

9.6 The Neutron Activation Analyses of the Pottery from Tall al-Fukhār, and Its Implications for a Ceramic Sequence of Northern Transjordan

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Five seasons of excavation (1990-1993 and 2002) at Tall al-Fukhār in northern Jordan have yielded a rich, diverse collection of Bronze and Iron Age pottery and silicate artifacts. This corpus is particularly important for the archaeology of Jordan, because it constitutes the first long-term stratified sequence from the northern region of the country.

A review of the primary stylistic and technological features of the pottery and silicate artifacts from the main periods sets the stage for material analyses that reveal local industrial developments and the foreign relations of Tall al-Fukhār. The methodology follows with that which is outlined and used in a series of publications (e.g., McGovern 1986a, McGovern 1989a and 1989b, James and McGovern 1993b, and McGovern, Fleming and Swann 1993, McGovern 1997, McGovern and Harbottle 1997, and most recently, McGovern 2000; also see McGovern 1995a). In brief, technology and style are viewed as interacting variables in their larger cultural and environmental contexts, and are reconstructed from the archaeological record using the appropriate techniques in conjunction with relevant contemporaneous literary and pictorial evidence, and ethnoarchaeological analogy.

Ceramic Overview

The earliest occupation of the site is represented by only a few sherds of Early Bronze (EB) IB band-slip/grainwash ware. The subsequent nine phases of EB II-III, however, yielded pottery types that are comparable to those of EB Palestine generally, including bowls, large and small jars, juglets, and amphoriskoi. Except for more careful execution of patterned burnishing, painting, slipping, and combing on EB II vessels, the forms of the vessels and other stylistic details show marked uniformity throughout the period. The bodies of the larger vessels were usually built up of coils, although several examples had been thrown. Necks and rims were often finished on a tournette. Firing appears to have been carefully done, although thick black cores of unburnt carbon are the rule. One bowl sherd of Khirbet al-Karak ware, with a polished red interior and black exterior, was found in an EB III context.

After a probable gap in EB IV, Middle Bronze IIA is represented by a burial of probably two adults (male and female), in which three whole vessels, viz., a globular jar, platter bowl, and carinated bowl, had been deposited. All were thrown on a wheel. The absence of slips, the employment of irregular hand-burnishing or more careful wheel-burnishing in the case of the carinated bowl, relatively unstable disc bases (string-cut off the wheel), and specific stylistic features point to the vessels belonging to an early phase of MB IIA. Handmade, flat-bottomed cooking pots of the standard MB IIA type, with a fingerimpressed ledge below the rim, were found in associated contexts. Levantine Painted Ware, employing simple bichrome geometric designs, is also represented in the group.

The Late Bronze (LB) Age, a transitional Late Bronze/early Iron, and Iron IB levels are among the best attested periods at Tall al-Fukhār. To date, however, only a few sherds of Chocolate-on-White ware and of other characteristic pottery types indicate reoccupation of the site in LB IA, following a hiatus in MB IIB-C.

The repertoires of LB IB-IIA and IIB pottery include most of the types that are documented elsewhere in Palestine and Jordan (for comparable material from the Baq'ah Valley and Beth Shan, see McGovern

1986 and James and McGovern 1993). Several handleless collared-rim jars or pithoi are of particular interest (exceeding 1 m in height) from an early type with a rope appliqué at the upper mid-body, which also occurs at LB IIB Hazor and Beth Shan (compare Yadin, et al. 1960: pl. 129.2 and James and McGovern 1993b: figs. 14.2 and 32.4). The “collar” at the juncture of the neck and shoulder is most often the lower terminus of a coil or rarely a separately applied coil. Oblique notching on the collars is rarely used to indicate rope decoration. The cooking pots were manufactured by applying one or more clay coil to a moldmade body; the coil(s) were folded back and forth to produce two rim types, either the common flaring triangulated form, or, more commonly at Tall al-Fukhār, an upright form with a slight gutter on the interior and two ridges on the exterior.

In other respects, LB small- and medium-sized vessels are generally made on the wheel, but a shift to more handbuilt vessels is already apparent in the separately applied coils for ring bases of bowls and the interior or exterior development of krater rims. Bichrome and monochrome painted decoration, rarely over white slips, are fairly common, especially on kraters, jugs, and pilgrim flasks. In addition to the usual simple horizontal straight and wavy bands, metope-triglyph designs occur.

Sherds of several Mycenaean IIIB vessels, probably from jars and especially bowls/cups/*kylikes*, were recovered from the large public building “palace”. A fragment of a Cypriot White Slip II “milk” bowl came from a mixed context.

The “palace” also yielded a unique blue-green glazed pottery “knob,” possibly used as a wall decoration (attested at Nuzi in northern Mesopotamia in the 15th c. BC, cf Starr 1939: 408, pl. 98A) or an ornamental finial, a fragment from a blue-green glazed pottery jar or bottle, a glass female figurine pendant that is among the earliest molded glass artifacts ever made (McGovern 1986: 30, type II.B.1.a), and a blue-green glazed faience bottle and bowl. In general, the silicate artifacts are dated to LB I, predating the final use and destruction of the building, so that they must be heirlooms.

