

A Comparison of Bronze and Iron Age Pottery Production Based on Material from the Mādabā Plains Region

Introduction

Bronze and Iron Age ceramics can be compared and contrasted in terms of raw materials, manufacturing techniques, form, and finish. An investigation of these aspects offers information concerning the organization of the ceramics industry as a whole. The primary question here concerns the similarities and differences in the organization of the pottery industries of the middle and late third millennium and the seventh-sixth centuries BC based on material excavated at Tall al-'Umayrī. The focus centers on those aspects of the pottery that provide evidence relating to the organization of the ceramics industry. Specifically, in addition to superficial differences in the form and finish of Early Bronze and Iron II Age wares, what can one infer about the organization of the industry based on analysis of the clays, manufacturing techniques, and distribution of potters' marks? Sherds excavated by the "Mādabā Plains Project" at Tall al-'Umayrī and nearby sites in 1984 and 1987 serve as the basis for the research.

Petrographic Analysis

The preliminary petrographic analysis characterizes the mineralogical components of the clays for the purpose of addressing questions concerning the internal variation of the wares at Tall al-'Umayrī rather than the identification of the clay sources or origins (London *et al.* 1992). Each sample belongs to a different vessel form rather than multiple examples of any single vessel form. The Early Bronze Age sherds include a pithos with rope moulding on the shoulder, a holemouth jar, a round-bottomed cooking pot, and a painted bowl. The Iron II Age sherds include store jars, a large utilitarian vessel, cooking pots, and bowls (London *et al.* 1992: FIG. 23.1).

One of the most striking differences between the Bronze and Iron Age material is that each Bronze Age sherd has a different mineralogical composition resulting in four distinct clay bodies, but in contrast, there is overlap among the Iron Age sherds in that different vessel forms were made from identical or similar clays. For the

Bronze Age wares, each sample was made of a different clay, but for the Iron Age wares, a large utilitarian vessel, a burnished bowl, and a cooking pot belong to a single petrographic group. Also in this group is a modern sherd from a jar produced at Zizia where Egyptian migrant potters use local materials to manufacture a wide variety of ceramic forms used throughout the 'Ammān region today (London and Sinclair 1992: 421-424). Given the presence of the modern Zizia sherd and the Iron II large utilitarian form in this group, there is reason to infer that it constituted a locally produced ware made some place in the 'Ammān region, but not specifically at Tall al-'Umayrī.

In addition to the major Iron II clay type, there is some differentiation within the Iron II material: the fine black burnished bowls sometimes described as "Ammonite" ware, constitute a separate petrographic group. A third ware category includes some of the Iron II cooking pots along with Iron I and the Early Bronze Age cooking pots. A fourth group includes large jars of the Iron II and the Hellenistic periods.

The petrographic data suggest that there were at least four groups of potters in the Iron II period, each working with a different clay type. The clay type suitable for a wide variety of forms, including a large utilitarian vessel, a small bowl, cooking ware, and either burnished or plain wares is the most likely candidate for locally produced material. A specific clay type seems to have been favored for some of the fine black burnished ware. A third clay body was selected for certain cooking ware, and a fourth clay characterizes large jars.

The preliminary petrographic analysis implies that the Iron Age industry was not a monolithic entity. Various sets of potters using diverse clays were at work, yet the variety thus far is less than that in the Early Bronze Age sample. Given the greater diversity of the Bronze Age clay bodies than for the Iron Age wares, the implication is that a larger number of people or producers were making pottery in the middle and late third millennium than in the mid-first millennium BC. In other terms, craft spe-

cialists supplied more pottery in the Iron Age than during the Early Bronze Age when domestic potters were active. Although a greater degree of craft specialization may characterize the Iron Age ceramics industry than at the end of the Early Bronze Age, there was not a monopoly on pottery production in either period. This is of interest not simply because it informs on the organization of one of the most important industries of antiquity, but because it suggests that despite the characterization of the two periods as urbanized complex societies, pottery production was not an enterprise under strong state or other control regardless of the organization and control which may have existed in other industries. On the contrary, pottery production may have involved a large number of enterprises operating and producing at different capacities, some small and others large. Given this differentiation within the ceramics industry, the locations of pottery production may have been equally varied and distributed throughout towns and villages rather than in any urban setting.

The initial groupings of clay types at Tall al-'Umayrī are not exhaustive. A larger petrographic study in progress may suggest the presence of additional clay groups and the coexistence of other potters, but the point is that regardless of the precise number of pottery producers, in neither period under discussion was the industry limited to a single supplier or a single source.

