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The New Swedish Cyprus Expedition 2014 Excavations at Hala Sultan Tekke

Preliminary results. With contributions by B. Stolle, I. Trinks, L. Mazzotta & L. Recht, A. Lindqvist & D. Kofel

Abstract**

The initial aim of the project—the search for the oldest city of Hala Sultan Tekke—continued in 2014. Geophysical methods were used, which led to the discovery of new city quarters, and a broadening of the research objectives, to include revealing the total extent of the city. The GPR survey indicated a huge stone compound of at least 50 m × 40 m to the west of a probable street. Excavations continued in Area 6 West, where in 2013 a domestic and industrial compound was excavated as part of a hitherto unknown city quarter. The 2014 field work exposed stone-built structures and rich find contexts with locally made and imported pottery, numerous tools and several items of gold and silver jewellery. The violent destruction of the most recent layer of occupation, Stratum 1, which had been observed during previous seasons, was once again confirmed. Another georadar and magnetic survey west of the mosque of Hala Sultan Tekke indicated numerous circular anomalies. Five of these were excavated and turned out to be four wells and an offering pit. One of the wells was reused for human burials. Another well contained the skeleton of an equid, a complete bull figurine and a cylinder seal of haematite.

Keywords: Hala Sultan Tekke, GPR, textile production, copper production, figurine, cylinder seal, Cypriote pottery

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** *Acknowledgements*

The expedition would like to express its gratitude for the kind and proficient support of the Department of Antiquities of Cyprus (DAC) and its personnel, headed by the acting directors Drs D. Pilides and M. Solomidou-Ieronymidou. Much appreciated assistance was given by Dr A. Satraki, supported by personnel from the Larnaca Archaeological Museum. Mr P. Georgiou, former employee of the Department of Antiquities of Cyprus, and Mrs D. Georgiou admirably provided the necessary logistic support. Essential funding was once again gratefully received from the Torsten Söderberg Foundation, very kindly supported by Dr T. Söderberg, Gothenburg: without their support the project would not have been possible. We are also much obliged to INSTAP for their indispensable and generous support, and to the Royal Society of Arts and Sciences in Gothenburg for a financial contribution. Additional help was provided by the family of our late friend and colleague Prof. em. P. Åström. The board of the association of the Friends of the Swedish Cyprus Expedition lent their support. Last but not least I would like to convey my sincere thanks to the team. The basic team consisted of 26 archaeologists, students and other personnel from Sweden, Austria, Australia, Cyprus, Denmark, Germany, Iceland, Italy, Jordan, Poland, Romania, Switzerland, and the United States. Amongst the team members are T. Bürge, M.A., who acted as assistant field director. M. Al-Bataineh, M.A., functioned as the architect, surveyor and draughtsperson. Other participating archaeologists, geophysicists and students were R. Árnadóttir, M. Ausiayevich, D. Blattner, Dr S. Chandrasekaran, Dr A. Fischer, S. Fridh, S. Habinger, K. Heiß, A. Herzog, S. Klavins, D. Kofel, M.A., A. Lazarides, A. Lindqvist, K. Löcker, M.A., L. Marstorp, L. Mazzotta, M. Nissen, Dr L. Recht, K. Sauter, B. Stolle, R. Totschnig, MA, and Dr I. Trinks. Dr D. Reese provided essential information on the molluscs and the osteological material for which we are most grateful.

Introduction

The initial object of the project, i.e. the search for the oldest city of Hala Sultan Tekke, continued in 2014. During further excavations the objectives were broadened to include revealing of the total extent of the city. In 2013, following the 1.3 hectare Ground-Penetrating Radar (GPR) survey, an area of 200 m² was opened up west of the old Area 6 (Area 6W).[1] Of the three phases of occupation, Strata 1–3 (numbered from below colluvial soil), the uppermost Stratum 1 comprised two partly exposed compounds with ten walled spaces. On the evidence of finds of numerous spindle whorls and loom weights the main activity carried out in this compound was textile manufacture, i.e. spinning, weaving and purple dyeing, but there was also production of cheese. Eight walled spaces were partly exposed in Stratum 2 which is dominated by finds which are related to copper production. Another of these excellently decorated kraters, the "Horned God Krater" derives from this stratum.[2] Stratum 3 was represented by a tomb, which was looted and reused in Stratum 2 as a storage facility

[1] Fischer & Bürge 2014.

[2] See the painted kraters in Fischer 2012, 78, figs. 3, 4; Fischer & Bürge 2014, 81, figs. 27, 28.

Fig. 1. The team of 2014 (photograph by T. Bürge).

