

# The New Swedish Cyprus Expedition 2013 Excavations at Hala Sultan Tekke

Preliminary results. With contributions by R. Árnadóttir, M. Mehofer, F. Köstelbauer, A. Satraki, L. Mazzotta & A. Trecarichi, D. Blattner, B. Stolle & A. Miltiadous Johansson

## Abstract\*\*

The results from a 1.3-hectare GPR survey in 2012 were confirmed during the 2013 excavation of a limited area (200 m<sup>2</sup>). Three phases of occupation were partly exposed. The most recent phase, Stratum 1, contained living and working facilities, e.g. for spinning, weaving and purple dyeing. Textile production also took place in the older Stratum 2, where the major activity was metal-working: 300 kg of remains from copper-working consist of tapped slag, furnace walls, fragments of at least five tuyères, crucible fragments, copper/bronze fragments and pieces of raw copper. Another of these unique kraters of White Painted Wheel-made Pictorial Style (WPPS) was found. It was termed “Horned God Krater” on account of one of the decorative elements. These kraters may indicate that there was a “Hala Sultan Tekke painter”. The oldest phase of occupation so far, “Stratum 3”, which is a reused and looted tomb, produced two cylinder seals and numerous finds which are related to textile production. The findings from test trenches west of the main area suggest a street which separated two city quarters: one to the east (our main area) and one to the west. Test excavations in the western city quarter produced two anthropomorphic figurines and a horse figurine.

**Keywords:** GPR, textile production, metal work, loom weight, fibula, Cypriote pottery, Mycenaen pottery, figurine, cylinder seal

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## Introduction

Over three seasons, from 2010 to 2012, a large compound with living and small industrial facilities was exposed in Area 6 of the Late Bronze Age city of Hala Sultan Tekke.<sup>1</sup> Three occupational layers could be determined: Stratum 1, the most recent phase of occupation, can be roughly dated to the first half of the LC III period. The date of Stratum 2 is anywhere in the period LC IIA2 to LC IIC, and most likely in the latter, which is based on the presence of complete Base-ring I and Mycenaean-type vessels (FS149).<sup>2</sup> The remains of Stratum 3 are scanty: this phase has been uncovered only at a few spots, and a more precise dating has not been possible so far.

A Ground-Penetrating Radar (GPR) survey in June 2012, which covered 1.3 ha, revealed new man-made structures of stone to the west and south of Area 6 (*Fig. 2*).<sup>3</sup> The results indicate massive structures of stone in previously unidentified quarters within the urban landscape of Hala Sultan Tekke (*Fig. 3*). The most striking, and therefore highly interesting,

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<sup>1</sup> Fischer 2011, 2012a; Fischer & Bürge 2013.

<sup>2</sup> See Fischer 2012a; Bürge 2012.

<sup>3</sup> Trink & Fischer in Fischer & Bürge 2013, 57–59.



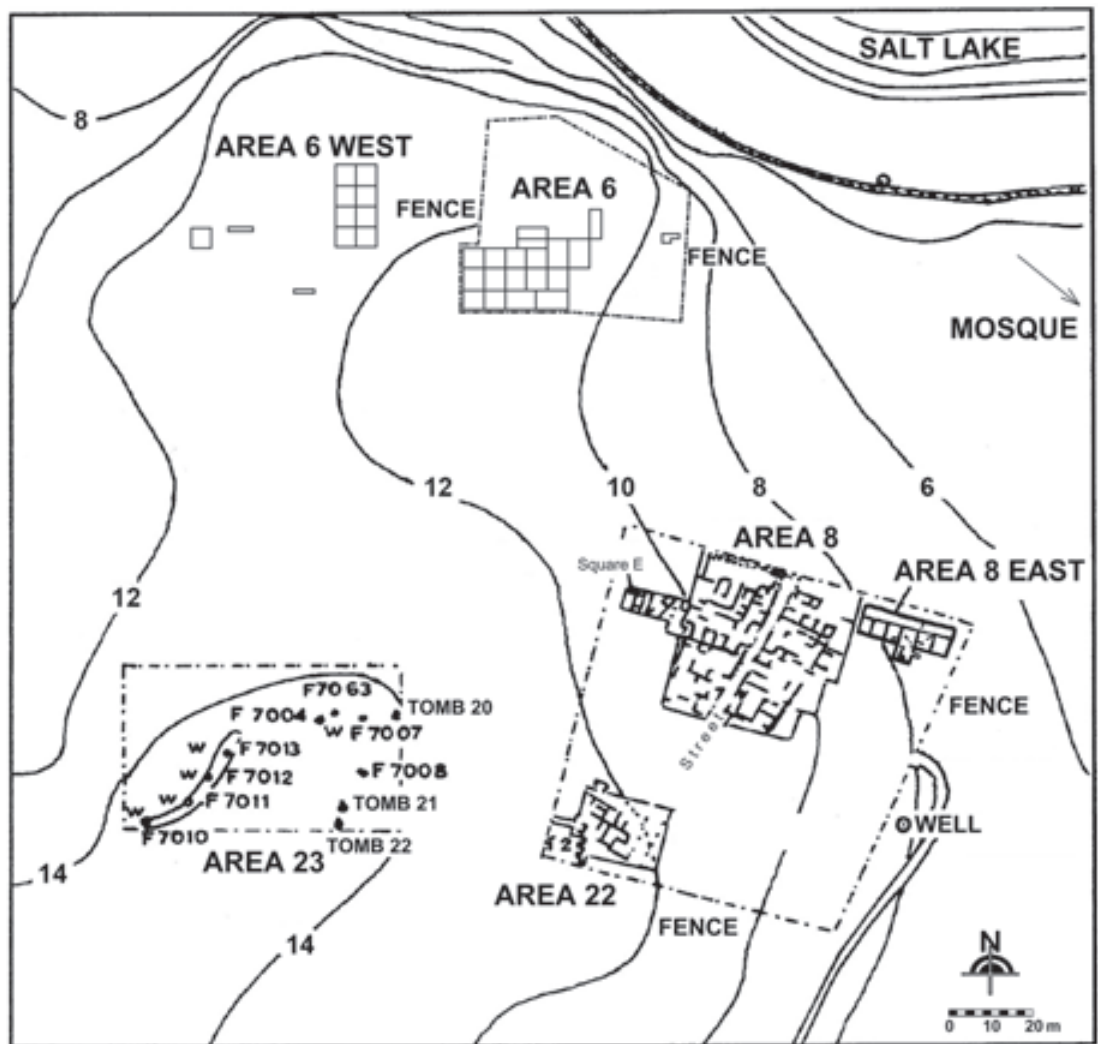
*Fig. 1. The team of 2013 during the visit of Clas Gierow, the Swedish Ambassador to Cyprus (photo by T. Bürge).*



*Fig. 2. The GPR survey of 2012 (processed by I. Trinks).*



Fig. 3. Overview of the areas of excavations (adjusted drawing by T. Bürge).



architectural structures are located in an area extending some 75 m to the west of Area 6 (Area 6 West, henceforth abbreviated as Area 6W), measured from the western part of the fence of Area 6. The radar images show a compound that consists of clearly defined walls surrounding a central rectangular room, which is oriented north by north-west (A in Fig. 2). This complex covers some 35 m × 30 m and is located 30–40 m west of Area 6. At the westernmost part of the surveyed area, additional structures in the form of perpendicular stone walls were visible in the GPR data (B in Fig. 2). The radar data strongly indicated a 10-m-wide band (assumed to be a stone-paved street; C in Fig. 2), oriented from north by north-west to south by south-east, which separates the western city quarter from the larger building complex in Area 6 West, i.e. to

the west of Area 6 (Trenches 1–9).<sup>4</sup> Additional stone-built structures were indicated to the south-east of the fenced Area 6 (D in Fig. 2).

Guided by the GPR data, excavations directed by P.M. Fischer were carried out in Area 6 West from 13 May to 14 June 2013 (see overview in Fig. 4 and panoramic aerial photograph in Fig. 5). The area that was opened up extends 10 m from west to east and 20 m from north to south (Trenches 10A–D, 11A–B, 12C–D). In addition, three test trenches

<sup>4</sup> The terminology of the trench system and other features is described in detail in Fischer 2011, 74. In principle, each trench in our grid system is 10 m × 10 m in size. The numbering is consecutive regardless of area or year of excavation; 10 m × 10 m squares are as a rule divided into four sub-trenches and labelled (going clockwise) with the suffixes A–D, e.g. Trench 10A–D (2013).

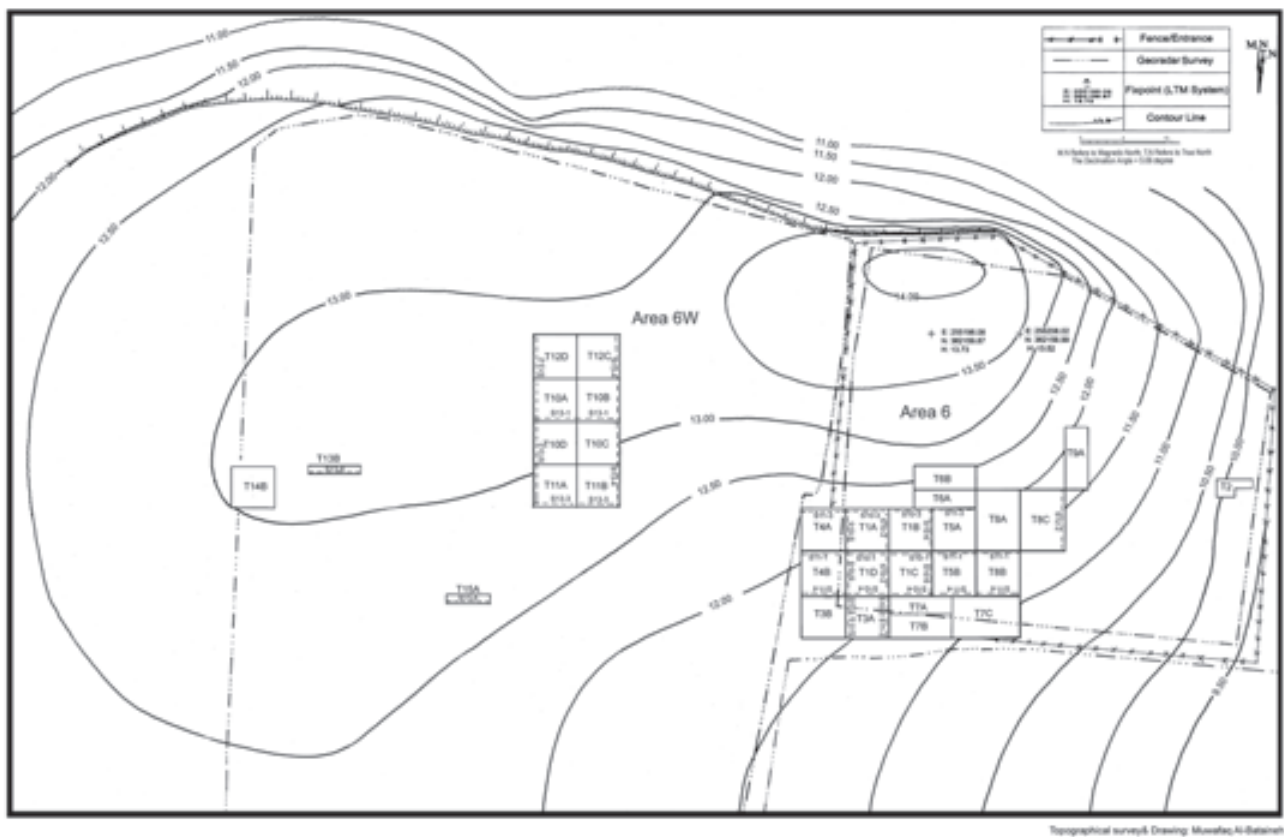


Fig. 4. Contour map and overview of Areas 6 and 6W, trenches 2010–2013 (drawing by M. Al-Bataineh).



Fig. 5. Aerial photograph taken from the north—Area 6 is left, and Area 6W is centre and right—during the excavations (photo by A. Ioannou).

(Trenches 13B, 14B and 15A) were opened west of Trenches 10–12. During a survey in an eroded area, a tomb (“Tomb” A) close to the mosque was discovered and excavated (see Appendix 1).<sup>5</sup>

## Results from the excavations in 2013

### STRATUM I (TRENCHES 10A–D, 11A–B AND 12 C–D; FIG. 7; SECTIONS IN FIG. 6A–C)

This stratum starts approximately 0.2–0.3 m below the ploughed soil. The thickness of Stratum 1 is around 0.3 m in the northern part (Trenches 12C, D and 10A, B) and around 0.2 m in the southern part (Trenches 10C, D and 11A, B). The remains of two compounds separated by a passage 1.3 m wide were partly exposed. The outer dimensions of the northern structure are roughly 6 m × 5.4 m. There are two rooms in the northern structure (R22 and R23). The southern structure stretches from the centre of the excavated area to the southern end. This structure extends at least 10 m from west to east and 12 m from north to south, and it contains seven walled spaces (R24–30). The longitudinal axis of both structures runs from north by north-west to south by south-east.

### STRATUM I: NORTHERN STRUCTURE

The northernmost space, R22, is bordered by W54 and W53. It is 4.5 m wide. There are mudbricks which most likely belonged to a basin or a nearby crushed vessel where textiles were dyed purple (*Fig. 8*): stains of purple dye were found spread around the mudbricks. A Mycenaean piri-form jar (L384-1; *Fig. 29:2*) comes from R22. Small finds from this room consist of six loom weights of fired clay (N157, N159–161, N170, N210), two pestles (N187, N211) and a stone weight (N171). Textile production and dyeing seem to have been the main functions of this room (see Appendix 6).

South of R22 is R23. The southern and eastern walls of R23 (W51 and W52) are built on a stone-paved gutter (L301, L386), which was covered by fine clay and ashy soil. A mould for a ring (N152; see Appendix 5; *Fig. 9*) was found in the gutter south of W51. R22 is accessible from R23 via a doorway in W53, and from the exterior through an entrance in W54. It is 4.4 m × 2.6 m in size and is subdivided by a small partition wall or bench into

<sup>5</sup> Additional minor reports by other authors are included in the main text. More comprehensive reports/studies are published as appendices.

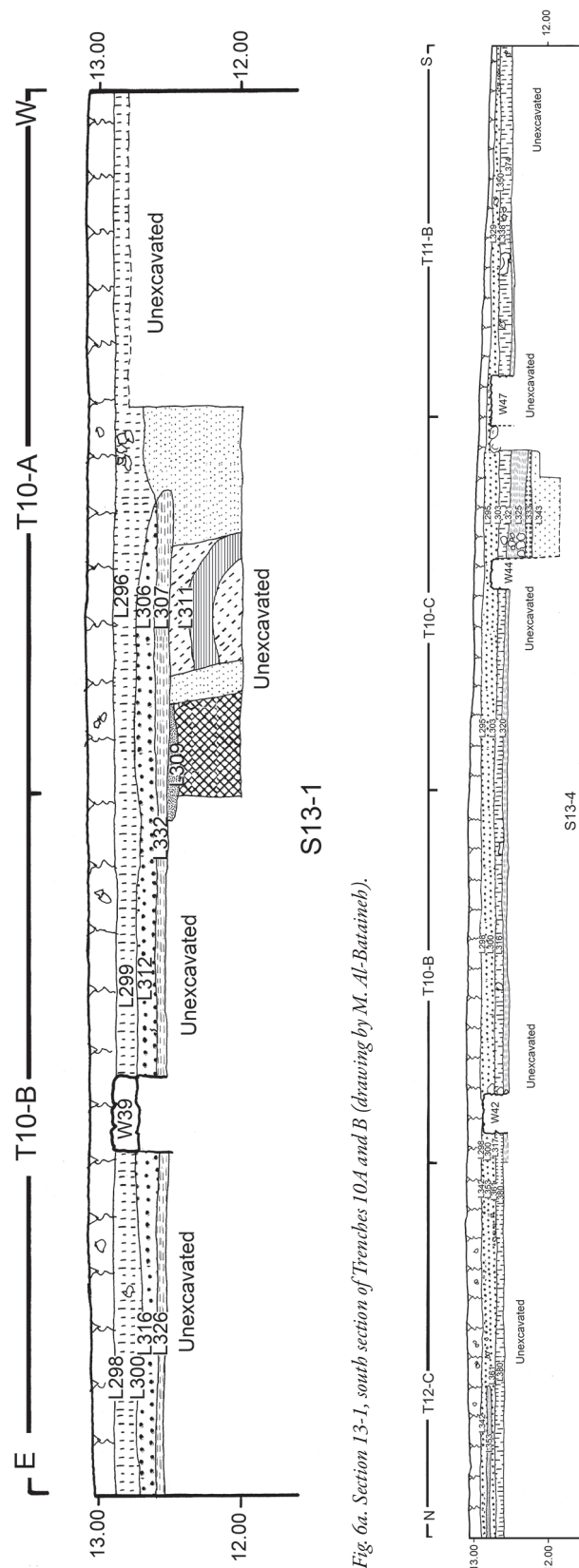


Fig. 6a. Section 13-1, south section of Trenches 10A and B (drawing by M. Al-Bataineh).

Fig. 6b. Section 13-4, east section of Trenches 12C, 10B and C, and 11B (drawing by M. Al-Bataineh).

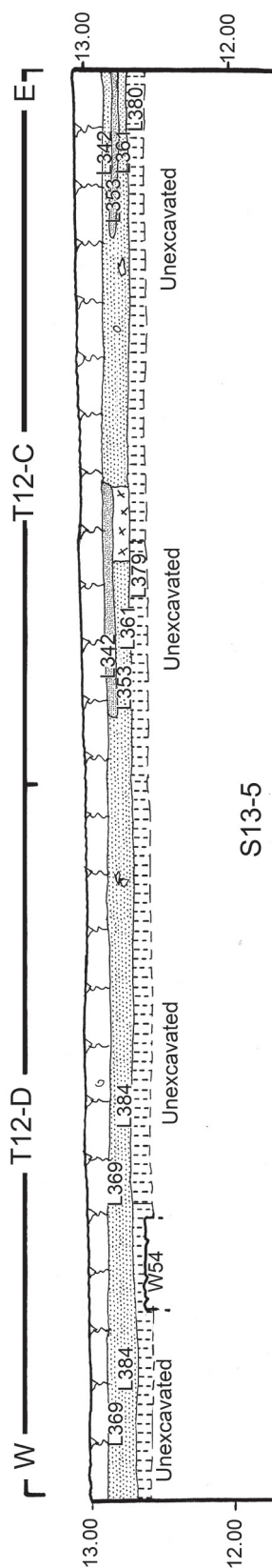


Fig. 6c. Section 13-5, north section of Trenches 12D and C (drawing by M. Al-Bataineh).