Once the petrographic analysis enables the identification of different clay bodies within each of the two archaeological periods, the next question concerns the manufacturing technique. Does each clay type coincide with a specific fabrication technique? If so, this would strengthen the inference that each clay type indicates a different producer of pottery.

The Manufacturing Traditions

For the third millennium BC material, four manufacturing techniques characterize the ceramic tradition, but for the present there is no clear overlap between each clay group and a specific fabrication process. The four techniques include the use of a slow moving turntable; coiling; pinch pots; and moulds. Not represented thus far at Tall al-'Umayrī is the paddling technique identified among the Early Bronze Age material from Bāb adh-Dhrā' and Numayra (Beynon *et al.* 1986: 304).

For the EB III/IV material, the manufacturing technique varied according to vessel shape and size. The smallest vessels were made in the pinch pot technique. Many jars were coil made, except for the largest which involved the use of slabs in addition to coils. Moulds were used for the red slipped and burnished platters. Pots of all sizes and shapes could have been placed on the turntable at various stages of their manufacture. To determine whether or not different potters can be associated

with each technique, preliminary studies of the jars, ledge handles, and potters' marks address the question of individuality among the Early Bronze Age potters whose wares were found at Tall al-'Umayrī (London 1992: 384-393).

For the Iron II pottery, a combined coiling and turning technique appears to have been common for many normal sized vessels of all types. After the rims and upper bodies were either coiled or constructed on the turntable with the use of centrifugal force, the lower bodies may have been trimmed and shaped as the vessel stood upside-down on a rotating turntable. To shape large jars, a second technique involved coils with minimal or no use of the turntable. The result is a handmade form with irregular interior surfaces and wall thicknesses. Evidence for the use of a fast wheel for small bowls and lamps thrown from a cone of clay is seen in the unmodified string cut bases. Besides these small lamps and bowls, the prevalence of throwing pottery is undetermined.

The presence of handmade wares in first millennium BC assemblages has been documented at Jericho (Franken and Kalsbeek 1974: 87) and at Tall al-Mazār (Homès-Fredericq and Franken 1986: 175-177 n. 574). Franken and Kalsbeek (1974: 108) describe the bulk of the seventh century Jericho material as coiled and turned rather than thrown, and suggest diversification of the pottery industry indicating that potters specialized according to vessel type and manufacturing technique (1974: 90).

Potters' Marks

Another source of information concerning the organization of the pottery industry is the mark incised into the wet clay on the shoulders or bodies of jars prior to firing. Fourteen pre-fire potters' marks of Early Bronze Age date were found in the combined 1984 and 1987 assemblages at Tall al-'Umayrī. Most are incomplete, but they appear to be pictorial in contrast to the 23 simple linear marks found on the Iron Age jars (London 1992: FIGS. 21.8 and 10).

Among the Early Bronze Age marks, a tree motif incised on a red slipped jar is one of the more complete potters' marks in the assemblage. Some of the fragmentary linear marks might belong to the same or similar pattern. Animals are possibly represented below the rim of one holemouth jar. Another holemouth jar has a wavy checkerboard pattern and there are other potters' marks or insignia. A rectangular box divided by seven vertical lines, with fingernail impressions above was incised on the shoulder of a large jar or pithos. Two features characterize all of the Early Bronze Age marks: they are conspicuous and located on the shoulders of large containers. None are found on small pots.

Iron Age potters' marks, like those of the Early

Bronze Age, are found on large containers and are on the rim as well as the shoulder or upper body where they are immediately evident and visible. In contrast, post-firing marks on Iron Age II wares are restricted to the small and medium sized portable closed vessels used to carry liquids. The post-firing marks scratched into the fired clay are thought to represent signs of ownership rather than marks of individual potters and/or producers. No Early Bronze Age post-firing marks were found.

The Iron II pre-firing potters' marks include a variety of designs such as patterns of one, two, and three sets of vertical lines. Two sherds have four horizontal lines. A five-pointed star was found in addition to an incomplete mark resembling an asterisk or star. A "V" shape is incised into a jug handle and a jar. For all of the Iron Age II pre-fire marks, expediency and simplicity prevail. The minimal, yet recognizable distinctions in the marks on large jars suggest that each mark represented a different potter and/or workshop, and possibly more than one generation of a single family of potters. One person might have signed pots with a single incised line while the progeny or siblings used two. Another member of the family, perhaps a third generation, could have used three lines. The pre-firing marks are found on the very large jars whose life span may have exceeded 100 years, thus making it difficult to determine the relationship between the marks and potters. The longevity of the large jars implies that their use could have spanned much of the Iron II period. The similarity of the marks implies that they may have been manufactured or used simultaneously. The purpose of the mark was to differentiate the work of each potter in a subtle, yet recognizable manner.

