

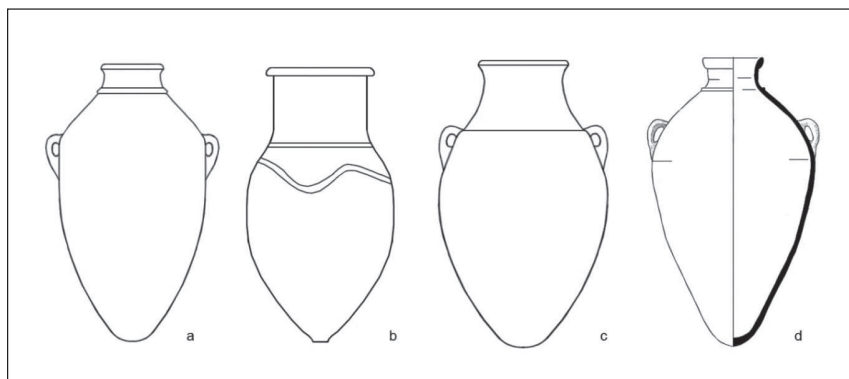
Linking Iron I Sites on the Mādabā Plain: The Evidence from Collared Pithoi

Introduction

The most distinctive Iron Age I vessel form in Transjordan is that of the collared pithos. The rim forms assigned to these pithoi are similar to those on large storage vessels found in the central highlands or hill country of Cisjordan, a type recognized by Raban (2001:494; fig. 25.1) and Mazar (2015:13) as distinct from Cypro-Tyrian jars found at site on the Mediterranean coast of Canaan, also known as wavy band jars, and from “Galilean” pithoi, which are the northern wide-mouth version of these large jars (FIG. 1). Central Highland style jars recovered at Shiloh (Bunimovitz and Finkelstein 1993: figs. 6.56:4, 6.63:3–5), as well as at Tall al-Mu-

tasallim (Megiddo) where fifty-five jars from the early excavations in Stratum VI are in the range of 1.00-1.15m tall (Loud 1948: pl. 83:1, 4; Esse 1992:88; figs. 2; 3:1)¹.

The first known group of comparable Early Iron Age pithoi found in central Jordan (FIG. 2) was recovered at Saḥab by Moawiyah Ibrahim, who described them as large jars with a collared rim and plastic ridge below a short neck (Ibrahim 1978: fig. 1; pls. XIX, XX). At sites in the Jordan Valley, large storage jars are somewhat smaller, such as a jar from Tall Dayr ‘Allā that is 85cm tall (Franken 1969: fig. 47:1) and one from Tall as-Sa‘īdiyya at 92.5cm (Tubb *et al.* 1996: fig. 20). So too, their numbers are



1. Types of Iron I pithoi: a) hill country pithos; b) Coastal, Cypro-Tyrian pithos; c) Galilean pithos (drawn by P. M. M. Daviau, after Raban 2001: fig. 25:1); Transjordan pithos (MPP Tall al-‘Umayrī pithos, L. G. Herr, published with permission).

1. Note that the scale of P6069 in Tall al-Mutasallim (Megiddo) 3

(Harrison 2004: pl. 12:2) is misleading.

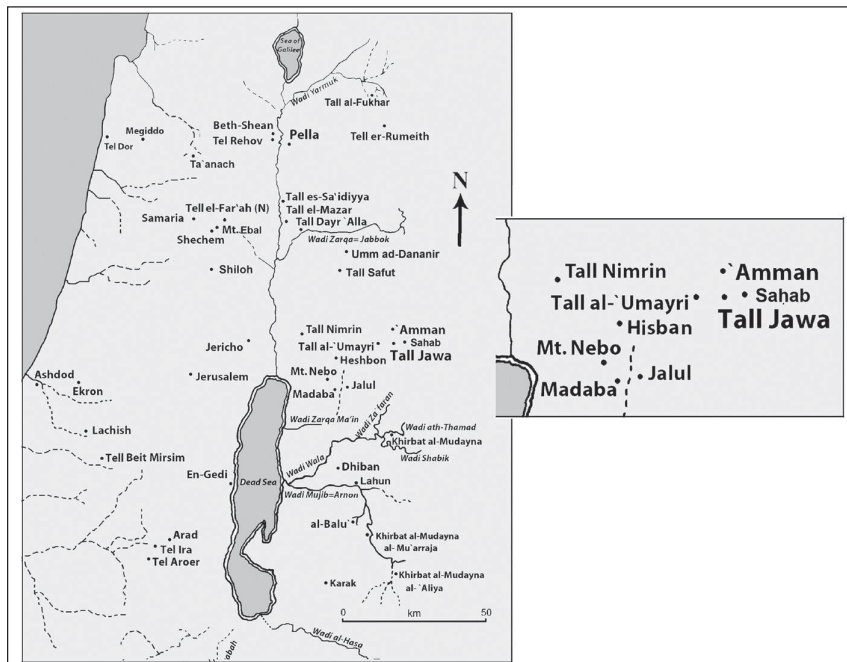
fewer—one each from Tall Dayr ‘Allā and Tall as-Sa‘īdiyya, two possible late Iron I jars from al-Lāhūn in Mu‘āb (Steiner 2013: fig. 3:1–2) and six (+2?) short-necked jars from Bālū‘ (Worschech 1992: fig. 2, 3). It is noteworthy that the jars from al-Lāhūn do not have a collar around the neck and only the rim, neck and shoulder are preserved.

The second, even larger group of 80 restored pithoi was recovered from secure Iron I contexts at Tall al-‘Umayrī. These jars are in the range of 110–120 cm in height (Clark 2002: fig. 4.17–4.23) with an ovoid or piriform body shape (see FIG. 4). Less well-known is the Iron I corpus from Tall Jāwā, where pithos sherds were recovered from Iron I loci as well as in later debris layers. Altogether, more than 900 diagnostic sherds were assigned to Iron I and of these, the collared pithos is the most characteristic Iron Age I vessel type. The identification of the pithos with a collar at the base of the neck is called the *collared* pithos, rather than the *collared-rim* pithos, since the rim may be folded, thickened, ribbed, or simple². Thus, an initial study of the basic types of collared pithoi from

Tall Jāwā (Daviau) pertains to vessels with a collar at the base of the neck, regardless of the shape of the rim. In order to investigate the production technology of the potting industry that produced these large jars, this paper also presents an analysis of their petrography (Klassen).

The Context

Tall Jāwā, south of ‘Ammān, is located on the eastern edge of the Mādabā Plain, southwest of Saḥāb. Excavation at the site was carried out for six seasons from 1989–1995, after which modern development reduced access to the site. Two principal strata of occupation were identified, Stratum VIII in the western sector and Stratum VII in the southeast, dating to Iron IIB and IIC respectively. It was below the Iron II remains of Building 113 that a small amount of Iron I architecture and pottery was located *in situ* (FIG. 3). Iron I architecture, identified as two walls, W1015 and W1016, forming a corner of Building 50 (Daviau 2003:34; fig. 4.3), was first encountered in a deep sounding in Field A, below Wall 1009 in Building 113. These walls framed a thick layer of ash and burnt mudbrick,



2. Map of Palestine and Jordan, with detail of sites in the ‘Ammān region and on the Mādabā Plain.

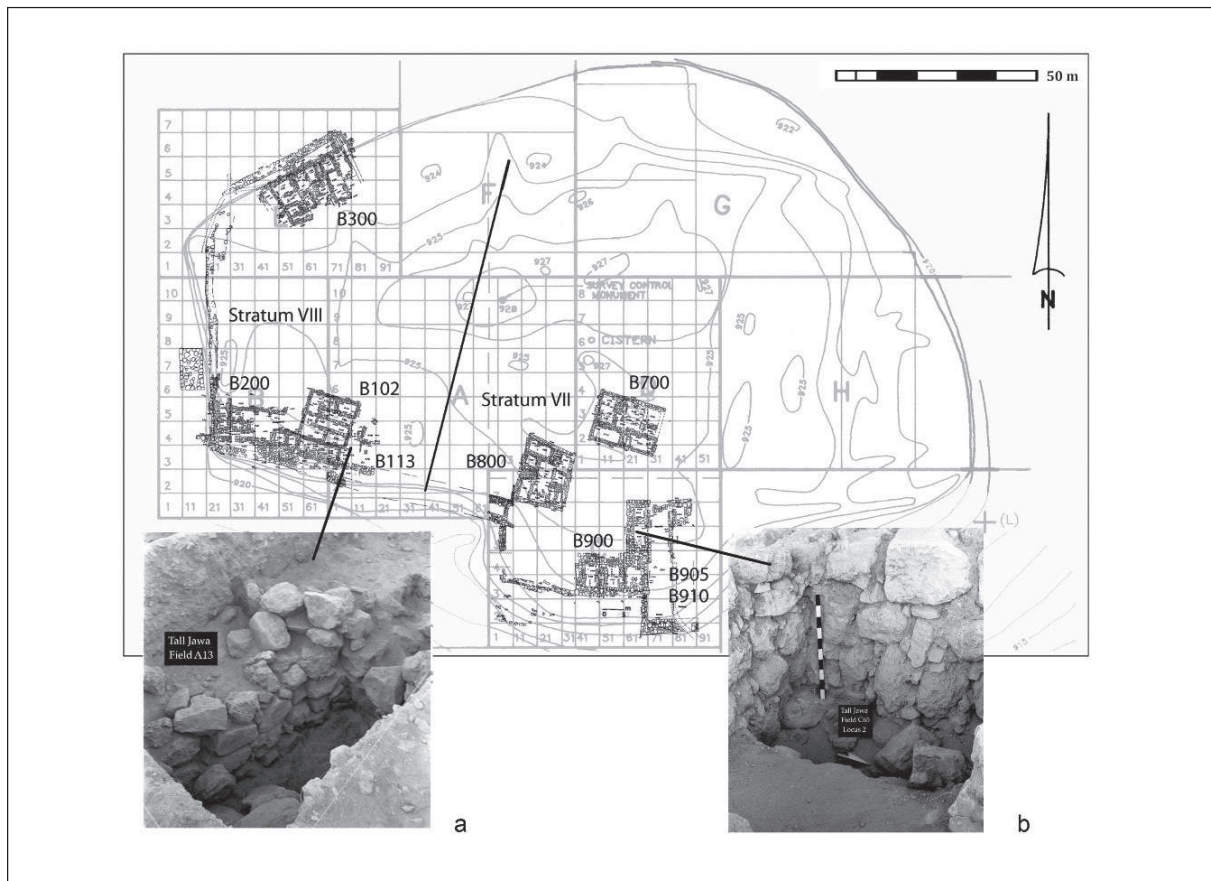
2. This designation follows Killebrew (2001:377, n. 1), who explains the misunderstanding that arose from the term “collared-rim pithos”, when several scholars, including Ibrahim, thought that

