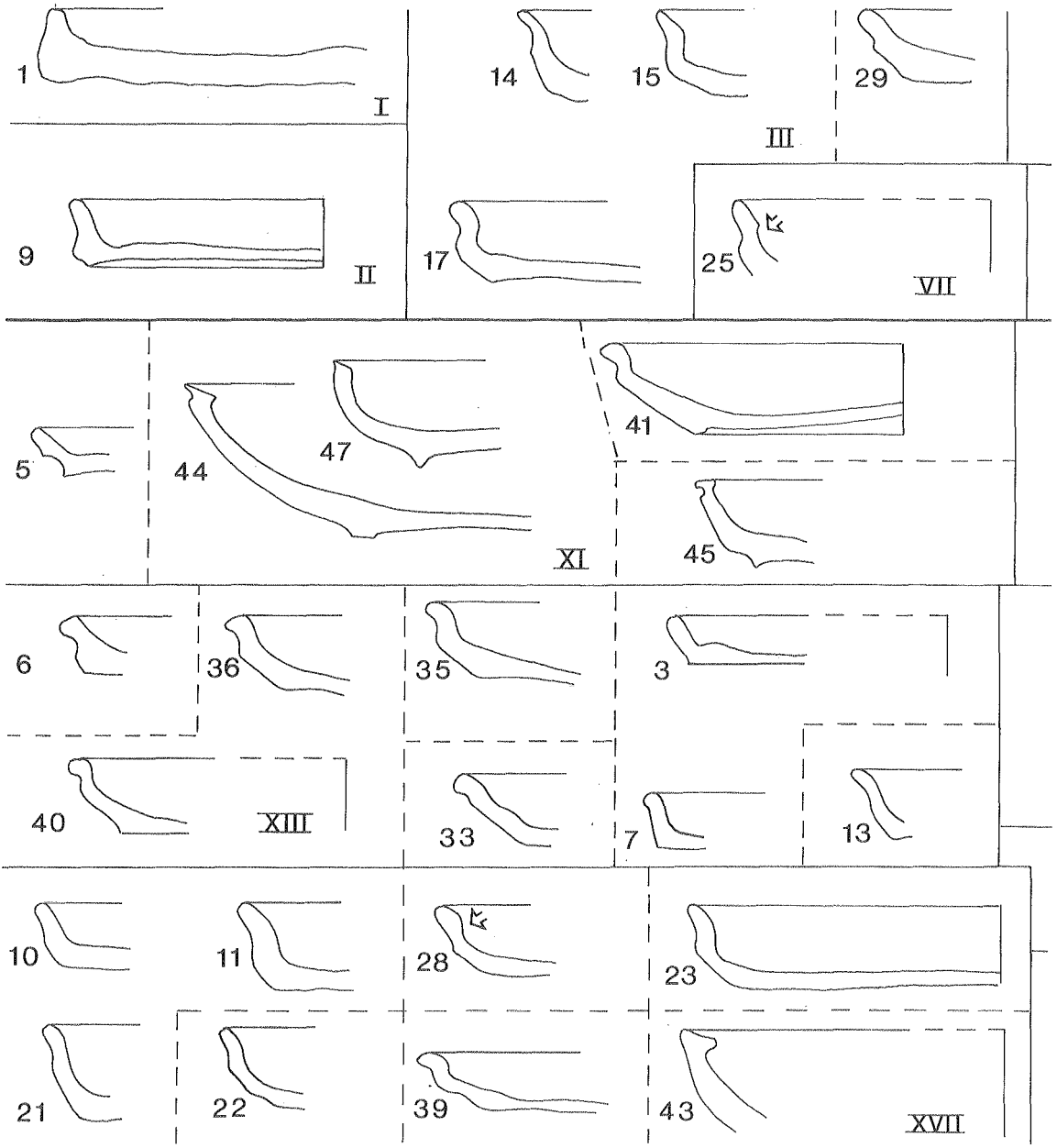
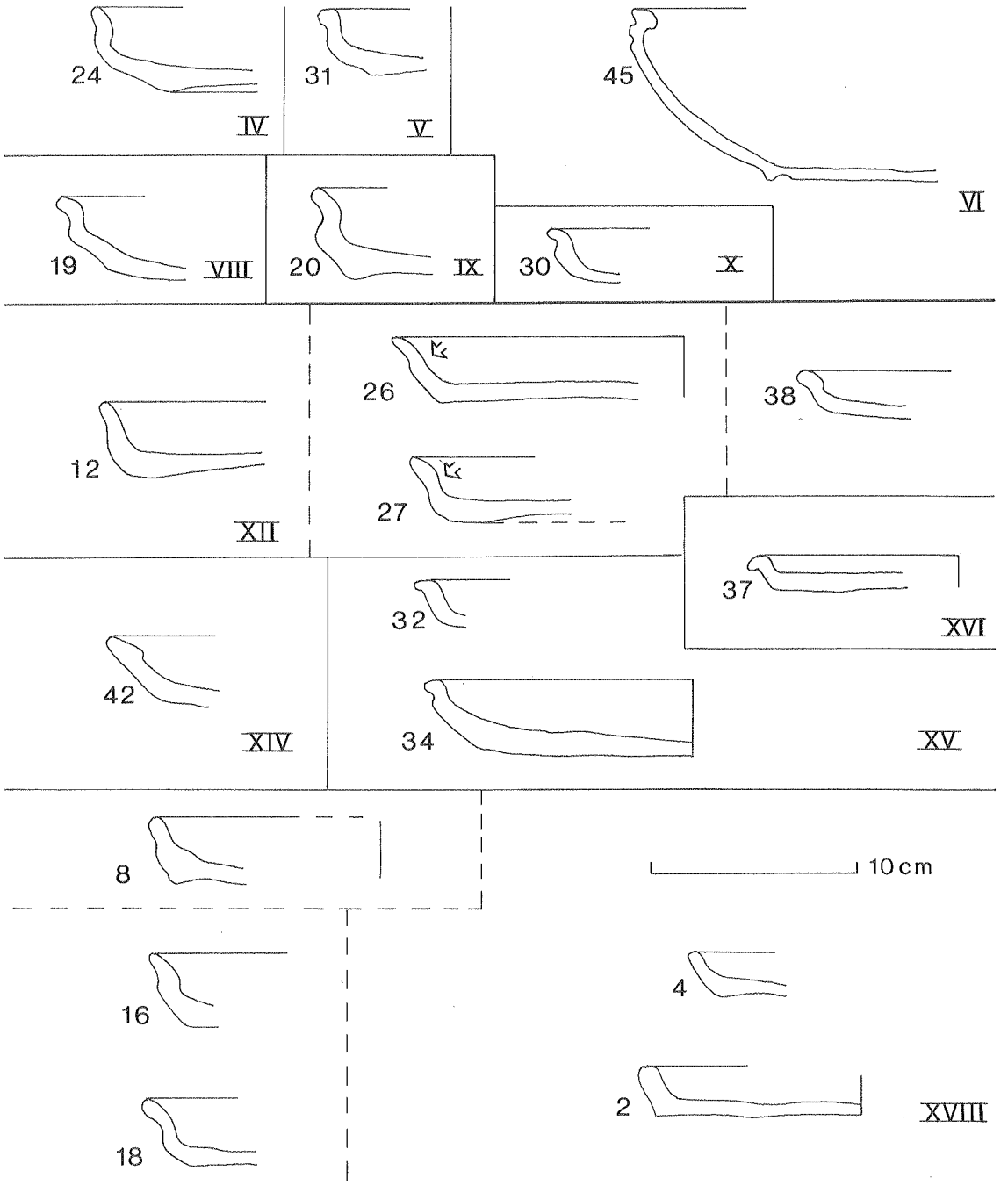


Fig. 3. Morphological classification of some pottery trays from Tell ed-Deir (1650-1630 B.C.).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2. and 3. species of bases. As regards the vessels he distinguishes between open and closed forms, as seen from the exterior profile. On the basis of the contours of the exterior profile he divides the open vessels into low open vessels (bowl shaped), and high open vessels (goblet shaped). He divides the closed vessels into closed vessels without neck and those with a neck or a half neck. The first are kettle shaped or barrel shaped. The second category comprises pot shaped or bottle shaped vessels. Both categories can be globular or conical (Fig. 4).

As for the rims, Karstens starts from a number of basic shapes (called families), such as the simple rounded rim, the cut rim, the oblique rim, etc. With each basic shape he distinguishes a number of species, namely no profile outside (symmetrical/non-symmetrical), one side with profile, both sides with profile (symmetrical/non-symmetrical).

Karstens also divides the bases into a number of families: flat base, foot, high foot, ring base, high ring base, more than one foot, pointed base, globular base, and base-like segment of sphere. He also distinguishes between bases which provide a stable position and those which do not. In the first category there are both closed bases (namely flat bases and those with a solid foot) and open bases (ring bases, tripods).

When we consider the morphological classification of the pottery trays, then we see a complete re-arrangement as regards the previous archaeological and technological ordering. The trays depicted in Figure 3 consist, according to Karstens, of low, bowl-shaped vessels with the following characteristics:

I closed, conical, no neck, flat base, simple rim.

II closed, conical, with neck, ring base, rim family 7, mainside in.

III closed, with neck, globular, single rim, flat base.

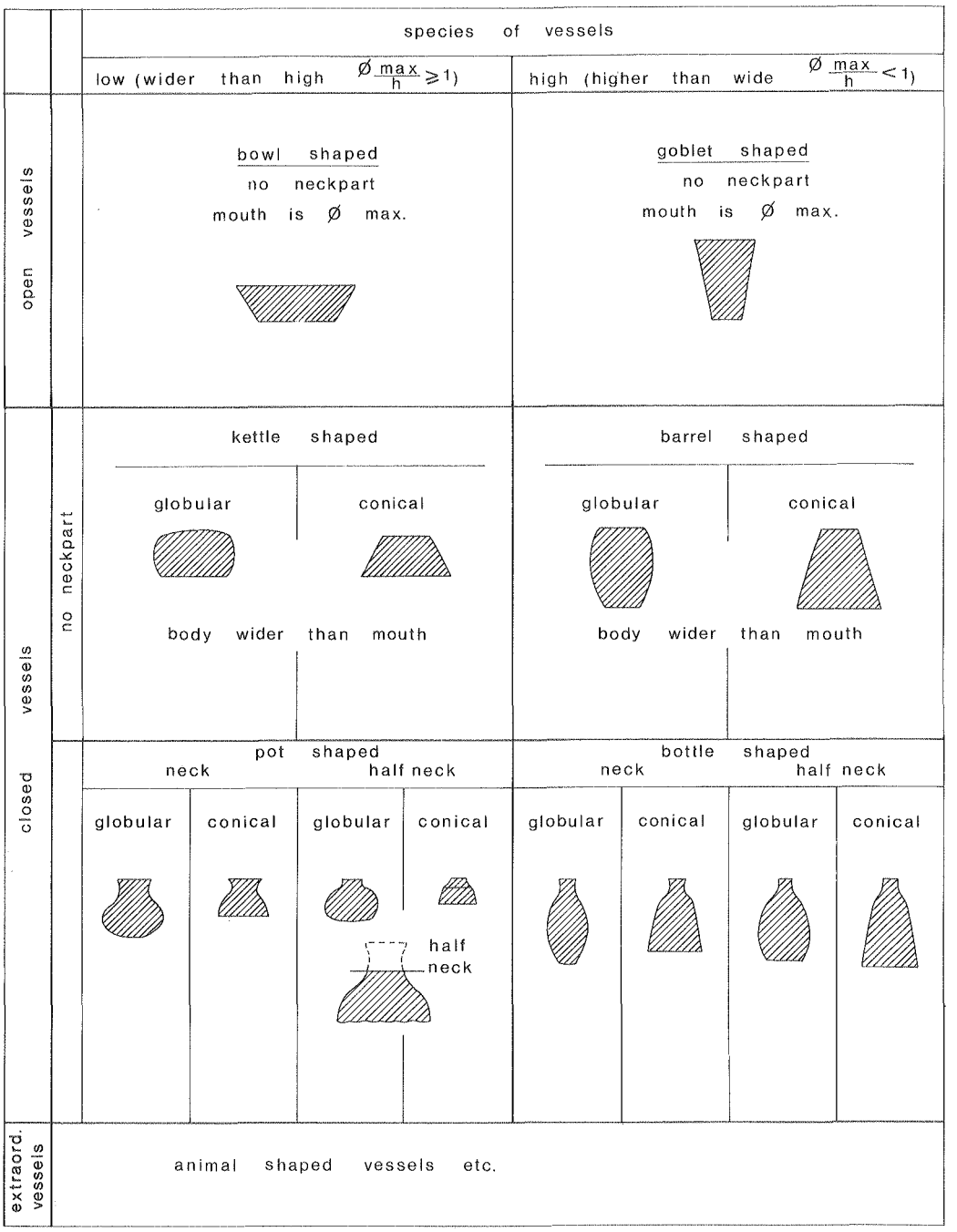

Fig. 4. K. Karsten's morphological categorization of pottery shapes: species of vessels.

IV closed, with neck, globular, flat base, hollow, rim family 7.
V closed, no neck, globular, flat base hollow, main side of rim cut.
VI closed, no neck, globular, flat base with small composed rim.
VII closed, with neck, globular, main side of rim in.
VIII closed, with neck, globular, round base.
IX closed, with neck, globular, flat base hollow.
X closed, no neck, globular, round base, main side of rim cut.
XI open, ring base.
XII open, flat base, main side of rim in.
XIII open, flat base, main side of rim out.
XIV open, round base, main side of rim in.
XV open, round base, main side of rim out.
XVI open, flat base hollow, main side of rim out.
XVII open, flat base, main side of rim in.
XVIII open, flat base, simple rim.

When we compare the purely morphological classification of Karstens (Fig. 3) with the archaeological (Fig. 1) and the technological classification (Fig. 2), then the following remarks can be made. The purely morphological classification deviates much more from the technological classification than the archaeological arrangement which is mainly based on shape. This point can be explained by reference to the fact that in the archaeological classification certain technical characteristics, next to the rough shape, also constitute criteria for classification. For the morphological ordering only the detailed shape plays a role.

The discussion

The discussion in Washington about the model for the Corpus of Mesopotamian Pottery centred in the main upon the

usefulness of the morphological classification system as a presentation system for the final results. The archaeologists present at the meeting raised no objections to the technological classification. It should be noted that such an arrangement largely runs parallel with the archaeological classification. The technological ordering corrects the archaeological arrangement and shows the relationship between technique and form. In other words, the technological classification is explanatory. This point not only applies to the trays from the discussion example given above. From a discussion with J.A. Franke it became clear that her classification of Old Babylonian pottery, mainly based on shape, can for a large part be well supported by a technological analysis (Franke 1987).

The morphological classification system as designed by K. Karstens complies with the demands which should be put to an unambiguous reference system. This is especially true when the objectives of Karstens are taken into account, namely the classification of pottery of which the original is no longer available and for the study of which we can only use drawings and photographs. The objections which during the meeting in Washington were raised against the morphological classification system can be summarized as follows. The morphological classification system is too rigid and too oriented towards details. The different shapes which the archaeologist more or less intuitively tends to group together, and the various shapes which technically should be grouped together, may in this system be put too far apart from each other. By using the line of the outer profile as a criterion for open and closed vessels, certain pots for instance which are commonly called open vessels will in Karstens' system be grouped under the heading of closed vessels, while pottery usually classed as closed forms will belong to the category of open vessels (see Fig. 3). Most of those present at the meeting regarded this point as confusing,

and therefore unacceptable. It can be remarked, however, that the labelling of the different classes is unimportant (Dunnell 1971:58,59). At the end of the discussion the decision was made that the archaeologists would continue their work on the archaeological classifications of the pottery from the respective sites. The technological information collected since 1985 as regards the second millennium B.C. pottery would be published by the Department of Pottery Technology. At a later stage the question will again be raised how the final results will be presented in the definite Corpus.

Some considerations

In reference to the discussion about the presented model for the Corpus of Mesopotamian Pottery we would like to close this report with the following remarks.

The need for a rigid morphological reference system of pottery in order to standardize the descriptions of pottery, to develop chronologies and to help intersite comparisons - the first objective of the pottery corpus - has, at the present stage of archaeological research, become less acutely felt. During the last fifty to sixty years such morphological pottery studies sufficed for chronological studies. Nowadays, however, there is the increased precision in respect to chronometric dating. Certain theoretical orientations have also come more to the foreground during the last twenty years and, together with new dating techniques apart from pottery, these have changed the emphasis in archaeological pottery studies. Within this field there is at present considerable interest, for example, in function, technique, production, residence patterns and socio- economic patterns. With the change in accent, from chronology and comparison to the `man behind the pottery´, the classification of ceramics should also be approached in a different manner. The type of classification is dependent upon its purpose. Because the planned pottery corpus intends both to present a chronology

and a comparison on the one hand, and `the man behind the pottery´ on the other, different types of classification should be combined within the Corpus. One could ask oneself, however, whether both objectives or classifications for the Corpus are compatible. Without discussing this question in a too detailed a manner (there is considerable literature about classification systems in general and about archaeological classification in particular), we may wonder which classifications are concerned. In relation to this problem it is also important to realize which type concept we are going to use in the planned Corpus.

The purely morphological and the technological classification are both so-called devised classifications. This means that they are both set up by the analyst. One or more characteristics or attributes of pottery are selected by the researcher and used as criteria for classification. The selection from a number of attributes which in principle is limitless is determined by the objective of the classification. In the case of a purely morphological arrangement the form is the sole attribute which is used as a criterion. Because the different form possibilities (bowl shaped, goblet shaped, etc.) to describe classes of pottery are equivalent, such a classification is called paradigmatic (Dunnell 1971:70). The classification procedure provides morphological classes. The term class is used on purpose, because it is a generic term referring to any division of materials or events into groupings based on similarities and differences (Hill and Evans 1972:233). It is possible that classes are only based on a single attribute.

In a technological classification various technical attributes, such as form technique, non-plastics, firing atmosphere, hardness, etc. are simultaneously used as classification criteria. This procedure provides technological types. Now the word `type´ is used, for this term has a more special meaning. "It refers to the division of an assemblage

of materials or events into groupings based on the conscious recognition of dimensions of formal variation by these phenomena. A type is a group that has been formed on the basis of a consistent patterning of attributes of the materials or events, and it is distinguished from other types, which are different patterns of attributes" (Hill and Evans 1972:233; based on Krieger 1944; 1960:143; Spaulding 1953; Sackett 1966). When in a technological classification of pottery we do not regard the different attributes as equivalent, but hierarchically, then we talk about a taxonomic classification (Dunnell 1971:70). The so-called type variety system which is often used in pottery studies forms a clear example of such classification (Dunnell 1970:144f.; 157f.). This is an hierarchical classification system in which the varieties form the smallest units within the type.

According to Rouse (1960), types are composed of what he calls `modes´. With the term `mode´ Rouse refers to "any standard, concept, or custom, which governs the behaviour of artisans of a community which they hand down from generation to generation, and which may be spread from community to community over considerable distances." `Mode´ can only be detected from the attributes. The classification, also called the analytic classification, should be concentrated upon those characteristics of the pottery which show the particular modes. The Department of Pottery Technology, Leiden, is attempting to reach the same goal with the analysis of pottery: The discovery of pottery traditions within the pottery repertoire. By tradition we understand "one system of making one kind of pots" (Franken 1974:20). Within a tradition it is possible to divide pottery into types. With type we then not refer, as is often done, to identity in shape. On the contrary, with types we refer to interrelated variables of a system with a tradition. Classifications in this sense reflect the ideas and values of the ancient people who made and used the artifacts.