The Late Bronze-Early Iron transitional phase is characterized by numerous collared-rim jars and cooking pots. The collared-rim jars now have lower necks, more elongated bodies, and two relatively small loop handles at the upper mid-body. Evidence of coil manufacture is very clear from the impressions of ropes applied horizontally every 5-6 cms to hold each coil during the drying process, the next lower coil having been smeared over the top of the one added above it. As in the preceding LB IIB period, the cooking pots were manufactured by applying one or *more* clay coils to a mold-made body. Folding and subsequent shaping, sometimes using a sharp-pointed instrument or turning, now has resulted in a profusion of rim types, clearly related to what has gone before but more ridged and grooved and sometimes more inturned than the LB IIB prototypes.

Monochrome red painting, sometimes on a white slip (occasionally irregularly hand-burnished), predominates. A greater variety of designs than in LB II, albeit more poorly done, are attested, including filled triangles, crisscrossed lines, concentric circles on pilgrim flasks, figural designs including palm tree and the unique side and top views of a highly schematic bird on either side of a pilgrim flask (pl. 155,8), etc. One Philistine sherd (pl. 154,8) that belongs to a type derived from a Mycenaean drinking vessel, the *skyphos*, had a well-executed looped spiral in black paint on a white slip (compare Dothan 1982: 98-106, fig. 2, pl. 2).

The ensuing Iron IB level, which may date as late as 1050 BC in Jordan (see McGovern 1986: 9), is marked by collared-rim jars of LB/early Iron types which were evidently recycled as ovens by cutting off their bases and burying the necks of the vessels upside-down in the ground. Often two jars were used, one inside the other, with a stoking hole broken through the sidewalls. Medium-sized vessels, including jugs, juglets, and bowls, are generally coil-built; only small bowls and lamps are thrown off-the-hump. Cooking pot types are difficult to distinguish from LB/early Iron varieties. Painted decoration decreases,

but coil appliques on vessel exteriors and rows of reed impressions, especially on loop handles, are popular.

Following an apparent hiatus of occupation from Iron IB through IIB, the pottery repertoire of the Iron IIC-Persian period (ca. 650-400 BC, although likely continuing down to the Hellenistic times), which is primarily associated with silos covering a large area of the tall, is remarkably similar to that found in the 'Amman region (McGovern 1983). Vessels are generally made on the wheel, including cooking pots, and probably fired quickly to a high temperature, leaving a carbon core. A ridge, forming a groove below the rim on bowl and krater exteriors and along the top of everted cooking pot rims, however, was achieved using a coil; ring bases could also be made by adding a coil. Decoration includes very fine wheel-burnished red slips on bowls and monochrome and bichrome horizontal bands, sometimes over a white slip, on jugs and kraters. Several Cypro-Phoenician sherds of late type have brown or black painted horizontal bands and concentric circles applied over a hand-burnished surface.

Ceramic Analyses

Instrumental neutron activation analysis (NAA) of 96 sherds and vessels (see Table I) for the main periods reviewed above have revealed that pottery was produced locally from an alluvial clay source in the Wadi esh-Shallala, below the site through the period from ca. 3000 BC through Hellenistic times (McGovern 2000: 29, 183-85 [Appendix 2]; NAA data for local samples are provided in Appendix 3 [table 36]; also cf. 2 and table 2 and 3). Imported pottery from several regions of the eastern Mediterranean was also attested. The physicochemical method of NAA has been extensively employed in pottery provenience studies, because of its sensitivity and precision in measuring as many as 35 elements, including rare earths which often characterize a clay source, and because it requires very small samples (50-200 mg) that are non-destructively analyzed (for analytical procedure and references, see James and McGovern 1993, and especially McGovern 2000).

Relating the chemical composition of a particular ancient pottery sample to a given clay source, thereby "fingerprinting" the pottery and its presumed place of manufacture, is based on what has become known as the Provenience Postulate. Briefly, the assumption is made that the chemical variation within a given clay source is less than that between different sources. A native clay, however, was often modified by the ancient potter. Inorganic aplastics (temper) or organic materials might be added to the clay body, to improve its workability, drying and firing properties, and functionality. If these inclusions are relatively "pure" (e.g., quartz, calcite, or straw), the diluent effect on the chemical composition of an ancient sample will be spread across the range of elements and correction factors (e.g., least-means fitting) can be readily applied. The addition of complex heavy minerals, which can unpredictably enhance or diminish certain elemental concentrations, are less easily corrected statistically.

A range of univariate and multivariate algorithms means and standard deviations, and correlational, clustering, and principal components analyses of a range of elements – are used to define local chemical groups of ancient pottery, with widely divergent samples (outliers) being excluded. Archaeological and geological criteria are important in refining and testing these groups, whether well-dated pottery types, clays from specific geochemical regimes, clay beds within a single deposit, etc. For example, cooking pots, as well as walls and kilns of mudbrick (sunbaked clay), are often made of local clay and are not transported to another site. The NAA analyses of such samples should then serve to confirm a hypothesized local group based on other pottery types. This approach is essential when an ancient clay source has been totally exploited or systematic clay sampling has not yet been carried out in a region.

