IMPORTED POTTERY FROM ABYDOS: A NEW PETROGRAPHIC PERSPECTIVE

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Part I – Archaeology

Introduction

Abydos is an important site in the Egyptian Nile Valley, approximately 500 km south of Cairo, situated along the western edge of the flood plain near the village of Araba el-Madfuna. Its archaeological remains stretch back well into the early prehistoric period and it has been occupied continuously to this day. The significance of this site for the culture history of ancient Egypt lies in its role during the emergence of the early territorial state of Egypt around 3100 B.C.E. on the one hand, and in it being an important religious center in later Pharaonic times on the other.

This paper deals with an aspect relevant to the early history of Abydos, in particular with archaeological material from the necropolis at Umm-el-Qaab, which comprises a Predynastic cemetery as well as a royal necropolis for much of the Proto-Dynastic and Early Dynastic period (Table 1; Fig. 1). The site has been investigated archaeologically since the late 19th century by French and British excavators and again from the late 1970s onwards by a mission of the German Archaeological Institute in Cairo under the direction of Werner Kaiser and Günter Dreyer.[5]

It was W.M. Flinders Petrie who was the first scholar to describe ceramic vessels from the 1st Dynasty royal tombs that he had thought to be of foreign origin due to their un-Egyptian characteristics in clay fabric, quality, surface treatment and decoration.[6] What Petrie had initially believed to be imported pottery from the Aegean region later entered the literature under the label 'Abydos Ware' and became generally known to be Early Bronze Age (=EB) II imports from the Levant. However, discussions surrounding the suitability of the term 'Abydos Ware' as well as the precise place of manufacture of such material has been on-going ever since.[7]

The label 'Abydos Ware' itself has been generally rejected by archaeologists simply because it does not represent a ceramic ware at all, but rather a conglomerate of at least four different wares with variable surface treatment, clay fabrics, morphology, quality and most probably places of manufacture.[8] And yet, the term is still used by many,[9] most likely because its association instantly brings to mind those Levantine EB II imports first discovered by Petrie at Abydos which have been the object of so many studies throughout the 20th and 21st centuries in Egypt and the Levant. Therefore, the authors of this paper will refrain from applying this label directly to any of our imports, but refer to it only where appropriate for better comparability.

EB Levantine imports in Egypt have been of great significance to both archaeologists working in Egypt as well as in the Levant. They offer valu-

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4 University of Arizona. Author of the section on the petrography.

5 See the preliminary excavation reports by Dreyer et al. included in the Bibliography. The project has been funded primarily by the Deutsche Forschungsgemeinschaft (DFG) and the German Institute of Archaeology in Cairo (DAIK).

6 Petrie 1901, pl. LIV; Petrie 1902, pls. VI:17, VIII.

7 E.g. Wright 1937, 59; Saad in Emery 1938, 50 (Type 12); Emery 1961, 204; Hennessy 1967; Amiran 1969, 59; Esse 1991; Kantor 1992; Stager 1992; Porat and Adams 1996; Porat and Goren 2001; Hendrickx and Bavay 2002; Sowada 2009; Braun 2011; Köhler and Ownby 2011; Köhler and Thalmann 2014; Müller 2014; Sowada 2014.

8 Cf. Braun 2011, 977–78; 2012.

9 E.g. Porat and Goren 2001; 2002; Wengrow 2006: 148; Sowada 2009, 39–44; 2014; Kafafi 2011; Miroshedji 2014, 320.

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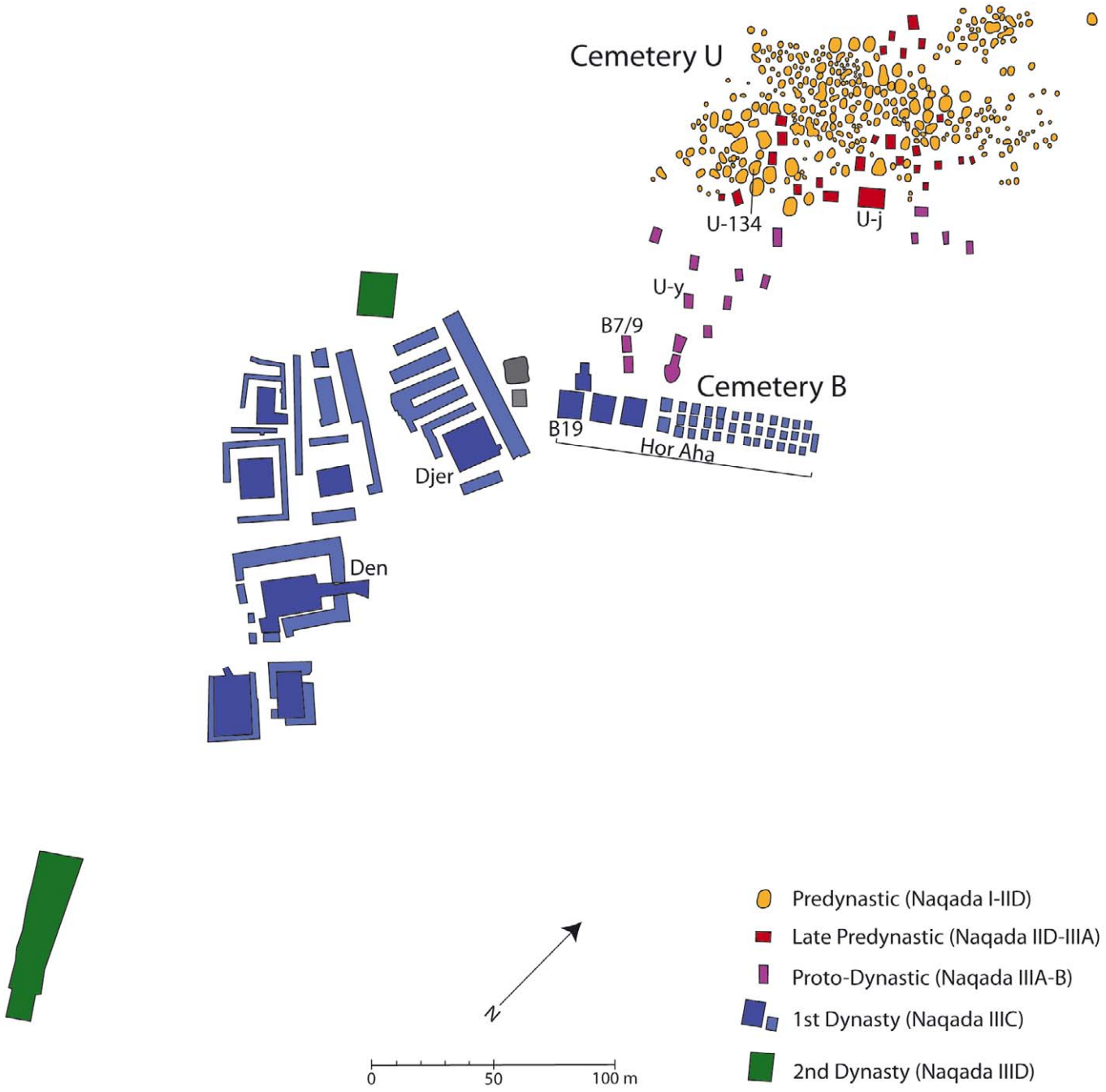

Fig. 1 General Plan of Abydos – Umm el-Qaab (with those tombs highlighted from where samples discussed in the text derive)

Table 1 – Chronological overview of the primary periods of occupation at Abydos – Umm el-Qaab

Ca. years B.C.E.	**Area / Tombs**	**Relative Chronology**	**Historical chronology**
2800–2700	Tombs of Peribsen and Khasekhemwi	Naqada IIID	Late 2nd Dynasty
	Hiatus		
3050–2900	Tombs of Djer, Wadji, Den, Adjib, Semerkhet, Qaa	Naqada IIIC1–3	1st Dynasty
3200–3050	Cemetery B	Naqada IIIB–C1	Proto-Dynastic / Dynasty 0 – early 1st Dynasty
3900–3200	Cemetery U	Naqada I–IIIB	Predynastic – Proto-Dynastic

able insights for interregional synchronisms and exchange, given that such imported material is today known to occur at various other contemporary sites in Egypt, including non-elite contexts, in considerable quantities and covering an almost uninterrupted sequence of variable intensity from the Predynastic to the late Old Kingdom periods. By far the largest number of early Levantine imported ceramic vessels still comes from the site of Abydos–Umm el-Qaab, and the authors take the opportunity to review the evidence with a fresh look at the chronology and possible places of manufacture.

Research questions

A study by two of the authors on imported ceramic vessels from the Early Dynastic Memphite necropolis at Helwan yielded significant results on the origins of Levantine imports found in 2nd Dynasty contexts.[10] Although of a slightly later date, four of the five imported vessels included in the study were relatively small polished, ovoid jars or juglets which showed great affinities to classical 'Abydos Ware' imports. The petrographic analysis revealed that their most likely place of manufacture was in northern Lebanon, which at the time stood in contrast to a strong trend to view 'Abydos Ware' as a product of the southern Levant.[11] One possible explanation evoked at the time was that, as the Helwan imports are of a later date, there may have been a shift in interrelations with Egypt from the southern to the northern Levant over time, i.e. from the 1st to the 2nd Dynasty. The other possible explanation was that the notion of the origin of 'Abydos Ware' itself was perhaps not entirely settled and more complex than widely appreciated.[12]

The latter had already been problematized by the discussion that arose from the analysis and publication of the large group of EB Ib imports from Tomb U-j by another of the present authors.[13] The results of various scientific methods, including X-ray Fluorescence (XRF), Neutron Activation Analysis (NAA) and petrography, proved to be inconsistent and difficult to interpret since they did not produce an unequivocal provenance for the vessels.[14] Especially the contribution by Porat and Goren, who concluded that the assemblage of vessels in question was almost entirely of Egyptian manufacture, triggered a vivid discussion in the field.[15]

It became obvious that more work needed to be done on this largest assemblage of EB I-II imports, at the site where such vessels were first discovered – Abydos. This present paper summarizes the results of a pilot study on 20 ceramic samples from different contexts conducted in fall 2014 (Table 2).[16]

Cemeteries U and B

Cemeteries U and B represent the northernmost area of Umm el-Qaab where tombs have been discovered to-date. The separation of these two areas from each other and from the rest of Umm el-Qaab is of modern origin; it does not reflect distinct topographical features or clearly segregated clusters of tombs. This distinction has also been subject to change in the course of archaeological investigations over the 20th century. Nevertheless, the occupation of these areas in relation to the rest of Umm el-Qaab does reflect a general trend in horizontal stratigraphy that describes a chronological development from north to south (Fig. 1).

The Predynastic Cemetery U represents the earliest phase of occupation at Umm el-Qaab and comprises some 650 graves dating from the early Naqada I Period until the early Naqada III Period (ca. 3900 – 3300 B.C.E.). These graves were excavated by the German mission between 1985 and 2002 and produced archaeological data that radically changed our view of Egyptian Predynastic

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10 Köhler and Ownby 2011.

11 Henessy and Millet 1963; Hennessy 1967; Amiran 1969; Porat and Adams 1996; Nakano 1998; Porat and Goren 2001; 2002; Hendrickx and Bavay 2002; Campagno 2008.

12 See also earlier studies by Wright 1937; Henessy and Millet 1963; Henessy 1967; Esse and Hopke 1986; Kantor 1992; Sowada 2009, 41.

13 Hartung 2001; 2002.

14 Cf. Pape 2001; McGovern 2001; Porat and Goren 2001.

15 It also caused some archaeologists to search for possible manufacturing centers where Levantine potters may have operated in Egypt; cf. Hill 2011; Hill and Herbich 2011.

16 The authors are grateful to the Ministry of State of Antiquities in Egypt for granting permission to transfer the samples from Abydos to the Institut Français d'Archéologie Orientale in Cairo. We also appreciate the close cooperation of Anita Quiles and Nadine Mounir Iskander at the IFAO and the funding provided by the University of Vienna to conduct the petrographic analyses.

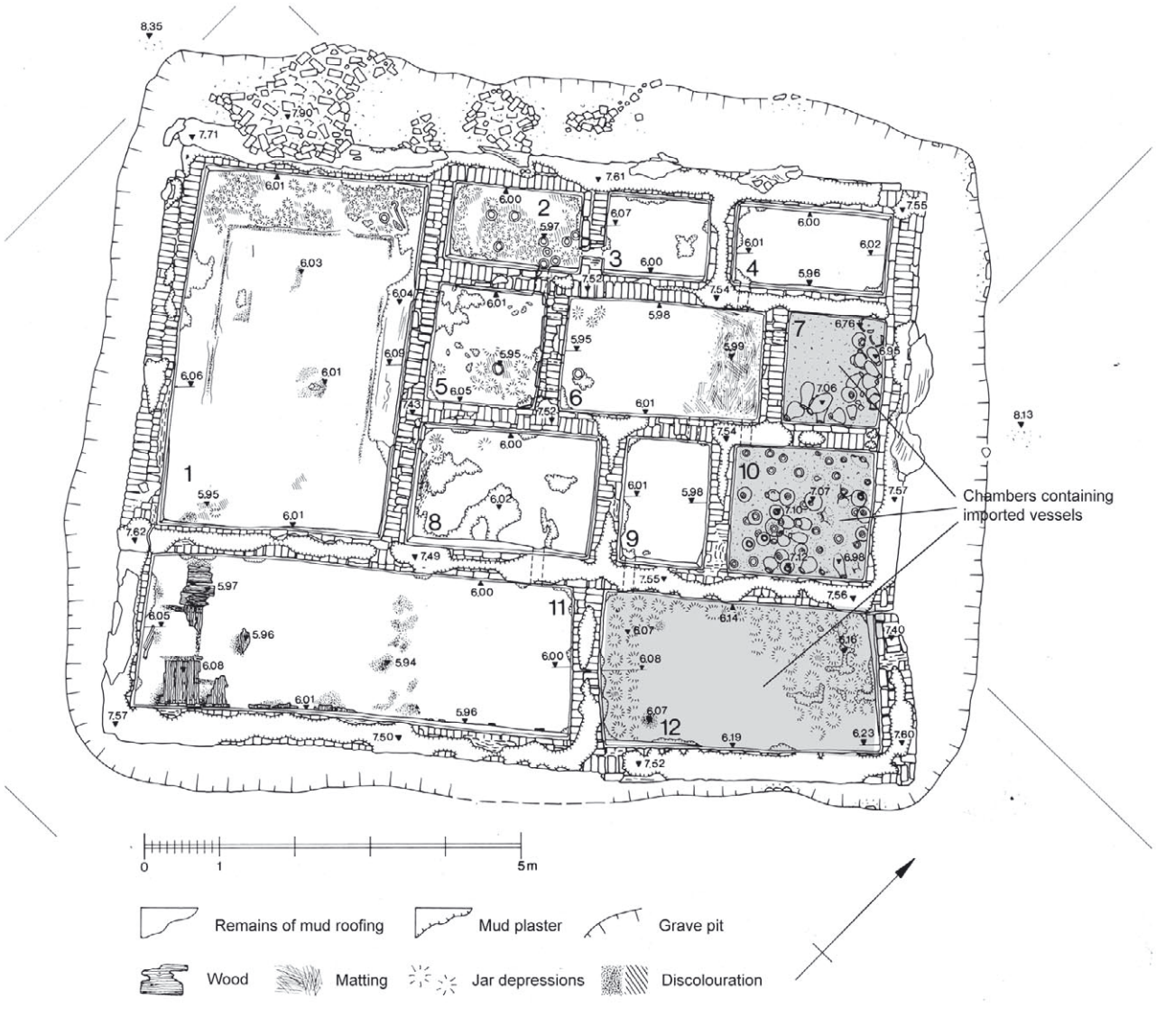

Fig. 2 Plan of Tomb U-j at Abydos

culture and society.[17] Imported Levantine pottery only appears in the later phase of cemetery occupation (from Naqada IID – ca. 3350 B.C.E. onwards) but comprised almost 500 vessels, the majority of which were from one single context, Tomb U-j.[18] The frequency of imported vessels drops significantly thereafter, although imports do not cease entirely.