It seems to us to be incorrect to present the technological types and their variants, determined by a classification on the basis of different technical criteria, in a paradigmatic system of classes, as designed by Karstens. His system is based on a rigid classification on the basis of one attribute, namely the shape. Within an archaeological context preference should be given, in our opinion, to an explanatory typology, rather than a non-explanatory classification. The morphological classification system is, it is true, unambiguous and therefore useful as a reference system for which it was designed, but the technological types cannot be set out in a clear manner. For that, the morphological system is too refined. As a compromise for a reference system we think that preference should be given to a simple archaeological/morphological arrangement such as that designed by Franke (1987) - plates and bowls (open forms); cups, goblets, beakers, jars (closed forms); large vessels, etc. Such a system can be used subsequently in order to determine technical types within the archaeological/form categories. Finally Karsten's system of morphological classes can be used for the arrangement of the final presentation.

* Our visit to the United States was subsidized by the Netherlands Organization for Scientific Research (NWO), the Smithsonian Institution at Washington D.C. and the University of Chicago.

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TECHNOLOGICAL RESEARCH ON NEOLITHIC POTTERY FROM SESKLO (GREECE) - A PRELIMINARY REPORT

Introduction

From 29th August to 24th September, 1988, the Department of Pottery Technology carried out technological research into the Neolithic pottery from Sesklo, in the district of Thessaly, Greece (Fig. 1). The studies were carried out locally within the context of a research programme which is subsidized by the Netherlands Organization for Scientific Research (NWO), and which is carried out by M.H. Wijnen. This research programme is entitled: `The Early Neolithic pottery of Sesklo: settlement study and chronological implications´. The objectives of this programme are two-fold. In the first place it constitutes a rounding-off of the study of the Early Neolithic pottery from Sesklo, excavated by the Archaeological Department of Greece, under the directorship of D.R. Theocharis, during the period 1957-1977 (see Wijnen 1982, for further references). Wijnen´s programme should lead to the drafting of a typochronology for this area. In addition, an answer is sought to the question whether during the Early Neolithic there was already a differentiation in the habitation of the site, as reflected in the ceramics used and their production. In the second place, research is being carried out into the problem whether the currently widely accepted periodization of the Thessalian Neolithic, with its regionally widely divergent phases, is perhaps mainly based on peripheral data and should be drastically simplified. Furthermore, the question is tackled whether there really was such a clear separation between the Early and Middle Neolithic, such as is widely believed, and whether it would perhaps be preferable to speak about a period of continuity

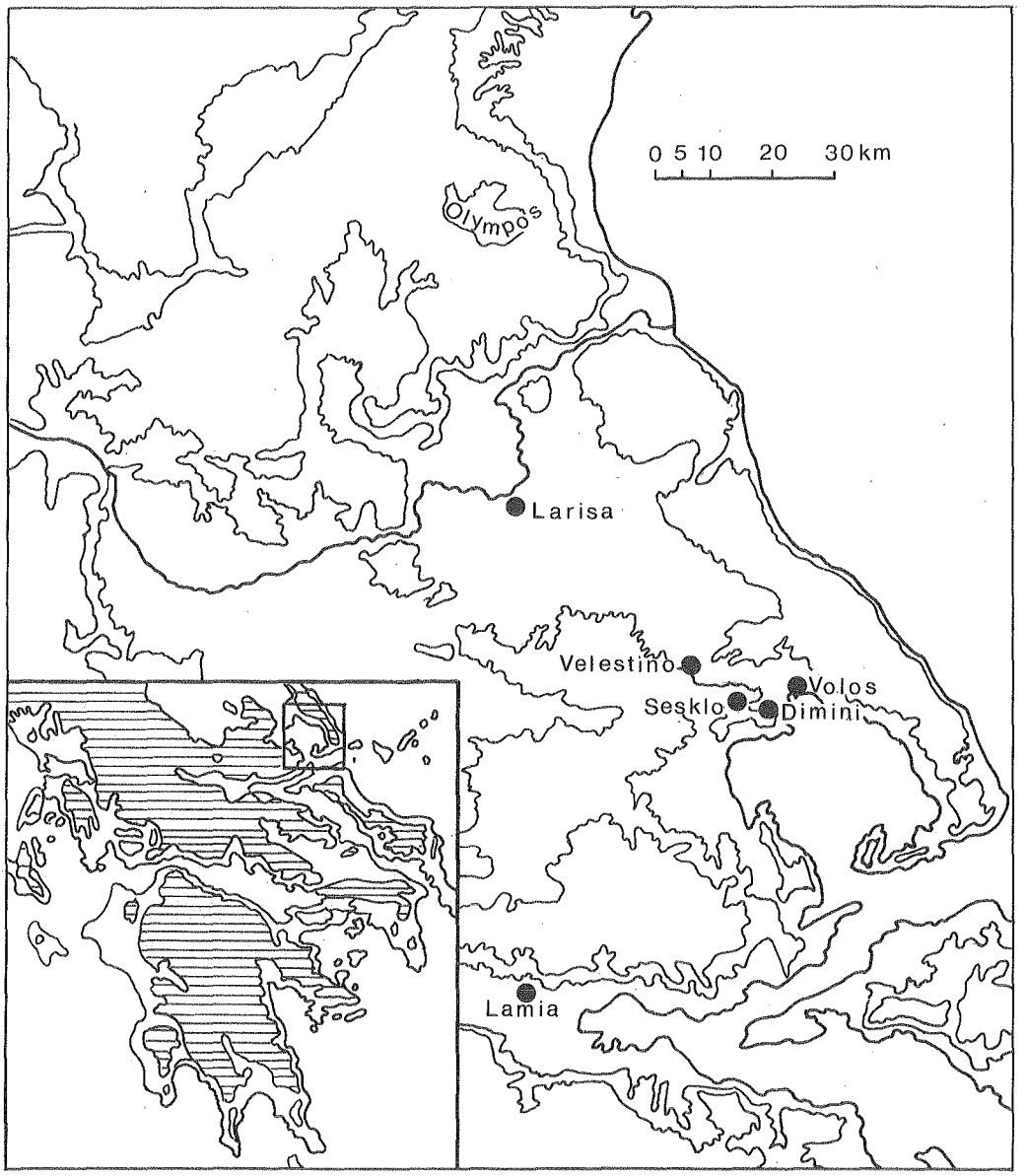

Fig. 1. Map of Thessaly (Greece).

which can be divided up into four of five phases.

The technological studies

The technological studies were carried out in the dig-house at Sesklo, where all the pottery from the 1957-1977 campaigns are stored. A sample which was thought to be representative for the Neolithic pottery from Sesklo, was studied with respect to the raw materials (non-plastics), form and decoration techniques and the original firing circumstances. Within the context of the technological pottery studies, clay samples were collected from the direct environment of Sesklo, and a visit was paid to a potter in the village of Dimini, five kilometres from Sesklo. The Neolithic pottery from other findspots in Thessaly, as housed in the museums of Volos and Larissa, was also studied.

In this preliminary report, the results are presented of the technological studies carried out at Sesklo itself. The studies are currently being continued in Leiden. The final report will be published in the Publications of the Netherlands School of Archaeology at Athens.

The Neolithic pottery from Sesklo

Within the Neolithic pottery repertoire from Sesklo, a number of categories can be differentiated. Their occurrence in the Early I, II, III, Middle and Late Neolithic (E.N. I, II, III; M.N.; L.N.) periods is indicated in Table 1. For absolute dates of the various periods of the Sesklo Neolithic we refer to Theocharis (1973:119f.).

The following remarks can be made. Categories 1-5 occur during all phases of the Sesklo Neolithic. Surface sherds from among these categories can therefore not be ascribed to a particular period. These pots are all handmade and undecorated. Among the categories 2-5 the granules of the non-plastics vary in size from very coarse to fine. For a further description, especially of the pottery from E.N. I,

	E.N.I	E.N.II,III	M.N.	L.N.
1. Plain smoothed ware	----------	----------	----------	----------
2. Very coarse ware	----------	----------	----------	----------
3. Coarse ware	----------	----------	----------	----------
4. Medium ware	----------	----------	----------	----------
5. Fine ware	----------	----------	----------	----------
6. Slipped ware		----------	----------	----------
7. Self slipped ware		----------	----------	----------
8. Red slipped ware		----------	----------	----------
9. Painted ware		----------	x----	x------
10. Ceramics with incised decoration		----------	----------	x------
11. Ceramics with pinched decoration		----------		
12. White ware		----------		
13. Double slipped ware		----------		
14. Predecessor of 15 (?)		----------		
15. Metallic ware			------	
16. `Flower pot´ ceramics			--	
17. Ceramics with infilled incised decoration				------

Table 1. Various categories of Neolithic ceramics from Sesklo.

we refer to Wijnen (1982:21-37). The categories 6-8 occur from the E.N. II to the L.N. Because there is no clear correlation between the shapes of these wares and the strata in the magoula in which they were found, these categories cannot easily be used as a means for dating. As to category 8, the red-slipped ware, it can be remarked that at first the slip is less skillfully applied than in later periods. Category 9, the painted ware, which also occurs from the E.N. II to the L.N., can be differentiated per period on the basis of the type of decoration. As regards category 10, the pottery with incised

decoration, it is possible, on the basis of decoration motifs, to indicate a clear break in its development between the M.N. and the L.N. Category 11, which is found in the E.N. II, III and the M.N., consists of decorated pottery. The decoration is made by pinching out, between thumb and index finger, the soft clay on the outside of the pot. The remaining categories (nos. 12-17) are typical for shorter periods of the Neolithic. In the E.N. II, III, there are the categories 12 and 13, white ware and double slipped ware respectively. The white ware (category 13) is handmade monochrome, `porcelain-like´ pottery (cf. Wijnen 1982:36). As for the so-called double-slipped ware (category 14), the whole surface is provided with a white slip, on top of which another, thin red slip is applied. The surface is burnished. Also category 14 only occurs in E.N. II, III. This pottery is very similar to that of category 15, which only occurs in the M.N. Category 15 concerns sophisticated, thin-walled, and hard-red firing, burnished pottery (`metallic´ ware).

There remain two other categories. The first of these is indicated as `flowerpot´ ware, and it occurs during the last part of the M.N. This pottery is rather coarse, red pottery with a rather high percentage of quartz in the soft sherd. Finally there is the incised pottery which only occurs in the L.N. After firing the incisions are filled up with loam.

The form technique

The Neolithic pottery from Sesklo is handmade. For a more detailed description of the form techniques of the pottery from the E.N. I period, we refer to Wijnen (1982:24-27). The form technique of the M.N. is described by Kotsakis (1983: 105-141). This pottery is made with a technique which the Greek scholar calls the "technique of the added pieces". It is a modified form of the so-called coiling technique. The base and part of the wall of the pots are made from a ball of clay. This part forms the basis, on which coils are laid which

further form the pot. Subsequently the potter, according to Kotsakis, covered the coils both on the inside and outside with a layer of clay. The layer of clay was applied to form the final surface. Scraping was used to give the walls the required form and thickness. The coils only served as a skeleton. The ultimate form of the pot was co-determined by this skeleton of coils, and by the layer of clay applied on the inside and outside of the pot. The coils are placed, not on top of, but next to each other, so that a larger area of adhesion is used. When the coils were not pressed well enough against each other, air pockets were created, which however do not seem to have negatively affected the durability of the vessel. In some cases the coils were not covered with a layer of clay. Such pots can be recognized by a smoothed juncture, which sticks out somewhat. There are only a few of these vessels, partly because the finishing off of the pots masks the traces. According to Kotsakis, such a technique made it possible to manufacture in a simple manner types of pots which otherwise would have been difficult to form. Also Vitelli (1974), in her reconstruction by experiment of the form technique of Greek Neolithic pottery, concludes that use was made of a variant of the coiling technique. "The Greek Neolithic potters used coils, applying the coil not directly on top of, but inside or outside the previously built wall. After applying the coil the clay is smeared up and/or down to cover and seal the juncture, eliminating any air pockets which might expand during firing and cause the pot to break at that point. Then the additional clay provided by the coil is pinched and pulled up in order to continue shaping the pot. Subsequent finishing eliminates all traces of the undulation or thick-thin areas of each coil joint. What remains, although rarely in Greek Neolithic sherds, to provide in the break of a sherd, with the smooth contact point between two coils preserved in the break of a sherd, with tails protruding on either side of which the clay was smeared up or down over the

joint" (Vitelli 1974:119).

During our studies of the Neolithic pottery from Sesklo, we also observed certain features which point at the use of a `assembly technique´ such as the reconstructed techniques described by Vitelli (1974) and Kotsakis (1983). All the ringbases which occur within the studied repertoire are added, and not scraped out. In almost all categories there are some sherds which on the place of the break more or less clearly show that they are made of thin bands of clay. It was determined that the manufacture of the pots was not carried out according to a strict pattern.

The non-plastics

The studies of the applied raw materials was focused on the macroscopic analysis of the non-plastics. Because the non-plastics of the complete Early and Middle Neolithic pottery repertoire from Sesklo were studied by Wijnen and Kotsakis respectively, we only studied a small sample collection. In order to obtain a broad impression, a dozen of sherds from each category were laid under the microscope (x35) and studied at the place of a new break. The non-plastic inclusions consisted in the main of sandy material. Studies of thin sections of E.N. I sherds had shown that the larger part contained, apart from the fine-grained quartz-biotite schist, also quartz-biotite-epidote-feldspar and quartz-epidote-muscovite schists. In one case, pottery temper had been noticed among the non-plastics (Wijnen 1982:22). The same picture emerged as regards the sample studied by us. Because of the limited number of sherds for each pottery category which we were able to study, it was impossible to indicate the variability of the non-plastic contents for each category. Nor was it possible to determine whether within each category it was feasible to distinguish different sub-groups of non-plastics. The studies carried out by Wijnen and Kotsakis will shed light upon these problems. The only clear change in

non-plastics could be observed in category 9, the painted ware. While in the E.N. and M.N. mixed coarse and fine quartz was used for tempering, in the L.N. we only found much finer quartz, while at the same time this pottery was in general fired at a high temperature. The same feature was found in connection with the 'metallic' ware. It appears as if the clays for these categories were carefully selected.

The clay samples

According to the geological map, Sesklo is situated in an area which consists of fluviolacustrine and terrestrial deposits of red clay, loam, and sandy, clay material of low cohesion, with breccio conglomerate intercalations. The lowest horizons consist of marls, alternating with red clayey, marly material. In the Sesklo area these deposits turn yellow-reddish, due to a large proportion of coloured clastic material from the adjacent gneisses. On the basis of thin section analysis and limited trace element analysis it can be assumed that the clay of the Neolithic Sesklo pottery was derived from local deposits (Maniatis et al. 1988:268). In order to test the workability of the local clays and to use the results for the technological interpretation of the Neolithic pottery from Sesklo, 13 clay samples were collected in the direct environment of the site (Fig. 2). The clays are different in colour. At the findspot itself, the following tests were carried out: cohesion strength test; HCL test; piglet's tail test and the finger groove test. In addition, the degree of workability was determined for the manufacture of pottery. In Table 2 the results of these tests are represented.

In a number of cases the clays are very short, and therefore not or hardly suitable to be used for the pottery industry. This point applies especially to the white clays. The red and yellow clays are normally plastic. The dark grey sample (no. 8) showed the greatest plasticity. This clay can

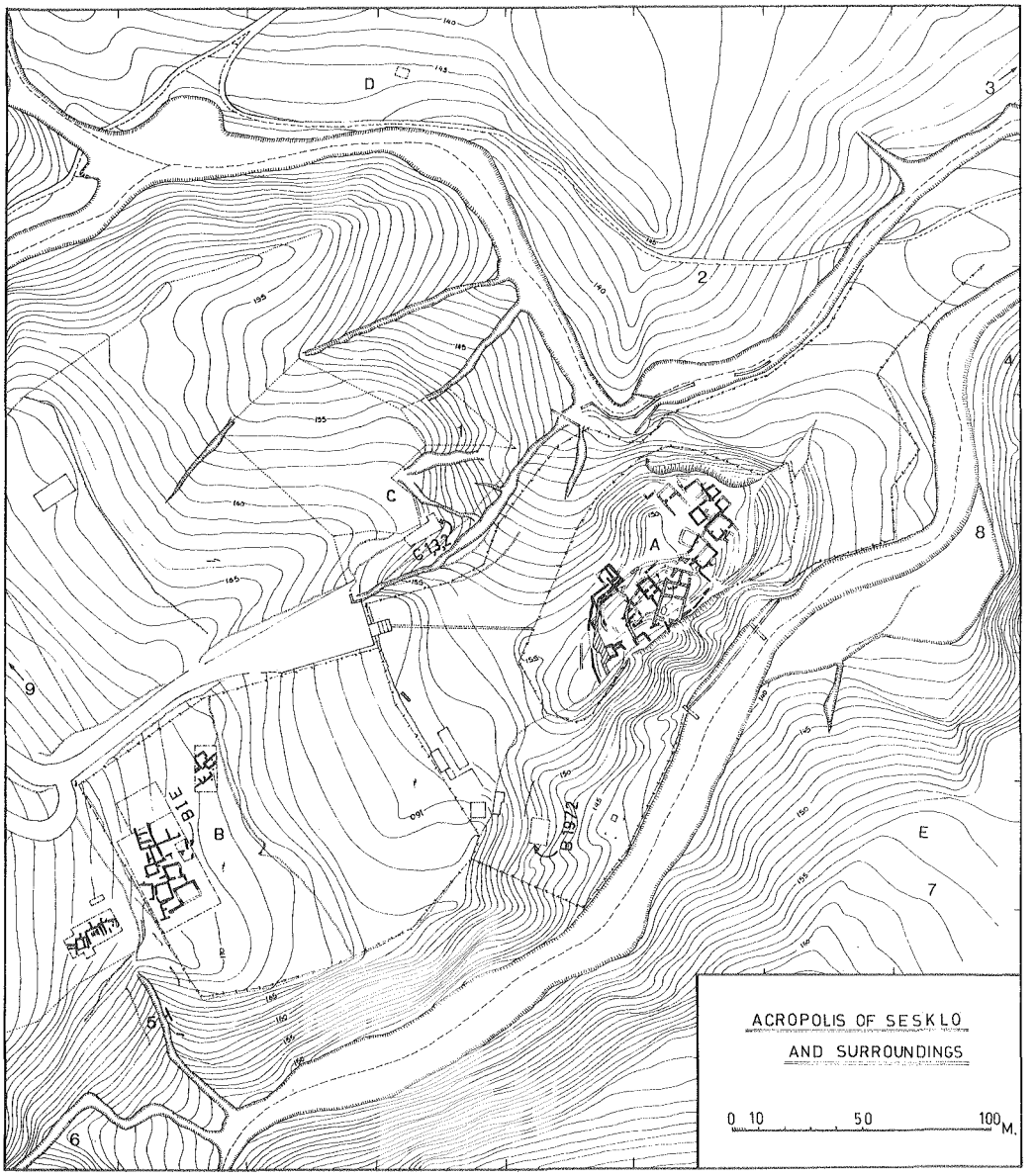

Fig. 2. Clay samples collected in the direct environment of the archaeological site of Sesklo.

