

Some Technological Features of Tall as-Sa'idiyya Cooking Pots

Introduction¹

This paper will attempt to describe and explain the production of cooking pots in the Jordan Valley between c. 1250-600 BC. For this purpose the Late Bronze and Iron Age cooking pots from Tall as-Sa'idiyya were analysed technologically. The analysis was carried out in 1991, and made possible by a Palestine Exploration Fund grant.

Future research will focus on the complete pottery repertoire of Tall as-Sa'idiyya, and the comparison of the results of this study with the analysis of the chronologically comparative material from the neighbouring site of Dayr 'Allā in an attempt to reconstruct socio-economic processes in the central Jordan Valley.

The large double mound of Tall as-Sa'idiyya lies in the northern part of the central Jordan Valley, 1.8 km east of the Jordan River, south of Wādī Kufranja. The most recent excavations on this site have been taking place since 1985 and are funded by the British Museum.

The reasons why Late Bronze and Iron Age Near Eastern cooking pots are easily recognised is two-fold: their shape and dark brown colour. In this paper a preliminary description of these features is presented and a brief explanation is given as to why these two features were preferred by the ancient potters and their consumers.

Analysis

During the first five seasons of excavations by the British Museum, work was carried out in seven areas (FIG. 1), which produced a total of 180 rim sherds and 16 complete cooking pots² found in areas AA and EE.

Stratigraphically, the material belongs to strata XII-IV (Late Bronze Age II-Iron Age III: c. 1250-600 BC). The sherds and most of the complete pots are in London,

one is in Leiden, and one is in 'Ammān.

1. Raw Materials

A small piece was broken off each sherd to obtain a clean break. When studied under a binocular microscope (10x magnification), these showed that the whole repertoire was made of one ware.³ The potters used a mixture of clay, crushed calcite and organic material (i.e., dung or straw). Organic or animal iron oxide was probably also added (i.e., animal blood) but as yet this has not been proven. The presence of such oxide is deduced from the characteristic dark brown colour of the pots, which cannot possibly be solely the result of the oxidising firing atmosphere in the kiln, as calcareous clay shows pale colours when fired between 600-800°C.

In 11.3% of the sherd material lime spalling had occurred. Lime spalling occurs when the temperature in the kiln reaches about 800°C (Rice 1987: 98), because the added calcite is never unpolluted. During the firing process the calcite (CaCO_3) changes into quick lime (CaO) and when exposed to the moist air changes into slaked lime (Ca(OH)_2) (FIG. 2), resulting in the cracking of the body of the pottery.