the rim, rather than the neck, had a collar. More recently, Mazar (2001:13) also uses the term “collared pithos” to refer to large jars with a ridge at the base of the neck.

a building material not seen in any of the Iron II walls. Typical Iron I pottery, consisting of collared pithoi, kraters and triangular rim cooking pots (Daviau 2003: figs. 4.7, 4.8), clearly distinguished this assemblage from the later Iron II ceramic material. In Field C-east, below the footings of the Iron II gate building, Iron I collared pithos rims were recovered from a packed soil layer, although no Iron I architecture was identified in this area.

Altogether, more than 240 sherds, including rims, collars, handles and a base, were identified as Iron I pithoi (Stratum X; for example, Daviau 2003:37–38; fig. 4.7:1–4). Various rim styles and fabric types are represented in the corpus, suggesting either a long period of use

or considerable change in ceramic technology over time³. Both the rim and the collar vary in shape from one vessel to another and determine the sub-types among the Tall Jāwā jars. Based on the shape of the rim, its stance, and the height of the neck, styles extend from tall-necked to short-necked jars, similar to the variety of rim and neck forms seen at Tall al-‘Umayrī and Ḥisbān. So too, the shape of the collar varies from pointed to rounded to flattened. Finally, the fabrics differ from coarse wares to compact fabrics, from oxidized fabrics to dark gray wares; vessels with a short neck were assigned to Stratum IX, early Iron IIA at Tall Jāwā⁴, although these sherds from fills and ceiling material are stratigraphically insecure.



3. Town plan of Tall Jāwā (R. Force, C. J. Gohm): a) detail of Iron Age remains of B50, below B113 in Field A; b) detail of Iron Age debris below B910 in Field C-east.

3. The great diversity of fabric composition and firing techniques argues for wood's position that the model of itinerant potters observed in ethnographic studies can be applied to Palestine and Transjordan. Wood also points out that such large vessels may last as long as 40–50 years (Wood 1990: 81–82, Table 4), with one known example

lasting 130 years.

4. Early Iron Age IIA elongated pithoi with a short neck and vestigial collar are also found in the Negev, such as in Stratum II at Tall Masos (Fritz and Kempinski 1983: pl. 155:4).

Technology: Forming techniques employed in the production of Iron Age I pithoi from Tall al-‘Umayrī were described by Clark and London (2000:104). Only the formation processes used to make the rim, neck and collar, and the clay preparation and firing of pithoi from Tall Jāwā, can be commented upon here⁵. Of note is the fact that several sherds show in section that the rim was formed in two and sometimes three stages. First, the clay was folded to the outside to double the thickness of the neck⁶. At the bottom of the neck, this clay was pinched or cut off, forming the collar. Thereafter, a second coil of clay was added and again folded over to form either a simple, but longer rim (V16) with either a rounded lip or to fashion a thickened rim, either a plain ovoid rim or a heavy rim enhanced with grooves or ribs on the outer face (A13/142.2; E75/32.7; E54/15.4)⁷. In some cases, a third stage was added to form the lip. This multi-stage technique can be seen most clearly in section where the colour of each fold is distinct with the second fold a lighter or darker colour than the first innermost fold (for example, A2/74.7)⁸. In one case, the rim is darker than the remainder of the neck and appears to comprise two additional clay coils to form the rim and the lip (FIG. 4).

Among the Tall Jāwā pithoi, there is considerable variety of rim shape and stance that makes it difficult to establish a typology and a secure chronological sequence without C14 dates; this was also noticed by Killebrew (2001), who studied the pithoi from Biet Jala and Bisan (Beth Shean) and judged the tall-necked jars to be the earliest examples of this

vessel type (Killebrew 2001:380). This is supported by comparison with a collared pithos from Khirbat an-Nuḥās, which has a short neck and is dated to the 9th century by C14 analysis (Smith and Levy 2008: fig. 11:7).

At Tall Jāwā, pithoi with a tall flaring rim come in three styles. The first type is a tall flaring rim pithos with a rim folded to create a rib below the lip or on the upper neck (FIG. 4:1, 2). This type is also seen in two unstratified sherds from Ḥisbān (Herr 2012: fig. 2.3:1) and in a group from Tall Mādabā; however, the best example, with a more upright stance, comes from late Iron I (Stratum V) at Shiloh in the central hill country (Bunimovitz and Finkelstein 1993: fig. 6.53:6).

The pithoi with a flaring mouth that have a thickened rim may have a break at the point where the rim joins the neck (FIG. 4:3, 4). In the third group, there is a sharp mid-neck ridge above the collar and a large, sharply defined collar (FIG. 4:5). Also in this subtype is a pithos with a rectangular rim, a gentle upper-neck ridge, and a rounded collar (FIG. 4:6).

In a second group, the rim is vertical or incurving and externally thickened, either plain or ribbed. The incurving rims (FIG. 5:1, 2) have a relatively tall neck as do the heavy walled jars with a plain thickened rim (FIG. 5:3, 4). There are several examples of the ribbed rim (FIG. 5:5), while a thickened, undercut rim stands on a ribbed neck above a pronounced collar (FIG. 5:6). Pithoi with a shorter neck are seen with either a vertical or sloping stance (lower image), approaching the stance of Iron II vessels.

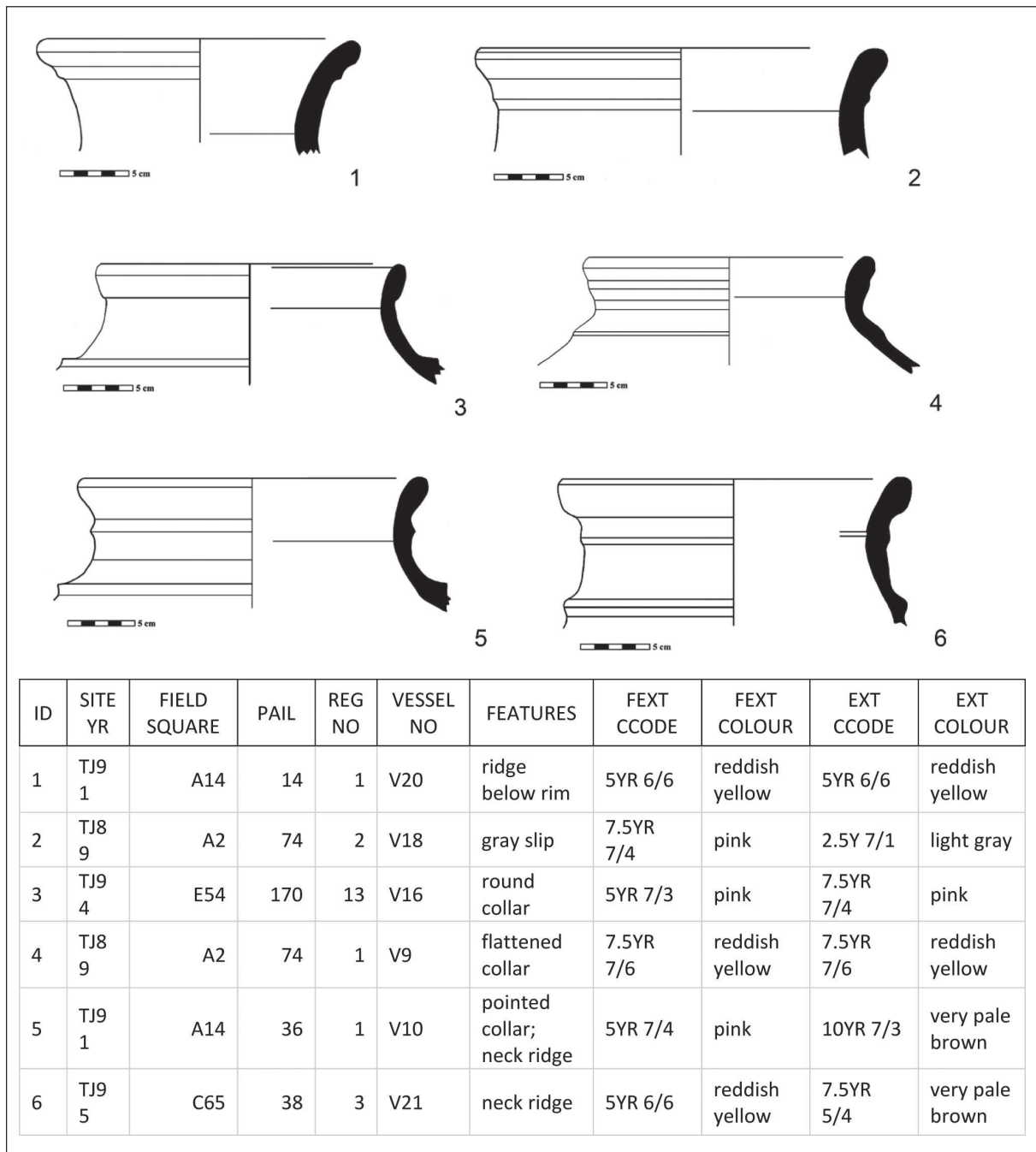
A group of sherds represent variations on

