

## A Technological Study of Iron Age I Pottery from Tell Deir 'Allā

In the Institute of Pottery Technology at Leiden technological studies of ancient pottery concentrate on a reconstruction of pottery making techniques. It has become clear that this type of pottery analysis can reveal a great deal about the potters and the people who used their products. The traditional archaeological approach to pottery studies requires some rethinking on both aspects; technology and human activity.

Questions of pottery typology arose in the technical studies of the pottery excavated at tell Deir 'Allā. In the publication of the Iron Age I pottery from Deir 'Allā, I modified the traditional way of publishing pottery from an excavation (Franken, 1969). The surveys of the pottery shapes found in each phase of the stratigraphic sequence were no longer accompanied by notes on colour, hardness, etc. These features were summarized as being part of the type description. Also I tried to interpret the idea of type by taking larger units than is often done, and to define these types in technical terms. Not only grit, hardness, temper or colour were considered to be part of such a description, but also shape and shape variety. In the plates showing drawings of the pottery according to the phases, this variety in shape is shown. Although this also could have been summarized, I wanted to leave to the readers the possibility of detecting any slow developments of shape through the phases.

However, the main principle for classification of this pottery was the technical construction of the pottery. In theory there must be a causal relationship between construction methods and pottery shapes. There is nothing new in this statement, but the impact on archaeological pottery studies has by no means been made clear as yet. A description of observed features ought to be followed by an explanation—at least to a certain extent. Shape by itself does not necessarily reveal the construction method. Often pots are so well finished that the technical background can only be reconstructed hypothetically. Sometimes one and the same shape may even be obtained with different techniques. Not only the features which are used in traditional pottery descriptions have to be explained; other features which never get any attention in pottery description have to be taken into consideration as well. A simple example is the description of the

base. Very often the round bases, which are made while the pot is in an upside-down position on the wheel, are not mentioned. Yet this is important for the classification of pottery.

With the exception of some extensively studied classes of pottery, like the classical Greek pottery or Roman Terra Sigillata, pottery classifications lack the support of shape explanation. These classifications are largely based on shape variation and to a much lesser extent on observations of features such as colour. Binford has pointed out that an analysis of observed features only serves to clarify information that is already available; it cannot increase our knowledge (Binford 1972, p. 79ff.). Explaining pottery shape by making an analysis of the manufacturing techniques is an attempt to add new information to what is known already. But it is more. It is also a step toward the elimination of a subjective element in a pottery type series or pottery classification. It is to be regretted that there still are archaeologists who do not feel the need for a yard-stick to eliminate (or at least reduce) subjective elements in pottery classification. Without such a yard-stick every classification is as good as its presumptions, and may not even clarify information that is already available. We may trust an authority in the field to make reliable classifications, or mistrust the man who claims to be an authority; the fact remains that we cannot know whether they are valid or not. The argument that a certain classification of pottery shapes 'fits beautifully' is not very convincing. The traditional pottery descriptions can only help the reader to visualize shapes and colours which are known already, because one important aspect has been neglected: the selection of attributes. Why, for instance, should colour be a significant attribute for classification? So the fact remains that many pottery classifications consist of so many shapes or types, that 'type' loses its meaning completely.

I may quote Binford again: 'The yardstick of measurement is the degree to which propositions about the past can be confirmed or refuted through hypothesis testing—not by passing judgement on the personal qualifications of the person putting forth the propositions' (Ibid. p. 90). If pottery classification is the proposition, then what is the yard-stick?

The yard-stick has to be found by constructing a theory of typology. The word typology was taken from theology and introduced into archaeology by the Swedish antiquarians Montelius and Hildebrand about a century ago. This may explain why it is used in archaeology in so many different ways. However, it ought to indicate the theory of classification. This is not to be confused with the technique of classification or taxonomy. It seems to me that typology should give us the yard-stick for hypothesis testing, and the first step to arriving at typology is a technical analysis of pottery. A technical analysis aims at a better understanding of pottery in general, and of groups of pottery submitted to this study in particular. Often elements of construction are found which influence or modify the existing classification. With a growing understanding of the structure of pottery we also get into a better position to judge what can be used to measure time or to define culture. Typology demands explanation of shape before we can rely on shape analysis. Similarly, an explanation of colour will show whether colour description is useful or not, or whether our colour descriptions should be modified.