Sample	MSCC col.	adh.str.	HCl	Piglet	Fing.	Work.
1a	5Y 8/1 white	++		1	c	+
1b	10YR 7/8 yellow	+	++	1	c	+
1c	5Y 8/1 white	+		1	c	+
2a	10YR 6/6 brownish yellow	++		n	m	+
3b	5YR 6/8 reddish yellow	+++++		l	m	+
3c	5YR 5/8 yellowish red	++		l	c	+
4a	10YR 6/4 light yellowish brown	++++		n	m	+
4b	10YR 8/1 white	+++		h	f	-
5	2.5Y 7/4 pale yellow	-	++	-	-	-
6	10YR 8/1 white	-		-	-	-
7	2.5Y 8/2 white 2.5Y 7/2 light grey	+		vl	c	-
8	10YR 4/1 dark grey	+++		h	m	+
9a	10YR 8/1 white	no clay				
9b	2.5Y 8/2 white	+		vl	c	
10	7.5YR 5/6 strong brown	+++		n	f	+

Sample	MSCC col.	adh.str.	HCl	Piglet	Fing.	Work.
11a	5YR 5/8 yellowish red	++++	++	n	m	+
11b	2.5YR 4/6 red	+++		n	m	+
12	2.5YR 4/6 red	+++		h	m	+
13	2.5Y 3/2 very dark greyish brown	-	++	n	m	+

Table 2. Workability tests.

Adhesion strength:
++++ = very strong
+ = not strong

HCL:
+ = minimal chalk
++ = a lot of chalk

Piglet:
h = high
l = low
vl = very low
n = normal

Fingergroove:
f = fine
m = medium
c = coarse

Workability:
+ = good for pottery
- = not good for pottery

be well formed, but soon shows shrinking cracks during the drying process. In order to make such a clay better suitable for pottery making, it is possible that people mixed it with a less plastic clay. In fact, this is at present being done by the potter from nearby Dimini (see the present Newsletter, p. 35-40).

Preliminary conclusions

The pottery repertoire of the Early, Middle and Late Neolithic period from Sesklo is characterized by an identical form technique. The pottery was handmade, and the `assembly

technique' played an important role. The vessels were made of local clay. It is possible that in certain cases a mixture of clays was used. Only in the case of the `metallic' ware and the L.N. painted pottery a fine clay was selected, or use was made of a levigated clay. The E.N. II, III white ware was made of a white-firing clay. Research is continuing in order to find out whether one of the clay samples, or a mixture, could have been used to make such a ware.

In general there is a continuity as regards the craft aspects of the Sesklo Neolithic pottery. However, there are certain changes. These take place in the field of the decoration and form repertoire. For example, the decoration of the painted ware in the M.N. has improved considerably as regards the same ware during the E.N. It is possible that technical developments lie behind this development. A solution to these and other problems, such as that concerning the hardness of the `metallic' ware are at present being sought in the Department of Pottery Technology, Leiden.

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With thanks to Mrs. M.H. Wijnen for the information in the introduction, and for her cooperation at Sesklo.

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THE POTTER OF DIMINI (GREECE) - SOME OBSERVATIONS

On September 16 and 23, 1988, and within the context of the technological studies of Neolithic pottery from Sesklo (see the present Newsletter, pp. 23-34), our team paid a visit to Kostas Louros, a potter at Dimini (see the present Newsletter, p. 24, Fig. 1) in order to find out about the quality of the local clays. Below we list certain observations made during the two visits.

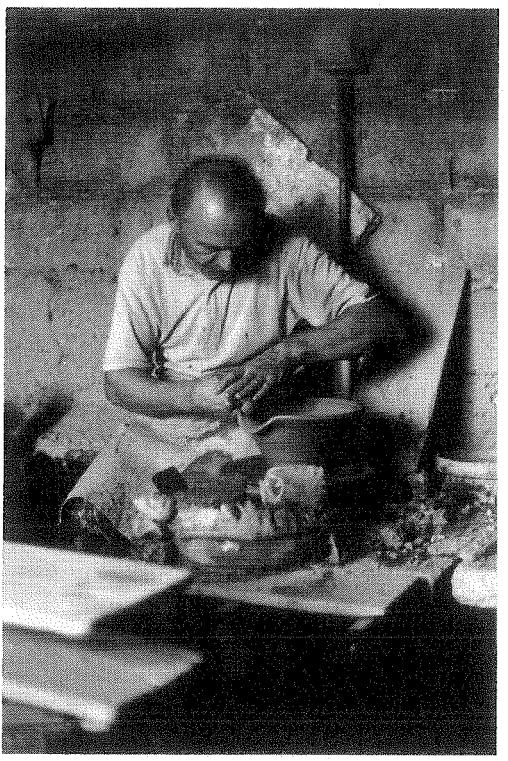
Kostas Louros is fifty-four years old and has worked for some forty years as potter in Dimini. His father had another profession, but a family tradition has been established by Kostas teaching his daughter how to make pottery. She now works in her father´s workshop, where she makes ornamental ceramics without the potter´s wheel, which are destined for sale to tourists.

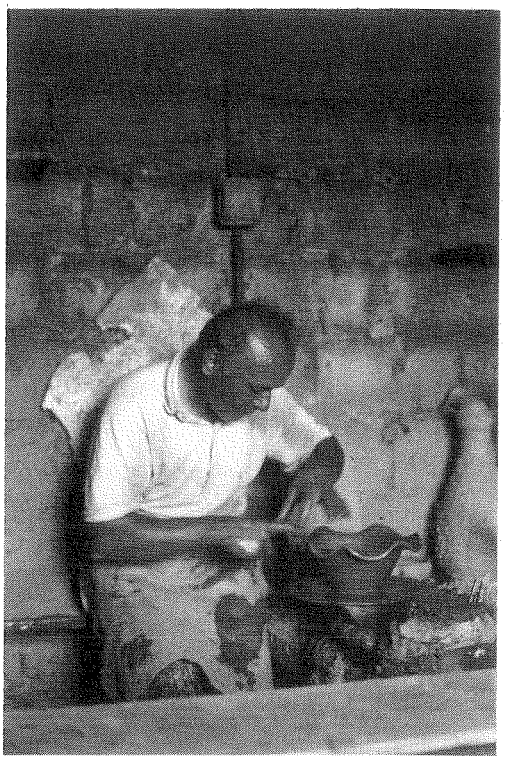
For the last nineteen years, Kostas has been the owner of his own firm. It was then when he introduced the electric potter´s wheel into business, of which he now has three operating in his workshop. Before that time Kostas used a mechanical wheel. Kostas works six days a week. When he does not work, according to Kostas, his back starts to hurt. On Sundays he likes to go out hunting.

Kostas produces various types of jars, plates and bowls on the wheel, behind which he sits at an angle. He starts at eight in the morning and continues until three o´clock in the afternoon. Sometimes he goes to work again at five, to go on until eight, with one or both of his helpers who operate the other two wheels. It becomes more and more difficult to find people to learn the craft. Those who help are not in full employment, but do so for pocket money.

During our first visit Kostas was engaged in the fabrication of bowls with a wavy rim (Figs. 1 and 2). After kneading the clay, which, packed in plastic, is imported from Crete, he made seven balls of clay. From each ball he made one bowl. The ball was centred on the wheel, opened and pulled up. With the help of a rib placed against the exterior of the bowl Kostas made a vessel with a taut appearance. He finished off his product with his fingers. Subsequently he stopped the potter´s wheel and gave the rim the undulating line. The bowl was then cut off from the wheel and placed on a plank in front. The wavy rim was sometimes brushed off. As soon as the plank was full , Kostas took it to another part of the workshop where the bowls can be left to go through the initial drying process. Later the plank was brought outside for further drying (Fig. 3). Kostas is able to produce some 150 bowls a day.

During our second visit, Kostas Louros was engaged in the fabrication of small pots. For these he also used imported clay from Crete. After kneading he made a number of balls out of the great lump, enough to make an identical number of pots. Kostas centred the clay ball on the wheel, opened the ball, made the base and then pulled up the wall. Subsequently he used his fingers to press the clay of the wall from inside to outside, while holding a rib to the outside of the vessel. He then made the bulge of the pot by making vertically turning movements with his rib against the wall´s exterior, and giving support to the inside of the wall with his fingers. He also pressed the edge outside over the rib. He repeated these actions once and then finished off the exterior with his wet fingers. Sometimes he held the rib against the lower side of the wall, thus making a faint ridge which was later removed with his finger. When the pot was finished, Kostas stopped the wheel and cut off the vessel from the wheel, lifted it up and placed it on the plank in front of the potter´s wheel. He sometimes brushed the lower side of the wall with his finger.





Figs. 1 and 2. Kostas Louros engaged in the fabrication of bowls with a wavy rim.

Fig. 3. Jars drying outside the workshop.

Fifteen pots fill a plank. When full it was then removed so that the pots could be dried. Within a series, made as described above, none of the pots are exactly identical. There are minor differences in size, shape of the rim and brush marks. "It is handicraft", says Kostas, almost insulted, "only vessels made in a mould are identical." The latter is the case with the cups and flowerpots made by his wife, Anna (Fig. 4). In addition to making pottery in a mould, Anna helps her husband by feeding fuel into the kiln. It is an updraft grate-kiln built against the wall of the workshop (Fig. 5).

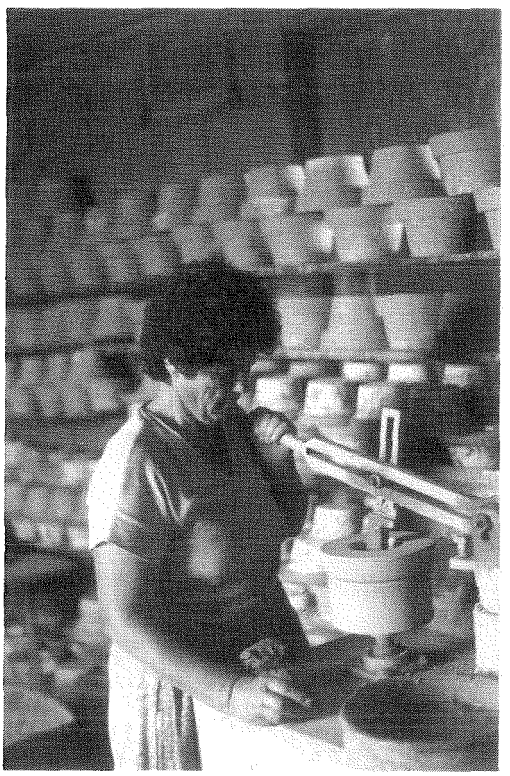


Fig. 4. Anna Louros, making flowerpots in a mould.

Fig. 5.
The updraft grate-kiln built against the wall of the workshop.

The furnace is dug in. The grid is at the same level as the workshop. The kiln is fired with wood chips and reaches a temperature of approximately 1000° C.

Contrary to the imported clay for the wheeldrawn pottery, Kostas uses self-prepared clay for the manufacture of coarser, everyday ware such as flower pots and sanitary pottery (Fig. 6). To prepare this clay Kostas has a permanent employee, Nikos. The clay is a mixture of grey clay from Lamia, red clay from Velestino and white clay from the direct environment of Dimini. These clays are stored outside the workshop. The clays are mixed with water in a clay processing machine and with the help of a blade (Fig. 7). The mixed clay flows from the mixing container into a receptacle. Before being used, the clay is levigated. During our visit the clay processing machine was not in use. The mixing of clay was especially done during the winter season. As regards the utility of the local clays,

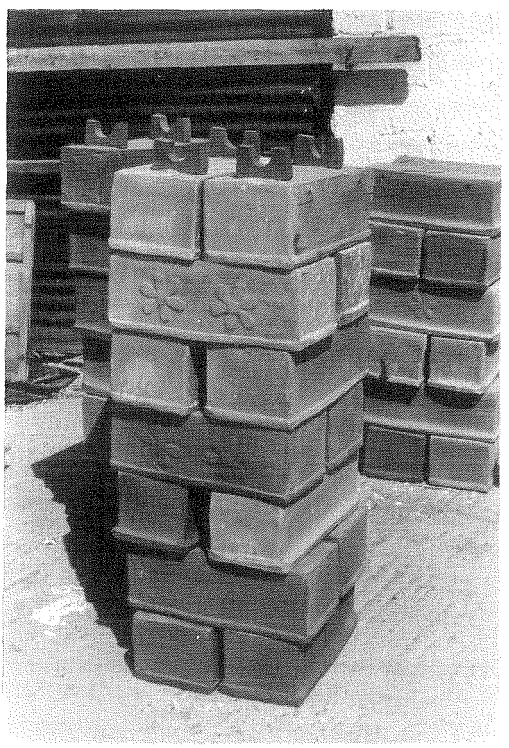


Fig. 6.
Coarse everyday ware:
flower-boxes.

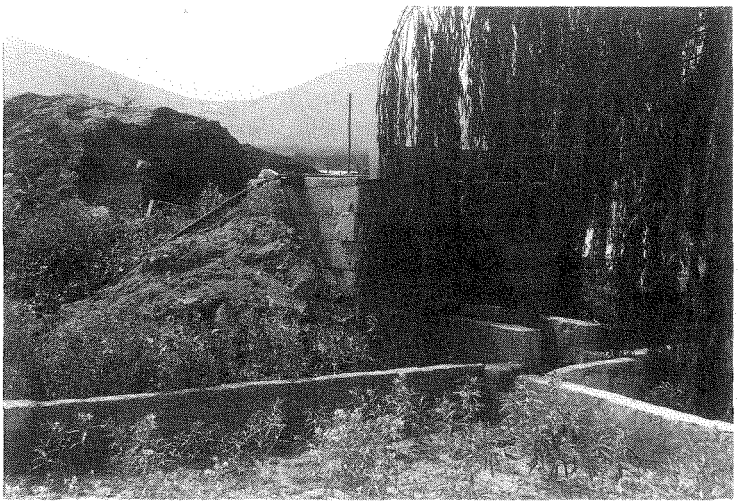


Fig. 7. Clay storage and levigation.

Kostas remarked that the white clay could not be used by itself. This clay is too sandy. The red clay contains a rather large amount of grit. On the other hand, the black clay is very plastic, but soon shows cracks during the drying and firing process. If you mixed, however, the clays, then a clay is made which can be used, perhaps even better than in the case of the Cretan clay. Kostas would like to start a local clay factory, but he is afraid that such a plan is unpractical due to competition. He mixes his clays only for the coarser ceramics and uses the imported Cretan clay for the wheeldrawn pottery. For a short time now he has also used imported clay from Thessaloniki, which is a great success.

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M.-H Wijnen

AN EXPLORATORY VISIT TO ILIPINAR, TURKEY

Between September 27 and 29, 1988, the authors visited the site of Ilipinar, in preparation of a technological study of the pottery to be carried out locally.

Ilipinar (formerly called Ilicapinar) is a tell located along the western banks of the Iznik Lake, in the municipality of Orhangazi, Bursa province, Turkey (Fig. 1). It is a multi-period site, some 25 metres in diameter and rising to a height of some 5 metres. J.J. Roodenberg, director of the Netherlands Historical Institute, Istanbul, has worked at the site since 1987, undertaking a research programme financed by the Netherlands Organization for Scientific Research (NWO). The purpose of this programme is to determine whether Northwest Anatolia really formed a contact zone for the introduction of Neolithic cultures onto the European subcontinent. As generally assumed, this emergence was caused by the distribution of agriculture and animal husbandry from the Near East to Southeast Europe. However, whether this process was accompanied by ethnic migrations or the spread of knowledge and certain products from the area of origin remains a moot point.

In general, the early agricultural settlements of Anatolia are located along the rivers of the East Turkish mountain ranges and in the southern plains of Central Anatolia. In Northwest Anatolia, a dozen early agricultural sites have been found along the well watered eastern littoral of the Sea of Marmara. Only two of these, Fikirtepe (Bittel 1969/70) and Pendik (Özdoğan 1983) have been studied, and only merely by some exploratory trenches. At the present stage of archaeological research as regards the Anatolian hinterland, this group of settlements along the Sea of Marmara occupies

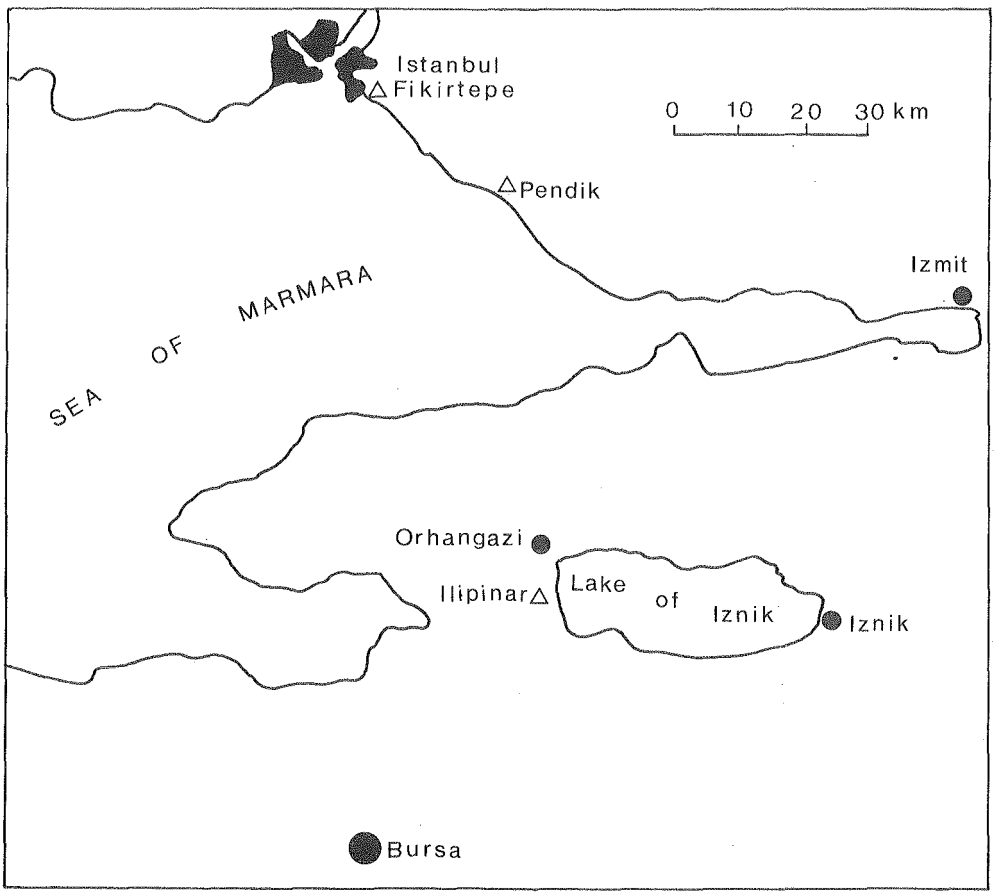

Fig. 1. Map of the south-eastern littoral of the sea of Marmara.

the most western location. Ilipinar is the largest and best preserved prehistoric tell along the route from Central Anatolia to the Sea of Marmara. It was for this reason that the site was selected for excavations within the context of the stated objective. In order to determine the relationships between Northwest Anatolia and the Anatolian hinterland on the one hand, and the Balkan peninsula on the other, research has been carried out in the field of palaeobotanics, archaeozoology and geomorpholy. Furthermore, a study is being made of the material culture. The latter aspect led to the

involvement of the Department of Pottery Technology, Leiden.

