DRINKING ON THE PERIPHERY: THE TELL NEBI MEND GOBLETS IN THEIR REGIONAL AND ARCHAEOMETRIC CONTEXT

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Abstract

This paper explores the late 3rd millennium BC goblet corpus from Tell Nebi Mend in the upper Orontes Valley, Syria, by comparing the form, size, petrographic and chemical composition of these drinking vessels. The available evidence suggests that Tell Nebi Mend belongs to its own distinct ceramic–culture province, which shares a greater affinity with the Beqa‘ Valley and the Black Wheel–made Ware of the southern Levant than with the traditional heartland of the Syrian ‘Caliciform’ culture.

Keywords: Early Bronze Age IV, Goblets, Caliciform, Archaeometry, Orontes.

Introduction

Along with the rise of urbanism and the northern Levant’s first large, regional polities (Matthiae 1993), one of the most characteristic features of the 3rd millennium BC is the sudden and widespread distribution of drinking paraphernalia, in particular “goblets” and “teapots” (Mazzoni 1994). These mass–produced vessels have been discussed extensively in regards to their form, chronology and distribution (Al–Maqdissi 1987; Bechar 2015; Bunimovitz and Greenberg 2004; 2006; D’Andrea 2015; Kennedy 2015a; Mazzoni 1985; 1994; 2002; Sala 2012; Welton and Cooper 2014). However, discussions have frequently omitted the upper Orontes, the Beqa‘ and northern Lebanon, due to the rarity of published stratified sequences from these regions. One exception is the site of the Tell Nebi Mend.[1] Recent analysis of the Nebi Mend sequence suggests that its goblet assemblage and cultural horizon differed

[1] One of the other complete sequences to be published is Tell Arqa on the Akkar Plain of, although ‘Grey Ware’ Caliciform vessels appear to be rare at this site (Thalmann 2006)

considerably from both the central and lower Orontes and the Ebla *chora*, the heartland of the Syrian 'Caliciform' tradition (Kennedy 2015a: 198–205). The identification of a new and distinct goblet culture or horizon within the northern and central Levant suggests that the ceramic landscape was distinguished by a number of regional variants and expressions, with each of these potentially indicative of specific areas of cultural interaction and influence. These cultural "provinces" or spheres of association, shed light upon the varying trajectories of urban development and the cultural and economic interactions between the northern and southern Levant during the terminal centuries of the 3rd millennium BC; the goblet culture of the upper Orontes, the Beqa' and northern Lebanon (Fadous–Kfarabida/Tell Arqa) may mark a cultural boundary or interface between the northern and southern Levant.

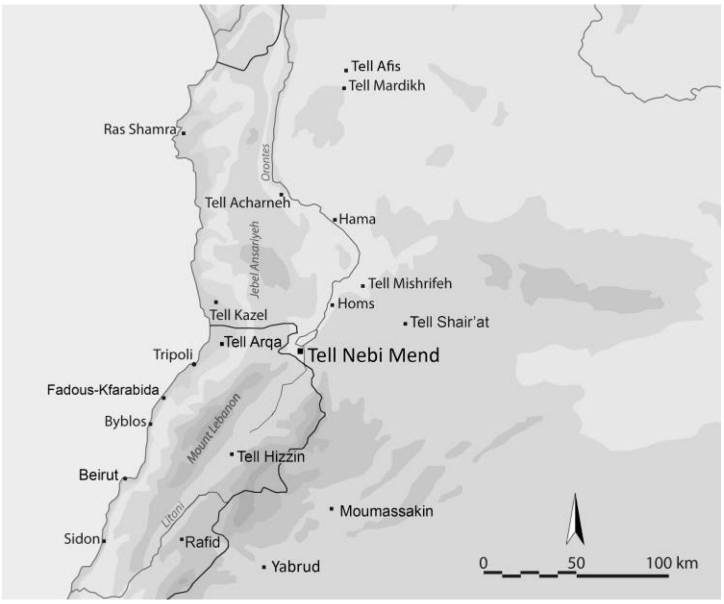

Figure 1. Map of Central and Southern Syria and the Lebanon.

Tell Nebi Mend

The 10 ha site of Tell Nebi Mend (henceforth TNM), ancient Qadesh on the Orontes, is located approximately 30 km south–west of Homs, at the confluence of the Orontes River and its major tributary, the Mukadiyah (Parr 1983: 100; **Figure 1**). The site is characterised by an upper and lower *tell* (Parr 1983: 100). The upper *tell* measures approximately 450 x 200 m at its base, and rises 30 m above the alluvium. The lower *tell* lies to the south of the main mound, rising 7 m above the plain (Parr 1983: 102; **Figure 2**). The site is also strategically located at the south–eastern end of the "Homs–Tripoli Gap", the major east–west route from the Mediterranean to inland Syria (Kennedy 2015a: 38). This pass is one of the few natural access routes through the Anti–Lebanon range, functioning as a key conduit for interaction between the coastal and inland zones throughout antiquity (Akkermans and Schwartz 2003: 4).

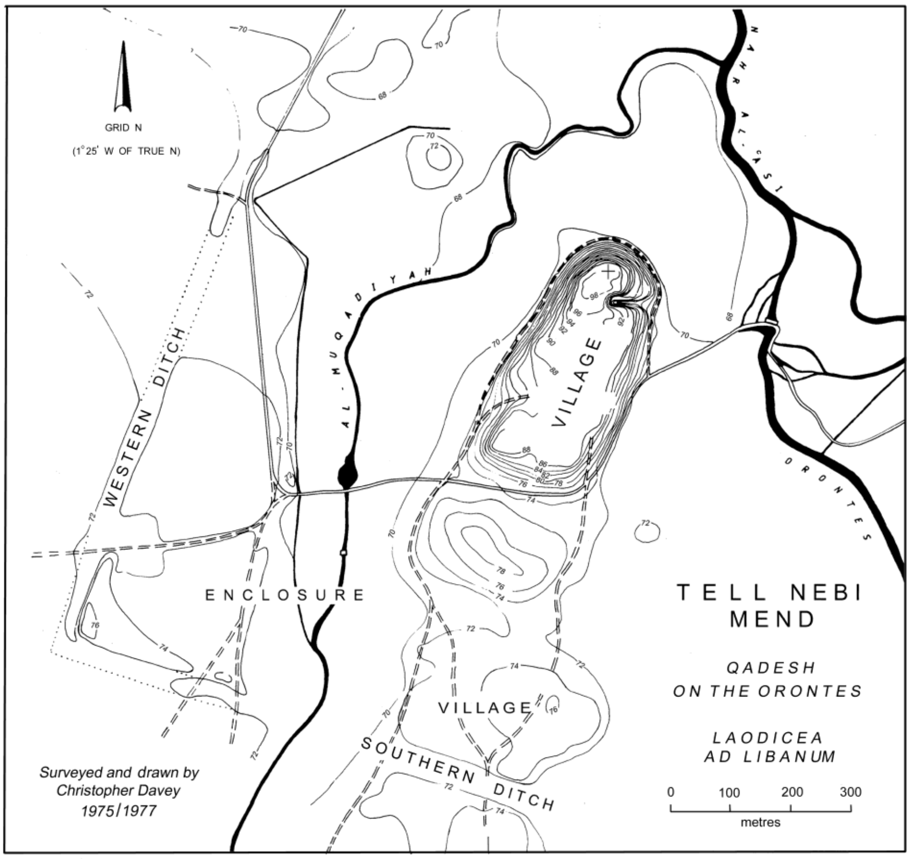

Figure 2. Plan of Tell Nebi Mend.

Maurice Pézard (Louvre) was the first to excavate TNM in the early 1920s (Pézard 1931). Pézard's excavations concentrated on the north–eastern extent of the *tell* (*Tranche A* and *B*), revealing occupational evidence from the Byzantine through to the early Middle Bronze Age (Pézard 1931: 4–11). The site then lay abandoned until 1975 when Peter J. Parr resumed excavations for the Institute of Archaeology, University College London. Excavations under Parr continued largely uninterrupted until 1995 (Parr 1983; Kennedy 2015a: 39). The British excavations concentrated on two main areas. The first area comprised of Trenches I, II, V and VIII, with these positioned on the north–eastern slopes of the *tell*. The second area incorporated Trench III and was located on the western side of the mound, in an area previously unexplored (Kennedy 2015a: 39–40; **Figure 3**). Third millennium BC deposits have been encountered in Trenches I, III and VIII. However, this paper will focus only upon the lower deposits of Trench I, beneath the MB II city–wall (Pézard's Mur X or Wall I of the British excavations) first exposed by Pézard and later explored by Parr between 1988 and 1995 (Kennedy 2015a: 40). Trench I is the focus of this paper, as it has revealed the most extensive and complete late Third Millennium BC sequence. The corresponding phases in Trenches III and VIII were truncated by a number of MBA pits and other intrusive features, complicating stratigraphic discussions and correlations of this material at present.

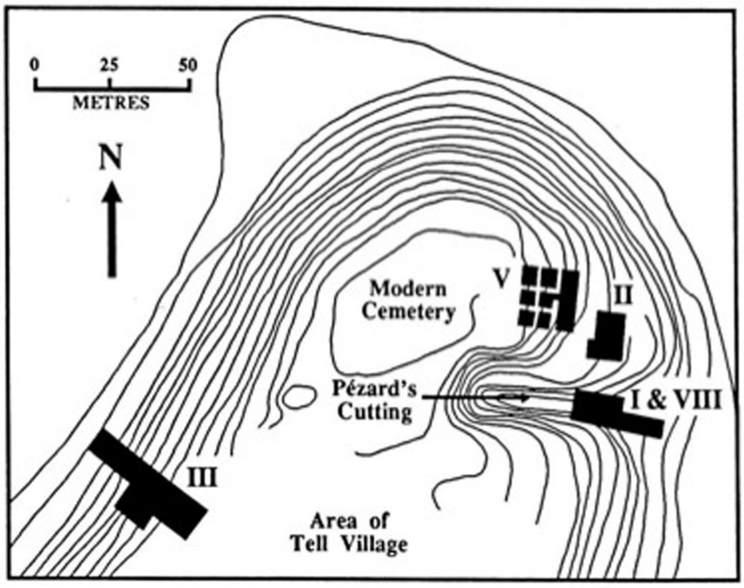

Figure 3. Location of Trenches I, III and VIII at Tell Nebi Mend.

Tell Nebi Mend Trench I Stratigraphic Sequence

Trench I is a 15 x 15 m exposure located directly beneath Pézard's *Tranche A*. The trench was designed to investigate the MB II city–wall and the underlying deposits of occupation (Kennedy 2015a: 40). These contexts were excavated over the course of the 1988, 1990, 1992 and 1995 field seasons (Kennedy 2015a: 41). Analysis of the Trench I pre–city wall sequence has revealed eight architectural/structural phases, dating from the MB I through to the EB III or EB II–III transition. These phases have been labelled, Phases K to R, in order to integrate them with Stephen Bourke's 2nd millennium BC Trench I sequence (Kennedy 2015a: 41; **Table 1**). This periodization differs from the recently published volume on the Neolithic (Parr 2015).

Phase K, represents the latest phase in the pre city–wall sequence and Phase R the earliest (Kennedy 2015a: 40). Excavations in the adjacent Trench VIII revealed earlier horizons of occupation dating to the early Ceramic Neolithic, between the 8th and 7th millennia BC, through to the MB I (Mathias and Parr 2015: 47). Phases Q to L are most relevant to the current discussion, with the earliest extant goblet examples recovered from the EB III contexts of Phases Q, P and O.[2]

TNM Phase	Periodization
Phase A	Late Bronze Age IIB
Phase B	Late Bronze Age IIB
Phase C	Late Bronze Age IIA
Phase D	Late Bronze Age IIA
Phase E	Late Bronze I–IIA Age Transition
Phase F	Late Bronze Age I
Phase G	Middle Bronze Age II–Late Bronze Age I Transition
Phase H	Middle Bronze Age II (Late)
Phase I	Not Utilised
Phase J	Middle Bronze Age II (Early)
Phase K	**Middle Bronze Age I**
Phase L	**Early Bronze–Middle Bronze Age Transition**
Phase M	**Early Bronze Age IVB**
Phase N	**Early Bronze Age IVA**
Phase O	**Early Bronze Age III–IV Transition**
Phase P	**Early Bronze Age III**
Phase Q	**Early Bronze Age III**
Phase R	Early Bronze Age III–II Transition/Early Bronze Age II

Table 1: Tell Nebi Mend Trench I Phasing: LBA to the EBA.[3] Phases highlighted in grey are most relevant to the current study.

The Tell Nebi Mend Goblet Corpus

Chronological of Development of the Tell Nebi Mend Goblets

Chronologically, the TNM Trench I goblet corpus has a relatively wide stratigraphic distribution, with examples of this class identified between Phases Q (EB III) and K (MB I). The earliest instances of this type were recovered from Phases Q and P (EB III). These examples account for approximately 2% of the overall goblet

[2] For a more in depth discussion of the stratigraphy of Trench I see Kennedy 2015a: 38–67. It should be noted that the Tell Nebi Mend excavations used Kenyon's locus/level system for stratigraphic recording see Parr (2015: 25–26) for a more detailed explanation of this recording system.
[3] This periodization is based on the stratigraphic and ceramic analysis presented in Bourke 1991, 1993 and Kennedy 2015a. This phasing differs somewhat from that presented by Parr (2015), this is due to the fact that this phasing can be considered the 'local' phasing of the Trench I sequence. It should also be noted that the upper deposits of Trench VIII were heavily disturbed, making precise stratigraphic correlations between the two trenches complex.

corpus and may perhaps be intrusive, as Phases Q and P were heavily truncated by numerous large refuse pits cut from the EB III–IV transitional horizon of Phase O. Instances of this class increased significantly during Phase O, with approximately 17% of the Trench I goblet assemblage recovered from this horizon. Interestingly, examples appear to have declined somewhat during the EB IVA (Phase N), with approximately 13% of the corpus recovered from depositional contexts associated with this horizon (Trench I). However, the onset of Phase M and the EB IVB marked the zenith of this class, with approximately 53% of the goblet corpus identified within this stratum. Instances then declined steadily during the terminal EB IVB (Phase L) and early MB I (Phase K), with approximately 10% and 5% of the goblet assemblage (respectively) recovered from these phases. In total, 160 diagnostic (rims; MNV) examples of this tradition were recovered from Trench I at TNM.

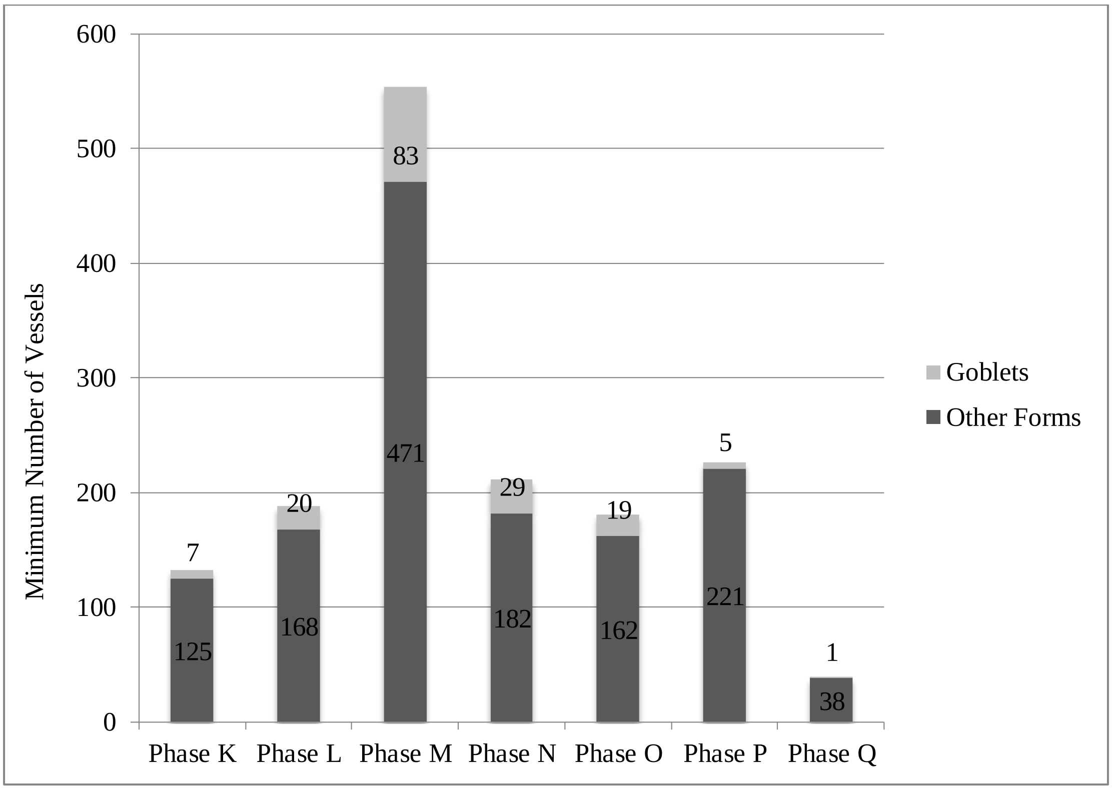

Table 2. Stratigraphic Distribution of the Tell Nebi Mend Trench I Goblet Assemblage.[4]

[4] MNV based on the total number of rim sherds/vessels per phase. This figure does not include body sherds or bases, of which a significant amount could be classified as Caliciform.