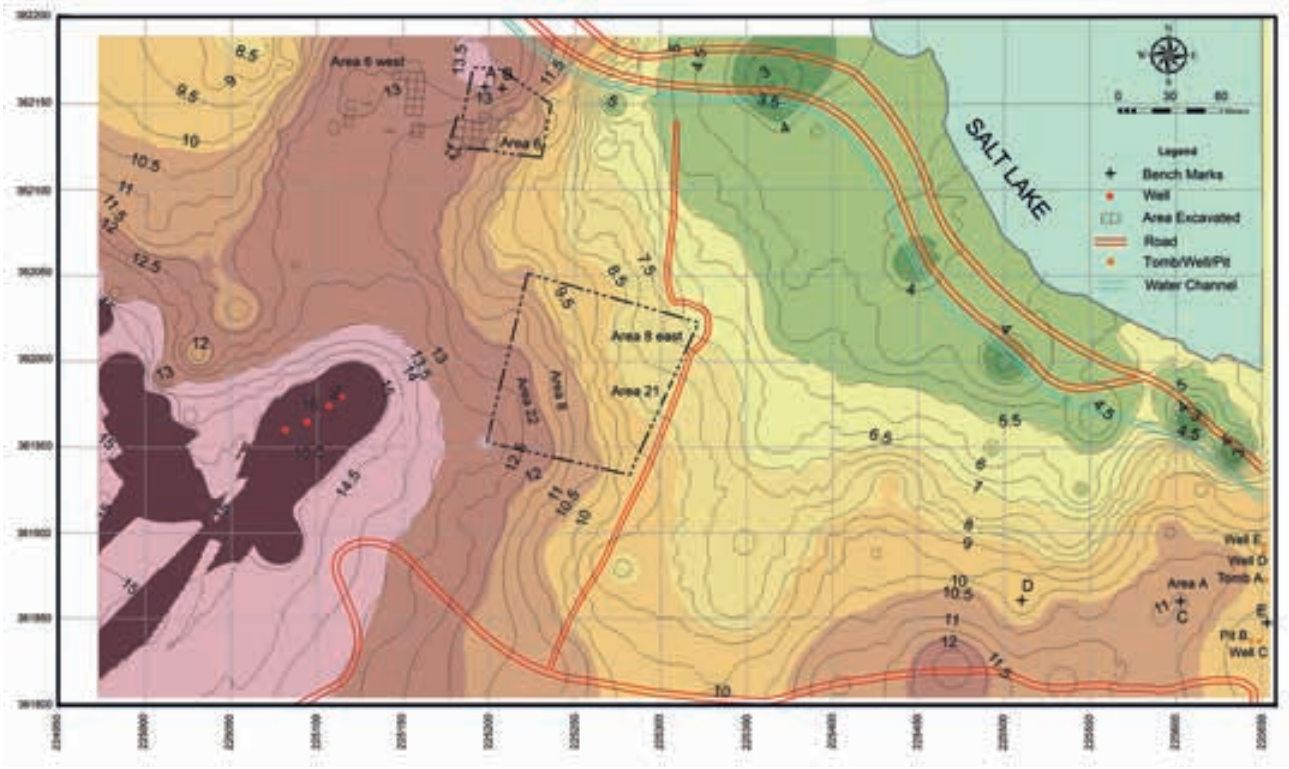


Fig. 2. Topographic map (from west to east): Area 6 West, Area 6, Area 8 and Area A (drawing by M. Al-Bataineh).

for copper production. The tomb contained numerous items which were overlooked by the occupants of Stratum 2: textile production-related tools, several White Slip II bowls of the mature style, and two cylinder seals: one shows affinities with the Mitanni repertoire, and the other Egyptianizing traits.

Inspired by the promising results from 2013, excavations were carried out from 12 May to 13 June 2014 in Area 6W (*Fig. 1*), north and south of the structures which were exposed during the previous season (*Figs. 2*, *3a*, *3b*). An area of 5 m × 20 m (Trenches 12A and B, 16A and B) was opened north of the trenches from 2013, and another 7.5 m × 7.5 m south of them (Trenches 17B and C, and 18A and D). In addition, a pit, the outlines of which could be discerned in 2013 in Trench 10D, was excavated.