In general, our Old World data bank has excellent temporal and spatial coverage of the Levant and Egypt (approximately 2700 samples from 150 sites), together with other regions of the Near East and

Mediterranean, including the Sudan, Greece, Iraq, Iran, and parts of Turkey. Tell Abu al-Kharaz, Tell as-Sa'idiyah, Kataret as-Samra', Pella and Jericho in the Jordan Valley, Khirbet Umm ad-Dananir and Rujm al-Henu (West) in the Baq'ah Valley, the Amman Citadel, Bab edh-Dhra', and es-Safi are among the Bronze and Iron Age sites in Jordan for which material has been analyzed. This wide areal coverage, coupled with large numbers of samples for locally defined groups, enable us to apply powerful multivariate statistics in determining the archaeological origin of the pottery from Tall al-Fukhâr. The clays included in the data bank date from the Lower Cretaceous period to recent times and derive from deposits throughout the Levant (e.g., the red loess clays of the southern Palestinian coastal region, the yellow limestone-derived clays of the Palestinian hill country, and Jordanian smectites and kaolin clays).

It is quite common for the elements in clays and minerals to covary with one another. For example, the high correlation ($r > 0.99$) of iron (Fe) and scandium (Sc), both trivalent ions of about equal size, in nature is well known. Univariate statistics can be very misleading if this relationship goes unrecognized. If the variance-covariance matrix for many elements of a presumed local group is calculated, however, a new set of standardized orthogonal coordinates (eigenvectors) can be defined in multi-dimensional Mahalanobis space that takes advantage of elemental correlations. For statistical calculations, oxide data are also converted to logarithms, since many chemical elements appear to be lognormally distributed in nature, and are also standardized by this procedure. The Mahalanobis distance of a given sample from the origin or centroid of the group is directly related to the probability of the group membership of that sample, assuming a multivariate normal distribution. With high correlations between many elements, such as is characteristic of Levantine clays and pottery, it is possible to achieve extremely good results. A Mahalanobis probability above 5 % for a sample tested against a group with a high sample number to variate ratio is a strong guarantee that it belongs to that group.

One of the most significant results of the NAA study of the Tall al-Fukhâr pottery is that the largest group, representing every major period, was produced somewhere in the vicinity of the site, since the group is very close chemically to alluvial clay deposited in the Wadi esh-Shallala below the site. This result is also substantiated by preliminary petrographic analysis. The overwhelming majority of the EB II-III pottery tested (13 out of 21 samples) is of local origin, including bowls, jars, jugs, and holemouth cooking pots. Two jars with well-executed pattern burnishing and an EB II bowl that had been tournette burnished along the rim and highly polished by hand elsewhere were of uncertain provenience, as was the Khirbet Kerak sherd (cf. Chazan and McGovern 1984, *re* local production in the Jezreel Valley). Six of 9 MB IIA vessels analyzed were of local origin, including cooking pots, jars (one whole vessel from the burial-above), and a Levantine Painted Ware sherd. For LB IIB, a red-painted cylindrical stand fragment, cooking pots, and a range of macroscopically different wares were produced locally.

During the Late Bronze/early Iron transition, a *pyxis* and possibly the pilgrim flask with the unique painted bird design (above) are of local origin. In Iron IB, of the few examples tested, only a cooking pot was made locally. It should be noted that all except one collared-rim jar of transitional LB/early Iron and Iron IB date are of uncertain origin, suggesting that they were imported into Tall al-Fukhâr from a region not well represented in the data bank (for the one exception from southern Palestine, see below). The pattern of primarily local production is again evidenced for cooking pots in the Iron IIC-Persian period. The three Cypro-Phoenician sherds, which were available for analysis, are of uncertain origin. Although not reviewed above, the Hellenistic pottery corpus retains many of the technological and stylistic features of the Iron IIC-Persian repertoire. Correspondingly, 9 out of 20 Hellenistic storage jars, jugs, and a cooking pot and bowl are of local origin.

The main source of pottery imports to Tall al-Fukhâr from MB IIA through the end of the Iron Age was southern Palestine, *viz.*, the Gaza region, extending along the coast north to Ashkelon and as far

inland as Tell Beit Mirsim, which is chemically characterized by its red loess clays (for a more extended discussion, with data, see McGovern, et al. 1994 and especially McGovern 2000). This finding stands in marked contrast to the lack of imports from this region in EB II-III. The pottery types for each main period imported from southern Palestine are as follows:

- (1) MB IIA: cooking pot and jar/goblet
- (2) LB IIB: cooking pot
- (3) Iron IB: collared-rim jar and Philistine bowl
- (4) Iron IIC-Persian: cooking pot, bichrome-painted jug, undecorated bowl, and wheel-burnished red-slipped bowl
- (5) Hellenistic: two cooking pots, red-slipped bowl, and alabastron

Pottery of special types were clearly being imported from the Gaza region. The prevalence of cooking pots is more difficult to explain, since these vessels have generally been considered as more intransigent to technological change, due to their association with traditional cuisine, and thus tied to local household and/or village production. The NAA data from Tall-al Fukhār, however, suggests that cooking pots were produced on a larger scale and distributed to other regions of Palestine from workshops in southern Palestine (see McGovern 2000: 82), at least during the periods represented at Tall-al Fukhār. Alternatively, it might be argued that people from southern Palestine moved to the site, bringing their important belongings with them, or visited friends or relatives there and left the cooking pots behind. Some kind of economic activity, trading the vessels for their own sake or possibly for what they contained, is more likely, but lacking contemporaneous texts, other explanations cannot be ruled out.