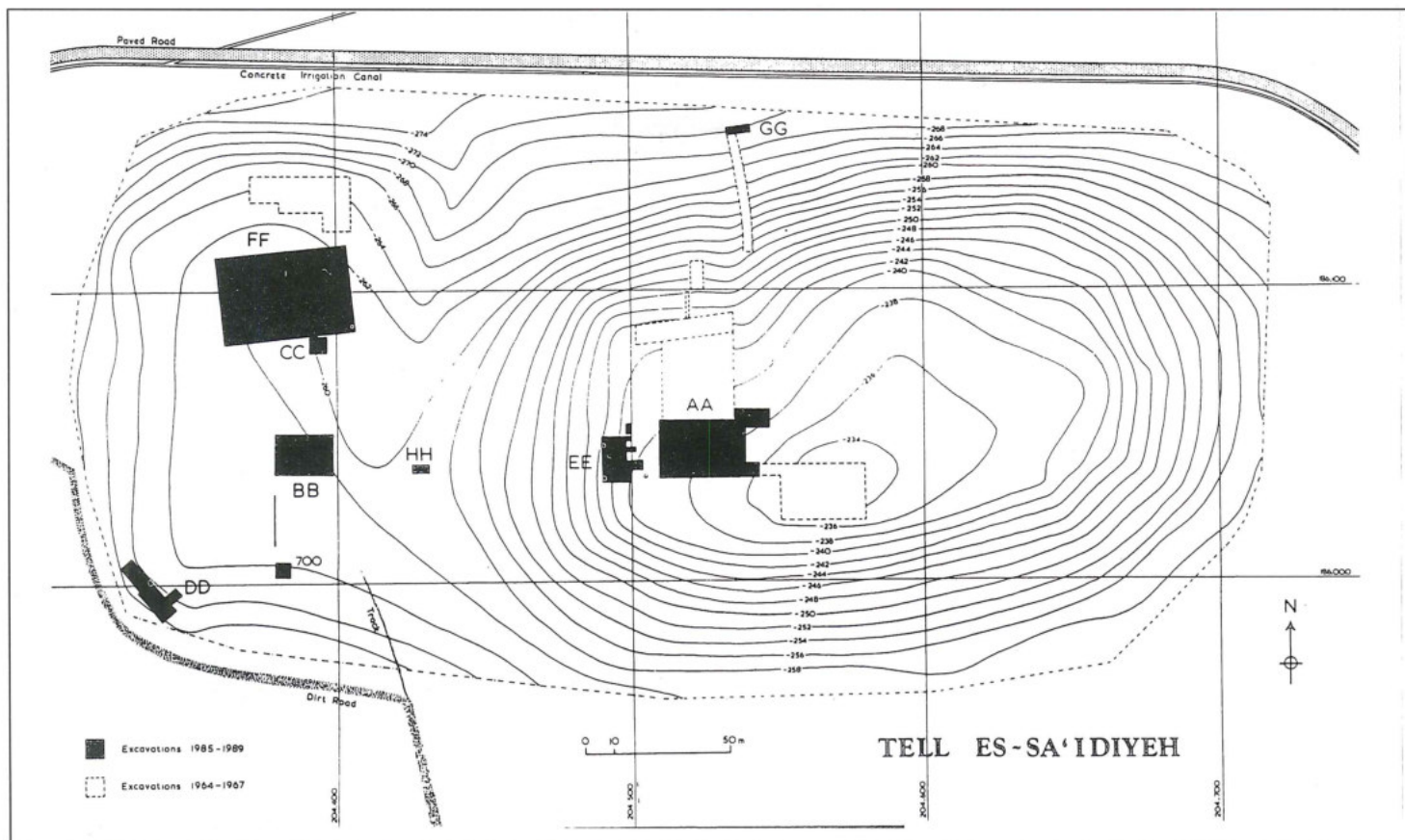
2. Basic Shaping Technique

In all cases, a slab of clay was pressed into a mould (either from lime or clay) for the shaping of the base of the Tall as-Sa'idiyya cooking pot, the advantage being that the potter had sufficient control over the thinness of the wall (FIG. 3). In addition, the base was sometimes scraped, a conclusion based on the scrape marks on one of the complete pots. The shoulder and neck were formed on the base with coils resulting in a sharp carination between the base and the shoulder. The last step was the attachment of the handles.

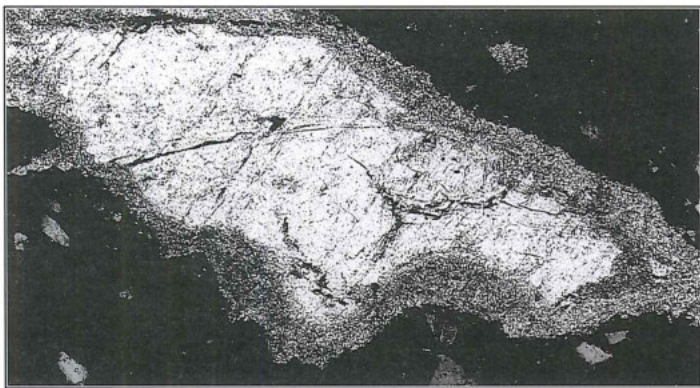
¹ This analysis could not have been carried out without the advice of Prof. H. J. Franken and Ms. M. L. Steiner of the Institute of Archaeology, Leiden, and Lou Jacobs of the Department of Pottery Technology, Leiden. Also, I would like to thank Erick van Driel for the drawings, Jan Pauptit and Allan Hills for the photographs and, last but certainly not least, Peri Bearman for the correction of my English.