Imported jars from Naqada IID and IIIA tombs

This study includes five ceramic samples from Predynastic tombs, i.e. one from Tomb U-134 and four from Tomb U-j. Being the largest structure in this cemetery, Tomb U-j is without a doubt the tomb of a late Predynastic ruler.[19] On the basis of the recovered Egyptian pottery, it has been dated Naqada IIIA1; the analysed remains of wood provided traditional C14 dates around 3320 B.C.E.[20]

Tomb U-j measures approximately 12.5 × 10 m and comprises 12 chambers of different size (Fig. 2). Although badly plundered, imprints and discolorations on the floor of the chambers and the distribution of pottery in the fill allow us to reconstruct the arrangement of the tomb equipment, at least in part. For instance, in Chambers 1 (beside a

17 For more detail on previous research in this area, cf. Dreyer et al. 1990, 54–62; 1993, 24–56; 1996, 13–47; 1998, 79–123; 2000, 46–89; 2003, 69–85; 2006, 71–73; 1999; Hartmann 2011; in press; Hartung 1998; 2001; 2010; in press.

18 Hartung 2001, 47.

19 For a comprehensive publication of this tomb, see Dreyer 1998.

20 Boehmer, Dreyer and Kromer 1993; for more recent absolute dates see also Dee et al. 2013.

wooden shrine, which probably contained the burial), 2 and 5 more than 500 jars of the Egyptian Wavy Handled class, some of which inscribed, may have been stored. Other chambers yielded either a large amount of Nile silt Rough Ware vessels such as beer jars, bowls and baking plates, or predominantly marl clay storage vessels. In Chamber 11 remains of several boxes made of cedar wood were preserved.

Chambers 7 and 10 yielded more than 200 ceramic vessels in a primary context and deposited in several layers. These vessels appear to be completely un-Egyptian, not only in terms of their shapes and decoration, but also with regard to their clay paste and temper, which differ fundamentally from the Nile silt and marl clay fabrics otherwise common in Predynastic Egypt.[21] Further, Chamber 12 must have also contained such jars, because fragments belonging to at least 150 additional imported vessels were found in its fill. Jar imprints on the floor and the walls suggest that almost 500 jars were deposited in layers also in this chamber.[22] In total, we estimate that this tomb once contained some 700 imported pottery vessels amounting to ca. 4500 litres of content volume.

As a general pattern, the vessels represent restricted vessel shapes and most probably contained wine.[23] Numerous fragments of Nile mud seals with seal impressions found in the three chambers where the imported jars were discovered[24] suggest that wine was considered a valuable commodity and that the wine jars – in contrast to the local Egyptian pottery in the tomb – had been monitored and sealed by an authority, perhaps at the point when this shipment arrived in the Nile Valley.

Although other individual imported jars are known from various Predynastic cemeteries and settlement contexts, the finds from Tomb U-j at Abydos represent the largest assemblage of imported pottery so far known for Predynastic Egypt. Additionally, three other roughly contemporary tombs probably also contained imported pottery, namely U-a (ca. 30 vessels), U-o (6 vessels) and U-k (some 40 vessels), but no vessel was found in a primary context. Two further jars may be ascribed to Tomb U-134 (dating to Naqada IID), and there were possibly other tombs with imports but this is impossible to ascertain due to the general disturbance of the cemetery.[25]

The Cemetery U assemblage of imported pottery is not very homogenous; the macroscopic observation of the vessels' clay fabric, their method of manufacture, surface treatment and quality reveal significant differences. Several ware groups can be distinguished which apply to a specific range of vessel shapes (Fig. 3 and 4): Jars of the largest Ware groups 1 and 2 constitute the main bulk of the U-j inventory (amounting to 43 % and 28 % of the assemblage, respectively), other groups (e. g. Ware group 3 with 11 % and Ware group 4 at 8 %) are much smaller or may even apply only to individual jars.[26] However, when comparing the U-j inventory with that of other tombs there are also remarkable differences suggesting that the assemblage in U-j represents a discrete group. Also, considering the variation between the ware groups it is obvious that the use of diverse clays and tempers, the variable technologies of manufacture, the application of different kinds of handles and decoration represent distinct potters' skills and styles. This would suggest different pottery making traditions and hence probably different places of provenance. On the other hand, the shapes of the vessels follow a degree of standardisation; in all the main groups plain bottle-shaped jars with narrow neck and mouth prevail (Fig. 3:a-b), while less restricted jars occur only occasionally (Fig. 3:c-d). This could be explained by the simple fact that bottle-shaped jars are much better suited for long-distance transport of liquids than vessels with wider mouth. Hence, the U-j assemblage may reflect a general effort of potters in different areas to adapt their production to the specific demands of the wine trade with Egypt. More typical wide-mouthed vessels may have been necessary to supplement the consignment if not enough special wine jars were available.

While local Egyptian wine making is not attested prior to Dynasty 0, viticulture and wine

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21 For a detailed discussion of this material see Hartung 2001.

22 Several vessels today in the Egyptian Museum Cairo (CG 11652–57, 11663), the Louvre (E 28005–9, 21807) and the British Museum (BM 27747–49, and perhaps also no. 58219) might come from this chamber, presumably removed by Amélineau during his excavations more than 100 years ago (*cf.* Amélineau 1899: pl. XIV and XV).

23 Feindt 2001; McGovern, Glusker and Exner 2001.

24 Hartung 2001, 216–238.

25 Hartung 2001, 34–44.

26 Hartung 2001, 15–34, 72–209.

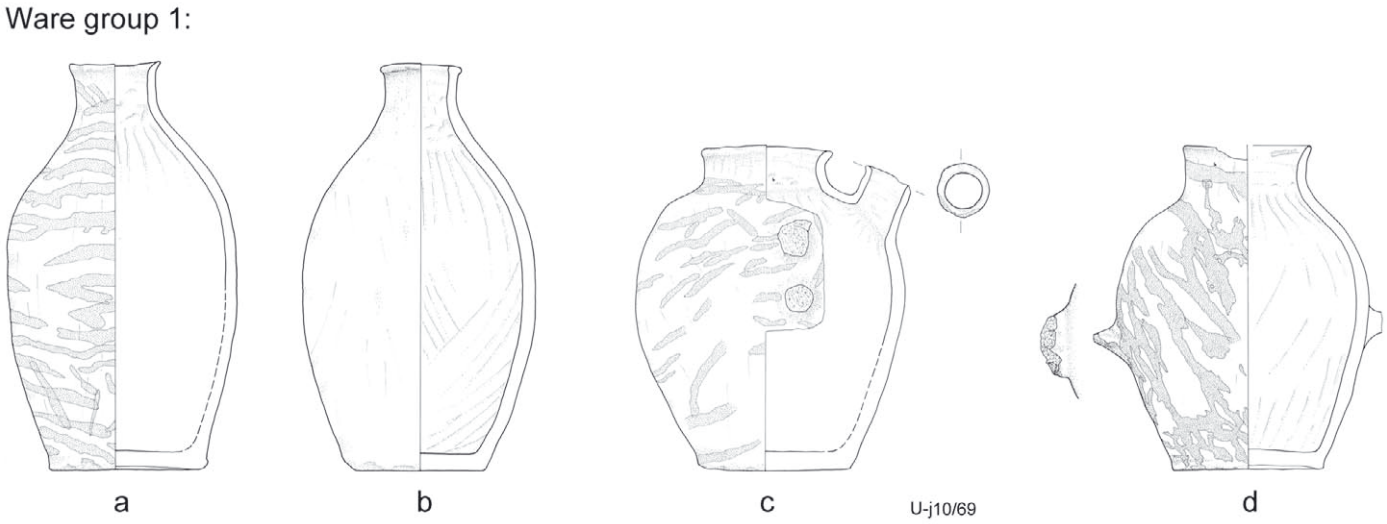


Fig. 3 Overview of shapes of Ware groups 1–4 from Tomb U-j; scale 1 8.

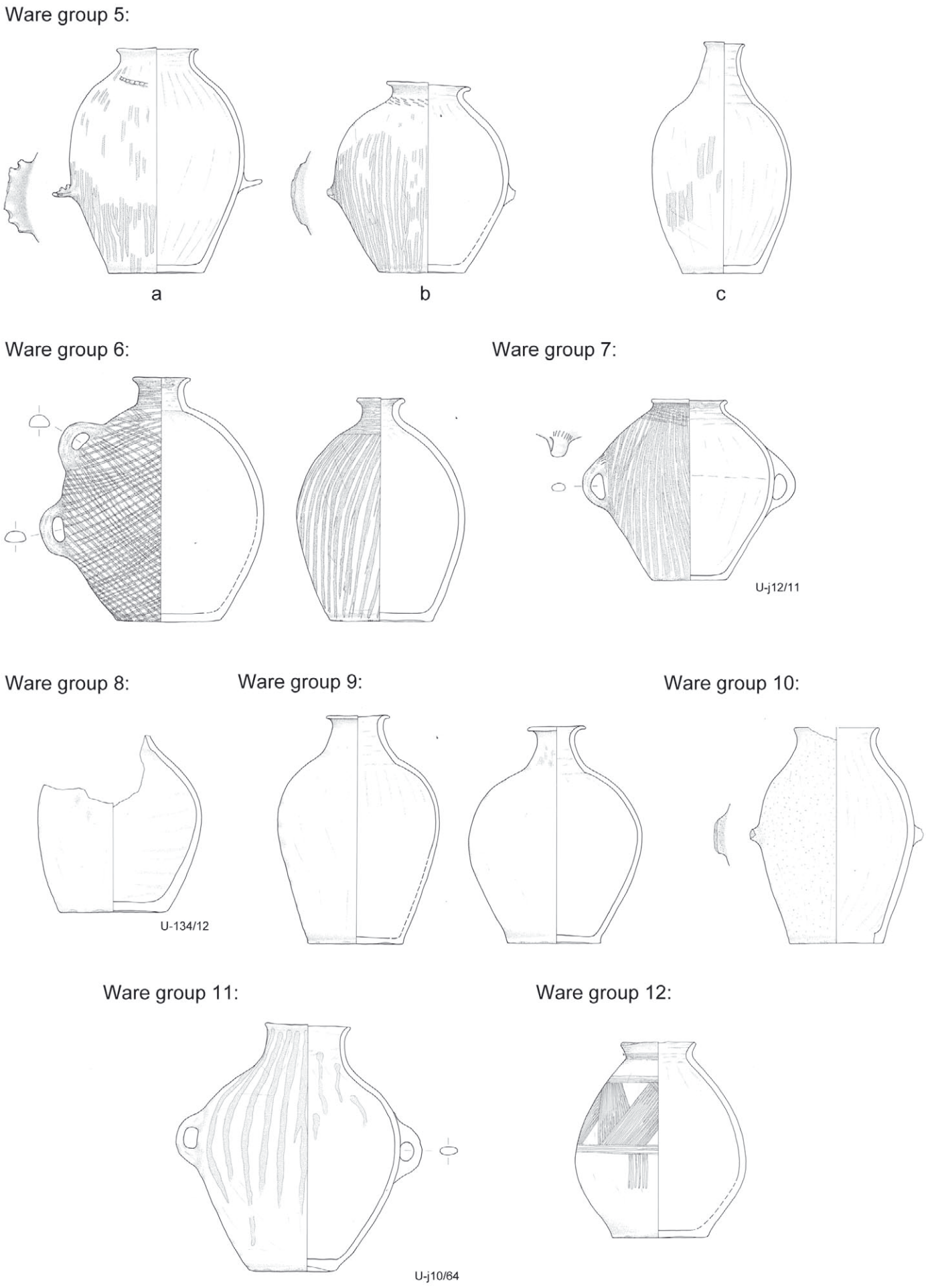


Fig. 4 Overview of shapes of Ware groups 5–12 from Tombs U-134 and U-j; scale 1 8

making seem to have started much earlier in the Levant,[27] suggesting that this region was the most likely provenance of wine in Predynastic Egypt. However, it is very difficult to find good parallels for the U-j jars in Levantine contexts, especially for the characteristic bottle-shaped jars. There are only a few vessels in the local EBI Levantine pottery assemblages, e. g. jars with vertical handles, ledge handles and with painted decoration, which can be considered comparable.

Previous natural scientific analyses

In order to establish a solid basis for the classification and to determine the possible provenance of the different ware groups, more than 200 vessels were previously sampled and analysed by different methods. Unfortunately, the findings of these analyses have not yet provided a consistent picture. Whilst the results of Neutron Activation Analysis (NAA)[28] and X-ray Fluorescence (XRF) analysis combined with petrographic analysis[29] left no doubt about the non-Egyptian provenance of the vessels, the results of another petrographic analysis conducted by N. Porat and Y. Goren[30] proposed a production place within Egypt.

The NAA data were compared with samples in the database used at the time with the nearest chemical matches indicating the possible provenance of the analysed jars covering an area from the northern Transjordanian plateau through the Jordan valley to the southern Palestinian hill country and Petra region.[31] The combination of XRF and petrographic analysis allowed for the definition of mineralogical and chemical subgroups[32] which were partly reflected by variations in the vessels' shapes and which confirm the general range of ware groups. The chemical composition of the clay also provided some information about the provenance of the vessels; for example the distinctively high percentage of chromium, vanadium and nickel in Ware group 1 samples is completely alien to Egyptian clays but known from Syria. Group 4 is characterized chemically by a very high iron content, which may point to the area of Lebanon. Samples of common red-striped painted ware from Tel Erani proved to be petrographically and chemically identical with group 5 vessels.[33]

On the other hand, Porat and Goren defined several petrographic groups and noticed a considerable mixture of clays, as well as combinations of clays and temper that are not known in pottery assemblages from the region of the southern Levant.[34] As a result four groups of jars relating to the provenance of the vessels were established, namely *"definitely non-Canaanite",* "*probably not Canaanite"*, *"possibly Canaanite"*, and finally "*definitely Canaanite"*. The latter group comprises only very few samples; two samples with basalt temper apparently originating in the central Jordan valley and Lower Galilee (Ware group 7, *cf.* Fig. 4 = Sample #3), three grog tempered samples without specific origin (Ware group 9, *cf.* Fig. 4), and two samples made from a loessy clay which may come from the southern coastal plain or north-western Negev.[35] Although most of the raw materials used for these jars can be found in the area of the southern Levant, the mixing of clays and temper appeared to be unknown to the EB pottery production in this region. Also, the fact that vessels of apparently similar shapes were made of different clays caused Porat and Goren to conclude that all the vessels must have been manufactured in the same area outside the southern Levant, and most likely in the Egyptian Wadi Qena, i.e. close to Abydos. Following this conclusion, the potters would have been either Egyptians who imitated Levantine ceramics and catered for Egyptian preferences or Levantine potters living and working in Egypt.[36]

Samples analysed in this study

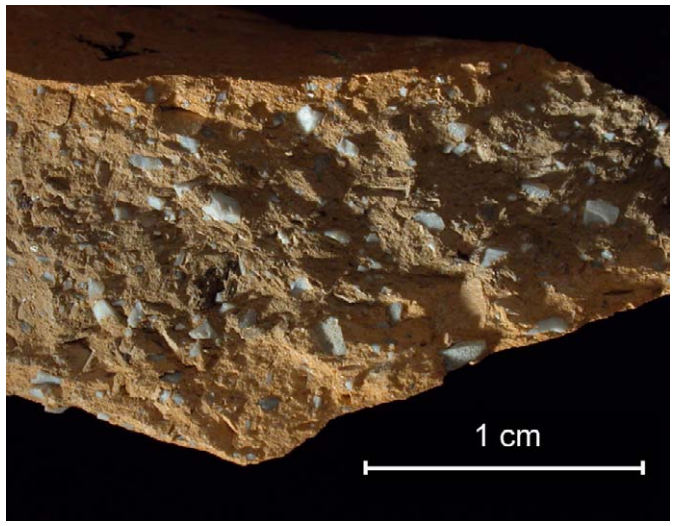
Although the small number of samples in this pilot study cannot be considered representative, the results from the new petrographic analysis presented here (see Part II) are very encouraging and seem to be a first step in the right direction to solve the apparent contradictions. A probable northern Levantine origin of the samples from Ware groups 1 and 2 (Samples #1 and #4, Figs. 3 and 5), i.e. the most substantial part of the U-j assemblage, would considerably change our per-

27 Hartung 2001, 68–69, with further references.
28 McGovern 2001.
29 Pape 2001.
30 Porat and Goren 2001; 2002.
31 McGovern 2001, 408.
32 Pape 2001, 443–460.
33 Pape 2001, 462–464; *cf.* Fig. 3.
34 Porat and Goren 2001, 468–476.
35 Porat and Goren 2001, 477–479.
36 Porat and Goren 2001, 479–481.