Several other regions of the Levant and Egypt account for other imported pottery and silicate artifacts into Tall al-Fukhār: In LB IIB, a probable jar came from 'Affuleh in the Jezreel Valley; in the Persian period, a multiple-handled and knobbed krater was from the Baq'ah Valley in central Jordan (see McGovern 1986) and a red-painted jar was made of Egyptian Nile alluvial clay; and during the Hellenistic period, high quality slipped and painted bowls were imported from eastern Cyprus and storage jars from Rhodes and probably the Cilician plain of southeastern Anatolia.

Three Chocolate-on-White sherds from a bowl, pyxis and jar, dating to LB IA, fit the same chemical profile as other examples of this ware analyzed from Beth Shan, Tell Abu al-Kharaz, Pella, Kataret as-Samra', the Amman Citadel, and sites in the Baq'ah Valley. A central-southern Jordan Valley origin is probable based on the NAA results, and accords with the high frequency of the unique ware in this region, especially at Tell Nimrin and Kataret es-Samra. Probable wasters at the latter site suggest local production. As yet, however, a clay source has not been located.

Four Mycenaean *kylikes*, which are particularly associated with wine drinking in Greece, and a probable piriform jar fragment were tested by NAA. Three had been produced in the Mycenae region itself in central mainland Greece. One *kylix* and the jar were of uncertain origin. The glass of the female figurine pendant and the glazes on the pottery knob, pottery jar/bottle, and faience vessels are all of similar composition, according to nonquantitative energy-dispersive spectrometric analyses using a scanning electron microscope. The blue-green coloration, which has been extensively leached out on all the artifacts, is due to copper ions in the +2 oxidation state. Potassium oxide exceeds soda, suggesting

that a plant material was used as the main flux. These results could fit with local Palestinian production (McGovern, Fleming and Swann 1993; McGovern 1986), but stylistic considerations point rather to a northern Mesopotamian origin. The NAA data for the pottery of the knob and jar/bottle sherd did not match any site or region in the data bank.

Conclusions

The stratigraphic sequence of pottery and silicate artifacts from Tall al-Fukhār, coupled with stylistic and technological analyses, provides the first long-term perspective on the Bronze and Iron Age material culture of northern Jordan, and enables this region to be integrated into broader developments of Jordan and the Levant (see, e.g., McGovern 1987, 1995b, and 2000).

The neutron activation analysis study of a wide range of pottery types from the main periods at the site shows that Tall al-Fukhār was not the isolated, uninhabited tall that it is today. Contacts were especially strong with southern Palestine from the Middle Bronze Age onwards. A local pottery industry, which had already begun in the Early Bronze Age and used alluvial clays deposited in the Wadi esh-Shallala, continued to produce the majority of the pottery found at the site through Hellenistic times. Specific contacts, most probably trade connections, are documented for northern Palestine, the Aegean, and Cyprus in Late Bronze IIB, central Jordan and Egypt in the Iron IIC-Persian period, and the eastern Mediterranean (Cyprus, Rhodes, and probably southern Turkey) in the Hellenistic period. Thus, Tall al-Fukhār shared in the economic prosperity of these cosmopolitan times. Some political integration with central Jordan in the Iron IIC-Persian period is possible, since the pottery types are almost identical in the two regions.

Some pottery was probably imported for its own sake, whether as drinking vessels (e.g., the Mycenaean *kylikes* and the Philistine *skyphos*) or because of traditional associations (e.g., cooking pots which were used to prepare particular foods). In case of the Philistine import, this opens the question of Sea People influence in northern Jordan (McGovern 1994). Other pottery, especially jars, probably functioned as containers for other goods, yet to be determined (see Biers and McGovern 1990; Michel, McGovern and Badler 1993; McGovern 2003/2006 and 2009/2010).

The most important group of silicate artifacts at Tall al-Fukhār belong to LB IIB, and are probably heirlooms of 16th-15th c. BC date, near the beginnings of glassmaking in the Near East. The glazed pottery artifacts are particularly unusual, only a few other examples being reported from LB Palestine (for Beth Shan, see James and McGovern 1993). The molded glass female figurine pendant, the forms of the faience vessels, and a unique glazed pottery "knob" suggest an origin in northern Mesopotamia, but the chemistry of the glazes and neutron activation analyses of the pottery of the glazed pottery artifacts do not provide a definitive answer.