² Twenty-eight sherds and two complete pots were defined as miscellaneous and not described in the typology.

³ The term ware is used here to mean: the mixture of clay and inclusions. The inclusions are both those naturally present in the clay and the material added by the potter.



1. The excavated areas on Tall as-Sa'idiyya (Tubb and Dorrell 1991: 68).



2. The conversion of a calcite grain (0.84 mm) into slaked lime (courtesy of Prof. H. J. Franken).

When the potters began using turntables⁴ to finish the treatment, this carination became less distinct because one of the finishing touches was the smoothing of the shoulder and the carination with a piece of cloth to remove the construction marks. Within the Tall as-Sa'idiyya repertoire, the Late Bronze II material shows both the sharp carination and the smoothed carination. In the Iron Age, on the other hand, the turntable was always used.

The Tall as-Sa'idiyya type 1 cooking pot (FIG. 4) — the characteristic Late Bronze Age II cooking pot — did not have handles as far as we know. The other three distinguishable types always had handles. In almost all of the cases, these were attached to the rim and the carination, and only in a few cases was the handle attached halfway down the rim.

3. Firing

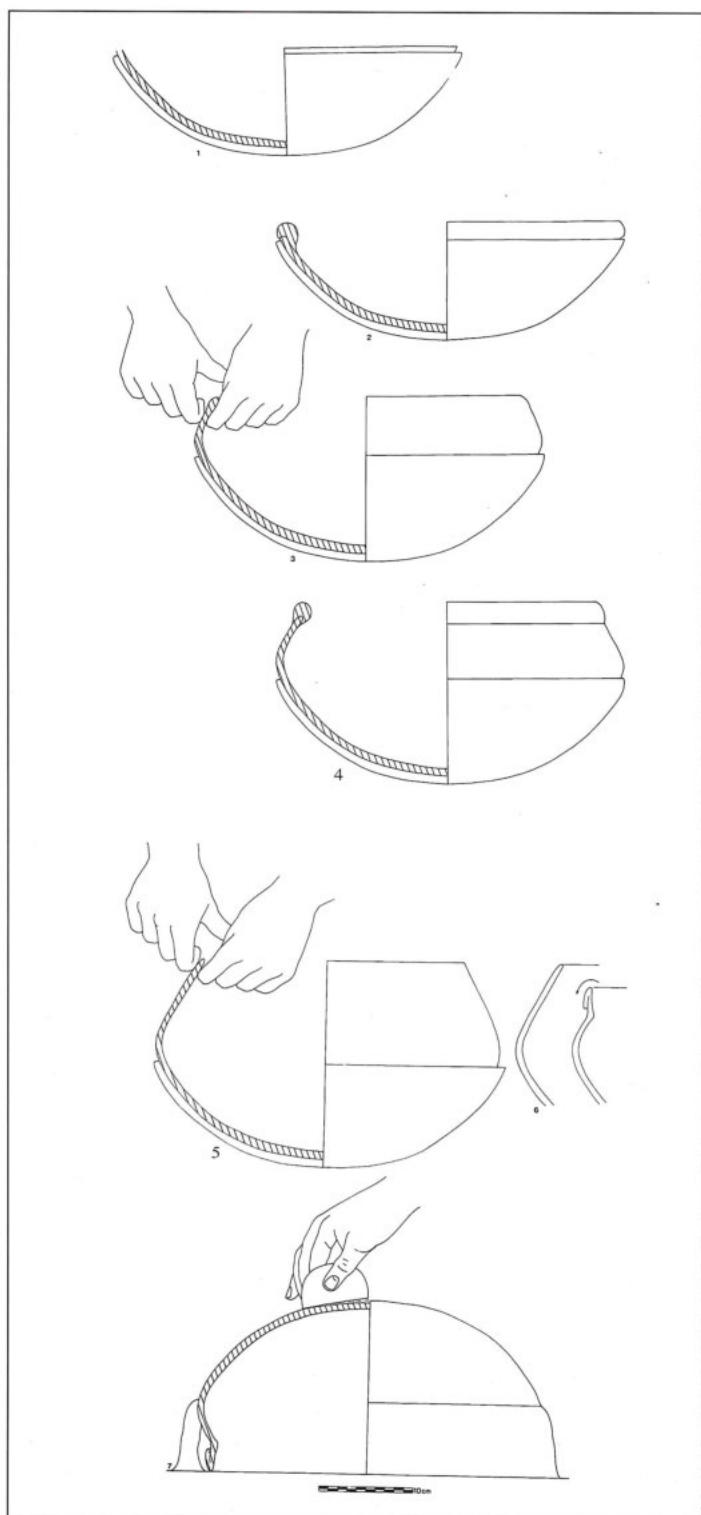
The colour is, predominantly, the result of the iron in the clay and the oxidising atmosphere in the kiln.