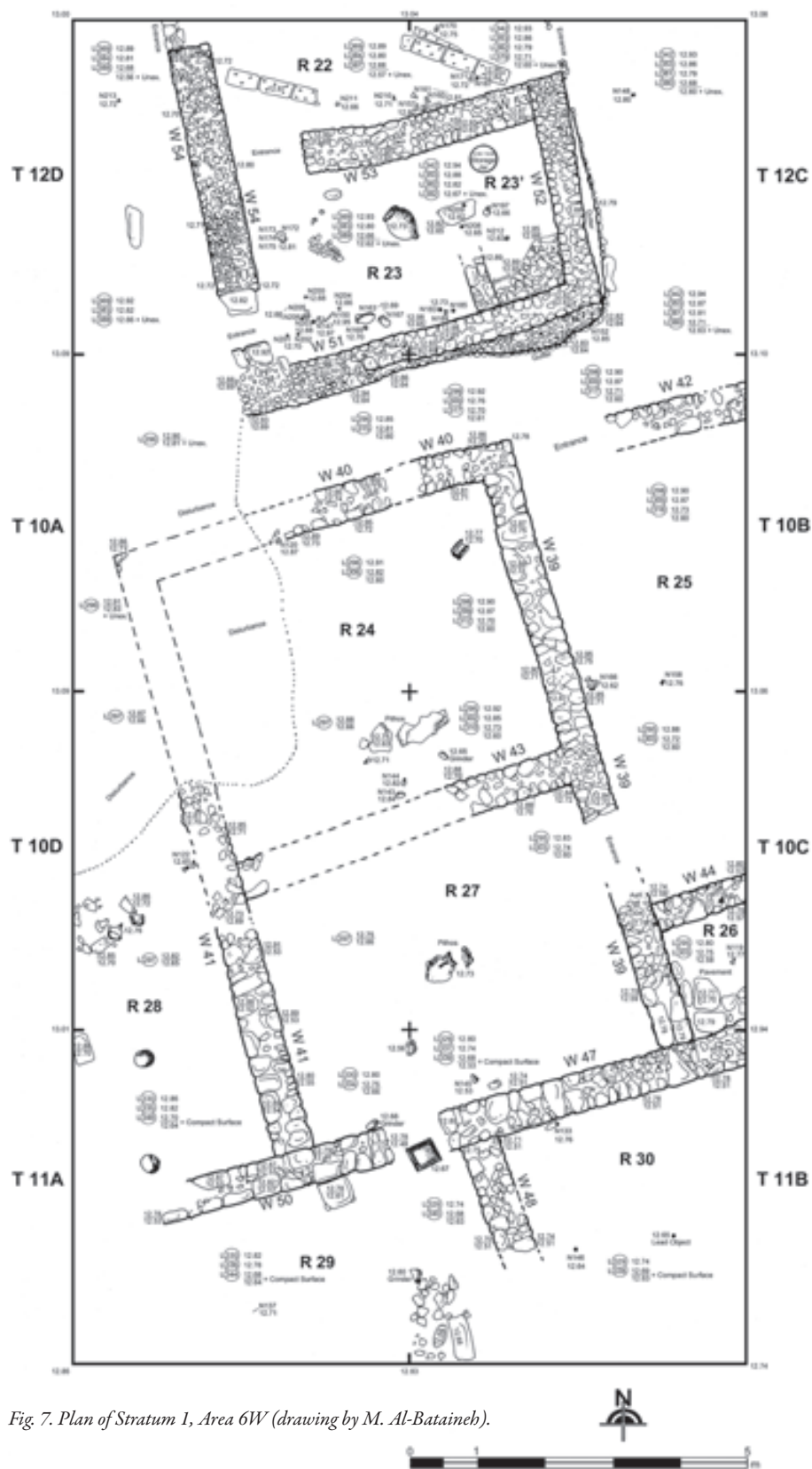
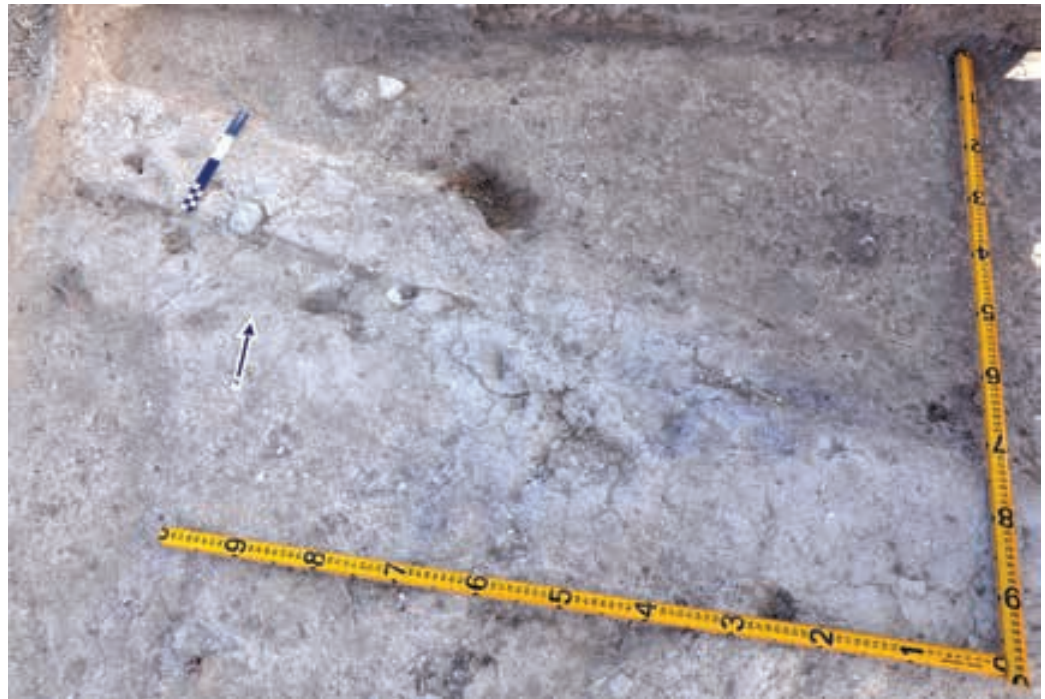


Fig. 7. Plan of Stratum 1, Area 6W (drawing by M. Al-Bataineh).



Fig. 8. Basin of mud-brick with purple stains centre and right (photo by P.M. Fischer).



a larger space to the west (dimensions 3.0 m × 2.6 m) and a smaller one to the east (R23, dimensions 1.0 m × 2.6 m). The western room contained several intact ceramic vessels which were covered by destruction debris (Figs. 10 and 11): two pilgrim flasks of Plain White Wheel-made ware (N167, N172), a large vessel which functioned as a funnel (L383-5; Fig. 29:11), a Plain White Wheel-made jug with a trefoil mouth (N163), and a White Painted Wheel-made Geometric Style (WPGS)<sup>6</sup> spouted juglet (N205). A spindle whorl of stone (N173), another one of blue glass (N174), and a spherical bead of turquoise (N175) were found inside one of the pilgrim flasks (N172). Other finds include a figurine of White Painted ware (N147), a toggle pin (N150) and a number of stone tools, the majority of which were pestles (N168, N183, N184, N185, N199–204, N206). Two stone tools (N208, N209) were found in the doorway to the smaller room to the east. There is also the ceramic part of what is likely a pot bellows (L369-5).

<sup>6</sup> See the discussion on the problematic terminology of White Painted Wheel-made I–III in Fischer 2012b. This terminology was created by P. Åström (1972, 276–289) who, on several occasions, stated that “it is not possible to attribute correctly ... to White Painted Wheel-made I, II or III ...” (e.g. P. Åström 1972, 270 n. 1). It becomes clear that the differentiation of these three sub-types seems to be based on the suggested dating of the specific context in which they were found rather than on absolute diagnostic criteria. Based on this study, the terms “White Painted Wheel-made Pictorial Style (WPPS)” and “White Painted Wheel-made Geometric Style (WPGS)” are used during the current project. The latter group includes locally produced pottery of Mycenaean style.



Fig. 9. Stone mould N152 from Stratum 1 (photo by P.M. Fischer, drawing by M. Al-Bataineh).

A bench of stone, which was built against W51, provided a work surface. A one-handed lentoid flask with red pattern-burnished slip was found in this room (N197), together with a fragment of a White Painted Wheel-made Pictorial Style (WPPS) krater (L382-1; Fig. 29:6), a large storage vessel and a stone tool (N212). These two spaces had several functions, including spinning and the preparation of food. The large funnel-shaped vessel (Fig. 29:11) was certainly used to filter liquids, in one or both of the following ways: either a piece of fabric, which functioned as a filter, was tightened against the collar on the lowest part of the vessel; or the lower part of the vessel was filled with, for instance, stones of approximately 2



Fig. 10. Destruction level Stratum 1 (photo by T. Bürge).

cm, which functioned as a coarse sieve. This vessel was possibly used in the production of cheese.

A White Painted Wheel-made Geometric Style bowl (L388-1; *Fig. 29:3*), a cooking pot (L369-3; *Fig. 29:9*), an unfinished spindle whorl of sandstone (N213) and, to the south, a large grinding stone derive from west of the structure described above. A faience bead (N148) and a tripod cooking pot (L361-6; *Fig. 29:10*) come from east of this structure.

### STRATUM I: SOUTHERN STRUCTURE

The north-westernmost space of this structure, R24, is bounded by walls W40, W39, W43 and W41. It is 5.0 m × 4.0 m. It contained a White Painted Wheel-made Geometric Style/Mycenaean-type krater (L296-5; *Fig. 29:1*), two loom weights (N143, N144), a bronze ring (N120), a grinding stone, a water channel of hewn limestone which was found not in its original position, a fragment of a wall bracket (L312-1), a part of a tuyère/torch (L297-3),<sup>7</sup> an arm of a Psi-figurine of White Painted ware (L302-1), and fragments of a large pithos. The western and north-western portions of this room were affect-

ed by a disturbance which also affected Stratum 2 (see below). The function of this space is difficult to assess.

The next space to the east, R25, could be entered from the north via W42 and from the west via W39. It is bordered by W42, W39 and W44. It is 6.6 m × at least 3.5 m in area. Finds from this room include a complete loom weight of clay (N158), a jug of wheel-made Bucchero ware (L300-10; *Fig. 29:8*), a fragment of a Mycenaean IIIB(?) krater (L300-1; *Fig. 29:4*), and a bowl of Red Slip Wheel-made ware (L316-3). From the southern part of R25 came a 34-cm-tall, fairly complete, Mycenaean-style piriform jar (N166; *Fig. 12*). It is bichrome-decorated with matt colours: the black-painted neck is enclosed by red lines on the rim and below the neck. The shoulder zone is between two red bands and decorated with an “upside-down” red-painted scale pattern, which is arranged in three large triangles between the three handles. Below this triple motif on the belly, there are horizontal bands in red, black and red again. This pattern is repeated on the lower part of the vessel. The raised ring-base is painted red. The three handles are decorated with framed chevrons.

To the south of R25 is another small, walled space, R26, which is 1.7 m wide, stone-paved and bordered by W44, W39 and W47. This structure was originally built in Stratum 2 (see below). Two loom weights (N118, N119) were found in the debris above this space. Both spaces seem to have been

<sup>7</sup> See the discussion on tuyères contra torches below.



involved in the manufacture of textiles. The fireplace (L304) on top of W39 is of more recent date. It may belong to squatters who temporarily dwelled there at some point after the general abandonment of the city.

R27 is to the west of R25/26 and could be entered via an entrance in W39. This room contained a loom weight (N145), a fragment of a White Painted Wheel-made Pictorial Style krater (L303-4; *Fig. 29:5*), a pithos (L303-5), a cooking pot (L339-2), two grinding stones and a dislodged fragment of a stone water channel. It is plausible that this room was used for the preparation of food and textile-production-related activities.

This room had no clear connection with the space to the west, R28. Two vessels of Plain White Wheel-made ware (L297-11, -12) and murex shells point to the dyeing of textiles (L297). Other finds from R28 are a loom weight (N122) and parts of two tuyères/torches (L335-1, -2). This space was obviously an open or partly roofed courtyard.

The two southernmost spaces, R29 and R30, are reused from Stratum 2; they were only partly excavated. The western space, R29, was connected with R via a doorway between W50 and W47. A basin of hewn limestone, 0.4 m × 0.4 m × 0.1 m in size, was found in the doorway—obviously not in its original position. Remains of a stone pavement and traces of a havara floor are preserved. The fairly large, flat stone which was placed against W50 represents a working surface. A toggle pin of bronze (N137) was found in this space. R29 was most likely an open courtyard.

R30 is bordered by W47 to the north and W48 to the west. Finds from this space include a complete large violin bow fibula of bronze (N133; *Figs. 13a, b* and 40; see Appendix 4), a fragment of a White Painted Wheel-made Geometric Style krater (L338-1; *Fig. 29:7*), a barrel-shaped spindle whorl (N146), and a spherical object of lead (N135). Interpretation of the function of this space must await additional excavation.



*Fig. 11. Vessels from northern compound, Stratum 1: 1. N167; 2. N163; 3. N197; 4. N205 (photo by P.M. Fischer, drawing by M. Al-Bataineh).*



Fig. 12. Mycenaean-type vessel N166 from Room 25, Stratum 1 (photo by P.M. Fischer, drawing by M. Al-Bataineh).



Fig. 13a. Bronze fibula N133 from Room 30, Stratum 1, after discovery (photo by P.M. Fischer).



Fig. 13b. Bronze fibula N133 from Room 30, Stratum 1, after cleaning (photo by T. Bürge).

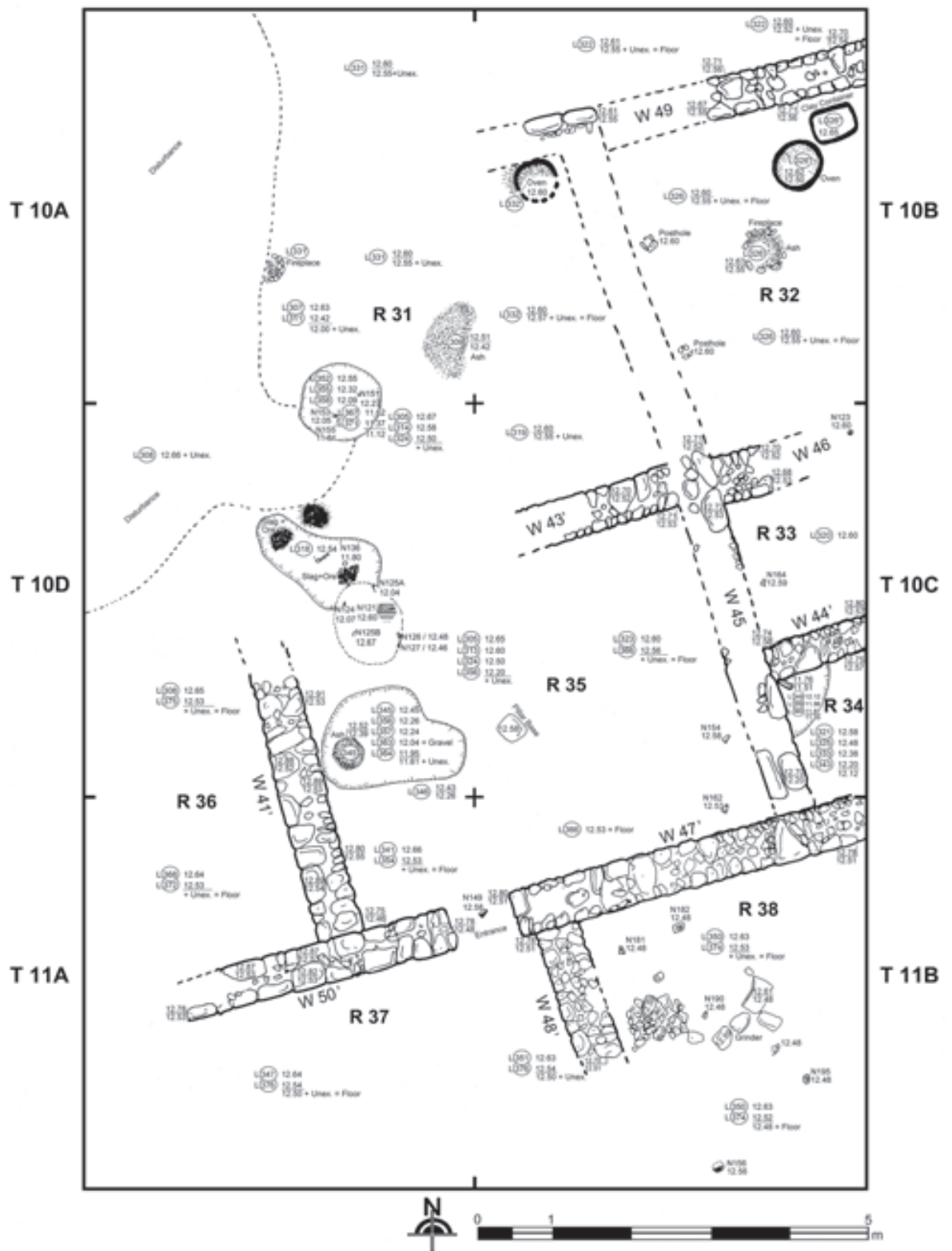


Fig. 14. Plan of Stratum 2, Area 6W (drawing by M. Al-Bataineh).



## STRATUM 2 (TRENCHES 10A–D AND 11A–B; FIG. 14; SECTIONS IN FIG. 6A–C)

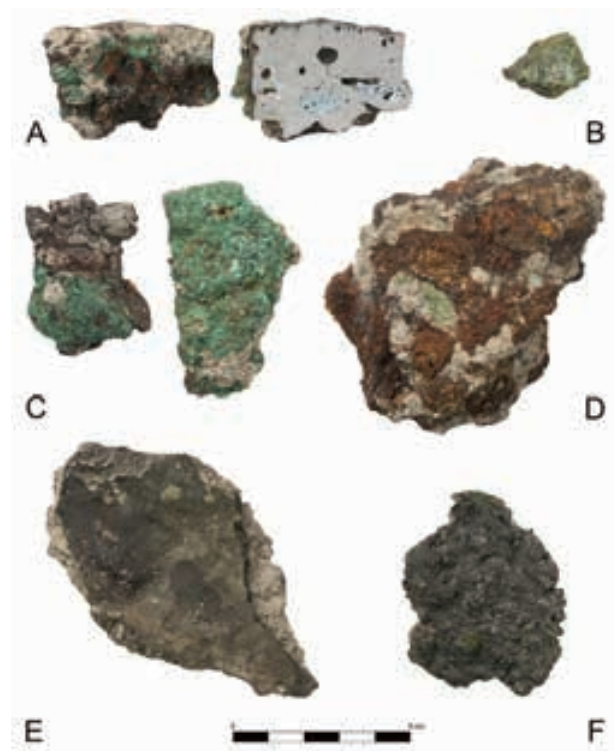
This stratum is only partly preserved. Structures from this stratum were re-used in Stratum 1. Consequently, the general architectural layout of these two phases of occupation is similar. Eight walled spaces (R31–38) were partly exposed in 2013: Stratum 2, for instance, was not reached in Trenches 12C and D, namely in the northern part of the area of excavation.

R31 seems to have been bounded by W45 to the east and W43' to the south, which means that these walls were re-used in Stratum 1. Analogously to the situation in Stratum 1, the western and north-western parts of this space are disturbed. However, in the undisturbed part of R31 it was possible to expose two fireplaces and an oven: a stone-paved fireplace in the north-west (L331'), the remains of another fireplace approximately in the centre of this space (L309), and an oven (L332') in the north-eastern corner of R31. Finds from this space include a complete Base-ring II bowl (L314-3; *Fig. 30:1*), a cooking pot of Coarse ware (L331-1; *Fig. 30:3*) and a head of a Base-ring bull figurine (L332-1). A circular pit (L352, L355, L358, L367, L371), approximately 1 m in diameter, was distinguishable from the surrounding soil by its fairly large limestone inclusions. It contained two faience beads (N151), a biconical spindle whorl of stone with circular incisions (N153), and a bronze pin (N155). The pit was definitely not for rubbish, but its exact function is not clear. Another pit (L318), which was kidney shaped, was exposed just below the foundation level of W43 from Stratum 1. It is approximately 1.6 m long and 0.9 m wide (maximum width). An older "pit" (in fact a tomb) was disturbed when this pit was dug (see below under the heading "Stratum 3"). The kidney-shaped pit and its surroundings contained around 300 kg of material related to copper-working (*Fig. 15*): this included tapped slag, furnace walls, crucible fragments, copper/bronze fragments and pieces of raw copper fragments (*Fig. 16*). Other finds from the pit include a bowl of Base-ring I ware (L318-1; *Fig. 30:2*), a loom weight (N124), a deformed bronze ring (N136), and a fire rake made of bronze (N125A/B).<sup>8</sup> The pit was used for the storage of raw material necessary for the production of copper.

<sup>8</sup> Note that one part of the fire rake (N125A) was found in Stratum 2 and the other (N125B) on the level of "Stratum 3", which confirms that the people of Stratum 2 disturbed "Stratum 3" (see below).



*Fig. 15. Collecting copper production material (photo by P.M. Fischer).*



*Fig. 16. Selection of remains from copper production in Stratum 2, Area 6W. A: Copper smelting slag. The cross section (upper row, middle) exhibits various slag layers with blue inclusions; these can be identified as copper-iron-sulphides. B: small bronze artefact. C: slag with copper oxides (green) on surface. D: Raw copper fragment. E, F: fragments of vitrified clay, which formed part of a furnace wall or a crucible (photo by G. Gattinger, Institute for Early- and Prehistory, University of Vienna).*

The space to the east, R32, is bounded by W49, W46 and W45. It contained a stone-lined fireplace (L326') with a diameter of roughly 0.6 m, a clay oven (L326'') 0.6 m in diameter, and a rectangular clay container (L326''') 0.6 m × 0.4 m in size, next to the latter. There are two postholes just east of W45, which indicate a wooden structure. Five tuyères/torches from R32 and R33 point to a workshop for copper production (one in Fig. 17). A White Painted Wheel-made Geometric Style deep bowl (L322-1; Fig. 30:4) was found north of R32.