During the first excavation campaign, three squares of 10 metres were opened on top of the tell (W13, X13, Y13) and in the extension two more squares (also of 10 metres), in the lower, eastern part of the tell (AA13, BB13). Along the steep edge of the tell (south side), a 20 metres long and 5 metres high profile was cut. On the basis of this profile, the following chronology could be established. To date there are not sufficient radiocarbon datings to support the stratigraphical sequence with an absolute chronology.

As is to be seen in the scheme below, Ilipinar has well stratified levels from Early Chalcolithic I, Fikirtepe,

Stratigraphy

Section		Squares
4		W13, from lot 042
	Early Chalcolithic I	X12, 13
5		Y13
	Intermediate	AA13 above 165
6		
	Fikirtepe, approx. 7000 BP	AA13 below 165
7		
8	Catastrophe	
9		
10	Lower Ilipinar	
11		
sterile		

Neolithic and a pre-Fikirtepe Neolithic, called Lower Ilipinar. The squares excavated seem to indicate that between the Early Chalcolithic and the Fikirtepe Neolithic there was a phase which has characteristics of the Fikirtepe phase as well as of Early Chalcolithic I.

Unstratified, Ilipinar has yielded many graves from the Bronze Age I period (also called Troy I), and also several graves from the Hellenistic and Byzantine periods. Some of the graves have disturbed a number of squares, while other squares (e.g. BB13) were heavily disturbed by a Hellenistic wall.

During our visit to Ilipinar we have studied the pottery excavated so far in order to set up a plan for further technological research in 1989.

The Ilipinar ceramics from stratified levels can be characterized as follows:

Lower Ilipinar

Handmade monochrome ware with a generally highly burnished surface. Open convex walled bowls and slightly closed globular jars are most common, but there are also a fair amount of hole mouthed vessels. There are some pierced lugs. The rims are blunt or slightly overturned. Bases are mostly always plano-convex flat. The pottery was manufactured by a combination of modelling and coiling techniques and fired in an open fire with reduction. The colour of the ceramics is dark, uncertain buffish (5-7.5YR 3-5/2-4) and dark, non oxidized (black and greys), while the core is generally black. Use was probably made of micaceous clay. Quartz, grit, chaff and limestone can be observed as non- plastics.

Fikirtepe phase

As to characteristics, this pottery diverges little from that of the Lower Ilipinar phase. Apart from the mentioned non- plastics, it seems that use was also made of pottery grit. Chaff as a non-plastic has disappeared. The firing

condition (reduction) seems better controlled. In addition to many pierced lugs, there are also (closed) lug handles. Decorated ware is rare. The latter always has incised decoration in a checkerboard, fine line pattern. Painted decoration is non- existent. The repertoire of shapes has remained identical. The base is always flat.

AA13 higher levels

This phase appears to be separate from the preceding Fikirtepe levels, although the appearance, surface finish, colour, firing and shapes of the pottery do not show many differences. The use of fingernail impressions as a decorative form, however, is new.

Early Chalcolithic I

The pottery from this period does not differ much from that of the preceding periods. Our observations identified grit, quartz, limestone and some pottery grit as non-plastics. Dark buffish (brown and grey-brown) colours seem to become more common. There are also some reddish colours. The core is mostly dark (blackish), but there are also red cores with darker surfaces (end reduction). As regards decoration, there are incised patterns, namely line patterns or a combination of lines and dots. Line patterns may be filled with white paste (cf. Nea Makri, Knossos). There are also very broad lines (2 mm wide). These are nearly always on pots with a highly burnished surface. Fingernail impressions are also found. In addition to pierced lugs, there are also applied knobs or applied handles (handle shaped bands). The shapes are more or less identical with those from the preceding phases, although some vessels are carinated. The bases are mostly flat, or, rarely, the pots are set on a low stand.

Initially the sequence appeared to show a great continuity. However, a few differences can be noticed, among others in decoration and shape, and possibly also in colour

and surface finish. In both cases, the differences are minimal.

A thorough analytical study of the section material and if necessary of some of the material from squares AA13 and X12/W13 - taking into account only the diagnostics - seem to be necessary in order to obtain a sufficient insight into the ceramic development at this site.

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With thanks to J. J. Roodenberg for the archaeological information and his hospitality at Ilipinar.

M. Beatrice Annis

MODES OF PRODUCTION AND THE USE OF SPACE IN POTTERS' WORKSHOPS IN SARDINIA: A CHANGING PICTURE

Introduction

One of the points on which the ethnoarchaeological research that I am carrying out in Sardinia concentrates is the analysis and definition of the different modes of pottery production according to the model formulated by David Peacock (1982). The aim is to trace both the causes of the synchronic variability of the modes of production encountered in the Sardinian context and the background of their diachronic changes. Special attention has been paid to the material signs in which the different forms of organization reveal themselves, in other words to the interaction of the ideal aspects of the production and the material aspects. One of the most eloquent signs is the use of space. This is meant to include both the use of space in production, that is, the situation and the layout of the workshops, and the use of space in distribution: the local, regional or long-distance diffusion of the artefacts. The present paper intends to schematically represent the situation in Sardinia from 1920 to 1980. The different modes of production will be discussed in succession, from the simplest to the most complex one, with special attention for their spatial implications. At the same time, a brief outline will be given of the transformations in the organization of the production against the background of the changes that took place in the cultural context. Finally, a more detailed description will be given of the case of a workshop in which the use of space was constantly adapted according to changes in the working conditions of the potter-owner. The terminology used to define the different modes of production is that proposed by D. Peacock (1982: 6-11).

Modes of production and the use of space from 1920 to 1980

Figure 1 shows the situation of the traditional centres of pottery production in Sardinia. These are distinguished according to the size of their productions and the radius of their distribution. From the 20s to the 50s they produced terracotta vessels, roof-tiles and bricks for a population of about one million people, mostly peasants and shepherds. The production of pots was in the hands of professional potters, in the sense that they all worked for a market and used a fast wheel and a permanent kiln (Balfet 1965; Peacock 1982). The properties of the raw materials, the manufacturing techniques, the range of shapes and the functions of the ware did not differ much in the various centres. Apparently they all shared one common tradition, in keeping with the characteristics of the context (Annis 1983).

The modes of production, however, did present differences, ascribable to the differing geographical, social and economic circumstances of the various centres. In the years after World War I until the middle of the 30s when Sardinia started to participate in the national life from which the island had been virtually secluded for centuries (Le Lannou 1941: 9-26; Brigaglia 1976: 313-321), the following modes of production were found.

HOUSEHOLD INDUSTRY

Organization:

The potter worked alone and procured his own raw materials and fuel. Occasionally, he was assisted by his family and friends.

Type of activity:

The work was seasonal, limited to the summer months (July-August), the off-season in the agrarian year and the time of increased demand after the harvest had been sold (Angioni 1976:

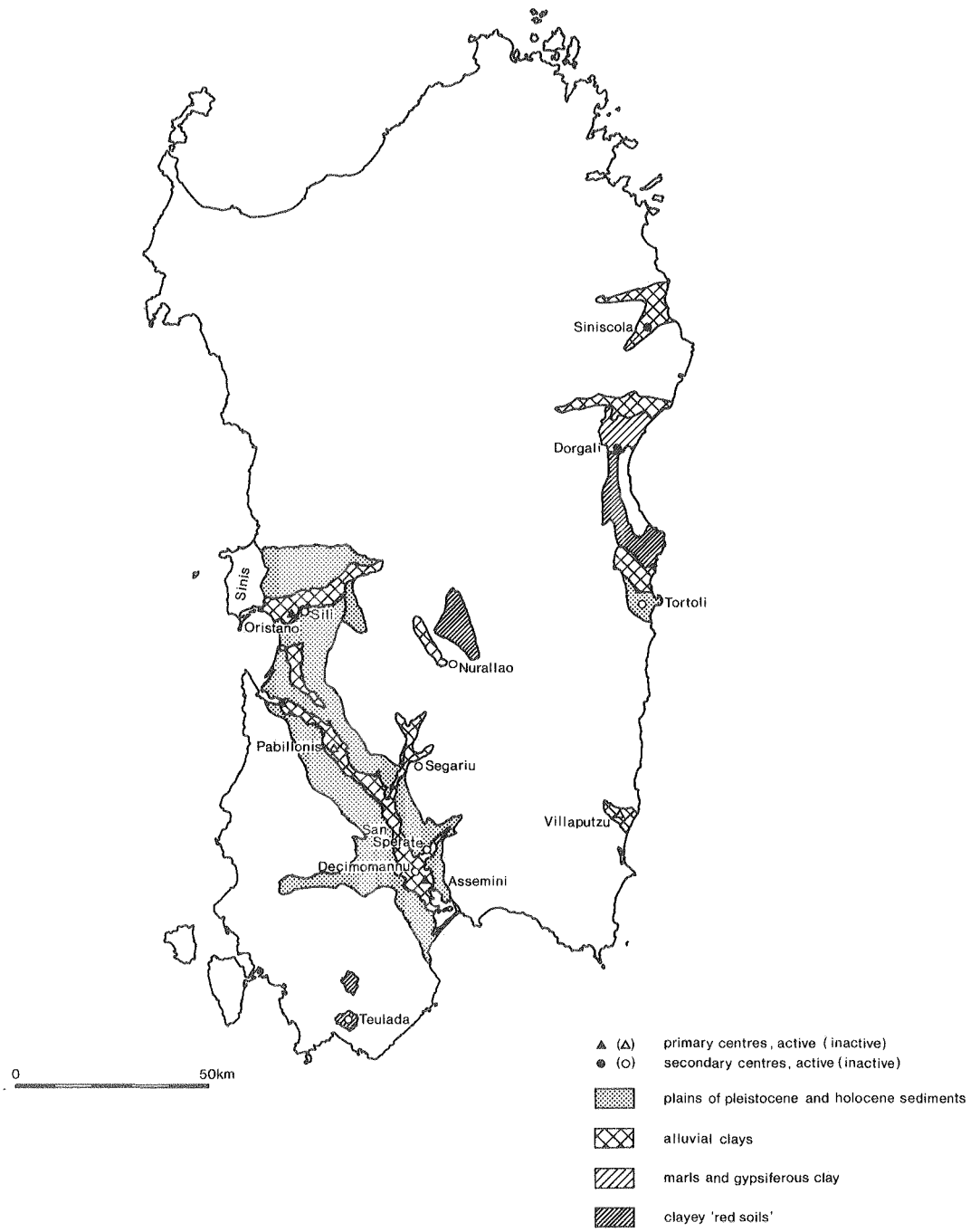

Fig. 1. Sardinia, centres of pottery production.

220-275). This form of organization served a supplementary purpose in the sense that the leading centres were unable to meet the full demand in the high season of pottery production and distribution.

Economy:

For the potter and his family pottery production was an important, but not the first and only source of income. His actual livelihood was small-scale arable farming and stockbreeding. As a potter, he worked to order for a small, local market.

Situation of the workshops:

The situation of the workshops was determined mainly by the distance to the raw materials and fuel and by the presence of water (Arnold 1985: 32-56).

Layout of the workshops:

The workshops, or in this case rather working areas, were non-differentiated multifunctional rooms, which were normally used for farming. They lacked any functional division of space as found in the proper workshops. Specific features of the layout were the wheel, which was disassembled and stored away after the production season, and a small kiln.

Distribution:

Distribution was limited to the village and its immediate surroundings. The products were distributed on foot or on the backs of pack animals.

RURAL WORKSHOP INDUSTRY

Organization:

The potter was the owner of a small, independent family business in which he worked with the help of a trained

assistant and an apprentice or at least one apprentice. He was also assisted by his family and, moreover, he could count on external services for the transport of the raw materials, the supply of fuel and the distribution of the products.

Type of activity:

This was a continuous activity, with climatically determined fluctuations. In the wet season (October-April) the reduced productivity was supplemented with farming, hunting and fishing. In the dry season the potter worked practically day and night.

Economy:

The production constituted an irreplaceable source of income for the potter and his family and played an important part in the economy of the village too (Annis & Geertman 1987).

Situation of the workshops:

The workshops lay scattered around the village, which seems to emphasize their mutual independence (Fig. 2).

Layout of the workshops:

The workshop and the house formed a single unit according to the model of the houses of the farm labourers and small peasants in the different regions of the island (Le Lannou 1941: 257-271; Mossa 1957; Angioni 1976: 169-181; Arata & Biasi 1983: 103-126; Angioni Sanna 1988). The yard, which lay either in front of or behind the house, depending on the region, and the rooms opening onto the yard were used for pottery production, while the potter's family lived in the part of the house furthest from the yard. The space that was reserved for the potter's craft was divided into parts with well-defined functions. If a potter owned some land and livestock, there were also areas for farming activities and requirements, but these were separate from the rooms reserved for the potter's

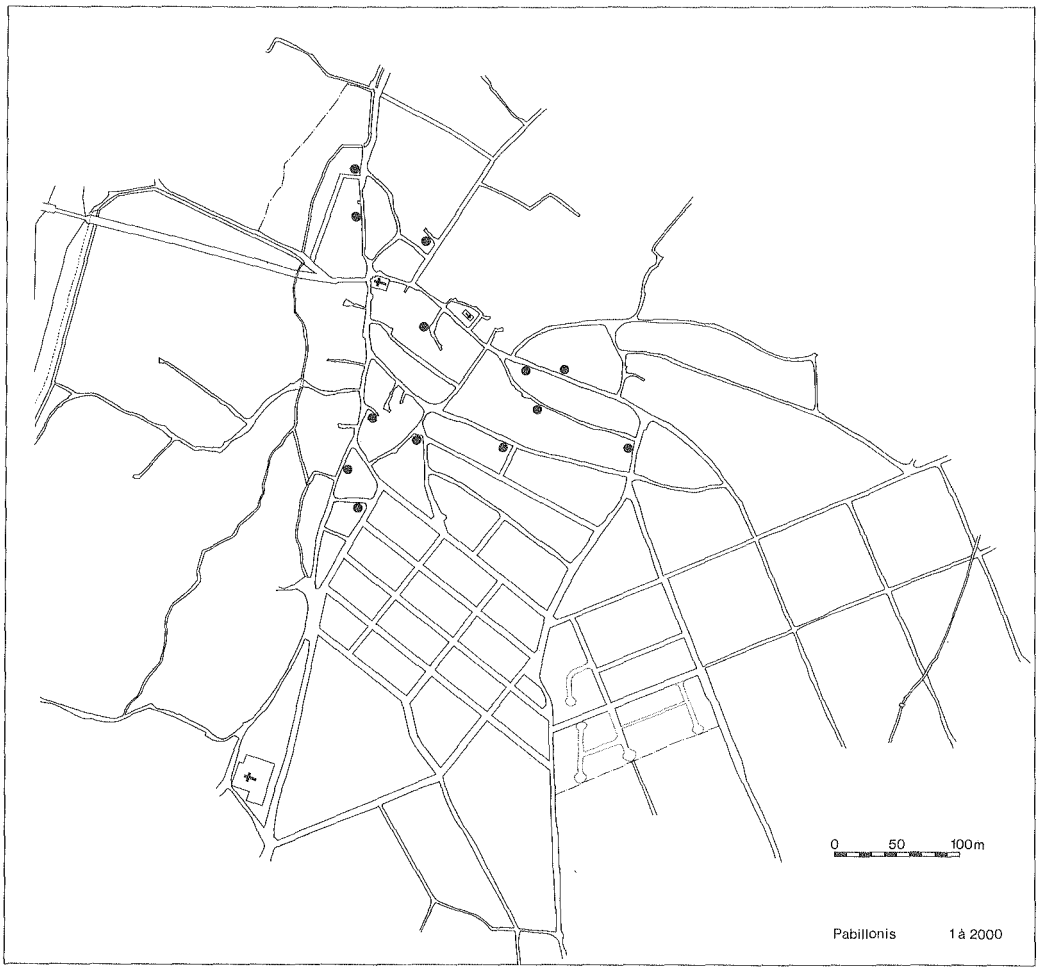

Fig. 2. Pabillonis: plan of the village indicating the workshops.

craft.

Distribution:

Direct sale took place, but the greater part of the distribution was in the hands of middlemen of different calibres. Depending on the function of the products, the distribution area sometimes extended over the entire island. The areas supplied were in any case always large (Annis 1985b:

Fig. 1; Annis & Geertman 1987). Transport was on foot, by ox- or horse-drawn cart, and later also by train.

URBAN WORKSHOP INDUSTRY

Organization:

This form of organization was found in the only production centre to have the status of a town, Oristano. Here the potters were united in a Società, a corporation that replaced the original guild, which was abolished in 1864 (Loddo Canepa 1961; Boscolo et al. 1962). Admission to the Società was subject to the members' approval. Once a potter had become a member, he was allowed to practise his craft independently, had access to the communal clay pits and could lay claim to the assistance of his colleagues in mining the clay and firing the kilns. He was provided with galena for glazing and if he suffered misfortune he could appeal to the Association's funds. Of course, he himself had as many obligations to the Società and membership of the association counted more than independence. The influence of the Società even extended to the potter's private life and limited his personal freedom.

Type of activity:

The potter was a full-time craftsman. The activity was continuous, except for the fluctuations caused by the wet and the dry seasons.

Economy:

The potter's craft was his only source of income. He had to see to it that he earned enough in the dry season to supplement his meagre income during the wet season. The potter's craft also played a part in the economy of the town, as appears from the various measures taken by the municipal government regarding the sale and the prices of the products (Virdis 1959/1960: 59).

Situation of the workshops:

At Oristano, there were two types of workshops, corresponding to two different phases in the organization of the production, which, in turn, were expressions of two different moments in the history of the town and the island (Fig. 3):

(1) Workshops without adjoining living quarters, lying in a row outside the town walls along the via Figoli (Potters' Street) in the vicinity of large communal kilns (10 m3). From written sources (Della Marmora 1868: 286; Angius 1853: 269) we know that this nucleation dates from the time when the statute of the guild had force of law. In the years between the two World Wars the workshops and the kilns were owned by a former potter who had become an entrepreneur and had employed 15 potters in these workshops (Annis 1985a).

(2) Home-workshops, which operated independently from one another and each had their own kiln. A few were situated along the via Figoli, but most lay in a suburban district that had developed in the second half of the 19th century, in the period in which the Piedmontese government which at that time ruled over Sardinia abolished the institution of the guild, replacing it by an association for mutual help (Virdis 1959/1960: 74; Annis 1985a).

Layout of the workshops:

(1) The workshops along the via Figoli were divided into different functionally determined rooms. The workshop was entered from the street and the back of the building opened onto a communal yard.