On the basis of this distribution and the potentially intrusive nature of the early examples from Phases Q and P, it can be argued that the goblet phenomenon began slightly later at TNM than at other sites, at the boundary between the EB III and EB IV. Interestingly, the goblet tradition seems to have arrived at the site almost as a fully developed concept, with perhaps the exception of Type 7 (see **Figure 4: 9**), a facet also borne out by the archaeometric analysis (see below), perhaps reflecting a change in social practice of external origin. This is in marked contrast to a number of other sites located along the Orontes corridor and in its periphery, such as Tell Tuqan (Vacca 2014: fig. 3: 10 and 15), Ebla (Vacca 2014: fig. 7), Tell Mastuma (Tsuneki 2009: fig. 3.24) and Hama (Thuesen 1988: pl. LXV: 2, 4), which have all revealed earlier EB III antecedents, such as cyma–recta cups (see Jamieson 2014: 120–122; figs 3–4). The comparatively abrupt appearance of these vessels therefore heralds the beginning of the EB IV period at TNM, marking a significant change in cultural ethos, just as it appears to have done in the southern Levant (Bunimovitz and Greenberg 2004; 2006).

Typological Development of the Tell Nebi Mend Goblets

Typological analysis of the TNM goblets revealed that the corpus can be divided into ten main types (see Kennedy 2015a; **Figures 4–5**). Differentiation is based principally upon a nuanced study of variations in rim form, shape and decorative schema.[5] Yet, despite these typological distinctions, the corpus displays a number of commonalities; including a general uniformity of fabric, rim diameter,

[5] This examination is based upon the Tell Nebi Mend type–series (Kennedy 2015a: 68–191), which was developed in isolation, without reference to other typologies and sequences in order to avoid the circularity of what might be termed ‘truism typology’, in which all new corpora are required to ‘fit’ pre–existing typologies. It is not designed to be a wider regional typology, as it is based solely upon the TNM material.

decorative–mode, vessel size and overall shape. Examples of this class at TNM were generally rendered in fine to medium, dense grey, pink, yellowish–buff, greenish–buff and orange fabrics, with pink and grey hues predominating. Fabrics were also distinguished by small silt–sized mineral inclusions, perhaps suggestive of some form of levigation and a developing horizon of ceramic sophistication, although no evidence for localised ceramic production has as yet been identified at the site.

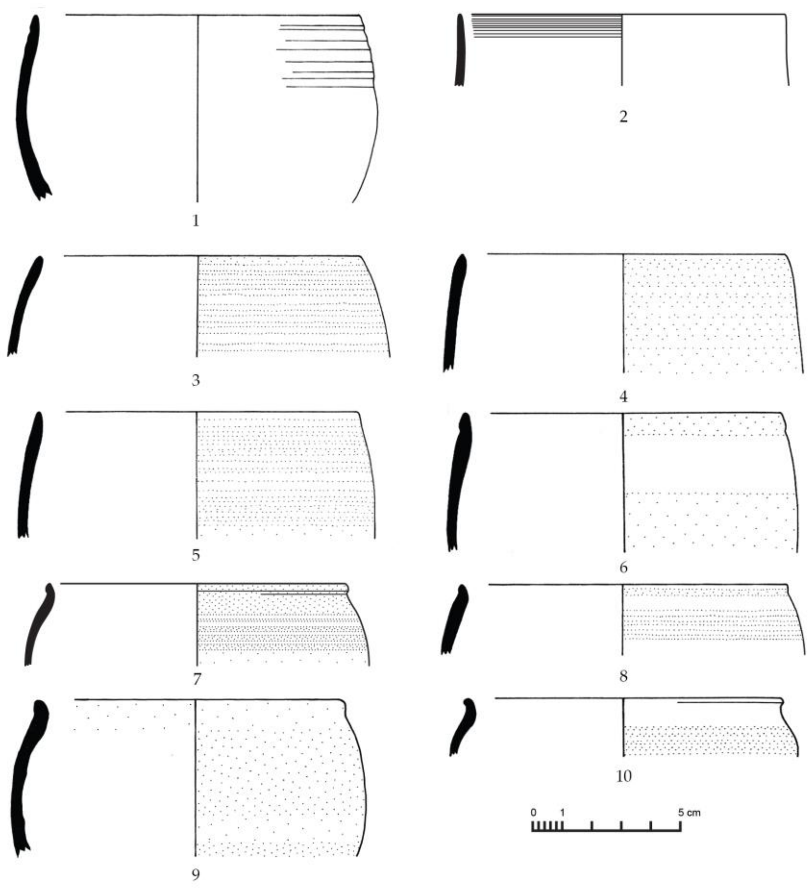

Figure 4. Tell Nebi Mend Goblet Types 1A to 5A.

No.	Cat No.	Locus/Level	Phase	Type	Description
1	2542	184.5	M	1A	Medium density, tiny to medium grey, white and red grits. 5 cream 10YR (8/3) corrugated and painted bands (ext.). Coil–made, wheel–finished
2	3150	191.47	O	1B	Sparse, tiny grey and white grits. Corrugated and self–slipped (in. and ext.). Wheel–finished.
3	2524	151.217A	Mi	2A	Dense, tiny to medium grey and white grits. Self–slipped. 18 horizontal corrugated and cream paint bands 10YR (8/3). Wheel–made?
4	2554	183.1	Mi	2B	Medium density, small white grits. Buff 10YR (7/3) slip (in. and ext.) Wheel–made.

5	2510	151.100–102	Lii	3A	Medium density, tiny to medium white and orange grits. Brick red slip with 15 horizontal cream 10YR (8/3) bands (ext.) and brick–red slip (in.). Wheel–made?
6	2555	183.6	Mii	3B	Medium density, tiny to large white and red grits. Single cream 5Y (8/2) band below rim. Coil–made, wheel–finished.
7	N/A	179.10	Liv	4A	Sparse, tiny white grits. Pinkish–orange slip with 8 pinkish–orange 5YR (7/4) bands (ext.). Wheel–finished.
8	2561	183.9	Miii	4B	Medium density, tiny to large grits. Orangey–brown 5YR (7/4) slip with 5 corrugated and painted cream 2.5Y (8/2) bands. Brown 2.5YR (6/6) band on rim. Wheel–made.
9	3141	191.27	Mi	4C	Sparse, tiny white grits. Grey slip with two creamy–white 10YR (8/3) bands (ext.). Wheel–made.
10	2562	183.1	Mi	4D	Sparse, tiny to small white grits. Reddish–grey slip with creamy–wash band. Wheel–made.

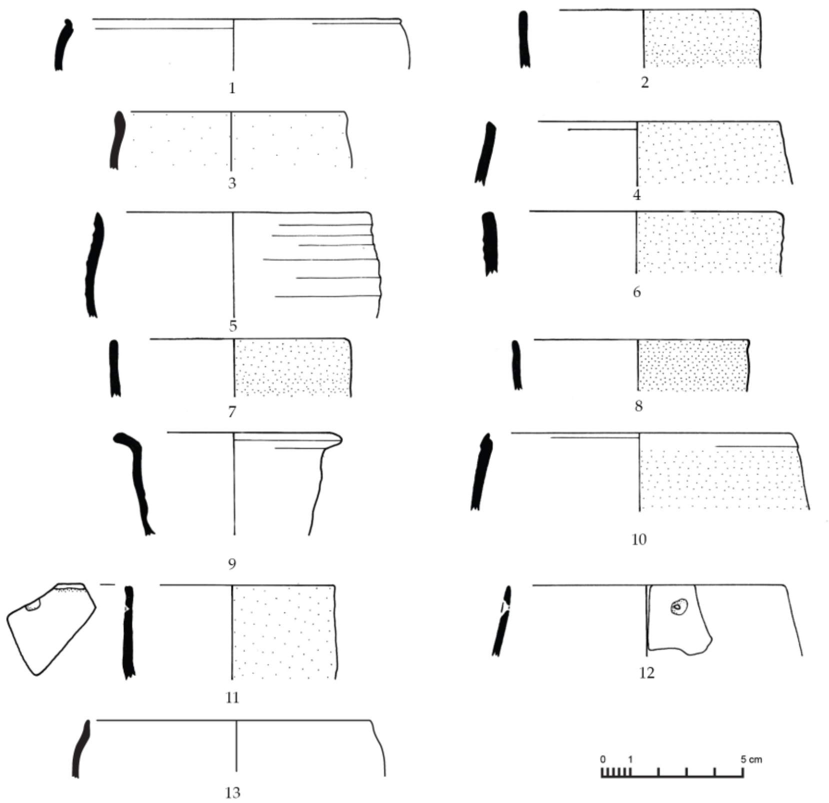

Figure 5. Tell Nebi Mend Goblet Types 4E to 10.

No.	Cat No.	Locus/Level	Phase	Type	Description
1	2569	192.56	Pii	4E	Medium density, small white and grey grits. Self–slipped (in. & ext.). Wheel–finished.
2	2410	191.42	O	5A	Sparse, grey grits. Self–slipped (in. & ext.). Wheel–finished.
3	2593	191.7	Liv	5B	Sparse, tiny grey and white grits. Pale cream 10YR (8/3) wash (ext.). Wheel–made.
4	2100	190.3	Kii	5C	Vegetable and dense, tiny to large grey and brown grits. Creamy–green 5Y (8/2) slip (ext.) and buff 10YR (8/4)

					slip (in.). Wheel–finished.
5	2003	260.2	O	6A	Sparse, tiny grey grits (very fine). Buff self–slip (in. & ext.). Wheel–made.
6	2594	191.33	Ni	6B	Dense, tiny to medium grey and white grits. Creamy–orange self–slip with 4 horizontal & corrugated white 7.5YR (8/4) paint bands (ext.). Wheel–made.
7	2580	191.47	O	6C	Dense, tiny grey, white and orange grits. Faint, white 5Y (8/1) bands. Wheel–finished.
8	2605	151.218B	Ni	6D	Dense, tiny to medium grey, white, red and orange grits. Creamy 5YR (8/3) horizontal band, below rim. Wheel–finished.
9	2194	192.58	Pi	7	Vegetable and dense, tiny to small grey, white and orange grits. No surface treatment. Wheel–finished.
10	2546	183.13	Ni	8	Sparse, tiny white grits (very fine). Greyish–red slip with 10 cream 10YR (8/2) bands. Wheel–made.
11	2570	192.62	Qi	9A	Sparse, tiny grey grits. Self–slipped (in. & ext.) with perforation 0.4 cm below rim Wheel–made.
12	2523	151.110	Liii	9B	Sparse, small white grits. Creamy–orange 2.5Y (8/4) slip with a perforation 0.5 cm below rim (ext.). Orange 5YR (7/6) wash (in.). Wheel–made.
13	2574	192.1	O	10	Sparse, tiny white grits. Orange 5YR (7/4) exterior slip with 8 orange 5YR (7/4) band, 1 cm below rim. Coil–made, wheel–finished.

Macroscopic analysis of these vessels suggests that they can be divided into two broad fabric categories. The most ubiquitous of these, accounting for approximately 69% of the goblet corpus, is a hard grey or pink fabric, with some fired at a high temperature in either an oxidised or reduced atmosphere. This is further evidenced by the fact that a number of examples have a two–toned core of grey and pink, as well as a metallic–like or ‘clinky’ quality. This fabric is best described as a traditional ‘Caliciform’ of ‘Grey Ware’ fabric (Cooper 2006: 154; Welton and Cooper 2014: 328–330; see **Figure 6**). Instances of this fabric type were generally distinguished by a hard, fine to medium, well to extremely–well prepared consistency. Temper was marked predominantly by tiny to medium–sized mineral grits (Kennedy 2015a: 158–159). Vegetal inclusions also appear to be present in the earliest variants, recovered from Phases Q (EB III) through to Phase O (EB III–IV transition).

Figure 6. A **'**Grey Ware' goblet from Tell Nebi Mend (complete but unreconstructed).

The second main fabric group accounts for approximately 29% of the goblet corpus, with examples rendered in fine to medium, yellowish–buff , orange–buff and greenish–buff hued fabrics (**Figures 7 and 8**). These examples are best described as a local (upper Orontes) variant of 'Simple Ware', an assertion supported by the archaeometric analysis (see below).[6] Examples fashioned from this fabric type were generally softer and more friable than those rendered in 'Grey Ware' and were possibly fired at a lower temperature. No evidence for oxidation or reduction can be discerned within this fabric class. Temper also appears to have varied more in consistency with both mineral and vegetal inclusions identifiable, inclusions also tend to be larger than those within the 'Grey Ware' variants (**Figures 6**).

[6] In this instance, 'Simple Ware' is defined on the basis of fabric type and colour. Instances are generally marked by a yellow–buff to light orangey–buff hue, fabrics range from fine to medium coarse, with mineral and vegetal inclusions.

Figure 7. 'Simple Ware' goblets from Tell Nebi Mend

The remaining 2% of the Trench I goblet assemblage consists of fabric types not readily identifiable within the wider TNM ceramic corpus, and these instances are potentially non–local. These variants are characterised by either a soft bright orange fabric or a soft blue–grey, almost vitrified fabric.

Figure 8. 'Simple Ware' goblets from Tell Nebi Mend

Typologically, a squat, thin–walled form distinguishes the TNM goblets (see **Figures 4–5**), with few examples identified of the more elongated, conical variants that characterise assemblages located further to the north, such as Hama (Fugmann 1958: figs 74: 3G696; 93: 3H353 and 103: 3G778), Ebla (D'Andrea 2015: fig. 1: 13; Sala 2012: fig. 11: 18–20), and other settlements in the region (Welton and Cooper 2014: pl. 2: 1–13; see **Figure 9**). In fact, the overall size and shape of the TNM goblets are much more reminiscent of instances from the southern Levant, the Beqa' and northern Lebanon (see Bechar 2015: fig. 5; D'Andrea 2014: pls XVII–XXIII; Genz 2010: fig. 2; Genz and Badreshany *in prep*; Kennedy 2015b: fig. 3: 36–44; Richard 2010: 90; fig. 4.4: 9–12).

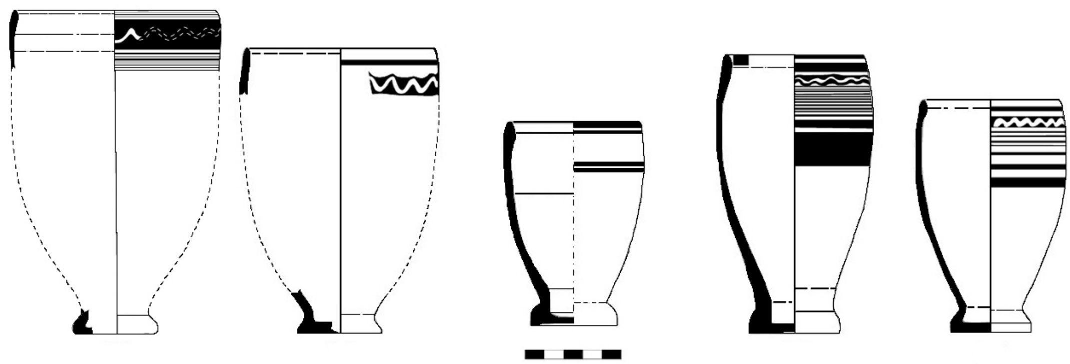

Figure 9. Conical goblet forms from central/middle Orontes and the Ebla *chora* (re–drawn after D'Andrea and Vacca 2015: fig. 3: 13–17).