R33 and R34 are directly south of R32. They were only partly excavated. R33, which is 2 m wide, is bounded by W46, W45 and W44'. A spindle whorl of stone (N123) was found in a possible doorway between the two spaces, and a loom weight (N164), a Red Slip Wheel-made bowl (L320-5; Fig. 30:6), and a krater of White Painted Wheel-made Geometric Style (L320-2; Fig. 30:5) come from R33. R34 is 1.6 m wide and bounded by W44', W45 and W47'. A White Slip II tankard (L333-1; Fig. 30:11) was found in R34. In the north-western corner, in a small test trench, a pit was discovered that starts below the foundations of W44' and W45, i.e. it belongs to an earlier stratum. It was excavated down to a depth of 0.8 m. A large ashlar block was found inside the pit. However, it could not be totally exposed because of the narrowness of the test trench. The function of these two spaces cannot be assessed at present.

R35 is a space, measuring 5.2 m × 3.6 m, in the centre of the excavated area. This room is bounded by W41', W43', W45, W47' and W50'. There is a 1-m-wide doorway towards R37, which separates W50' and W47' to the south. Traces of a havara floor and the remains of a fireplace, 0.4 m in diameter (L345'), were exposed in a pit in the western part of the room. A flat stone in the centre of the room may possibly have functioned as a roof support. Amongst the finds were a beaked jug of Plain White Wheel-made ware (L305-6; Fig. 30:7), another jug of the same ware (L305-3; Fig. 30:8), a White Slip II bowl (L313-1; Fig. 30:12), and four loom weights (N126, N127, N154, N162). One of the highlights of this season was the discovery of a fairly complete, large, White Painted Wheel-made Pictorial (WPPS) krater with skilfully executed painting. It was named the "Horned God Krater" (N121; see Figs. 27 and 28) because of a painted figure with a horned headdress that resembles the representations of horned gods from Enkomi (see further description and discussion below).

R36 is to the west of R35. It is bounded to the east by W41' and to the south by W50'. This space is affected by the same disturbance as mentioned in the description of R31 (see above). A White Slip II bowl (L308-2; Fig. 30:9) came from this space.

R37 is in the south-westernmost part of the opened-up area. It can be reached via a doorway from R35. Finds from there include a fragment of a bull figurine of Base-ring ware



Fig. 17. Torch/tuyère L326-7 from Room 32, Stratum 2 (photo by P.M. Fischer, drawing by M. Al-Bataineh).

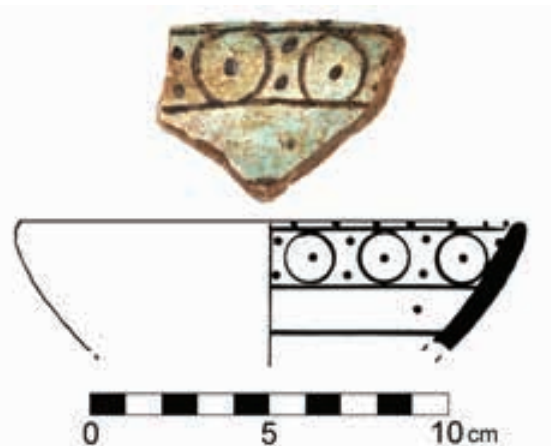


Fig. 18. Faience bowl L374-1 from Room 38, Stratum 2 (photo by P.M. Fischer, drawing by M. Al-Bataineh).

(L347-1), a bowl of Red Slip Wheel-made ware (L347-2), a White Slip II bowl (L351-1; Fig. 30:10), and a loom weight (N149). R37 seems to be an open space.

R38 is a space to the east of the former. It is bounded to the north by W47' and to the west by W48'. It is partly paved with stone and contained two loom weights of clay (N181, N190), a loom weight of stone (N195), a fragment of an Egyptian (?) bowl of bluish-white faience with brown decoration (L374-1; Fig. 18), a stone weight (N182), a flat stone with incised edges (N156), and several grinding stones. The function of this space is difficult to assess, but it may have been a partly exposed, roofed space that was used in connection with textile production.

## Notes on the walls from Area 6W

BY R. ÁRNADÓTTIR

There are 16 walls in Area 6W (state June, 2013; see main report). W45, W46 and W49 belong to Stratum 2; W39, W40, W42, W51, W52, W53 and W54 belong to Stratum 1; and W41, W43, W44, W47, W48 and W50 belong to both strata. All of the walls with stone-foundations run west by south-west to east by north-east or north-west by north to south-east by south. Worked limestone or conglomerate (not so frequent) was the main building material. Large blocks of limestone were placed as a façade, with smaller stones in the central part of the wall, and mud and pebbles filled the spaces between the blocks of limestone. The approximate measurements for the size of the stones are as follows: large stones: 0.40 m–0.50 m by 0.30 m–0.40 m, medium-sized stones: 0.25 m by 0.15 m, and small stones 0.15 m by 0.08 m.

### STRATUM I

R22 is bordered by W54, 0.13 m high and 0.54 m wide; and W53, 0.30 m high and 0.50 m wide. W54 (as preserved) was built of single courses of stones, consisting of small stones with a few medium-sized stones. The bottom level of this wall has not been excavated and is therefore not fully exposed. W53 (as preserved) was built of two to three courses of stones and consists of large stones at the bottom, medium to large stones in the second course, and flat small- to medium-sized stones in the upper course. R22 has three entrances: to the east, south and west.

R23 is bordered by W53 (see above); W52, 0.10 m high and 0.50 m wide; W51, 0.25 m high and 0.56 m wide and W54 (see above). W52 (as preserved) was built of single courses of small stones. The bottom level of the wall is not yet fully exposed. W51 (as preserved) is built of three courses of stones: the lower stone course consists of large stones with a few medium-sized stones, while the upper courses consist of medium-sized stones with a few larger ones. R23 has two entrances, to the north and the east, the latter of which is marked with two large ashlar blocks on either side. The gutters, on which some of the walls are built, are made of regularly made small stones.

R24 is bordered by W40, 0.15 m high and 0.60 m wide; W39, 0.15 m high and 0.60 m wide; W43, 0.20–0.30 m high and 0.60–0.70 m wide; and W41, 0.20–0.30 m high and 0.60–0.65 m wide. W40 (as preserved) was built of a single course of stones which are small to medium in size. W39 (as preserved) is built of single courses of stones, consisting of medium-sized to small stones with two (reused?) ashlar blocks; of the two, one is in the middle of the wall in the northern part and the other is in the southern part of the wall where

there is an entrance. W43 is built of a single course of stones, consisting of small to medium-sized stones with a few large ones. W41 (as preserved) is built of one to three courses of stones; large stones were used in the lower course and medium-sized stones in the upper courses.

R25 is bordered by W42 (0.15–0.20 m high and 0.55 m wide), W44 (0.15 m high and 0.40 m wide) and W39 (see above). W42 (as preserved) was built of a single course of small to medium-sized stones, with an opening in the western part of the wall that seems to be an entrance. W44 (as preserved) was built of a single course of medium-sized stones. R25 has two entrances, one to the north and one to the west.

R26 is bordered by W44 (see above), W47 (0.20 m high and 0.65 m wide), and W39 (see above). W47 (as preserved) was built of two courses of stones: large stones were used in the lower course, and medium-sized stones and some flat stones in the upper course. In the western part of the wall there is an ashlar block next to an entrance.

R27 is bordered by W43, W39, W47 (see above); and W50, which is 0.20 m high and 0.65 m wide. W50 (as preserved) was built of a single course of large to medium-sized stones. R27 has two entrances: to the east and to the south.

R28 is bordered by W41 and W50 (see above). R29 is bordered by W50 and W48, the latter being 0.10–0.25 m high and 0.65 m wide. W48 (as preserved) was built of one to two courses of stones: large stones were used in the lower course and medium-sized stones in the upper courses. R29 has an entrance to the north. R30 is bordered by W47 and W48 (see above).

W45 and W49 from Stratum 2 do not continue in Stratum 1, but they have walls built on top of them (W39 and W42) which are from Stratum 1. W46 does not continue into Stratum 1, and there is no wall built on top of it.

### STRATUM 2<sup>9</sup>

R32 is bordered by W45 (0.15 m high and 0.70 m wide), W49 (0.15–0.20 m high and 0.55 m wide), and W46 (0.10 m and 0.65 wide). The walls (as preserved) were built of single courses of stones. W45 consists of large to medium sized stones, W49 consists mainly of large to medium-sized stones, and W46 consists of small stones with a few large ones. In R34 (L321), where the walls were reused in Stratum 1, pieces of wall plaster were found.<sup>10</sup> Several ashlar blocks of stone came from the same space. However, the limited area opened up in

<sup>9</sup> W41', W43', W44', W47', W48' and W50' were reused in Stratum 1 (see description above).

<sup>10</sup> The definition of plaster used here is: "... dense, compact, even textured, fine grained substances, light coloured and not over hard. It is made of crushed limestone which was mixed with water in order to produce a paste, which was then applied ..." (Wright 1992, 387).



R34 does not allow the ashlar blocks to be associated with a specific stratum (Stratum 2 or 3).

## GENERAL OBSERVATIONS

Outcrops of sedimentary rock and dry, compact soil dominate in the southern coastal plain of Cyprus.<sup>11</sup> The soil of Area 6W is of dry, compact soil on which the walls were directly built. Clear foundation trenches could not be observed.

The walls from Area 6W in general resemble the walls uncovered in Area 6: the lower part was built of limestone rubble or, not so frequently, conglomerate, and the superstructure was made of mudbrick.<sup>12</sup> This construction is an opus mixtum.<sup>13</sup> The walls were built of natural or roughly worked field stones. This type of rubble-masonry walling is the most common on the island throughout the millennia.<sup>14</sup> The stones of the walls in Stratum 1 are generally smaller in size than those of the walls in Stratum 2. There seem to be two different construction methods: one where rubble was placed on top of the natural soil, and the other where the walls were built upon a gutter of small stones.

Plastering strengthens the walls and protects against weathering.<sup>15</sup> The ashlar blocks incorporated in W47, W39, W51 and W54 were used to mark and support doorways.

## A note on the copper-working remains from Area 6W, Stratum 2

BY M. MEHOFER\*

Cyprus is well known for its prehistoric copper-working sites and mining areas.<sup>16</sup> Numerous finds, for instance those from the Uluburun shipwreck,<sup>17</sup> confirm that Cyprus—especially in the Middle and Late Bronze Ages—was a supplier or even the dominating supplier of copper in the Eastern Mediterranean and beyond.<sup>18</sup>

The approximately 300 kg of remains from copper working, which derive from two pits in Area 6W and their imme-

diates surroundings, are made up of tapped slag, tuyères, copper/bronze fragments and a piece of raw copper. A selection of 15 samples has been forwarded to the Vienna Institute for Archaeological Science (VIAS) for archaeo-metallurgical analysis (a selection of samples can be seen in *Fig. 16*).

Preliminary investigations by metallographic analysis and scanning electron microscope made it possible to identify various steps of the copper-production process. Tapped slag with copper matte (*Fig. 16a* and *c*), and raw copper with a high amount of iron inclusions were found (*Fig. 16d*). SEM-analyses demonstrated that one of the objects (*Fig. 16b*) is a copper-tin bronze.

The tapped slag with matte inclusions can be assigned to the primary copper-smelting processes. The raw copper fragment is the final result of these smelting activities. Raw copper usually contains inconvenient inclusions, e.g. slag and/or a certain amount of iron. Raw copper has to be remelted several times to remove these impurities before it can be alloyed or cast. The bronze artefact may represent the remains of a finished product, the original form of which cannot be reconstructed. This piece may also represent raw material for the recycling process. Remains of furnace walls and crucible fragments are also present (*Fig. 16e* and *f*).

It is interesting to note that such smelting and melting remains were found together, in an area which belongs to the settlement, and not near the ore deposits which are the predominant location for such activities.<sup>19</sup> The planned project at VIAS will not only focus on the reconstruction of these copper-working activities at Hala Sultan Tekke<sup>20</sup> but will also target the questions of ore supply, metal trade and exchange in Cyprus, the Eastern Mediterranean and beyond.<sup>21</sup>

## STRATUM 3 (TRENCH 10D; FIG. 19)

The builder of the aforementioned pit (L318), which starts in R31 and stretches into R35, opened up another “pit” (L327, L328), which is of an older date. The discovery of fragmented human bones, inter alia a fairly complete humerus, indicates that this “pit” was in fact built as a tomb but was exposed accidentally by the occupants of Stratum 2 who cleared most of its contents. The tomb has a diameter of roughly 0.9 m, and it was reused for the storage of copper slag and ore. After cleaning out the contents of Stratum 2 from the tomb area, a number of finds were made at the bottom of the tomb and along the perimeter. These finds are ascribed to the tomb and include a complete bowl of White Slip ware (L328-1; *Fig. 31:1*), six fragments of White Slip bowls (L328-5–10; *Fig. 31:2–7*),

<sup>11</sup> Wright 1992, 400.

<sup>12</sup> Feldbacher 2012, 110.

<sup>13</sup> Here, Wright's definition of opus mixtum, “rubble and mud brick mixed together in the same structural register” (Wright 1992, 414), is used.

<sup>14</sup> Wright 1992, 408–409.

<sup>15</sup> Wright 1992, 423.

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<sup>16</sup> Stos-Gale *et al.* 1997; Gale *et al.* 1997; Gale *et al.* 1998.

<sup>17</sup> Yalçın *et al.* 2005.

<sup>18</sup> Yalçın *et al.* 2005; Betancourt & Ferrence 2011; Kassianidou & Papa-savvas 2012 with further literature.

<sup>19</sup> Gale *et al.* 1998, 237, fig. 2.

<sup>20</sup> Åström 2000.

<sup>21</sup> Zwicker 2000; Muhly 2005; Yalçın *et al.* 2005; Webb & Frankel 2013.

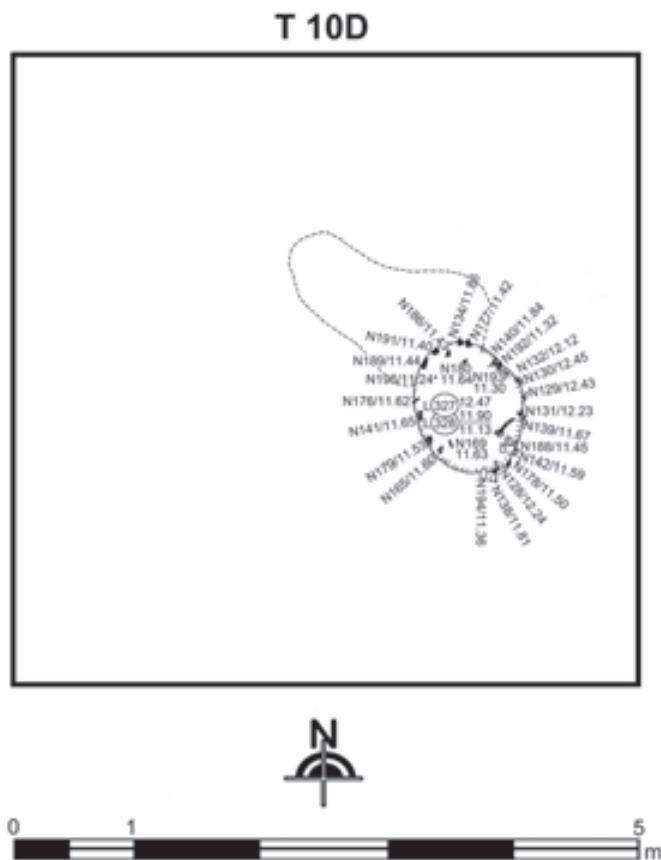


Fig. 19. Plan of "Stratum 3", Area 6W (by M. Al-Bataineh and T. Bürge).

a complete Plain ware lamp (L328-2; *Fig. 31:8*), a fragment of a Mycenaean piriform jar (L328-4), a bowl of Base-ring I ware (L328-11), 22 loom weights (N128–N132, N134, N138–N142, N165, N177–N180, N186, N188, N189, N191, N192, N194), a spindle whorl (N196), a bronze tool? (N176), a cylinder seal of Egyptian Blue (N169), and another one of faience (N193).

The first cylinder seal (N169) is of Egyptian Blue (paste/composition) and depicts three bearded figures, which are armed (*Figs. 20a–c*). The figures are not identical. There are differences in the lengths of the beards and the armour: all of them carry javelins, but one of them also carries what is probably a bow and arrow. The motif is probably related to Egyptian pictorial representations.<sup>22</sup>

The second cylinder seal (N193) is of white faience and depicts a kneeling figure with a headdress, maybe a feathered crown (*Figs. 21a–c*). His right hand is connected to a tree. Next to the tree is a running gazelle with long, backwards-pointing horns. A parallel from Hala Sultan Tekke<sup>23</sup> depicts a tree almost identical to that on N193 and a human standing next to it. There are stylistic parallels from the Mitanni repertoire:<sup>24</sup> on a seal from Tell Kazel, dated to 1450–1350 BC, a similar tree and a "hero killing griffin" are depicted.<sup>25</sup> The simple, "linear style" ("flüchtig linearer Stil", Syrian group)<sup>26</sup> in general resembles our seal. Another parallel (dated to the "advanced part of the Late Bronze Age"<sup>27</sup> according to the stratigraphy) comes from Kamid el-Loz and depicts an antelope and a human arranged in metopes.



Fig. 20a (top). Cylinder seal N169 of Egyptian Blue from "Stratum 3" (photo by T. Bürge).

Fig. 20b (above left). Impression of seal N169 (photo by P.M. Fischer).

Fig. 20c (above right). Cylinder seal N169 (drawing by T. Bürge).

<sup>22</sup> This is our preliminary interpretation. J. Smith put forward the same suggestion, "probably Egyptian", for which we are grateful (pers. communication, 6 March 2014).

<sup>23</sup> From an unnumbered tomb, see Kenna 1971, pl. XXX: 112.

<sup>24</sup> J. Smith also suggested a Mitannian provenance (see note 22).

<sup>25</sup> Gubel 2000, 580, 586, fig. 9.

<sup>26</sup> Salje 1990, 85.

<sup>27</sup> Kühne & Salje 1996, 56, no. 16.



Fig. 21a (top). Cylinder seal N193 of faience from "Stratum 3" (photo by T. Bürge).

Fig. 21b (above left). Impression of seal N193 (photo by P.M. Fischer).

Fig. 21c (above right). Cylinder seal N193 (drawing by T. Bürge).

#### TRIAL SOUNDINGS (TRENCHES 13B, 14B AND 15A; FIG. 4)

Three test trenches, T13B, T14B and T15A, were opened west of the main area of excavation, namely west of T10–12, in order to investigate a structure that had been indicated by GPR. This structure, which runs some 160 m from north by north-west to south by south-east, is approximately 10 m wide.

T13B was opened on the eastern part of the structure some 40 m west of the main area. Its dimensions are 1.5 m × 6 m. There were no small finds of interest from this area, and only a few fragments of Late Cypriote pottery, mainly of Plain White Wheel-made ware, were found. The structure which was indicated by GPR was covered with gravel.

T14B, 4 m west of T13B, was opened in order to explore an area where radar had indicated rectangular man-made structures. T14B is 5 m × 5 m in size. The results were rewarding although only the uppermost layers have so far been explored, namely colluvial soil and the uppermost part of the first stratum starting at a depth of 0.20–0.25 m. The trench produced three figurines (see Appendix 3): the head of a bird-faced female figurine of Base-ring ware (N207; Fig. 22), the head of a bichrome-decorated figurine of what is likely a female of Base-ring ware (N215; Fig. 23), and a Mycenaean figurine of a horse (N214; Fig. 24). Another find from this trench is a White Slip II bowl (L378-1).

Trench 15A, 1.5 m × 5 m in size, was opened some 15 m south-east of T11A in order to investigate the western limits of the 10-m-wide structure. The only small find of interest is a toggle pin or needle of bronze (N198). The 10-m-wide structure which was indicated by radar turned out to consist of packed pebbles. This structure has been preliminarily interpreted as a street which separated two city quarters (see below): i.e. the main quarter (T10–12) from the quarter west of the street (T14B).

### Interpretation of the 10-m-wide structure indicated by GPR

BY F. KÖSTELBAUER

#### INTRODUCTION

The GPR survey from 2012 indicated a structure approximately 10 m wide, heading from the north at the westernmost extension of the modern salt lake towards the south to Area 8 (C in Fig. 2). Two trenches, Trench 13B on the western border and Trench 15A on the eastern border of the indicated structure, were opened in order to identify the structure and study the stratigraphical evidence (Fig. 4). The dimensions of each of the two trenches were 1.5 m × 5 m. During the course of the project, Trench 13B was extended by 1 m to the west.