(2) The home-workshops, in which the potter lived and worked, were divided into separate living and working areas. The front part of the house, which was entered from the street, was reserved for the family, who assisted the potter in his work, while the back part, opening onto the yard, served as the workshop. These houses were also of the type of the homes of

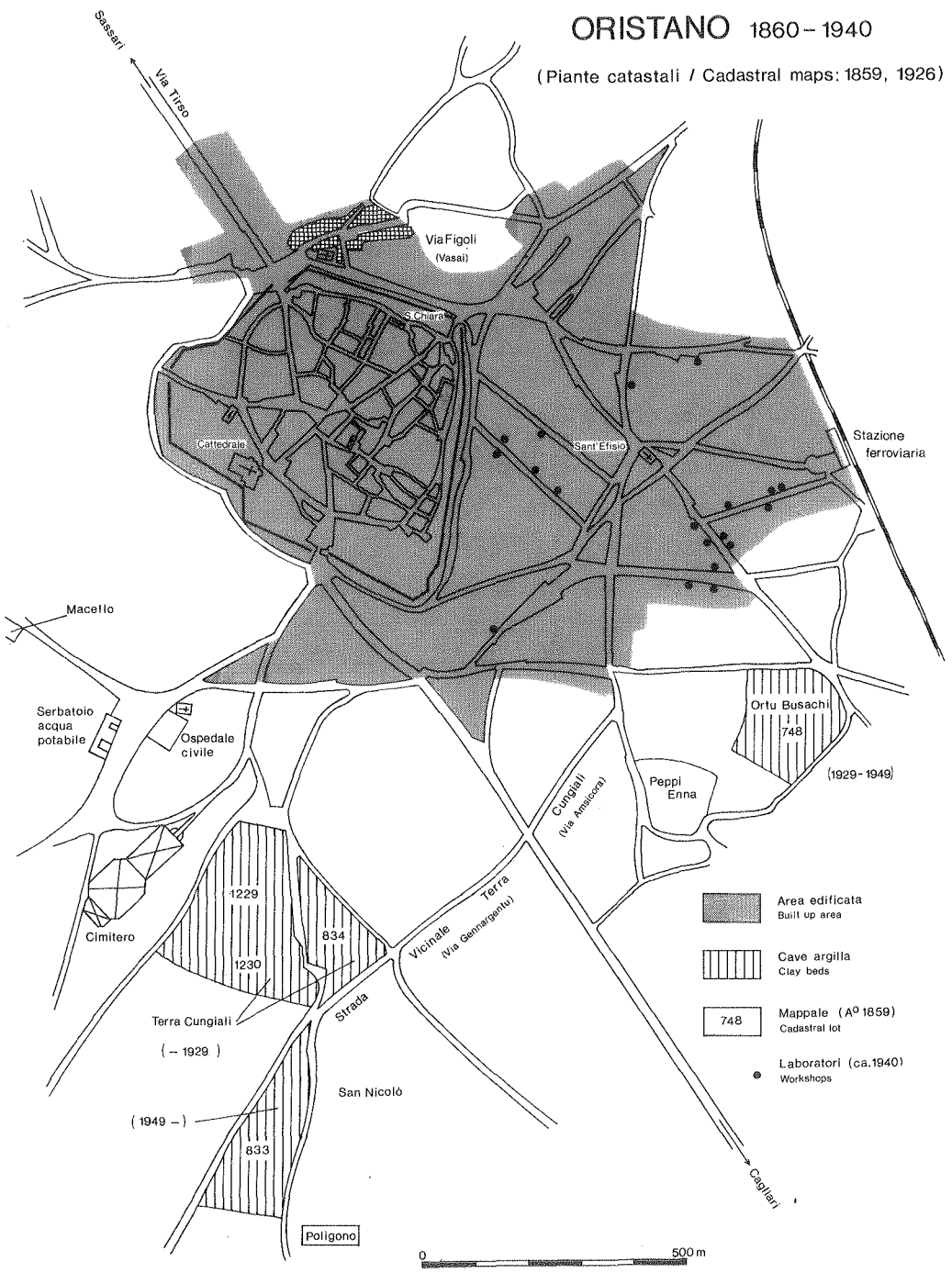

Fig. 3. Oristano: plan of the town indicating the workshops.

farm labourers and small peasants. The difference was in the elements of the layout and the functions of the rooms: the kiln, the wheels, the wetting tanks, the mortars for grinding flint and galena, the storage areas for clay and fuel, the drying rooms and the storerooms for the fired pots. In spite of the different character of the two parts of the house, also in architectural terms, the boundary between the two was flexible: particularly in the high season the work also invaded the rooms designed for domestic life.

Distribution:

Distribution was via middlemen and covered the entire northwestern part of the island. Transport was by ox- or horse-drawn cart and later also by train. Direct sale took place in the town itself and in the neighbouring areas within a radius of about 50 km which were visited by the potters themselves with hired ox-drawn carts in occasion of popular religious feasts (Annis 1985a: Fig. 2).

In the second half of the 30s the government's policy directed at integrating Sardinia with the rest of Italy led to greater welfare, an increase in population, diversification of the job market and the introduction of new technologies. Innovation was also observable in pottery production in the form of the manufacture of fine glazed and painted pottery. This development took place in a new organizational form, the manufactory.

MANUFACTORY

Organization:

The organization of the manufactory was of a capitalist type. The owner possessed the means of production and he employed a number of differently qualified persons, each performing a distinct task: labourers to mine and prepare the clay; throwers; decorators; kiln firers.

Type of activity:

The potter worked continuously. The kind of technical equipment used was such that climatic and seasonal variations no longer affected the production.

Economy:

The craftsmen earned wages. They worked a statutory number of hours and were obliged to produce a certain number of pots.

Layout of the workshop:

The work was done in a large building of several storeys. The ground around the building was partly open and partly sheltered, serving as a storage area for clay and fired products. The basement was used to prepare the clay. On the ground floor were the kilns and adjoining large rooms for drying. The rooms containing the wheels (between four and five) where the pots were thrown or cast in moulds and the rooms for decorating and glazing were on the upper floors. Special pots involving more laborious production methods were manufactured and fired in a separate department. Finally, there were also storerooms and a showroom- shop on the ground floor (Figures 4-5 and 6-7).

Distribution:

Distribution was direct or via middlemen and covered the entire island. In addition, products were exported to the mainland.

The years following World War II saw a rapid and fundamental change in every aspect of the context, which was accompanied by extinction, adaptation and total innovation of the potter's craft in the different centres. The first modes of production to suffer from the new situation were those which depended most on the old social and economic structures: in the first place the urban workshop industry, followed by the rural workshop industry (Annis 1985b). The mode of production characteristic

Fig. 4. Assemini: manufactory, yard and main building.

of this transitional context is that of the:

INDIVIDUAL WORKSHOP

Organization:

The potter works alone and has to rely on his own inventiveness to solve the organizational, technical and economic problems with which he is confronted. This has led to multiform solutions.

Type of activity:

The activity depends on the type of product (traditional or new) and on the manufacturing technique. If the latter is paleotechnic, then the activity is characterized by seasonal fluctuations; if it is neotechnic, the activity is continuous

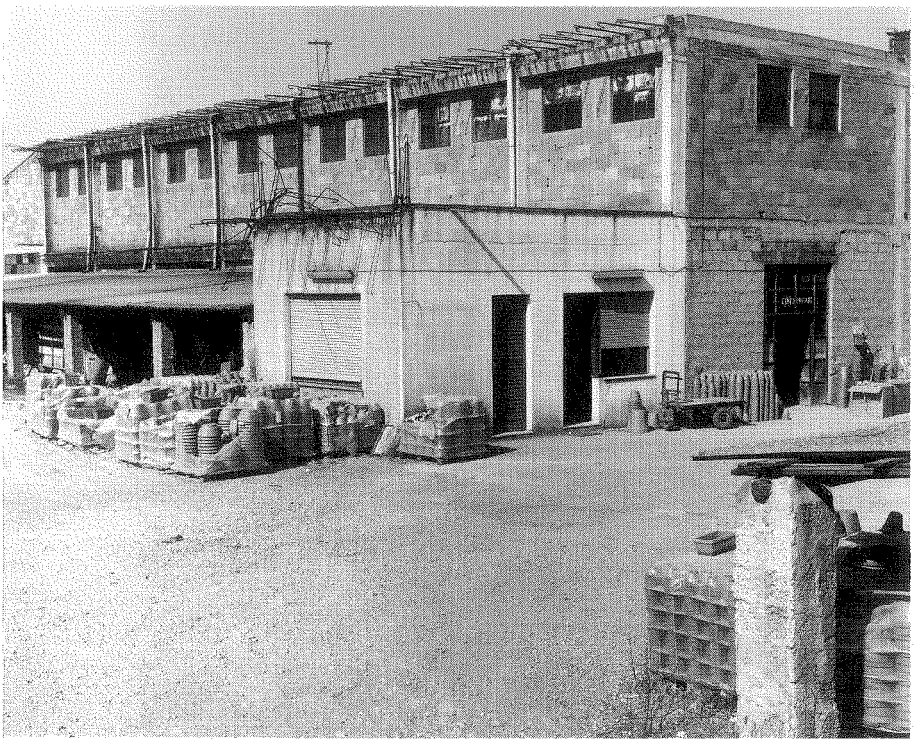

Fig. 5. Assemini: manufactory, yard and main building.

and dependent on the market.

Economy:

The activity is the principal, but not the only source of income. Every potter can depend on other forms of income or does other work too. This is possible thanks to modern technical conveniences which reduce the amount of work and make the potter's task easier.

Situation of the workshops:

The workshops lie scattered over the entire island. The presence of usable clay is not a binding factor any more (Fig. 1.) and the workshops are therefore no longer tied to the traditional centres. The new road system, modern means of transport and new techniques afford greater independence.

Fig. 6. Assemini: manufactory, drying and storage rooms.

Layout of the workshops:

The layout of the workshops varies according to personal requirements which, in turn, are connected with the type of product, ranging from traditional terracotta to artistic ceramics. However, these are all workshops, whose functions are apparent from the use of the various rooms and the elements of their layout, in particular the wheel and the kiln.

Distribution:

Distribution is direct or via middlemen, both local and

Fig. 7. Assemini: manufactory, drying and storage rooms.

intercontinental, and depends on the type of customer, which varies from peasants and shepherds, middle-class Sardinians and tourists, to American and Japanese trading firms. Means of transport range from carts to airoplanes.

The case of a workshop: four phases in the use of space

Figures 8-17 illustrate a concrete example of the development outlined above. They show four separate phases in he use of space in one and the same workshop, corresponding to as many changes in the organization of the production.

Phase 1:

In a standard type of home-workshop at Oristano the owner works together with a fully-qualified assistant and one or more apprentices. So as to be able to use the entire ground floor as a workshop, the potter-owner adds an upper storey to his traditional home to serve as the living quarters of his family.

Phase 2:

Towards the end of the 50s, when the new social laws and in particular the law regarding apprentices start to take effect, the potter dismisses his staff and continues the work by himself. He can still count on the assistance of some colleagues of the former Società and on external services. He buys a small house, adjoining his own home, and turns it into his workshop, equipping it with one wheel. He also reduces the capacity of the kiln (from 5.7 m3 to 3.8 m3). The ground floor of the house once again becomes his family's home and the upper storey is let out. There is no change in the type of products.

Phase 3:

When in the end the potter can no longer count on the help of his colleagues and on external services, he once again replaces his kiln by a smaller one (2.25 m3) which, moreover, is now built above the ground. These two measures make firing the kiln less hard. The type of product changes, large water vessels being replaced by small pots for the tourist market; the yield of the new kiln thus becomes greater than that of the previous one.

Phase 4:

For fiscal reasons the potter decides to stop working. He has his name removed from the register of the Chamber of Commerce and disassembles the kiln. He lets out his former workshop to a frame-maker and reserves a small working area for

himself in his yard where he sets up his wheel. The pots he produces here he has fired in a colleague's kiln.

Final remarks

After the above survey it seems justifiable to speak of significant relationships between the different modes of production and the use of space.

As for the situation of the workshops, it may be concluded that the more complex the organization, the greater the tendency to nucleation. The two extreme instances are the isolated workshops of the household industry, characterized by a minimum of organization, and the concentration of a number of craftsmen in one large building, the manufactory. The more complex the organization, the greater also the area of distribution.

The partial or dominant part played by the craft in the life of a workshop owner is reflected both in the surface area of the space reserved for the craft and in the degree of functional articulation of this space. In the household industry working space is created for a limited period of time and with a minimum of permanent equipment in an area that serves different purposes at the same time. In the rural workshop industry the working space is divided between agrarian and ceramic activities. In the urban workshop industry pottery production absorbs all the available space and, in order to obtain the greatest functionality, parts of the area reserved for domestic life are also temporarily taken over when necessary. In the individual workshop, finally, we see a sharp division between the areas designed for domestic life and those reserved for the craft and a curtailment of the latter to the advantage of the former (Figs. 8-16; Annis 1985a: Fig. 4). When the organization of production and distribution is not in the hands of the potter, as is the case with the manufactory and, to a certain extent, also with the guild, the workshops and homes are separate entities.

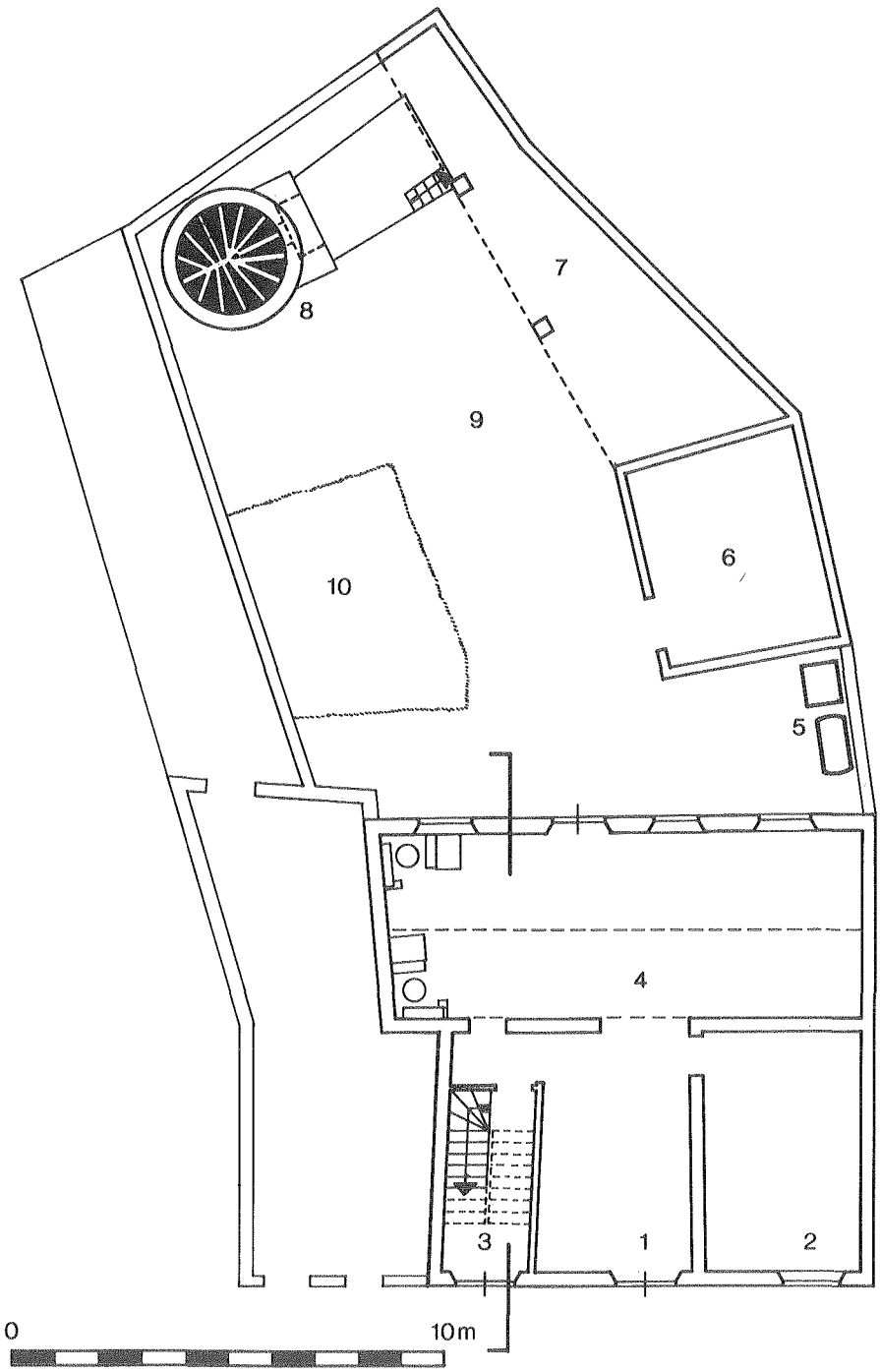
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Fig. 8. Oristano, a potter's workshop: phase 1. 1. entrance; 2 and 3. stores for unfired and fired vessels; 4. workshop, with two wheels; 5 wetting tanks; 6. storage of clay; 7. sheltered area for the storage of fuel; 8. kiln; 9. yard; 10. kitchen garden.

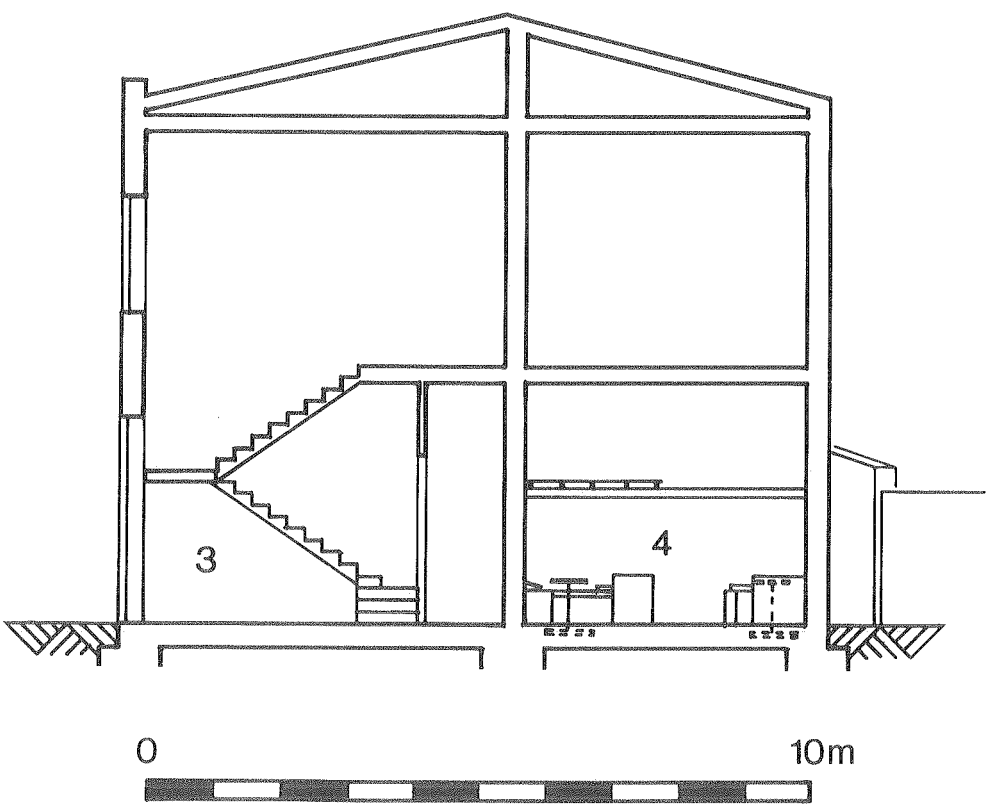

Fig. 9. Oristano, a potter's workshop: phase 1. Cross-section showing the wheels, the benches, the lowered ceiling for storage (below) and the living area (above).