Table 1

Catalogue of Neutron Activation Analysis Samples from Tall al-Fukhār (asterisked samples belong to the local group; ? indicates uncertain provenience)

PMG025	University of Pennsylvania Museum
Pottery no. 740	NAA Provenience: Southern Palestine
Lamp	Not illustrated
Area B, square CIId, locus 2	
Transitional LB/early Iron	*PMG030
University of Pennsylvania Museum	Pottery no. 763
NAA Provenience:?: no matches at mean	Bowl rim
Euclidean distance 0.1	Area B, square CIIa, locus 16
Pl. 164,6	LB II
	University of Pennsylvania Museum
	Pl. 154,12
PMG026	
Pottery no. 1132	
Collared-rim jar	PMG031
Area B, square CIId, locus 6	LB II Ware 5
Iron IA University of Pennsylvania Museum	Amphora body sherd
NAA Provenience: possibly Egyptian Nile allu- vium	Area B, square CIIa, locus 14
Not illustrated	University of Pennsylvania Museum
	NAA Provenience: probably north-central Palestinian Hill Country ('Affuleh)
	Not illustrated
PMG027	
Pottery no. 1001	
Collared-rim jar	*PMG032
Area B, square CIIa, locus 14	LB Ware 13
Iron IA	Canaanite Jar body sherd
University of Pennsylvania Museum	Area B, square CIId, in/on stone pavement 3
NAA Provenience: Southern Palestine	University of Pennsylvania Museum
Not illustrated	Not illustrated
*PMG028	*PMG033
Pottery no. 567	No registration no.
Cooking pot	Tabun fragment
Area B, square CIId, locus 1	Area B, square BIIC, locus 2, tabun 9
Iron IA	Iron IIC-Persian
University of Pennsylvania Museum	University of Pennsylvania Museum
Pl. 163,10	NAA Provenience:?: no matches at mean
	Euclidean distance 0.1
	Not illustrated
PMG029	PMG034
Pottery no. 1007	Chocolate-on-White bowl base
Possible cooking pot	Pottery no. 824
Area B, square CIIa, locus 14	
LB IIB	

- Area C, square AIIIa, locus 39
 LB IA
 University of Pennsylvania Museum
 NAA Provenience: central-southern Jordan Valley
Pl. 149,10
- PMG035
 Pottery no. 1300
 Chocolate-on-White pyxis
 Surface
 LB IA
 University of Pennsylvania Museum
 NAA Provenience: central-southern Jordan Valley
Pl. 149,6
- *PMG050
 Tall al-Fukhâr, Ware 16
 Canaanite Jar handle
 Area B, square CIId, locus 31
 LB II
 University of Pennsylvania Museum
 Not illustrated
- PMG199
 Pottery no. 392
 Red-burnished bowl fragment
 Area D, square BIVb, locus 9
 Iron IIC-Persian
 University of Pennsylvania Museum
 NAA Provenience: Southern Palestine
 Not illustrated
- PMG200
 Pottery no. 262
 Red-painted jar neck fragment
 Area C, square AIIIb, locus 3
 Iron IIC-Persian
 University of Pennsylvania Museum
 NAA Provenience: Egyptian Nile alluvium
 Not illustrated
- *PMG201
 Pottery no. 687
 Cooking pot rim
 Area D, square BIVb, locus 23
- Iron IIC-Persian
 University of Pennsylvania Museum
 Not illustrated
- *PMG202
 Pottery no. 776
 Cooking pot rim
 Area B, square CIIa, locus 16
 Iron IIC-Persian
 University of Pennsylvania Museum
Pl. 156,2
- PMG203
 Pottery no. 714
 Jar
 Area C, square AIIIc, locus 3
 Iron IIC-Persian
 University of Pennsylvania Museum
 NAA Provenience: possibly local
 Not illustrated
- PMG204
 Pottery no. 924
 Bowl
 Area C, square AIIId, locus 25
 Iron IIC-Persian
 University of Pennsylvania Museum
 NAA Provenience: Southern Palestine
 Not illustrated
- PMG205
 Pottery no. 817
 Body sherd
 Area C, square AIIIc, locus 5
 Hellenistic period
 University of Pennsylvania Museum
 NAA Provenience: ?; no matches at mean
 Euclidean distance 0.1
 Not illustrated
- PMG206
 Ware 30
 Cypro-Phoenician jug/pilgrim flask fragment
 Area C, AIIIa, locus 26
 Iron IIC-Persian