Rim–forms are generally simple with an incurving, rounded rim, which becomes increasingly swollen towards the end of the EBA sequence (see **Figure 4: 5–9)**. This feature is paralleled in other vessel classes, such as cooking pots and small jars, and is a useful relative chronological indicator of the later EB IV period at TNM (Kennedy 2015a: 189). Also featuring during the latter part of the TNM Trench I sequence are gutter and exterior bevelled (notched) rims, this too is paralleled in a number of other form classes and is a useful relative chronological indicator of the later EB IV period (EB IVB; Kennedy 2015a: 98; see **Figures 5: 1 and 10**). The appearance of this feature is also mirrored throughout other later EB IV (EB IVB) assemblages in western inland Syria (Al–Maqdissi 1987: fig. 2: 2; Mazzoni 2002: pl. XLV: 133; Welton and Cooper 2014: pl. 2: 3–5, 7, 24). Perhaps most interestingly, beaded–rims appear to be almost completely absent from the extant TNM assemblage, with only a single example (TNM2570) recovered from the Trench I sequence (**Figure 5: 11**). Conversely, beaded–rims are found throughout the region (Welton and Cooper 2014: pl. 3: 12–13, 14), with instances discovered in relatively close proximity to TNM, at sites such as Tell al–Sūr (Mouamar pers. comm.) and Qatna (Besana *et al.* 2008: 134–135). These distinctions may further suggest a local manufacturing tradition that includes only a subset of the traditions practiced further north.

Two principal base types characterise the TNM goblets (**Figure 9**). The earliest variant, identified between Phases Q and K (EB III–MB I) was marked by a small, upright, straight–sided form (**Figure 10: 1**). Ranging in size between 3 and 7 cm examples of this type were rendered in both ‘Simple’ (76%) and ‘Grey Ware’ (24%). The second base type was distinguished by a thickened, pedestal (‘drum/bell’) and concave form (**Figure 10: 2**). Instances of this type appear in slightly later stratigraphic contexts between Phases O and K (EB III–IV transition to MB I). Examples ranged in size between 3 and 6 cm in diameter and were also rendered in both ‘Grey Ware’ and ‘Simple Ware’ fabrics. However, ‘Grey Ware’ predominates strongly, accounting for approximately 89% of the extant Trench I goblet corpus, with ‘Simple Ware’ the remaining 11%.

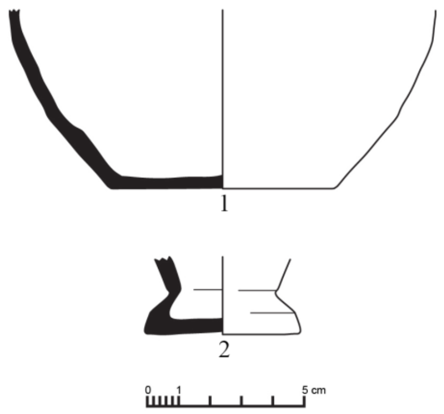

Figure 10. Tell Nebi Mend Goblet Base Forms.

The TNM goblets were also distinguished by relatively uniform rim diameters, with most instances clustered between 7 and 12 cm in size. Interestingly, almost 45% of the Trench I goblet corpus was marked by a diameter of 10 cm. The predominance of this diameter–size highlights the standardised nature of this form class at TNM. This attempted standardisation is a feature noted throughout the wider regional goblet corpus of both the northern and southern Levant (Bechar 2015: fig. 5; Welton and Cooper 2014: pls 1–2).

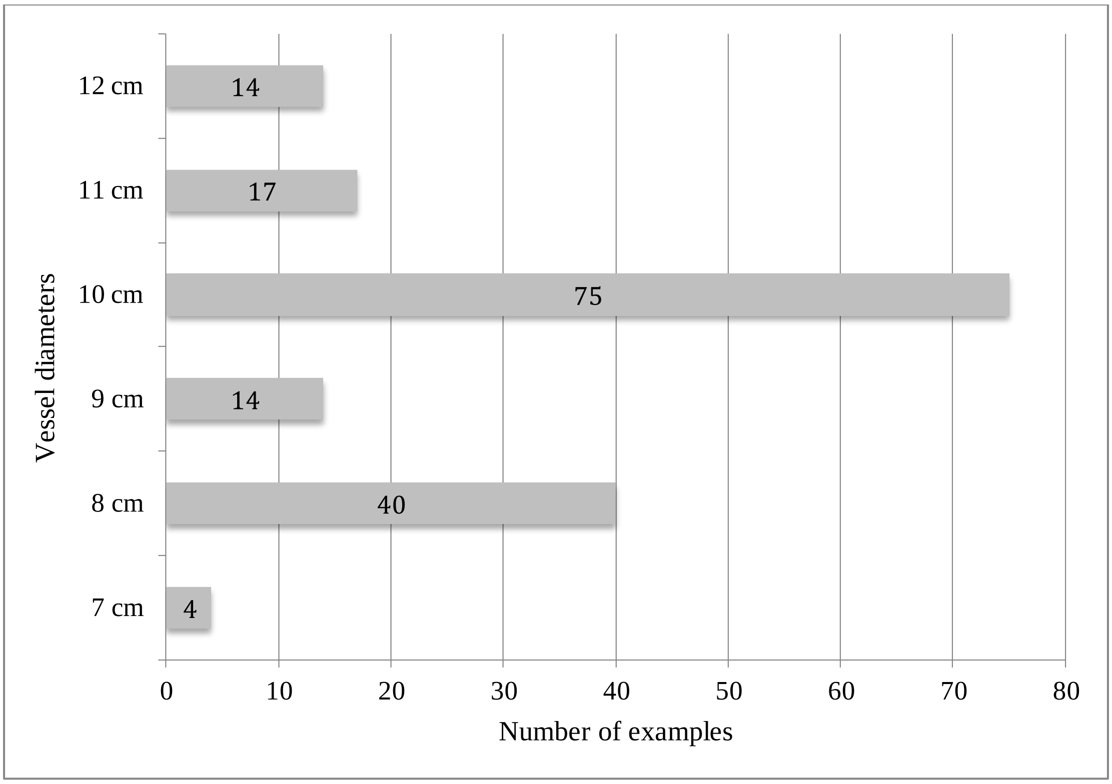

Table 3. Distribution of goblet rim diameters at Tell Nebi Mend.

In terms of manufacture, internal concentric striations suggest that the TNM goblets were predominantly hand–made (coil–made) and wheel–finished, but several instances also appear to have been fashioned on a wheel (Roux and Courty 1998).

The comparatively 'restricted' typological variation of the TNM Trench I goblet corpus may also account for the absence of 'teapots', with the rarity of this form potentially confirming Mazzoni's suggestions that specialised pouring vessels, were highly prized commodities during the EB IV. Only 20 examples of this class were identified in Palace G at Ebla (Mazzoni 1994: 250–253). Alternatively, the rarity of these vessels at TNM and at many other sites may in fact be more apparent than real, as these vessels are easily mistaken for small jars in the absence of a spout. Moreover, the comparative rarity of 'teapots' in the north is in stark contrast to the southern Levant, where examples are frequently identified in both settlement and mortuary contexts (Dever 1970, fig. 2: 1–10; Gitin 1975, fig. 4: 15–21; Richard 1980, fig. 2: 13–16). Richard (1980: 17–18) suggests that the squat ‘teapot’ type, developed out of the local, southern Levantine EB II–III holemouth tradition (Dever 1973: 47–48). Whilst, Prag (1974: 89) and Bunimovitz and Greenberg (2004) argue for a northern (Syrian) origin for this form. Although a northern Levantine origin appears more likely, with examples found in early EBA contexts, an indigenous genesis for this type in the south cannot be excluded (Amiran 1969: pl. 11: 23, 25; Kenyon 1960: fig. 14: 14; Schaub and Rast 1989: fig. 135: 5–13). Thus the possibility remains that ‘teapots’ may have spread from south to north, rather than from north to south, which may account for the apparent rarity of this type in the northern Levant.

Decorative Schema of the Tell Nebi Mend Goblets

The TNM goblet corpus was marked by a number of decorative schemas, such as slips, self–slips, painted and corrugated designs. The bulk of the corpus was characterised by a grey exterior and interior hue, with approximately 21% of the Trench I goblet corpus distinguished by slip and 15% by a self–slip. In addition to this, white or cream radial bands, numbering between one and 20 were often applied to the exterior of the vessel, with a number of examples also distinguished by a single painted band on the inner and outer–rim. These bands varied in thickness from 1–2 mm to 5 mm. The evenness of the bands suggests that decoration may have been applied with the use of a slow–wheel or tournette. In contrast to corpora further to the north, no black, brown or red painted decoration is discernable within the TNM corpus. Perhaps most interestingly, none of the TNM examples can be considered as true examples of the ‘reserved–slip’ tradition, as these bands were applied directly to the exterior of the vessel, rather than “wiped off” to reveal the underlying surface colour (Braidwood and Braidwood 1960: 355; Welton and Cooper 2014: 330; Castel 2014a: 30–31; figs 22–23).

In conjunction with grey slips and self–slips, a number of examples were distinguished by a grey or pink hue created by deliberate and controlled firing techniques in both oxidised and reduced atmospheres. Such methods may have been used as a means of aiding the manufacturing process, as it negated the need for a slip. Instances of this approach have been identified between Phases O and K, indicating that this technique was contemporary with the first appearance of the goblet tradition at TNM. However, examples of this technique increased considerably in frequency from Phase N onwards.

In contrast to other regional goblet assemblages (Welton and Cooper 2014: 328–330; 336), at TNM corrugated and painted goblets appear throughout the sequence in relatively stable quantities. Instances were recovered between Phases O and L, although the bulk of the Trench I goblet corpus (23%) was recovered from the later EB IV (EB IVB) contexts of Phase M. The continued production of corrugated goblets between the EB IVA (Phase N) and EB IVB (Phase M) contrasts with the assemblages from sites further north, such as Ebla, where variants of this tradition are found predominantly in the early EB IV (EB IVA) contexts of Palace G (Mazzoni 1985: 14). In this respect, these varying traditions cannot be used as relative chronological indicators of the EB IVA–EB IVB transition at TNM, as some scholars have previously suggested (Mazzoni 1985; 2002).

Despite the predominance of grey and pink hued goblets, other forms of surface treatment are apparent within the corpus. Approximately 10% of the Trench I goblet assemblage was distinguished by a simple slip, self–slips (7%), with slipped and perforated decoration accounting for approximately 1% of the assemblage. Slips and self–slips varied significantly in hue from pinkish–orange, red, reddish–orange, yellow–buff, creamy–yellow to green (most probably an over–fired yellow–buff). These vessels were subsequently decorated with white, cream or pinkish–orangey–brown radial bands, numbering from one to twenty. Painted bands were present in the upper registers of the vessel, and occasionally consisted of a single thick band on the inner rim. It should be noted that in contrast to the more characteristic 'Simple Ware' variants of the central Orontes and its peripheries, none of the TNM goblets was rendered with painted designs in black or dark–grey (see Kennedy 2015a: figs 78–81). Similarly, a number of examples were left undecorated. In fact, the TNM goblet corpus demonstrates little evidence for decorative change throughout the sequence, with schema remaining relatively static, perhaps suggesting somewhat limited contact with the northern urban centres.

A number of other decorative schema common to the Orontes corridor and its peripheries are also notably absent or rare in the TNM corpus, in particular burnished decoration and painted wavy–bands. No burnished examples have as yet been identified, despite the fact that burnished goblets/cups have been identified at other contemporary sites in the Orontes, such as Tell Qarqur (Dornemann 2003: 105). Likewise, the ubiquitous painted wavy–band decoration characteristic of traditional 'Simple Ware' variants in both the northern and southern Levant is also absent from the Trench I corpus. Indeed, only a single example of this tradition is known from TNM (Kennedy 2015a: fig. 81: 52), out of a total corpus of 164 (MNV). Unfortunately this find was recovered out of context on the surface of Trench VIII. The absence of this decorative mode is in strong contrast to its frequent occurrence throughout the Orontes corridor to the north and its peripheries. Indeed, the wavy–line motif extends from the east along the Euphrates to as far south as the Hauran and the southern Levant. Also rare is incised decoration, with only a single instance recovered, while examples of this decorative technique occur in a number of late to terminal EB IV contexts further to the north (Welton and Cooper 2014: 331).

Archaeometric Analysis of the Tell Nebi Mend Goblets

The Archaeometric analyses of sixty-two samples (**Table 4)** dating to the EB II-IV and the MB I (approximately 13% of the overall Trench I goblet assemblage), was undertaken with the aim of reinforcing the conclusions of the typological/macroscopic study of the TNM goblet corpus, while gaining a deeper understanding of aspects related to their production.[7] Specifically, the goals of the analyses were to better inform our understanding of raw material preferences, provenance, manufacturing processes, firing temperature, degrees of standardisation, the degree of the centralisation of production, and how these attributes change with time.

All sixty-two samples (predominantly rims and occasionally body sherds) were investigated by thin-section petrography and a smaller subset of fifty-seven samples was also analysed using ICP -AES and -MS (Inductively Coupled Plasma Atomic Emission Spectroscopy and Mass Spectrometry) to examine their geochemistry.

[7] Sampling was limited to vessels available in the UK and those allowed to be sampled by UCL.

Sample	Site	Date	Provenance	Context	Type	Description	Fabric Group	ICP–MS
P2324	SHR 190	EB IV/MB	Surface find	Surface find	Bowl, deep (rim)	Pink slip/brown	Quartz–calc A	Yes
P2439	SHR 270	EB II–IV	Surface find	Surface find	Jar, storage (rim)	Buff	Quartz–calc A	Yes
P8012	SHR 94	After 4500 BC	Surface find	Surface find	Jar (rim)	Pink	Quartz–calc A	Yes
P8015	SHR 94	EB II–III	Surface find	Surface find	Bowl, hemispherical (rim)	Pinkish–buff	Quartz–calc A	Yes
P8024	SHR 1066	After 4500 BC	Surface find	Surface find	Bowl, incurving (rim)	Reddish–brown	Quartz–calc A	Yes
P8025	SHR 1066	EB II–III	Surface find	Surface find	Jar (rim)	Reddish–brown	Quartz–calc B	Yes
P8034	SHR 1045	EB II–III	Surface find	Surface find	Bowl, platter (rim)	Coarse brown	Quartz–calc A	Yes
P8037	SHR 94	After 4500 BC	Surface find	Surface find	Jar (rim)	Pale wash	Quartz–calc A	Yes
P8043	SHR 81	EBA II–IV	Surface find	Surface find	Jar, tall narrow neck (rim)	Pinkish–buff	Quartz–calc B	Yes
P8057	SHR 1039	EB II–IV	Surface find	Surface find	Jar, short neck (rim)	Brownish	Quartz–calc B	Yes
P8060	SHR 1036	EB II–III	Surface find	Surface find	Jar, storage everted (rim)	Reddish–pink	Quartz–calc C	Yes
TNM2376	TNM	MB I	151.74	Sub–floor	Goblet (base)	Reddish–pink	Quartz–calc A	Yes
TNM2945	TNM	EB IVB	191.22	Fill	Goblet (rim)	Grey	Quartz–calc A	Yes
TNM2930	TNM	EB IVB	179.30	Floor/Surface	Goblet (rim)	Reddish–pink	Quartz–calc A	Yes
TNM3206	TNM	EB IVB	151.217A	Pit	Goblet (base)	Pink	Quartz–calc B	Yes
TNM2487	TNM	EB IVB–MB I	191.6	Floor/Surface	Jar, short neck (rim)	Grey, horizontal white paint band	Quartz–calc A	Yes
TNM2346	TNM	EB IVB	179.26	Fill	Jar (base)	Buff	Quartz–calc A	Yes
TNM2744	TNM	EB IVB	191.22	Fill	Jar (base)	Buff	Quartz–calc A	Yes
TNM179.26/1	TNM	EB IVB	179.26	Fill	Jar, short neck (rim)	Buff	Quartz–calc A	Yes
TNM2471	TNM	EB IVA	182.4	Fill	Jar, necked (rim)	Buff	Quartz–calc A Basalt	Yes
TNM2486	TNM	EB IVA	183.13	Floor/Surface	Jar, short neck (rim)	Buff	Quartz–calc C	Yes
TNM2347	TNM	EB IVB	179.30	Floor/Surface	Jar, short neck (rim)	Pinkish–buff	Quartz–calc A	Yes
TNM2506	TNM	MB I	190.1	Floor/Surface	Jar, short neck (rim)	Pinkish–buff	Quartz–calc C	Yes
TNM2366	TNM	EB IVA	182.1	Floor/Surface	Jar, necked (rim)	Buff	Quartz–calc C	Yes
TNM2134	TNM	MB I	193.7	Pit	Jar, necked (rim)	Buff	Quartz–calc A Basalt	Yes
TNM2958	TNM	EB II	182.34	Occupation	Jar, necked (rim)	Buff	Quartz–calc C	Yes
718	Arjoune	Late Neolithic	Surface find	Surface find	Halaf	Halaf	Quartz–calc A Halaf	Yes
720	Arjoune	Late Neolithic	Surface find	Surface find	Halaf	Halaf	Quartz–calc A Halaf	Yes
723	Arjoune	Late Neolithic	Surface find	Surface find	Halaf	Halaf	Quartz–calc A Halaf	Yes
724	Arjoune	Late Neolithic	Surface find	Surface find	Halaf	Halaf	Quartz–calc A Halaf	Yes
725	Arjoune	Late Neolithic	Surface find	Surface find	Halaf	Halaf	Quartz–calc A Halaf	Yes
P414x	SHR 94	Late Neolithic	Surface find	Surface find	Halaf	Halaf	Quartz–calc A Halaf	Yes
P2093a	SHR 286	Late Neolithic	Surface find	Surface find	Halaf	Halaf	Quartz–calc A Halaf	Yes
TNM2549	TNM	EB IVB	184.4	Floor/Surface	Goblet (rim)	Pink, band painted	Quartz–calc C	Yes
TNM2454	TNM	EB IVB	191.7	Floor/Surface	Goblet (rim)	Band painted	Quartz–calc C	Yes
TNM2557	TNM	EB IVB	183.1	Fill	Goblet (rim)	Band painted	Quartz–calc A	Yes
TNM3141	TNM	EB IVB	191.27	Fill	Goblet (rim)	Grey	Quartz–calc A	Yes
TNM2555	TNM	EB IVB	183.6	Fill	Goblet (rim)	Grey with White slip	Quartz–calc A	Yes
TNM2606	TNM	EB IVB	151.217A	Pit	Goblet (rim)	Grey, band painted	Quartz–calc A	Yes
TNM2511	TNM	EB IVA	151.220	Occupation	Goblet (rim)	Orangey–buff, incised lines below rim	Quartz–calc A	Yes
TNM2700	TNM	EB IVB	179.33	Fill	Jar, small (rim)	Grey, two horizontal white paint bands	Quartz–calc A	Yes