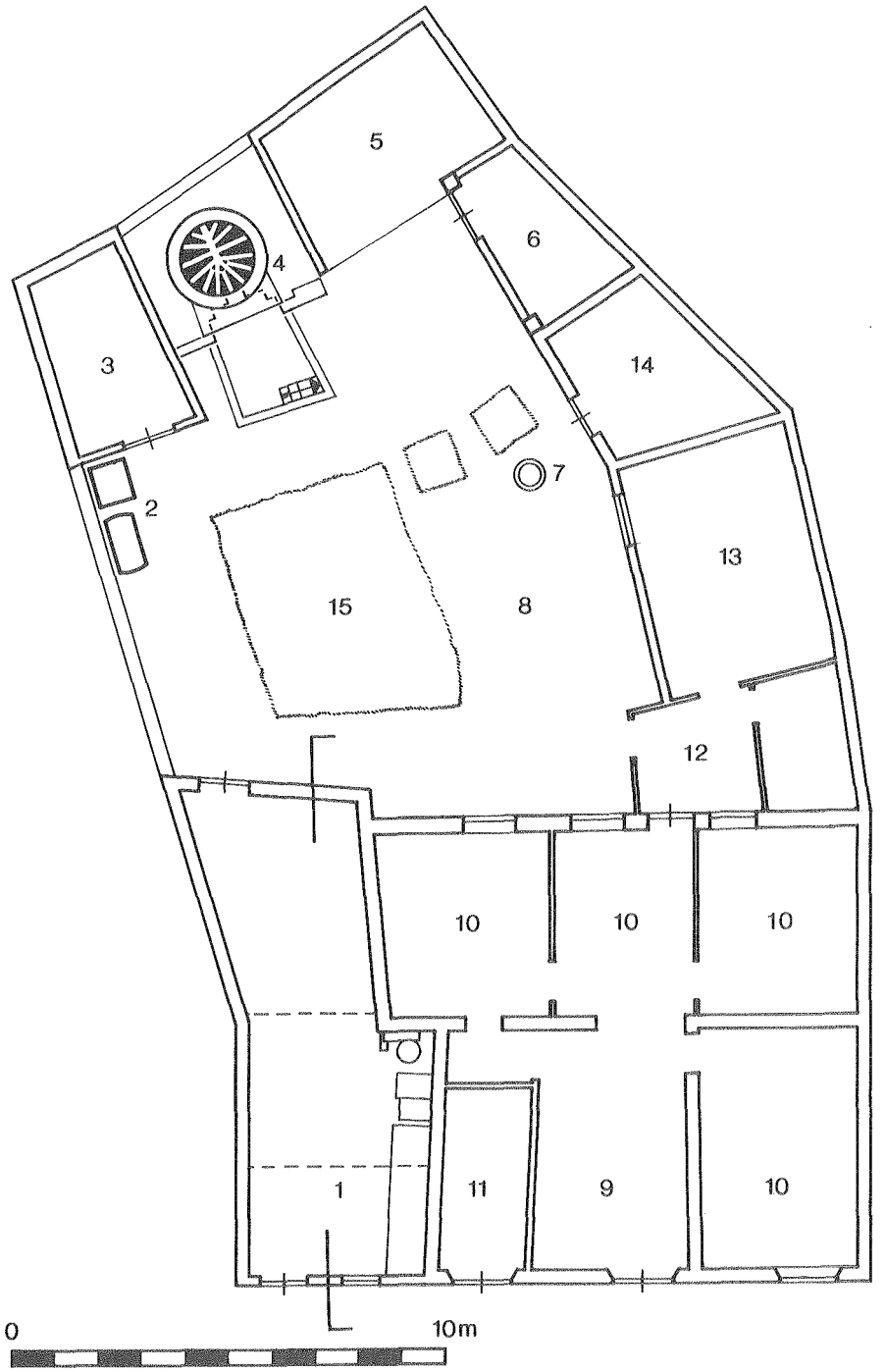
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Fig. 10. Oristano, a potter's workshop: phase 2. 1. workshop (one wheel); 2. wetting tanks; 3. storage of clay; 4. kiln; 5. sheltered area for the storage of fuel; 6. store for vessels; 7. mortar; 8. yard; 9. entrance; 10. living areas; 11. entrance to the upstairs flat (let out); 12. veranda; 13. kitchen; 14. washing room; 15. kitchen garden.

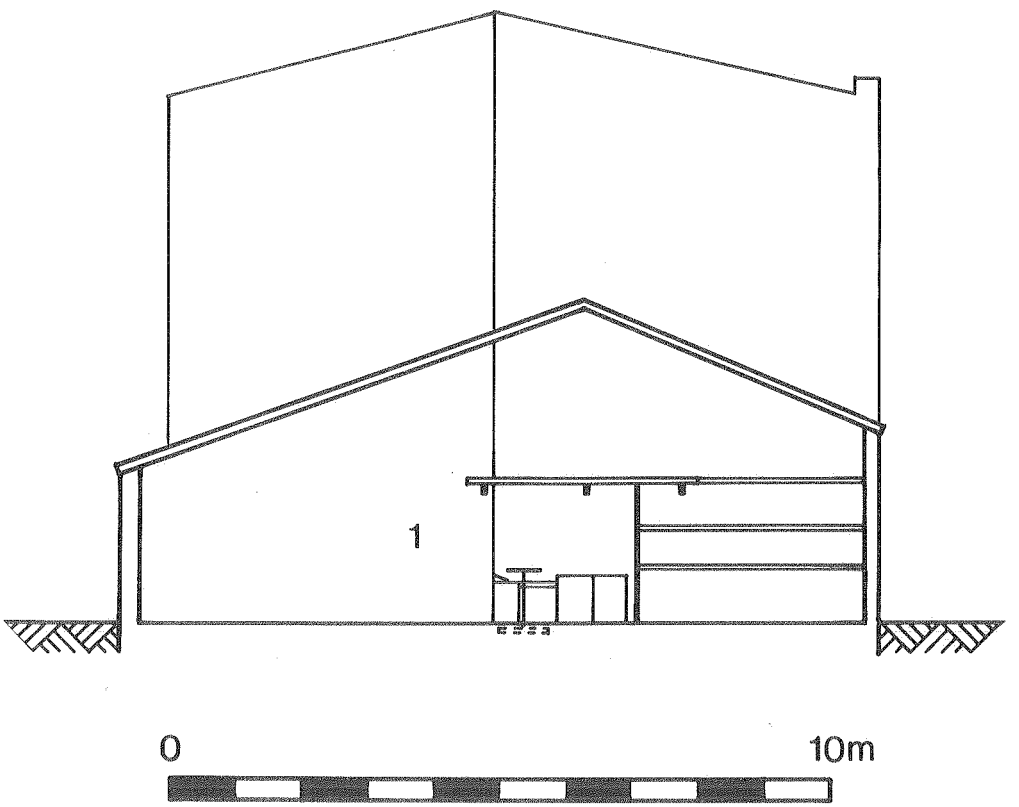
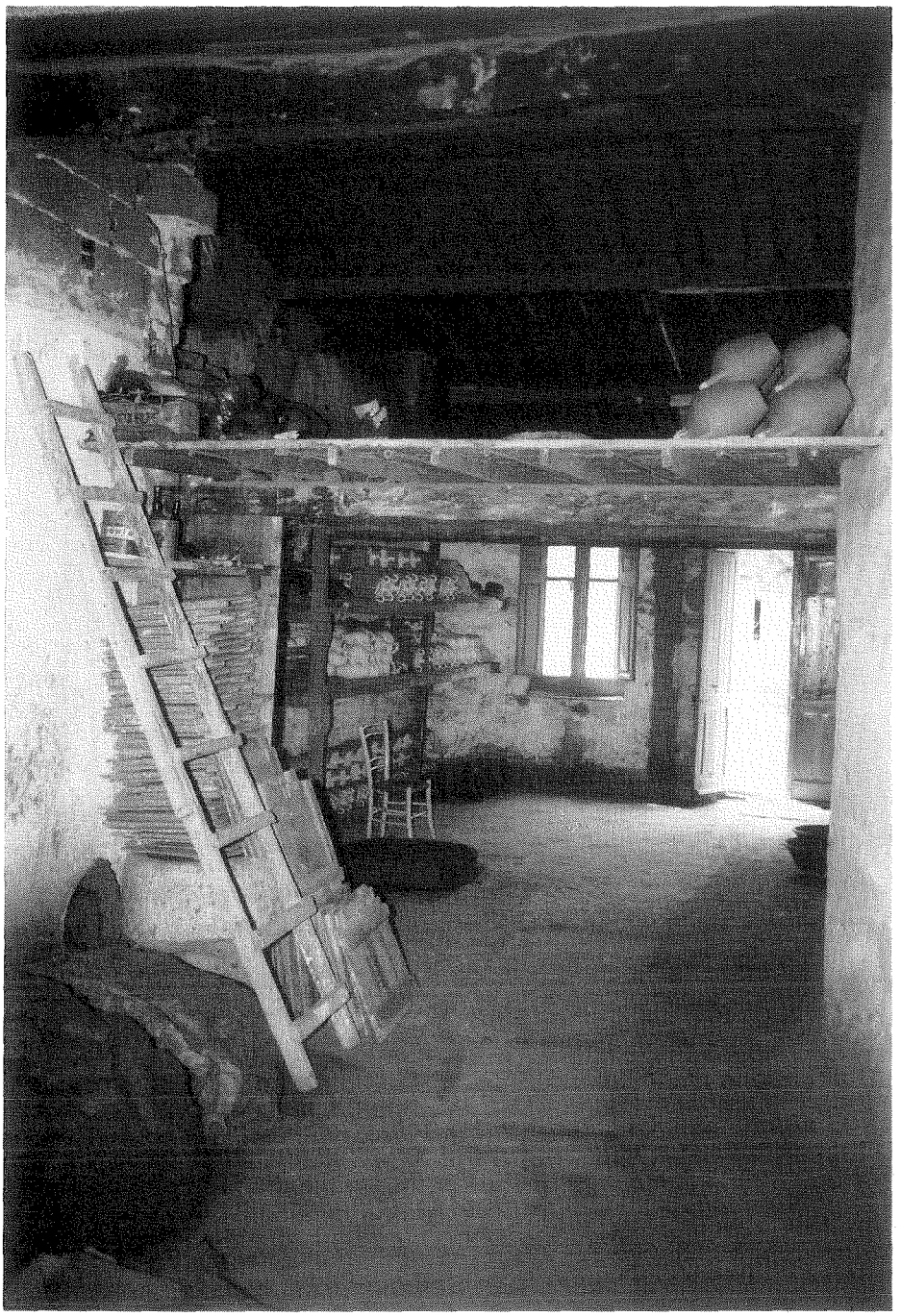
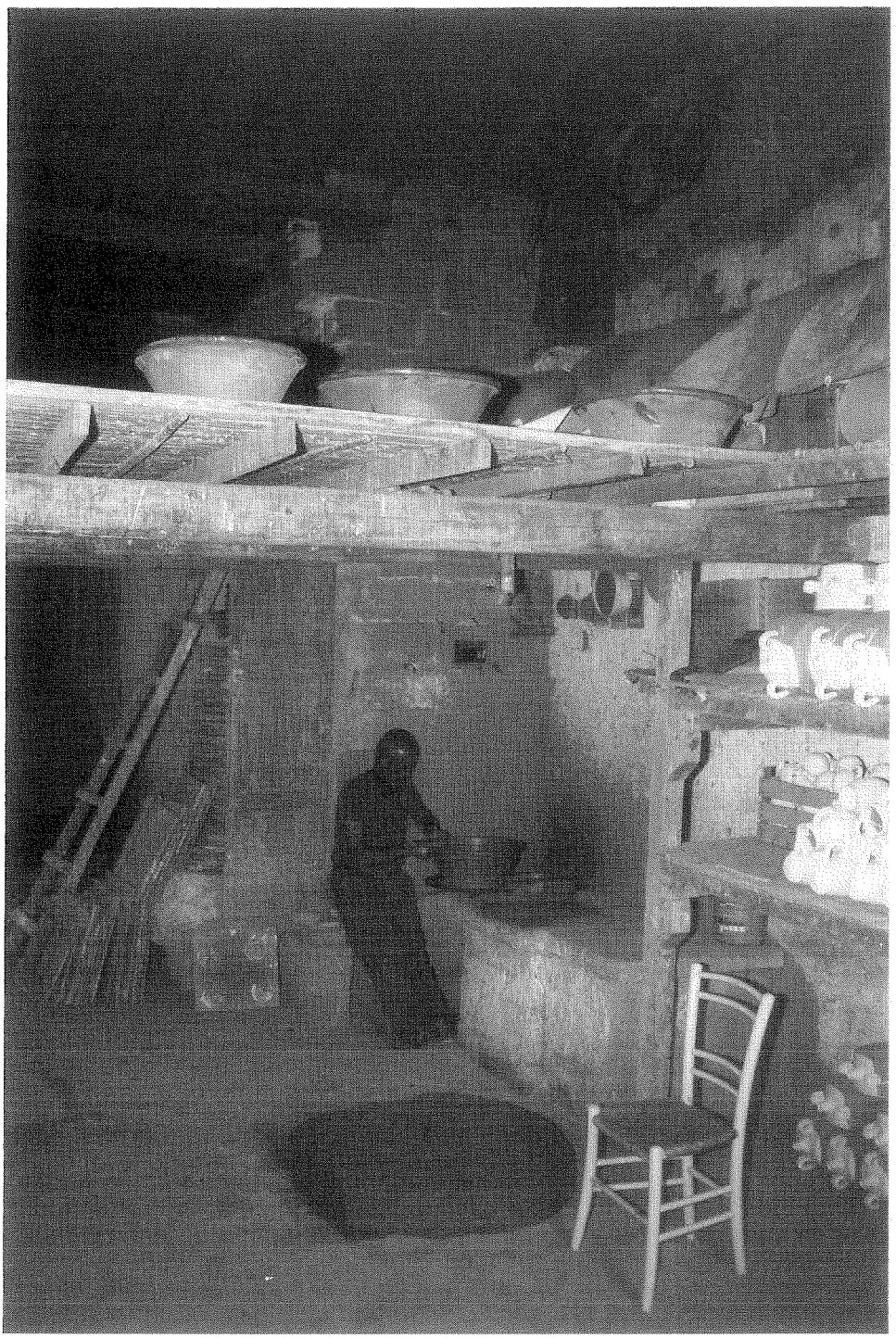


Fig. 11. Oristano, a potter's workshop: phase 2. Cross-section of the workshop, showing the wheel, the bench, a drying rack and the lowered ceiling for storage.



Figs. 12-13. Oristano, a potter's workshop: phase 2. The workshop.



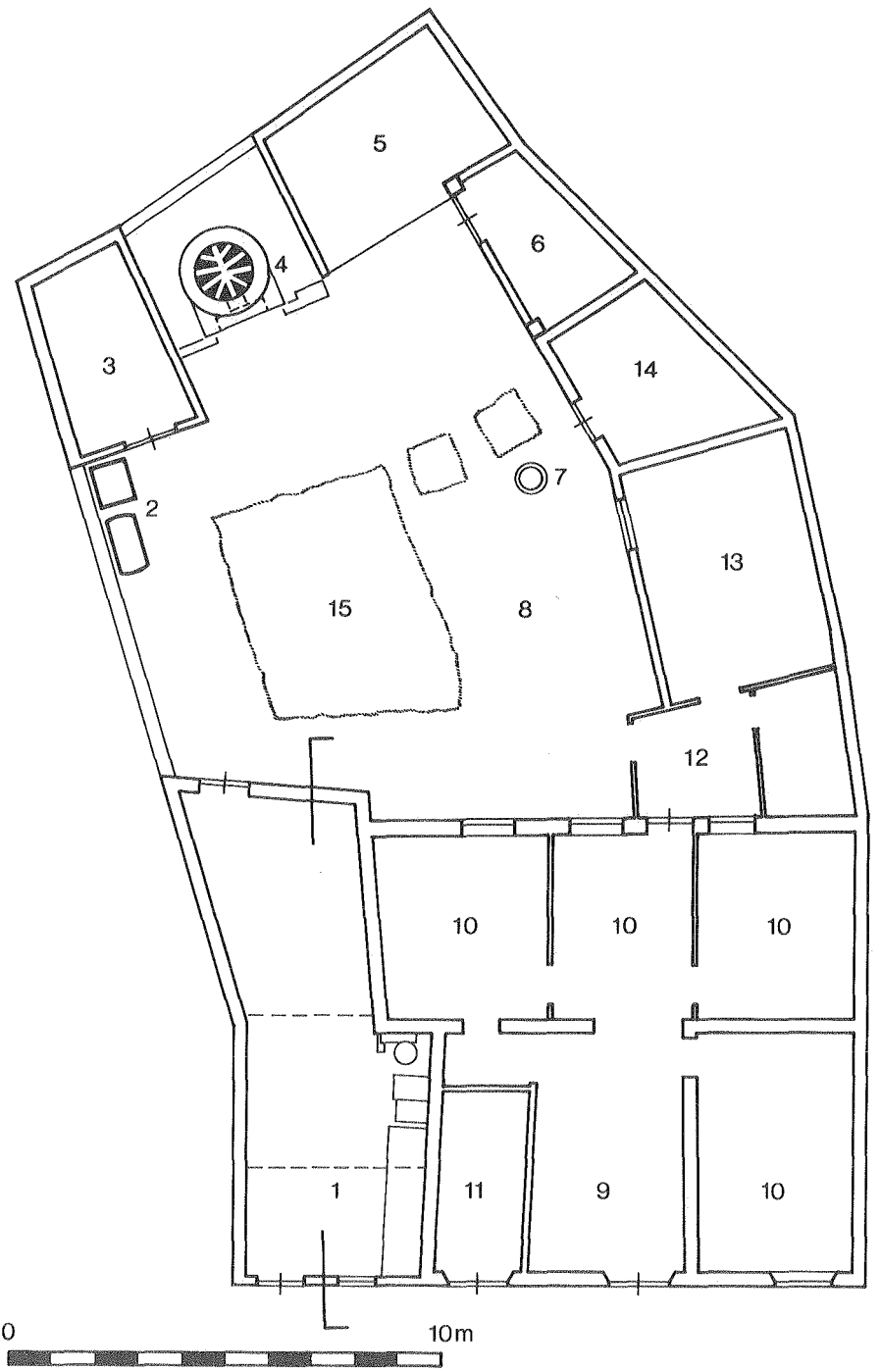

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Fig. 14. Oristano, a potter's workshop: phase 3. As Figure 9, but with a smaller kiln, built above the ground.