5. Of the early Iron Age I vessels illustrated by Franken, one collared jar and a second jar without a collar are sufficiently restored to determine their full height. These large jars (0.75–0.85 m tall) are from Phase A at Dayr ‘Allā (Franken 1969: fig. 47:1). Collared pithoi from Sahab with a short neck (Ibrahim 1978: fig. 1) are close in size (1.20 m tall) and overall body shape to the Iron Age II pithoi from Tall Jāwā (Daviau 1995; Chapter 4, below) and are discussed below in association with early Iron Age II forms (Stratum IX).

6. That this was the case can be seen clearly on Sherd E75/44.4, where the lower edge of the collar was not compressed sufficiently to erase the seam. This sherd also has an accumulation of clay on the interior of the lip where the second coil was attached to form the lip and the rectangular rim.

7. In the case of Sherd E54/15.4, the lower edge of the outer rim is preserved and is separated from the neck by a groove.

8. That the collar was a technological rather than a stylistic feature is also suggested by Killebrew (2001:391). A good illustration that shows how the clay was folded to strengthen the neck is the profile of a pithos from Tall al-‘Umayrī (Herr 2001: fig. 14.4:2=Clark 1997: fig. 4.20:2); unfortunately there is no mention of the forming technique for this particular vessel by Herr or by Clark and London (2000:104–106) in their discussions of pithoi. MacDonald’s observation (1992:135; fig. 12.12:7) of a lighter coloured clay used to reinforce the handle of a jug affirms that the addition to a pot of a different clay is not unusual. The jug in MacDonald’s corpus was recovered at Site 34 of the Southern *Ghawrs* and North-East Arabah Archaeological Survey and is dated to the Iron Age IA.

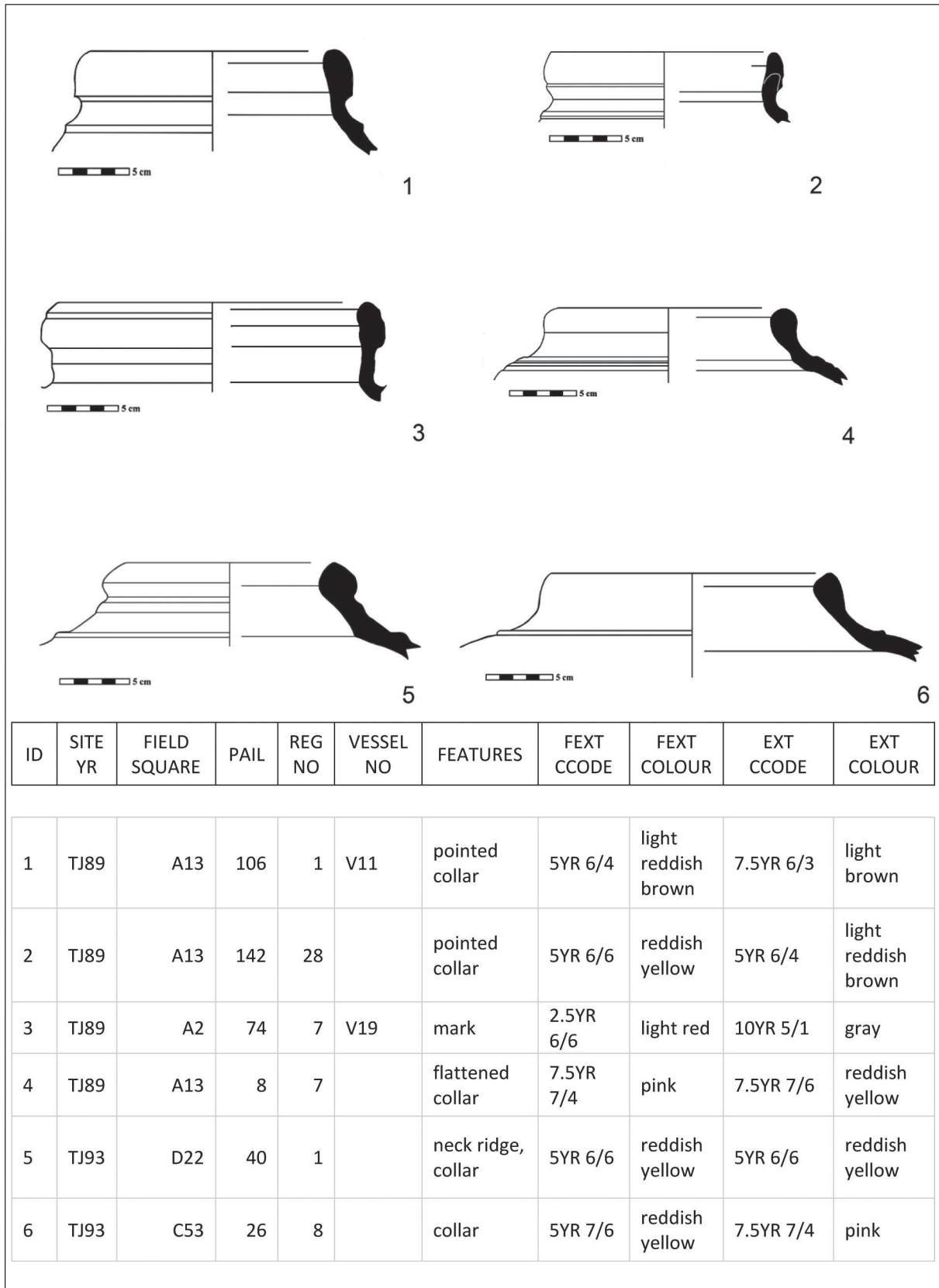


4. Tall-necked pithoi.

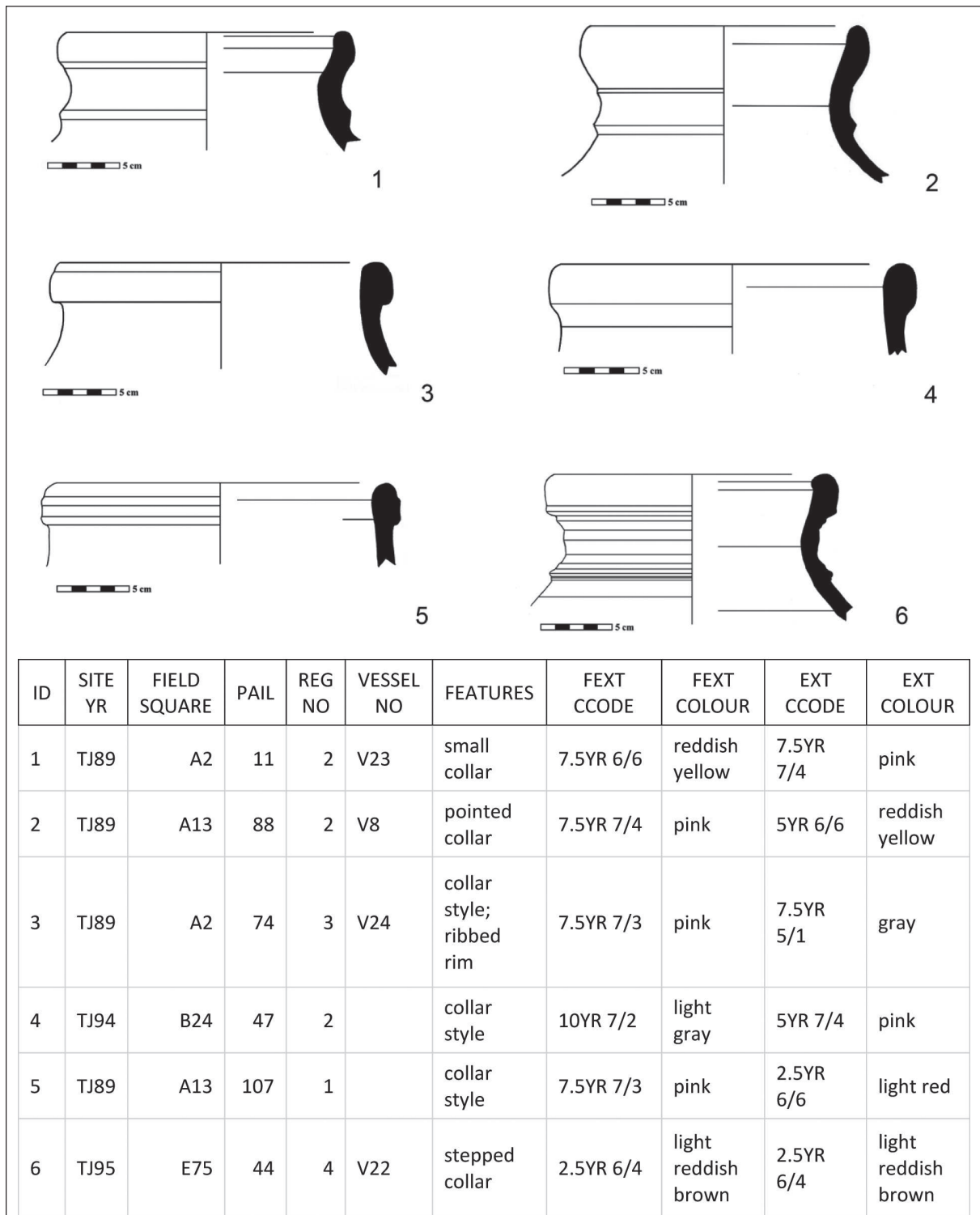
the styles described above. These include thickened rims, plain or with one or more ribs (FIG. 6:1–3) on shortened necks. Rolled and externally thickened rims on sloping necks (FIG. 6:4–6) suggest that the sherds in this group probably date late in Iron I or early in Iron II. However, among the short-necked pithoi are numerous examples with an Iron I gray ware fabric