#### RESULTS

##### Trench 13B

The soil below the colluvial soil was packed with a thick layer of chert pebbles (L365). This layer slopes under another layer of soft, light-brown sand in the western part of the trench.





Fig. 22. "Bird-faced" figurine N207 from Trench 14B (photograph and drawing by T. Bürge).



Fig. 23. Female figurine N215 from Trench 14B (photo and drawing by T. Bürge).



Fig. 24. Mycenaean horse figurine N214 from Trench 14B (photo and drawing by T. Bürge).

There were only five non-diagnostic body sherds in L365. Small amounts of compact but fragile clay were found between the pebbles, and they appear to be remains of mud-bricks. The information from this test trench was inadequate as regards the interpretation of the structure. Therefore, the original trench was extended by 1 m to the west (L370). The stratigraphy of the southern and western section can be studied in Fig. 25. It shows a changing pattern of layers consisting of pebbles and sand. The sandy layer under the colluvial soil of this extension exhibits a feature which could be interpreted as a pit going alongside the pebble layer. Numerous pottery sherds, including Plain White Wheel-made, Pithos, White Slip II, Mycenaean and possibly Grey Minyan, were found in this sandy layer.

#### Trench 15A

The stratigraphy of this trench is "reversed" in comparison with that of Trench 13B. The sandy layer (L381) slopes under a layer of pebbles (L385; Fig. 26). The intersection between those two layers is situated in the centre of the trench, as indicated by radar. The bottom of the pebble layer cuts straighter through the sand than in Trench 13B. There are no finds of ceramics, but an amorphous piece of bronze (N198), maybe part of a toggle pin or needle, was noted.

#### INTERPRETATION AND DISCUSSION

The well-defined border between pebbles and sand in Trench 15A suggests that this 10-m-wide feature is most likely man-made and is not a natural deposition, such as a river bed, which is one of the plausible interpretations of the evidence from Trench 13B. In addition, the location of a river bed in this elevated area is highly unlikely because a 10-m-wide river would more likely be in the small valley west of the trenches. Another explanation may be that the band of pebbles was left by a tsunami.<sup>28</sup>

There is another probable interpretation: a considerable, well-defined deposition of pebbles may point to the surface of a road which connected the city quarters of Area 6W and Area 8. This would not be the first possible road in this area: an aerial photograph from 1963 showed possible traces of several roads around Hala Sultan Tekke.<sup>29</sup>

<sup>28</sup> Fischer & Bürge 2013.

<sup>29</sup> Åström *et al.* 1976, VI, fig. 2, VII.



Fig. 25. Test Trench 13B (photo by P.M. Fischer).

Roads are known from Mycenaean Greece.<sup>30</sup> A road found during a survey in Messenia shows a similar composition of schist gravel over a rocky surface.<sup>31</sup> The understructure of a Mycenaean road in Phocis included a bedding of smaller stones that was supporting the surface structure of the road.<sup>32</sup>

The ultimate targets of this road are unclear, but it seems to continue north by north-west, thereby approaching the western end of the former harbour (modern-day Salt Lake). It is also not clear why the southern part of the road towards Area 8 is disturbed. Nevertheless, extensive farming may serve as an explanation. Just before the road approaches Area 8 it divides into two smaller side roads, one of which goes further south-east, probably connecting with the road from Area 8,<sup>33</sup> while the other goes to the east. The functions of roads vary and include economic,



Fig. 26. Test Trench 15A (photo by P.M. Fischer).

agricultural or military purposes.<sup>34</sup> If we are correct in our assumption that this structure is a road, its extension is logical: it served as a connection between the harbour, the copper workshop in Area 6W and the living and working quarter in Area 8.

<sup>30</sup> Jansen 2002, 8–25.

<sup>31</sup> Jansen 2002, 9.

<sup>32</sup> Kase 1973, 76.

<sup>33</sup> Hult 1981, 10.

<sup>34</sup> Jansen 2002, 113–124.

## Primary conclusions and discussion

During the 2013 season, the indications obtained during the 1.3-hectare GPR survey in June 2012 were confirmed. An area of 200 m<sup>2</sup> was opened up west of Area 6 (excavated 2010–2012) in the northern part of the GPR-surveyed area, where structures of a strict geometric pattern were indicated. The excavation exposed three phases of occupation, Strata 1–3 (numbered from below colluvial soil).

### STRATUM 1

The uppermost Stratum 1 comprised two partly exposed compounds with ten partly walled spaces: the northern and the southern structures. Remains of complete sun-dried mudbricks confirm once again the construction of the buildings at Hala Sultan Tekke: a relatively low stone foundation had a superstructure of sun-dried mudbrick. The northern structure encompasses three walled spaces (R22, R23, R23') and a stone-paved gutter. Based on the presence of numerous spindle whorls and loom weights, the main activity carried out in this compound was textile manufacturing, i.e. spinning, weaving and purple dyeing. The production of cheese could also have taken place. The latter suggestion is based on the presence of a large funnel-shaped vessel which was interpreted as a filter or separation tank.

The southern structure, where a number of walls from Stratum 2 were reused, comprises seven spaces (R24–R30). Some of them were walled, while others were outdoor spaces such as, for instance, a courtyard. In R28, which is interpreted as a courtyard, the finds of vessels of Plain White Wheel-made ware, murex shells and textile-production tools point to the manufacture and purple-dyeing of textiles.

#### The Mycenaean-style piriform jar (Fig. 12)

R25, in the eastern part of the southern structure, produced a fairly complete, Mycenaean-style, bichrome-decorated, piriform jar (N166; volume: 6.0 litres) that exhibits some characteristics which are not commonly found in the standard Mycenaean repertoire of vessels.<sup>35</sup> As far as the general shape is concerned, it is most similar to FS37/38. There are, however, important differences—for example, the tapering neck. In addition, the decorative pattern, which is bichrome, namely in black and dark red, is untypical. It includes a kind

of “upside-down” red-painted scale pattern<sup>36</sup> arranged in three large triangles between the three handles, which are painted bichrome and include a chevron pattern. Also, the manufacturing technique differs from “standard” Mycenaean pottery: the fabric is not as fine, and the slip and the bichrome paint is matt. Therefore, our preliminary conclusion is that the small amphora was produced locally by a Cypriote potter or, maybe less probably, that it was brought to Cyprus in LH IIIC. S. Deger-Jalkotzy refers, for instance, to odd style and shape derivatives of Mycenaean pottery at LH IIIC Elateia in Greece.

One of the finds from R30 is a complete, very large violin bow fibula of bronze (N133; see Appendix 4). It has been argued that this early type of fibulae is concentrated on the southern and eastern coast of Cyprus. It seems therefore that this object was mainly in use at urban sites connected with sea trade. This observation supports the assumption that the fibula arrived in Cyprus through contacts with the Aegean and the western Mediterranean, or even central Europe (see Appendix 4).

Stratum 1 is preliminarily dated roughly to the 12th century BC, i.e. Late Cypriot IIIA. This date is mainly based on the ceramic evidence (see a collection of ceramics from Stratum 1 in Fig. 29). The comparison with the results from Area 6 (2010–2012) made it clear once again that the city was hastily abandoned, or that the inhabitants were forced to leave their homes, after a catastrophic event (see e.g. Fig. 10): this claim is supported not only by destruction debris in both areas but also by the multitude of complete small containers and other valuables which are easily portable but were left behind. Further exposure of Area 6W will certainly decide whether Stratum 1 in this area is contemporaneous with Stratum 1 in Area 6, where a rich find repertoire is present.<sup>37</sup> Currently, there is no stratigraphical connection between these two areas. Late Cypriot IIIA remains are well represented in the old excavations in Area 8, where major portions of the exposed area belong to this period.<sup>38</sup> However, a more detailed comparison has to await the final publication of Area 8.<sup>39</sup>

### STRATUM 2

Eight walled spaces were partly exposed. Although there is evidence of textile production, the most conspicuous discovery was the large amount of copper production material: 300

<sup>35</sup> We all agree on this statement, with reference to email contacts between S. Deger-Jalkotzy and P.M. Fischer during August 2013. The authors are grateful for the valuable opinion forwarded by S. Deger-Jalkotzy.

<sup>36</sup> This pattern is, for example, used on a piriform jar from Vati, Rhodes, which is dated to LH IIIB; see Mountjoy 1999, 1014, fig. 413:78.

<sup>37</sup> Fischer 2011, 2012a; Fischer & Bürge 2013. This concerns Strata 2 and 3 as well.

<sup>38</sup> *HST* 1–12.

<sup>39</sup> The scholarly community is awaiting the final publication of Area 8. In 2009, all of P. Åström's records which were stored in Gothenburg were forwarded to K. Nys, who is responsible for this publication.





Fig. 27. Detail of “Horned God Krater” N121 from Room 35, Stratum 2 (photo by P.M. Fischer).



Fig. 28. “Horned God Krater” N121 from Room 35, Stratum 2 (drawing by M. Al-Bataineh).

kg of remains from copper-working consist of tapped slag, furnace walls, crucible fragments, copper/bronze fragments, pieces of raw copper, and at least five tuyères. It is our impression that these objects may also represent reused torches since the sections of the broken-off “cups” are blackened by fire. However, it is not unlikely that these objects are not torches, as is often assumed, but instead were a priori produced to function as tuyères (where the cups had the role of protecting

the craftsperson from fire and heat).<sup>40</sup> Preliminary investigations using metallographic analyses and a scanning electron microscope made it possible to identify various steps of the copper-production process (see below). The aforementioned “Horned God Krater” (N121) derives from R35. A collection of additional pottery from Stratum 2 is shown in Fig. 30.

<sup>40</sup> See also H.W. Catling & E.A. Catling 1984, 220. Contra Kilian 1986 and Karageorghis 1987 and 1999, who term these objects “torches”.

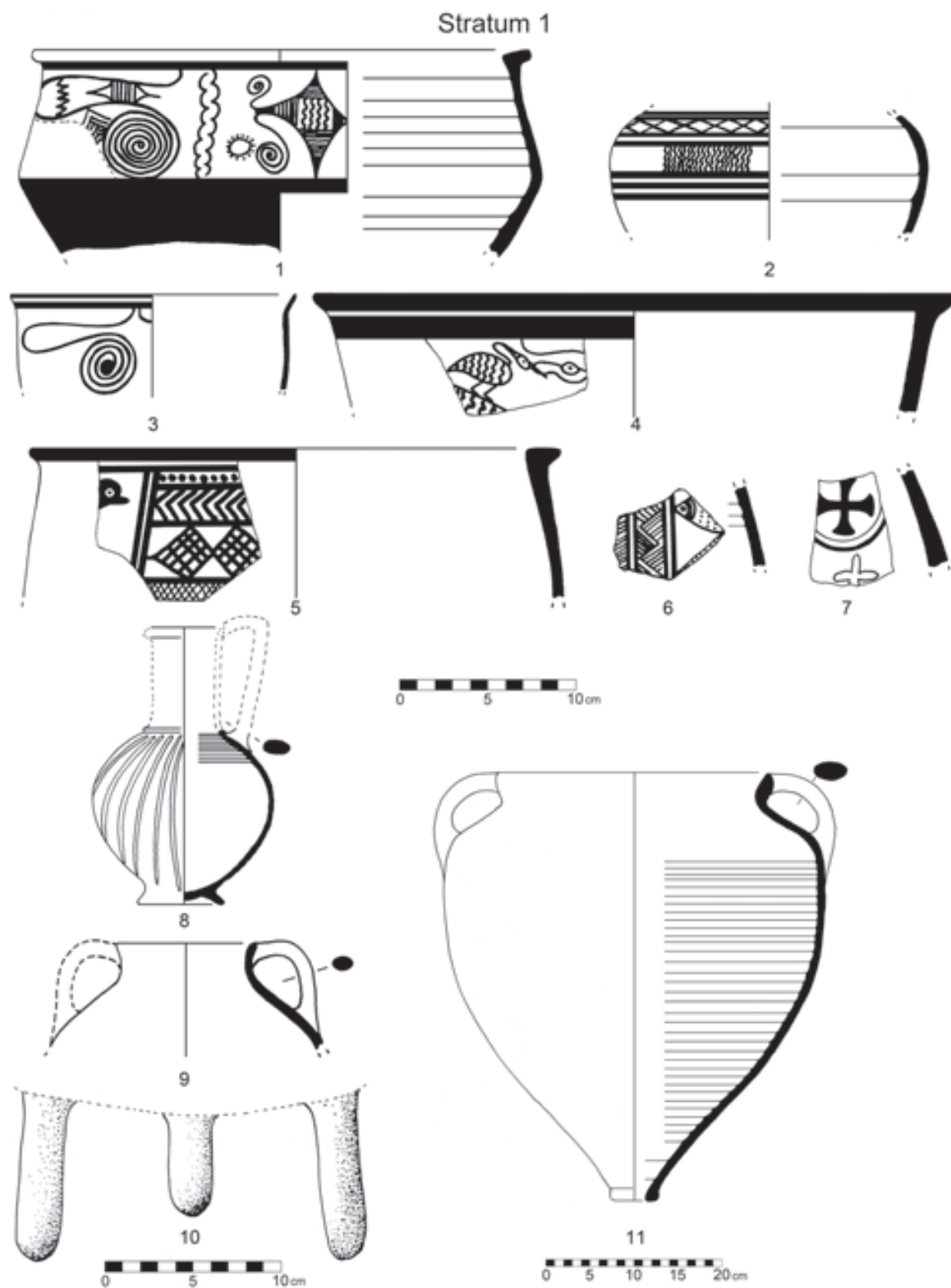


Fig. 29. Collection of pottery from Stratum 1 (drawing by M. Al-Bataineh).

### The “Horned God Krater” (Figs. 27 and 28)

The upper part of the krater with the pictorial motifs is fairly well preserved, whereas sections of the lower part are reconstructed. The reconstructed dimensions and the approximate volume are as follows: height 42 cm, maximum diameter 45 cm, diameter of rim 35 cm, volume 36 litres. The krater has a flattened, everted rim and two horizontally placed, looping handles with a roughly circular section. The raised ring-base is reconstructed in our drawing with the help of the Creature Krater from 2010 as the template.<sup>41</sup> It is medium-hard fired, of medium-coarse light greenish-yellow fabric and covered with a light greenish-yellow slip. The paint is dark brown.

On the front of the upper part of the krater there is a panel decoration with two panels depicting representations of “human” and animal figures. The two figurative panels, which are complete, cover approximately one-third of the panel above the belly. Complex geometric patterns, which are themselves arranged in panels and are only partly preserved, cover the remaining panel. Below the panel zone, just below the belly, are four horizontal bands. The three horizontal bands on the lower part are reconstructed.

The dominating element on the front panel to the left is an anthropomorphic figure standing legs apart with uplifted arms, between an abstract tree and a snake with three heads, facing the viewer. The right hand has only four fingers, whereas the left hand has five. It has a pointed, horned helmet on its head. The face of the figure has accentuated eyes. The ears are also enlarged. It is difficult to determine whether the downward-pointing lines below the ears are parts of the ears or earrings. The latter interpretation may be more likely. The knee-length dress is decorated with points. It ends with a stripe from which long fringes hang. The object (or creature?) between the figure’s legs is only partly preserved. It may be a shield.

The next panel to the right, which is separated from the former, depicts another, much smaller, anthropomorphic figure. This figure is turned to the left, and has a bird-like head and a dress which again is decorated with dots. The left hand has four fingers which are placed on the head of a bull, and the right holds a rope which ends in the bull’s muzzle. The bull, which is depicted in a sort of moving pose, has two long, forwards-pointing horns. The sex of the bull is accentuated. A super-sized bird is sitting on the back of the bull. The abstract objects to the left of the bird may represent fruits, which hang down from a tree attracting the interest of the bird, or they may be a symbol for the sun or stars. A large fish which resembles a tuna is below the bull. The panel ends with the

representation of a peacock below the handle. There are two zigzag lines above the peacock.

The geometric motifs are also arranged in panels. Next to the bird below the handle is a panel composed of six geometric elements: vertical lines, vertical and horizontal chevrons, vertical and horizontal dotted lines, small vertical chevrons, horizontal lines and a dotted zigzag pattern. Next to it there is a panel with six vertically aligned, hatched triangles. The next panel with horizontal lines is only fragmentarily preserved. To the left of the “Horned God” is a panel with five hatched diamonds. The panel next to it is only partly preserved but it seems to mirror the panel to the right of the peacock.

Our krater belongs to the White Painted Wheel-made Pictorial Style (WPPS) class of pottery, of which several vessels have been found during the last four seasons.<sup>42</sup> These finds may lead to the conclusion that there was a “Hala Sultan Tekke painter”. Nevertheless, further studies on the raw material, the manufacturing techniques, and the style are necessary in order to assign these vessels to a single painter or workshop.

It is interesting to note that luxury goods were found close to the copper-working plant. This may lead to the conclusion that people who were engaged in the copper-working process belonged to an elevated social class. At present, the date of Stratum 2 in Area 6W is difficult to assess. There is material which points to a date in the 13th century BC (Late Cypriote IIC) or even earlier but which may be considered residual—for example, the fragmentary Mycenaean pottery (see Appendix 2) and mature White Slip II bowls. There is also material which, according to earlier chronological tables,<sup>43</sup> would fit best in Late Cypriote IIIA1—for instance, wheel-made *Bucchero* ware. In any case, it seems that Strata 1 and 2 are close in terms of their chronology.

### “STRATUM 3”

This phase of occupation is represented by a tomb that was looted and reused for copper production in Stratum 2. Numerous textile-production-related items are amongst the finds from the tomb which were overlooked by the occupants of Stratum 2. Also from the tomb are seven White Slip II bowls of the mature style, which can be dated to around 1300 BC or Late Cypriote IIC (see the collection of pottery from Stratum 3 in Fig. 31), and two cylinder seals: one exhibits affinities with the Mitanni repertoire and the other Egyptian or Egyptianizing traits.

<sup>41</sup> Fischer 2011, 82, fig. 15.

<sup>42</sup> Fischer 2012b.

<sup>43</sup> P. Åström 1972, 700–701.