Another georadar and magnetic survey of a 70 m × 50 m area was carried out in 2014 parallel with the excavations. The

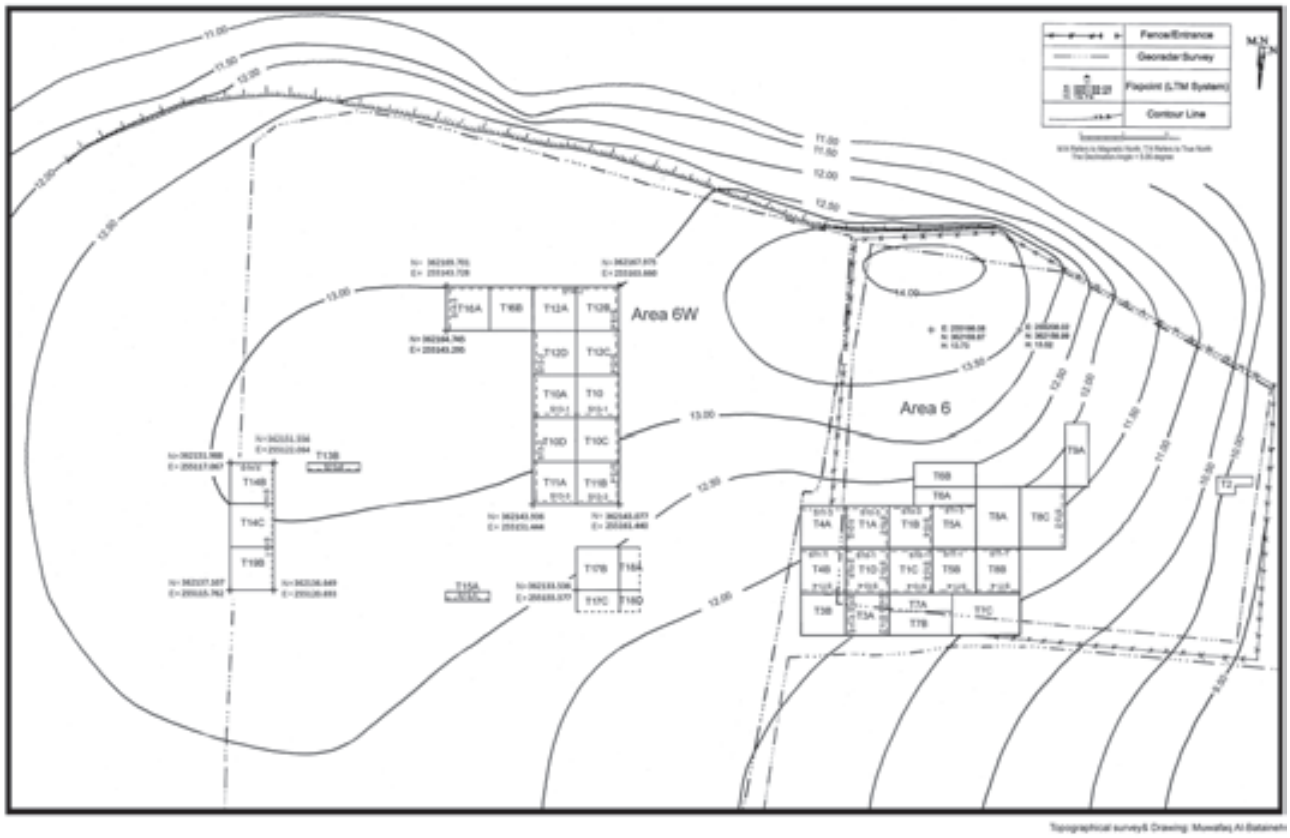


Fig. 3a. Positions of trenches and sections (drawing by M. Al-Bataineh).

Fig. 3b. Aerial photograph taken using a GPS/radio-controlled quadcopter (photograph by P.M. Fischer and T. Bürge).