#1

#2

#3



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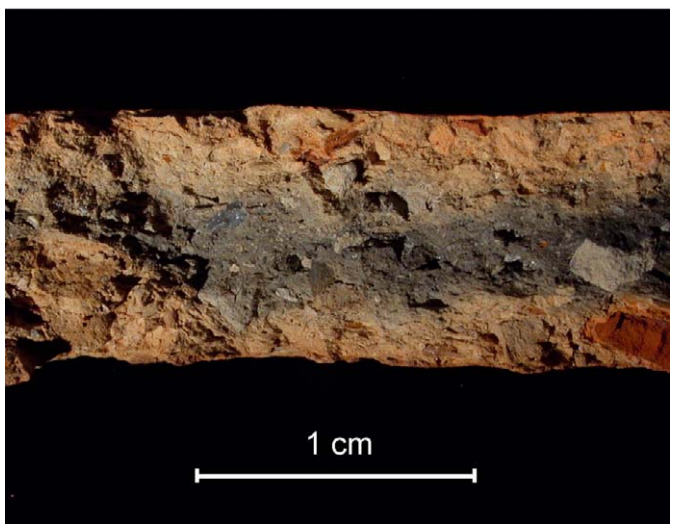

#5

Fig. 5 Photographs of fractures of Samples #1–5; (c) DAIK, photos by F. Barthel

spective on Egyptian-Levantine interconnections. The samples belonging to Ware groups 7 and 11 from Tomb U-j (Samples #2 and #3, Figs. 4 and 5) seem to point in the same direction. With the new results, the U-j assemblage reflects a much wider trade network than hitherto known, comprising not only the southern Levant but also likely the northern Levant. Given the quantity of the U-j jars, and considering that Levantine potters obviously adapted their production to the demands of interregional commodity trade, such a substantial shipment was surely not the result of sporadic contacts but of well-established networks and well-planned logistics. That these networks reached back even further is indicated by the analysed jar base from Tomb U-134, which dates Naqada IID (sample #5, Ware group 8, Figs. 4 and 5), but also by the remains of a coffin made of cedar wood found in the contemporary Tomb U-127.[37]

Further, copper objects with high arsenic/nickel content from contemporaneous tombs at other Upper Egyptian sites and the still earlier Lower Egyptian settlement of Maadi (dating to Naqada I-IIBC) would suggest a source in Anatolia. Maadi provided additional evidence, such as rectangular stone houses with rounded corners primarily known from northern Palestine and Lebanon as well as imitations of the so-called Esdraelon-ware.[38] Finally, apparent imports in Buto phase III (dating late Naqada II-early III), which comprise a number of unusual ceramic bowl fragments that are comparable to northern Levantine coastal and Amuq plain (Phase F) ceramics, are noteworthy and also ought to be re-investigated in the future.[39]

In this context, the maritime trade along the coast[40] also gains new significance, since the most suitable method of transport of commodities, like the U-j wine jars, from the northern Levant would have been by boat, and less likely by overland donkey caravan.

Imports from later tombs in Cemetery U and from Cemetery B

Now that excavations and primary data analysis of the material are complete and currently being prepared for publication, the German mission can contribute more insights to the discussion about imports from the subsequent phases.[41] These derive from tombs in Cemetery U which post-date Tomb U-j, and in particular from Cemetery B. Because all of these were plundered in antiquity and excavated repeatedly over the past 120 years, only very few imported pieces can be assigned to the individual tomb assemblages with certainty. In total, more than 600 imported vessel fragments were recorded in the fill, spoil heaps and debris associated with the tombs in Cemetery B, including those of Iry-Hor (B0/1/2), Ka/Sekhen (B7/9) of Dynasty 0, possibly that of an unnamed ruler (B40/50), Narmer (B17/18) as well as the large complex of King Hor Aha (B10/13/14/15/16/19) of the early 1st Dynasty (Fig. 1). There is little doubt now that these tombs also contained ceramic imports which may be expected given the elite status of their owners. But it is important to remember that due to the significant transformation processes that almost all of the tombs in Umm el-Qaab were subject to, it is very possible that the pottery fragments collected from Cemetery B include material from adjacent other 1st Dynasty tombs and vice-versa. The main chamber of King Djer is ca. 30 meters distant from the western-most chamber B19 of Hor Aha. It is therefore likely that a good part of the highly burnt, and thus unclassified pieces (N=44) derive from the tomb of Djer that was greatly destroyed by fire; although the main chambers of the tomb of Hor Aha also exhibit secondary burning. But it is very unlikely that all or very many of the fragments found in Cemetery B have been displaced from later 1st Dynasty tombs. This is supported by two observations, the first is that the imported vessels from Cemetery B tend to be smaller and of lesser volume than those from the tomb of Djer suggesting that they may represent separate shipments. The other important factor is that a large number of imported vessels from Cemetery B, especially those with ledge handles, coil applications and spouts, find closer parallels in Levantine EB Ib than in EB II contexts and that vessels of EB II character, i.e. classical 'Abydos Ware', were found

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37 Cf. Hartung 2001, 315. Recent analyses of textiles in Predynastic Egyptian tombs from as early as the 5th Millennium B.C.E. consistently yielded remains of coniferous resin, which may have also derived from Lebanon; cf. Jones et al. 2014.

38 *cf.* as a summary e. g. Hartung 2001, 298–307, 313–315; 2013, 183–186.

39 Köhler 1998, 37–39, Pls. 68, 74.

40 *cf.* e. g. Gophna 2002; Sharvit et al. 2002.

41 The full publication of this material will be presented in the forthcoming *Umm el-Qaab* series of the German mission.

intermingled with these. The importance of this material, therefore, is that it covers the time span between the Predynastic Period and the early 1st Dynasty before the rule of King Djer who was the successor to Hor Aha. Djer's reign has frequently been synchronized with the beginning of the EB II in the Levant because 'Abydos Ware' imports, especially of the Combed Ware variety, had then only been recognized to come from his and later royal tombs of the 1st Dynasty.[42] While the early imports from Cemetery U have superficially little in common with those from 1st Dynasty contexts, the Proto-Dynastic imports may assist in bridging the two phases in more than just a chronological sense since they all seem to share a common provenance. The Cemetery B imports may therefore be considered in a continuum with the imports from the Predynastic Period and with classical 'Abydos Ware'.[43]

Among the vessels sampled and analyzed petrographically is a previously published piece from around Tomb U-y[44], which is a mud brick-lined structure of early Naqada IIIB date, thus being slightly later than Tomb U-j. It is a squat, flat based jar with vertical handles and irregularly combed surface (Sample #6; Figs. 6:1, 7:1) and has been assigned to the silty shale clay group. Because it is so very similar to imported material from the later 1st Dynasty royal tombs[45] there were some initial doubts as to whether it was really a part of this tomb's assemblage or if it had been displaced from elsewhere at Umm el-Qaab.[46] That this need not be the case and that vessels with combed surface may have appeared prior to the reign of Djer is supported by more than 80 imported combed vessel fragments found all over Cemetery B, of which one piece has been included in the analyses (Sample #9; Figs. 6:2, 7:2) and also assigned to the same petrographic group as the vessel from U-y. Also, several fragments of such combed vessels were found by Petrie in Tomb B19 of King Hor Aha, today in the Ashmolean Museum.[47] What is interesting, too, is that the earlier vessel from Tomb U-y exhibits a different style of combing, with the combing pattern being applied irregularly and in different directions, whereas those from Cemetery B and many later vessels of the combed ware have broader and generally more regular combing patterns.

Among the Cemetery B samples analyzed and discussed in this paper are also two jars with polished surface of which one (Sample #7; Figs. 6:3, 7:3) is a small jar with multiple vertical handles on the shoulder formed from clay also of the silty shale group. It was found in numerous fragments concentrating around the complex of King Hor Aha and is in shape similar to a vessel found by Petrie in the tomb of Djer.[48] The other piece is a base fragment of a slightly different, more narrow vessel form (Sample #8; Figs. 6:4, 7:4) corresponding to the red polished jugs and jars typical of 'Abydos Ware'[49] and frequently compared with the so-called 'Metallic Ware' of the Levant. On its base it has a potmark comprised of two simple squares which have been incised before firing.[50] Whilst its fabric belongs to the shale group, it contained noticeable quantities of quartz.

Finally, the lower part of an ovoid jar with flat base and wet-smoothed surface (Sample #10; Figs. 6:5, 7:5) was found in fragments around Tomb B7/9. Although it exhibits less diagnostic features and its shape and plain surface character are quite different from the vessels previously mentioned, as well as from the vessel characteristics usually attributed to 'Abydos Ware', it was made from similar raw materials, a shale clay but in this case with igneous inclusions. It could be regarded as a descendant from the imported bottles found in Tomb U-j (especially Ware group 2, Fig. 3) whose majority share with it a comparably plain appearance, shape and clay fabric.

Vessels of this plain ware represent the largest of four main groups of imported jars in Cemetery B, making up 26 % of over 600 fragments, the oth-

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42 Wright 1937; Henessy 1967; Amiran 1969; Adams and Porat 1996, 98; Braun 2011.

43 Hartung 2001, 60 already discussed the possibility of EB II imports being somewhat earlier than the reign of Djer.

44 Hartung 2001, no. 457.

45 cf. Petrie 1902, pl.VIII:6

46 Hartung 2001, 42, 60; Müller 2014, 243.

47 R.E. 4029. We are grateful to L. McNamara for providing photographs and more details about this piece. The vessel is also mentioned by Nakano 1998, 11 and Müller 2014, 243. The same tomb chamber contained another interesting imported vessel with pattern burnishing and vertical handles previously published by Hartung 2001, Taf.86.

48 Petrie 1902, pl.VIII:7

49 Petrie 1902, pl.VIII:1–5.

50 Such simple square potmarks have been observed previously on 'Abydos Ware' vessels, in particular on those of Porat's Group A, of which some were also incised before firing. Adams and Porat 1996, 104.

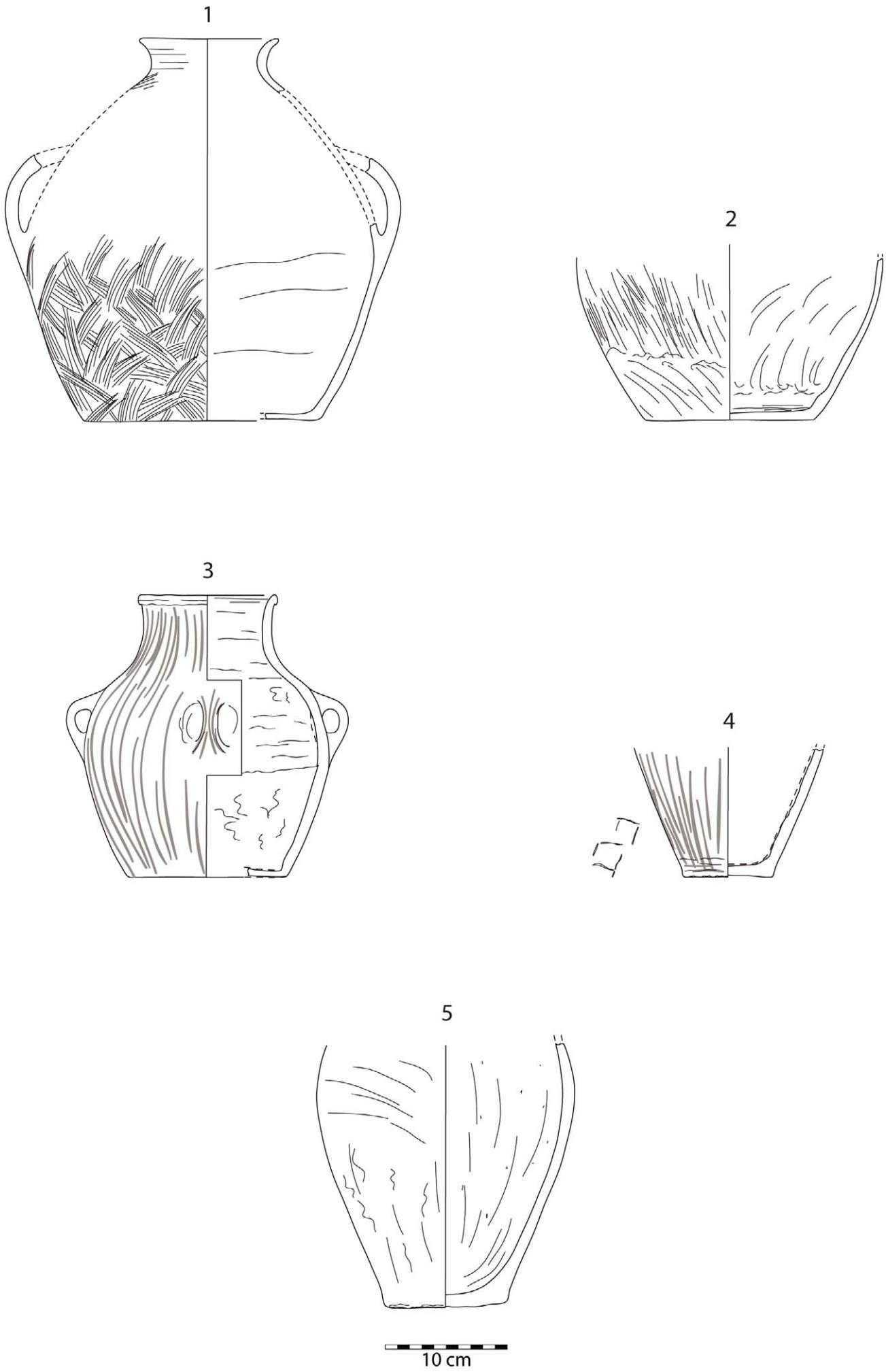

Fig. 6 Levantine imports from tomb U-y and from Cemetery B

Fig. 7 Fracture photographs of Levantine imports from Tomb U-y, Cemetery B and the tomb of King Djer

er larger groups being vessels with red slip and wet-smoothed surfaces (16 %), vessels with polished surfaces (15 %) and with combed surfaces (14 %).[51] The remainder of fragments fall into different smaller categories or could not be classified due to erosion or burning. This distribution of wares and fabrics, and the range of shapes result in a rather heterogeneous character for these vessels, similar to the assemblage of imports from Tomb U-j. They may in fact have a variety of sources, even though the petrography of the samples in this study may point to one general region.[52] Many of these imported vessels, in particular the polished and combed wares, may represent a chronological backward extension to the classical 'Abydos Ware' of the EB II, and would push its first occurrence in Egypt back by several generations of rulers, or approximately 150 years, when taking the combed

[51] In general, the imported vessels appear to be coil built by hand although the interior surface is often not preserved.

[52] We intend to enlarge the sample for further petrographic analysis in order to better appreciate the variety of wares and clay fabrics.

ware specimen from the Naqada IIIB Tomb U-y as the earliest evidence.[53]

Royal Tombs of the 1st Dynasty

The royal tombs of the later 1st Dynasty complete the sequence of kings until the end of that Dynasty, i.e. Djer, Wadji, Den, Anedjib, Semerkhet and Qaa. This part of the necropolis has been subject to the most intensive ancient and modern transformation processes including looting, deliberate destruction, architectural alterations during later Pharaonic periods and archaeological investigations. Excavations of the late 19th and early 20th centuries, especially by Amélineau and Petrie, yielded large quantities of archaeological material of which much had been transferred to European and North American museums. Other material that was not deemed worthwhile for removal, e. g. fragmentary artefacts, was dumped with backfill in the tomb chambers and in the massive spoil heaps surrounding the tombs. The more recent excavations by the German mission invested great effort in re-excavating several of these tombs and their surroundings in their entirety, which significantly increased the evidentiary basis of Early Dynastic material culture and understanding of the archaeology of these early royal tombs. As a result, new data have also been collected pertaining to the classical 'Abydos Ware', its precise character, variability and volume.[54]

The sample from the tomb of Djer, #15 (Fig. 7:6), derives from a relatively large ovoid jar with flat base, at least one vertical handle, orange-red slip and very irregularly burnished surface.[55] It is particularly interesting because the type of vessel could fall into the group of red polished jar imports typically attributed to the 'Abydos Ware', but of a lesser quality than the so-called 'Metallic Ware' jars. Of note is its irregularly polished surface which shows a striking similarity in character with the wavy or vertical burnishing on jars in early EB layers at Tell Arqa.[56] It has been assigned to the silty shale clay group, which this jar shares with many of the imports described above and below.

Since the material from the tomb of Djer is still under study, the imported pottery from the tomb of Den and its surroundings, excavated between 1985 and 2002, will be highlighted here to illustrate the heterogeneity of what is considered the classical EB II 'Abydos Ware' and the difficulties surrounding this very label.