(FIG. 7). These are gray throughout, often with a gray slip on the exterior. A variant has a thin light red margin immediately under the surface, which itself may be gray or red.

Collars (FIG. 8): Both tall and short-necked pithoi are found with pointed or rounded upright collars, round collars on the shoulder, round compressed collars and even rounded

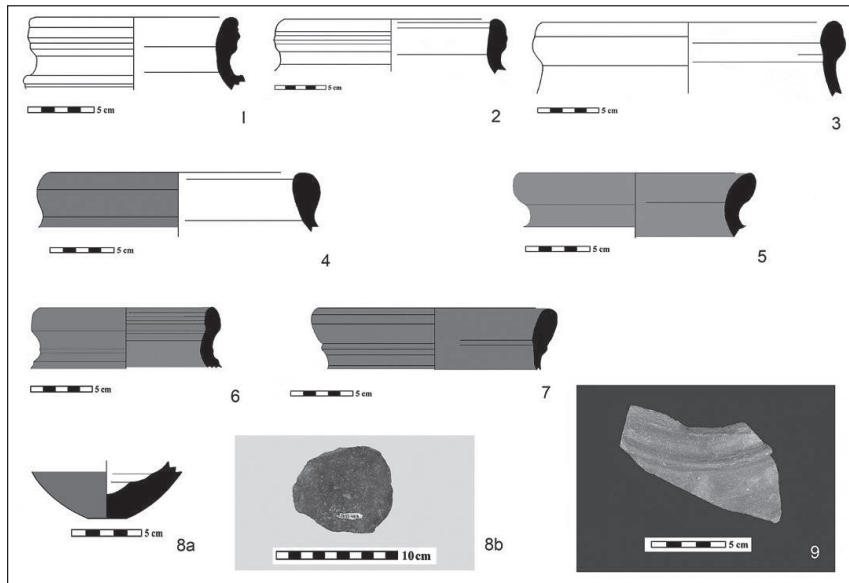


5. Thickened and Incurving Rim Pithoi.

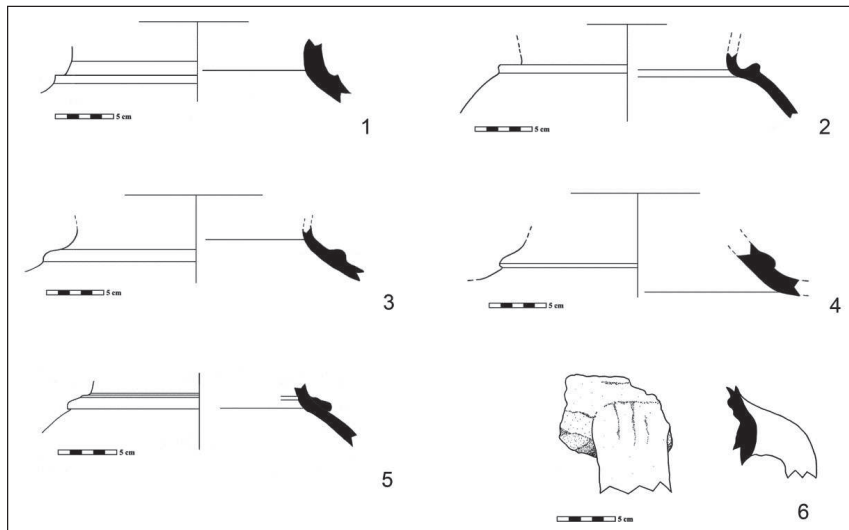


6. Thickened and ribbed rim, long sloping-necked Pithoi and flattened collars. Most unusual among these jars is the round flattened collar that is vestigial in some places around the neck. A close parallel is found among the pithoi in a storeroom at

Tall al-'Umayrī (Clark 1997: fig. 4.17) and in the corpus from Biet Jala near Jerusalem (Mazar 1981: fig. 9:5). As at Shiloh and Biet Jala, the collar may have one or more grooves, like



7. Examples of gray ware pithos rims, base and collar.



8. 1) Pointed, 2-3) rounded, and 4-5) compressed collars; 6) large ribbed handle.

a step, on the lower edge (Bunimovitz and Finkelstein 1993: fig. 6.58.8; Kelso 1968: pl. 56:1, 9, 11; Mazar 1981: fig. 9:4). This great variety of styles points to the production of various workshops, as well as different clay preparation and firing techniques. Although no restorable pots were recovered at Tall Jāwā, several handles can be assigned to these large jars (FIG. 8:6).

Function: While it is apparent that these very large jars were used for long term storage, scholars still debate their precise function. Were they used exclusively as containers for liquids or were dry goods also stored in these jars? and how were the contents removed from

the jars given their size, which is usually more than 1.00 m in height. This problem, apparent at Tall al-'Umayrī where jars were found containing barley, was also evident at Tall Jāwā, where there is no sign of dipper juglets in the contemporary assemblage.

Petrography

Recent discussions of technology and potential modes of production used to produce collared pithoi have often been couched in the "ethnicity" debate. London (1989) preferred to see the collared pithos as a marker of the dichotomy between urban and rural lifestyles rather than the traditional highland vs. lowland

view, whereas Esse's (1992) work on the pithoi from Tall al-Mutasallim (Megiddo) lead him to reaffirm that collared pithoi were indicative of a highland tradition. He maintained that diversity and diffusion of this tradition was through both economic relations as well as exogamous marriage as these vessels were likely produced by women at the household level. Although Ibrahim (1978) does not comment exclusively on the mode of production of the pithoi found at Saḥab, he argues strongly that the diversity and spread of this vessel style is due to a socio-economic tradition not ethnicity⁹. London (1989) put forth the notion that these vessels were formed by specialists, likely itinerant potters producing pithoi locally. This position is also advocated by Herr (2006:66) for vessels excavated at Tall al-'Umayrī, as well as Killebrew (2001:391) for vessels found at smaller hill country sites, adding that specialized production centres were also likely involved (2001:389–391)¹⁰.

Due to the size and complexity in construction techniques involved, it is clear that these vessels were produced by very skilled potters. The appearance of groups of collared pithoi composed of multiple petrographic or chemical groups at individual sites is often suggested as an indication of multiple workshops¹¹ (Yellin and Gunneweg 1989; Cohen-Weinberger and Goren 1996; Glass *et al.* 1993)¹², some not always local, which contradicts the notion that these vessels were produced by itinerant potters. Analysis of the collared pithoi from Biet Jala indicates diversity even in local production with the identification of two distinct ware groups (G1-A and G1-B; Killebrew 2001). This is further reinforced with the existence of 4 sub-groups within Group G1-A suggesting production by multiple potters (2001:389). Similar di-

versity is noted at the Mādabā Plain sites of Tall al-'Umayrī and Ḥisbān (London 2012, London *et al.* 1991). Although most collared pithoi from both sites fall into the same chemical group¹³, three separate Ware groups were identified (London 2012:694–696). Wares 6 and 7 differ on the basis of the percentages of limestone inclusions, with Ware 9 identified as having no single dominant inclusion (London 2012:649–653). Diversity within Ware group 6 is slight, however, London does indicate that the pithoi from Tall al-'Umayrī consistently contain limestone inclusions at slightly less than 65%, with those from Ḥisbān having between 70 and 80% (London 2012: 695).