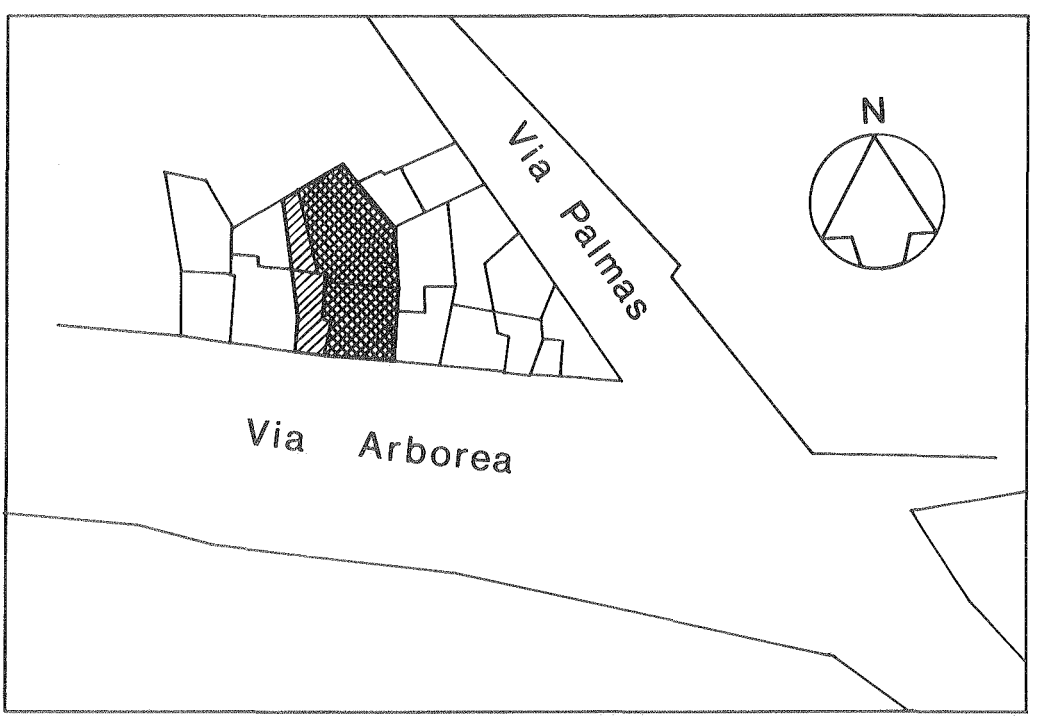

Fig. 15. Oristano, a potter's workshop: phases 1 and 2-3. Cadastral plan.

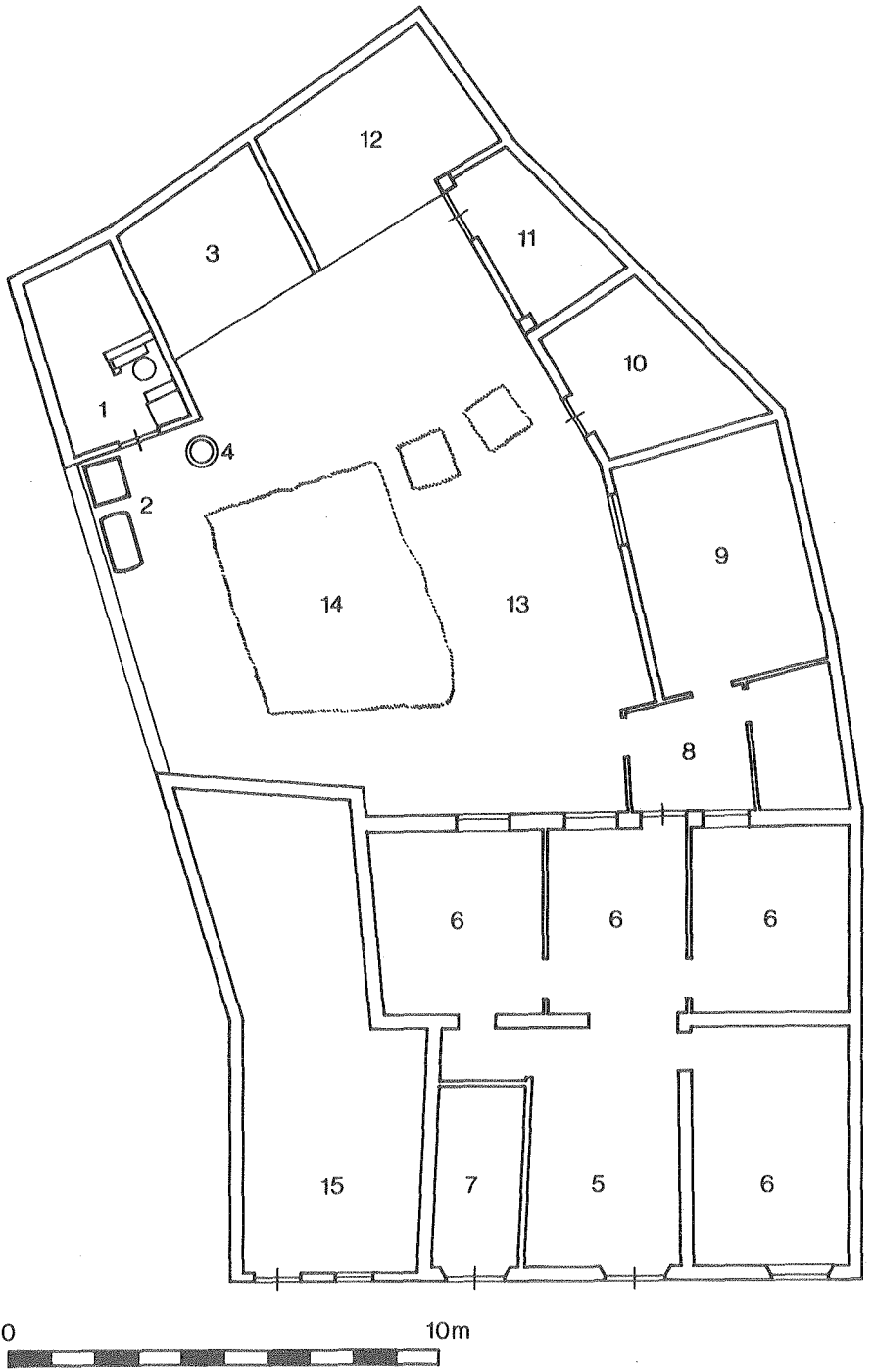
12
3
11
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Fig. 16. Oristano, a potter's workshop: phase 4. 1. room for the wheel and the storage of clay; 2. wetting tanks; 3. sheltered area for drying and storing the vessels; 4. mortar; 5. entrance; 6. living area; 7. entrance to the upstairs flat (let out); veranda; 9. kitchen; 10. washing room; 11. larder; 12. sheltered area with washing lines; 13. yard; 14. kitchen garden; 15. shop (let out).

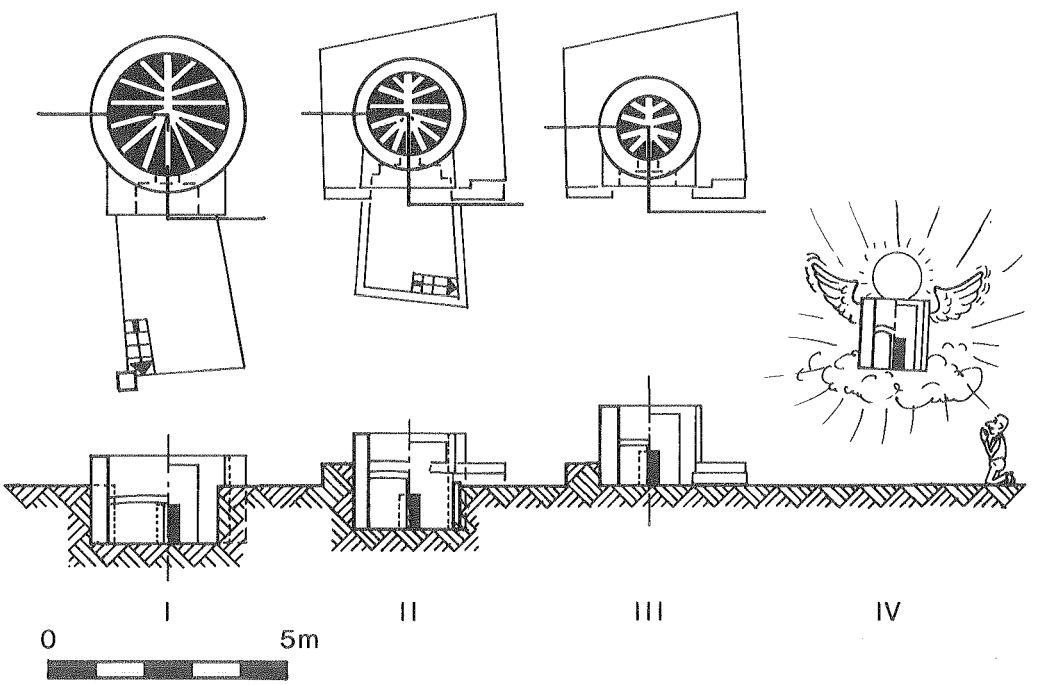

Fig. 17. Oristano, a potter's workshop: phases 1, 2 and 3. Plans and cross-sections of the kilns.

The use of space in the two simplest forms of organization, the household industry and the individual workshop, differs greatly: the specifically functional character of the rooms reserved for the craft is, as already explained, far more distinct in the second case than in the first; moreover,

distribution is exclusively local in the first case, whereas in the second, it may cover long distances too.

As for the indications from which the size of the activity of a workshop can be deduced, the number of wheels and the number and capacity of the kilns seem to be more important assessment criteria than the surface area reserved for the craft. However, the capacity of the kiln must always be regarded in relation to the type of products: large or small.

Once the existence of relationships between 'behaviour' (the use of space), 'material culture' (the situation and type of workshop and the distribution of the products) and 'culture' (the modes of production) has been established (Kent 1987a; 1987b), the question as to the meaning of their occurrence and their changing still remains. With this we have reached a complex subject that cannot be discussed exhaustively in the present article and at this stage of the research. Here, I would like to limit myself to formulating a few considerations.

The degree of nucleation and the situation of the workshops; their degree of functionality; the proportion of the surface areas reserved for domestic life and work; the relationship between surface area, number of wheels and capacity of the kilns and the dimensions of the kilns and the type of product; the proportional relationship between the complexity of the organizational form and the size of the distribution area - these are all phenomena that can be explained in techno-economic terms. That is, in terms of the technical and organizational efficiency in production and distribution; the economic dependence of the craft; the adaptation to the market demand. Such an explicitly 'functional' and 'materialistic' (Hodder 1986; Kent 1987b) interpretation is in my opinion justifiable on the grounds that production for a market is essentially an economic fact.

Nevertheless, the analysis of the context has shown that it was not only technical and economic factors that determined the situation described above. The part played by the potter's

attitude towards his work and his family; tradition and legislation; personal initiative and inventiveness may not be neglected. For a correct interpretation of the data the identification of the material as well as the ideal factors that caused the different phenomena and the analysis of the way in which they are connected appear to be of essential importance. In this respect, speaking from a more general viewpoint, it seems to me that, in spite of theoretical and methodological differences of opinion regarding ethnoarchaeology, its definition and its importance for understanding the past, it cannot be denied that it is particularly ethnoarchaeological studies that have provided concrete proof of the lack of a dichotomy between material and ideal aspects of a culture. Whether and how both aspects can be detected archaeologically is an argument which is playing an essential role in the current debate on methods and theories regarding the interpretation of human behaviour in the past (Binford 1983; Hodder 1986; Kent 1987). *

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M. Vilders

A TECHNOLOGICAL STUDY OF THE POTTERY FROM DEIR ʿALLA PHASE M

Introduction

As part of my study of Palestinian Archaeology at the Rijksuniversiteit in Leiden, I made a technological study of the phase M pottery excavated in 1967(1) by H.J. Franken at tell Deir ᶜAlla.

Tell Deir ᶜAlla is located in the middle of the fertile Jordan Valley, approximately 5 kilometres east of the Jordan river and approximately 2 kilometres west of the spot where the valley of the Zerqa river (the biblical Jabbok) flows into the Jordan Valley. The first five seasons of digging showed that the site had been continuously inhabited from the late Bronze Age until the Persian Period. Within the Iron Age phases A-M, the last phase, phase M, is particularly important due to the discovery of the so-called Bileam text(2), a plaster text written in an unknown Aramaic dialect. With regard to the architectural context of the text, the excavator, H.J. Franken, has noted that it concerns a number of work-rooms with inner courtyards.

The purpose of the study of the pottery was to answer the question to what extent this material was connected to the previous phase L. To begin with, a number of technological aspects of the phase M material will be treated summarily, after which a comparison with phase L is possible.

Method

The study by H.J. Franken of the Iron Age phases A-L from tell Deir ᶜAlla (Franken 1969), was the first to look at pottery from a technological viewpoint and to make a diachronic comparison. Thus in this publication(3) the technological development of the pottery is described, from which emerges a technological-chronological development of the

pottery. The research I have done into the phase M material is grouped as much as possible into the same criteria, so as to be able to make a comparison with phase L; therefore, here also, a classification based on the function was made first, resulting in the following grouping according to use: cooking pots, bowls, jars, kraters and oil-lamps. Thereupon a typology based on the shaping of the rim (see below for this typology) was possible. The choice of this criterium lies in the fact that both in the phases A-L as in the phase M material, the rim sherds represented the bulk of the material. This has led to a classification of the phase M material into: 3 types of cooking pots, 1 type of deep bowl, 7 types of shallow bowls, 1 type of large shallow bowl, 4 types of jars, 1 type of krater and 1 type of oil-lamp. Within the types established in this way, it was in most cases also possible to group together the rim variants. This term is used to refer to the different ways encountered in the finishing off of the rims. Attention was paid during the study to the following aspects: clay and temper; basic shaping techniques; secondary shaping techniques; firing.

Clay and temper

The microscopic study (10x magnification) of the material resulted in a division into two clay groups: banded and not banded clay.

Banded clay consists of thin layers of clay with layers of sand and sometimes layers of iron oxide in between. The potters of the Deir ᶜAlla material who prepared this clay did not let the clay soak long enough for the clay particles to dissolve. The latter break down into sub-plates during the firing process (personal information from H.J. Franken). The occurrence of banded clay can be easily explained since the site itself originated on this kind of clay. Worth noting is that both clays contain organic material as temper and that the banded clay always contains quartz sand as temper. This

quartz sand is abundantly available in the neighbourhood of the site since the river Zerqa transports large amounts of eroded Nubian sandstone. Within the above-mentioned clay groups, a further division into six wares was possible, on the basis of the non-plastics added (Fig. 1). With the term ware is meant the combination of the raw clay and the non-plastics added. For the cooking pots not banded clay mixed with calcite was used (wares 1 and 5). The largest group consisted of household crockery such as bowls, jars, kraters and oil-lamps, and was made of banded clay mixed with organic material and quartz sand (ware 3) and organic material with crushed calcite (ware 4). Defined as import are the cooking pot type 3, not only because of its quartz temper (ware 2) but also because of its being fired in a reduced atmosphere, and the so-called `Madaba´ pottery (see Franken 1969: 145) (ware 6). From the fact that the regular crockery was made from banded clay, which is locally present (see above), it is safe to conclude that this pottery was locally produced.

Basic shaping techniques

For the shaping of the body, three basic methods were used:

Mould-made

A slab of clay was pressed into a mould (which was most probably of clay) to form the base , and on this, the shoulder and the neck were formed by means of coiling. This resulted in a sharp angle between the body and the shoulder, which in the case of the Deir ᶜAlla cooking pot type 2 is weakened because of the use of the wheel for the finishing off of the shoulder. This method was used for the production of cooking pots (types 1-3), deep bowls (type 3) and the so-called `Mensif´ bowl (type 18).

Coiling

In most cases this was done on a base of clay on which

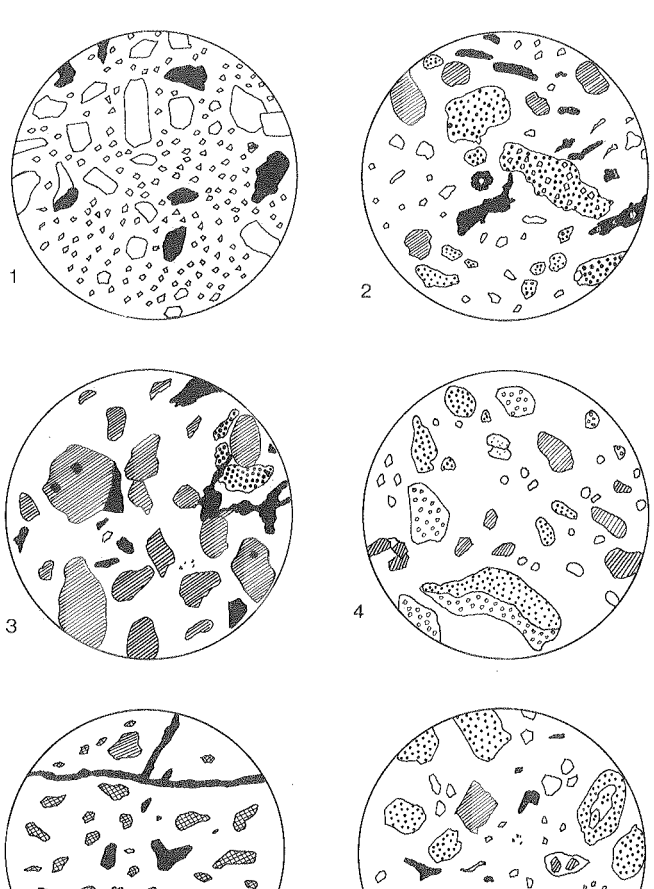

Fig. 1. Drawings of the thin slides of the six wares.

the pot was either: coil-built (jars type 2), coil-built in two phases (jars type 1, kraters type 1) or coil-built on an mould-made base (cooking pots types 1-3 and deep bowls type 3). Considering the turnmarks on the wall of the material, this coiling was very often done with the aid of a turntable/tournette. The bulk of the phase M material, such as bowls, jars, kraters, plates and oil-lamps, were produced in this manner.

Throwing

This method was used on a large scale in the Middle and early Late Bronze Age, but then the know-how became extinct, probably in connection with the economic decline of the period. At Deir ᶜAlla we see the introduction of wheel-thrown pottery in Iron Age I phase G onwards, not as an innovation of the indigenous potters, but as an article of import (Franken 1969: 145). Within the rest of the repertoire there were a number of the jars type 2 and the oil-lamps thrown from the cone. In phase M we recognize a gradual shifting from coiling to throwing since a very small number of the shallow bowls were wheel-thrown, but until the later material is published nothing more can be said about this aspect now.

For the shaping of the rim, four basic rim-shaping techniques were distinguished within the phase M material:

1. Unprofiled; in the case of the shallow bowls types 4-15, the jar type 3 (i.e. the cylindrical jar) and the oil-lamps.
2. The last, flattened coil was turned inwards; in the case of the cooking pot type 2, the `Mensif´ bowl type 18 and jar type 2.
3. The last, flattened coil was turned outwards; in the case of the cooking pot type 3, the deep bowl type 3, and the krater type 1.
4. The last, flattened coil was turned inwards and outwards;

in the case of the cooking pot type 1, the jar type 1 and type 4 (i.e. the hole-mouth jar).