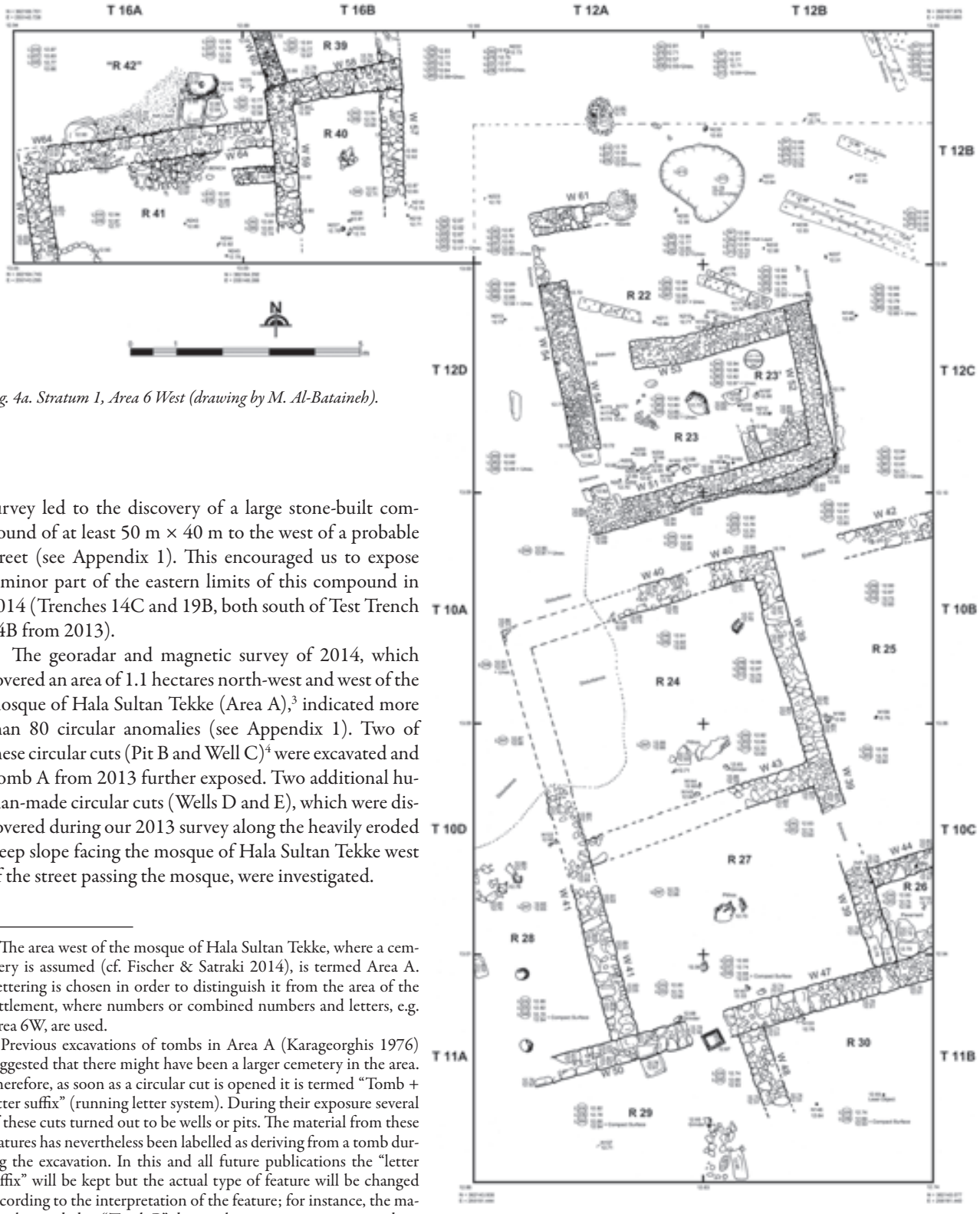


Fig. 4a. Stratum 1, Area 6 West (drawing by M. Al-Bataineh).

survey led to the discovery of a large stone-built compound of at least 50 m × 40 m to the west of a probable street (see Appendix 1). This encouraged us to expose a minor part of the eastern limits of this compound in 2014 (Trenches 14C and 19B, both south of Test Trench 14B from 2013).

The georadar and magnetic survey of 2014, which covered an area of 1.1 hectares north-west and west of the mosque of Hala Sultan Tekke (Area A),[3] indicated more than 80 circular anomalies (see Appendix 1). Two of these circular cuts (Pit B and Well C)[4] were excavated and Tomb A from 2013 further exposed. Two additional human-made circular cuts (Wells D and E), which were discovered during our 2013 survey along the heavily eroded steep slope facing the mosque of Hala Sultan Tekke west of the street passing the mosque, were investigated.

[3] The area west of the mosque of Hala Sultan Tekke, where a cemetery is assumed (cf. Fischer & Satraki 2014), is termed Area A. Lettering is chosen in order to distinguish it from the area of the settlement, where numbers or combined numbers and letters, e.g. Area 6W, are used.

[4] Previous excavations of tombs in Area A (Karageorghis 1976) suggested that there might have been a larger cemetery in the area. Therefore, as soon as a circular cut is opened it is termed "Tomb + letter suffix" (running letter system). During their exposure several of these cuts turned out to be wells or pits. The material from these features has nevertheless been labelled as deriving from a tomb during the excavation. In this and all future publications the "letter suffix" will be kept but the actual type of feature will be changed according to the interpretation of the feature; for instance, the material recorded as "Tomb B" during the excavations corresponds to "Pit B" since the actual feature is an offering pit.