Methodology

To address questions regarding mode of production, technological style, and provenance, petrographic analysis was conducted on six collared pithos rims from Tall Jāwā¹⁴. Although not a representative sample, the analysis of the six vessels does give us some insight into the technological choices made by the potters manufacturing these vessels. Examples of all three rim forms (tall flaring rim, tall neck thickened rim and short-necked rims) were sampled. Analytical procedures espoused by Mason (2004) and Whitbread (1986, 1995) were utilized, with petrographic descriptions of “primary characteristics” following Freestone (1991). Petrofabric groups were characterized based on quantity, shape, size, and composition of inclusions (Klassen 2009).

Petrographic Descriptions

Although there is apparent variety between the samples, the petrofabrics identified appear to be variations of the same clay matrix and mineral suite evident in the aplastic inclu-

9. After this paper was completed, we learned that the final report on Saḥab has recently been published by the Department of Antiquities (personal communication, M. Ibrahim).

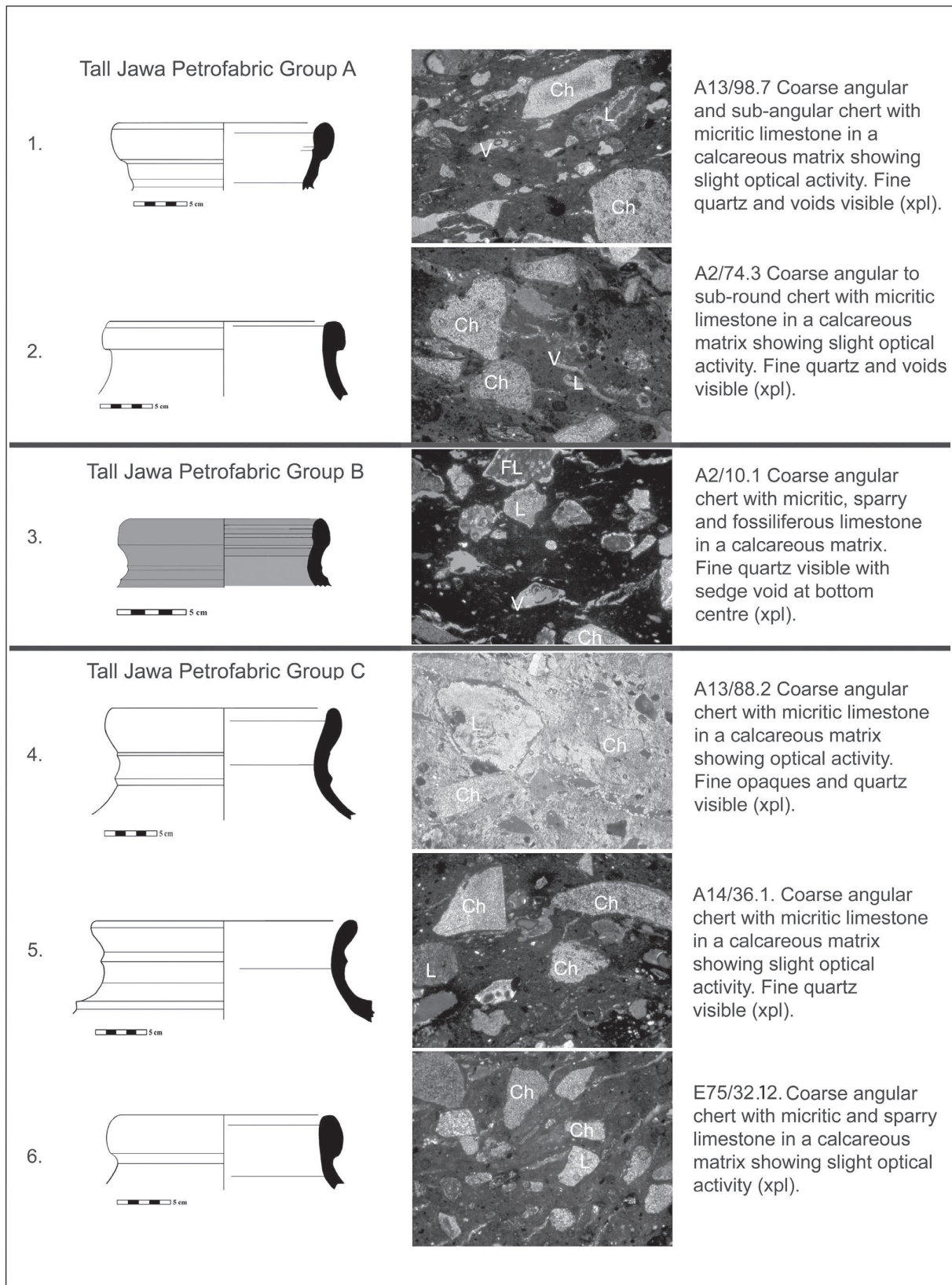
10. Raban (2001) agrees but goes on to suggest these highly specialized containers evolved out of the Late Bronze Age store jar tradition and are standardized in volume to meet administrative demands.

11. Mazar (1981: 30) suggests this on basis of diversity in rim shapes.

12. A collared pithos from Tall Kaysān, has been suggested to come from the Nahal Qishon region to the south of the site (Courtois 1980:356, table 1.12).

13. Two vessels from Tall al-'Umayrī that belong to Ware groups 7 and 9 do not fit any of the chemical groups determined through Instrumental Neutron Activation Analysis.

14. Sherd numbers include the field+square/pail number.item number.



9. Illustrations and photomicrographs of Iron I collared pithoi from Tall Jāwā analyzed using petrography; image width = 3.5 mm (Ch=chert, L=limestone, FL=fossiliferous limestone, V=void).

sions¹⁵, all showing bimodal distribution. As a whole, the petrofabrics can be described as calcareous clay with slight to high optical activity with most samples showing a speckled b-fabric. Identifiable features of the aplastic inclusions suggest that there are three Tall Jāwā sub-groups defined by the presence or absence of shale and the coarseness of texture.

Petrofabric Group A

Petrofabric A (FIG. 9:1, 2) is composed of 2 samples (A13/98.7 and A2/74.3), which have a reduced core and are relatively coarse, with trace to non-existent shale. Dominant features include poorly sorted coarse inclusions composed of 13–14% well round to angular, medium to granule sand sized chert, 11–16% well round to sub-angular, fine sand to granule sized limestone (micritic, coquina, and sparite), 8–10% well round to sub-round, fine to very coarse sand sized opaques, trace to 1% medium sand sized rounded clay nodules. Sub-angular to angular grog and trace sub-angular medium sand size basalt occur only in A13/98.7. Finer aplastic inclusions consist of 1–2% silt to very fine sand sized angular quartz, with well round opaques, and micritic carbonates. Vessel A2/74.3 also shows small amounts of allochems in the form of echinoderm.

Petrofabric Group B

Group B (FIG. 9:3) has only one sample (A2/10.1) showing 1% of shale, much coarser than Group A, and is the only sample that does not show optical activity. Aplastics include poorly sorted coarse inclusions composed of 16% sub-round to angular, medium sand to very coarse sand sized chert, 20% well round to angular, medium sand to granule limestone (micritic and fossiliferous, with some sparite), 3% well round to sub-round, medium to granule sand sized opaques, 2% sub-angular to angular, medium to coarse sand sized calcite, 1% well round to sub-round, medium sand sized clay

nodules, and trace sub-angular to angular, fine to medium sand size basalt and pyroxene. Finer aplastic inclusions consist of 1% silt to very fine sized angular quartz, well round opaques, chert, and micritic carbonates. Plant phytoliths are present in some voids in long section (.5 mm) with sharp edges indicating chaff temper; however most voids appear to be due to drying.

Petrofabric Group C

The final petrofabric group (FIG. 9:4–6), is composed of 3 samples (A13/88.2, A14/36.1, E75/32.7) defined by a finer texture than both groups A and B, and contains trace to 1% medium to coarse sand sized shale. Group C is characterized by poorly sorted coarse inclusions composed of 10–18% sub-round to angular, medium to granule sand sized chert, 4–18% well round to sub-round angular, medium to very coarse sand sized opaques, 8–16% well round to angular, medium to very coarse sand sized limestone (micritic and sparite), trace to 2% well round to round, medium to coarse sand sized clay nodules, and trace sub-angular, medium sand sized grog (E75/32.7 and A13/88.2). Trace medium sand sized basalt (A13/88.2) and plagioclase occur (A13/88.2 and E75/32.7), along with trace fine sand sized pyroxene and amphibole (A14/36.1). Finer aplastic inclusions consist of 2% silt to very fine sand sized angular quartz, along with well round opaques, angular chert, and micritic carbonates. Samples show trace amounts of allochems in the form of echinoderm, foraminifera and peloids, along with minimal fine to medium sand sized phosphates (E75/32.7).

Discussion

Organic inclusions are clearly evident by the presence of negative voids, ranging from 1–4% in four of the six samples. Of these, sedge is prominent with poorly preserved silica skeletons visible in both long and cross section in three of the samples (A13/88.2, A14/36.1, and

15. Overall, the petrofabrics of the collared pithoi, excluding the chert temper and coarse limestone, show similarities to those fabrics

from Tall Jāwā described by Daviau and Graham (2009).

A13/98.7). As the percentage of this inclusion is relatively low, it is possible that it occurs naturally within the clay, suggesting clays were harvested from a wet environment, likely from a local wadi (Daviau and Klassen 2014:105, fig 4.3). Some negatives suggest the presence of chaff; however, this is not evident in all samples¹⁶. Other voids show parallel alignment and are the result of the drying process (Quinn 2013:61).