- University of Pennsylvania Museum
NAA Provenience: ?; no matches at mean
Euclidean distance 0.1
Not illustrated
- PMG207
Pottery no. 835
Jug handle
Area C, square AIIIc, locus 3
Hellenistic period
University of Pennsylvania Museum
NAA Provenience: ?; no matches at mean
Euclidean distance 0.1
Not illustrated
- PMG243
Wadi Shellale, below Tell el-Fukhār
Kaolin accumulations
University of Pennsylvania Museum
NAA Provenience: clay **not** used to make local
pottery in antiquity
Not illustrated
- *PMG244
Wadi Shellale, below Tell el-Fukhār
Alluvial raw clay
University of Pennsylvania Museum
NAA Provenience: clay used to make local pot-
tery in antiquity
Not illustrated
- *PMG245
Wadi Shellale, below Tall al-Fukhār, near sandbar
Alluvial raw clay
University of Pennsylvania Museum
NAA Provenience: clay used to make local pot-
tery in antiquity
Not illustrated
- PMG280
Tell el-Fukhār
Pottery no. 5000
Jug, with red and black painted bands on shoul-
der
Area D, square CIVb, locus 4(1)
- Iron IIC-Persian or Hellenistic period
University of Copenhagen
NAA Provenience: Southern Palestine
Pl. 170,16
- PMG281
Pottery no. 4625
Cooking pot
Area D, square AIVc, locus 20
Iron IIC-Persian
University of Copenhagen
NAA Provenience: Southern Palestine
Pl. 172,3
- *PMG282
Pottery no. 4990
Cooking pot rim
Area D, square BIIIc, locus 9
Hellenistic period
University of Pennsylvania Museum
Not illustrated
- *PMG283
Pottery no. 4508
Jug
Area D, square BIIIc, locus 10
Hellenistic period
University of Pennsylvania Museum
Not illustrated
- PMG284
Pottery no. 4100
Plate, with white painted design
Area D, square AIVb, locus 11
Hellenistic period
University of Copenhagen
NAA Provenience: ?; no matches at mean
Euclidean distance 0.1
Not illustrated
- *PMG285
Pottery no. 4548
Stand fragment, with painted decoration
Area C, square AIIIa, locus 105
LB IIB

- University of Copenhagen
Pl. 152,8
- PMG286
 Pottery no. 4365-4366
 Cypro-Phoenician jug body sherd, with
 red-painted design
 Area D, square AIII, clean-up from robber's hole
 Iron IIC-Persian
 University of Copenhagen
 NAA Provenience: ?; no matches at mean
 Euclidean distance 0.1
Pl. 174,10
- PMG287
 Pottery no. 4740
 Bowl, with black slip
 Area C, square AIIa, locus 9
 Hellenistic period
 University of Copenhagen
 NAA Provenience: eastern Cyprus
 Not illustrated
- *PMG288
 Pottery no. 4810
 Bowl, with red slip
 Area C-D, square AII, locus 1
 Hellenistic period
 University of Copenhagen
 NAA Provenience: eastern Cyprus
 Not illustrated
- PMG289
 Pottery no. 4670
 Bowl
 Area C, square AIIId, locus 2
 Hellenistic period
 University of Copenhagen
 NAA Provenience: ?; no matches at mean
 Euclidean distance 0.1
Pl. 190,8
- PMG290
 Pottery no. 4627
 Bowl
- Area D, square AIIId, locus 8
 Hellenistic period
 University of Copenhagen
 NAA Provenience: Southern Palestine
 Not illustrated
- PMG291
 Pottery no. 5055
 Krater, mended in antiquity
 Area D, square CIVb, locus 1
 Persian period
 University of Copenhagen
 NAA Provenience: Baq'ah Valley, Jordan
Pl. 171,3
- *PMG292
 Pottery no. 5067
 Jar rim and shoulder
 Area D, square AIIId, locus 29
 Hellenistic period
 University of Copenhagen
 Not illustrated
- PMG293
 Pottery no. 4978
 Cooking pot
 Area D, square BIIId, locus 10
 Hellenistic period
 University of Copenhagen
 NAA Provenience: Southern Palestine
 Not illustrated
- *PMG294=PMG300
 Pottery no. 5199
 Canaanite Jar body sherd
 Area D, square AIIb, locus 1
 Hellenistic period
 University of Copenhagen
 Not illustrated
- *PMG295
 Pottery no. 4977
 Jug rim
 Area D, square BIIId, locus 10
 Hellenistic period

- University of Copenhagen
Not illustrated
- *PMG296
Pottery no. 4972
Jug rim
Area D, square BIIIc, locus 10
Hellenistic period
University of Copenhagen
Not illustrated
- PMG297
Pottery no. 5156
Bowl base
Area D, square AIIb, locus 1
Hellenistic period
University of Copenhagen
NAA Provenience: Southern Palestine
Not illustrated
- *PMG298
Pottery no. 5341
Jar
Area D, square BIIIc, locus 34
Hellenistic period
University of Copenhagen
Pl. 192,6
- PMG299
Pottery no. 5284
Alabastron
Area D, square BIIIb, locus 25
Hellenistic period
University of Copenhagen
NAA Provenience: Southern Palestine
Pl. 193,25
- *PMG300=PMG294
Pottery no. 5199
Canaanite Jar rim
Area D, square AIIb, locus 1
Hellenistic period
University of Copenhagen
Not illustrated
- PMG301
Pottery no. 5063
Cooking pot
Area D, square AIIIId, locus 29
Hellenistic period
University of Copenhagen
NAA Provenience: Southern Palestine
Pl. 194,10
- PMG302
Pottery no. 5214/5219
Collared-rim jar
Area C, square AIIIa, locus 134
LB IIB
University of Copenhagen
NAA Provenience: ?; no matches at mean
Euclidean distance 0.1
Pl. 152,3
- *PMG303
Pottery no. 5218
Cooking pot rim
Area C, square AIIIa, locus 134
LB IIB
University of Copenhagen
Pl. 152,1
- *PMG304
Pottery no. 5226
Cooking pot rim
Area C, square AIIIa, locus 134
MB IIA
University of Copenhagen
NAA Provenience: Southern Palestine
Pl. 147,11
- PMG305
Pottery no. 5291
Jar handle of Rhodian type
Area D, square BIIb, locus 6(1)
Hellenistic period
University of Copenhagen
NAA Provenience: Rhodes
Not illustrated