TNM2530	TNM	EB IVB	179.33	Fill	Goblet (rim)	Grey, horizontal white paint band	Quartz–calc A	Yes
TNM2470	TNM	EB IVB	179.33	Fill	Jar (rim)	Grey, self slip, two horizontal white bands	Quartz–calc C	Yes
TNM2539	TNM	EB IVA	182.1	Occupation	Goblet (rim)	Buff self–slip	Quartz–calc B	Yes
TNM3106	TNM	EB III	182.25	Floor/Surface	Goblet (base)	Greenish buff–slip	Quartz–calc B	Yes
TNM2693	TNM	MB I	182.25	Floor/Surface	Goblet (body sherd)	Pinkish–white with net pattern burnish	Quartz–calc A	Yes
TNM2990	TNM	EB IV	185.3	Occupation	Goblet (body sherd)	Grey–self slip, horizontal burnish	Quartz–calc A	Yes
TNM2550	TNM	MB I	190.1	Occupation	Goblet (rim)	Creamy green self–slip and white paint	Quartz–calc B	Yes
TNM2850	TNM	LB IIB	191.13	Brick debris	Goblet (body sherd)	Grey–black net pattern decoration	Unknown (no petrography)	Yes
TNM2867	TNM	EB IVA	191.36	Occupation	Goblet (body sherd)	Grey, self–slip, orangey buff stripes	Quartz–calc A	Yes
TNM2451	TNM	EB IVB	191.20	Occupation	Bowl (rim)	Creamy–orange band on rim interior	Quartz–calc A	Yes
TNM2518	TNM	EB IVB	151.217A	Pit	Goblet (rim)	Grey, rilled bands of creamy slip	Quartz–calc A	Yes
TNM2601	TNM	EB III–IV	191.47	Occupation	Goblet (rim)	Greenish–guff	Quartz–calc B	Yes
TNM3236	TNM	EB IVB	179.33	Fill	Bowl (rim)	Pink	Quartz–calc A	Yes
TNM2342	TNM	EB IVB	179.33	Fill	Basin (rim)	Pink	Quartz–calc A	No
TNM2848	TNM	EB IVB	179.21	Occupation	Jar (body sherd)	Pink, reddish–brown self–slip with incised palm fronds	Quartz–calc A	No
TNM2559	TNM	EB IVB	183.6	Occupation	Miniature bowl (rim)	Pink, reddish–brown self–slip, with brown band on rim	Quartz–calc A	No
TNM2464	TNM	EB III	182.25	Floor	Bowl, platter (rim)	Pink, orangey–buff slip	Quartz–calc A	No
TNM2706	TNM	EB III	192.74	Pit	Bowl (rim)	Pink, creamy slip	Quartz–calc A	No
MSH99F 257.4	Qatna	EB IV	Qatna 4	N/A	Jar, small (rim)	Grey, band painted	Quartz–calc A	Yes
MSH99F 147/1	Qatna	EB IV	Qatna 7	N/A	Goblet (rim)	Corrugated	Quartz–calc A	Yes
MSH99F 147/2	Qatna	EB IV	Qatna 8	N/A	Goblet (rim)	Reddish–pink	Quartz–calc A	Yes
P2324	SHR 190	EB IV/MB	Survey site	N/A	Bowl, deep (rim)	Pink slip/brown	Quartz–calc A	Yes

Table 4. List and description of samples analysed as part of this study. Sites designated by SHR followed by a number were surface collected by the regional survey Settlement and Landscape Development in the Homs Region. Sherds from the survey are numbered Pxxxx. For a recent overview readers are directed to Philip and Bradbury 2016.

Sample Selection and Analytical Methods

In addition to samples from goblets, a range of bowls and jars were included in this study to understand the wider context of the production of these goblets and assess the similarity, in terms of materials used, across multiple typological classes. The samples were also selected from as wide a range as possible of phases and sites to detect potential geographical and diachronic variations in production. The majority of samples was drawn from stratified contexts at TNM (Kennedy 2015a), with a lesser amount derived from sites discovered during the Settlement and Landscape Development in the Homs Region project (SHR) (Philip *et al.* 2002; Philip *et al.* 2005; Philip 2007; Philip and Bradbury 2010; Philip and Bradbury 2016*)* and Qatna (see references already mentioned in text and Maritan *et al.* 2005 for an archaeometric treatment of related materials).

Table 4 provides the relevant sample details, including find context, shape, decoration, phase, and petrofabric. The core sample–set includes twenty–one stratified goblet rims and bases from TNM and three from Qatna. The samples from Qatna were chosen with the aim of detecting any differences between those and the examples from TNM, which could indicate the presence of a separate goblet tradition, perhaps centred on that site or drawing from further north. Forty–one jar and bowl samples from the TNM ceramic collections held at University College London, and surface material collected from a range of EBA sites surveyed between 1999 and 2006 by the project Settlement and Landscape Development in the Homs Region, Syria (SHR) were also selected for analysis (see **Figure 21** for location map). These mostly comprised buff/yellow–buff and grey coloured jars of a similar ware to that of the goblets. The jars and bowls were selected in order to understand the relationship of their fabrics to those employed to produce goblets within the EBA ceramic assemblage of the area, and to investigate whether the production of goblets was closely related to that of other forms of the 'Caliciform' tradition. If so, it could be posited that goblets had a strong conceptual and functional link with other forms in the wider assemblage; if not, this may indicate that they filled a highly specialised role with EB IV society. As a geochemical control, some earlier jars and bowls, including seven Halaf sherds collected from the site of Arjoune (Parr 2003) and from sites visited by the SHR project that are made in a similar petrofabric were analysed by ICP.

The samples were first studied in transmitted light using a Leitz petrographic microscope. Light micrographs were taken with a Leica EC3 digital camera mounted on the microscope. The thin–sections were described using terminology and values proposed by Stoops (2003), Quinn (2013), and Klein and Philpotts (2013). The measurement and quantification of the aplastic fraction of each sample and grain measurements were completed using the digital image analysis software, Jmicrovision (Roduit 2007; www.jmicrovision.com). Tiled images of an area on each thin–section measuring 1 cm^2 were produced for this purpose.

Fifty–seven samples were analysed by ICP –AES and –MS. Chemical analysis using ICP yields the inorganic elemental composition of each sample, providing a chemical signature that can be used to determine whether different ceramics were made using clays from the same outcrop which can imply a shared production location (Orton and Hughes 2013: 168–183) – or from different clay sources. As the signature can vary even within the same clay outcrop, very close signatures suggests production from a geographically and, potentially, temporally proximate batch of materials and, thus, likely the same production location and a similar date.

Following the methodology employed by Hughes (2005) and Allen (1999) powders were obtained from the profile of each sherd using a 12–volt dental drill fitted with a 2 mm diameter solid tungsten carbide bit. The samples were prepared at the Durham Archaeomaterials Research Centre (DARC). The powders were acid digested using hydrofluoric acid and analysed by ICP–AES and ICP–MS at the Department of Earth Sciences, Durham University. The analysis measured for 39 elements (**Table 5**). The major elements, analysed by ICP–AES as weight percentage oxide, include Al_2O_3, Fe_2O_3, MgO, CaO, Na_2O, K2O, TiO_2, P_2O_5 and MnO. The minor and trace elements analysed by ICP–MS as parts per million (ppm) include Co, Cr, Cu, Ni, Sc, Sr, V, Zn, Rb, Y, Zr, Nb, Cs, Ba, Pb, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu.

Sample	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	Co	Cr	Cu	Ni	Sc	Sr	V	Zn	Rb	Y
P2324	9.83	5	1.79	21.79	0.18	2.03	0.66	0.36	0.07	16.81	172.85	30.91	106.88	11.51	303.8	86.38	91.88	36.89	32.4
P2439	12.6	6.67	4.91	16.42	0.76	2.03	0.72	0.34	0.11	26.52	280.96	45.65	250.68	16.77	294.68	117.9	97.7	97.74	29
P8012	10.99	5.42	2.28	14.44	0.29	1.71	0.63	0.26	0.06	15.68	129.68	30.54	105.68	11.4	283.34	95.49	99.9	46.39	31.36
P8015	12.48	4.82	1.59	14.09	0.25	2.9	0.65	0.27	0.02	11.71	84.66	10.76	42.1	10.55	275.5	134.46	92.06	86.49	32.12
P8024	13.2	6.46	3.21	16.28	0.33	1.84	0.82	0.23	0.13	25.64	185.24	34.54	185.81	13.84	236.21	109.72	96.83	64.8	28
P8025	15.34	5.12	2.1	12.83	0.46	2.94	0.76	0.37	0.02	12.6	105.29	17.78	49.9	13.63	247.49	109.86	119.2	99.56	38.31
P8034	13.28	5.24	1.72	12.98	0.36	3.28	0.76	0.35	0.06	17.45	103.04	14.98	43.55	11.61	259.62	152.98	95.59	101.75	36.23
P8037	13.01	4.89	1.57	13.99	0.33	2.94	0.7	0.33	0.02	11.42	95.49	15.43	56.67	10.85	266.23	125	92.23	98.73	33.62
P8043	9.38	5.27	1.29	19.75	0.18	1.27	0.86	0.51	0.09	22.89	159.59	33.83	107.78	11.97	252.98	107.72	105.67	41.21	30.37
P8057	18.35	5.13	1.53	13.1	0.31	3.35	0.96	0.42	0.03	16.08	117.94	43.37	58.14	14.98	290.56	127.84	101.67	103.65	46.7
P8060	8.21	4.35	1.28	20.08	0.19	1.01	0.67	0.3	0.1	18.58	121.77	26.42	113.14	9.2	408.58	87.14	82.66	28.01	29.11
TNM2376	13.87	6.88	4.33	6.91	0.33	2.64	1.08	0.16	0.12	30.09	143.3	24.42	124.5	15.98	129.8	134.3	104.6	77.56	23.23
TNM2945	14.64	7.28	4.99	6.39	0.31	2.56	1.12	0.19	0.12	30.39	159.4	26.35	129.8	16.92	117	145.5	116.9	76.61	27.73
TNM2930	13.88	6.86	5.1	8.1	0.34	2.55	1.1	0.15	0.11	28.35	160.6	28.8	123.4	15.97	124.2	134.8	108.9	73.83	24
TNM3206	10.69	5.78	3.85	3.61	0.24	1.12	0.77	0.86	0.09	24.17	325.2	62.43	280.5	16.13	153.1	183.4	188.6	46.93	60.04
TNM2487	11.39	5.69	4.35	10.05	0.64	2.45	0.91	0.13	0.07	21.18	168.4	18.12	120.9	14.46	217.6	142	80.53	73.47	21.08
TNM2346	12.41	6.08	4.3	9.58	0.47	2.43	0.98	0.14	0.09	23.93	188.5	21.77	142.1	15.27	192.7	148	103.2	74.32	22.55
TNM2744	12.11	5.93	4.11	8.23	0.42	2.65	0.95	0.18	0.1	21.94	163.3	27.6	142.1	14.88	174.3	123.5	108	68.16	24.87
TNM179.26/1	10.52	5.18	3.63	8.98	0.43	2.06	0.97	0.1	0.09	23.86	175	25.17	147.2	15.24	198.2	143.5	105.4	74.16	22.18
TNM2471	10.7	6.43	2.47	15.68	0.68	1.61	1.16	0.32	0.1	29.37	206.7	52.19	172	16.64	320.8	150.8	113.4	41.72	25.19
TNM2486	7.93	4.52	2.13	17.39	0.55	1.21	0.85	0.2	0.08	22.62	216.4	36.94	165	12.59	244.1	126.9	100.5	36.77	26.27
TNM2347	12.43	5.97	4.1	14.13	0.45	2.7	0.9	0.2	0.12	22.5	148.3	26.74	150.5	14.76	271	111.8	103.9	77.12	24.06
TNM2506	10.92	6.21	2.27	13.15	0.41	1.65	0.96	0.25	0.1	26.46	211.6	52.47	170.5	14.76	188.4	144.3	107.6	44.72	25.12
TNM2366	7.05	3.8	2.06	20.32	0.31	1.35	0.73	0.15	0.03	12.9	162.9	16.5	79.28	10.03	194.6	90.46	62.49	33.02	22.98
TNM2134	10.54	6.17	2.06	16.78	0.3	1.41	0.99	0.32	0.09	26.28	240.5	46.91	165.7	15.08	214.8	151.5	109.8	40.16	29.42
TNM2958	6.98	3.53	3.14	22.6	0.63	2.45	0.56	0.49	0.04	11.59	99.37	27.42	77.43	11.12	638.1	105.2	89.02	36.64	21.95
718	9.28	4.5	5.21	19.82	0.24	1.21	0.6	0.56	0.1	15.61	108.03	18.94	76.54	10.31	267.29	105.58	93.18	17.11	28.13
720	9.4	4.97	2.59	23.02	0.23	1.65	0.66	0.5	0.07	17.34	147.07	20.72	117.93	11.4	406.55	93.34	110.49	39.48	30.28
723	7.85	4.05	2.05	25.93	0.18	1.34	0.51	0.6	0.06	13.48	118.55	24.9	100.14	10.1	423.47	73.43	76.55	25.3	27.29
724	8.25	4.38	3.43	21.2	0.23	1.33	0.64	0.6	0.03	13.95	147.7	42.32	153.61	11.68	331.28	87.25	121.02	30.74	34.27
725	8.47	4.46	3.31	22.28	0.12	1.28	0.67	0.54	0.04	14.36	161.98	43.66	128.35	11.19	237.35	82.52	113.64	31.51	32.35