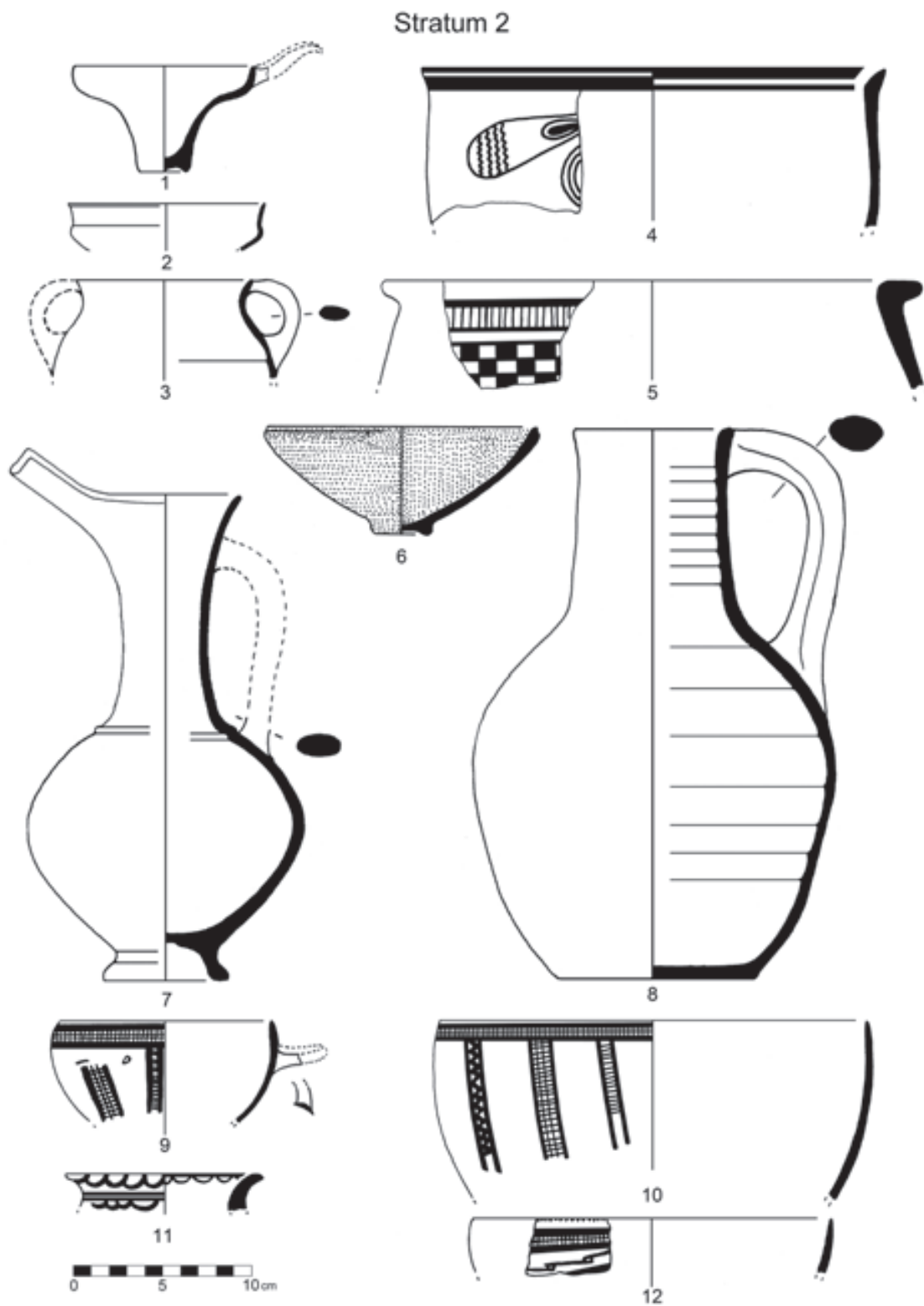
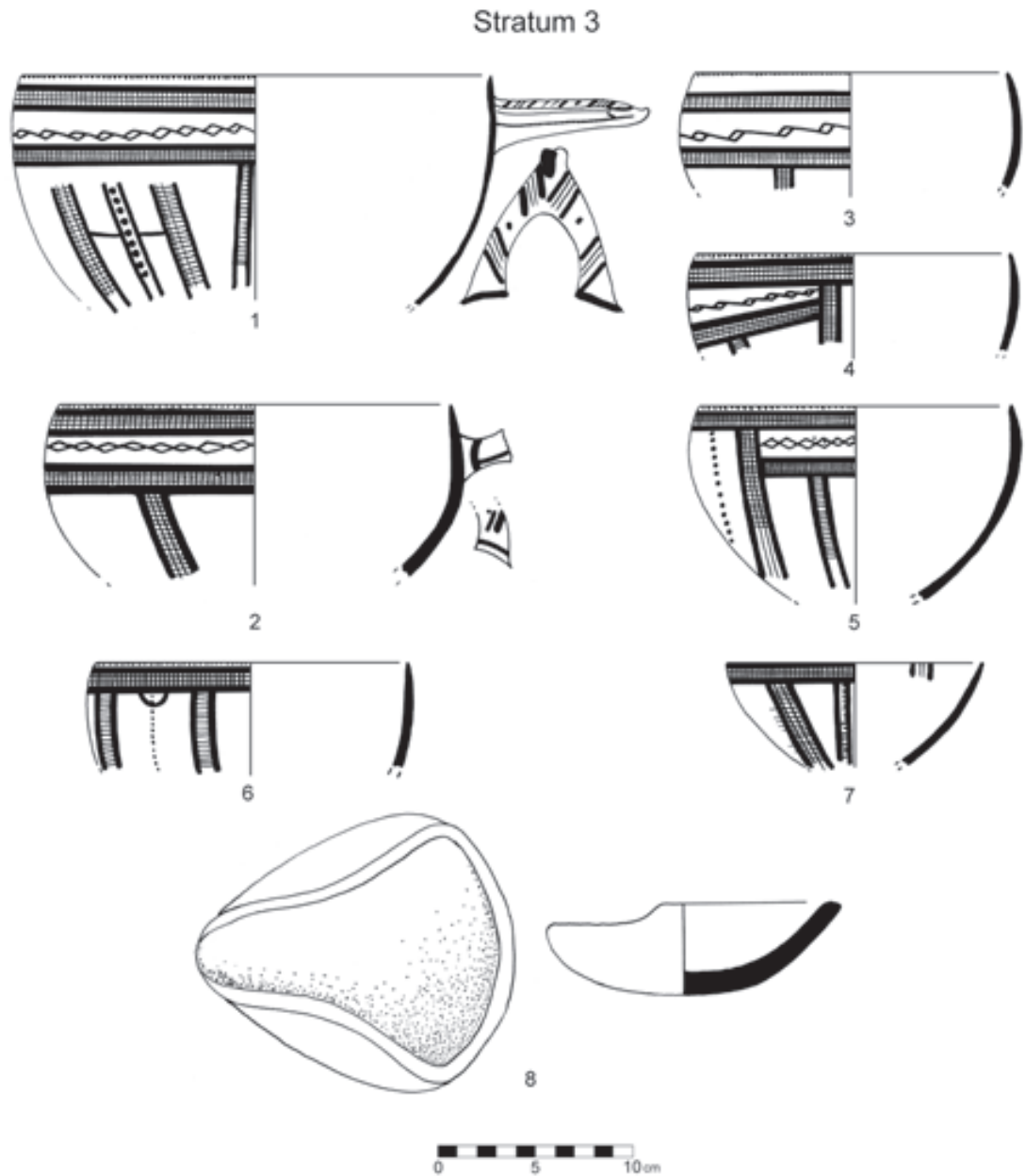


Fig. 30. Collection of pottery from Stratum 2 (drawing by M. Al-Bataineh).

Fig. 31. Collection of pottery from Stratum 3 (drawing by M. Al-Bataineh).



### TRIAL SOUNDINGS

Two of the test trenches were opened up in order to investigate a 10-m-wide structure which was indicated by GPR. From the stratigraphical evidence it seems that this structure was a street.

Only the uppermost layers of the westernmost test trench were excavated. Amongst the finds in this (so far) westernmost city quarter are three figurines: two anthropomorphic figurines of Base-ring ware, of which one is bichrome-decorated and the other has a bird-like head, and a horse of Mycenaean ware and style. The general, although very preliminary, impression deduced from the pottery, e.g. the relatively high amount of mature White Slip II (11.9%), is that the remains of this city quarter are older than Stratum 2 in Area 6W.

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# Appendix I: “Tomb” A from Hala Sultan Tekke 2013

BY P.M. FISCHER AND A. SATRAKI\*

## Introduction

In June 2013, during a survey in connection with complementary field studies for the publication of the excavations of the New Swedish Cyprus Expedition (NSCE) in 2010–2012 in Area 6,<sup>44</sup> co-author P.M. Fischer—accompanied by P. Georgiou, a former employee of the Department of Antiquities—visited the area opposite and west of the mosque of Hala Sultan Tekke. There, in 1968, V. Karageorghis had excavated two rich tombs.<sup>45</sup> A parking lot, a street and a deep “ditch” are between the tomb area and the mosque. The “ditch” is in fact a channel which was built by the Irrigation Department in 1952 without informing the Department of Antiquities.<sup>46</sup> Several tombs were disturbed in the course of that work.

The outlines of the tombs excavated in 1968 were today only partly visible because of erosion. Traces of three more likely tombs could be observed just a few metres to the north of the tombs previously excavated.

One partly eroded tomb in particular was clearly visible in the section. The Department of Antiquities, represented by co-author A. Satraki and the acting director, D. Pilides, were informed of the overwhelming risk of looting. The decision was taken to excavate the most exposed tomb. Consequently, co-author P.M. Fischer offered the resources of the Swedish mission as regards personnel and expertise, which were gratefully accepted by the Department of Antiquities.

A section approximately 10 m long and 2.5 m deep was cleared in the eroded part where one of the tombs was visible. A trench, 3.5 m × 2.5 m in size, was opened up above the tomb, and excavations were carried out from colluvial soil down to 3.15 m below colluvial soil. According to the Cypriote Local Transverse Mercator (LTM) projection system, the centre of the tomb is E=255652.10 m and N=361872.94 m (see the tomb in relation to the areas of excavation in *Fig. 32*). The centre of the tomb, projected to today’s surface, lies 10.18 m above mean sea level.



*Fig. 32. Overview Areas 6W, 6, 8 and “Tomb” A (Google Earth).*

\* Archaeological Officer, Larnaca District Museum. The excavation of the tomb was carried out in area where the Department of Antiquities is in charge. Therefore, this part of the project is separated from the remainder.

<sup>44</sup> Fischer forthcoming.

<sup>45</sup> Tombs 1 and 2; see Karageorghis 1976, 70–89. P. Georgiou participated in the excavations in 1968.

<sup>46</sup> Karageorghis 1976, 71.



## Burials and stratigraphy (Fig. 33)

### COLLUVIAL SOIL

The colluvial soil, which starts at 10.18 m, is approximately 0.3 m deep, which is the depth normally reached by modern ploughs.

### LA1–3<sup>47</sup>

Stones appear at approximately 9.5 m. They continue down to 9.1 m, where a layer of sandy soil appears (LA3).

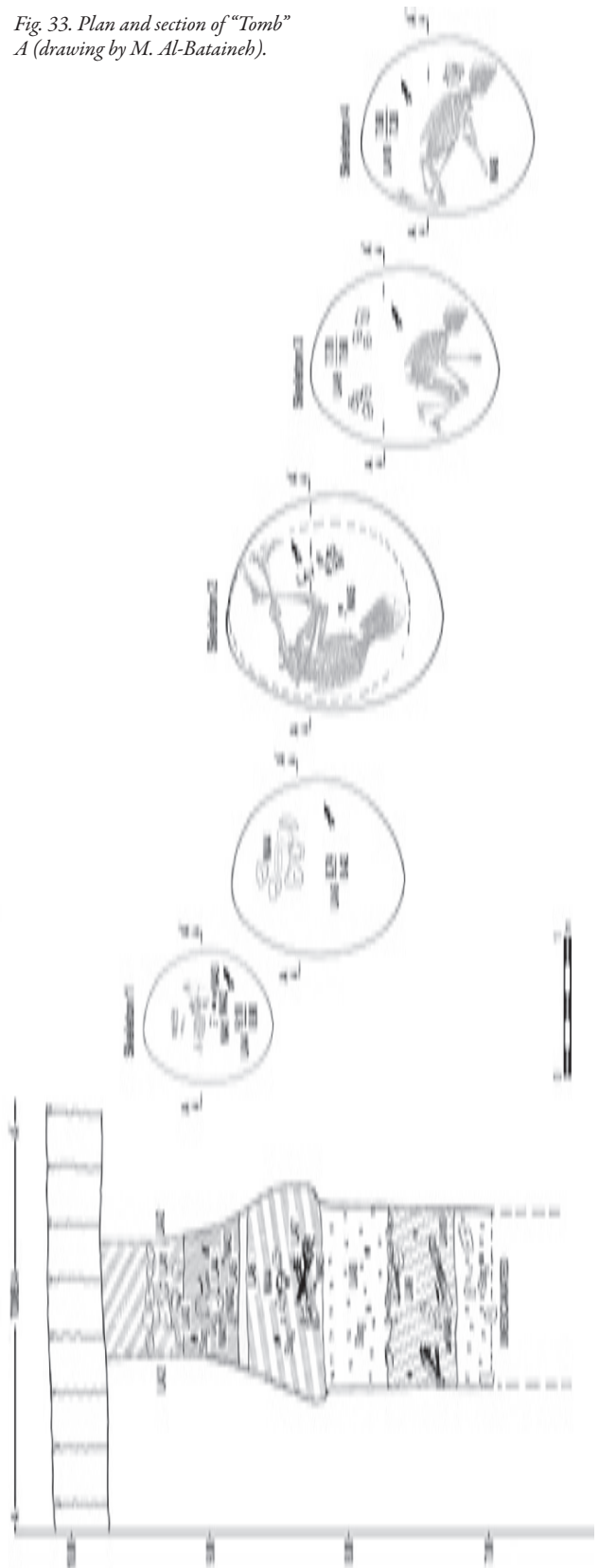
### LA4; SKELETON 1

Dislocated bones (a secondary burial?) belong to Skeleton 1. These include parts of a cranium, and a mandible with eleven quite small teeth (with caries and periodontal disease),<sup>48</sup> ribs, one vertebra, left ulna and radius, sacrum, and parts of the left femur and tibia. Most parts of the right side of the skeleton were missing. Estimated sex: female; estimated age mainly based on the dental remains: 40+ years. Remaining objects that were certainly once the personal belongings of the individual, with which she was buried and which were found close to the cranium, consist of four beads of faience (NA1), one earring (NA2) and one plaque (both of silver (NA3)). No tomb gifts were present.

### LA5–7; SKELETON 2

LA5 and LA6 are layers of fill above Skeleton 2, the burial below Skeleton 1. The layers of fill contained much copper slag, which is present in all layers of the fill of this tomb. Skeleton 2 in LA7 is buried upon a layer of mudbrick; it is lying on its right side in a crouched position with the right leg bent and the left straight. It faces north. It is largely complete, with the exception of one arm and both hands (secondary burial?). Two ribs were found somewhat out of their original position, upon other ribs. At least five teeth were lost *intra vitam* (17, 26, 36, 35 and 45), and there were at least four cavities in the maxilla and mandible as a result of purulent abscesses caused by caries and extensive abrasion. Remaining teeth were also affected by caries and periodontal disease. There seem to be cut marks on the left femoral bone. Length, sex and age estimations are as follows: length: 1.73 m (measured *in situ*); sex: male; age: 40 years. The remaining personal belongings of the individual are a faience bead and a pierced plaque of silver (NA5). LA6 contained only one burial gift in the shape of a

Fig. 33. Plan and section of “Tomb” A (drawing by M. Al-Bataineh).



<sup>47</sup> L plus letters are used for this joint-project. The same is valid for the finds: e.g. NA1 means Find no. 1 from “Tomb” A.

<sup>48</sup> Cf. the study of other Cypriote skeletal material in Fischer 1980, 6–18; Fischer 1986.

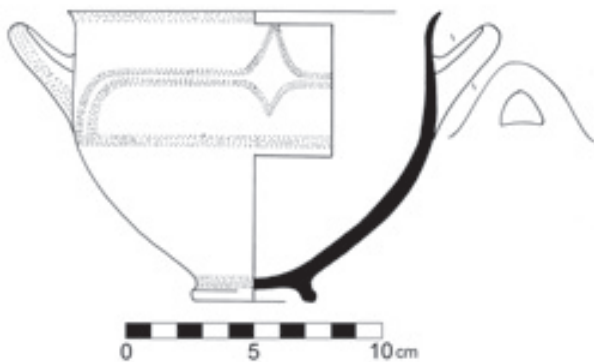


Fig. 34. WPGS bowl NA4 from “Tomb” A (drawing by M. Al-Bataineh).

broken but complete bowl (NA4) of White Painted Wheel-made Geometric Style (WPGS; Fig. 34).<sup>49</sup> The walls of the tomb are covered with a layer of fine clay from LA7 downwards.

#### LA8–9; SKELETON 3

LA8 is a layer of fill with much copper slag. The bottom of LA8 contains a layer of stones just above LA9. LA9 encloses the next burial of a well-preserved, almost complete skeleton lying on its left side in a somewhat crouched position facing south-east. The arms are more or less aligned, and the legs were bent at the hip and at the knee. Estimated age: six years, mainly based on the remaining deciduous and erupted/erupting permanent teeth, and the development of the epiphyses. No personal belongings or tomb gifts were found. The walls of the tomb in LA8–9 are covered with a layer of fine clay

#### LA10; SKELETON 4

LA10 is of the same soil texture as L9. The bottom of LA10 contained the next burial, Skeleton 4, which faces south-east. The peculiar position of the skeletal remains suggests a dumped body. The cranium was broken but complete. There is an ellipsoid hole, approximately 2 cm × 1 cm in size, high up on the left side of the cranial vault (os parietale); this was most likely caused ante mortem by a pointed, sharp object, and it seems to have caused the death of the individual. Two of the vertebrae were fused together, suggesting back problems. The dental status is poor, with caries in two incisors, two canines, two premolars and one molar. Caries and periodontal problems have caused cavities in the jaws, triggered by purulent abscesses, more precisely in the area of tooth 46. Two large shells (murex) were found amongst the bones. Estimated sex: male; estimated age: 35–40 years. There are no tomb gifts, but one

personal belonging in the shape of a double ring of bronze was still attached to one of the fingers (NA6).

The walls of the tomb in LA10 are still covered with a layer of fine clay. Excavations came to a halt when it became clear that the shaft continues downwards to a considerable depth (a small test trench was dug some 30 cm below LA10).

## Conclusions and future projects

The shape of “Tomb” A is completely different from that of the nearby excavated Tombs 1 and 2:<sup>50</sup> these were quite shallow chamber tombs, and it was no more than 1.5 m from the surface of the colluvial soil to the bottom of the chamber. The diameters of the chamber varied from approximately 3.6 m (estimated for Tomb 1) to 3.25 m (estimated for Tomb 2); the heights of the chambers were not more than 0.9–0.95 m.

During the excavations it soon became evident that “Tomb” A was not a chamber tomb (see though the transient widening of the tomb in LA7 which has been caused by the loss of surrounding loose, sandy soil). Our working hypothesis that the tomb may represent a shaft tomb proved to be incorrect when it became clear that the surface of the shaft was intentionally covered by a layer of fine clay and that the shaft continued down to a considerable depth. This made us conclude that “Tomb” A was a reused well which originally had a water-resistant surface of clay. The absence of tomb gifts—except for one obviously deliberately smashed White Painted Wheel-made Geometric Style (WPGS) bowl—supports our theory that the four individuals were more or less dumped in the former well on several occasions. The deepest-placed burial, Skeleton 4, exhibited a fatal blow to the cranial vault, whereas the causes of death of the other three could not be determined.

The date of the burials is according to the associated pottery LC IIC2–IIIA1, or around 1200 BC. The sherd of White Slip II may push the date of the earliest burial further back into the 13th century BC, but this sherd may be residual and have come with the filling.

For 2014, a geophysical survey by means of a GPR<sup>51</sup> and a fluxgate magnetometer is planned in the area to the west of “Tomb” A, where we assume the cemetery or one of the cemeteries of Hala Sultan Tekke are situated. The area is a natural plateau overlooking the Salt Lake. It covers approximately 100 m × 100 m. Permission to start regular excavation there in connection with the NSCE project has been given to the director of the excavations by the Department of Antiquities.

<sup>50</sup> Karageorghis 1976, 71–72.

<sup>51</sup> Fischer 1980, 48–62; id. 2011, 70–72; Trinks *et al.* 2013.

<sup>49</sup> See Fischer 2012b, 75–79.

## Appendix 2: The Mycenaean-imported pottery from Hala Sultan Tekke 2013

BY L. MAZZOTTA AND A. TRECARCHI

### Introduction

The aim of this study is to report the results of the analysis of the Mycenaean-imported pottery<sup>52</sup> from the 2013 season of excavation at Hala Sultan Tekke. The study material consists of 210 sherds, and the study focuses on two main aspects: typology and chronology. The former provides an overview of the range of shapes used at the site and the functions of the various vessels. The latter allows us to identify trends in the use of the Mycenaean-imported pottery at the site.

### Objectives and methodology

The distinction between locally produced Mycenaean-style pottery, i.e. the White Painted Wheel-made Geometric Style (WPGS),<sup>53</sup> and the Mycenaean-imported pottery is far from straightforward. Often, only natural scientific analyses are able to establish whether a certain sherd is imported or not; consequently, the criteria which we used to establish whether sherds belong to the group of Mycenaean-imported pottery or not are based on technological differences. The main differences, which can be observed macroscopically, concern fabric, surface treatment and paint. The fabric of the Mycenaean-imported pottery is usually very compact and fine, and the typical core is easily identifiable in the section. The core usually has a pinkish-yellow colour, whereas the exterior fracture is of a more intense pinkish-orange colour. The surface of the vessel is usually burnished and rarely polished, and the paint is generally lustrous. At Hala Sultan Tekke, WPGS vessels ex-



Fig. 35. Functional classification of the Mycenaean-imported pottery from Hala Sultan Tekke.

hibit a less compact, fine fabric, which is sandy to touch and often quite a homogeneous greenish colour on both the surface and the fracture. The surfaces are not usually burnished or polished, and the paint is always matt.

However, a small amount of sherds exhibit some odd technological features: hard-fired medium-fine fabric with a homogeneous reddish colour and a large amount of micaceous inclusions; the absence of burnishing or polishing; lustrous paint. With regards to this small group, a south-eastern Aegean origin, based on similarities with products from Rhodes and Kos, is assumed.<sup>54</sup>

Once the selection of the pottery fragments was completed, a database was created in which the following information was recorded for each fragment: catalogue number, trench, locus, stratum, shape, decoration, dating.