Imported pottery in the tomb of King Den

Since the time of Hor Aha the burial chambers have increasingly grown in size reaching a high point during Den's reign when the ground-floor measured ca. 140 m² with a depth of nearly 7 m below the surface.[57]

These huge burial chambers were used for the deposition of large amounts of tomb equipment encompassing not only furniture and boxes with personal items but also enormous quantities of liquids and food kept in vessels made of pottery and stone. In addition, some chambers on the southern side of the tomb of Den were used as magazines, while each subsidiary grave was also equipped with a number of vessels and other items. Although the dimensions of the burial chamber decreased after the time of Den, it is possible that the reduction of space in the royal chamber was compensated for by an increased use of some of the subsidiary chambers as store-rooms.[58] The burial complex of King Den is the only tomb with a floor consisting of massive granite slabs that had to be brought into the pit via a ramp. Only in a second construction phase was this ramp converted into a staircase that was eventually used during

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53 This would correspond well with the current absolute date for the EB Ib/EB II transition at least in the southern Levant between c. 3250–3000 B.C.E., and with the notion that this transition was gradual and not occurring simultaneously across different areas; cf. Regev et al. 2014; Sharon 2014, 51. This correlation may also be indirectly corroborated by the association of Naqada IIIB Egyptian imports with those typical red-polished juglets, here called Proto-Metallic Ware, in EB Ib contexts in Jordan; cf. Fischer 2014.

54 For the possible contents of the Levantine vessels, see Serpico and White 1996 and more recently Dee et al. 2015.

55 The pottery from the tomb of Djer will be published by R. Hartmann in the Umm el-Qaab monographs series. We are grateful to her for allowing this sample to be included in this study.

56 Strata 20–19, cf. Köhler and Thalmann 2014, Fig. 12 and pers. comm. J.P. Thalmann, to whom we are very grateful for providing comparative material and valuable advice.

57 See the compilation of relevant data in Engel 2008, 37–40. Short overviews on the development of the cemetery can be found in Dreyer 2011; 2007; 2003 and Engel 2008. For more detail see the preliminary excavation reports, by Dreyer et al. 2011 with the literature mentioned there in footnote 1.

58 Compare Engel 2008.

the burial but that still allowed the tomb to be roofed considerably earlier than that event.

Furthermore, each royal tomb had (at least) one enclosure situated close to the cultivated land.[59] These enclosures of the 1st Dynasty were also surrounded by a large number of subsidiary graves that amounted to nearly 600 in the tomb complex of Djer (330 around the tomb plus 269 around the enclosure).[60] Accordingly, the amount of objects deposited in these vast complexes is enormous.

As already mentioned above, the various transformation processes in this cemetery during the past 5000 years were considerable. None of the tombs in this respect is affected as much as the tomb of Den. Due to the heavy fire in the burial chamber – probably intensified by the draft from the staircase – all its objects were either completely destroyed or severely affected by the flames and broken into small bits and pieces. Only a few objects could be found still *in situ*.

As nearly all vessels imported from the Levant found in the vicinity of the tomb of Den show traces of this conflagration, it seems highly probable that the majority of them was once deposited in Den's burial chamber – and not in one of the many subsidiary tombs.[61] This is also corroborated by the find of several bases of imported jars and juglets in its north-eastern corner.[62] Apart from these vessels, at least 250 additional vessels can be reconstructed from fragments distributed in the filling and dump hills surrounding the tomb. In no other royal tomb at Abydos were deposited so many containers of foreign origin. Thus the reign of Den definitely defines an apex within EB II as observable in the amount of imported jugs and juglets from the Levant found at Abydos, a picture also supported by the discovery of imports in contemporary tombs throughout Egypt.[63]

Interestingly jars with combed surfaces and wavy handles belong to an EB II vessel type that was already present during EB I and continued into EB III.[64] In the inventory of EB II it is, however, more the exception than the rule. Another type reminiscent of EB I is a jar with a neck of moderate dimensions in the assemblage of EB I though with a longer neck.[65] It resembles the jars of Tomb U-j without handles designed, according to Hartung, for long-distance trade. In contrast to its forbears, however, usually two tubular handles were attached to their bodies and their surfaces were burnished. The burnishing strokes either cover the whole body in a vertical direction or display a net-pattern that is sometimes divided into fields by means of vertically burnished bands. This jar type is only represented in small numbers.

The majority of imported containers from the tomb of Den consists of slender juglets with single strap handles reaching from their rims to their high shoulders. These were sometimes supplemented by two lug handles attached to opposite sides of the shoulder at right angles to the strap handles: in all probability they symbolize in a miniaturized form loop handles that are regularly found on jars from EB I onwards. This vessel type is the prototype for the hieroglyph W9 that is generally used as a determinative in words meaning ointments and different oils. As suggested in another context,[66] at least some of the jars could have contained wine.

Similar to the evidence in U-j, the ceramic material from the tomb of Den displays great diversity in shapes, surface treatments, types and numbers of handles, manufacturing techniques,[67] as well as in clays and tempers. Accordingly, scholars tried to classify the material into different groups.[68] The present classification is, however,

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59 While the evidence suggests three enclosures for King Hor Aha (see Bestock 2008; 2009), enclosures are still missing for some kings of the later 1st Dynasty, one of which is King Den, see also Vaudou 2008; Adams and O'Connor 2003; 2008; 2010; 2011.

60 The number 590 for the amount of subsidiary tombs at Umm el-Qaab in Vaudou (2008, 150) must be a typographical error; in recent excavations on behalf of the German Archaeological Institute Cairo the number of 330 could be ascertained, see erstwhile Dreyer 2014, 3. For the number of subsidiary graves at the enclosure see Bestock 2008, 52; Vaudou 2008, 150.

61 Neither the subsidiary chambers nor the store-rooms on the southern side of Den's tomb exhibit signs of burning. Especially those fragments found in the north-eastern dump hills could once have belonged to Djer's tomb that was also severely affected by the fire.

62 Dreyer 1998, 142–145 with fig. 31.

63 For this compilation see table 3.7 in Hendrickx–Bavay 2002, 71.

64 Müller 2014, 249 fig. 1b.

65 Müller 2014, 249 fig. 1a.

66 Müller 2014, 247–248.

67 For the use of potter's wheels in the EB see Roux–de Miroschedji 2009.

68 See for instance: Braun 2012; Sowada 2009: 39–44; Hendrickx–Bavay 2002: 70.

very unsatisfactory as the criteria are not well established and the terminology is not coherent.

Terminology of EB II jars and juglets

As noted earlier, the labelling of imported EB II jars and juglets as 'Abydos Ware' is rather unfortunate and is simply due to its first find spot in the Early Dynastic royal cemetery at Abydos.[69] For a number of reasons, we do not consider this term well defined as it is not applicable to all of the material. The variety of vessel shapes, materials and qualities suggests that they do not represent a homogenous body of ceramics, i.e. a ceramic ware, and that their origins are to be sought in different areas.

Recently, some authors have also favored the term 'Metallic Ware' instead,[70] and often both designations are used side by side.[71] This designation is also not without ambiguities[72]: certain other wares, especially in Northern Syria and Mesopotamia, are also named with this term. These wares are not only of different clays and shapes but also date to different periods than the 1st Dynasty vessels.[73] Furthermore, this term was chosen because of the hardness of the ceramic fabric and the metallic sound of some of the vessels when struck lightly.[74] While this property is subjective to a certain degree, scholars use the term for a great variety of vessels in the Levant that comprise a whole range of different jugs, juglets, jars and even open shapes with different surface treatments, clays and qualities.[75]

At the same time, many scholars differentiated between the burnished and the painted vessels although the latter are frequently burnished too, and also have the same shapes as some of the vessels defined as *Metallic Ware*.[76] Due to their light-coloured surface painted with red, brown or black geometric designs, the latter group is designated by others as *Light-Faced Painted Ware*.[77] Several authors would consider *Red Polished Ware* as a distinct third group by describing it as a heterogeneous group deriving from the middle and southern regions of the southern Levant.[78]

Given these terminological contradictions, a more precise classification and terminology is called for. In the context of this article, the vessels shall thus very generally be termed "EB II jars and juglets"[79] and each will be described with their specific properties.

For a new classification of this diverse vessel group not only aspects of surface treatment and manufacturing techniques should be taken into consideration but also the fabrics, petrographic classification and their possible place of origin. The analysis of 9 samples of different vessel types is a first step in this respect. As this material is still in the process of documentation it was not yet possible to create a coherent typology according to ware groups as could already be accomplished for Cemeteries U and B. The compilation below should therefore be considered as of preliminary character.

Light Faced Painted Ware (= LFPW)

This pottery group is considered here as a separate ware group because its distinctive decoration and its light coloured clay do not occur with other imported vessels found in the tomb of Den.[80]

With its light surface (10 YR 8/4 very pale brown)[81] the section of which turns to light grey towards the inside, Sample #12 from juglet T-W/71 (Figs. 8 and 17:1), preserved only in its lower part,

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69 Petrie 1901, pl. LIV; Petrie 1902, pls. VI: 17, VIII.

70 Greenberg–Porat 1996.

71 For instance, de Miroschedji 2014, 320 summarizes the red burnished and painted jugs with the term Abydos ware, while Northern Metallic Ware is not defined.

72 For a critical view on this term see Hendrickx and Bavay 2002, 70; Braun 201, 19.

73 See literature in Braun 2012, fn. 18. This is probably why the term was qualified as Northern Canaanite Metallic Ware by some scholars.

74 Braun 2012, 26–27, Greenberg and Porat 1996, 6.

75 Sala, for instance, defines the pattern-combed jars of Transjordan as *Metallic ware* for EB II as well as for EB III, see Sala 2014: 262 (EB II), 264 (EB IIIa), 268 (EB IIIb). In contrast Sowada 2009: 40 summarizes the red-burnished ware with this term. Finally, Greenberg and Porat (1996, 5) used the term to describe the plates, bowls, juglets and jars of a certain clay group in "*…the upper Jordan Valley, and the adjacent regions of northern Transjordan, the Golan, the Galilee, and the Lebanese Biqᶜa*".

76 See for instance Braun 2012 to name but one.

77 For the definitions of these wares see most recently Braun 2012. For a complex treatment of the painted vessels see Genz 1993.

78 But see Braun 2012, 11 who notes that also this designation is not used coherently.

79 This is in accordance with the terminology used by Hendrickx and Bavay 2002.

80 This is in accordance with Genz 1993; 2002 and Braun 2012.

81 According to Munsell Soil Color Charts. In the following descriptions the number code used in the charts are omitted, only the designations of the colours mentioned there are cited.

Fig. 8 T-W/71 with Sample #12, tomb of Den, Light Faced Painted Ware

Fig. 9 T-aB/253 with Sample #16, tomb of Den, plain burnished

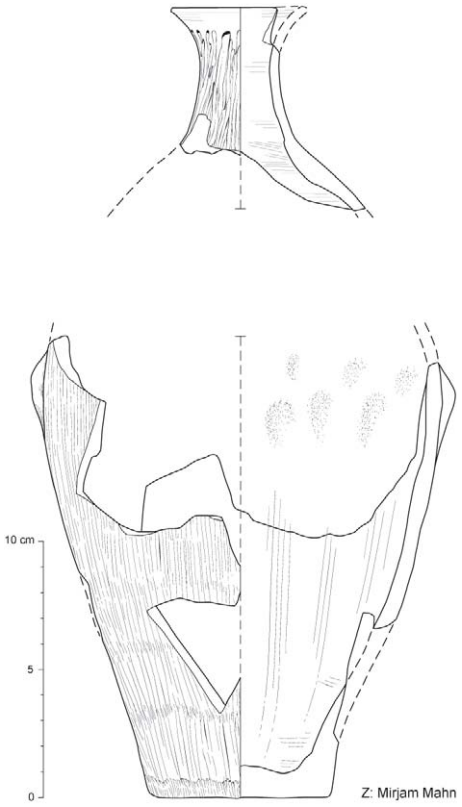


Fig. 10 T-aB/271 with Sample #18, tomb of Den, plain burnished and combed

Fig. 11 T-aB/251 with Sample #17, tomb of Den, red burnished

Fig. 12 T-KK/75 with Sample #11, tomb of Den, red burnished

belongs to the group of *LFPW*. Typically, this type of vessel has a painted decoration on its neck and shoulder which are missing in the case of this vessel that stands only to a height of 7,9 cm. The surface was burnished with very fine strokes in a vertical direction. Unfortunately the surface of the interior was affected by an aggressive substance so that the production technique is not clearly visible. The few marks conserved on the otherwise very even surface points to a fine smoothing with the fingers in a horizontal direction. Macroscopically the fine clay consists of clearly visible limestone and small stones of whitish, greyish and dark colour.[82] It has been classified petrographically in the calcareous volcanic group.

EB II juglets and jugs with burnished and combed surfaces

Sample #16 was taken from jug T-aB/253 (Figs. 9 and 17:2) that is preserved to a maximum height of 24,5 cm reaching from the base to the neck. The pink surface in the lower 15 cm is vertically burnished with very fine strokes, while the strokes are nearly horizontal in the part above, i.e. the whole surface is plain burnished. The vessel has been coil-built on a turning device from which it was string-cut. The interior surface is quite uneven with many finger strokes and displays clearly visible bulges from the poorly smoothed coils. The section is of a reddish grey colour. With the assistance of a hand lens, the clay can be described as extremely fine with a lot of very fine shale inclusions, some fine sand and sporadic black stones. Petrographically it belongs to an unusual, sandy clay fabric in the shale group.

Although the adjoining shoulder is missing, there is no doubt that the rim and lower part belong to the same vessel, juglet T-aB/271 (Figs. 10 and 17:3) from which Sample #18 was taken. The vessel can be reconstructed to a height of 30,8 cm. On its shoulder two lug handles have been applied to which in all probability a strap handle attached to the rim was added. The pinkish surface has been burnished with short, narrow, strokes that have been set vertically. Also the base is covered with burnishing. The surface on the upper part has been horizontally combed before it was burnished. The vessel was coil-built on a turning device, the interior surface of the base revealing turning marks. In contrast, the body shows marks of the smoothing of the coils in a first step in a vertical direction and in a second step in horizontal direction. Viewed by hand lens the reddish-yellow section has many visible inclusions of shale in different sizes and limestone, with sporadic quartz. Petrographically, the fabric was classified in the silty shale clay group.

Sample #17 belongs to the very slender juglet T-aB/251 (Figs. 11 and 17:4) of which only the neck, the rim, the strap handle and a few body sherds are missing. Otherwise it is well preserved. It stands to a height of 25,3 cm. The broad dark grey clay has a thin oxidation-zone. The light reddish brown surface was covered with a red wash that has been burnished vertically with irregular strokes. A pot-mark was incised on the shoulder post-firing. The vessel is coil-built on a turning device. The base has been smoothed in a spiral direction while the body has been smoothed with the fingers in a horizontal as well as diagonal direction. The neck has been attached with a clearly visible bulge on the inside, with the overlap not completely smoothed in several places of the body. The vessel has a string-cut base that otherwise was not smoothed. With the assistance of a hand lens the clay looks extremely fine showing only a few limestone particles, and many very fine sand and shale particles. The petrographic analysis places this piece in the calcareous clay group.

The red burnished surface of the more bulgy jug T-KK/75 (Figs. 12 and 17:5), from which Sample #11 was taken, has in addition to a relatively broad strap handle a ridge below the neck. Together with the body-sherds that cannot directly be attached to the preserved parts, about one quarter of the vessel is preserved, allowing for the complete reconstruction of the profile. It has a height of 34,6 cm. The vessel was handmade using the coiling technique with an even surface smoothed with the fingers in all directions. As the base is missing, it cannot be discerned if a turning device was used. The section has a grey core and light red oxidation-zones. The visible inclusions consist of shale, a few white stones, a few limestone particles and a few black particles; its clay group has been determined as silty shale by petrography.

A third variant with a red burnished surface is represented by the squat vessel T-aB/283 (Figs. 13 and 17:6) that is only preserved in height to shortly

[82] To this writer the clay looks levigated, but M. Ownby has kindly noted that levigation of clays for pottery production is difficult to establish with certainty without the examination of the original clay source.