I shall not go into details of the technical analysis of Iron Age I pottery in Jordan. Instead I make four propositions about the manufacture of pottery which will bring the human aspect into focus. These propositions I shall use in discussing some of the new perspectives that come from technical analysis. They refer to situations and conditions such as we may expect to have existed in the Iron Age in Jordan.

- 1) A potter, working under circumstances that are normal for his trade, will not attempt to change pottery shapes nor make new ones. A potter does not change his production unless he is forced to do so.
- 2) Under normal circumstances, shapes may undergo slight changes over longer periods. Such changes are caused by alterations of the clay composition used by the potter, or by a slow process of deterioration of certain details of the manufacturing methods. Improvement of such methods will seldom be found.
- 3) If a new ceramic element appears in the archaeological record, it has to be explained by reference to influences from outside the ordinary potter's trade.
- 4) When demonstrating the presence of a new ceramic element in the archaeological record it is not sufficient to refer to the comparative shape analysis. The technical characteristics have to be taken into consideration as well.

In order to show how a technical analysis leads to formulating new questions, I will now turn to the Iron Age I pottery from tell Deir 'Allā. I shall no longer use the word 'type' to indicate a pottery shape, as it was done in the publication of 1969. One type of pottery designates a group of pottery shapes, like bowls and jars, which can be described in one technical formula. One type may contain several classes of pottery. This

I have described in a study of medieval pottery (Franken-Kalsbeek 1975). At Deir 'Allā we find mainly four types of pottery in Iron Age I. These four types belong to the regular repertoire of the site. There are reasons to suppose that one type was locally made. It contains most of the pottery in daily use; small and large bowls, small and large jars. It is a very simple type of pottery, but it does not have the characteristics of family-made pottery. Instead it was made in a potters workshop, and fired in potters' kilns. When re-fired to a temperature of 1,000°C it has a uniform colour. The temper in all investigated sherds is the same: coarse mixed sand. Larger pieces are coil built, and the pottery is made on a turning base. The cooking pot is represented by two types. The earlier one is made in a pottery mould, the temper is pounded calcite, the maximum firing temperature is about 800°C. When fired to 825°C the coarse calcite grains will decompose. The calcium carbonate ( $\text{CaCO}_3$ ) will turn into calcia ( $\text{CaO}$ ) or quicklime and carbon dioxide ( $\text{CO}_2$ ) will escape as a gas. After cooling the calcia will absorb water and expand in this process. In a very short time this will reduce the pot to dust. It is very likely that this cooking pot was not locally made, but obtained through trade. In Palestine the pot is known as the Iron Age I cooking pot.

Some time during the 12th century BC this pot was already replaced by a cooking pot which is known in Palestine in Iron Age II. The difference with the first cooking pot is the construction of the rim. There is, however, no question of a slow development from the first to the second type. For details I refer to the publication.

The fourth type is the so-called mensif bowl with two classes. It was probably made in a basket mould. At 1,000°C it fires to a slightly different colour from type 1. We assume that it was made in the East Ghor, and not at Deir 'Allā. Apparently it dates from the Iron Age, unlike the other three types which date from the Late Bronze Age. It is not found in Palestine.

The main body of the Deir 'Allā pottery is thus divided into four types, according to four different manufacturing processes. When looking for parallels I must deal with them separately. It would not be surprising to find type one elsewhere without the types two, three or four. Such a situation would strengthen the supposition that the latter types were not made by the potters who made type one. The area of distribution of types two to four could possibly be established by surface exploration, because each of them is represented by one or two classes only.