Fig 4b. Stratum 1, Area 6 West (see Fig. 4a*; aerial photograph by P.M. Fischer and T. Bürge).*

A GPS and transmitter controlled quadcopter drone, the DJI Phantom with camera, was used throughout the entire fieldwork, both for surveying and during the excavations. A portable XRF-device, Thermo Niton XL3 Analyzer, was tested with good results in order to identify various materials immediately.

Results of the excavations in Area 6W: Trenches 12A/B, 16A/B, 17B/C and 18A/D

The excavations of the combined domestic and industrial compound in Area 6W, which was partly excavated in 2013,[5] were extended in 2014 (for the position of trenches in Area 6 West see *Fig. 3a* and *b*).

STRATUM 1 (NORTH AND SOUTH: *FIGS. 4–6*)

The excavated area from 2013 was extended to the north (Trenches 12A/B and 16A/B) and to the south (Trenches 17B/C and 18A/D).

Room 22 (R22) was further exposed to the north. The room is bordered by W54, W61 and W53, while the eastern part is open or not preserved. R22 is 4.5 m × 2.6 m in area, i.e. the same size as R23 from 2013.[6] There is a 1 m wide entrance in the north-west between W54 and W61. W61 is only preserved to a length of 1.6 m, the remainder being destroyed. A partly stone-lined hearth (L407), approximately 0.6 m in diameter, is integrated into the wall but it may be of later date. There is a roughly circular shallow pit (L413, L415) with a diameter of 1.6–1.8 m to the west of the destroyed W61. This shallow pit is filled with ash. There are several attached blocks of mudbrick which were interpreted in 2013 as a possible ba-

[5] Fischer & Bürge 2014.

[6] Fischer & Bürge 2014, 65–68.

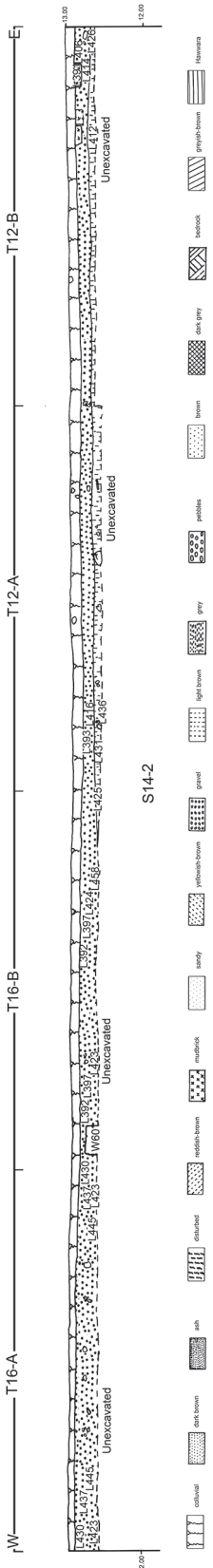


Fig. 5. Section 14-2, north section Trenches 16A and B, and 12A and B (drawing by M. Al-Bataineh).

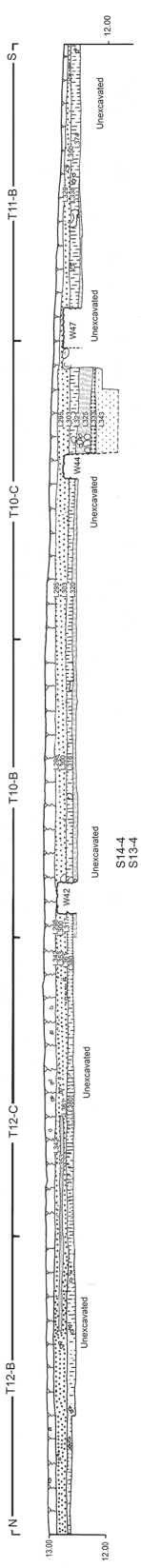


Fig. 6. Section 14-4, east section Trenches 12B and C, and 11B (drawing by M. Al-Bataineh).

sin for dyeing textiles. R22 contained a bronze ring (N232), seven loom weights of fired clay (N157, N159–161, N170, N210, N235), two pestles (N187, N211) and a stone weight (N171). Textile production and dyeing seem to have been the main functions of this room.

The area north and north-east of the northern structure was further exposed. It contained the remains of mudbrick structures and a pebble hearth (L411) north of W61. The fragment of a faience bowl of "Egyptian Blue" (N230) derives from here. A WPGS[7] shallow bowl (L412-5; *Fig. 7a:3*), a WPGS deep bowl (L431-1; *Fig. 7a:4*), the stem of a White Painted Wheel-made kylix (L412-2; *Fig. 7a:6*), a loom weight of fired clay (N231), a biconical bead of lead (N236), a sling bullet of lead (N237), the upper body of a Mycenaean Psi-figurine (N239; *Fig. 7b*) and a bronze wire (N221) come from the north-eastern part of the excavations. This area seems to have been an outdoor area.