Fig. 13 T-aB/283 with Sample #19, tomb of Den, red burnished

Fig. 15 T-aB/288 with Sample #13, tomb of Den, plain net burnished

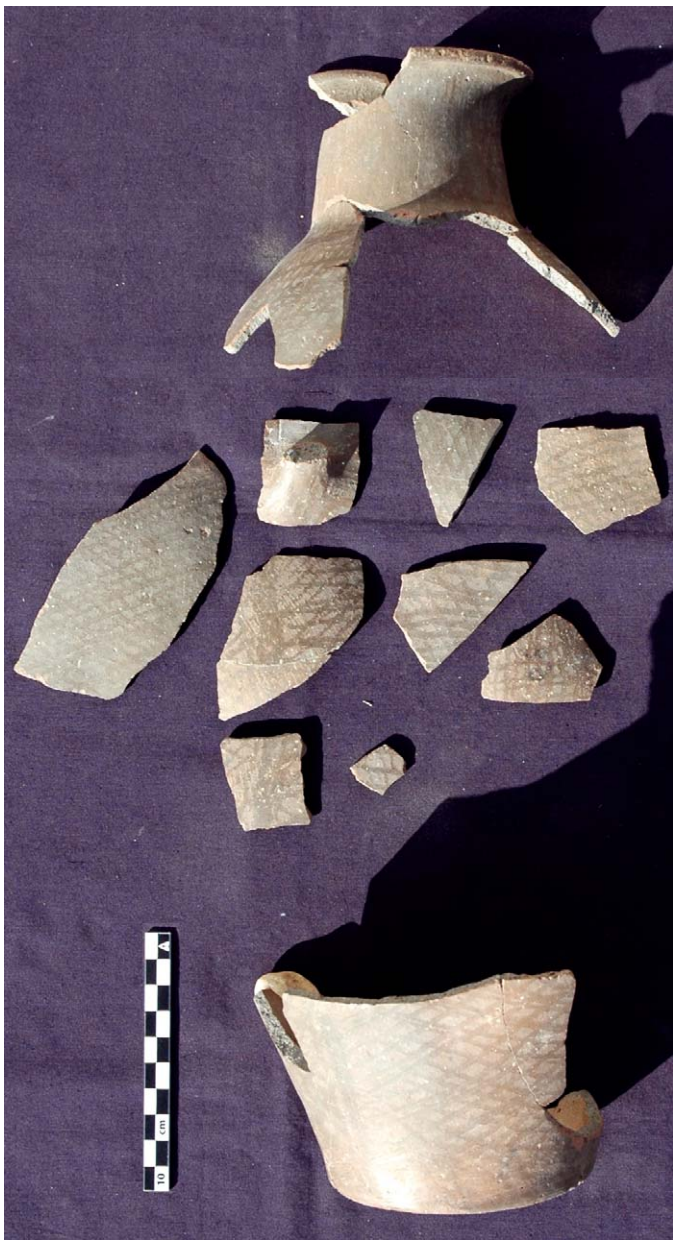


Fig. 14 T-aB/257 with Sample #14, tomb of Den, red net burnished

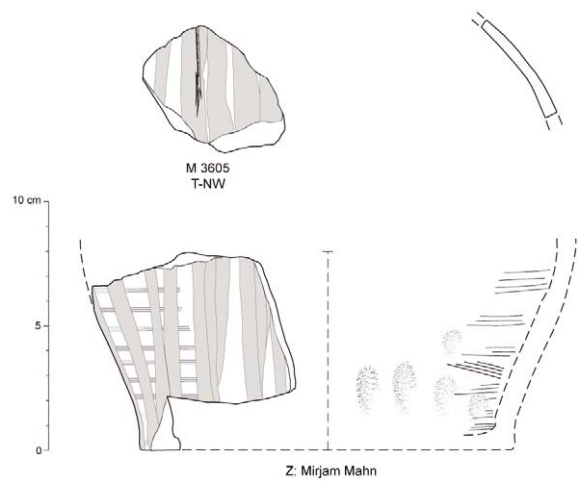


Fig. 16 T-aB/290 with Sample #20, tomb of Den, plain net burnished and combed

above the belly, reaching 20,4 cm. Sample #19 derives from this vessel. Two loop handles had been attached to the body. Its surface was covered with a red wash that was darkened by the conflagration of the tomb. In addition, a few burnishing strokes were applied very casually, mostly in a vertical direction while crossing and loops were not excluded. The vessel has been coil-built on a turning device as revealed by the concentric smoothing marks on the interior base. The uneven surface of the body is covered with rows of finger imprints and smoothing marks in all directions that still reveal the bulges of the coils. In many places the surface is chipped away by decomposed limestone. The very fine clay has several cavities and is of a middle grey colour with a dark grey core. Very few inclusions are visible with a hand lens in only small quantities, consisting of shale, quartz, mica, grey and black stones. The clay fabric also falls into the silty shale group.

Jar T-aB/257 (Figs. 14 and 17:7), to which Sample #14 belongs, is reconstructed from numerous fragments which could not be joined; preserved are the base, rim and neck, the upper part of the shoulder, a few body sherds and part of a loop handle. The entire vessel can be reconstructed to a height of ca. 35 cm. While only partially preserved, the two loop handles can be reconstructed at the height of the belly. At 9,8 cm in diameter the rim is rather wide. The light red surface is covered with a weak red wash that has been pattern burnished. While the neck is covered with narrowly set burnishing strokes in a vertical direction, the body was divided into fields by vertically burnished bands that have been filled with net-burnished patterns. The vessel was coil-built on a turning device as revealed by a spiral on the base and wheel marks on the rim. The body has been smoothed with the fingers in a vertical direction covering zones with finger imprints only poorly. The section has a very broad grey core with a very thin red oxidation zone. A lot of shale inclusions in all sizes are visible with a hand lens, while the amount of limestone and white stones is minimal. According to the petrographic analysis the clay fabric is shale-based.

Juglet T-aB/288 (Figs. 15 and 17:8), represented by Sample #13, again consists of different parts that cannot be directly joined. While the lower part is preserved above the maximum diameter, a part consisting of the shoulder and neck cannot be directly attached and the rim is missing. The reconstructed height should be around 35 cm. Although no handle could be attributed to this vessel, it is quite probable that a strap handle was once attached to the rim. The neck has been vertically burnished with narrow strokes, and the body is covered with a loosely set net-pattern that started at a height of 7 cm. The vessel was coil-built on a turning device and was string-cut. The interior surface of the base has spiral finger marks; the body was horizontally smoothed with the fingers but reveals clear zones of finger imprints at the overlaps of the coils. The neck shows wheel turning marks. The section is predominantly gray and has only a narrow pink oxidation-zone on the outer part. A large amount of shale inclusions are clearly visible with a hand lens as well as plentiful quartz, while limestone was only detected in small quantities. The petrographic analysis places it in the shale clay group with quartz.

Sample #20 was taken from the lower part of squat jar T-aB/290 (Figs. 16 and 17:9) to which eight body sherds can be attributed; no handle is preserved. The base can most probably be reconstructed to a diameter of 15 to 16 cm. The reddish brown surface of the body was first combed horizontally and then covered with a burnished net pattern that was made up of broad strokes and wide spaces. The very even interior surface was smoothed with a spatula after it was coil-built. The grey section has very narrow oxidation-zones and reveals a lot of black particles that could be shale and a few quartz inclusions. Petrographically its fabric is in the silty shale group.

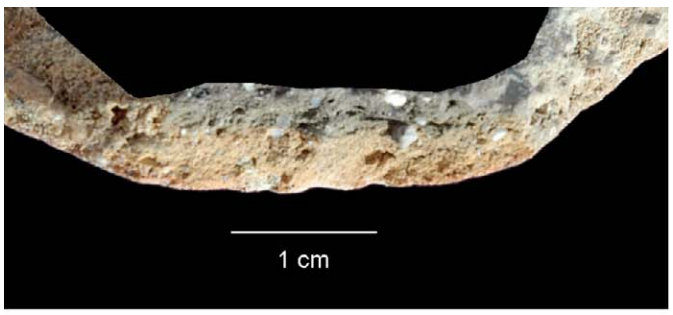
The assemblage of imports presented here can be considered a typical sample of what would have been previously labelled ‘Abydos Ware’. Some of the vessels would also have fallen into the group designated by some scholars as ‘Metallic Ware’.

Part II – Petrographic analysis

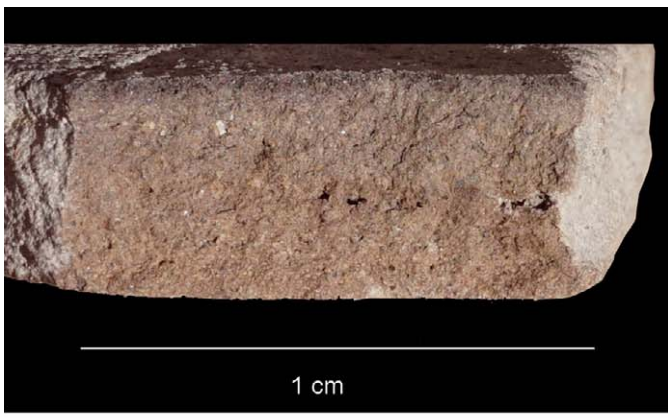
Samples and methodology

The petrographic analysis was conducted at the Archaeometry Laboratory of the Institut Français d’Archéologie Orientale, Cairo. The analysis of the 20 thin sections with a petrographic microscope at 100× magnification followed standard procedures.[83] Both the inclusions and clay were charac-

[83] see Bourriau and Nicholson 1992; Ownby 2010; Whitbread 1995.

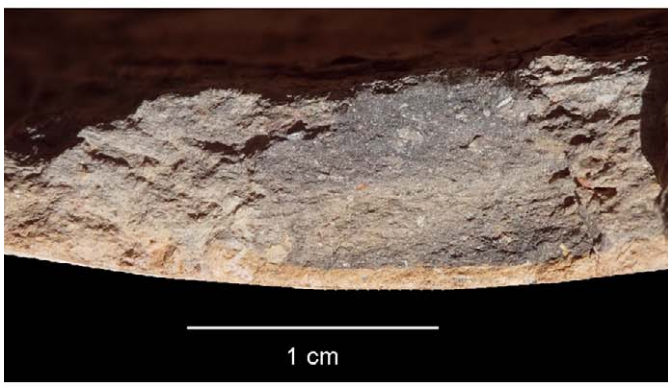


1. section of Sample #12, calcareous volcanic group, T-W-071



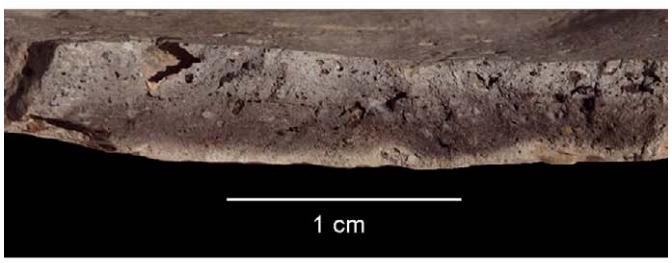
2. section of Sample #16, probably shale, sandy group, T-aB-253

3. section of Sample #18, silty shale group, T-aB-271



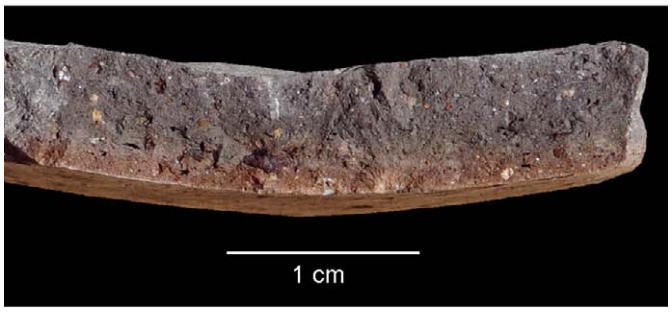
4. section of Sample #17, calcareous group, T-aB-251

5. section of Sample #11, silty shale group, T-KK-075

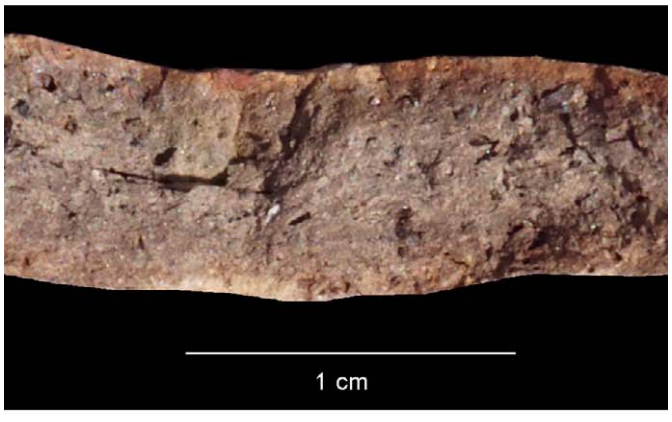


6. section of Sample #19, silty shale group, T-aB-283

7. section of Sample #14, shale group, T-aB-257



8. section of Sample #13, shale quartz group, T-aB-288



9. section of Sample #20, silty shale group, T-aB-290

Fig. 17 sections of the analysed samples from the tomb of Den

terized, and their features noted. All of the provenance assignments are postulated as the thin sections were not compared to ceramic raw materials or kiln material from known sites. Geological maps and some soil maps were consulted to arrive at the postulated provenance.[84]

Results

As in previous studies on early ceramic imports from Abydos[85] the petrographic analysis revealed a range of materials that share some characteristics. Similar clays could appear with different inclusions and similar inclusions could be present within varying clays. This relates intimately to the geology of the region where they were produced, and in fact is a classic feature of Levantine pottery.[86] Nevertheless, the samples could be divided into groups with related clays that likely represent a similar geologic origin for the raw materials.

1. Calcareous Clay Group

The first group comprises three samples with calcareous clay and various other inclusions. Sample #3 from Tomb U-j (Fig. 4) is made of a clay comprised of ostracoda, foraminifera, sparry and micritic limestone, and calcite. Notable volcanic inclusions were present comprising glassy vesicular basalt (often weathered orange) and ophitic alkali olivine basalt/diabase (Fig. 18a). Some of the glass has altered becoming iron-rich and clayey while the calcite in the clay likely derives from the alteration of pyroxene.[87] Less common in the paste and of fine-size are inclusions of plagioclase, quartz, iddingsite (altered olivine), chert, and pyroxene. This sample was assigned to Ware group 7 and was similarly described by Pape[88] who noted the calcite, chalk, basalt and lime in-filled 'bubbles' for the iron-containing glass. He suggested the foraminifera were Upper Cretaceous in date. Likewise, Porat and Goren[89] noted the calcareous clay with glassy and ophitic basalt.

The two other samples in this group are both EB II juglets from the tomb of Den. Sample #12, the lower part of a Light Faced Painted juglet (Figs. 8, 17:1), has a calcareous clay with a high amount of foraminifera and only a single inclusion of basalt/diabase. The glass fragments are lacking except for one possible example. Calcite and micritic to sparry limestone are common, while fine-sized pyroxene and plagioclase are rare. Scattered throughout the paste are iron-rich clay pellets, but these and the other inclusions are likely natural to the clay deposit. Sample #17, a juglet of the Red Burnished Ware (Figs. 11, 17:4), has some foraminifera in the calcareous clay, but in quantities less than Sample #12 and more than Sample #3. However, calcite is the least in this sample among the three. Iron-rich clay pellets are conspicuous and other inclusions are very fine to coarse-sized quartz grains and micritic limestone up to very coarse in size. Fine-sized plagioclase, pyroxene and chert are rare in the paste. A single hypocrystalline alkali basalt fragment was observed.

2. Shale Clay Group

A set of eight samples have clay that is likely from the weathering of shale outcrops, particularly as many of the samples contain shale fragments in the paste. Silty quartz is not common in these samples. Two samples contain igneous rock fragments. Sample #1, a jar from Tomb U-j classified as Ware Group 2b (Fig. 3), has a shale-derived clay and what appears to be broken down fragments of granite to diorite with quartz, plagioclase, potassium feldspar, opaques, biotite and amphibole as mineral constituents.[90] Also present are mafic volcanic rock fragments, probably andesite, which are porphyritic with an iron-rich matrix, common coarse-sized plagioclase, and opaques. Inclusions of basalt are hypocyrstalline with plagioclase, opaques and probably iddingsite. Cataclastic grains, of metamorphic origin, appear to represent deformed granite and granodiorite. Also present are common quartz and fragments of micritic limestone along with rare gypsum/anhydrite (possibly due to alteration of the igneous

84 e. g. Bartov 1994; Beydoun 1977; Dan *et al*. 1975; Dubertret 1955; Ilaiwi 1985; Said 1962; Shazly 1977; Sneh *et al*. 1998a and b.

85 Porat and Goren 2001, 2002. This present study would not have been possible without the generous geologic assistance provided by Kamal Badreshany and Mohamed Fathy Abd El Fattah.

86 Ownby 2010.

87 see Fawcett 1965.