A clear example of shaping technique number 2 in Deir ᶜAlla is the cooking pot type 2 (Fig. 2)(4). Within this type it has been possible to distinguish seven variants since Iron Age Deir ᶜAlla phase E. Variant A is sec, the basic shaping technique, while specific aspects were added to the other six variants, probably to strengthen the rim.

Apparent from the above-given list is the fact that the potters deemed it necessary to strengthen the rim of the larger earthenware types by folding them once or twice, and that this was not needed for the smaller types, such as the shallow bowls, which always possess unprofiled rims. The only exception is formed by the newly-introduced jar type 4, the cylindrical jar.

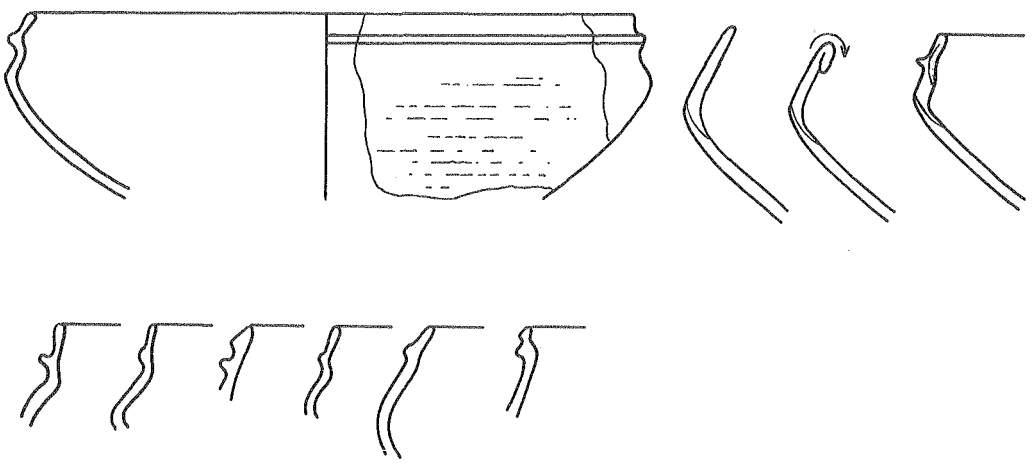

Fig. 2. Construction drawing of cooking pot type 2 (Franken 1969: Fig. 28).

Secondary shaping techniques

Burnishing

The expanding tendency to burnish is especially clear in Deir ᶜAlla phases H-L. In the line of this tradition, we can define phase M as a continuation, because 56% of the shallow

bowls was burnished either on both the inside and outside or only on the inside.

Slip decoration

This method occurs sparsely in phase M on jars, bowls and pilgrim flasks with a brown-red slip. Used motifs are lines, circles, squares and, in one case, something that looks like a wheel. What is needed is a thorough research into the motifs of the Iron Age material of Deir ᶜAlla, which is difficult due to the absence of complete decorated objects.

Firing

Most of the material was fired in an oxidizing to neutral atmosphere producing earthenware with a reddish to brown-reddish colour. A few types were fired in a reducing atmosphere producing a greyish to black(5) colour on the surface (e.g. cooking pot type 3). This is very likely an indication that the pot was imported. A large amount of the sherds contain secondary contamination such as salt/lime from the sub-soilwater which fluxed into the material after having been deposited.

A test was performed on a selection of sherds from the six wares to discover whether by refiring them in an oxidizing atmosphere at 750° C for 30 minutes we could distinguish a relationship between colour and ware. Both before and after the refiring, the colour of the surface and the core were noted with the use of the Munsell Soil Color Charts (1959). The result of this test was not conclusive , possibly because the amount of sherds selected for the test per ware (10) was too small for this aim.

Dating phase M

It was possible to establish a date "ante quem" for the phase M material because of the presence of a few sherds imported from Jerusalem and because of the introduction in

Deir ᶜAlla of jar type 4, the hole-mouth jar, which is introduced in Jerusalem in phase 2. Phase 2 is dated by the authors of Iron Age Jerusalem (Franken and Steiner in press) from the 9/8th century B.C.

Conclusion

Before we put the two phases side by side for comparison, it is necessary to cast a glance at the stratigraphy of phase M to see how disturbed it is or in other words how reliable our material is. At this point it appears that the inhabitants of phase M had the habit of digging many pits. As a result of the disturbance in the layers, a number of types which appear scantily in the phase M material but not at all in phase L are regarded as contamination and are left out.

If we now compare the above-mentioned technological aspects of the phase M material with phase L, we can conclude in the area of shaping techniques that there is no indication of fundamental changes. Franken (1969) unfortunately does not go into detail about the aspects of temper and the firing process, so that these cannot be fully compared here, but the phase L material was "fired in an oxidizing kiln " (Franken 1969: 96), which firing process brings about the same result.

A different matter concerns the question whether we now, on the basis of the pottery for daily use in phase M, can be more specific about the break in time between phase L and phase M which emerges from the stratigraphy, in view of "an accumulation of washed material over the phase L builings. Phase M shows a new lay-out of the village." (Franken 1969: 61). It appears that next to the types which occur in both phases and which continue in a straight line as far as development goes, there emerges a number of new types(6) in phase M.

Given the production method, the wares used (wares 3 and 4) and the method of firing (oxidizing), we have only local imitations of the types developed elsewhere. This can be seen

as a confirmation of the stratigraphical data with respect to an interruption in the continuous habitation of the site, It is possible that the residents settled somewhere else where these new types were produced/imported; upon return to Deir ᶜAlla the potters began to imitate these with the clays, etc. available there.

In regard to the length of time involved, it can be assumed that it was of short duration in view of the continuity of the types existing in both phases, and that either the residents of phase L had returned to the site or people with the same tradition of pottery manufacture inhabited the site during phase M.

Notes

1. No preliminary report of this season was published.
2. In the publication of the Bileam text, a stratigraphical sketch is given of the architectural context of the text (Hoftijzer and Van der Kooij 1976: 3-16).
3. With respect to the material, it is necessary to point out that the number of sherds (723) was too small to be treated statistically.
4. This drawing is taken from Franken (1969: 123).
5. or blue, as J. Kalsbeek calls it in Franken (1969: 96).
6. Two types of shallow bowls (types 19 and 20), the hole-mouth jar (jars type 3) and the cylindrical jar (jars type 4).

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E. LaGro
H. de Haas

ANNOUNCING A STUDY OF ISLAMIC POTTERY FROM TELL ABU SARBUT (JORDAN)

Archaeological interest in the Middle East has been traditionally focused on what are called the "ancient civilizations", the field of Assyriology, Egyptology and Biblical or rather Palestinian Archaeology. As in Europe more recent history has mainly been studied via texts, archaeological interest in the Islamic periods has been minimal and then mainly oriented towards remnants of monumental architecture. This is certainly the case in Palestine and Trans Jordan, where interest was and is mainly centred on the so called Desert Castles from the Umayyad Period (A. D. 660 - 750) and the remains of secular, mainly military, and religious architecture from the times of the Crusades. Some excavation reports, notably of the Byzantine period, contain some information about the early Islamic strata which had to be unearthed first, yet they remain isolated and restricted to one period only. While the archaeological knowledge from cities is meagre, the material culture in villages has hitherto remained unknown. Sometimes we find references to these villages and their inhabitants in chronicles, written by people in distant capital cities. These reports give the impression of a desolated, impoverished way of life, where people were exploited by landlords and the military from their mansions and palaces. At the same time the farmers provided the towns with food and cash crops which formed the economical backbone of urban society. Yet the economical development of the countryside and the social changes which went with the introduction of new cash crops remain unknown. We know that the Jordan Valley was a thriving agricultural area, providing abundant crops of products which

were introduced during the Islamic periods, such as indigo and sugar. The study of these aspects is hampered by the limited archaeological research and the consequential lack of basic archaeological information. This is examplified by the fact that pottery studies for these Islamic periods have been limited mainly to glazed pottery, to the detriment of the common and more frequent pottery, which in village type sites especially may account for more then 90 percent of the total number of sherds found.

One of the aims of the excavations at Tell Abu Sarbut is to conduct a small scale excavation of the Islamic occupational layers and to construct a typochronology of not only the glazed pottery but also of the more common wares. This research has an important starting point in the studies which Prof. H.J. Franken carried out on the pottery he found during a small scale excavation at Tell Abu Gurdan, Jordan (Franken and Kalsbeek 1975). A typochronolgy of pottery from the Islamic periods in the Jordan Valley will contribute to a study of material found during surveys in the area and will also be an aid to archaeologists working in other periods but who are confronted willy nilly with material of these Islamic periods.

Tell Abu Sarbut is situated in the central Jordan Valley, approximately 3 kilometres due west from Tell Deir ᶜAlla and is a virtually undisturbed site. This in itself is a unique fact because most of the tells from the Islamic period in the Jordan Valley have been levelled in recent efforts to bring that part of the Jordan Valley under cultivation or have been built up with houses, as a continuation of the past. Tell Abu Sarbut was probably spared because until recently it was located in a military zone, being situated nearly 3000 meters from the Jordan river. Sherding on the surface in 1987 and a trial excavation in 1988 confirmed that there has been a nearly continuous Islamic occupation from the Umayyad to the

Mamluk period (A.D. 1250 - 1500). Underneath these deposits we have found traces of the Byzantine and late Roman periods. This enables us also to study the transition from Byzantine into Islamic cultures about which not much certainty exists. The excavation is planned for three seasons, starting January 1989.

During the trial excavation of 1988 nearly 6000 sherds were found and not one piece of pottery was complete. This implies that as much mending as possible has to be done in order to reconstruct large fragments and, possibly, complete profiles. For this reason not only rims, bases and the like were kept but also many of the body sherds. The pottery which has been studied until now has been divided into several preliminary groups, which are easily discernable visually and a large group of varia which as yet cannot be attributed directly to a specific group. Following several more seasons of work we expect to have enough material in this "varia" group to be able to divide it into several sections. The visual appearance of these pieces is of practical necessity in view of the large number of sherds which need to be processed. After further study these groups might be split up or put together. The following aspects will be studied for all the groups.

Technical: which clay and what kind of temper were used? How were the different forms constructed, and which forms can be discerned?

Statistical: what part do the different clays, tempers and construction methods and forms have in the repertoire and what is the diachronical development of these aspects?

Relations: what are the relations of this pottery with that published from other sites? What can be said about the

organization of the production and trade of the pottery? What can we conclude about the social and economical status of the village and its inhabitants?

The most well known kind of Islamic pottery is the glazed ware. This makes up, however, less than five percent of the total number of sherds, again indicating the importance of the remaining 95 percent. These are provisionally divided into:

1. thin reddish ware (Byzantine - Umayyad)
2. hard orange ware with dark grey stripes (Byzantine - Umayyad)
3. thin white ware (Umayyad)
4. sugarpots (Ayyubid - Mamluk)
5. Arabic geometric (Ayyubid - Mamluk)
6. cooking pots (different forms Byzantine - Mamluk)
7. varia

As regards groups 1 - 3 we intend to gather more material in order to get a better insight into the forms. They were probably imported and might indicate links of the village with other places. Group 4, "sugarpots", is an economically important group. It is assumed that these pots were produced for the sugar industry which was widespread in the Jordan Valley. A study of this presumably industrially produced pottery might reveal diachronical developments which reflect economic changes as regards the sugar industry. At the same time we hope to find out whether this pottery also had a secondary function in the repertoire, it being not inconceivable that a part of the production was also used in the household or that these potters made another kind of pottery, apart from the sugarpots, which was used in the village.

Group 5 is a specific class of pottery which is conspicuously represented in the pottery repertoire at Tell

Abu Sarbut, so there is reason to elaborate somewhat on this group. The different characteristics of this kind of pottery are partly expressed by various denominations given: P.J. Riss and V. Poulson (1949: 270-274) called it " céramique géometrique" because it reminded them of the Attic pottery of the eighth century B.C., which of course was of a much better quality they added. Also O. Grabar (1978:111-113), when excavating at Qasr al-Hair East, was reminded by this pottery of earlier times and used the name pseudo-prehistoric ware, which in itself sounds more appreciating than the description "drab jugs", which was the term used by W. Needler (1949: 69) in his description of old and modern Palestine. The ware is known to have been found in Syria, Palestine and Trans Jordan. It is usually dated to the Ayyubid and Mamluk Periods (A.D. 1169 -1516), but an earlier date seems possible and the remark of, for example Needler (1949:76) that similar kind of drab ware were still being produced at the beginning of this century in Ramallah strongly suggests that the tradition of this pottery lasted a long time(1). The first ones to give a technical description were H. J. Franken and J. Kalsbeek. They made a "model" of construction, indicating that the ware was handformed using a shaping dish and a cloth of finely woven fabric (Franken and Kalsbeek 1975:167-199). The traces of the fabric were usually obliterated by wiping and smoothing, one reason why more material is needed for a study of the role of the fabric. The amount of material they had available however was limited, prohibiting an insight into the repertoire of this ware and a more detailed study of the combination of shaping dish and cloth, and with other possible techniques. From the sherd material found at Tell Abu Sarbut we were able to reconstruct the profiles of some new forms. One of them is a small juglet (Fig.1). The bottom half of this small juglet was formed using a shaping dish, giving the slight identation at the carination. This part was wiped, leaving no traces of any, possible, cloth. After completion of this part of the

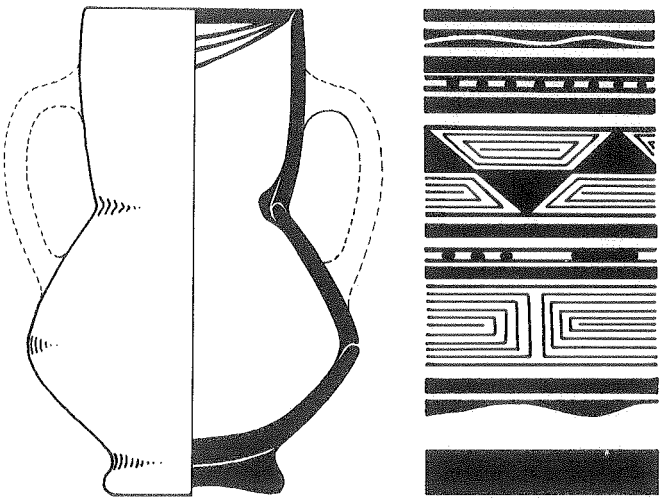

Fig. 1.
Arabic geometrical ware, small juglet. Scale 1:2.

Fig. 2.
Painted jar, geometric design.

jug, a second section was formed, using either a shaping dish and putting that half upside down on the other, or using coils. The latter part was not smoothed on the inside. Then a rim collar was placed on top.

The painted decorations are of a geometric design (Fig. 2). They are usually applied on a layer of white slip and have a black or dark-red colour, rarely combined (Petrie 1932:11; 1933:12)(2). Individual geometric motifs have been categorised by H.J. Franken. At Tell Abu Sarbut we found motifs that paralleled those from Tell Abu Gourdan and also some which have not been found there. During the coming years we expect to find large fragments of this pottery which can be used to study and categorise the combinations of the various geometric motifs. Standard combinations might give us a clue as to wether this specific kind of pottery was produced by one group of potters or whether individual households produced this pottery for their own use. The combination of a further study into the potmaking techniques with the methods and patterns of decoration will provide conclusions needed to find, at least partially, an answer to the question of where did this kind of pottery come from. Although patterns of geometrical decoration were not unknown in this area, they had not been used for a long time. Why they suddenly (re)appear, in combination with this specific potmaking technique is one of the problems which we will try to solve during our investigations at Tell Abu Sarbut.

Notes

1. Al-'Ush suggests a 9th/10th century date for one specific pot, prefering for the others a 13th -14th century date. al-'Ush: al fukar ghair matli. In AAAS XI-XII, p. 48.
2. It is hard to distinguish on basis of decoration alone between the designs from the Islamic periods and the much earlier Egyptian examples.

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H.J. Franken

A REMARKABLE SHERD CHARACTERIZATION STUDY

Some years ago Y. Hemelryk asked advice from the Department of Pottery Technology about the study of a sherd collection from the excavations at Lehun in Jordan. His study resulted in 1987 in a thesis for a `licentiaat´ from the University of Leuven. His promotor was Prof. Dr. P. M. Vermeersch, Director of the Laboratorium voor Prehistorie. This thesis deserves more attention from archaeologists than it has so far gained in its present unpublished form.

The study is called `Een technologische studie van aardewerk uit Lehun, Jordanië´. The material that was available for this study came from the excavations of a Belgian mission directed by Prof. P. Naster and Dr. D. Homès-Fredericq. Hemelryk chose to work on what is often called in archaeology non-diagnostic sherds, meaning body sherds which are usually not described or taken into account in typological studies of ancient pottery.

Somehow in agreement with the humble character of the sherd collection, the author stated that it was his aim, (a) to make as little use as possible of costly laboratory research equipment, (b) to develop methods of study that could be learned within a reasonable time, and (c), to produce a maximum of information which should be presented in a non-technical language.

The result of this study is remarkable for several reasons. This is undoubtedly due to an approach which can rightly be said to be systematic in a philosophical sense of the word. The sherds selected for this study date from the Early Bronze Age, the Late Bronze Age and early Iron Age, also included are some medieval sherds.

After a general characterization of the geographical and geological situation and the topography of the site of Lehun

(Chapters 1 and 2) the author defines in Chapter. 3 the terminology which he has used in his characterization studies. This is exemplary for its clear definition of descriptive words taken from ordinary language that are often used in characterization studies of ancient pottery. Hemelryk does this under the following headings: general terminology, structural terminology, terminology concerning the composition of the material of sherds, concerning characteristic features of the inside and outside surfaces of sherds, concerning the firing processes and concerning the identification of temper materials (the mineralogy). In this chapter the foundations are laid for the criteria to be used in the pottery study.

In Chapter 4 the principles of classification are described and discussed. Following the successive steps in the process of pot making, Hemelryk discusses a programme for the study of sherds, using criteria based on elements that are progressively less fundamental or elementary for the potter. Prerequisite is that the successive stages in the manufacturing process are studied on the basis of well defined ceramic phenomena.

The author systematically discusses how he arrived at a hierarchy of the importance of the observed features. The result is rather interesting. In the order of diminishing importance the first step in ordering the sherd material is the study of the size of the mineral inclusions or the temper. The second step is the study of `construction´ or what can be observed on the surfaces of the sherds. Only then follows the third step, which includes the study of the nature of the non-plastic inclusions, both mineral and organic. The fourth step concerns the study of wall thickness and if possible its relation to the diameter of the vessel at its widest circumference. The fifth step concerns the finishing treatment which the potter applied and the sixth and last step is the study of the result of the firing in a kiln or otherwise.

Judging from the logic at nature of Hemelryks˜ approach to

the study of body sherds and from the tables in which the results are condensed, the author has produced a strong argument for the application of such a hierarchy to a study of `non-diagnostic' sherd material.

ERRATUM

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Iron Age pottery from Jerusalem - A preliminary classification of the pottery found in two caves during the 1961-1967 Kenyon excavations by Ted LaGro and Dick Noordhuizen.

Unfortunately the captions going with the second diagram on page 22 have been interchanged. Below the diagram is shown with the correct captions.