R39–42 belong to another compound north-west of the former. It extends approximately 8.6 m from west to east. It was only partly exposed during this season.

R39, the north-easternmost room, is 2 m wide (inner dimensions). It is enclosed by W57, W58 and W60, the latter originally built in Stratum 2 and reused in Stratum 1. The northern enclosure and the northern part of the room are not exposed so far. The function of this space cannot be determined. Of special interest is a stirrup jar (L397-6; *Figs. 7a:5* and *8*) with carefully executed thick red and burnished decoration of horizontal lines, scales and hatched lozenges. Several discoloured fragments of this vessel attest that it was affected by fire after it was broken (*Fig. 8*).

R40 is south of R39 and bordered by W59, W58 and W57. It is 1.8 m wide and at least 2.8 m long. The southern boundary of the room is not clear since the southern parts of W57 and W59 are not preserved. The entrance to this room was most likely from the south. In the centre of the room there is a stone-supported pillar-base. Finds from this room include the upper part of a Plain White wheel-made krater (L398-1), a WPGS rounded bowl (L398-2; *Fig. 7a:2*)—the shape and decoration of which recalls White Slip bowls—, a fragment of a WPPS krater (L398-3), a fragment of a closed vessel of WPGS (L398-6), a fragment of a limestone bowl (L398-5), a part of a decorated limestone basin (N218; *Fig. 7a:8*), a cubical stone tool (N219) and three loom weights: two of stone (N226, N227) and one of fired clay (N228). A deformed ring of bronze (N223) and a bronze needle (N222) come from the

[7] For the terminology of WPGS (White Painted wheel-made Geometric Style) and WPPS (White Painted wheel-made Pictorial Style) see Fischer 2012. These two terms are substitutes for the ill-defined White Painted wheel-made III; see also P. Åström's comments quoted in Fischer 2012, 77.