Additional evidence of the work of individual potters might be encoded in the precise rendering of the rim and overall vessel proportions, but to test this requires reconstructible or complete jars. Nevertheless, jar rims with one incision resemble each other more than the other marked rims. The two rims with three strokes also resemble each other more than any of the other rim shapes. The similarity and distribution of the marks imply proximity, perhaps temporal (such as three contemporaneous workshops) or social proximity (such as several generations of potters in one family). There is nothing to suggest that the pre-fire marks signify the contents or the capacity of the containers. The different marks found on vessels of more or less the same size and shape suggest that the pre-firing marks do not refer to size or contents. If the marks designated vessel size, jars of a given size should all have the identical marks.

Organization of the Bronze and Iron Age Pottery Industries

For the present, the data available from the petrographic analysis and study of the manufacturing techniques sug-

gest that the Early Bronze Age ceramic industry involved potters who specialized in vessels according to size and shape. The largest jars, or pithoi, could have been the work of craft specialists who worked with a clay to which they added grog tempering material. In addition to the craft specialists who produced the large jars, other potters, either domestic potters or craft specialists, made the wares used daily in each household. The abundance of potters' marks on the holemouth jars suggests they were manufactured by domestic potters, each of whom identified her wares with a mark. The emerging picture is a ceramics industry consisting of domestic potters, who made pots for their own families, as well as specialists who produced for the general public.

Based on the petrographic analysis and a preliminary assessment of the methods of fabrication, the Iron Age pottery industry appears to have been divided into at least four sets of potters who produced: (1) the full range of open and closed forms, large and small, plain or burnished; (2) cooking pots; (3) hand built oversize containers; and (4) the highly burnished "Ammonite" ware. All were craft specialists, but each used different clays, tempering materials, and manufacturing techniques, including the coiling process.

In the areas thus far excavated at Tall al-'Umayri there is no evidence of pottery manufacture at the site for any period. There are no wasters, tools, few imperfect sherds or pots, clay deposits, or other raw material. Nevertheless, a local clay industry either involving clay pots or possibly sacred artifacts alone is suggested by the presence of moulds for figurines and a shrine (Franken and Abujaber 1989: FIG. C.5, C.6), as well as a lion head mould (Geraty *et al.* *fc.*). If figurines used for religious purposes were the only ceramic items made at the site, perhaps Tall al-'Umayri served as a sacred site with a small industry devoted to the production of religious artifacts, such as figurines and incense stands or shrines. If clay moulds were made and fired at the site, pottery could have been made as well unless the *tall* in antiquity had a sacred function. One of the most important raw materials needed to make pottery is water, and the spring could supply it. Although the remains of ceramic production are minimal, pottery production may have been carried out in individual courtyards. This is especially pertinent for the Early Bronze Age. Domestic potters who work seasonally, during the dry summer months, leave sparse evidence of the craft during the winter period when the same space is used for other purposes (London 1989).

In assessing the petrographic study and the manufacturing traditions, the reconstruction of the organization of the ceramics industry relies on ethnographic and ethnoarchaeological studies of traditional potters which demonstrate that individual potters do not normally use

two types of clay. Individual potters tend to work with one clay mixture. If one clay is used to create all types of pots, including cooking ware and decorated pieces, then all shapes can be made in one workshop or household. Differences in clays, however, represent different groups of potters and or workshops.

Conclusions

Pottery is important for the chronological ordering of the deposits in which it is found, but it also represents the remains of an important industry. For the middle and late third millennium BC variations in the clay bodies, manufacturing techniques, surface treatment, and the marks incised prior to firing suggest a multi-faceted ceramics industry, with both domestic potters as well as craft specialists, but not very different from the seventh-sixth century industry. Since the Iron II pottery shows less variation in the clay bodies than the third millennium BC wares based on the preliminary petrographic analysis, craft specialists dominated an industry which was not necessarily an urban craft, but may have been centered in rural areas where the raw materials were available.

The evidence of the potters' marks, combined with the differences in the clay bodies and the manufacturing techniques, provide information about the people who made and used the pots. In antiquity the marks incised in the wet clay conveyed a different meaning to different members of the society. Cultural information within any community is always divided among its members. There is a division of labor in who knows what. The people who made the pottery found at Tall al-'Umayri could probably identify and recognize the potter responsible for each mark. Archaeologists who find the marks can use them, in combination with other information, to learn about the organization of the industry and the society in which it functioned.

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