The idea of a type requires comparison including all the classes comprised in the type. I have already said that in this concept type may contain a number of pottery classes. These classes can be described in one formula. The clays used have the same properties, the temper is similar, the pots are all made in the same way, and the finishing treatments are the same, as is the technique of firing the pots. I have called this a tradition of potmaking. In the example from tell Deir 'Allā, the cooking pot type 2 reveals a completely different manu-

have been stopped by tribes fighting over the sources. Yet another possibility is that in the course of time the technical execution deteriorated and some of the required knowledge was lost. In tell Deir 'Allā Vol. 1 (Franken, 1969) it is shown that potters eventually found a solution for the technical defect of the cracks in the bases of bowls and jars: a well known feature of 13th century pottery.

It is very well possible that the rise of Iron Age pottery has to be explained from developments in Jordan. It is equally possible that both the Iron Age I and the Iron Age II cooking pots have their origin in Jordan. The question why the Iron Age II cooking pot became popular in Palestine is not so difficult to answer. In contrast to the Iron Age I cooking pot this one developed into a pot with a much narrower opening and with handles. The first one seemed unfit for such developments and died out.

In my view the end of the Iron Age pottery is marked by foreign influence. The beginning of this end is to be dated in the 7th century BC. Probably under the influence of the Assyrian occupation a new technique of potmaking was introduced. For the first time since the Hyksos period wheel-thrown pottery appears; a new technique which is described in my book about the Jericho potters (Franken, 1974). One of the most striking innovations is the small grain size of the tempers used in pottery, whereas coarse limestone as a temper is avoided. As a result of the introduction of wheel-thrown pottery small workshops were pushed out of business. There is no sense in introducing techniques resulting in large pottery production unless the products can be sold over a large area. This process can be compared with a small industrial revolution, as long as the Marxist definition of what is to be called an industry is not applied. About the labour conditions in this new type of workshop and the relation between owners and

labourers nothing is known. For us it is important to see that from that moment on a synchronous pottery development in large areas has become more likely. In Jordan the breakdown of this system comes when in the early Islamic period families start making their own pottery for daily use again.

This is the so-called Mamluk pottery: a rather misleading name. The final blow to wheel-made pottery came when the Turkish administration put taxes on the use of the kick-wheel. All these aspects of the craft of potmaking should be studied from the analysis of the craft itself.

Analysis of the manufacturing processes of pottery brings the ancient potters into focus. It is an archaeological research technique with a strongly discriminating factor. It shows the archaeologist which classes belong to one type of pottery, and enables him to study patterns of pottery distribution. It provides a logic framework for parallel quoting and reveals the limitations of this activity. It provides the archaeologist with many reasons for re-thinking the problems of the relationship between pottery and time, between pottery and culture, and between pottery and ethnic groups. It does not make the interpretation of the archaeological record easier. It rather shows that things are far more complicated than is suggested by the traditional shape typology.

#### References

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not explained. The fact remains that this pottery already existed during the Late Bronze Age. It has often been assumed that the Deir 'Alla Iron Age I pottery is somehow related to Iron Age pottery from Palestine. What happened in Palestine at the end of the Bronze Age is by no means clear. The current hypothesis about the origin of Iron Age pottery is based on an ethnic interpretation. This pottery is said to have been developed by early Hebrew potters from the Late Bronze tradition (Amiran, 1970). It is supposed that there were no Hebrew potters before the end of the 13th century BC. It is also supposed that they learned the art of potmaking from the Canaanite potters. One has to assume then that the Canaanite potters disappeared from the scene. But if so, what happened in the cities that remained Canaanite in the beginning of the Iron Age, like Jerusalem? One would expect that in those cities the Canaanite potters went on making Late Bronze pottery, or pottery shapes that were developed from it according to its own possibilities. In this hypothesis too much is unexplained.