As yet no remnants of kilns have been found in either the vicinity of the site or anywhere else in the Jordan Valley, but considering the quality of the pottery found during this period, I assume that they were fired in a kiln and not in an open fire. If so, then the so-called up-draught kilns, which have been found in Palestine dating from this period, must have been in use in the Jordan Valley as well.

Typology

Based solely on the basic shaping technique, it seems that we are dealing here with one type, but owing to a

⁴ A turntable is a disk or device that can be revolved slowly by hand and supports a vessel being formed (Rye 1981:147).



3. A reconstruction of the basic shaping technique.

few characteristic differences in the actual shape, four types have been distinguished (FIG. 4). A further division within the types based on the finishing of the rims was possible for type 3, being the only type with a considerable amount of sherds and complete pots.

Except for two, all complete pots fitted into the fol-

lowing typology.

Type 1 (sherds: 5.4%; pots: 18.7%)

A wide-mouthed (mean diameter: 29 cm) pot without handles. The rim was made using the last coil flattened and folded outwards, resulting in a somewhat flattened top with a sharp angle (FIG. 3).

Main occurrence of this type at Tall as-Sa'idiyya is in the Late Bronze II and Iron I periods.

Type 2 (sherds: 3.2%; pots: 6.2%)

An approximately 25 cm high cooking jug with a rim diameter between 10-14 cm, with one or two handles (FIG. 5).

The rim is unprofiled: the last added coil was flattened horizontally, probably by the potter's finger.

This type only occurs in the Late Bronze II and Iron Age I periods.

Type 3 (sherds: 57.3%; pots: 56.2%)

Identical to type 1 except for a decrease in diameter to between 18-22 cm, and with two handles. Within this type three rim-variants were recognized.

Type 4 (sherds: 15.1%; pots: 6.25%)

In shape identical to types 1 and 3, with a diameter between 16-20 cm, and two handles. This type is smaller in size than type 3, and completely different in colour.