P414x	8.25	4.5	3.36	19.4	0.23	1.04	0.32	0.92	0.03	9.44	113.3	24.39	92.67	6.57	141.6	69.66	71.5	16.2	20.46
P2093a	8.11	4.81	1.93	19.87	0.29	1.8	0.87	0.72	0.07	17.26	149.1	26.63	95.18	11.53	420.9	122.9	73.58	39.4	24.17
TNM2549	9.41	5.48	3.99	12.21	0.48	1.9	0.51	0.33	0.08	19.17	156.3	32.52	163.2	12.58	205.4	108.6	123.4	42.63	29.81
TNM2454	10.5	6.08	3.06	13.03	0.55	1.69	0.71	0.33	0.08	20	177.1	36.01	173.3	12.97	241.7	152.4	107.7	47.05	28.36
TNM2557	11.34	5.98	4.36	11.03	0.59	2.32	0.9	0.13	0.12	24.62	99.12	22.23	96.74	12.37	196.6	111.3	96.8	61.38	16.81
TNM3141	14.62	7.42	5.24	10.28	0.33	2.25	1.04	0.22	0.12	29.03	115	24.04	117.7	16.27	154.4	127	96.57	79.62	26.98
TNM2555	13.26	7.1	3.95	9.99	0.44	2.23	1	0.15	0.07	25.21	144.3	22.72	154.6	15.29	166.7	155.8	94.9	75.97	20.82
TNM2606	13	6.66	5.27	10.09	0.48	2.02	0.92	0.29	0.09	22.17	132.3	30.66	168	14.74	221.1	129.1	120.9	68.89	19.98
TNM2511	17.08	6.34	1.72	8.04	0.58	3.22	0.91	0.35	0.03	11.32	99.21	20.2	50.24	14.54	222.3	180.3	122.2	123.7	37
TNM2700	15.42	8.03	5.06	6.27	0.4	2.47	1.18	0.28	0.13	30.24	124.2	25.77	122.7	17.14	124.5	106.4	120.6	86.03	28.43
TNM2530	15.67	8.02	4.74	7.67	0.36	2.43	1.12	0.42	0.11	28.68	123.1	24.21	122	17	97.27	101.2	105.6	85.03	25.15
TNM2470	13.1	6.7	4.44	8.86	0.53	2.38	0.94	0.19	0.07	21.94	144	16.78	123.9	14.66	187.6	127.8	85.32	80.67	23.41
TNM2539	7.62	4.1	1.66	26.3	0.51	1.75	0.37	0.51	0.08	15.27	146.6	25.62	128.1	9.72	332.8	64.05	94.89	32.36	29.39
TNM3106	7.48	4.09	1.64	26.42	0.51	1.72	0.34	0.4	0.08	14.48	115.5	24.46	123.8	9.1	304.6	60.16	85.35	30.4	27.59
TNM2693	15.69	6.01	2.14	10.8	0.6	3.14	0.84	0.5	0.02	9.72	75.72	18.16	47.37	13.83	262.5	139	109.4	113.4	35.44
TNM2990	18.32	10.34	2.26	5.55	0.32	2.77	2.3	0.38	0.07	46.07	188.6	31.97	129	21.09	156.9	134.2	98.26	60.68	39.12
TNM2550	15.15	10.37	1.5	12.79	0.29	1.26	1.49	0.34	0.09	34.62	171.1	44.73	160.6	19.73	316	128.4	116.8	47.93	61.82
TNM2850	9.25	5.35	3.33	21.18	0.72	2.22	0.87	0.25	0.09	25.94	98.39	28.67	84.77	11.71	296.2	92.88	99.11	47.32	24.42
TNM2867	18.87	13.91	2.85	8.95	0.27	2.62	2.22	0.45	0.08	36.71	152.4	25.09	122.1	21.97	245.3	138	98.74	69.17	34.17
TNM2451	11.5	6.29	4.16	3.69	0.31	1.11	0.7	0.81	0.07	20.96	301.5	47.87	238.8	15.12	143.4	167.1	172.4	44.32	61.64
TNM3236	10.97	6.08	4.18	3.81	0.39	1.25	0.71	0.86	0.08	22.17	308.5	54.59	255.6	15.1	143.2	148.2	169.9	43.73	63.56
TNM2706	8.69	4.75	2.66	23.46	0.75	1.26	0.42	0.86	0.04	15.85	204.2	46.02	162.7	11.95	394.7	78.67	97.59	23.38	39.03
TNM179.33/9	15.26	7.78	4.55	5.96	0.34	2.32	1.12	0.18	0.13	30.05	115.3	38.24	127.7	15.99	93.48	143.2	113.1	78.72	25.09
MSH99F 257.4	16.02	5.7	1.78	14.26	0.63	2.99	0.8	0.38	0.02	11.63	82.39	19.05	56.91	13.25	288.7	144.3	113.2	103.6	34.38
MSH99F 147/1	16.93	6.55	1.91	11.69	0.54	3.06	0.88	0.6	0.03	11.55	86.16	22.36	50.46	14.15	274.4	156.2	121.3	119.5	37.92
MSH99F 147/2	18.32	6.81	1.68	10.55	0.57	3.25	0.92	0.51	0.03	12.5	87.15	30.74	51.63	15.15	316.4	167.5	121	123.2	38.42

Sample	Zr	Nb	Cs	Ba	Pb	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	La/Lu	Eu/Sm	LREE + HREE
P2324	101.42	12.53	2	616.84	10.06	27.8	45.73	6.42	26.5	4.99	1.26	4.61	0.91	4.58	0.95	2.73	0.48	2.67	0.39	7.33	0.67	343.21
P2439	166.04	13.74	5.41	269.28	12.47	29.05	55.08	6.83	27.49	5.24	1.21	4.69	0.92	4.62	0.96	2.61	0.47	2.62	0.38	7.98	0.61	360.36
P8012	216.35	12.41	2.73	700.47	10.2	29.68	49.28	6.75	27.52	5.19	1.27	4.7	0.92	4.51	0.96	2.62	0.48	2.66	0.38	8.02	0.65	356.18
P8015	213.06	16.67	3.89	1144.27	16.8	41.23	81.74	9.94	39.87	7.4	1.74	6.4	1.19	5.49	1.08	3.09	0.5	2.77	0.4	10.78	0.62	494.62
P8024	253.25	20.48	4.66	670.08	14.17	30.68	62.05	7.16	28.99	5.52	1.41	4.91	0.95	4.68	0.94	2.58	0.46	2.55	0.38	8.39	0.68	380.59
P8025	247.11	24.7	4.91	839.88	19.25	48.65	91.57	11.65	46.62	8.65	1.97	7.51	1.4	6.49	1.28	3.48	0.63	3.56	0.46	10.87	0.61	577.58

P8034	226.57	17.83	4.22	834.31	20.31	45.13	87.02	11.03	44.61	8.37	1.86	7.28	1.33	6.16	1.2	3.32	0.57	3.05	0.43	10.83	0.59	544.81
P8037	217.45	14.38	4.19	765.74	17.7	43.98	85.85	10.66	42.73	8.01	1.81	6.91	1.27	5.79	1.15	3.12	0.52	2.76	0.41	11.18	0.60	524.93
P8043	87.72	9.38	2.48	537.31	14.06	29.6	53.63	6.72	27.55	5.15	1.26	4.6	0.92	4.42	0.94	2.61	0.47	2.61	0.39	7.90	0.65	358.91
P8057	237.91	20.08	3.44	644.74	14.05	58.15	106.49	13.73	55.74	10.45	2.3	9.26	1.73	8.16	1.54	4.28	0.72	4.01	0.55	11.04	0.58	687.53
P8060	147.34	13.88	1.45	1356.98	11.76	24.31	42.32	5.57	22.9	4.46	1.31	4.14	0.84	4.07	0.88	2.65	0.43	2.42	0.37	6.87	0.78	308.61
TNM2376	129.4	25.69	4.15	341.9	19.62	34.85	89.67	8.77	32.49	6.13	1.29	4.95	0.76	4.12	0.8	2.15	0.36	2.22	0.35	10.31	0.56	426.22
TNM2945	158.4	26.91	4.11	346	20.37	37.54	92.62	9.3	34.76	6.52	1.41	5.45	0.84	4.74	0.95	2.57	0.43	2.61	0.41	9.55	0.57	459.75
TNM2930	152.6	25.5	3.92	341.8	19.37	34.01	85.37	8.56	32.18	6.08	1.3	5.03	0.78	4.3	0.84	2.28	0.39	2.33	0.37	9.60	0.57	420.88
TNM3206	100.5	16.48	3.48	682.7	10.97	42.68	53.47	8.68	34.71	6.78	1.64	7.23	1.08	6.49	1.43	3.88	0.62	3.7	0.6	7.38	0.64	472.30
TNM2487	118	21.53	4.71	348.8	15.98	29.15	77.08	7.74	29.24	5.82	1.32	5.19	0.8	4.41	0.85	2.18	0.37	2.17	0.34	8.88	0.60	387.03
TNM2346	153.2	23.18	5.24	747	16.71	29.8	79.45	7.63	28.54	5.55	1.21	4.91	0.76	4.22	0.83	2.2	0.37	2.29	0.36	8.59	0.58	385.77
TNM2744	138.2	22.76	4.85	676.5	16.21	33.36	76.21	8.37	31.84	6.05	1.34	5.3	0.82	4.55	0.89	2.36	0.39	2.38	0.38	9.19	0.59	411.73
TNM179.26/1	140.2	22.77	5.22	745.9	16.66	30.5	79.51	7.64	28.48	5.56	1.21	4.97	0.76	4.18	0.83	2.18	0.37	2.23	0.35	8.95	0.58	387.21
TNM2471	104.9	19.36	2.27	511.2	8.8	24.95	44.63	6.33	24.87	4.87	1.24	4.74	0.7	3.93	0.79	2.06	0.33	1.95	0.31	8.31	0.68	311.96
TNM2486	93.56	16.34	2.43	256.8	6.2	24.96	44.35	6.02	23.54	4.53	1.08	4.37	0.66	3.81	0.78	2.08	0.34	2.02	0.32	8.00	0.63	302.63
TNM2347	130.1	21.75	4.91	2045	15.93	32.38	74.19	8.23	31.16	5.96	1.28	5.44	0.78	4.3	0.84	2.2	0.37	2.2	0.35	9.63	0.57	399.70
TNM2506	103.1	17.71	2.82	365.2	11.25	25.81	50	6.19	23.85	4.68	1.15	4.52	0.68	3.88	0.79	2.12	0.34	2.06	0.33	8.12	0.66	315.76
TNM2366	70.18	14.59	1.7	316.4	6.79	22.07	37.53	5.32	20.63	3.96	0.95	3.93	0.58	3.34	0.69	1.83	0.3	1.78	0.28	8.05	0.64	265.21
TNM2134	110.6	16.75	2.59	1564	9.49	27	43.8	6.45	25.39	4.99	1.23	5.2	0.74	4.26	0.86	2.3	0.37	2.18	0.35	8.06	0.66	326.48
TNM2958	69.98	12.93	1.5	826.3	10.46	20.17	35.98	5.04	19.4	3.79	0.89	3.69	0.55	3.16	0.65	1.74	0.28	1.7	0.27	7.68	0.62	262.99
718	198.72	14	1.14	1468.7	5.43	27.33	52.38	6.48	26.38	4.97	1.42	4.58	0.9	4.46	0.92	2.52	0.49	2.62	0.39	7.30	0.76	368.32
720	198.22	10.63	2.29	1432.12	19.35	26.39	46.24	6.12	25.16	4.77	1.39	4.43	0.86	4.36	0.92	2.54	0.44	2.53	0.38	7.21	0.77	350.97
723	49.06	7.55	1.54	1487.99	8.49	22.58	37.82	5.15	21.28	3.99	1.26	3.8	0.75	3.8	0.83	2.21	0.4	2.27	0.34	6.96	0.84	300.41
724	109.72	11.73	1.96	1014.5	7.52	26.15	40.08	5.78	24.17	4.6	1.28	4.37	0.86	4.35	0.94	2.59	0.46	2.64	0.4	6.79	0.74	339.89
725	103.04	11.14	1.99	626.91	11.41	26.23	41.38	5.95	24.82	4.66	1.23	4.42	0.86	4.41	0.93	2.52	0.43	2.54	0.37	7.33	0.70	340.77
P414x	36.57	7.01	1	432.9	16.36	15.57	21.3	3.55	14.03	2.74	0.65	2.91	0.43	2.48	0.53	1.45	0.23	1.37	0.22	7.20	0.63	194.21
P2093a	90.9	17.34	2.03	1117	4.9	24	42.46	6.08	23.49	4.61	1.1	4.54	0.65	3.67	0.73	1.95	0.32	1.88	0.3	8.26	0.64	311.35
TNM2549	86.63	15.76	2.7	1820	11.1	27.59	45.74	6.77	26.44	5.13	1.17	5.22	0.73	4.11	0.84	2.23	0.36	2.12	0.35	8.26	0.61	349.37
TNM2454	90.9	16.3	2.95	892.7	6.7	27.66	45.9	6.81	26.45	5.09	1.21	5.09	0.74	4.14	0.83	2.19	0.35	2.04	0.33	8.73	0.63	348.40
TNM2557	162.9	21.26	3.19	303.4	17.53	27.04	76.99	6.89	25.26	4.76	1	4.03	0.63	3.4	0.66	1.73	0.3	1.82	0.28	9.96	0.56	356.14
TNM3141	143.6	26.01	4.48	464.6	20.48	37.76	94.1	9.34	34.15	6.34	1.36	5.38	0.81	4.48	0.9	2.46	0.41	2.49	0.39	9.97	0.57	475.10
TNM2555	138.8	24.64	5.21	430.7	17.22	30.58	83.32	7.91	29.28	5.9	1.31	5.25	0.84	4.53	0.86	2.26	0.38	2.35	0.37	8.47	0.59	420.16
TNM2606	148.5	22.74	5.21	3736	16.79	30.57	71.69	7.7	28.84	5.49	1.18	5.31	0.69	3.64	0.69	1.76	0.28	1.65	0.26	12.04	0.57	381.29
TNM2511	122.6	22.75	5.3	657.6	25.87	50.78	104.5	13.02	48.68	9.12	1.97	8.09	1.18	6.4	1.25	3.24	0.52	3.09	0.49	10.69	0.57	629.42

TNM2700	159.2	28.62	4.63	585.6	22.17	40.76	99.37	10.33	38.64	7.22	1.55	6.24	0.91	4.93	0.98	2.61	0.42	2.57	0.4	10.45	0.57	517.71
TNM2530	197.8	28.07	4.73	393.5	21.09	37.36	95.55	9.36	34.48	6.47	1.39	5.43	0.82	4.42	0.87	2.32	0.39	2.37	0.37	10.43	0.57	473.74
TNM2470	178.2	23.77	5.26	410.3	18.39	33.19	85.66	8.63	32.16	6.36	1.42	5.67	0.89	4.9	0.95	2.44	0.41	2.48	0.39	8.86	0.59	450.00
TNM2539	72.72	11.8	1.87	1832	10.61	23.88	34.74	5.68	22.38	4.31	1.02	4.59	0.65	3.75	0.8	2.17	0.35	2.06	0.34	7.17	0.63	302.87
TNM3106	67.49	10.91	1.74	1515	7.25	22.56	32.9	5.3	20.73	4.07	0.95	4.29	0.62	3.53	0.75	2.03	0.33	1.95	0.32	7.35	0.62	284.21
TNM2693	129.4	21.11	4.86	917.3	22.31	49.36	99.4	12.57	46.64	8.81	1.88	7.82	1.13	6.13	1.2	3.08	0.5	2.89	0.45	11.26	0.57	604.35
TNM2990	329.8	48.12	2.87	182	13.94	46.11	92.96	11.85	45.86	8.94	2.39	8.38	1.27	6.91	1.34	3.42	0.54	3.16	0.49	9.76	0.71	604.04
TNM2550	243.7	33.35	3.01	425.4	16.47	49.08	82.29	12.46	50.33	10.04	2.57	10.27	1.56	8.85	1.79	4.63	0.73	4.17	0.66	7.69	0.68	668.03
TNM2850	116.9	18.51	2.12	739.6	11.42	28.5	61.2	7.29	28.01	5.42	1.32	5.28	0.78	4.22	0.85	2.13	0.35	2.04	0.32	9.19	0.65	376.01
TNM2867	285.4	48	2.8	75.52	21.3	53.45	96.76	11.08	41.04	7.94	2.1	7.42	1.14	6.22	1.21	3.09	0.5	2.88	0.46	12.08	0.70	592.18
TNM2451	127.9	15.69	3.5	646.1	11.38	38.35	53.33	8.53	33.91	6.62	1.61	7.13	1.07	6.28	1.36	3.67	0.58	3.33	0.54	7.33	0.64	478.36
TNM3236	136.3	15.9	3.34	720	11.2	37.31	51.33	8.26	32.88	6.42	1.57	6.88	1.06	6.28	1.36	3.74	0.6	3.51	0.58	6.64	0.65	470.85
TNM2706	80.15	12.42	2.11	477.6	6.39	27.32	36.84	6.2	24.46	4.75	1.16	5.09	0.76	4.62	1	2.74	0.45	2.7	0.44	6.46	0.65	347.38
TNM179.33/9	187.8	26.89	4.43	397.3	21.98	37.5	95.81	9.31	34.42	6.42	1.39	5.38	0.83	4.47	0.87	2.34	0.39	2.36	0.38	10.27	0.57	474.04
MSH99F 257.4	138.5	20.3	4.68	761.6	23	47.85	94.15	12.24	45.88	8.64	1.83	7.54	1.1	5.94	1.14	2.94	0.47	2.68	0.42	11.82	0.56	583.09
MSH99F 147/1	162.5	21.97	4.97	1159	26.83	50.5	101.9	12.89	48.74	9.1	1.93	8.17	1.19	6.5	1.26	3.26	0.52	3.02	0.48	10.89	0.56	624.87
MSH 99F 147/2	117	23.01	5.26	740.5	24.39	53.99	110.8	13.55	51.25	9.57	2.03	8.32	1.23	6.62	1.29	3.3	0.52	3.08	0.49	11.50	0.56	658.00

Table 5. Chemical concentrations for samples measured by ICP –AES and –MS. The values for oxides are given as weight percentage and all other elements in ppm. The condirite normalised La/Lu and Eu/Sm ratios along with the total REE values in ppm are also given.