The typological study was completed by a functional analysis that was mainly based on parallels from available publications.<sup>55</sup> This classification consists of four main functional categories (see Fig. 35: F1–4). The first one, including the tableware, was divided into two sub-categories: the so called “drinking sets”, including vessels for mixing (kraters, FS 8, 281–282) and pouring (jugs and juglets, FS 110, 114–115) and drinking (cups, FS 220; goblets, FS 254–255; kylikes, FS 257–258; stemmed cups, FS 278), as well as the vessels which could be used both for drinking and eating (deep bowls, FS 284; shallow angular bowls, FS 295–296). The second functional class concerns small containers for precious substances (small piriform and stirrup jars, FS 45–48, 166, 171). The third includes vessels used for storage (medium-sized piriform

<sup>52</sup> We would particularly like to thank Professor P.M. Fischer for giving us the opportunity to take part in NSCE 2013 and study the Mycenaean-imported pottery. We also thank the assistant director, T. Bürge, for her unflinching support during the study season. We are also thankful to Professors G. Graziadio and M. Benzi for their comments on the paper. For an overview of the Mycenaean pottery found outside Greece, see Van Wijngaarden 2002. For an overview of the Mycenaean pottery from Cyprus, see Steel 2004a; Van Wijngaarden 2002, 125–202 (in particular 183–202), for the cultural significance of Mycenaean pottery in Cyprus. For the Mycenaean pottery from Syria-Palestine, see Leonard 1994.

<sup>53</sup> Fischer 2012b, 73–80.

<sup>54</sup> Mountjoy 1999, 979–1074, 1075–1125.

<sup>55</sup> The present classification is based on an elaboration of two main works: Mountjoy’s functional classes presented in Mountjoy 1993, 122–128, tables III–IV–V, but especially the functional classification elaborated in Graziadio & Pezzi 2013, 68–69, figs. 3, 4, which was referred to the cemetery of Enkomi.



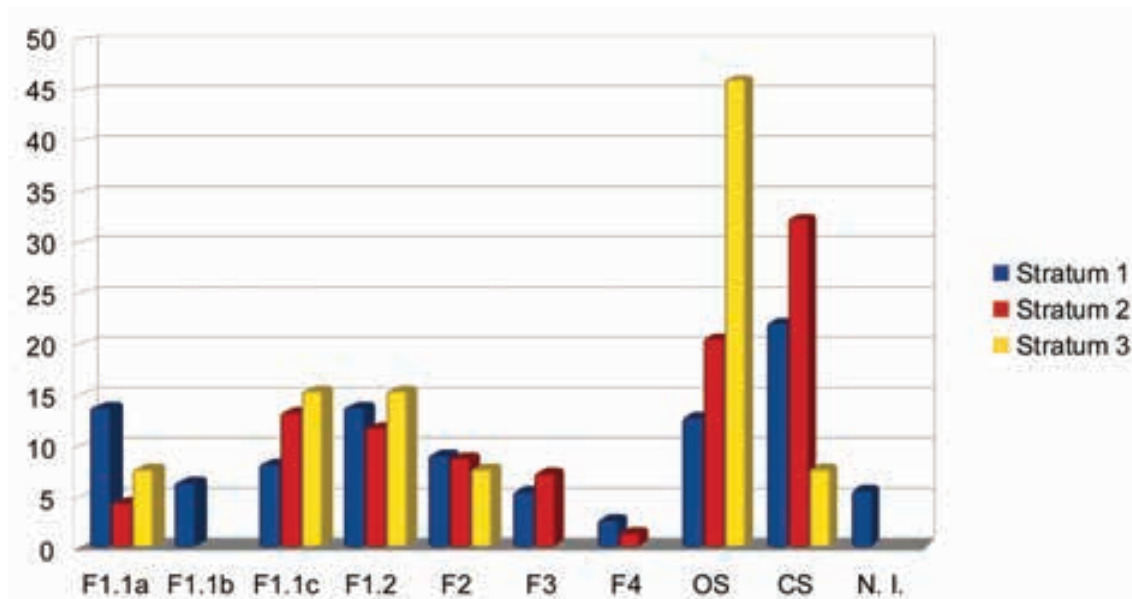


Fig. 36. Trends of the functional classes of the Mycenaean-imported pottery from 2013 for each Stratum.

and stirrup jars, FS 39–40, 34–35; FS 167, 173). The fourth consists of ritual vessels (rhyta, FS 199).

Through the functional classification and the use of the catalogue it was possible to observe the composition of the typological range of Mycenaean imports from Hala Sultan Tekke and the degree of appreciation of specific shapes over time. *Figure 36* shows the distribution of the functional classes in Strata 1–3.

## Results

Taking into account the functional analysis, the classification was applied to each locus in which Mycenaean imports were detected. By grouping the loci according to Strata 1–3, it was possible to observe stratigraphical differences in functional classes. In general, the material from earliest stratum, Stratum 3, is not as abundant as in Strata 1 and 2. It should be highlighted that our study is based on Mycenaean sherd material and not on complete vessels which, to a certain extent, limits the value for dating our strata according to the Mycenaean material. The general chronology is mainly based on locally produced fairly complete *in situ* vessels, which in general are of somewhat later date. Our material is characterized by a high degree of fragmentation, low percentage of joins, and scarcity of diagnostic features, i.e. many sherds are body sherds. This is the reason why the precise identification of the shape, ac-

cording to Furumark's<sup>56</sup> and Mountjoy's<sup>57</sup> classifications, was possible only in a relatively few cases. In most other cases, only the general shape could be identified (without indicating FS) or, when this was impossible, the sherds were described as belonging to an open or a closed shape.<sup>58</sup>

The first functional class is the best represented in all the strata: all shapes belonging to this category are well represented except for the pouring vessels, which are almost absent. While the number of mixing vessels and the drinking/eating vessels increase from Stratum 2 to the most recent Stratum 1, the quantity of drinking vessels, which consist almost exclusively of shallow semi-globular cups (FS 220), declines constantly from Stratum 3 to Stratum 1. In the second functional category, the small containers for precious commodities are less attested than the first class but constantly increase in number over time. The containers used for storage, representing the third functional class, are present only in the last two strata and demonstrate a reduction of numbers from Stratum 2 to Stratum 1. Finally, the rare ritual vessels are absent in Stratum 3 but their quantity increases through the following two strata. With regard to the open and closed shapes, the former are much better attested in the earlier strata while the latter are better attested in the later strata (*Fig. 36*).

<sup>56</sup> Furumark 1941.

<sup>57</sup> Mountjoy 1986.

<sup>58</sup> Only six of 210 sherds could not be ascribed to an open or a closed shape.

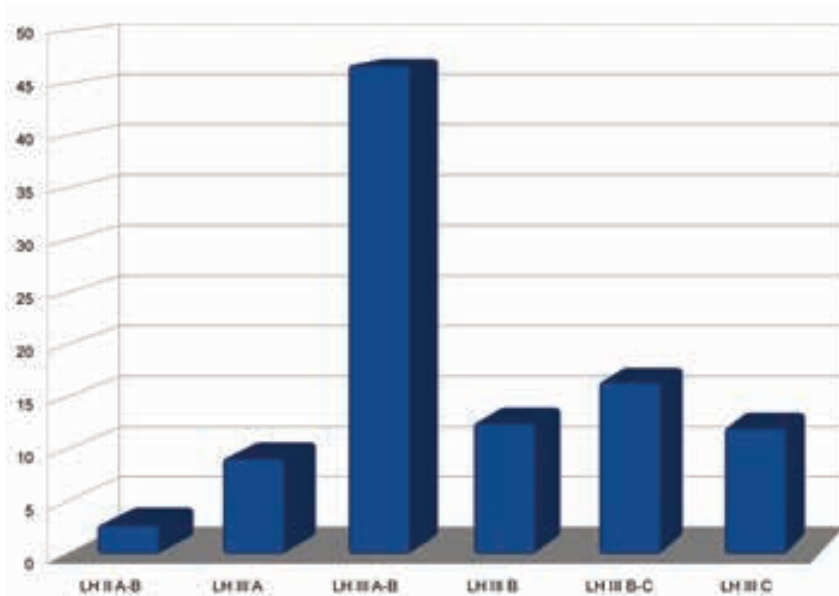


Fig. 37. Chronological distribution of the Mycenaean-imported pottery in all strata.

“Stratum X”<sup>59</sup> produced 16 sherds. Only four belong to a closed shape, while the rest consist almost exclusively of “drinking set” vessels: mainly kraters FS 8 or FS 281, a shallow semi-globular cup FS 220, and two kylikes (one FS 257); a deep bowl FS 284 and a probable goblet are also included in the material from “Stratum X”.

Open shapes represent 56% (113 sherds) and closed shapes 44% (91 sherds). Of 113 open shape fragments, 85 specimens (i.e. 75%) belong to typologically classified open shapes. Among the classified open shapes, the most common are kraters FS 8, 281–281 (32%), deep bowls FS 284 (20%), shallow semi-globular cups FS 220 (7%), and shallow angular bowls—FS 296 (7%). Definite goblets FS 254–255 account for only 6%, the kylikes FS 257–258 for 6%, while almost 3.5% could be either goblets or kylikes. Finally, stemmed cups like FS 278 are scarcely attested (3.5%).<sup>60</sup> The presence of the shallow, angular bowl FS 296<sup>61</sup> and the stemmed cup FS 278, which are both Levanto-Helladic shapes, is particularly interesting.<sup>62</sup> Moreover, the FS 278 is rarely attested.<sup>63</sup> Other types of open shapes are present but are not attested in significant quantities.

<sup>59</sup> The material from L377 belongs to a test trench. It has not yet been correlated to the phasing at Hala Sultan Tekke. It is here termed Stratum X. However, a first impression is that the material is of older date than Stratum 1.

<sup>60</sup> One of the fragments (FS 278) exhibits a high level of technological skill, especially because of its very good surface treatment.

<sup>61</sup> Leonard 1994, 123–126.

<sup>62</sup> For a synthesis of the Levanto-Helladic Style see Leonard 1994, 6–7.

<sup>63</sup> Leonard 1994, 110–111.

As for the closed shapes, 39 (43%) of 91 fragments could be recognized. The most commonly identified closed shapes were the stirrup jars—FS 161, 166, 171–173 (38%), piriform jars—FS 34–35, 39–40, 45–48 (18%), and rhyta FS 199 (10%). Fifteen percent of the identified closed shapes can be considered as belonging either to stirrup or piriform jars, which emphasizes the prevalence of these two shapes. Other types of closed shapes are present but not in significant quantities.

By grouping the loci according to their relevant strata and quantifying all the shapes attested in each of them, the trend of each shape over time has been recorded. The majority of all classified closed and open shapes come from Stratum 1, in which kraters, deep bowls, stirrup jars and piriform jars are equally attested. These shapes are also the most

common in Stratum 2. The most noticeable trends concern kraters and deep bowls. The majority of kraters, 18 specimens, come from Stratum 1, whereas Stratum 2 produced only three fragments. In contrast, the number of deep bowls remains fairly constant through the two strata: eight for Stratum 1 and six for Stratum 2. Stratum 3 and Stratum X do not permit any kind of trend analysis because of the low quantity of sherds.

The dating of the fragments is based on typology and decoration. Each specimen was dated to a precise Late Helladic (LH) period or, when this was not possible, to a chronological range.<sup>64</sup> It is possible to come to some conclusions in relation to the assemblages of Strata 1 and 2. *Figure 37* (all strata) shows that the Mycenaean imports appear in Area 6 W in small quantities in LH IIA–B.<sup>65</sup> A peak is registered in LH IIIA–B, after which the number of Mycenaean sherds decreases again. *Figures 38* and *39* depict the chronological distribution of Mycenaean sherds in Strata 1 and 2. A few of the dated fragments have not been taken into account because their chronological range was too broad and was thus not significant.<sup>66</sup> It is interesting to note that no LH IIA material was detected in Stratum 1, and that there are only very few LH IIIA sherds (2.3%; *Fig. 38*). In contrast, LH IIA sherds are attested in Stratum 2, and the quantity of LH IIIA material increases noticeably (12%). In both strata there is a peak of LH

<sup>64</sup> Of 210 sherds, 175 were dated.

<sup>65</sup> Cf. Van Wijngaarden 2002, 186.

<sup>66</sup> For Stratum 1, 84 fragments out of 87 have been included, and for Stratum 2, 51 out of 59.

IIIA–B material, even if there is a significant difference in the levels of occurrences of pure LH IIIB material (8% in Stratum 2 and 19% in Stratum 1). The LH IIIC is better represented in Stratum 1 (19.2%) than in Stratum 2 (8%).

As far as Stratum X is concerned, we can conclude that only LH IIIA1 to LH IIIB2, and neither earlier (LHII) nor later (LHIIIC), sherds are present.

## Preliminary conclusions

Functional and typological analyses allow us to draw valuable conclusions. The most significant variations in the quantities of imports are observed in relation to the mixing and the drinking/eating vessels, namely the kraters and the deep bowls. Together with the shallow semi-globular cups, these vessels belong to the first functional class. The most common shapes in the White Painted Wheel-made ware repertoire, namely the Mycenaean-style WPGS, are kraters, deep bowls, and cups (not only of the shallow semi-globular type).<sup>67</sup> This may suggest that these shapes were imported from the Mycenaean sphere of culture for functional considerations and then reproduced locally in much greater numbers. The same is true as far as the shallow, angular bowl is concerned, even if it is not attested in great quantities amongst the Mycenaean imports. This phenomenon can be interpreted as the result of social dynamics, with the Mycenaean “drinking sets” being used by elite groups as a symbol of a certain kind of lifestyle.<sup>68</sup> Once these dynamics began to involve new social groups, the growing demand for Mycenaean pottery was satisfied by the local reproduction of imported prototypes. The Mycenaean pottery thus ceased to be an elitarian issue. This statement can be supported by the fact that both

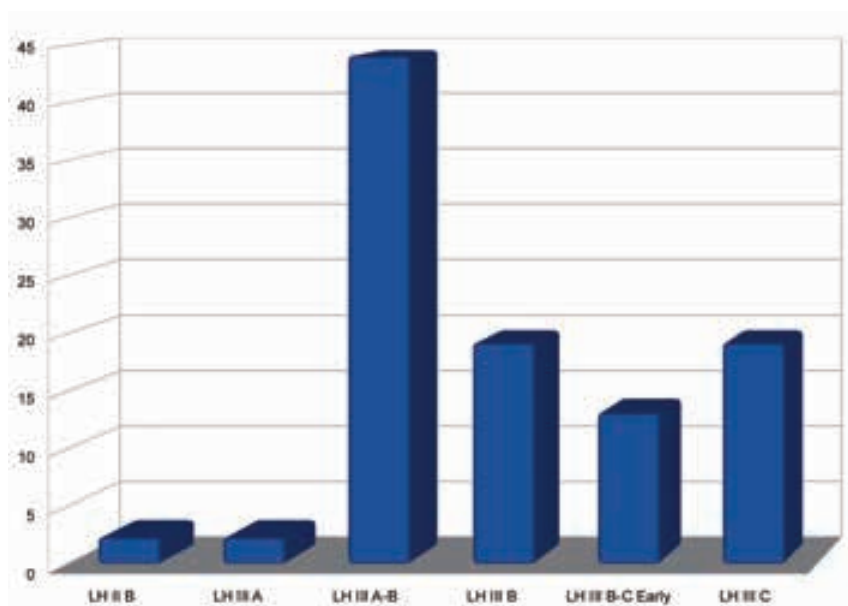


Fig. 38. Chronological distribution of the Mycenaean-imported pottery in Stratum 1.

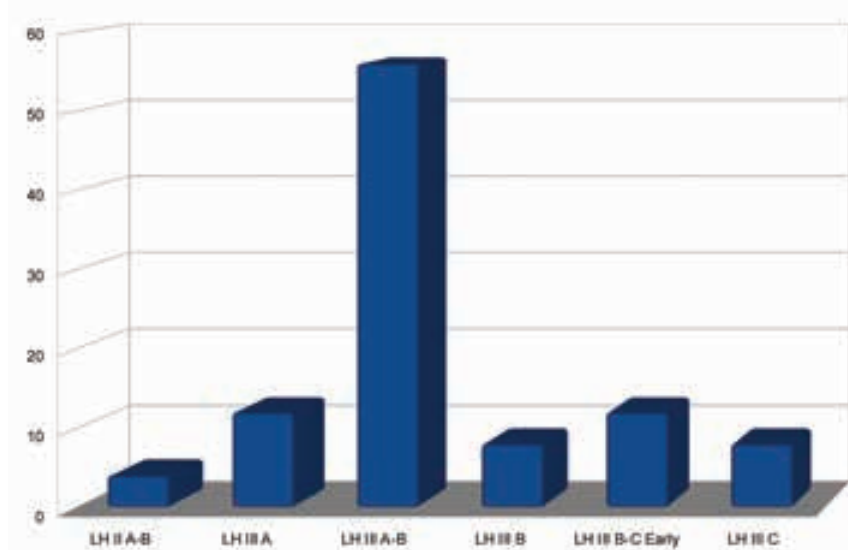


Fig. 39. Chronological distribution of the Mycenaean-imported pottery in Stratum 2.

Mycenaean imports and White Painted Wheel-made ware are largely attested in contexts of day-to-day activities.<sup>69</sup>

Further observations can be made as regards goblets and kylikes: they are attested only until the LH IIIA, and they

<sup>67</sup> Quantitative analyses of White Painted Wheel-made Ware types have not yet been carried out.

<sup>68</sup> Van Wijngaarden 2002, 194, 198.

<sup>69</sup> Cf. Van Wijngaarden 2002, 187. In the case of Hala Sultan Tekke, this pottery was found in contexts devoted to metal and textile production.



were not reproduced locally. It becomes even more interesting if one considers that the kylikes FS 257–258, especially, represent one of the most common shapes during LH IIIB on the mainland, where they form part of the feasting typological repertoire.<sup>70</sup> The noticeable absence of these two shapes points to an intentional selection of vessel types. In contrast, the containers—both the small and the medium-sized/large stirrup and piriform jars—exhibit a more equal distribution and are much less often reproduced locally. Thus, it is likely that these vessels were imported mainly for their contents.<sup>71</sup>

Finally, there is no local reproduction of the rhyton, which is attested exclusively among the Mycenaean imports. It is represented only by a few specimens, but this does not diminish the value of its presence since it is also a rare shape on the mainland. This could mean that these vessels maintained their original function and symbolic value.

It has been highlighted that the Mycenaean-imported pottery from NSCE 2013 is characterized by a high degree of fragmentation, a low percentage of joins, and a scarcity of diagnostic features. This picture does not match the preliminary analysis of the White Painted Wheel-made pottery: it is very abundant and many of the vessels of this ware are complete or almost complete. In the same loci, mainly in Stratum 1, a high percentage of LH IIIA–B Mycenaean imports and an even higher amount of WPGS pottery whose typological and decorative repertoires point to the LH IIIC Early to Middle could be noted. Thus, it seems that the LH IIIA–B Mycenaean imports are mainly residual<sup>72</sup> within our contexts (parts of which can be dated to the LC IIIA to early B(?) period), taking into account the locally produced Mycenaean-style pottery (WPGS). This means that the dating of the stratigraphical sequence cannot be based exclusively on the Mycenaean imports.

In order to support and extend the results of the present study, it would be useful to carry out a similar study on the White Painted Wheel-made material.

## Appendix 3: Three Late Bronze Age figurines from Trench 14B at Hala Sultan Tekke

BY D.M. BLATTNER

### Introduction

Test Trench 14B, in the westernmost part of the area investigated in 2013, produced three partly preserved figurines in the uppermost stratum. The aims of this study are to describe them and determine their origin and dating. The possible functions of these figurines will not be discussed since thorough stratigraphical and functional analyses have to await the future excavation of this new area.

### Description

#### 1. HEAD OF ANTHROPOID FIGURINE (N207; FIG. 22)

This was found at the border between colluvial soil and the first layer of occupation (Stratum 1). It is handmade Base-ring ware, about 3 cm high and 3.4 cm wide. The fabric is fine and dark grey, and it has an orange slip. The top of the head is flat, and the nose is long, pinched and beak-like. The ears are only partly preserved: the right one is broken off, and approximately half of the left is preserved. The left ear is pierced at least twice (as preserved). The eyes are made of pellets of clay, and pupils are marked by incisions.