PMG306

Pottery no. 5311
 Jar, with notched rope design and possible collar
 Area C, square AIIIa, locus 136
 LB IIB
 University of Copenhagen
 NAA Provenience: ?; no matches at mean
 Euclidean distance 0.1
Pl. 152,4

PMG307

Obj. O-93/44
 Jar handle of Rhodian type
 surface find
 Hellenistic period
 University of Copenhagen
 NAA Provenience: probably Cilician plain, south-
 eastern Anatolia
Pl. 199,2 col. pl. 12,4

PMG346

Pottery no. 6977
 Jar body sherd, with red-painted design
 Area D, square CIVb, locus 54
 Iron IIC-Persian
 University of Copenhagen
 NAA Provenience: Egyptian Nile alluvium
Pl. 174,9

*PMG347

Pottery no. 6825
 Pyxis
 Area C, square AIIIa, locus 105
 Transitional LB/early Iron
 University of Copenhagen
Pl. 157,5

PMG348

Pottery no. 6700
 Philistine krater body sherd, with red and black
 painted design
 Area B, square DIId, locus 67
 Iron IB
 Irbid (Jordan) Museum

NAA Provenience: Southern Palestine
Pl. 154,8

*PMG349

Pottery no. 6701
 Pilgrim's flask
 Area B, square DIId, locus 66
 Transitional LB/early Iron
 University of Copenhagen
Pl. 155,5

PMG350

Pottery no. 7016
 Collared-rim jar
 Area C, square AIIIc, locus 73
 Iron IB
 University of Copenhagen
 NAA Provenience: Southern Palestine
 Not illustrated

PMG351

Pottery no. 6824
 Collared-rim jar
 Area C, square AIIIc, locus 87
 LB IIB
 Irbid (Jordan) Museum
 NAA Provenience: ?; no matches at mean
 Euclidean distance 0.1
Pl. 151,1

PMG352

Pottery no. 7019-20
 Collared-rim jar
 Area C, square AIIIId, locus 1016
 LB IIB
 University of Copenhagen
 NAA Provenience: ?; no matches at mean
 Euclidean distance 0.1
Pl. 157,3

PMG353

Pottery no. 6788
 Chocolate-on-White chalice/jar sherd
 Area C, square AIIIId, locus 102

- LB IA
University of Copenhagen
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 149,4
- *PMG354
Pottery no. 5610
Body sherd, with red and black painted decoration
Area C, square AIIIa, locus 151
MB IIA
University of Copenhagen
Pl. 148,12
- PMG355
Pottery no. 5652
Jar/goblet
Area C, square AIIIa, locus 150
MB IIA
University of Copenhagen
NAA Provenience: Southern Palestine
Pl. 146,11
- *PMG356
Pottery no. 5653
Cooking pot appliqué
Area C, square AIIIa, locus 150
MB IIA
University of Copenhagen
Pl. 147,15
- *PMG357
Pottery no. 5756
Cooking pot appliqué
Area C, square AIIIa, locus 153
MB IIA
University of Copenhagen
Pl. 147,13
- PMG358
Pottery no. 5758
Cooking pot, with finger-impressed band
Area C, square AIIIa, locus 153
MB IIA
- University of Copenhagen
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 147,14
- *PMG359
Pottery no. 5760
Jar, with incised decoration
Area C, square AIIIa, locus 153
MB IIA
University of Copenhagen
Pl. 148,13
- PMG360
Pottery no. 5854
Body sherd, with punctate design
Probable Transitional LB/early Iron
Irbid (Jordan) Museum
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 149,9
- PMG361
Pottery no. 6021
Krater, with rope design
Area C, square AIIIa, locus 159
MB IIA
University of Copenhagen
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 148,11
- *PMG362
Pottery no. 6050
Jar
Area C, square AIIIa, locus 158
MB IIA
Irbid (Jordan) Museum
Pl. 149,3
- PMG363
Pottery no. 6466
Khirbet Kerak sherd
Area C, square AIIIa, locus 171
EB III

Irbid (Jordan) Museu
 NAA Provenience?: no matches at mean
 Euclidean distance 0.1
Pl. 146,7

***PMG364**

Pottery no. 6506
 Bowl rim
 Area C, square AIIIa, locus 171a
 EB III
 University of Copenhagen
Pl. 145,3

PMG365

Pottery no. 6507
 Bowl
 Area C, square AIIIa, locus 171a
 EB III
 University of Copenhagen
 NAA Provenience?: no matches at mean
 Euclidean distance 0.1
Pl. 144,18

***PMG366**

Pottery no. 6512
 Holemouth jar rim
 Area C, square AIIIa, locus 171a
 EB III
 University of Copenhagen
Pl. 145,11

***PMG367**

Pottery no. 6664
 Jar neck, with collar
 Area C, square Aura, locus 178a
 EB III
 University of Copenhagen
 Not illustrated