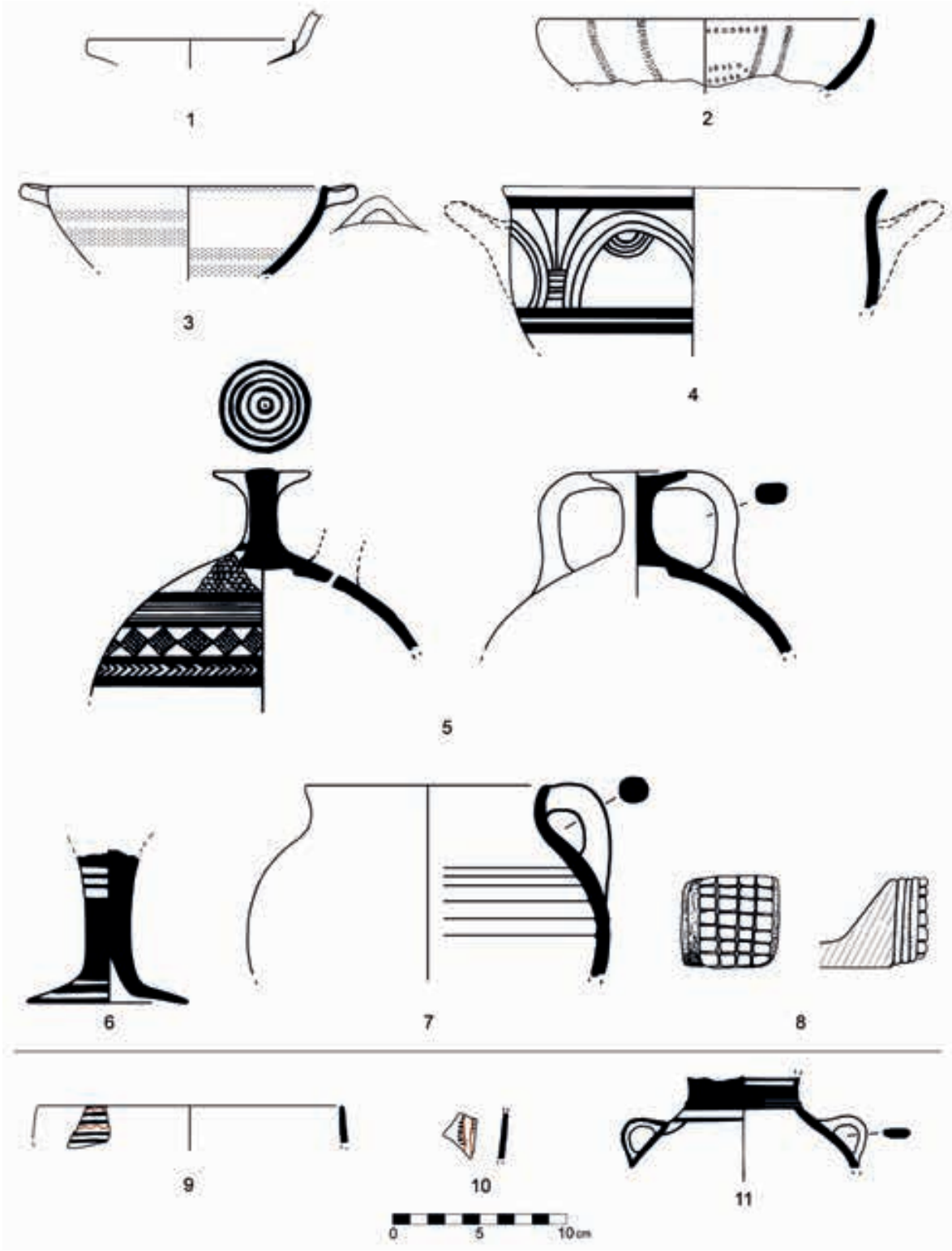


Fig. 7a. Collection of finds from Stratum 1, Area 6 West. Finds below line (9–11) are residual (drawing by M. Al-Bataineh).

Fig. 7b. Mycenaean Psi-figurine from Stratum 1, Area 6 West (drawing and photograph by T. Bürge).

Fig. 8. Detail of White Painted Geometric Style stirrup jar L397-6 from "Room 39" (see Fig. 7a:5*) demonstrating breakage prior to final deposition in destruction layer. The lower part is affected by high temperatures as the result of a conflagration (photograph by T. Bürge).*

area east of R39/40. This room with a pillar-supported roof seems to be domestic in nature.

R41 is west of R40. Only the northern part of this room is exposed. The room is surrounded by W65, W64 which was reused from Stratum 2, and W59. A stone surface was exposed in the northern part of the room (part of a dividing wall?) from where a grinder derived. Another stone structure, a possible wall or a bench, is west of W59. A third stone-lined structure was built against W65 in the western part of the room. Finds from R41 include a stone pestle (N243), an arrowhead of bronze (N244) and a spindle whorl of dark grey stone (N245). This space seems be a combined domestic and working facility.

"R42" is most likely an open space. Several large worked stones, which represent the remains of a large basin with raised walls, were found in this room. The area just north of W64 (L447) is covered with ash. Finds from this space include a fragment of a calcite bowl (L445-1), two wheel-made cooking pots (L445-2, -5; *Fig. 7a:7*), a fragment of a White Slip I bichrome bowl (L445-3; *Fig. 7a:10*)[8] and three fishing net weights of lead (N220, N240A/B). This space seems to have been an outdoor area where food was prepared and olives were pressed: the large worked stones are most likely the dislocated remains of an olive press.[9]

The GPR survey from 2012 did not indicate any structures immediately south of the area from 2013, viz. south of T11A and B which would have corresponded to T11C and D. Consequently this area was left alone and a 7.5 m × 7.5 m test trench was opened further south (Trenches 17B and C, and 18A and D; *Fig. 9a* and *b)*. There are two walls W67 and W68 which have the same orientation as the remainder of the walls in the compound to the north. W67 is preserved to a length of approximately 1.0 m, and W68 to a length of 4.6 m. The entire test trench suffered heavily from ploughing and many contexts are disturbed.

There is a pit against the northern section of T17B (L409, L427, L442). It is roughly 3 m wide but not exposed to its full extent. A bronze sheet (N216) was found on top of the pit. A large fragment of a heavy stone anchor was found inside the pit.[10] The anchor is of the composite type with two circular holes and one larger square hole.[11] The pit contained many pottery fragments, amongst them four cooking pots (L409-1, -2, -7, L442-2), a Base-ring II bowl (L409-3; *Fig. 7a:1*), two WPGS jugs (L409-4, -6), a Mycenaean jar (L442-1; *Fig. 7a:11*) and a White Slip II late bowl (L409-5). A fragment of a White Slip I bowl (L410-1; *Fig. 7a:9*) was found in the area outside the pit and is residual. There is an ash spot (L395) approximately in the centre of the exposed area and a circular structure of stones between the ash spot and the pit. A biconi-

[8] This and the other two illustrated sherds (*Figs. 7:9–11*) are residual.

[9] A few olive pits were found close to the installation; see Appendix 4.

[10] The stone anchor is still *in situ*. Its weight has not yet been determined.