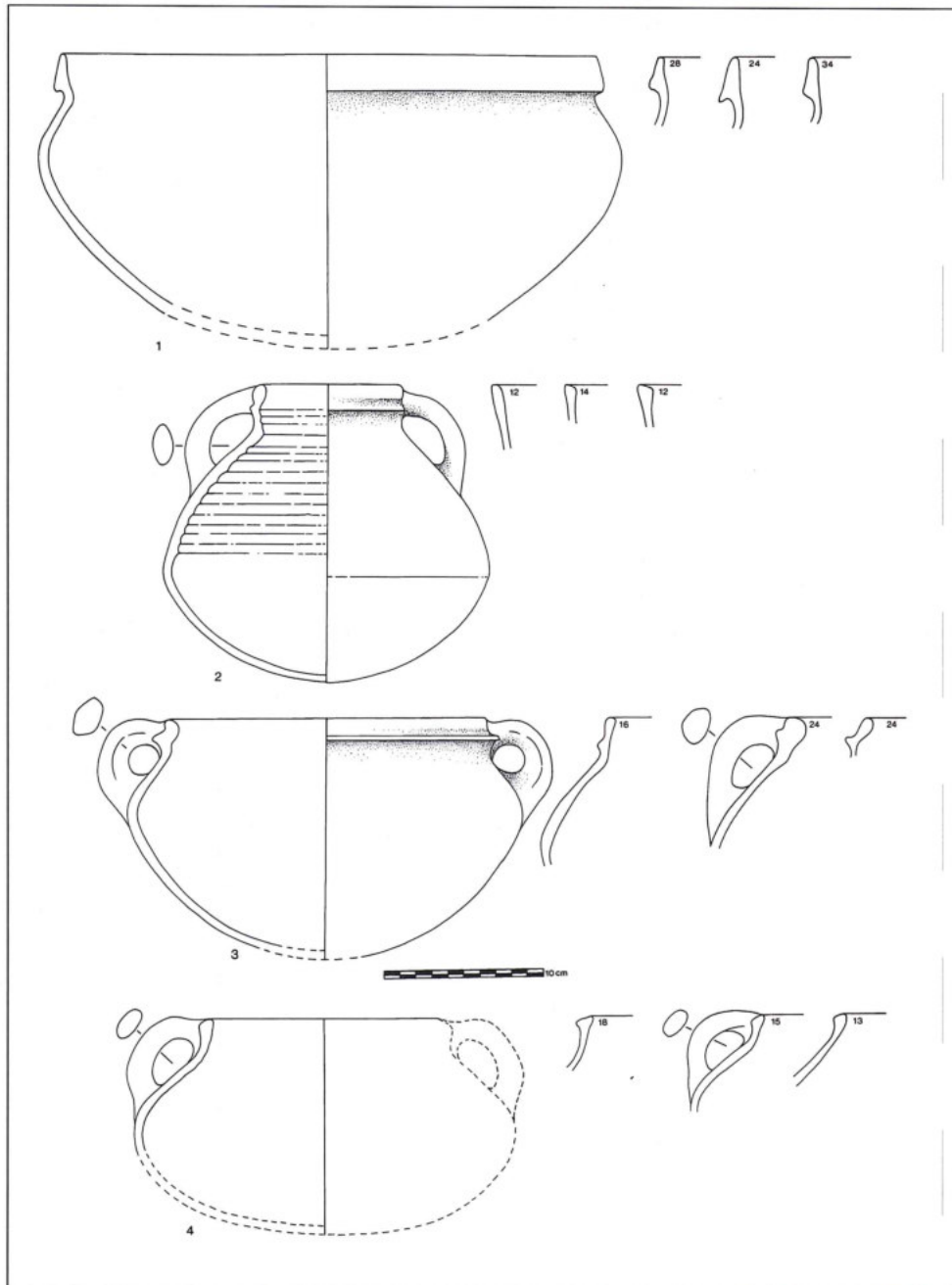
Initially I defined it as a cooking pot because of its shape and afterwards the microscopic studies confirmed this. However, because of the brownish yellow colour, I am not absolutely sure whether I am dealing with actual cooking pot sherds. It would appear that for this type no iron oxide was added to the clay.

Reasoning for the Technology Used for Making the Cooking Pots

The most important demand put on a cooking pot is its ability to endure sudden changes in temperature without immediately cracking and falling into pieces.