A principle components analysis (PCA) (Orton and Hughes 2013: 176–180) incorporating the remaining elements was conducted using SPSS v.22 to plot the similarity of the 'chemical fingerprint' of each sample (**Figures 14–16**). A number of elements were removed from multivariate statistical analyses as various processes can affect them during deposition and sample preparation, including CaO, P_2O_5, Co, Ba, and Zr. As the thin–section analysis indicated that closely related clays sources were used for the production of most of these vessels, the geochemical analysis focused primarily on the rare earth elements (henceforth REE). REE are ideal for geochemical fingerprinting in clays as they are largely immobile during low–grade metamorphism, weathering, and hydrothermal alteration (Rollinson 1993). As such, REE values, more than other elements, are a good indicator of the original composition of the parent rock. Moreover, recent studies show that there is no fractionation of these elements as a result of the firing process (Finlay *et al.* 2012: 2389). The REE values used for the Lu/La Eu/Sm ratios, and the light REE + heavy REE totals were normalised using the values for chondritic meteorites as presented in Rollinson 1993 (**Table 5**).

Results of the Petrography

The petrographic analysis shows that a related set of petrofabrics and preparations, utilising mostly fine grained quartz–rich calcareous fabrics, was used exclusively for jars, bowls, and goblets at Nebi Mend and in the Homs area during the EB II–IV and MB I. In contrast, on–going work (Badreshany and Philip *in prep)*, shows that coarser fabrics, generally associated with vessel forms that are interpreted as cooking pots, are almost always composed of basalt tempered igneous or calcareous fabrics. This distinction hints at the existence of a broad two–fold functional and, perhaps, conceptual division of the 3rd millennium BC ceramic repertoire.

The Quartz–Calcareous Fabrics

The main fabric grouping, termed here 'quartz–calcareous', consists of a clay–rich matrix with a fine texture. The ground mass is rich in microcrystalline calcite and in most cases has an optically active crystalic *b–fabric.* The ground mass is in some cases well–sintered and elongate channel voids can occur.

The samples were mostly composed of a similar suite of non–plastic inclusions, but three subfabrics (A, B, and C) can be differentiated by an increasing average coarseness. The lines dividing these subfabrics are somewhat blurred and they are best seen as parts of a continuum rather than as distinct categories. These subfabrics overlap chronologically and crosscut typological categories.

The aplastic inclusions in the samples are generally subhedral and rounded. Rarely spherical and elongate grains are noted. Equant grains of fine to medium sand sized quartz occurred. Some samples contained silt sized grains of quartz commonly (**Figure 11).** The grains were well rounded to subangular and subhedral. Pieces of fine to coarse sand sized grains of micritic lime mudstone occur in the samples to varying degrees (**Figure 11).** Rarely, a few grains of fossiliferous chalk occur (**Figure 13**). Rounded grains of fine sand sized calcite occurred rarely as did sand–sized grains of chert. Elongate, sub–rounded fragments of fossil shell occurred rarely in the samples.

Subfabric A **(Figure 11)** denotes the finest grained fabrics, where the total aplastic inclusions made up 12–15% of the sample. The average size of the inclusions rarely exceeds that of fine sand, and silt sized grains of quartz are noted commonly.

The samples belonging to this subfabric contain comparatively less limestone relative to other samples. Two samples TNM 192.7/3 and TNM 182.4/1 contained a few fragments of basalt although, as discussed below, their addition may not have been intentional. Subfabric B (**Figure 12)** is similar to A, but slightly coarser, 16–20% total aplastics, and commonly contains elongate voids indicative of the use of organic temper. Subfabric C **(Figure 13)** is the coarsest fabric, containing 21–26% fine to coarse sand sized non–plastic inclusions. The average size of individual grains tends to be larger. Further, the samples of subfabric C contain the highest amounts of limestone. Finally, on the basis of this analysis it would appear that subfabrics A–C encompass both the 'Grey' and 'Simple' Wares identified macroscopically, suggesting that such divisions are purely visual and aesthetic.

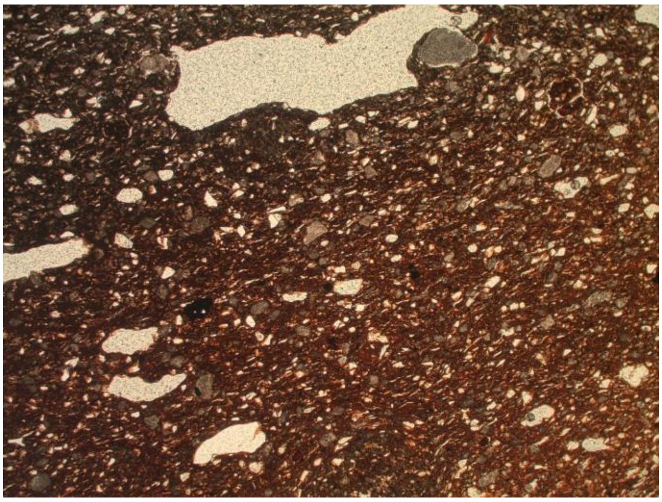

Figure 11. Photomicrograph of Subfabric A (Sample 2376). Field of view is 2 mm.

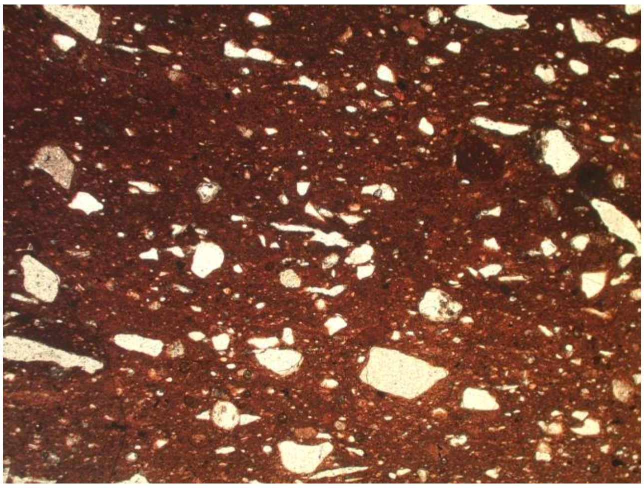

Figure 12. Photomicrograph of Subfabric B (Sample 3206). Field of view is 2 mm.

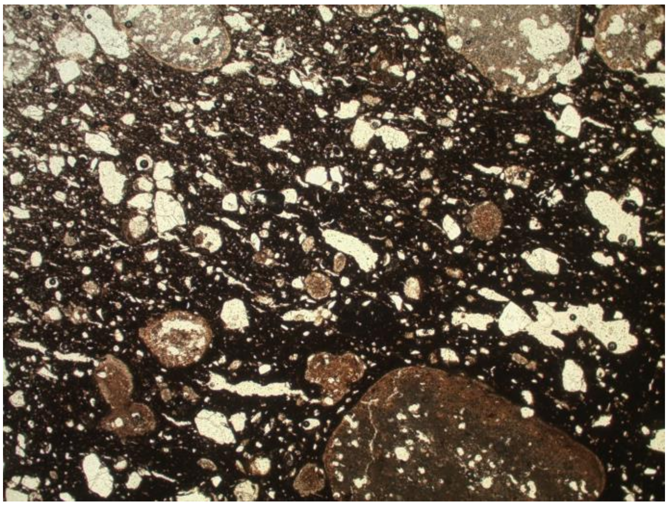

Figure 13. Photomicrograph of Subfabric C (Sample 2968). Field of view is 2 mm.

Results of the Geochemistry

The results of ICP analysis reinforced the petrography and, additionally, provided data that allowed for the identification of geographical and temporal groupings. Three components were extracted cumulatively explaining 82.4% of the variation in the dataset. The loading plots associated with the PCA analysis showed that the REE had the most impact on the variability between samples. A two–step cluster analysis allowed for the delineation of five distinct chemical groups.

Group A, the first and largest group, is composed of jars, bowls, and goblets from TNM. These samples belonged almost exclusively to the Quartz–Calcareous A subfabric, dated to the EB IVB (with one case probably dating to the MB I), and were mostly buff or grey coloured. The chemistry of the Group A vessels is characterised by a lower total concentration of REE relative to other samples (**Table 5**).

Group B samples are enriched in REE compared to other samples. Group B, consisted only of goblets and included all of the samples from Qatna and a few from TNM. These samples are principally dated to the EB IV, with a couple of EB IVA samples and one residual EB IV sherd from a LB I context. Like those of Group A, these samples mostly belonged to the Quartz–Calcareous A subfabric.

Group C consisted of EB IV jars and goblets relating to the Quartz–Calcareous C subfabric, as well as finer versions of the Quartz–Calcareous A subfabric containing basalt. The coarser nature of this group probably explains the chemical differences in relation to Groups A and B.

Group D was mostly composed of Halaf sherds and shared a chemical profile with EB vessels from sites located the Northern survey area of the SHR project, that is from sites located north–west of Homs (see **Figure 21**). The Halaf sherds showed a distinctly higher Eu/Sm ratio **(Figure 17**) than all other samples analysed in this study, indicating the use of clays from a slightly different source area.

Finally, Group E is composed of three samples distinguished by their very low calcium values (<4.00 wt%). A single bowl and two goblets, dating to the EB IVB represent Group E.

The ungrouped samples, clustering between Groups C, B and E, including materials from sites in the northern part of the SHR area, may suggest a separate production source.

In general, the geochemistry shows that the EB II, EB III and EB IVA samples exhibit a greater chemical variability than the EB IVB samples, the latter clustering into larger and more definable groups than the former.

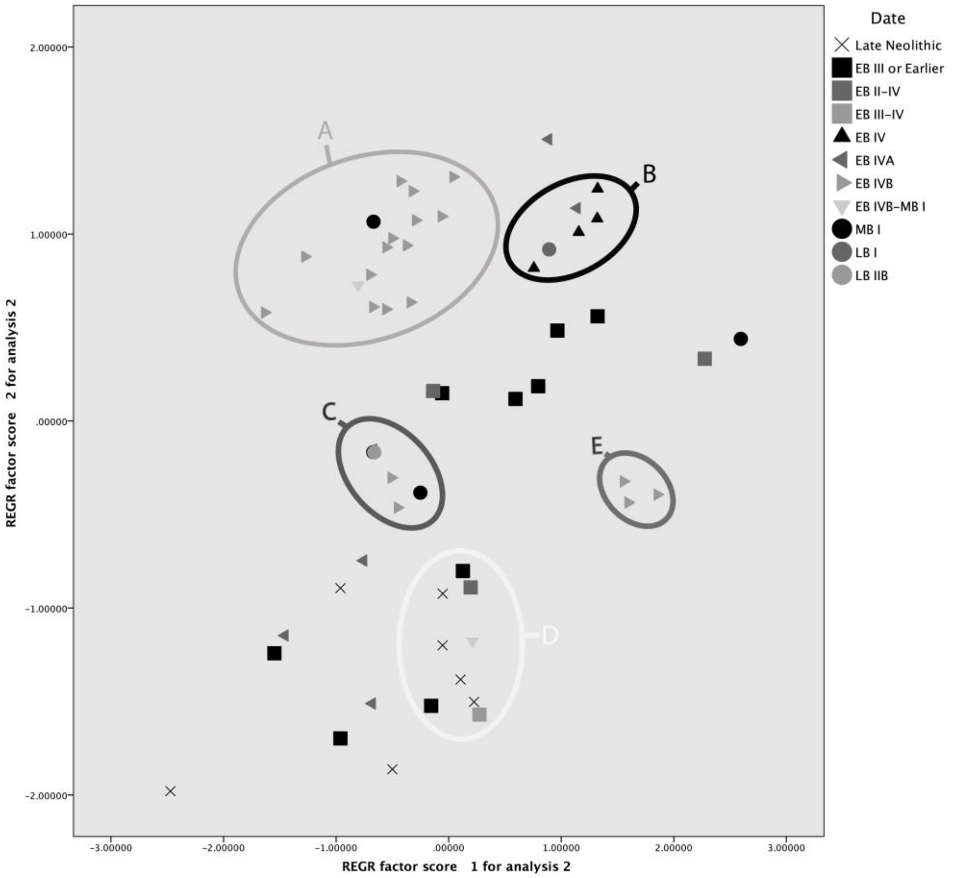

Figure 14. Plot of the factor scores generated from the principle components analysis of the chemical data generated by ICP –AES and –MS sorted by date. Factor 1 explains 52.1% of the variation and factor 2 explains 16.2%.

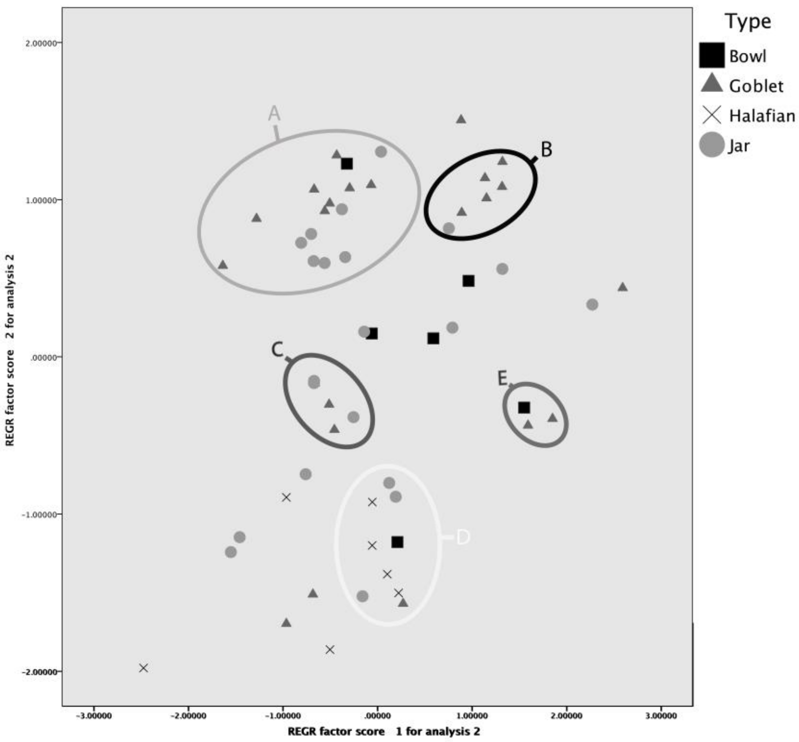

Figure 15. Plot of the factor scores generated from the principle components analysis of the chemical data generated by ICP –AES and –MS sorted by type. Factor 1 explains 52.1% of the variation and factor 2 explains 16.2%.