88 Pape 2001, 428, 435, 440.

89 Porat and Goren 2001, 470, 476–477; 2002, 256, 263.

90 Hartung 2001, 144.

rock as gypsum/anhydrite was seen attached to a feldspar). Clusters of epidote could represent alteration products; a supposition supported by the weathered appearance of the feldspar. The sample was described by Pape[91] as containing tuffaceous chalk, basalt, biotite or amphibole, sericitized anorthoclase (potassium feldspar), orthoclase (potassium feldspar), and little plagioclase. Significantly, he identified sandstone particles comprising quartz and potassium feldspar with an iron matrix. Pape[92] suggested a terrestrial carbonate from a spring formation was present that is likely the gypsum/anhydrite currently identified. This inclusion was called gypsum by Porat and Goren[93] who noted fragments of granite to diorite, basic and acid volcanic rocks, and cataclastic rocks in the paste.

A sherd with similar inclusions and clay is Sample #10 from Cemetery B (Figs. 6:5, 7:5), assigned to Fabric Ib. The igneous fragments are larger in this sample and show more metamorphic alteration, particularly a cataclastic texture (Fig. 18b). Porphritic likely andesite fragments are also more common, but some exhibit a finer texture. Micritic limestone was absent, while some potential felsic/acid rocks and chert were noted, unlike in Sample #1. A single fragment of volcanic tuff in Sample #10 (Fig. 18b) is similar to those in Samples #12 and #13 from the tomb of Den. A few possible sandstone to siltstone fragments were noticed in this sample.

Sample #4, a spouted jar from Tomb U-j, Ware Group 1 (Fig. 3), has a shale clay with a calcareous component and large, angular chert fragments that were probably intentionally added[94] (Fig. 18c). Few other inclusions are present, mostly being quartz, sparry limestone, foraminifera, and phosphate. The common chert was noted by Pape[95] and Porat and Goren,[96] who also noted the phosphate and calcareous inclusions. A sample of Ware Group 8 from Tomb U-134, Sample #5, has a similar clay to Sample #4 though lacking the calcareous component and intentionally added angular chert (Fig. 18d). Instead, chert is uncommon and could be natural to the clay. Other inclusions are rare quartz and the paste is dominated by shale fragments, some of which are iron-rich. The latter inclusions can have silty quartz. Sample #8, a jar fragment from Cemetery B of Fabric Ic (Figs. 6:4, 7:4), also comprised a shale-derived clay but in this case with fine to medium-size quartz. Several shale fragments seem similar to those in Samples #4, #5, and #14. This sample also has a calcareous component in the paste. Iron-rich shale inclusions, some with quartz, are common as are iron oxides in general. This represents another similarity with the other three samples.

Two samples in this group belong to vessels from the tomb of Den. Sample #14 (Figs. 14, 17:7), has a shale derived clay with a calcareous component, but the clay appears different than in Samples #4 and #5. However, a few of the shale inclusions are similar, though these are likely to be natural to the clay deposit representing variable clay sources from similar outcrops. Iron-rich shale fragments are also present. One similarity to Samples #4 and #5 is the prevalence of iron oxides. Beyond quartz, micritic and sparry limestone, and rare foraminifera, other inclusions are uncommon. Sample #13 (Figs. 15, 17:8), is likely related to Sample #8 with sand-sized quartz, shale, and a calcareous component. Some iron-rich shale pieces with or without quartz are present. Micritic limestone is the dominant calcareous material with rare foraminifera. Unusual glassy tuff inclusions with hematite, probably volcanic, are similar to rare examples in Samples #10 and #12. Interestingly, the clay for Sample #10, from Cemetery B is shale-derived, but that for Sample #12, a Light Faced Painted Ware juglet, from the tomb of Den is a foraminiferous calcareous clay. This may once again indicate the utilization of raw materials from a similar geologic deposit with slight differences, particularly as the current sample shares affinity with Sample #8, which is related to Samples #4, #5, and #14. In fact, a single shale fragment in Sample #13 is very much like those in the latter three samples and the clay is similar to that for Sample #14.

3. Silty-shale Clay Group

This group has the most samples, nine, and comprises those with a silty and iron-rich clay often having shale inclusions that feature common silty quartz. Some of the shale inclusions are similar to those seen in the previous group. A jar assigned to either Ware Group 11 or 1 from Tomb U-j, Sample

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91 Pape 2001, 419, 423, 430.

92 2001, 433.

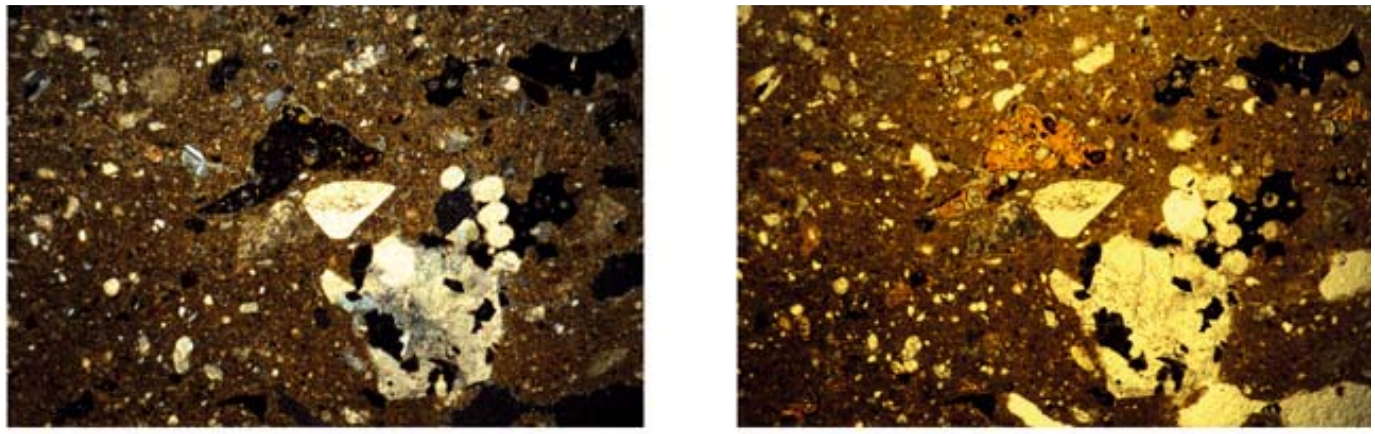
93 Porat and Goren 2001, 470, 475; 2002, 256, 261.

94 Hartung 2001, 120.

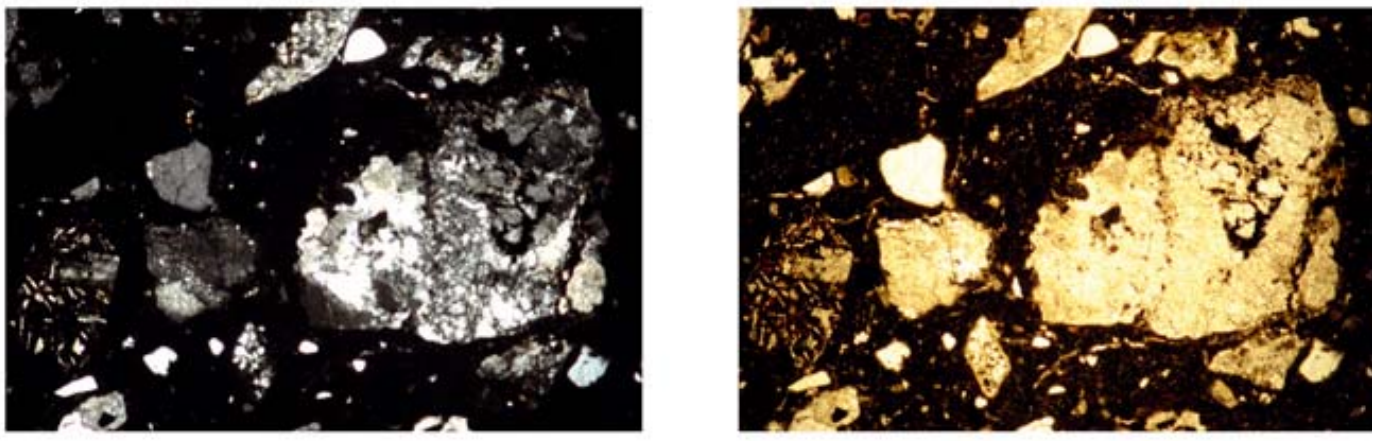
95 Pape 2001, 421, 431.

96 Porat and Goren 2001, 469, 474; 2002, 255, 260.

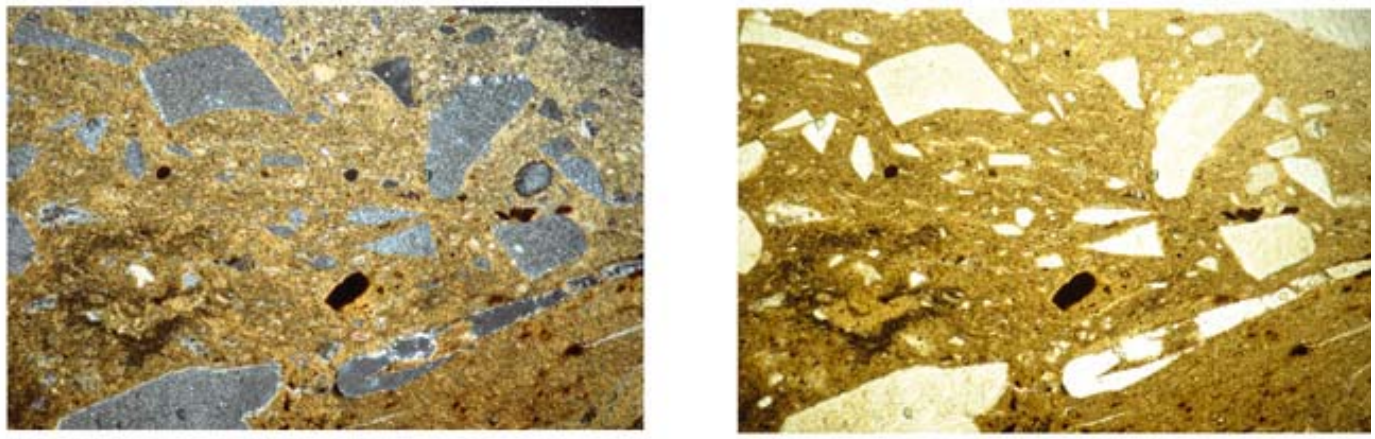
a)



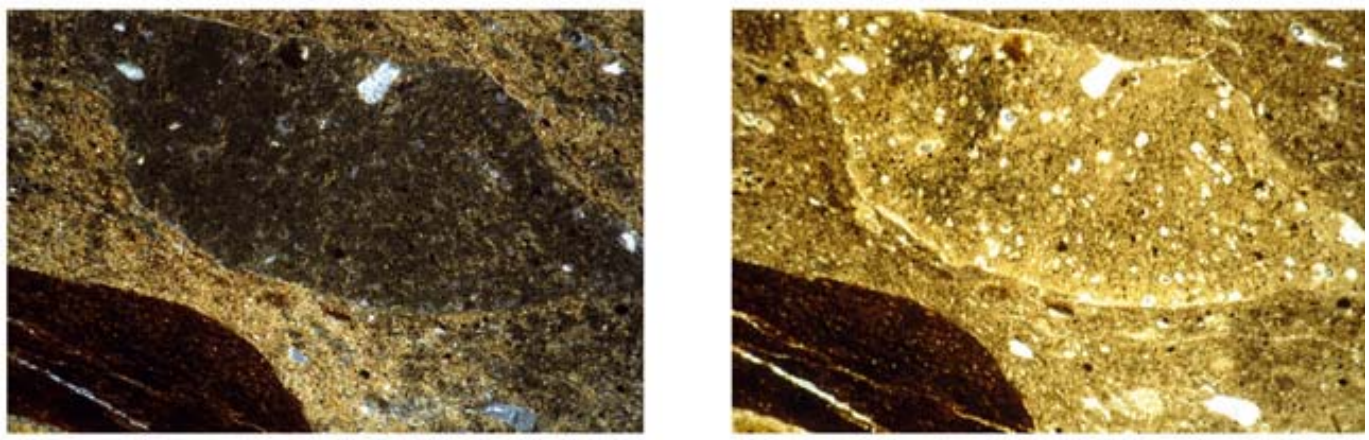
b)



c)



d)



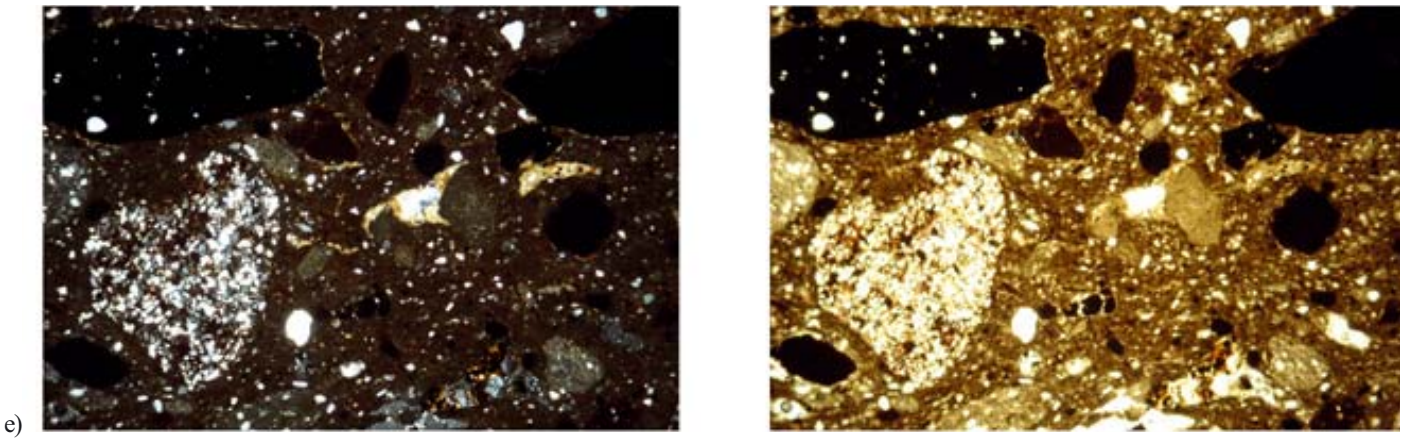


Fig. 18 Thin section images of samples representative of the clay groups. Image on the right is in plane polarized light, image on the left is in cross polarized light. Magnification is 100x.
a) Sample #3 from the Calcareous clay group – squat jar with handles from Tomb U-j
b) Sample #10 from the Shale clay group –Plain ware vessel from Cemetery B
c) Sample #4 from the Calcareous clay group – spouted jar from Tomb U-j
d) Sample #5 from the Shale clay group – a fragmentary vessel from Tomb U-134
e) Sample #18 from the Silty-shale clay group – Plain Burnished and Combed Ware vessel from the tomb of King Den

#2 (Fig. 4), has a shale-derived clay with common silty quartz.[97] Along with shale inclusions, most having silty quartz, are coarse-sized biogenic limestone fragments. Chert, biotite, amphibole, potassium, and plagioclase were rare inclusions. A single likely diorite fragment was identified. In fact, Porat and Goren[98] assigned this sample to the clayey-silty category with igneous temper. Pape[99] also identified some sericitized anorthoclase (potassium feldspar) and amphibole along with the iron-rich, silty clay and possibly Upper Cretaceous foraminifera.

Sample #6, a Combed Ware sherd of Fabric Ia from Tomb U-y (Figs. 6:1, 7:1), has an iron-rich shale-derived clay with no limestone. Rather, a few angular rhomb-shaped inclusions of anhydrite were in the paste; otherwise most of the inclusions were very fine to medium-sized quartz and feldspar. Some of the quartz and feldspar probably originates from sandstone as a single fragment with clay matrix, quartz, feldspar, and iron-rich oolites was seen. Quartz and feldspar may also have come from the intact shale fragments, although some of these fragments lacked such inclusions, particularly the more iron-rich ones. A number of the shale inclusions were analogous to some seen in Sample #14 (Fig. 14), from the tomb of Den. Sample #6 is slightly less silty than others in this group. Sample #7 from Cemetery B (Figs. 6:3, 7:3) has a shale-derived clay with silty quartz plus some fine to medium- sized quartz and feldspar. Most of the paste is iron-rich and closely resembles that in Sample #6, particularly the iron-rich shale fragments with or without quartz and feldspar inclusions. Rhomb-shaped anhydrite is absent but phosphate may be present. Although a similar sandstone fragment was not seen, a few fine sandy inclusions were noted. Sample #9 from Cemetery B (Figs. 6:2, 7:2) is also of Fabric Ia and is a Combed Ware jar. While there are iron-rich inclusions, some having silty quartz, the clay is more similar to Sample #11 (Fig. 12; see below). However, this sample lacks a calcareous component making it also similar to the two other sherds of Fabric Ia, although having less sand-sized quartz and feldspar. Few other inclusions were noted and all are likely natural to the clay deposit. This is reinforced by the presence of a large fragment of siltstone with a clay matrix, and a sandstone fragment with iron-rich clay matrix. The weathering of such siltstone and sandstone outcrops probably contributed quartz, feldspar, and clay to create the raw materials for these samples.