The angularity and poor sorting of the chert inclusions in all samples suggest this material was added as temper. Trace amounts of angular basalt inclusions (not common to the region) along with associated minerals (plagioclase and pyroxene) occur in four of the six samples, and may indicate that basalt vessels or tools were used to process the chert (Klassen 2009:199; London 2012:687–689).

In all of the vessels analyzed, separate coils can be clearly discerned in the thin section showing the primary forming technique used to produce the rim as discussed above. Consistency in fabric and aplastic inclusions in the observed coils is evident in all but one vessel. In sherd A13/98.7 there is a clear distinction of organic material in the form of sedge occurring only in the upper coil. The addition of organic material to the clay, or the use of clay with natural organic material for the upper coil, may have been used to even the drying time between the coils to avoid differential shrinkage with the potential of causing cracking (Quinn 2013:158).

When we compare the petrofabric groups of the Tall Jāwā collared pithoi to those analyzed at other sites on the Mādabā Plain, the diversity in the manufacturing of these vessels is clearly apparent. Although variety between the subgroups at Tall Jāwā has been noted, the mineral suite is consistent and the use of chert as temper

is unseen at other sites in the region¹⁷. London (2012) identifies three Ware groups of collared pithoi at Tall al-‘Umayrī, two of which overlap with those identified at Ḥisbān (Wares 6 and 9), although subtle differences in the percentages of limestone occur (see above). Similarities between Tall al-‘Umayrī and Ḥisbān go beyond the mineralogy evident in the fabrics, as grog is consistently used as temper in all three groups (2012:646–653), unlike Tall Jāwā. Differences are also evident in the much higher percentages of carbonates in the form of limestone, as well as fine sand sized quartz in the clays used at both Tall al-‘Umayrī and Ḥisbān¹⁸.

Local Production

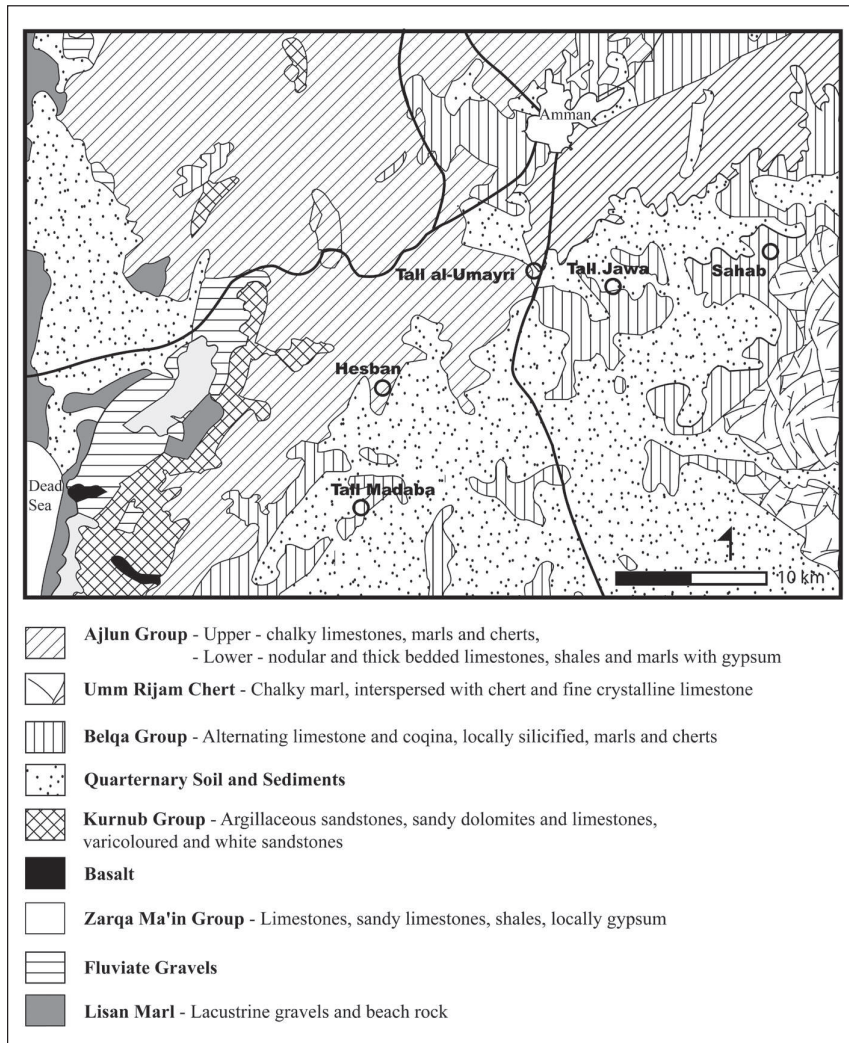
The site of Tall Jāwā sits firmly on the ‘Ajlūn and al-Balqā’ groups of the Upper and Middle Cretaceous periods with the Wādī as-Sīr Limestone, Umm al-Ghudrān and the ‘Ammān Silicified Limestone formations exposed in outcrops found throughout the Mādabā Plain region (FIG. 10) (Bender 1974; Bullard 1972; Lacelle 1986; Schnurrenburger 1991; 2003). It is understandable that the mineralogy described in the various petrographic analyses conducted on collared pithoi from Tall Jāwā, Tall al-‘Umayrī, and Ḥisbān show such homogeneity, as these sites share a common geology. Similar clays and aplastic inclusions used to produce the collared pithoi are evident, as potters acquired materials from the formations that outcrop in the region. However, a clear distinction in the temper applied, as well as in the percentage and size of aplastic inclusions, highlights the heterogeneity in the production of these vessels. This additional petrographic study from Tall Jāwā reinforces the suggestion that unique technological styles are clearly evident in the production of collared pithoi at the various Iron I sites on the Mādabā Plain.

16. The use of chaff as temper is far from ubiquitous at Iron I sites in central Jordan. Chaff tempering has been noted as common in early Iron Age fabrics at Lāhūn (Steiner and Jacobs 2008) as well as Mādabā (S. Klassen, personal observation), whereas only 6% of the 51 samples analyzed petrographically from Khirbat al-Mudayna al-‘Uliya show evidence of tempering with any organic material (Routledge et al 2014:98–99). Ibrahim (1978:117) mentions the oc-

currence of “straw” as a temper in the collared pithoi at Saḥab.

17. Only one of the eight collared pithoi analyzed from Tall Mādabā showed evidence of chert temper (Klassen 2012).

18. A local calcareous clay with a low percentage of fine quartz similar to that used for the Tall Jāwā collared pithoi was utilized by potters producing flared rim jars and holemouth vessels during the EB III period at Tall al-‘Umayrī (Klassen 2009).



10. Geological map of Mādabā Plain region (adapted from Bender 1974 and Bullard 1972).

Distribution

When we look at the distribution of collared pithoi in the southern Levant, the hill country/central highlands style has its heaviest concentration at sites from Tall al-Mutasallim (Megiddo) to Shiloh in Cisrjordan. Small numbers of collared pithoi are found at other sites south of Shiloh, but are not represented in the Negev at Beer-Sheba (Brandfon 1984:41) or Khirbat al-Mishāsh (Tall Masos) (Kempinski and Fritz 1977:144, n.6). The second area where collared pithoi are numerous is located south of ‘Ammān in central Jordan. Especially notable are the sites of Saḥab, Tall al-‘Umayrī, Tall Jāwā, Ḥisbān and Tall Mādabā (Table A). Sites to the north and south of this area have many fewer examples of this large storage vessel, and

most jars show no evidence of a collar around the neck. At the same time, these two area with heaviest concentration of collared pithoi reflect a settlement pattern that is not contiguous across the Jordan, especially in the area of Tall as-Sa‘īdiyya and Tall Dayr ‘Allā, where collared jars are few.

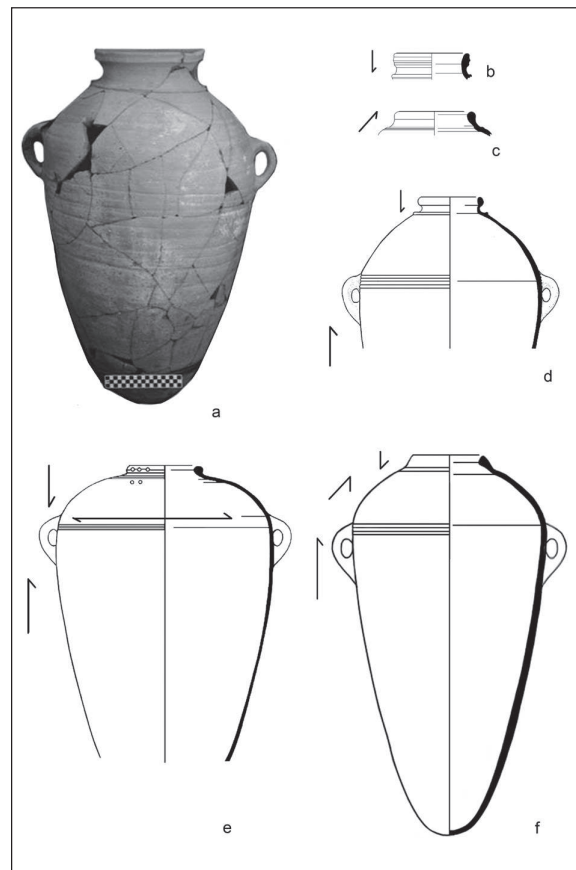
Table 1. Distribution of Collared Pithoi in Transjordan