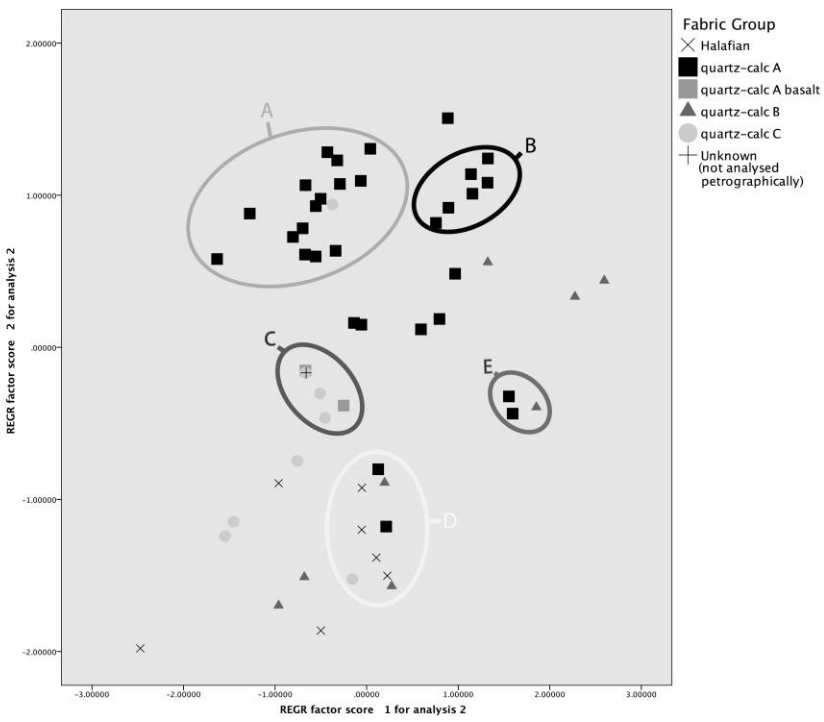

Figure 16. Plot of the factor scores generated from the principle components analysis of the chemical

data generated by ICP –AES and –MS sorted by petrofabric. Factor 1 explains 52.1% of the variation and factor 2 explains 16.2%.

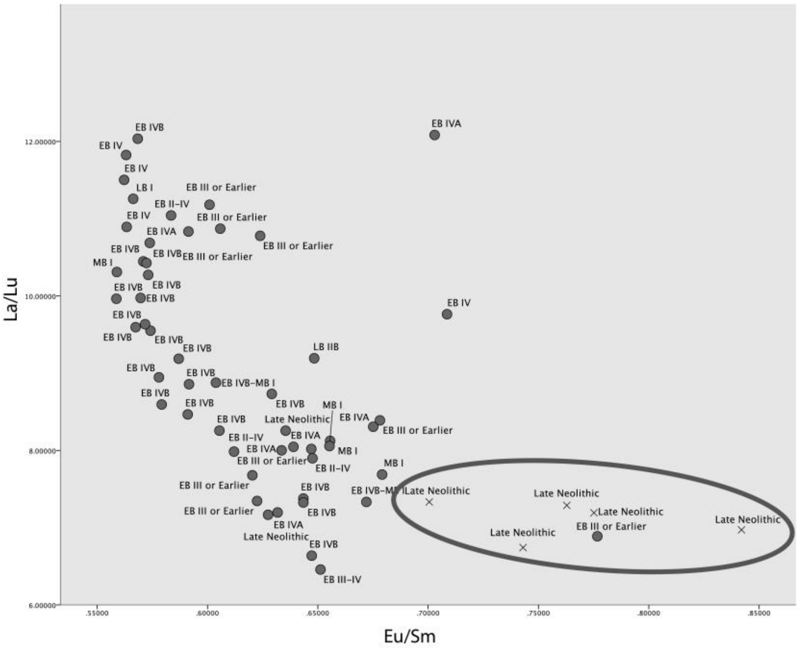

Figure 17. Plot of the La/Lu ratio and Eu/Sm ratios which are indicative of the parent materials of the clays used in the samples. The Halaf samples, though of a similar petrofabric to the later samples, exhibit a lower La/Lu ratio and a higher Eu/Sm ratio indicating a slightly different parent material.

Provenance, Comparative Petrography, and Technological considerations

The petrographic analyses demonstrate that the potters of the EB II–EB IV, over hundreds of years, consistently utilised a fine quartz–rich calcareous clay for producing hard jars, fine bowls, and goblets. Interestingly, the usage and preparation of clays in the EBA finds parallels with the earlier Halaf pottery, also examined as part of this study, although the geochemical results indicate a related, but different source for this material. The stratified Halaf ceramics from the Neolithic settlement of Arjoune were published by Campbell, Mathias and Phillips (2003: 33–35).

The petrofabric of the goblets and related vessels is often fine–grained and composed only a few commonly occurring mineral phases (mostly quartz) and rocks (limestone), presenting challenges for suggesting an exact provenience and understanding aspects of technology through petrography. The characteristics of Quartz–Calcareous fabric are consistent with clays formed on the Pliocene (N_2) formation as described by Ponikarov (1967: 147–148), and which outcrop extensively to the east of TNM (Ponikarov *et al.* 1963; **Figure 18**). Ponikarov (1967: 147) also notes that in some areas the section is topped by calcareous clays abundant with fresh water molluscs, which might be related to the sources utilised by the EB potters. Additionally, the basalt fragments noted occasionally are consistent with the Neogene outcrops directly abutting the Pliocene calcareous outcrops roughly 5 km north–west of TNM.

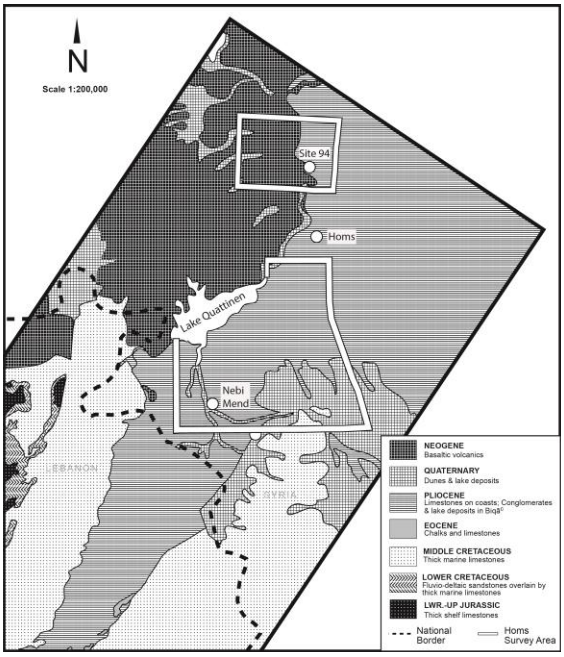

Figure 18. Geological map of the Homs area (after Ponikarov *et al.* 1963).

The clays used to produce all of the samples examined are consistent with a source around TNM. However, the geology in the area is uniform over a large area, making it difficult to identify positively specific clay sources around the site. A focused program of geoprospection, when circumstances in Syria permit, may help identify possible sources.

The results of the geochemistry inform on aspects of production, including suggesting a shared provenance for some samples, and reinforcing the idea that many of the EB IVB goblets result from a centralised mode of production. Further, the ICP results indicate that ‘Grey Ware’ and buff ‘Simple Ware’ jars, bowls, and goblets, especially those of the EB IVB reflect a shared production. This supports to the idea that these vessel forms would have been viewed as single, related class of products by their producers and, reinforces the typological assessment that these forms may have been a recognisable product of the area, in the wider region. Boileau (2006) and Welton and Cooper (2014: 330), in their synthesis of EB IV material from Tell ‘Acharneh, take a similar view, linking goblets to a broader range of types occurring within the assemblage from that site during the EB IV.

Without geoprospection for potential sources or the unearthing of EBA kilns in the area, the locus of production of these vessels remains a mystery, though the geochemistry suggests there were multiple sources in use throughout the EB IV. The majority of goblet and ‘Grey Ware’ samples belonged to Group A which contained samples exclusively from TNM. Group B, on the other hand, contained samples from both Qatna and TNM. The divide might represent two different production locations or might be diachronic. It is tempting to suggest Group A might be associated with TNM and Group B might be associated with Qatna or some related site, perhaps Tell Shair’at (see Moumar this volume), though the supporting evidence remains inconclusive. It is worth noting that typologically, the samples from TNM found in Group B were the only examples decorated with burnish (2 samples) and incision (1 sample), both previously noted as unusual within the TNM corpus, lending support to the suggestion that the Group B vessels would have been considered unusual or were imports to the area of TNM.

The vessels dating to the EB II–III, and EB IVA at TNM show a greater degree of chemical variability than those from the EB IVB (**Figure 14**). As mentioned earlier, these periods are characterised by a relatively low number of goblets. Perhaps in the earlier phases, more of the vessels originated from varied sources outside the region rather than being produced locally, while during EB IVB, from which a much greater number of goblets were recorded, a higher proportion were locally produced or acquired from a single source. A high proportion of imports when goblets first appear at TNM is consistent with the suggestion made above that the goblet tradition arrived at the site fully formed, and subsequently became a part of local ceramic production.

The use of fabrics very similar in description to our Quartz–Calcareous fabric for the production of similar vessel types during the EBA has been noted at Qatna (Maritan *et al.* 2005: 729; Fabrics 8 and 9), Sh'airat (Mouamar this volume: Fabric Group A), Tuqan (Santereli 2013, Vacca this volume: Fabric 3) and Ebla (Santereli 2013, Lazzrini and Colombo 1994, D'Andrea this volume: subgroup 2d). At 'Acharneh a fabric similar in texture and usage has also been noted, but differs slightly in composition as it is dominated by fine grained dolomite rather than limestone (Boileau this volume: dolomitic fabric group). The similarities in resource usage for potting at these sites are not surprising, as they are all located near calcareous marls similar to those around TNM. The consistent availability of similar clay resources across large parts of the northern Levant could have served to facilitate the sharing of technology and knowhow, partially accounting for the uniformity of paste preparation and shared elements of ceramic style across these areas during the period.

To the south a very similar petrofabric fabric is noted from samples of the Black Wheel Made Ware (BWW) from Tell Hizzin and Tell Fadous–Kfarabida (Genz and Badreshany *in prep.)*. The stylistic similarities between BWW and the TNM goblet assemblage are discussed in more detail below.

Technologically, the use of a quartz rich fabric would have contributed to the creation of a hard and durable vessel. The addition of varying degrees of limestone seems unrelated to vessel type, although it tends to be more common on larger vessels. In general, jars were made of a coarser and more varied fabric than goblets and bowls, which is unsurprising as the coarser pastes would have been necessary to help support larger vessels during their construction. Some fabrics are so fine it seems likely they were levigated (see Maritan *et al.* 2005 for comparative MBA examples of levigated fabrics).

Consistently and accurately estimating firing temperature of the samples in this set based on their petrographic characteristics proved difficult due to their relatively fine grain size, homogeneity, and composition. The samples were mostly composed of quartz, a mineral of little use for the visual assessment of firing temperature (Maggetti 1982). X–ray diffraction, though commonly used to estimate firing temperature in ceramics, could not be used in this study due to the limited amount of sample available. Based on the vitrification of the groundmass in a few samples it is possible to suggest the firing temperature exceeded 800^{O}C in some cases (Quinn 2014:191). However, many samples exhibited an optically active groundmass, typically consistent with a lower firing temperature (Quinn 2013: 190). In sum, while the samples were mostly well–fired only a few were fired to relatively high temperatures.

The Tell Nebi Mend Goblets in their Regional Typological Context

Recent analysis of the goblet assemblage of the Levant (sometimes termed 'Caliciform' pottery) has suggested that the corpus can be divided into five main groups or "provinces" on the basis of geographical distribution and typology (Welton and Cooper 2014: 332–335; **Table 6**).

"Province"	**Associated Sites**
Inland Western Syria	Tell Qarqur, Ebla, Tell Tuqan, Tell Afis, Tell Matsuma, Hama, Tell 'Acharneh, Al–Rawda, Dnebi and Tell 'As.
'Amuq	Tell Tay'inat, Tell Judaidah and Catal Höyuk.
Coastal Levant	Byblos, Tell Arqa and Simiriyan.
Euphrates	Shiyuk Tahtani, Qara Quzaq, Tell Kabir, Tell Banat, Tell es–Sweyhat and Selenkahiye.
Upper Orontes/Beqa'	**Tell Nebi Mend, Rafid, Yabrud, Tell Hizzin**
Southern Levant	Megiddo, Hazor, Tell Na'ama and Qedesh.

Table 6. Geographical Distribution of Levantine Goblet Assemblages as defined by Welton and Copper (2014) with the addition of the Upper Orontes/Beqa' group.

Of these five geographical/typological regions, "inland western Syria", specifically the Orontes watershed and its surroundings, have been viewed as the heartland of the Syrian 'Caliciform' tradition (Welton and Cooper 2014: 333), with the first examples of this ware identifiable in Phase J7 of the Hama sequence (Fugmann 1958: fig. 62: 3K219). However, on the basis of the TNM evidence, both typological and archaeometric, it would seem that the designation of "inland western Syria" is in need of further refinement.

On the basis of the evidence presented here, it would appear that just as the material from the lower Orontes/‘Amuq can classed as a distinct regional variant of the goblet/‘Caliciform’ tradition (Braidwood and Braidwood 1960: figs 338 and 342; Welton 2014: figs 4–5), so too can that from the upper Orontes. The ‘Caliciform’ culture of the Orontes corridor can therefore be divided into three distinct typological groups / regional provinces: “upper”, “central/middle” and “lower”. Indeed, in comparison to the “central/middle” and “lower/‘Amuq”, the upper Orontes, typified by the TNM sequence, is marked by a discrete chemical signature and number of distinct typological features, many of which are not extant in the traditional ceramic lexicon of the ‘Caliciform’ heartland. This is exemplified by the fact that the TNM corpus is marked overwhelmingly by ‘Grey Ware’ goblets, which account for almost 69% of the assemblage.

The TNM assemblage is also distinguished by the absence of traditional ‘Painted Simple’ wares, such as those identified at Ebla (D’Andrea 2015: figs 1–2) and Hama (Fugmann 1958: fig. 85: 3H124); as well as painted wavy–band decoration (Al–Maqdissi 1988: fig. 1: 10; Sala 2012: fig. 11: 28; Suleiman and Gritsenko 1986: fig. 1: 2) and zoomorphic designs (D’Andrea 2015: fig. 1: 11–16; Fugmann 1958: fig. 106: 4B825). In comparison to other regional goblet/‘Caliciform’ assemblages the TNM corpus is distinguished overwhelmingly by its insular nature, with comparatively few typological developments discernable throughout the later 3rd millennium BC (Kennedy 2015a: 310). This is also evidenced by the archaeometric analysis, which indicates that the bulk of the TNM goblets are characterised by a discrete chemical signature.

The Upper Orontes in Context: A New Levantine Goblet Assemblage

Geographically, the “upper Orontes” cultural horizon appears to have extended south from the Lake of Homs into the Beqa‘ Valley and is exemplified by material recovered mainly from mortuary sites, such as Tell Hizzin (Genz and Sader 2008; Genz 2010), Rafid (Mansfeld 1979), Yabrud (Abou Assaf 1967), it also appears to have extended as far east as Tell Shair’at on the central steppe (pers. comm Mouamar; see **Figure 19**) and into northern Lebanon (Genz and Badreshany *in prep.*). It is also characterised by a high degree of ceramic “conservatism”.

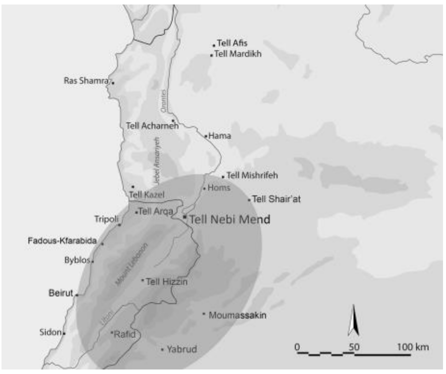

Figure 19. Distribution of the upper Orontes/Beqa‘ ‘Caliciform’ Tradition.