#### 2. HEAD AND NECK OF ANTHROPOID FIGURINE (N215; FIG. 23)

This fragment was found in Stratum 1, Locus 377, which is just below the colluvial soil. Like N207, it is handmade Base-ring ware of a fine, dark grey fabric, but this one has a light-brown slip. It is about 3.3 cm high, the maximum width is 2.7 cm, and the diameter at the neck is 1.2 cm. The top of the head is flat, the rear is concave, and the ears are very small. The nose is pinched, and the chin, eye sockets and eyebrows are carefully modelled. The mouth is represented by an incised line. The eyes are made of attached pellets with incised circles (see N207). It is bichrome decorated: the eyebrows and the top of the head are painted black, and the mouth is red. The neck is decorated with two red and black bands.

<sup>70</sup> This apparent lack of appreciation for the kylix does not seem to be attested over the whole island, cf. Van Wijngaarden 2002, 185, 192–193.

<sup>71</sup> For the importance of Mycenaean closed shapes at Cypriote southern coastal sites, see Van Wijngaarden 2002, 186.

<sup>72</sup> This could also be due to a long period of circulation of the vessels, cf. Van Wijngaarden 2002, 192.

### 3. HEAD AND NECK OF AN ANIMAL FIGURINE (N214; FIG. 24)

The object was found in Stratum 1, L377, and is made of fine, light-red fabric and has a light reddish-yellow slip. It is 3.8 cm long, 2.2 cm high and has a thickness of about 1.4 cm at the head. The figurine is broken off at the neck and the nostrils. The fragment is decorated with several dark red to brown lines on the left side of the neck and face. The ears are triangular, modelled separately and painted dark brown.

## Discussion

Figurine N207 belongs to the native Cypriote Class II Type 2,<sup>73</sup> according to Åström.<sup>74</sup> It is most frequently found in Cyprus,<sup>75</sup> but some examples have also been discovered outside Cyprus in the Eastern Mediterranean.<sup>76</sup> Those figurines are often referred to as “bird-faced” female figurines.<sup>77</sup> Complete examples feature earrings (in most cases not preserved)<sup>78</sup> and a straight body, often with a wide, accentuated pelvis.<sup>79</sup> The arms are either bent up to the chest, along the body<sup>80</sup> or are looped towards the waist.<sup>81</sup> The breasts are superimposed, and incisions represent jewellery, fingers, toes and the pubic region.<sup>82</sup> Some examples have a added pellet with a circular incision for the navel.<sup>83</sup> A figurine of this type has been found at Hala Sultan Tekke in a tomb context.<sup>84</sup> This type is mostly dated to LC II.<sup>85</sup>

Figurine N215 is of local origin and corresponds to Åström’s native Cypriote Class II Type 1.<sup>86</sup> A distinctive feature of this type is the bichrome decoration. Complete examples are classified as females<sup>87</sup> and are similar to those of the Class II Type 2, which are incised in order to accentuate the pubic region. Some of the figurines feature an impressed

navel.<sup>88</sup> This type seems to be more common than the Class II Type 2 figurines and is mainly dated to LC II.<sup>89</sup>

Figurine N214 is, to judge from the fabric and the paint, of Mycenaean origin and was most likely part of a chariot group (Åström’s Mycenaean ware Class I type 6)<sup>90</sup> that consisted of two horses and an attached chariot with operators. The primary indicator for this hypothesis is that the horse was only painted on the left side of the head, which would have faced the outside of the figurine group. The other hint is the break on the right side of the neck, which probably stems from the originally attached, plastically rendered reins.<sup>91</sup> The lines on the neck clearly depict the harness, and the paint applied to the eye sockets could symbolize blinkers. Similar objects were found in several Mycenaean centres, but also in Cyprus,<sup>92</sup> the Eastern Mediterranean and even Syria.<sup>93</sup> Most examples were found in contexts corresponding to LH IIIA–B,<sup>94</sup> which roughly correlates to LC IIB–C.

## Conclusion

The figurines referred to are all dated to LC II and are either locally made or imported from the Mycenaean sphere of culture. Even though they are quite common in Cyprus, it is interesting that all our figurines stem from such a limited area. Future exposure will certainly determine the function of this area.

<sup>73</sup> For parallels and further reading, see L. Åström 1972, 513; Karageorghis 1974, 19; Begg 1991, 64–91.

<sup>74</sup> L. Åström 1972, 513.

<sup>75</sup> L. Åström 1972, 513; Begg 1991, 61–91.

<sup>76</sup> L. Åström 1972, 584.

<sup>77</sup> Knapp 2013, 390–391.

<sup>78</sup> Knapp 2013, 513; Begg 1991, 62.

<sup>79</sup> For parallels see Davis 1964, pl. I: 9; Karageorghis 1976, pl. LX: 3.

<sup>80</sup> Davis 1964, 7.

<sup>81</sup> For parallels see Karageorghis 1974, fig. 30; Karageorghis 1976, pl. LX: 3; Åström 1989, fig. 73.

<sup>82</sup> For parallels see Karageorghis 1974, fig. 30.

<sup>83</sup> For parallels see Karageorghis 1974, fig. 30; Åström 1989, fig. 73.

<sup>84</sup> Karageorghis 1976, pl. LX: 3.

<sup>85</sup> L. Åström 1972, 584; Begg 1991, 61–91.

<sup>86</sup> For parallels and further reading, see L. Åström 1972, 512–513; Symons 1984, 27; Begg 1991, 64–91; Nys & Åström 2005, 19; Mihalopoulos 2006, 18.

<sup>87</sup> Knapp 2013, 392–393.

<sup>88</sup> For parallels see L. Åström 1972, 512–513; Symons 1984, 37, no. 140; Åström 1989, fig. 73; Nys & Åström 2005, pl. 7:142; Mihalopoulos 2006, fig. 27.

<sup>89</sup> Begg 1991, 61–91.

<sup>90</sup> L. Åström 1972, 512; for parallels and further reading, see Leonard 1964, 140–141; Nicolaou 1965, 52; L. Åström 1972, 512.

<sup>91</sup> For parallels see Nicolaou 1965, pl. VIII a, b, c; French 2009, fig. 2.

<sup>92</sup> Nicolaou 1965, 52.

<sup>93</sup> For parallels see Leonard 1994, 140–141.

<sup>94</sup> Leonard 1994, 140–141.

## Appendix 4: A violin bow fibula from Hala Sultan Tekke 2013

BY T. BÜRGE

### Material and context

During the 2013 season of excavation, a complete and very well-preserved fibula of bronze (N133) was discovered in Area 6W (Figs. 13a, b and 40). The fibula was found in Trench 11B, just south of W47, in the debris of the floor of R30 (L329), which can be assigned to Stratum 1. Other finds from this only partly exposed space include an ovoid/spherical object of lead (N125), a krater of White Painted Wheel-made Geometric Style (L338-1; Fig. 29:7), a bowl of Plain White Wheel-made ware (L338-2), and a wheel-made cooking pot (L338-3).

### Description

Length: 12.1 cm; maximal opening: 5.8 cm; diameter of spring: 1.8 cm; weight: 43 g.

The fibula has a single spring. Its pin is straight and pointed at one end. The bow is almost parallel to the pin and slightly curved with a swelling bordered by two biconical knobs or buttons. The catch plate has been widened by hammering. The bow of the fibula is decorated with an incised herringbone-like motif partitioned by four incised collars: two broader are in the central part of the bow and two smaller next to the knobs.

### Selected parallels

Fibulae are attested on Cyprus from the 13th to the 6th century BC, and then from the Roman period onwards.<sup>95</sup> Our fibula belongs to the violin bow (or fiddle bow) type, which is characterized by a horizontal bow parallel to the pin. This type of fibula is the oldest type known from Cyprus. It is attested in contexts dated between 1220 and 1050 BC, namely LC IIC2–IIIB2 or LH IIIB2–IIIC.<sup>96</sup> Our type of fibula rep-

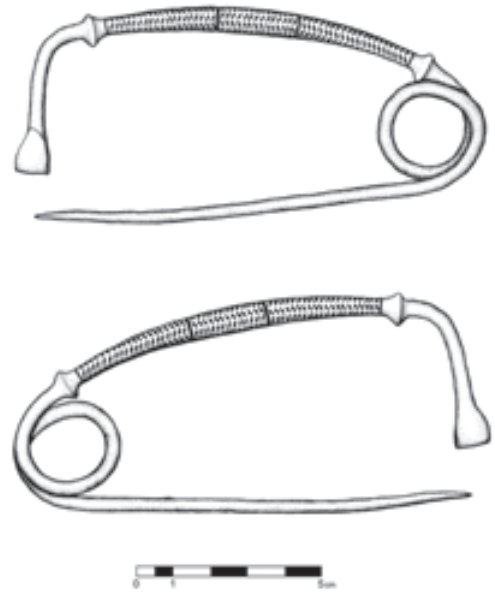


Fig. 40. Bronze fibula N133 from Room 30, Stratum 1 (drawing by T. Bürge).

resents a development from a simple garment pin with an eyelet,<sup>97</sup> a type which is also known from Cyprus.<sup>98</sup> The violin bow fibula is attested in many parts of Europe:<sup>99</sup> the Alpine region, Dalmatia, the Carpathians and the Balkans—especially along the Danube,<sup>100</sup> as well as the Aegean, Cyprus and also the Levant. These fibulae belong to a group of bronze artefacts and personal ornaments that includes pins, knives, and weapons—for instance certain types of swords, daggers and spear-heads—which are often referred to as “Urnfield bronzes”.<sup>101</sup> However, it is not clear where exactly this early type of fibula originates from. It is likely that there is no single point of origin and the violin bow fibula was developed independently in different regions.<sup>102</sup>

The violin bow fibulae with leaf-shaped bows are the most common type of fibula found on Cyprus. Parallels to our type with circular section include a fibula from Kition,<sup>103</sup> which is

places the first appearance of the fibula in Cyprus during LH IIIC.

<sup>97</sup> Alexander 1973, 217–220; see also discussion and references in Giesen 2001, 50–52.

<sup>98</sup> Catling 1964, 237.

<sup>99</sup> Von Eles Masi 1986, 1–13; Lo Schiavo 2010.

<sup>100</sup> Vasić 1999, 12–14, see distribution on pl. 61A.

<sup>101</sup> See e.g. Sherratt 2000, 84–87 with further references.

<sup>102</sup> See discussion and references in Sundwall 1943, 8–18; Kilian 1985, 202; Vasić 1999, 12; Teržan 2000, 35; Giesen 2001, 50–54. Alexander & Hopkin (1982, 406–409) suggest the Alpine foothills as the area where the violin bow form was invented.

<sup>103</sup> No. 5032 from Area II Floor II, Room 117; see Karageorghis 1985, 182; Karageorghis & Demas 1985b, pls. 152, 216; context dating from

<sup>95</sup> My sincere thanks to Dr R. Jung for our fruitful discussion. General information in Giesen 2003.

<sup>96</sup> Desborough 1964, 54–58; Furumark 1972, 91–93; see also chronological chart in Giesen 2001, 375, fig. 4; contra Kilian 1985, 190, who



considerably smaller (length 7.7 cm; weight 16.5 g) and has no knobs. Another quite close parallel is a fibula with two knobs from Enkomi<sup>104</sup>—the only other knobbed, Cypriote, violin bow fibula in addition to ours from Hala Sultan Tekke (length 12.7 cm; weight 57.6 g). Nevertheless, the Enkomi fibula has a longer forearm, and the bow and needle are not parallel.

There are several of the early type fibulae with two knobs from the Greek mainland, most of which have incised decorations.<sup>105</sup> However, there is only one very close parallel to our type with swollen bows with circular sections and two knobs (Kilian's type VIB), which comes from Marathon. It has a length of 14.4 cm, which is somewhat larger than the fibula from Hala Sultan Tekke, and its decoration is composed of zigzag and lines on the bow.<sup>106</sup> Another, even closer, parallel comes from a Late Minoan IIIC mature context at Chalasmenos, Crete.<sup>107</sup>

There are two striking parallels from Italy: one comes from the necropolis of Cavallo Morto (Province Rome, Lazio; dated to Young Bronze Age 2) and is approximately 12 cm long.<sup>108</sup> Another one, with discoidal knobs, comes from Torre Mordillo, Calabria and is 10.3 cm long.<sup>109</sup> Similar to our fibula all mentioned parallels have a tripartite decoration with a colored band in the centre of the bow and a herringbone-like pattern.

An exact dating of the known Late Bronze Age fibulae is often difficult because many of them were found either in contexts that were not well stratified or in tombs. Others come from old excavations and their context is unknown or poorly documented. Nevertheless, Kilian observed that the violin fibulae with two knobs (his type VI) are only attested from the middle of LH IIIC, which is in contrast to the date of the fibula from Enkomi (see note 105).<sup>110</sup> The parallels from Italy and Crete referred to are dated to the 12th century BC.<sup>111</sup>

## Discussion

Twenty-four violin bow fibulae are known from Cyprus, according to Giesen's compilation:<sup>112</sup> they come from Enkomi (15), Maa-Palaeokastro (2), Kition (1), Kourion-Bamboula (1), Atheniou (1), Amathous (1), or are of unknown provenance. No other violin bow fibulae are reported from Hala Sultan Tekke, so the fibula from the 2013 season of excavation is the first to be found there. Other roughly contemporaneous sites where this kind of fibula has not yet been found are Kalavassos-Ayios Dhimitrios, Alassa and Maroni.<sup>113</sup> The fibula appears not to be a common object on the island during the Late Bronze Age and might have been limited to certain social strata.

Giesen argued that fibulae of this early type are concentrated on the southern and eastern coast of Cyprus, while they are missing in the heartland,<sup>114</sup> and Hala Sultan Tekke matches this pattern well. It seems therefore that this object was mainly in use at urban sites connected with sea trade. This observation supports the assumption that the fibula arrived in Cyprus through contacts with the Aegean and the Western Mediterranean.<sup>115</sup>

The fibula from Hala Sultan Tekke is one of the largest violin bow fibulae from Cyprus: the size range of the published objects from Cyprus is from around 4 cm<sup>116</sup> to 12.7 cm<sup>117</sup> in length, and the size of most of these fibulae is between 7 and 11 cm. As pointed out above, the closest parallels come from the Greek mainland and Italy but not from Cyprus. While the parallels from Italy and Greece seem to be locally produced, and their similarities can be explained by intense mutual contacts and an exchange of ideas, it is, in contrast, not unlikely that the fibula from Hala Sultan Tekke is an import.<sup>118</sup> However, the total number of attested violin bow fibulae from Cyprus is too small to distinguish between local and imported types on the basis of typological criteria. Future trace-element and lead-isotope analyses may shed light upon the provenance of our fibula.

LC IIIB (1125/1100–1050), see Karageorghis & Demas 1985a, 266–267, 272, fig. 1; also Giesen 2001, pl. 1, no. 2; description on p. 40.

<sup>104</sup> Enkomi T. 74, BM 97.4-I-1511; from a LC IIIA context; see Birmingham 1963, 83–84, fig. 2a; Giesen 2001, pl. 4, no. 15 (the knobs are not rendered here); see description on p. 42.

<sup>105</sup> E.g. from Teichos Dymaion, Achaea (11.6 cm long, decorated with incised lines, Kilian's type VIA), from Mycenae (13 cm long, undecorated, Kilian's type VIC) and from Thermos, Aetolia (11.6 cm long, line pattern, Kilian's type VIC). All compiled in Kilian 1985, 150, fig. 3 and 151, fig. 4.

<sup>106</sup> Cambridge, Fitzwilliam Museum, inv. no. GR 3.1960; Nicholls 1962, 47–48, fig. 2; also Kilian 1985, 150, fig. 3, VIB1.

<sup>107</sup> Tsipopoulou & Nowicki 2003, 563, 575, fig. 15.

<sup>108</sup> Angle *et al.* 2004, 131, fig. 3, T. 12.3; also Jung 2006, 116, pl. 10.3.

<sup>109</sup> Most likely from a tomb, dated to the Final Bronze Age ("Bronzo finale"); see Lo Schiavo 2010, 89, pl. 2:16.

<sup>110</sup> Based on the find assemblages; see Kilian 1985, 190.

<sup>111</sup> Cavallo Morto: Angle *et al.* 2004, 136–138; Torre Mordillo: Lo Schiavo 2010, 89; Chalasmenos: Tsipopoulou & Nowicki 2003, 565;

see also the chronological discussion of the fibulae in Jung 2006, 116. Chronological table: *ibid.* 216, fig. 24.

<sup>112</sup> See catalogue in Giesen 2001, 40–43.

<sup>113</sup> Giesen 2001, 54.

<sup>114</sup> With the exception of Atheniou; Giesen 2001, 54.

<sup>115</sup> E.g. Giesen 2003, 13.

<sup>116</sup> E.g. a fibula from Enkomi; see Giesen 2001, 40; pl. 1, no. 3.

<sup>117</sup> The fibula from Enkomi; see Giesen 2001, 42; pl. 4, no. 15.

<sup>118</sup> Birmingham 1963, 84 regarded the two knobs as trait which is not common to the violin bow fibula from Cyprus and the Eastern Mediterranean.

## Appendix 5: Reflections on a stone mould from Hala Sultan Tekke 2013

BY B. STOLLE

### Material and context

This study deals with a stone mould (N152) which was found in Area 6 W in Stratum 1 (*Fig. 9*). It was found inside the south-eastern part of a possible gutter just south and outside of R23.

The mould itself has a somewhat irregular rhomboidal shape with the following dimensions: length 3.9 cm, width 2.6 cm, thickness 1.4 cm, weight 21 g. It is made of a greyish-black, quite soft stone, which is possibly steatite.<sup>119</sup> On the obverse, it features the circular impression of a complete hoop with a diameter of 2.0 cm and an intake channel. The channel and the engraved circle exhibit traces of ochre-coloured oxidation. On the reverse side, there are two linear incisions. The main aim of this study is to locate this object in relation to jewellery production and craftsmanship at Hala Sultan Tekke.

### Moulds and casting in the Late Bronze Age: some observations

The importance of copper/bronze workshops at Hala Sultan Tekke has been highlighted by Åström.<sup>120</sup> A mould for the manufacture of arrowheads is proof of that weapons were locally produced at Hala Sultan Tekke.<sup>121</sup> In addition, two stone and terracotta moulds for the production of (agricultural) tools and tripods came from a coppersmith's workshop in Area 8.<sup>122</sup> Our mould has its closest parallel in a mould from Enkomi—a rectangular finger-ring mould (originally a three-part mould).<sup>123</sup> The mould is made of steatite and has four pinholes.

Finger rings are quite frequent finds on Late Bronze Age sites in the Eastern Mediterranean. However, moulds for casting these objects are rather rare. They are usually rectangular or square, with an average thickness of 1–2 cm and a ring di-

ameter of 1.7–2.6 cm.<sup>124</sup> Finger-ring moulds can be carved with just one or more negatives on one or more surfaces.<sup>125</sup> Find spots of previously recorded moulds all have in common the characteristic of representing larger administrative and/or economic centres: this is not unexpected because craft specialisation is considered a typical feature of urban centres.<sup>126</sup> Steel assumes that the production of tools, weapons and luxury items on Cyprus was carried out in these centres, and that it “was closely controlled by the Late Cypriote urban elite”.<sup>127</sup> According to Pini, Cypriote jewellery in general demonstrates the advanced skills of Late Bronze Age smiths.<sup>128</sup> In addition to external influences, mainly from the Levantine area, Late Cypriote jewellery exhibits local features with regard to shape and decoration.

Steatite was the material predominantly used for the production of jewellery moulds.<sup>129</sup> Experiments have shown that steatite, due to its soft and heat-resistant properties, is easy to carve and can be reused several times in the casting process.<sup>130</sup> Other common materials for moulds are sandstone and bauxite.<sup>131</sup>

In order to guarantee a good result, the components of closed moulds had to be attached firmly to each other during the casting process.<sup>132</sup> This was achieved by lacing the mould with metal wire<sup>133</sup> and often also with metal pins which were thrust into drilled keyholes.<sup>134</sup>

According to Reinholdt, simple bivalve moulds were quite common in the Aegean (e.g. at Thebes and Mycenae) during the Late Bronze Age.<sup>135</sup> During the next process of soldering, the plain hoops could be connected to a bezel.<sup>136</sup> Three-part moulds, where the bezel and hoop were directly connected in the casting process, were preferred for the production of bezel rings.

Concerning casting itself, two procedures can be distinguished. The liquid metal was either poured directly into the mould with the help of crucibles, or the moulds were used as a

<sup>119</sup> Petrological analyses have not yet been carried out.

<sup>120</sup> See Åström 1982, 178 and Åström 2000, 33–34.

<sup>121</sup> See Hult 1978, 83. This is the only find so far which proves production of weaponry.

<sup>122</sup> Åström 2000, 33–34.