Site	No.	Comments	References
Tall al-Fukhar	2	and 7 Galilean style, no collar	Barako 2015
Tall Abū al-Kharaz	2		Fischer 2013
Tall al-Sa‘īdiyya	1 ?		
Tall Dayr ‘Allā	2		Franken 1969

Tall al-Mazār	?		
‘Ammān		Unpub	
Saḥab	16		Ibrahim 1978
Tall al-‘Umayrī	80+	Restored and 100s among sherds	Herr 2001; pers. communication
Tall Jāwā	230	rim sherds	In preparation
Ḥisbān	45	rim sherds	Herr 2012
Tall Mādabā	20	rim sherds	In prep
Jalūl	8+	rim sherds; more to come	Ray, pers. communication
Lāhūn	2	rim sherds	Steiner 2013
Bālū‘	6 ?	short necked pothoi	Worschech 1992
Khirbat al-Mudayna al-‘Uliya	1 ?		Routledge 2004

What this does not tell us is whether there was social, political or ethnic cohesion among the sites using the collared style of large jar or whether there is continuity between the peoples of Iron I and Iron Age II in the ‘Ammān region. What is clear is that the potting tradition underwent a transformation with the noticeable decline in the use of gray ware, the development of new fabrics, the introduction of oxides and, possibly, grog as inclusions, and modifications in the shape of large pithoi. Most noticeable are the changes in the height of the neck that becomes shorter over time and the position of the shoulder that rises toward the rim throughout the Iron Age II, culminating in neckless pithoi (FIG. 11). With these changes came a repositioning of the handles at the change of direction between the body and the shoulder, often marked by grooves or string lines, and the disappearance of the collar. A new method of sealing the edge of folded clay is introduced consisting of a finger wide compressed band near the top of the shoulder that is marked by the resulting fine ridges flanking it on either side (Daviau 1995).

In order to expand our understanding of Iron Age I settlement on the Mādabā Plain, we hope



11. Changes in pithos shape from Iron I to Iron II: a) MPP Iron I Tall al-‘Umayrī pithoi, photo D. R. Clark (used with permission); Tall Jāwā pithoi: b) neck becomes shorter; c) neck begins to slope inward; d) shoulder rises; e) shoulder is compressed and expanded; f) shoulder slopes directly to rim.

to see the full publication of additional ceramic assemblages that may clarify the distribution and the limits of the collared pithos tradition, especially from Tall Šāfūt, north of ‘Ammān, from ‘Ammān itself and from Jalūl. Pottery from these sites may also enable us to document changes over time in technology and body shape throughout the Early Iron Age in Transjordan.

Bibliography

- Barako, T.J. 2015. The Iron Age Pottery. Pp. 71–187 in T. J. Barako and N. L. Lapp (eds.), *Tell er-Rumeith: The Excavations of Paul W. Lapp, 1962 and 1967*. American Schools of Oriental Research Archaeological Reports 22. Winona Lake, IN: Eisenbrauns.
- Bender, F. 1974. *Geology of Jordan. Contributions to the*

- Regional Geology of the Earth. Supplementary Edition of Volume 7.* Gebrüder Borntraeger. Berlin.
- Brandfon, F.R. 1984. The Pottery. Pp. 37–69 in Z. Herzog (ed.), *Beer-sheba II. The Early Iron Age Settlements*. Tel Aviv: Tel Aviv University Institute of Archaeology.
- Bullard, R.G. 1972. Geological Study of the Hesban Area. *Andrews University Seminary Studies* 10: 129–141.
- Bunimovitz, S. and Finkelstein, I. 1993. Pottery. Pp. 81–196 in I. Finkelstein (ed.), *Shiloh: The Archaeology of a Biblical Site*. Monograph Series of the Institute of Archaeology, No. 10. Tel Aviv: Tel Aviv University.
- Clark, D.R. 1997. Field B: The Western Defense System. Pp. 53–98 in L.G. Herr, L.T. Geraty, Ø.S. LaBianca and R.W. Younker (eds.), *Madaba Plains Project 3: The 1989 Season of Excavations at Tell el-‘Umeiri and Vicinity and Subsequent Studies*, Berrien Springs, MI: Andrews University Press.
- 2002. Field B: The Western Defense System. Pp. 48–116 in L.G. Herr, D.R. Clark, L.T. Geraty, R.W. Younker and Ø.S. LaBianca (eds.), *Madaba Plains Project 5: The 1994 Season at Tell el-‘Umeiri and Subsequent Studies*, Berrien Springs, MI: Andrews University Press.
- Cohen-Weinberger, A and Goren, Y. 1996. Petrographic Analysis of Iron Age I Pithoi from Tel Sasa. *Atiqot* 28: 77–83.
- Courtois, L. 1980. Examen Pétrographique et Caractérisation Matérielle de quelques Céramiques de Tell Keisan. Pp. 353–60 in J. Briend and J.B. Humbert (eds.), *Tell Keisan (1971-1976).—une cité phénicienne en Galilée.*, Orbis Biblicus orientalis, Series Archaeologica 1. Paris: Gabalda.
- Daviau, P.M.M. 1995. Iron Age II Pithoi from Tell Jawa, Jordan: Construction Techniques and Typology. *SHAJ* 5: 607–616
- 2003. Excavations at Tall Jawa, Jordan. Volume 1: The Iron Age Town. *Culture and History of the Ancient Near East* 11/1. Leiden: Brill.
- Daviau, P.M.M. and Graham, A. 2009. Black-Slipped and Burnished Pottery: A Special 7th-Century Technology in Jordan and Syria. *Levant* 41(1): 41–58.
- Daviau, P.M.M. and Klassen, S. 2014. Conspicuous Consumption and Tribute: Assyrian Glazed Ceramic Bottles at Khirbat al-Mudayna ath-Thamad. *BASOR* 372: 99–122.
- Esse, D.L. 1992. The Collared Pithos at Megiddo: Ceramic Distribution and Ethnicity. *Journal of Near Eastern Studies* 51:81–103.
- Finkelstein, I. 2011. Tall al-‘Umayri in the Iron Age I. Facts and Fiction with an Appendix on the History of the Collared Rim Pithoi. Pp. 113–128 in I. Finkelstein and N. Na‘aman (eds.), *The Fire Signals of Lachish. Studies in the Archaeology and History of Israel in the Late Bronze Age, Iron Age, and Persian*
- Period in Honor of David Ussishkin*, Winona Lake, IN: Eisenbrauns.
- Finkelstein, I.; Bunimovitz, S. and Lederman, Z. 1993. *Shiloh. The Archaeology of a Biblical Site*, I. Finkelstein (ed.), Monograph Series of the Institute of Archaeology, No. 10. Tel Aviv: Tel Aviv University.
- Fischer, P.M. 2013. *Tell Abu Al-Kharaz in the Jordan Valley. Volume III: The Iron Age*. Österreichische Akademie der Wissenschaften / Contributions to the Chronology of the Eastern Mediterranean, Volume XXXIV. Vienna: Verlag der Österreichische Akademie der Wissenschaften.
- Foran, D. and Klassen, S. 2013. Madaba Before Mesha: The Earliest Settlements on the City’s West Acropolis. *SHAJ* 11: 211–19
- Franken, H. 1969. *Excavations at Tell Deir ‘Alla I. A Stratigraphical and Analytical Study of the Early Iron Age Pottery*. Leiden: E. J. Brill.
- Freestone, I. C. 1991. Extending Ceramic Petrology. Pp. 399–410 in A. Middleton and I. Freestone (eds.), *Recent Developments in Ceramic Petrology*, British Museum Occasional Papers No. 81, London: British Museum.
- Fritz, V. and Kempinski, A. 1983. *Ergebnisse der Ausgrabungen auf der Hirbet el-Msas (Tel Masos) 1972/1975*. 2 vols. Abhandlungen des Deutschen Palästinavereins. Wiesbaden: Otto Harrassowitz.
- Glass, J., Goren, Y., Bunimovitz, S. and Finkelstein, I. 1993. Petrographic Analyses of Middle Bronze Age III, Late Bronze Age and Iron Age I Pottery Assemblages. Pp. 271–86 in I. Finkelstein (ed.), *Shiloh. The Archaeology of a Biblical Site*. Monograph Series of the Institute of Archaeology, 10. Tel Aviv: Tel Aviv University.
- Harrison, T.P. 2004. *Megiddo 3. Final Report on the Stratum VI Excavations*. Oriental Institute Publications 127. Chicago: University of Chicago.
- Henschel-Simon, E. 1945. Note on the Pottery of the Amman Tombs. *Quarterly of the Department of Antiquities of Palestine* 14:75–80.
- Herr, L.G. 2001. The History of the Collared Pithos at Tell el-‘Umeiri, Jordan. Pp. 237–250 in S.R. Wolff (ed.), *Studies in the Archaeology of Israel and Neighboring Lands in Memory of Douglas L. Esse.*, Studies in Ancient Oriental Civilization, 59/ASOR Books, 5. Chicago: The Oriental Institute of the University of Chicago/Atlanta, GA: American Schools of Oriental Research.
- 2006. An Early Iron Age I House with a Cultic Corner at Tall al-‘Umayri, Jordan. Pp. 61–73 in S. Gitin, J.E. Wright and J.P. Dessel (eds.), *Confronting the Past: Archaeological and Historical Essays on Ancient Israel in Honor of William G. Dever.*, Winona lake, IN: Eisenbrauns.
- 2007. The Late Iron Age I Ceramic Assemblage from Tall al-‘Umayri, Jordan. Pp. 135–145 in S. White-Crawford, A. Ben-Tor, J.P. Dessel, W.G.