How did the potters solve this problem? They must have experimented for a long time, and once they found a satisfactory solution they stuck to it. Thus except for a few changes in shape, the cooking pot in this area was always constructed and tempered in the same way for at least the period in question. The potters discovered that:

- by adding organic material the porosity of the pot increases, which provides elasticity to the body that allows for sudden expansion. A consequence of this was that the pot was not supposed to be fired at a temperature above c. 900-950°C. The reason for this restriction is that up to that temperature the porosity increases, but beyond it the mass starts to shrink, resulting in a decrease of the porosity;
- the mineral inclusions make it possible for the con-



4. The four Tall as-Sa'idiyya cooking pot types.

- tents to heat faster and the pot to be more durable under conditions of heavy use-wear abrasion (Skibo *et al.* 1989), but also restricts the firing temperature, which means a decrease in the amount of fuel needed;
- c. the rounded shape of the base permits a horizontal position both over a fire or on a *ṭābūn*;
- d. also, the larger the surface of the rounded base, the greater the exposure of the contents to heat, and thus the most efficient use of the fire;
- e. the thinness of the wall, obtained by the basic shaping technique, lessens the thermal gradient and hence the stress (Braun 1983: 119).

Conclusion and Comparison

For a period of at least 600 years, the Tall as-Sa'idiyya cooking pots were produced in the same manner using the same raw materials. During the Late Bronze II period two types of pots were in use. The shape difference between the two must be function-related: type 1, with the large mouth opening, for frying meat; and type 2, with the higher shoulder and neck, for boiling, e.g. vegetables. Introduced in the early Iron Age I and gradually overtaking the use of type 1 are types 3 and 4. This decrease in the size of the pot could well be a result of the economic decline in this period.



5. An example of the Type 2 cooking jug from Tall as-Sa'idiyya.

In 1969 the first technological description of Transjordanian pottery was published as a part of the final report on the Iron Age I phases at Tall Dayr 'Allā (Franken 1969).

In addition, the Iron Age II material excavated in 1967 from this site were published in recent years (Vilders 1989; 1992). Franken's analysis is the basis for the method used for the Tall as-Sa'idiyya pottery, which makes it possible now to compare this with Tall Dayr 'Allā.

The preliminary comparison shows that the cooking

pot repertoires from both sites are very much alike in the choice of construction method and of the tempering materials,⁵ and show no major differences except for details such as different rim-variants. Also, no so-called "cooking jugs" were found at Dayr 'Allā. The similarities could be considered to point to the existence of a workshop specialised in the production of cooking pots for the region.

A possible location for this workshop could well have been along one of the many wadis, close to the mountains where the materials needed, such as clay, calcite, water and wood, were easily available.

Bibliography

- Braun, D. P. 1983. Pots as Tools. Pp. 107-134 in J. A. Moore and A. S. Keene (eds.), *Archaeological Hammers and Theories*. New York.
- Franken, H. J. 1969. *Excavations at Tell Deir 'Alla I*. Leiden.
- Rice, P. M. 1987. *Pottery Analysis: A Sourcebook*. Chicago.
- Rye, O. S. 1981. *Pottery Technology*. Washington.
- Skibo, J. H., Schiffer, M. B. and Reid, K. C. 1989. Organic-tempered Pottery: An Experimental Study. *AA* 54: 122-146.
- Tubb, J. N. and Dorrell, P. G. 1991. Tell es-Sa'idiyyeh: Interim Report on the Fifth (1990) Season of Excavations. *Levant* 23: 67-86.
- Vilders, M. M. E. 1989. The Phase M Pottery of Deir 'Alla. *Newsletter of the Department of Pottery Technology* (Leiden University) 6: 79-87.
- 1992. The Stratigraphy and the Pottery of Phase M at Deir 'Alla and the Date of the Plaster Texts. *Levant* 24: 187-200.

⁵ In regard to Tall as-Sa'idiyya material, this conclusion is based solely on the microscopic ware study.