My third proposition was that if a new ceramic element appears in the archaeological record, it has to be explained by reference to influences from outside the ordinary potter's trade. In the accepted explanation, however, the early Hebrews are not supposed to have brought any knowledge about potmaking into the country. As far as I know there is no technical study of the transitional stages which are supposed to have existed between Late Bronze pottery and Iron Age pottery from Palestine. It is not even clear that there were any technical innovations. What seem to be changes may be developments of certain elements that were present for a long time in the Late Bronze tradition. It has not been demonstrated that early Hebrew potters took over the production from the Canaanites. I am not arguing that early Hebrew tribes in Palestine did not make their own pottery. It is not known, however, when and where they learned the craft of potmaking. At the present stage of our knowledge pottery cannot be used to demonstrate the presence of Hebrew tribes in the country. Moreover, there is no reason to assume a relation between these tribes and Iron Age I pottery in Jordan. The technological history of this pottery is too complicated to be revealed by information derived from the historical texts of the Old Testament. Not only the question of the origin of Iron Age pottery is involved, but also the extinction of Late Bronze pottery.

According to my fourth proposition, an analysis of shape alone is not sufficient to reveal new elements in the potter's craft. Late Bronze pottery may have developed into Iron Age pottery over a long period of time in certain parts of the country and not in other parts. For instance, the population of the towns may have preferred the decorated Late Bronze pottery, whereas the countryside had a preference for the simpler forms that became general fashion in the Iron Age. Or Late Bronze pottery lost its decoration because the sources of white-firing slips, which were needed for decoration, were no longer accessible. The trade in such white coloured slips may

products of their own industry? In that case the origin is still workers went to a market to buy pottery or to exchange it for 'Alla is hypothetical. It is so at the site, but what if these metal 'Alla only. The association with metal workers outside Deir 'Alla cannot be dated by reference to tell Deir 'Alla. How long were the Deir 'Alla potters associated with these metal workers? That metal workers occupied a site which was completely ruined by earthquake does not indicate a migration. They may have been working in the East Ghor for hundreds of years; if in those years the pottery was associated already, it may have existed for a long time side by side with the Late Bronze Age pottery. In that case it will not be found on sites like Deir 'Alla, but probably on camp sites. If this pottery is derived from Late Bronze Age pottery, this process must have taken place long before Iron Age I, or the origin may be found outside the country. It is clear that this pottery cannot be dated by reference to tell Deir 'Alla only. The association with metal workers outside Deir 'Alla is hypothetical. It is so at the site, but what if these metal workers went to a market to buy pottery or to exchange it for products of their own industry? In that case the origin is still

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facturing process from type 1; it is distinguished from type 1 by a different formula. This clearly has consequences for the activity of parallel quoting. Instead of looking for individual classes that can be taken as parallels, one starts looking for sites where potters are working in the same tradition. These potters must have a common origin from where they settled in different parts of the country. Over a long period of time they may have modified their production. Such modifications, however, may happen at certain places but not at others. One reason for a modification may be that the clays found at their site demand a different treatment, as is suggested in propositions 1 and 2. But we should not rule out the possibility that potters transported clays that were suitable for their purpose over long distances. A study of pottery techniques enables us to write a history of potmaking which can explain many aspects. This is not possible in a system where only classes or individual shapes are quoted as parallels.

All this questioning of our traditional procedures of quoting parallels and drawing conclusions, serves the purpose of analysing historical processes which are ill understood. This is especially so in connection with the Iron Age. (For later periods I will mention a situation which seems to justify the existing practice of parallel quoting.)

In the Iron Age there must have been many small potteries in the country, and if they followed some development in shape this does not necessarily mean that it happened at the same time (Peacock 1977). This leads to the question of the origins of Iron Age pottery. At Deir 'Alla we have found a clear situation. Pottery made at the end of the 13th century BC is technically still related to the Late Bronze Age pottery. After an earthquake which occurred just at the turn of the century we find pottery of types one and two which cannot have been derived from the Late Bronze pottery found at the site. There are no signs of any development taking place in the 12th century BC. Although there are several possible explanations for this situation, there is little doubt that this early Iron Age I pottery was produced elsewhere before it came into production at Deir 'Alla. Where did it come from?