Five samples of classical EB II vessels are also in this group. Sample #11 (Fig. 12) is of silty clay with inclusions of shale, some of which also have silty quartz and others that have some calcareous inclusions. Most resembled the clay and suggest a

[97] Hartung 2001, 206.

[98] Porat and Goren 2001, 469, 475; 2002, 255, 261.

[99] Pape 2001, 429, 434, 440

deposit of eroding shale and siltstone as the source for the paste. Even the micritic and sparry limestone and few calcite inclusions are likely to be natural to the clay deposit. Some of the shale resembles that seen in Sample #14 (Fig. 14), also an EB II jar of Plain Net Burnished Ware, though this sample has little silty quartz and common dispersed micritic limestone. The clay is similar to that in Sample #9 and the presence of a siltstone fragment with clay matrix also links these two samples. Also comparable to Sample #9 is Sample #15 (Fig. 7:6), which has common silty quartz and feldspar along with a few iron-rich inclusions, some having silty quartz. Rare siltstone fragments mostly lack a matrix but the quartz and feldspar within them closely resemble those in the paste. Sample #18 appears related to Sample #6, a Combed Ware sherd, and to Sample #7, a Polished Ware sherd. The clay is fairly iron-rich with notable shale inclusions, some having silty quartz (Fig. 18e). Iron-rich shale fragments with and without silty quartz are also common. Micritic limestone was present though uncommon and one fragment had coarse-sized quartz. This sample also shares some affinity with Samples #9, #15, #19 and #20 (see below). Notable was a single possible volcanic rock fragment. Sample #19, a squat jar of the Red Burnished Ware (Fig. 13), has a shale-derived clay with common silty quartz and some iron-rich shale fragments. Some of the latter contain silty quartz. Notable are the rare inclusions of sandstone and siltstone rock fragments. These appear to be the source materials for the clay, quartz, and feldspar inclusions in the paste. A single fragment of limestone had quartz inclusions. Sample #20 (Fig. 16) is similar though the grain-sizes are slightly larger. This seems to relate to the siltstone fragments present in the paste that also have fine-sized quartz and feldspar. Thus, these inclusions could be termed fine sandstone. A fragment of sandstone is present with an iron-rich matrix and grains of quartz and feldspar. Shale fragments are common, being more noticeable than in the other samples in this group. Overall, the clay is slightly more iron-rich, though both Samples #19 and #20 are similar to Sample #9.

Sample #16, a juglet of the Plain Burnished Ware from the tomb of Den (Fig. 9), has a unique paste with common micritic limestone and sand-sized quartz with minor potassium feldspar. The clay does have an iron-rich component and could be shale-derived. Few other inclusions are present. The quartz and feldspar in some of the limestone may suggest it is related to Sample #18 (Fig. 10), which also has sand-sized quartz and feldspar in the clay.

Discussion

The petrographic analysis revealed that many of the samples were produced with a related set of raw materials, as noted by Porat and Goren.[100] Often this involved clay that appeared derived from eroding shale and either more or less amounts of silty-quartz from the shale or siltstone deposits. Sandstone and limestone were infrequent but significant inclusions that confirm the geologic environment for the source of raw materials was dominantly sedimentary. The rare volcanic grains and feldspars suggest a minor volcanic component may also be nearby. Other samples had a more calcareous clay with distinct inclusions of volcanic rocks. However, the shale and silty-shale clay groups are notable for their appearance from the Naqada IID period to the 1st Dynasty.

Imported Pottery in the tomb of Den

The analysis of the imported pottery in the tomb of Den revealed some variation in the raw materials utilized to produce vessels traditionally assigned to the classical 'Abydos Ware'. While the identification of inclusions with a hand lens would not call for a clear-cut distinction into groups, the petrographic analysis indicated four of the nine samples were made with a silty-shale clay, while three had a shale clay. Interestingly, similar ceramic styles fall into different clay groups, i.e. the calcareous and silty shale group. At the same time, a variety of styles seem to have been produced of similar raw materials. For example, the juglet T-aB/288 (#13, Figs. 15, 17:8) with a plain net-burnished surface had a shale clay with some quartz, while a jar T-aB/257 (#14, Figs. 14, 17:7) with a red net-burnished surface had a shale clay with a calcareous component.[101] Conversely, the samples in the silty-shale group, comprising most of the analyzed samples, could display different surface finishes. Two vessels display a red bur-

[100] Porat and Goren 2001, 479–480; 2002, 265–266.

[101] This decoration is typical for vessels otherwise subsumed under the term 'Metallic Ware'.

nished surface, jug T-KK/75 (Sample #11, Figs. 12, 17:5) and squat jar T-aB/283 (Sample #19, Figs. 13, 17:6). The surface of juglet T-aB/271 (Sample #18, Figs. 10, 17:3, 18e) was first combed and afterwards burnished, while squat jar T-aB/290 (Sample #20, Figs. 16, 17:9) displays a net burnished pattern above a combed surface. Further, most of the raw materials utilized for producing the EB I-II jars from the tomb of King Den found parallels in the earlier material from Tombs U-j, U-y, and Cemetery B.

The source of this clay is suggested to be the Lower Cretaceous formations found in the Levant that contain common sandstone, siltstone, and iron-rich shales with or without quartz.[102] Weathered volcanic inclusions, particularly Mesozoic basalts, can be present and the outcrops are adjacent to the highly calcareous Upper Cretaceous formations (Cenomanian-Turonian and Senonian-Paleocene). Thus, the sandstone, siltstone, glassy tuff, and volcanic rock fragments could be from the Lower Cretaceous deposits. The limestone seen in some samples, but mixed in with shale fragments, could be due to the erosion of the Upper Cretaceous outcrops along with the Lower Cretaceous formations creating a secondary deposit of clay. The rhomboidal anhydrite, which has replaced gypsum, noted in Sample #6 could be from Albian deposits within the Lower Cretaceous outcrops,[103] while phosphate is known from Upper Cretaceous deposits.[104] Chert is also available in the Senonian-Paleocene formations, but its addition is suggested to be from crushed rocks. Porat and Goren[105] noted this technological tradition in a few EB II vessels from Arad. It was also suggested to occur in Middle Bronze Age jars found at Memphis in Egypt that were assigned a provenance of the Akkar Plain in northern Lebanon.[106]

There is clearly a link here between the classical 'Abydos Ware' and what is called in the Levant 'Metallic Ware'. In fact, Porat and Goren[107] discuss this possibility but note that there are few similarities. The 'Metallic Ware' analyzed by Greenberg and Porat[108] was produced from shale and silty clays with some carbonate inclusions, siltstone, and weathered volcanic rock fragments. The latter are visually similar to the glassy tuff inclusions seen in Samples #10, #12, and #13. They also noted the muscovite in the clay and suggested it derived from the siltstone fragments, but did not seem to have samples with sandstone. In large part, the descriptions appear similar to most of the samples analyzed here. Greenberg and Porat[109] suggested Lower Cretaceous deposits in the Upper Galilee as the source for the raw materials due to similarities between contemporaneous Canaanite pottery and 'Metallic Ware'. Porat and Goren[110] noted that samples with a calcareous component in their Nubian assemblage clays were not similar to the 'Metallic Ware'. However, the more iron-rich samples lacking calcareous inclusions and associated with Lower Cretaceous deposits were correlated to the samples of Greenberg and Porat.[111] This is an important point as the current study suggests some links between samples with and without calcareous inclusions and views all of the shale and silty shale clay vessels as from a similar related set of raw materials. In fact, the petrographic descriptions provided here are related to those for Fabric pEBI noted by Badreshany for 'Metallic Ware' from the Beqa'a Valley and comprising approximately 50 % of the EB II-III assemblage in this area. Likewise, Fabric Group 1 from Sidon as described by Griffiths is comparable and was common in EB II-III strata from this site. This suggests a much broader distribution and possibly production of shale-derived clay pottery.[112] Analysis of additional samples of 'Metallic Ware', especially from Lebanon, would clarify the raw materials utilized and any differences that could relate to the area of production.

Similar raw materials were noted for two samples from 2nd Dynasty contexts at Helwan.[113] Sample Op.4/180 has some basalt inclusions and Sample P01-10 has limestone and sandstone. Both were linked to the Lower Cretaceous deposits and suggested to come from northern Lebanon. Further, there are similarities between the samples with silty shale clay and the EB II-III vessels of Fabric VI in Badreshany and Genz,[114] who connected

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102 Beydoun 1977, 328–329; Dubertret 1955, 18–30; Porat and Goren 2001, 476; 2002, 263.

103 Doummar 2005, 104, 159, 167.

104 Dubertret 1955, 29.

105 Porat and Goren 2001, 474; 2002, 260.

106 Ownby 2010, 131.

107 Porat and Goren 2001, 476; 2002, 261.

108 Greenberg and Porat 1996, 13–16.

109 Greenberg and Porat 1996, 16–18.

110 Porat and Goren 2001, 476; 2002, 261.

111 Porat and Goren 2001, 476; 2002, 263.

112 Badreshany 2013, 462–469; Griffiths 2006, 283–287.

113 Köhler and Ownby 2011.

114 2009, 355–356.

this to the 'Metallic Ware' of Greenberg and Porat (1996). Their pottery derived from the site of Tell Fadous-Kfarabida located north of Byblos. Local resources are more calcareous, so Fabric VI was suggested to be non-local. The most prominent outcrops of Lower and Upper Cretaceous deposits are present in the area around Beirut.[115] Additional exposures are to the north and can be variably accessed through wadis. This region is where the current set of samples and the samples from Helwan are suggested to derive. This coastal location would have facilitated export to Egypt and there were known ties to the area during the 1st Dynasty. However, it is likely that several areas along the northern Lebanese coast are potential sources, and comparison to raw materials is necessary to confirm the suggested provenance.

Imported Pottery from Cemetery B

The slightly earlier imported pottery found in Cemetery B was produced with similar raw materials. Specifically, a Polished Ware vessel (Sample #7) and a Combed Ware vessel (Sample #9) were made with a silty-shale clay, while another Polished Ware vessel (Sample #8) was produced with a shale clay containing quartz, likely from sandstone. In fact, a Combed Ware vessel from Tomb U-y (Sample #6) was also made with a silty-shale clay, but probably dates to the early Naqada IIIB period. All of these samples bear some resemblance to the raw materials used to produce the samples from the tomb of King Den. This suggests long-term exploitation of the Lower Cretaceous deposits for pottery production, an idea supported by the use of similar raw materials for two of the vessels from Tomb U-j dated to the Naqada IIIA period. The Plain Ware vessel (Sample #10) from Cemetery B with igneous inclusions is similar to Sample #1 also from Tomb U-j further supporting the suggestion that the earlier Tomb U-j vessels and the slightly later Cemetery B vessels were made in a similar area. The provenance of the latter will be discussed below, but for those produced of Lower Cretaceous deposits, a source in northern Lebanon is suggested.

Twenty-one samples of mostly Combed Ware vessels of the Old Kingdom from Giza have also been examined petrographically.[116] The results suggested that fourteen were likely to be from coastal Lebanon; however, most appeared made with a clay derived from the erosion of limestone outcrops (i.e. rendzina) rather than exclusively Lower Cretaceous deposits. Two samples had inclusions more indicative of the Lower Cretaceous outcrops but with common quartz, limestone, and chert suggesting some mixing of materials in a secondary deposit from Lower and Upper Cretaceous (i.e., limestone) outcrops. This would make them dissimilar to the examples analyzed here that are of much earlier date. Sowada[117] noted that the distribution of Combed Ware covers the area of the northern to the southern Levant. Further, several scientific studies of this ware suggest that the Egyptian samples derived from areas in Palestine and Lebanon, specifically near Byblos.[118]

Imported pottery from Tombs U-j and U-134

Clearly, the imported vessels in Tomb U-j were manufactured with raw materials that were similar to those later utilized for producing Plain Ware, Combed Ware, Polished Ware, and other classical 'Abydos Ware' vessels. This indicates a similar source for all of the vessels but with some variation in the available raw materials. Sample #2 has a silty-shale clay likely related to Lower Cretaceous deposits and thus possibly from northern Lebanon. The spouted jar, Sample #4, and Sample #5 from Tomb U-134 both had a shale clay suggestive of the Lower Cretaceous formations. The angular chert fragments in Sample #4, which may have been intentionally added, could have come from the Upper Cretaceous Cenomanian-Turonian and Senonian deposits that contain chert.[119] Both samples could have been made with raw materials available in northern Lebanon.

While a shale-derived non-calcareous clay was used to produce Sample #1, the inclusions of granite to diorite, basalt, and andesite are unusual. A similar paste was used to produce Sample #10, a Plain Ware vessel from Cemetery B. Notably, the basalt fragments are not similar to those in the samples suggested to have been made with raw materials from the Lower Cretaceous formations. Rather they have a porphyritic texture with iron-rich matrix and large plagioclase grains but few

115 See map Badreshany 2013, 466.
116 Wodzinska and Ownby 2011.
117 2009, 155.
118 Sowada 2009, 156, 167–179.
119 Beydoun 1977, 329, 332–333.

other inclusions. One diorite fragment appears to have an attached piece of andesite suggesting a common origin for both. The granite shows some cataclastic textures indicative of possible metamorphic pressure. The clusters of epidote may support this suggestion as these can be the result of hydrothermal alteration of igneous rocks. These two jars were likely produced in an area with some metamorphic alteration, intermediate plutonic and volcanic rocks, and sedimentary deposits that included shale. In fact, diorite can form above a subduction zone due to partial melting of mafic rocks. This could explain the cataclastic textures and also the weathering suggested by the altered plagioclase, gypsum/anhydrite, and epidote. Alternatively, an area where a magma of intermediate composition extruded volcanic rocks but also was present as a dike creating coarser-grained diorite to granite is a possibility. The dike then could have undergone pressure resulting in the cataclastic textures of the igneous rocks with subsequent weathering. Shales are common in Lower Cretaceous deposits but diorite and andesite are notably rare. There are some Lower Cretaceous mafic volcanic rocks, however. In fact, Sample #2, also a jar from Tomb U-j, contained a likely igneous rock fragment (and was classified as such by Porat and Goren[120]) and a silty-shale clay suggested to derive from the Lower Cretaceous deposits. Thus, Samples #1 and #10 may have been made in an area in Lebanon with Lower Cretaceous shale and volcanic rocks, and possible reworked older igneous sediments. Older Jurassic volcanic rocks should also be considered and in the area of Beirut, Cretaceous and Jurassic formations are placed unconformably revealing more of the Jurassic deposits.[121] Igneous rocks are also exposed at the southern end of the Jordan Valley, but here the Lower Cretaceous shale formation is rarely exposed. Much more research is required to to identify the provenance of these vessels.

The squat jar with handles, Sample #3, consisted of a calcareous clay with foraminifera, basalt/diabase and glassy vesicular basalt fragments. The fresh appearance of these volcanic grains may suggest they derive from Neogene deposits located near calcareous outcrops.[122] Neogene calcareous formations containing benthic and other foraminifera are present in northern Lebanon where Neogene volcanic deposits are also found including basalt and diabase.[123] Thus, these samples may be from the northern part of Lebanon along the Akkar Plain. Identification of the foraminifera species would confirm rather the calcareous clay was from the Neogene or Upper Cretaceous formations. The latter mostly lack volcanic inclusions. Of note, Sample #3 was assigned to the Lower Galilee by Porat and Goren.[124] A few areas in this region do have an association of Upper Cretaceous calcareous deposits and Pliocene basalt and volcaniclastic material, therefore, comparisons would need to be made between raw materials in the Lower Galilee and northern Lebanese Neogene deposits.[125] A similar paste was used to make only one other vessel, Sample #12 a LFPW-julget (Figs. 8, 17:1) from the tomb of Den signifying some continuity in the use of these raw materials. The paste of jug T-aB/251 (#17, Figs. 11, 17:4) may be related though with very little volcanic inclusions or calcite. The broad distribution of calcareous Upper Cretaceous deposits means that the origin of this sample is also difficult to specify precisely, though the basalt inclusion could indicate either northern Lebanon or the Lower Galilee area.