<sup>123</sup> See Konstantinidi-Syvridi & Kontaki 2009.

<sup>124</sup> See Tournavitu 1997, 224.

<sup>125</sup> See e-mail from C. Reinholdt, University of Salzburg, Austria, dated 2 August 2013.

<sup>126</sup> See Steel 2004b, 161.

<sup>127</sup> Steel 2004b, 168.

<sup>128</sup> See Pini 2010, 67.

<sup>129</sup> See inter alia Karageorghis 1989, 440. See also Tournavitu 1997, 222.

<sup>130</sup> See Konstantinidi-Syvridi & Kontaki 2009, 314.

<sup>131</sup> See Konstantinidi-Syvridi & Kontaki 2009, 312; e-mail from C. Reinholdt dated 2 August 2013.

<sup>132</sup> See Laffineur 1996, 95.

<sup>133</sup> Konstantinidi-Syvridi & Kontaki 2009, 316 suggest the use of a flat wire of copper alloy.

<sup>134</sup> See Laffineur 1996, 95.

<sup>135</sup> E-mail from C. Reinholdt dated 2 August 2013; Konstantinidi-Syvridi & Kontaki 2009, 312.

<sup>136</sup> See Laffineur 1996, 95.

first step in the lost-wax process (*cire perdue*).<sup>137</sup> According to Karageorghis, the lost-wax method must have been used with a stone mould found at Hala Sultan Tekke in 1898.<sup>138</sup> The mould was for three human figures. It has been described as a “goldworker’s mould” used to produce decorations for a stand. It does not feature keyholes, intake channels, or metal traces. The most common materials used for manufacturing rings in the Late Bronze Age are gold, silver and bronze.<sup>139</sup> Finger rings of various diameters were produced for both adults and children.<sup>140</sup> According to Pini “... most of the rings dated to LH IIIA–B and later, including the Cypriote examples, have larger internal diameters of 1.60–2.00 cm, and were thus suitable for the ring fingers of adult males ...”<sup>141</sup> A connection between the size of the hoop and the gender and age of the owner, as suggested by Pini, has previously been declared questionable due to several contradictory findings.<sup>142</sup> Furthermore, it should be noted that plain hoops, irrespective of their size, could also have functioned as hair rings or joints for other objects, for example.<sup>143</sup>

## Discussion and conclusions

The features of our mould, which is most likely of steatite, suggest rather strongly that the object is half of a bivalve mould used for casting finger rings. The material, model and dimensions of our mould are comparable to other moulds in the Eastern Mediterranean. It can be assumed that our mould is a local product since both steatite and sandstone occur naturally in Cyprus. However, compared with many other stone moulds, ours is quite simple. The linear impressions on the reverse and the absence of keyholes normally found on contemporary moulds reveal that our mould was attached to its counterpart only by a metal wire. The rough, uneven surfaces and edges of the mould (in comparison to other local moulds) indicate that it was manufactured without much care. Since Late Cypriote craftsmanship in metal working is generally considered to have been quite advanced, the idea that a lack of knowledge or skill would explain the shape of our simple mould can be disregarded. Hence, it has been suggested by Reinholdt that our mould was used as a temporary form.<sup>144</sup>

Temporary moulds were produced quite rapidly and without much care. They were not usually made for long-term use. Thus, our mould could have been a temporary solution for the local smith.<sup>145</sup> Body adornment is repeatedly linked to the advanced social classes, which had control of jewellery production.<sup>146</sup> However, in our case it is not possible to exclude production for the elite, based on the assumption that it is a temporary form, or to decide whether it was meant for people of lower status.

The impressions on the reverse for the securing wire, as well as the traces of oxidation in the carved area that point to metal remains, verify that the mould has actually been used for casting hoops. The lost-wax process can be excluded at this point, so the liquid metal must have been poured directly into the closed mould via the intake channel. Further analyses of the remains in the mould are necessary to determine which kind of metal/alloy was used for casting. A well-grounded assumption, however, is bronze. This is supported by the following observations: 1. The simplicity of the mould itself would make the use of a precious metal such as gold rather unlikely. 2. Earlier finds of plain bronze rings in the vicinity are similar to rings which were produced in our mould.<sup>147</sup> The latter aspect, together with similar findings from the Levant and the average diameter of finger rings, supports our assumption that the mould was used for casting finger rings for adults. It is impossible to decide if our mould was used to produce plain rings or if these represent the first step in the manufacture of more advanced jewellery.

In conclusion, we now have proof that various groups of objects were cast at the large urban centre of Hala Sultan Tekke: weaponry, tools and jewellery.

<sup>137</sup> See Konstantinidi-Syvridi & Kontaki 2009, 314. See also Konstantinidi 2001, 19.

<sup>138</sup> See Karageorghis 1989, 440–442.

<sup>139</sup> See inter alia Effinger 1996, 16.

<sup>140</sup> Vitale 2012, 409. See also Pini 2010, 66.

<sup>141</sup> Pini 2010, 66.

<sup>142</sup> Effinger 1996, 80.

<sup>143</sup> Effinger 1996, 19; Bočkarov & Leskov 1980, 66.

<sup>144</sup> E-mail from C. Reinholdt dated 2 August 2013.

<sup>145</sup> E-mail from C. Reinholdt dated 5 August 2013.

<sup>146</sup> See Colburn 2012, 369.

<sup>147</sup> See Fischer 2011, 79.



# Appendix 6: Textile production tools, season 2013

BY A. MILTIADOUS JOHANSSON

## Material

The aim of this study is to examine the artefacts from Area 6 W that are associated with textile production.

### SPINDLE WHORLS

Of seven spindle whorls from 2013, four are from Stratum 1 (N146, N173, N174 and N213), two are from Stratum 2 (N123 and N153, R31) and one is from Stratum 3 (N196; see *Table 1*).

The spindle whorls generally fall within the “standard range of size and weight” varying between 7–25 g,<sup>148</sup> except for three samples that weigh less than 10 g: N153 and N173, both from Stratum 2, weigh 9 g, while N196 from Stratum 3 only weighs 7 g. Only one sample (N146) from Stratum 1 was slightly heavier, weighing 25 g.

*Table 1. Spindle whorls from Area 6W: find number (N), trench (T), locus (L), stratum (S), room (R), dimensions (H = height, Th = thickness, W = width, D = diameter), weight (= Wt), material, shape and state.*

N	T	L	S	R	Dimensions (cm)			Wt (g)	Material	Shape/state
					H	D	D hole			
146	11B	338	1	30	2.4	2.5	0.8	25 g	Greyish-black basalt	Barrel-shaped, complete
173	12D	369	1	23	1.1	2.3	0.7	9 g	Stone	Biconical, complete
174	12D	369	1	23	1.6	2.1	0.5	10 g	Glass	Biconical, complete
213	12D	384	1	–	2.3	3.3	0.8	21 g	Sandstone?	Conical object, possible unfinished spindle whorl
123	10C	320	2	–	2.0	1.9	0.6	10 g	Greenish basalt	Biconical, complete
153	10A	358	2	31	1.8	1.6	0.3	9 g	Stone	Biconical, complete, circular incisions
196	10D	328	3	–	1.8	1.6	0.4	7 g	Stone	Biconical, complete

<sup>148</sup> Crewe 1998, 13–14, argues that any object of similar shape which has a hole in the centre, a diameter of at least 20 mm and a weight of 10 g should be identified as a possible spindle whorl.

### LOOM WEIGHTS

A total of 45 loom weights were found (see *Table 2* and *Fig. 41*). Fourteen are from Stratum 1 (N118, N199, N122, N143, N144, N145, N157, N158, N159, N160, N161, N170, N210, N297-4), ten are from Stratum 2 (N124, N126, N127, N149, N154, N162, N164, N181, N190, N195) and twenty-one are from Stratum 3 (N129, N130, N131, N132, N134, N138, N139, N140, N141, N142, N165, N177, N178, N179, N180, N186, N188, N189, N191, N192, N194). The loom weights were of various shapes and fabrics. Their weights varied between 38 g (N145) and 157 g (N181).

### DISCUSSION

Experimental spinning with whorls weighing 4, 5, 8, 10, 18, 20 and 30 g, has revealed that the weight and shape of a spindle whorl decide the quality and thickness of the spun thread and, consequently, the quality of the textiles.<sup>149</sup> Other experiments have shown that the diameters and warp tensions of the thread are also important.<sup>150</sup> Another pivotal component that defines the type of thread produced is the preparation and quality of the raw material—for instance, wool or flax.

The weights of our spindle whorls suggest that different threads were produced. Both N153 and N173 weigh 9 g. Spinning wool with these whorls would produce up to 714 m weft yarn per 100 g, depending on the quality of the wool and variations in warp tensions. The weight and thickness of the loom weights would also affect the final fabric. Heavier loom-

<sup>149</sup> Andersson *et al.* 2010, 165; Andersson & Nosch 2003, 205. See also Svensson 2011; Andersson & Nosch 2003, 198 and Crewe 1998, 13, who state that the heavier weights from Area 6 (excavations 2010) were intended for thicker threads and the production of coarser textiles.

<sup>150</sup> Andersson *et al.* 2009, 387.

Table 2. Loom weights from Area 6W: find number (N), trench (T), locus (L), stratum (S), room (R), dimensions (H = height, Th = thickness, W = width, D = diameter), weight (= Wt), material, shape and state. Measurements of incomplete objects are in *italics*.

N	T	L	S	R	Dimensions (cm)				Wt (g)	Material	Shape/state
					H	Th top/ bottom	W top/ bottom	D hole			
118	10C	295	1	–	5.5	–/3.0	2.8/3.5	0.5	82 g	Clay	Truncated pyramidal, complete
119	10C	295	1	26	6.7	–/3.0	2.1/3.2	0.5	74 g	Clay	Truncated pyramidal, complete
122	10D	297	1	28	5.6	–/2.5	–/3.9	0.8	55 g	Lime-stone?	Elliptical, complete
143	10D	297	1	24	8.0	max. 2.8	–	0.6	72 g	Clay	Elongated, irregular, one end broken
144	10D	297	1	24	5.4	1.4/3.3	1.4/3.6	0.6	55 g	Clay	Truncated pyramidal, complete
145	11B	359	1	27	5.4	–/2.7	1.7/2.8	0.3	38 g	Clay	Truncated pyramidal, broken in 2 pieces
157	12C	361	1	22	5.2	1.9/2.8	2.1/3.1	0.4	56 g	Clay	Truncated pyramidal, complete
158	10B	300	1	25	6.5	2.1/3.4	2.2/3.5	0.7	84 g	Clay	Truncated pyramidal, complete
159	12C	361	1	22	6.1	2.1/3.3	2.0/2.8	0.5	65 g	Clay	Truncated pyramidal, complete
160	12C	361	1	22	5.8	1.9/3.7	3.1/4.2	0.6– 0.8	101 g	Clay	Truncated pyramidal, complete
161	12C	361	1	22	6.4	2.0/3.4	2.0/3.4	0.5	84 g	Clay	Truncated pyramidal, complete
170	12C	361	1	22	5.3	2.4/3.1	2.6/3.0	0.6	76 g	Clay	Truncated pyramidal, complete
210	12D	384	1	22	6.6	2.0/3.1	1.9/3.3	0.5	84 g	Clay	Truncated pyramidal, complete but some old breaks on base
297-4	10D	297	1	28	–	1.3/–	3.3/–	0.4	–	Clay	Truncated pyramidal, one end broken
124	10D	318	2	35	5.9	2.0/3.6	2.0/3.6	0.6	92 g	Clay	Truncated pyramidal, complete
126	10D	324	2	35	6.4	2.1/3.2	2.1/3.2	0.5	77 g	Clay	Truncated pyramidal, complete
127	10D	324	2	35	5.2	–/3.1	–/3.0	0.2	48 g	Clay	Pyramidal, complete
149	11B	351	2	35/37	5.1	2.0/2.5	2.7/3.3	0.5	57 g	Clay	Truncated pyramidal, complete
154	10C	323	2	35	5.4	2.2/–	–/2.9	0.6	57 g	Clay	Truncated pyramidal, complete
162	11B	339	2	35	5.9	1.6/3.9	1.3/4.1	0.6	91 g	Clay	Pyramidal, complete
164	10C	320	2	33	6.1	1.5/3.6	3.6/4.7	0.7– 0.9	100 g	Clay	Truncated pyramidal, irregular, complete
181	11B	374	2	38	7.0	3.0/4.4	3.3/4.3	0.7	157 g	Clay	Bell-shaped with rectangular base, complete
190	11B	374	2	38	6.0	1.6/3.1	2.5/3.9	0.5	68 g	Clay	Truncated pyramidal, complete
195	11B	374	2	38	5.7	max. 2.6	max. 4.5	0.7	78 g	Stone	Elliptical, irregular hole, complete
129	10D	327	3	–	6.4	2.0/3.1	2.1/3.3	0.2	69 g	Clay	Truncated pyramidal, complete
130	10D	327	3	–	6.1	1.8/3.1	1.9/2.9	0.4	55 g	Clay	Truncated pyramidal, complete
131	10D	327	3	–	6.0	1.9/3.1	1.9/2.9	0.4	58 g	Clay	Truncated pyramidal, complete
132	10D	327	3	–	3.8	–/3.5	–/3.2	–	48 g	Clay	Lower part of loom weight
134	10D	328	3	–	7.5	1.9/3.5	1.8/3.5	–	92 g	Clay	Truncated pyramidal, complete
138	10D	328	3	–	6.3	1.3/3.5	1.6/4.3	0.6	93 g	Clay	Truncated pyramidal, complete

<i>N</i>	<i>T</i>	<i>L</i>	<i>S</i>	<i>R</i>	<i>Dimensions (cm)</i>				<i>Wt (g)</i>	<i>Material</i>	<i>Shape/state</i>
					<i>H</i>	<i>Th top/ bottom</i>	<i>W top/ bottom</i>	<i>D hole</i>			
139	10D	328	3	–	7.0	1.8/3.7	2.2/4.7	0.5	122 g	Clay	Truncated pyramidal, complete
140	10D	328	3	–	6.5	1.6/3.5	1.8/4.8	0.5	115 g	Clay	Truncated pyramidal, complete
141	10D	328	3	–	6.1	1.5/3.5	2.0/3.9	0.5	80g	Clay	Truncated pyramidal, lower part broken
142	10D	328	3	–	6.9	2.0/3.4	1.9/3.3	0.5	77g	Clay	Truncated pyramidal, complete
165	10D	328	3	–	5.0	1.4/3.2	1.3/3.2	0.5	43 g	Clay	Truncated pyramidal, complete
177	10D	328	3	–	6.7	2.1/3.4	2.1/3.6	0.6	87 g	Clay	Truncated pyramidal, complete
178	10D	328	3	–	6.1	1.9/3.5	1.7/3.3	0.5	68 g	Clay	Truncated pyramidal, complete but some breaks on top
179	10D	328	3	–	6.2	2.1/3.1	2.0/2.9	0.4	64 g	Clay	Almost cylindrical, complete
180	10D	328	3	–	6.4	2.0/3.3	2.0/3.1	0.5	87 g	Clay	Truncated pyramidal, complete
186	10D	328	3	–	5.9	2.3/3.5	2.2/3.7	0.5	79 g	Clay	Truncated pyramidal, complete
188	10D	328	3	–	5.9	–/3.4	2.6/3.4	–	102 g	Clay	Truncated pyramidal partly broken on top
189	10D	328	3	–	6.4	2.0/3.2	1.9/3.0	0.4	64 g	Clay	Truncated pyramidal, complete
191	10D	328	3	–	7.1	2.3/3.4	2.3/3.2	0.6	82 g	Clay	Truncated pyramidal, complete
192	10D	328	3	–	5.9	1.7/3.4	1.3/3.4	0.5	70 g	Clay	Pyramidal, rounded edges, complete
194	10D	328	3	–	5.2	1.6/3.1	1.5/2.9	0.5	53 g	Clay	Pyramidal, complete but a few old breaks

weights and less warp tension produce the highest amount of woven yarn per hour.<sup>151</sup>

The loom weights in Area 6 W were most likely mounted in a vertical warp-weighted loom with weights attached to several warp threads.<sup>152</sup> This type of setup required two separate rows of loom weights of corresponding weight. The tension of the threads could be adjusted in order not to overload the thread, which could otherwise rupture, resulting in an uneven final product.<sup>153</sup> The thickness and quality of the threads determine the required tension of the warp. A thin thread, for instance, produced by a whorl weighing 4 g, would need a warp tension of approximately 10 g. This implies that a loom weight of 100 g would ideally have been operated with ten joining threads.

Recent experimental studies have shown that, after its weight, the thickness of a loom weight is the most significant trait<sup>154</sup> since it regulates the warp thread count of the woven fabric.<sup>155</sup> The weight and thickness of each loom weight will be used in order to calculate the number of warp threads per loom weight (estimated by dividing the weight of the loom

weight by the presumed warp tension), warp threads per cm (estimated by multiplying the sum of warp threads per loom weight by two and dividing this sum by the loom weight's thickness), and with proper hypothetical assemblages of similar loom weights. Our calculations are made by 1) examining the ratio between warp threads and loom weights, 2) analysing the number of threads per cm. 5–30 per weight is ideal, 30–40/4 is possible but not desirable since only four warp threads/loom weight would require a significant number of loom weights in a row, corresponding to the total width of the fabric.<sup>156</sup> More than 40/<4 is unlikely and optimal thread counts would be 5–30 for warp threads of 10–20 g warp tension, 5–20 for warp threads of 20–30 g warp tension and 5–10 for warp threads of more than 30 g warp tension. Unlikely thread counts are more than 40 or less than 4 warp threads for threads of more than 30 g warp tension.<sup>157</sup>

Our estimations were based on 10, 20 and 30 g warp tension in order to draw conclusions on the type of textiles produced. There are, however, differences in weight amongst our loom weights. The lightest (N145) weighs only 38 g and would probably have been used for threads requiring 10 g warp tension or less. The average weight of our loom weights

<sup>151</sup> Andersson & Nosch 2003, 198.

<sup>152</sup> Barber 1991, 92.

<sup>153</sup> Andersson *et al.* 2010, 166–167.

<sup>154</sup> Andersson *et al.* 2010, 166–167.

<sup>155</sup> Andersson *et al.* 2009, 394.

<sup>156</sup> Andersson *et al.* 2009, 392.

<sup>157</sup> Andersson *et al.* 2009, 392–393.





Fig. 41. Loom weights from Strata 1–3, Area 6W (photo by P.M. Fischer).

is approximately 76 g (N170), and these would have been ideally operated with threads of less than 10 g warp tension, while the largest weight (N181) of 157 g would have required 30 g warp tension (or maybe less, approximately 20 g and 10 g). In spite of rather striking differences in weight, our loom weights may all have been used in roughly the same setup.

Murex shells, from which raw material was extracted either by grinding or pressing the shells against the fabric, were used to produce purple dye for colouring textiles in antiquity.<sup>158</sup> The high quantities of loom weights (21) recovered in the pit of Stratum 3, which is interpreted as a disturbed tomb, can either be interpreted as a storage area or as offerings in a funerary setting.

<sup>158</sup> However, a comprehensive geological and chemical analysis is required to gain a better understanding of the possible types of pigments used at Hala Sultan Tekke for dyeing textiles. It is also worthy of note that the equipment used for producing fabrics, such as water, tubs or channel installations for providing and heating the water and facilities for drying the fabrics, was utilized for washing as well. However, installations for washing did not need to be as large as those for textile production. Barber 1991, 223, 228–229, 239–240.

## Conclusions

The considerable number of loom weights found (45), of which 14 are from Stratum 1 and ten are from Stratum 2, and also the presence of spindle whorls (7) in such a limited area demonstrate that textiles were produced in both strata. Additional evidence for the dyeing of textiles is provided by the finds of various stone tools and vessels containing murex shells (L297-10 and -11 in R27, Stratum 1; see main report).

The largest quantity of loom weights, 21 in total, was found in the tomb of Stratum 3. Their association with other finds from this tomb, for instance cylinder seals, implies that they were tomb gifts. The concentration of loom weights in the tomb suggests that the buried individual had perhaps once been active in the textile industry.

The majority of our spindle whorls weigh less than 20 g, which indicates that they had been used to produce finer fabrics with a high count of threads/cm,<sup>159</sup> while the heaviest whorl (N146) of 25 g, was used to produce coarser fabrics. The results of this preliminary study strongly support the interpretation of Area 6 W as an industrial quarter during the period which is represented here by Strata 1 and 2.

<sup>159</sup> Andersson & Nosch 2003, 198.

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