The “upper Orontes/Beqa‘” province is distinguished predominantly by ‘Grey Ware’. While ‘Grey Ware’ goblets are found further north in the central/middle Orontes and in the lower Orontes at sites such as Tell ‘Acharneh (Cooper 2006: 154), Ebla (during the EB IVA) and Tell Ta‘yinat (Braidwood and Braidwood 1960: pl. 88: 2; Welton 2014: fig. 4: 17), they occur infrequently. The higher frequency of ‘Grey Ware’ examples from the upper Orontes and the Beqa‘ suggests that in these areas, this ceramic type was the principal focus of production and distribution.

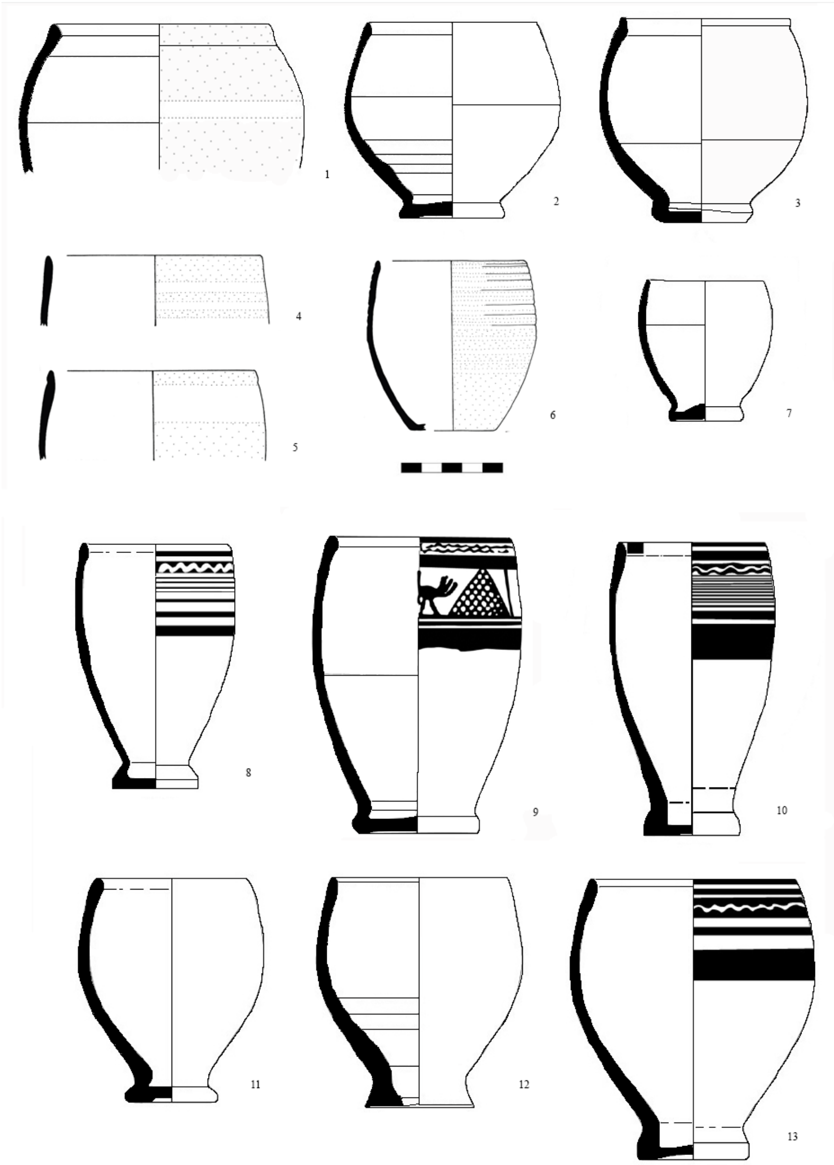

Figure 20. Goblet forms from upper Orontes/Beqa‘ (1–7) and the central/middle Orontes and ‘Amuq (8–13). 1, 4–6: Tell Nebi Mend; 2–3: Rafid (re–drawn after Mansfeld 1970: pl. 38.5, 39.7); 7: Tell Hizzin (re–drawn after Genz and Sader 2008: pl. 1: 1); 8: Hama (re–drawn after Fugmann 1958: fig. 106: 4B823); 9: Ebla (D'Andrea 2015: fig. 1: 13); 10: Saraqeb (Sulieman and Gritensko 1986: fig. 1: 1); 11: Tell Ta‘yinat (Braidwood and Braidwood 1960: fig. 338: 9); 12: Ebla (D'Andrea and Vacca 2015: fig. 3: 10); 13: Tell Masin (du Mesnil du Buisson 1935: fig. XLIX: 30).

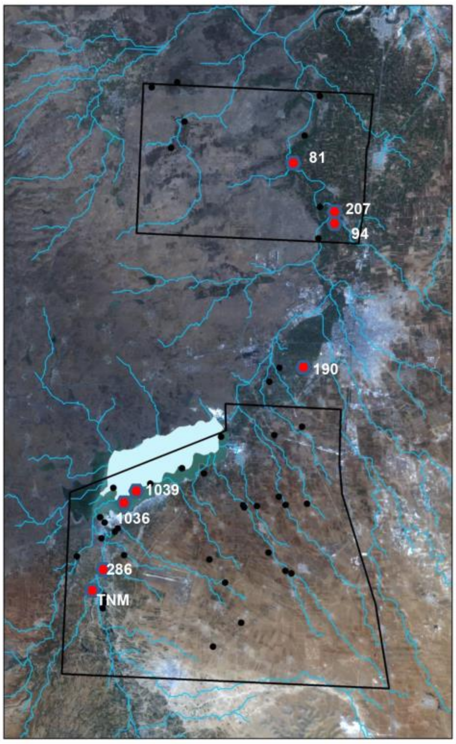

Figure 21. Map showing location of sites that produced ceramic samples used in this study. Site numbers are those of the SHR Project., with sites are plotted over a Landsat Thematic Mapper Image collected in October 1987. Small black dots are other sites with EB IV occupation. Watercourses reconstructed from SRTM 90 m Digital Elevation Model.

Typologically, examples from the upper Orontes and the Beqa‘ are characterised by smaller, squat and more globular forms, as opposed to the larger more conical and elongated variants of the ‘Caliciform’ heartland (see **Figure 20**). Yet despite these typological differences, rim forms are generally analogous, with simple, up–right, incurving thickened forms predominating (see Castel *et al.* 2005: fig. 13: RW1.2155.1; Dornemann 2003: fig. 198: 5; du Mesnil du Buisson 1935: fig. 39: 180; Fugmann 1958: fig. 62: 3K218; Thalmann 2006: pl. 56: 12). Surface treatment was generally simple, with vessels distinguished by one of three decorative schema: a single painted horizontal band (Genz and Sader 2008: pl. 1: 2; Kennedy

2015a: fig. 80: 28; see **Figure 4: 6**); multiple horizontal bands (Abou–Assaf 1967: taf. III: 24; Kennedy 2015a: figs 80: 29 and 38); and a single wavy band surrounded by horizontal bands (Genz and Sader 2008: fig. 3).

The apparent "conservatism" of the TNM corpus and the upper Orontes/Beqa' cultural horizon as a whole is in stark contrast to the more traditional 'Caliciform' culture of the central/middle Orontes and the Ebla *chora*, which was marked by considerable evolution of form and decorative schema throughout the second half of the 3rd millennium BC (D'Andrea 2015: 206; Mazzoni 2002: 70–71; Sala 2012: 75–77; Welton and Cooper 2014: 328–331). The "conservatism" of the TNM sequence in regards to both typology and archaeometry, is of particular note, as one of the major epicentres of the 'Caliciform' tradition, Hama, is located only 80 km to the north, with the two sites linked directly by the Orontes. The apparent disjunction between the sequences suggests that a cultural/ceramic interface lies somewhere between the two sites, perhaps in the vicinity of the modern Lake of Homs/Lake Qatina (see Moussli 1984: abb. 1). Although the initial date of construction for the dam has been extensively debated (Calvet and Geyer 1992: 32; Philip 2007: 238), this region appears to have functioned as a significant boundary throughout antiquity, marking both the northern and southern extents of numerous geo–political territories, a feature that can be seen in both the MBA and the LBA (Bourke 1991; Philip 2007: 238–240; Ziegler 2007: 314). The potential therefore remains for this region to have its origins as a geo–political boundary or interface much earlier, perhaps during the terminal centuries of the 3rd millennium BC.

Most intriguingly, the influence or distribution of this ceramic province appears to have extended into the marginal landscapes of the steppe, with large quantities of 'Grey Ware', almost identical to those from sites such as TNM and Tell

Hizzin, identified at Tell Shair‘at (Mouamar this volume) and in the settlements of the Hauran such as Khirbet al–‘Umbashi (Braemer *et al.* 2004: fig. 584). The appearance of both traditional ‘Caliciform’ variants and ‘Grey Ware’ examples in contemporary depositional contexts, suggests that differentiation is not so much chronological as regional, with Shair‘at potentially marking the eastern boundary/interface between the central/middle Orontes ceramic production zone and that of the upper Orontes/Beqa‘. The role of the steppe during the EB IVB needs to be explored in greater depth, particularly as a number of its large settlements, such as Tell al–Sūr (Mouamar 2014: 97, 100), Tell Munbatah (Mantellini *et al.* 2013: 179–180; Peyronel 2014: 125) and Khirbet al–Qasr (Castel *et al.* 2014b: 2–10; 26–31), continued to be occupied or were expanded significantly during this period.

Connections with Southern Levantine Black Wheel–made Ware and Elite Emulation

The idiosyncratic nature of the upper Orontes/Beqa‘ ‘Caliciform’ culture with its predominance of oxidised and reduced wares finds its best parallels to the south in Black Wheel–made Ware (henceforth BWW). First identified by Guy and Engberg (1938: 148) at Megiddo, this ceramic type is generally distinguished by a grey interior and exterior hue, decorated with white painted wavy or horizontal bands. In terms of distribution, instances are generally restricted to the Lebanon (both north and south) and northern Palestine with a concentration of examples in the Hulah Valley at Hazor (Bechar 2015: 29). Examples have also been identified at Tyre (Bikai 1978: pl. LVI: 11–13), Ma‘ayan Baruch (Tadmor 1978: fig. 8), and Qanat al–Ja‘ar (Bechar 2015: 29), with isolated examples identified as far south as Tell Beit Mirsim (Cohen and Dever. 1981: 63) and Khirbet Iskander (Richard and Borass 1988: 110; Richard and D’Andrea 2016: fig. 1; 574–576).

Analysis undertaken by Tadmor (1978) and Greenberg *et al.* (1998: 23) suggests that BWW was a locally produced ware, most probably imitating northern Levantine exemplars. Numerous parallels of form can be discerned between the BWW of the southern Levant and the goblets of the upper Orontes/Beqa‘ (see **Figure 20**). Typologically, both wares were distinguished by a squat, globular form, with most examples fired in an oxidised atmosphere (Bechar 2015: 40; Kennedy 2015a: 195–197). Several direct form parallels can be discerned between the upper Orontes/Beqa‘ group and BWW, such as TNM type 3A and Tell Hizzin (see **Figure 4: 5**; Genz and Sader 2008: pl. 1: 2), and examples from Qedesh (Tadmor 1978: fig. 8: 70–229) and Mitlol Zurim (Getzov *et al.* 1995: fig. 8: 1). Analogous teapot forms are also identifiable at TNM (Matthias 2000: fig. 23.5: 86), Megiddo (Guy and Engberg 2000: pls 20: 13; 22: 4) and Hazor (Bechar 2015: fig. 6: 1).

Bunimovitz and Greenberg (2004; 2006) hypothesize that an increase in drinking paraphernalia during the EB IV period was indicative of the wider phenomenon of social and cultural “transformation” that swept across the southern Levant at the end of the 3rd millennium BC. They argue that the collapse of the earlier ‘urban’ horizon of the EB II–III left a void, which needed to be filled by new modes of ideological expression, and that the large–scale adoption (or co–option) of ‘Syrian’ drinking customs served this function (Bunimovitz and Greenberg 2004: 27–28; 2006: 28). Moreover, the adoption of drinking paraphernalia and the emulation of northern elites provided the inhabitants of the southern Levant with new mechanisms for defining rank, sophistication and self–expression in a post–urban world (Bunimovitz and Greenberg 2004: 28).

Kennedy (2015a: 203–204) has previously argued that far from being an exclusively southern Levantine feature, elite emulation was also an important and integral feature of the northern Levant, with the typologically conservative nature of the TNM corpus perhaps the best example of this phenomenon. The distinct nature of the upper Orontes/Beqa‘ horizon and its similarities with BWW, would indicate that if the BWW can be described as an expression of elite emulation (Bunimovitz and Greenberg 2004), it is an emulation of the upper Orontes/Beqa‘ rather than the heartland of the Syrian ‘Caliciform’ tradition. This supposition would appear to be confirmed by the various chronological developments of the upper Orontes/Beqa‘. At TNM ‘Grey Ware’ goblets first appear at the very beginning of the EB IV, during Phase O (ca. 2600–2500 BC), whilst instances of BWW in the south date later to ca. 2350/2300–2000 BC on the basis of relative dating (Bechar 2015: 47–49). BWW is also distinguished by painted or reserved slipped wavy–bands (Bechar 2015: figs 5–6; Greenberg 2002: fig. 3.18: 14; Tadmor 1978: fig. 8). In the northern Levant this decorative schema first appears during the EB IVB, after the destruction of Palace G at Ebla (ca. 2340/2280 BC or 2310–2300 BC; see Kennedy 2015c: 200; Lebeau 2012: 305, 308; Mazzoni 1985: 15; 2002: 76, 79; Matthiae 2009: 54; Sallaberger 2007: 423, Table 1; Sallaberger and Schrakamp 2015: Table 10.1; Welton and Cooper 2014: 330–331). Likewise, wavy–band decoration can be identified in Phase J in the ‘Amuq (Braidwood and Braidwood 1960: 106; figs 342: 6–7 and 9) and from J5 at Hama (Fugmann 1958: fig. 74: 3G696), offering a useful (relative) *terminus post quem* for the appearance of this decorative schema in the southern Levant and reinforcing the suggestion of a later adoption date for this tradition in the southern Levant.

Summary and Conclusions

Analysis of the Tell Nebi Mend goblet assemblage suggests that the upper Orontes formed a discrete cultural and ceramic unit, characterised by a relatively restricted typological assemblage and the local production of ‘Grey Ware’ goblets throughout the Early Bronze Age IV. This horizon or sphere of influence appears to have extended into the Beqa‘ Valley, northern Lebanon, most probably via the ‘Homs–Tripoli Gap’, appearing a little later in northern Palestine in a local variant form recognised archaeologically as Black Wheel–made Ware. The potential spread of the ‘Grey Ware’ tradition from the upper Orontes into the Beqa‘ and in turn to the southern Levant, is part of a long tradition dating as far back as the Neolithic; with the distribution of the ‘Grey Ware’/Black Wheel–made Ware tradition mirroring the earlier spread of Dark–Faced Burnished Ware (Badreshany 2016). The links between the upper Orontes and the Beqa‘ Valley need to be explored further, however, it is becoming increasingly apparent that an important cultural synergy existed between these two regions throughout antiquity (for the strength of contact between the two areas in the Graeco–Roman period see Reynolds [2014]).

This upper Orontes/Beqa‘ Valley horizon differed somewhat from the traditional, northern heartland of the Syrian ‘Caliciform’ tradition, which was marked by a greater variety of types and styles, as well as significant evolution of form and decorative schema. These facets are most probably related to different scales of production, and perhaps a greater demand for this product in the north. At TNM appears that the goblet tradition was re–contextualized within a pre–existing local ceramic industry, and that the apparent constraints on its elaboration may have been a symptom of the constraints on that local industry more generally. Yet despite the apparent typological and archaeometric differences identified throughout the Orontes watershed, and the developing trajectory of urbanisation that characterised this region as a whole, a degree of ceramic continuity was maintained across the EBA at TNM. The bulk of the TNM ceramic and goblet assemblage was characterised by a similar chemical signature, suggesting a strong tradition of local production and distribution. This was maintained across the Early Bronze Age, indicating that although Tell Nebi Mend, the upper Orontes and the Beqa‘ were not part of the classic ‘Ebla’ world, nor were they on the periphery during the late 3rd millennium BC.

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