***PMG368**

Pottery no. 6908
 Bowl rim
 Area C, square AIIIa, locus 174
 EB III
 University of Copenhagen
Pl. 144,1

***PMG369**

Pottery no. 6910
 Juglet/Amphoriskos body sherd, with red slip
 Area C, square AIIIa, locus 174
 EB III
 University of Copenhagen
Pl. 146,8

***PMG370**

Pottery no. 6912
 Bottle base
 Area C, square AIIIa, locus 175
 EB III
 University of Copenhagen
Pl. 146,1

***PMG371**

Pottery nos. 6913-6914
 Bowl, with red slip
 Area C, square AIIIa, locus 176
 EB III
 University of Copenhagen
Pl. 144,19

PMG372

Pottery no. 6915
 Jar, red-slipped
 C, AIIIa, 174
 Probable EB III
 University of Copenhagen
 NAA Provenience?: no matches at mean
 Euclidean distance 0.1
Pl. 145,9

***PMG373**

Pottery no. 6916
 Jug/Amphoriskos, with red slip
 Area C, square AIIIa, locus 176
 EB III
 University of Copenhagen
Pl. 145,16

***PMG374**

Pottery nos. 6917-6918
 Bowl
 Area C, square AIIIa, locus 174

EB III
University of Copenhagen
Pl. 145,4

*PMG375

Pottery nos. 6920-6922
Holemouth cooking pot
Area C, square AIIIa, locus 174
EB III
University of Copenhagen
Pl. 145,10

PMG376

Pottery no. 6934
Jar, with combed design
Area C, square AIIIa, locus 174
Probable EB III
University of Copenhagen
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 146,2

PMG377

Pottery no. 7021-26
Jar, red-slipped
C, AIIIa, 174
EB III
University of Copenhagen
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 145,15

PMG378

Pottery no. 6987
Jar, with combed design
C, AIIIa, 198
EB II
University of Copenhagen
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 144,11

*PMG379

Pottery no. 6988
Jar, with red slip

Area C, square AIIIa, locus 198
EB III
University of Copenhagen
Pl. 144,10

PMG380

Pottery no. 6990
Tell el-Fukhār
Bowl
Area C, square AIIIa, locus 198
EB II
University of Copenhagen
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Not illustrated

*PMG381

Pottery no. 6992
Jar, with red-painted decoration
Area C, square AIIIa, locus 198
EB III
University of Copenhagen
Pl. 144,14

*PMG382

Pottery no. 6993
Jar, with black-painted decoration
Area C, square AIIIa, locus 198
EB III
University of Copenhagen
Pl. 144,15

PMG383

Pottery no. 7000
Polished bowl
Area C, square AIIIa, locus 200
EB II
University of Copenhagen
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 144,5

PMG384

Object no. 28
Glazed pottery sherd

- Area C, square AIIIb, locus 36
Irbid Museum
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 210,3. col. pl. 13,4
- Area C, square AIIIc, locus 119
Irbid Museum
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Col. pl. 11,1b
- PMG385
Object no. O-35
Mycenaean bowl/cup/*kylix*
Area C, square AIIIc, locus 122
Irbid Museum
NAA Provenience: Central Mainland Greece
Col. pl. 11,1a
- PMG389
Pottery no. 7099
Mycenaean piriform jar sherd
Area C, square AIIIc, locus 122
Irbid Museum
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Col. pl. 11c
- PMG386
Object no. O-36
Mycenaean bowl/cup/*kylix*
Area C, square AIIIc, locus 124
Irbid Museum
NAA Provenience: Central Mainland Greece
Col. pl. 11,1d
- PMG390
Object no. 30
Glazed pottery knob
Area C, square AIIIc, locus 111-115
Irbid Museum
NAA Provenience:?: no matches at mean
Euclidean distance 0.1
Pl. 197, 5. Col. pl. 12,2
- PMG387
Pottery no. 7190
Mycenaean bowl/cup/*kylix*
Area C, square AIIIc, locus 127
Irbid Museum
NAA Provenience: Central Mainland Greece
- PMG482
Pottery no. 1055
Cypriot Milk Bowl (White Slip II)
Surface
Irbid Museum
NAA Provenience: Cyprus
Col. pl. 11,4
- PMG388
Pottery no. 7070
Mycenaean bowl/cup/*kylix*

9.7 List of Samples

A number of samples were taken during the excavations. They have not been investigated, but are kept at the Carsten Niebuhr Department at the University of Copenhagen.

Plaster

CAIIIa loc. 130 (16.8.92)
CAIIIa loc. 167 (floor sample) (31.7.93)
CAIIIa wall C310 (31.7.93)
CAIIIa loc. 167 (floor sample) (31.7.93)
CAIII a loc. 121 (11.8.92)

CAIIIc loc. 87 (4.8.93)
CAIIIb loc. 26 (gypsum, plaster?) (30.7.91)
CAIIIc loc. 118 (15.8.9.)
Mud -plaster
CAIII a floor 167 (31.7.93)
CAIVa loc. 11 floor sample (1.8.92)