While Sample #3 was suggested by Porat and Goren[126] to be of "*Canaanite origin"*, Sample #4 was assigned as "*probably not Canaanite*", and Samples #1 and #2 were classified as "*definitely not Canaanite*". Rather, they suggested the vessels had been made from raw materials derived from the Wadi Qena in Upper Egypt.[127] The geology of the Wadi Qena does include rare shale outcrops of Upper Cretaceous date along with more extensive deposits of Upper Cretaceous Nubian Sandstone.[128] Lower Cretaceous volcanic rocks such as basalt and andesite are not present in this area. Fifty kilometers from the Nile Valley are found Precambrian granite, granodiorite and adamellite along with Precambrian biotite gneiss, psammitic hornblende, and migmatite. In a few places Precambrian metavolcanics crop out comprising metamorphosed rhyolite, dacite, andesite, basalt and pyroclastics. The weathering of these outcrops would produce a

120 Porat and Goren 2001, 472; 2002, 258.
121 Dubertret 1955, 22.
122 Dubertret 1955, 40.
123 Beydoun 1977, 322, 326, 328.
124 Porat and Goren 2001, 477; 2002, 263.
125 Abdel-Rahman and Nassar 2004, 548–549.
126 Porat and Goren 2001, 477–479; 2002, 263–265.
127 Porat and Goren 2001, 479–280; 2002, 265–266.
128 Said 1962.

broad mix of rock types and would need to travel some distance to reach places where shale and sandstone are present. The Abydos samples in this study with volcanic rocks would not match the metavolcanics in the Wadi Qena. The two samples with igneous rocks and andesite would also not find a comparison with the Precambrian formations in this part of Egypt. Finally, the silty shale and shale clay group is less likely to be from Wadi Qena as siltstone and shale are uncommon and most of the exposed Upper Cretaceous and Pliocene deposits are calcareous. Further, due to the history of the Tethys Sea, shale is common in the south and siltstone in north but there are few areas where they are associated. Rather, shale is often found with sandstone. Nevertheless, there are examples of shale-derived clay being utilized to produce local Egyptian pottery, particularly in the Predynastic.[129] However, there is little silty quartz or sandstone in these samples and their appearance is dissimilar to the samples analyzed in this study. Only through raw material sampling in this area and the purposed areas of Lebanon can a clear idea of provenance be attained.

Several statements by Porat and Goren[130] on Predynastic imports have proven true based on the results of the current analysis, 1) a single area of production using related raw materials is highly likely; and 2) this area was not in Palestine (except for possibly Sample #3). While three petrographic analyses performed on the material from Tomb U-j all identified the same clays and inclusions, the interpretation of their origin is what varies. Establishing a provenance for samples through petrographic analysis relies mostly on indirect evidence using geologic maps and published reports. This information can change over time as more work is conducted in an area. Further, additional archaeological and ceramic evidence can be acquired that suggests other areas are more promising as production locations. As more knowledge is gained, petrographic interpretations may change.

Part III – Conclusions

Although this sample of 20 imported Levantine EB I-II pottery vessels from Abydos–Umm el-Qaab only represents a tiny fraction of the hundreds of imported vessels from this site, it opens up new avenues of research and indeed encourages more scientific analysis and interpretation of such imported material in Pre-, Proto- and Early Dynastic Egypt.

What is important is that these samples stretch over a period of some 400 years, from the late Predynastic Period (Tombs U-134 and U-j), via the Proto-Dynastic Period and early 1st Dynasty in Cemetery B, and up to the tomb of King Den of the middle of the 1st Dynasty, i.e. between ca. 3350–2950 B.C.E. Across these phases, the samples fall into distinct groups, but all phases share at least one of the three petrographic groups, i.e. the silty shale group, whilst the calcareous volcanic group occurs in the earliest and latest set of samples. This would strongly suggest that there is a degree of chronological continuity on the one hand and inherent heterogeneity within one period, on the other. This can be illustrated with the imports from the tomb of King Den; the different kinds of wares, which have been classified largely on the basis of surface treatments, sometimes share the same petrographic group suggesting that different ceramic styles were produced in the same area. Conversely, the same ware, such as Red Burnished Ware, is represented by different petrographic clay groups, i.e. the silty shale and calcareous group, meaning that the same style of pottery was sometimes made of different raw materials.

Another important aspect to consider is that in the Predynastic Period, wine seems to have been the main commodity transported in the imported vessels until the Egyptians discovered wine making for themselves in the Proto-Dynastic Period. However, this did not end trade relations with the Levant, since other commodities, i.e. resin, oils or other fatty liquids, probably replaced wine as a predominant imported commodity suggesting that the drive to maintain contacts with Egypt was strong.

Even though many of the vessel shapes discussed in this paper find archaeological parallels in southern Levantine EB Ib and EB II assemblages it is interesting to note that recent excavations in early EB layers in the northern Levant have also yielded useful local parallels, both in shape and in surface treatments.[131] This is supported by the petrographic analysis which places the silty shale group

[129] Ownby in press; Ownby 2014, 221.

[130] Porat and Goren 2001, 480–481; 2002, 266–267.

[131] E.g. at Tell Arqa, strata 20 and 21. Pers. comm. Jean-Paul Thalmann. And see Köhler and Thalmann 2014, Figs.11–15. Also EB II material from Tell Fadous Kfarabida, cf. Genz 2010, Fig.12; 2014: 71, Fig.7, although Phase II is still not well exposed. See also Badreshany 2013 for a recent summary of EB II-III pottery in Lebanon.

near the Lower Cretaceous outcrops in northern Lebanon. The petrographic analysis of this particular material therefore is significant for two reasons; firstly because it documents that these ceramic imports of different qualities and obvious heterogeneity are made from quite similar raw material and thus originate in the same wider region, i.e. probably the northern Levant. That is in itself not a new discovery since 4th Millennium early Predynastic Egyptian interconnections with Byblos or its environs have been considered for some time, based primarily on timber, resin, ivory objects and other exotic materials.[132] A possible central Levantine origin has also long been considered for certain vessel types of the EB II imports, in particular for the polished jars and juglets.[133] But the focus has always been more strongly directed upon the south, especially in recent years, which may be due to several reasons. One is probably that a close relationship has been established petrographically between 'Abydos Ware' and 'Metallic Ware'[134] and that the latter has long been regarded as a southern Levantine product being manufactured in the region of the Golan Heights and Mount Hermon.[135] The other reason is that a strong Egyptian influence has been detected at numerous EB Ib southern Levantine sites suggesting that contacts between that region and the Nile Valley were close. Nevertheless, more recent research on Lebanese material supports the notion that 'Metallic Ware', or EB II–III Lower Cretaceous shale derived ceramic wares, was not only manufactured in northern Palestine but also across much of central and northern Lebanon, where Lower Cretaceaous outcrops occur, and especially along the Biqa^{c} plain.[136] The wide distribution of this material across the Levant suggests that such shale derived pottery was manufactured in highly specialized and centralized industries indicating reasonably complex socio-economic structures and economic networks that would help to explain the large number of vessels exported, at least in EB II–III.[137]

Our study provides more clarity and scientific substantiation to the suggestion that from the late Naqada II period onwards, i.e. about half a millennium prior to the start of the Old Kingdom, interregional contacts between Egypt, and the southern and northern Levant were close and regular and that the southern Levant was clearly not the only, or not the chief exchange partner. Our investigation has also brought a solution to the problem about the nature of those EB Ib imports from Tomb U-j, where a southern origin could not be demonstrated. As Porat and Goren had pointed out "*the great majority of the so-called Canaanite ceramic assemblage from Tomb U-j in Abydos was not imported from Canaan"*,[138] with which we fully agree. But they are clearly not of Egyptian manufacture and instead likely point to the northern coast of Lebanon.

This would allow for the suggestion that the contacts with the north were direct and via the sea, likely related to the early trade in timber, and that intermediaries were possibly not necessary.[139] It raises the question what role the southern Levantine EB Ib–EB II sites with strong Egyptian influence have really played in facilitating this contact. For example Beth Yerah, a site in the Galilee, has been discussed as a possible early Egyptian entrepôt for the trade in commodities such as resin and oil acquired from the north and transported in 'Metallic Ware' jars.[140] Some would even go as far as to say that the early Egyptian state maintained more than just trading posts, but colonies in the south during EB Ib, i.e. the late Predynastic and early Proto-Dynastic Period, and that parts of the southern Levant were an 'Egyptian colonial territory'.[141] There is no doubt that Egyptian influence was significant in this region[142], but it is also necessary to remember that at this time, there was no single territorial state system or entity in the Nile Valley, but several, probably competing regional polities.[143] From an Egyptian perspective, it is necessary to consider that these regional and still

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132 Prag 1986; Hartung 2001, 245–388; de Miroschedji 2002; Braun and van den Brink 2008; Hartung 2014.

133 Wright 1937; Henessy and Millet 1963; Henessy 1967; Esse and Hopke 1986; Kantor 1992.

134 Cf. Esse 1991; Greenberg and Porat 1996; Porat and Adams 1996; Braun 2010, 28.

135 Porat and Adams 1996; Porat and Goren 2001, 466; Porat and Goren 2002; Greenberg and Eisenberg 2002 and most recently Miroshedji 2014, 320.

136 Badreshany and Genz 2009; Badreshany 2013, 263, 462, Fig.5.5.

137 Badreshany 2013, 591.

138 Porat and Goren 2002, 267.

139 See also Köhler and Thalmann 2014, 191.

140 Cf. Greenberg and Eisenberg 2002; Sowada 2009, 52.

141 Miroshedji 2002; 2014, 212. See also Wilkinson 1999, 152–155.

142 Hartung 2001, 385–388; 2014.

143 Campagno 2002; Köhler 2010.

developing state polities had their own logistical challenges to overcome. Consideration of a variety of interpretive avenues, in addition to a colonial state enterprise in the southern Levant, is therefore prudent.[144] As much as the picture about the socio-economic circumstances and possible origins of commodities exported from the Levant is proving to be rather complex, also the political and socio-economic situation in the Nile Valley has to be regarded as in constant flux during the Pre-, Proto- and Early Dynastic Periods and following a variety of narratives.

This exchange certainly had its ups and downs, the ups being the early Naqada III period as measured by the hundreds of imported vessels in Cemetery U as well as the royal tombs of the 1st Dynasty. The downs being the Proto-Dynastic Period and the 2nd and 3rd Dynasty, although contacts never entirely ceased. It would probably be naive to measure the level of intensity of contacts on the basis of vessel counts alone because there does seem to be a general relation between tomb size (i.e. wealth of the owner) and number of vessels, at least for the time until the end of the 1st Dynasty. This explains the large quantities of imported vessels in the Memphite region due to the high concentration of very large and very well-equipped elite tombs in the area.[145] There is possibly also a relation between the length of a king's reign and the number of vessels from that king's reign, given that King Den probably ruled for at least 30, possibly even more than 40 years, and that his tomb contained very many imported vessels.[146] The death of a king and his burial would have resulted in the removal of a large portion of ceramic containers from the economic distribution circuit. The current estimate for the length of the 1st Dynasty should also be considered in this contexts as the eight kings of that dynasty probably ruled for some 200 years;[147] a long time span over which a lot of material could have been imported. However, almost the same could be said about the 2nd Dynasty kings, except that their tombs produced hardly any imported vessels.[148] But there are too many unknowns in this equation, because several 2nd and 3rd Dynasty royal tombs are poorly investigated, and indeed still missing. There is no obvious reason why contacts with the Levant should have suddenly ceased because many of the kings of the 2nd Dynasty also had long and stable reigns and very large, monumental tombs, suggesting economic wealth and buying power. Also, imported Levantine vessels were deposited in non-elite tombs until at least the middle of the 2nd Dynasty, indicating that the exchange networks were operational.

What is also still unsolved to this day is the question, what exactly the Nile Valley merchants could offer in exchange for northern Levantine goods, given that there are so few early Egyptian imports in the archaeological record of the north.[149] More research is necessary to investigate all these questions and the authors hope to pursue these in the near future on a much broader basis.

144 Hartung 2013a, 25–27.

145 E.g. Emery 1938–1961; Saad 1951, pl.LXXII:19–21. It is worth noting that not all of the previously published Levantine style vessels from early Memphite tombs are necessarily imported, see Köhler and Ownby 2011.

146 Nakano 1998; but see also Müller 2014.

147 cf. Köhler 2013; Dee *et al.* 2013.

148 The most recent publication on the tomb of Ninetjer in Saqqara by C. Lacher-Raschdorf (2014) does not mention any imported pottery.

149 Badreshany 2013, 578.

Table 2 – Overview of samples discussed in this study in chronological order of contexts

Fig.	Provenance	Sample/Field/ Vessel Number	Short Description	Petrographic group	Probable date
4 5 18d	Abydos, U-134	#5 134/12; Hartung No. 437	Lower part of a globular jar; Ware group 8	Shale	Naqada IID
3 5	Abydos, U-j	#1 U-j 12/18; Hartung No. 238	Ovoid jar; Ware group 2	Shale igneous	Naqada IIIA1
4 5	Abydos, U-j	#2 U-j 10/64; Hartung No. 449	Globular jar with vertical handles and painted decoration (vertical stripes); Ware group 11 or 1	Silty shale	Naqada IIIA1
4 5 18b	Abydos, U-j	#3 U-j 12/11; Hartung No. 428	Globular jar with vertical handles and painted red stripe decoration; Ware group 7	Calcareous volcanic	Naqada IIIA1
3 5 18c	Abydos, U-j	#4 U-j 10/69; Hartung No. 154	Spouted jar with vertical handles and flimsy painted red stripe decoration; Ware group 1	Shale chert	Naqada IIIA1
6:1 7:1	Abydos, U-y	#6 U-y/1; Hartung 2001 No. 457	Base and rim fragments of a squat jar with flat base, restricted rim, vertical handles and combed surface; Fabric Ia	Silty shale	Early Naqada IIIB
6:2 7:2	Abydos Cemetery B	#9 BS-11	Base fragments of a jar with flat base and combed surface; Fabric Ia	Silty shale	Dynasty 0/ early Dynasty 1
6:3 7:3	Abydos Cemetery B	#7 BS-2	Fragments of a small squat jar with flat base, cylindrical neck, multiple vertical handles and streaky polished surface; Fabric Ia	Silty shale	early Dynasty 1
6:4 7:4	Abydos Cemetery B	#8 BS-8	Base fragment of a jar with flat base, streaky polished surface and pre-firing potmark; Fabric Ic	Shale quartz	Dynasty 0/ early Dynasty 1
6:5 7:5 16b	Abydos Cemetery B	#10 BS-14	Base fragments of an ovoid jar with flat base and wet-smoothed surface; Fabric Ib	Shale igneous	Dynasty 0
7:6	Abydos, Tomb of Djer	#15 O-(1), O-KK-NO.3	Base fragments of an ovoid jar with flat base, vertical handle, orange-red slip and irregularly burnished surface	Silty shale	Early Dynasty 1
12 17:5	Abydos, Tomb of Den	#11 T-KK/75	Fragments of a globular juglet; red burnished	Silty shale	Dynasty 1
8 17:1	Abydos, Tomb of Den	#12 T-W/71	Base fragment of a juglet with burnished surface, Light Faced Burnished Ware	Calcareous volcanic	Dynasty 1
15 17:8	Abydos, Tomb of Den	#13 T-aB/288	Fragments of a juglet; plain net burnished	Shale quartz	Dynasty 1
14 17:7	Abydos, Tomb of Den	#14 T-aB/257	Fragments of a jar; red net burnished	Shale	Dynasty 1
9 17:2	Abydos, Tomb of Den	#16 T-aB/253	Base fragment of a jug with burnished surface; plain burnished	Shale? sandy	Dynasty 1
11 17:4	Abydos, Tomb of Den	#17 T-aB/251	Fragments of a juglet; red burnished	Calcareous	Dynasty 1
10 17:3 18e	Abydos, Tomb of Den	#18 T-aB/271	Fragments of a juglet with small lug handles; plain burnished and combed ware	Silty shale	Dynasty 1
13 17:6	Abydos, Tomb of Den	#19 T-aB/283	Fragments of a squat jar; red burnished	Silty shale	Dynasty 1
16 17:9	Abydos, Tomb of Den	#20 T-aB/290	Base fragment of a squat jar with burnished surface; plain net burnished and combed	Silty shale	Dynasty 1

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