- Dever, A. Mazar and J. Aviram (eds.), *'Up to the Gates of Ekron', Essays on the Archaeology and History of the Eastern Mediterranean in Honour of Seymour Gitin*, Jerusalem.
- 2012. The Iron Age. Pp. 9–172 in J.A. Sauer and L.G. Herr (eds.), *Ceramic Finds: Typological and Technological Studies of the Pottery Remains from Tell Hesban and Vicinity*, Hesban 11. Berrien Springs, MI: Andrews University Press.
- 2015. Iron Age I: Transjordan. Pp. 97–114 in S. Gitin (ed.), *The Ancient Pottery of Israel and Its Neighbors from the Iron Age to the Hellenistic Period*, Jerusalem: Israel Exploration Society
- Ibrahim, M.M. 1978. The Collared-rim Jar of the Early Iron Age. Pp. 116–26 in R. Moorey and P. Parr (eds.), *Warminster Archaeology in the Levant. Essays for Kathleen Kenyon*, Aris & Phillips Ltd.
- Kelso, J.L. 1968. The Excavation of Bethel (1934–1960). *Annual of the American Schools of Oriental Research* 39. Cambridge, MA: American Schools of Oriental Research.
- Kempinski, A. and Fritz, V. 1977. Excavations at Tel Masos (Khirbet el-Meshāsh), Preliminary Report on the Thid Season, 1975. *Tel Aviv* 4:136–158.
- Killebrew, A.E. 2001. The Collared Pithos in Context: A Typological, Technological, and Functional Reassessment. Pp. 377–398 in S.R. Wolff (ed.), *Studies in the Archaeology of Israel and Neighboring Lands in Memory of Douglas L. Esse*, Studies in Ancient Oriental Civilization, No. 59. ASOR Books, No. 5. Chicago: The Oriental Institute of the University of Chicago/Atlanta, GA: American Schools of Oriental Research.
- Klassen, S. 2009. Petrographic Analysis of EB III Ceramics from Tall al-Umayri, Jordan: A Re-Evaluation of Levels of Production. Pp. 189–210 in P. Quinn (ed.), *Interpreting Silent Artefacts: Petrographic Approaches to Archaeological Ceramics*, Oxford: Archaeopress.
- 2012. *Iron Age I Collared Pithoi in Central Jordan: Modes of Production and Technical Style*. Paper presented at the ASOR Annual Meeting Chicago, IL.
- Lacelle, L. 1986. Bedrock Geology, Surficial Geology, and Soils. Pp. 23–58 in Ø. LaBianca and L. Lacelle (eds.), *Hesban 2. Environmental Foundations: Studies of Climatological, Geological, Hydrological, and Phytological Conditions in Hesban and Vicinity*. Berrien Springs: Andrew University Press.
- London, G. 1989. A Comparison of Two Contemporaneous Lifestyles of the Late Second Millennium B.C. *Bulletin of the American School of Oriental Research* 273: 37–55.
- 2012. Ceramic Technology at Hisban. Pp. 597–763 in J.A. Sauer and L.G. Herr (eds.), *Ceramic Finds: Typological and Technological Studies of the Pottery Remains from Tell Hesban and Vicinity*, Hesban 11. Berrien Springs, MI: Andrews University Press.
- London, G., H. Plint, and Smith, J. 1991. Preliminary Petrographic Analysis of Pottery from Tell el-'Umeiri and Hinterland Sites, 1987. Pp. 429–39 in L. Geraty, L. Herr, Ø. LaBianca, and R. Younker (eds.), *Madaba Plains Project 2: The 1987 Season at Tell el-'Umeiri and Vicinity and Subsequent Studies*, Berrien Springs: Andrews University Press.
- Loud, G. 1948. Megiddo II, Seasons of 1935–1939. *Oriental Institute Publications* 62. Chicago: University of Chicago Press.
- MacDonald, B. 1992. Evidence from the Wadi el-Hasa and Southern Ghors and North-east Arabah Archaeological Surveys. Pp. 113–142 in P. Bienkowski (ed.), *Early Edom and Moab. The Beginning of the Iron Age in Southern Jordan*, Sheffield Archaeological Monographs, 7. Sheffield: J. R. Collis Publications.
- Mason, R. B. 2004. Shine Like the Sun: Lustre-Painted and Associated Pottery from the Medieval Middle East. *Bibliotheca Iranica: Islamic Art and Architecture Series* 12. Mazda in association with the Royal Ontario Museum: Costa Mesa and Toronto.
- Mazar, A. 1981. Giloh: An Early Israelite Settlement Site near Jerusalem. *Israel Exploration Journal* 31:1–36.
- 1990. Iron Age I and II Towers at Giloh and the Israelite Settlement. *Israel Exploration Society* 40:77–101.
- 2015. Iron Age I: Northern Coastal Plain, Galilee, Samaria, Jezreel Valley, Judah, and Negev. Pp. 5–69 in S. Gitin (ed.), *The Ancient Pottery of Israel and Its Neighbors from the Iron Age to the Hellenistic Period*, Jerusalem: Israel Exploration Society et al.
- Quinn, P.S. 2013. *Ceramic Petrography. The Interpretation of Archaeological Pottery and Related Artefacts in Thin Section*. Oxford: Archeopress.
- Raban, A. 2001. Standardized Collared-rim Pithoi and Short-lived Settlements. Pp.493–518 in S.R. Wolff (ed.), *Studies in the Archaeology of Israel and Neighboring Lands in Memory of Douglas L. Esse*, Studies in Ancient Oriental Civilization, No. 59/ ASOR Books, Vol. 5. Chicago: The Oriental Institute of the University of Chicago/Atlanta: American Schools of Oriental Research.
- Routledge, B., Smith, S., Mullan, A., Porter, B. and Klassen, S. 2014. A Late Iron Age I Ceramic Assemblage from Central Jordan: Integrating Form, Technology and Distribution. Pp. 82–107 in E. Van der Steen, J. Boertien and N. Mulder-Hymans (eds.), *Exploring the Narrative. Jerusalem and Jordan in the Bronze and Iron Ages. Papers in Honour of Margreet Steiner*. The Library of Hebrew and Bible/Old Testament Studies 583. New York: Bloomsbury T&T Clark.
- Schnurrenberger, D.W. 1991. Preliminary Comments on the Geology of the Tell el-'Umeiri Region. Pp. 370–376 in L. Geraty, L. Herr, Ø. LaBianca and R.

- Yunker (eds.), *Madaba Plains Project 2: The 1987 Season at Tell el-'Umeiri and Vicinity and Subsequent Studies*, Berrien Springs: Andrews University Press.
- 2003. Preliminary Geological Overview of Tall Jawa. Pp. 21-25 in *Excavations at Tall Jawa, Jordan. Volume 1: The Iron Age Town. Culture and History of the Ancient Near East* 11/1. Leiden: Brill.
- Steiner, M.L. 2013. The Iron I Pottery from Khirbat al-Lāhūn. *ADAJ* 57:519–533.
- Steiner, M. and Jacobs, L. 2008. The Iron Age Pottery of al-Lehun Jordan: Fabrics and Technology. *Leiden Journal of Pottery Studies* 24: 133–40.
- Swinnen, I.M. 2009. The Iron Age I Settlement and its Residential Houses at al-Lāhūn in Moab, Jordan. *Bulletin of the American School of Oriental Research* 354: 29-53.
- Tubb, J.N.; Dorrell, P.G. and Cobbing, F.J. 1996. Interim Report on the Eighth (1995) Season of Excavations at Tell es-Sa'idiyeh. *Palestine Exploration Quarterly* 128:16–40.
- Whitbread, I.K. 1986. The Characterization of Argillaceous Inclusions in Ceramic Thin Sections. *Archaeometry* 28(1): 79–88.
- 1995. *Greek Transport Amphorae. A Petrological and Archaeological Study*. Fitch Laboratory Occasional Papers 4. British School at Athens: Athens.
- Wood, B.G. 1990. *The Sociology of Pottery in Ancient Palestine: The Ceramic Industry and the Diffusion of Ceramic Style in the Bronze and Iron Ages*. JSOT Supplement Series 103. Sheffield: Sheffield Academic Press.
- Worschech, U. 1992. *Collared-Rim Jars* aus Moab. Anmerkungen, zur entwicklung und Verbreitung der Krüge mit "Halswulst". *Zeitschrift des Deutschen Palästina-Vereins* 108:149–155.
- Yellin, J. and Gunneweg, J. 1989. Instrumental Neutron Activation Analysis and the Origin of Iron Age I Collared-rim Jars and Pithoi from Tel Dan. Pp. 133–141 in S. Gitin and W.G. Dever. (eds.), *Recent Excavations in Israel: Studies in Iron Age Archaeology*. AASOR 49.