[11] Cf. McCaslin 1978, 120–157, figs. 216, 217, 279–283; Åström & Svensson 2007.

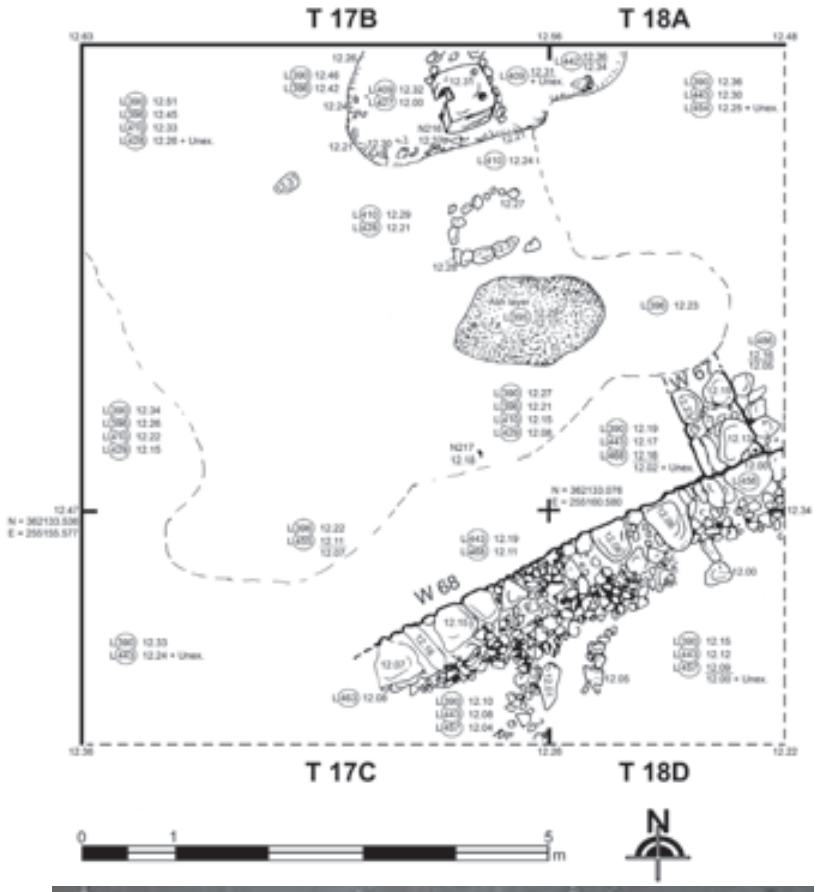


Fig. 9a. Stratum 1, Area 6W, Trenches 17B and C, and 18A and D with stone anchor to the north (drawing by M. Al-Bataineh).

Fig. 9b. Aerial photograph of Trenches 17B and C, and 18A and D (photograph by P.M. Fischer and T. Bürge).

cal bead of lead (N217) was found just north of W68. There is a stone-paved area to the south of W68. No interpretation of this area is yet possible. However, the GPR survey indicated stone-built structures south of the area which has been excavated in 2014.

STRATUM 2 (NORTHERN PART; *FIGS. 5, 6* AND *10*)

Stratum 2 was only partly exposed before the excavations came to a halt.[12] There are two walls, W60' and W64', which were originally built in this phase and, later on, reused in Stratum 1. Some of the other walls, which are provisionally associated with Stratum 1, might also have been built in Stratum 2 but altered in Stratum 1. Regardless of the preliminary stratigraphical division of the walls between Strata 2 and 1, there are two floors, mainly of havara, which are clearly recognizable in the southern section.

The space, which is limited by W60' to the east and W64' to the south, contained three cooking pots (L423-1, -7, -8), a Plain White wheel-made bowl (L423-2), a fragment of a White Slip II bowl (L423-3; *Fig. 11:6*), a WPGS deep bowl (L423-5; *Fig. 11:4*), a shallow bowl (L423-6) and a krater of the same ware (L423-4), and a Plain White wheel-made krater (L423-9).

From the area south and east of W64' come a WPPS krater with a fish (L444-1; *Fig. 11:5*), a WPGS deep bowl (L421-1; *Fig. 11:3*), a fragment of a Mycenaean krater with the head of a horse (L421-2; *Fig. 11:7*), a stone pestle (N247) and a loom weight of fired clay (N248). Finds of jewellery derive from the east and south of this space:[13] these include a silver amulet (weight 4 g; N224),[14] a bead of a disc-shaped black stone (N225), a gold earring with an attached profiled plate of gold with a possible representation of a bull (weight 1 g; N251; *Fig. 12:3*), a bronze ring (weight 3 g; N253), a silver earring

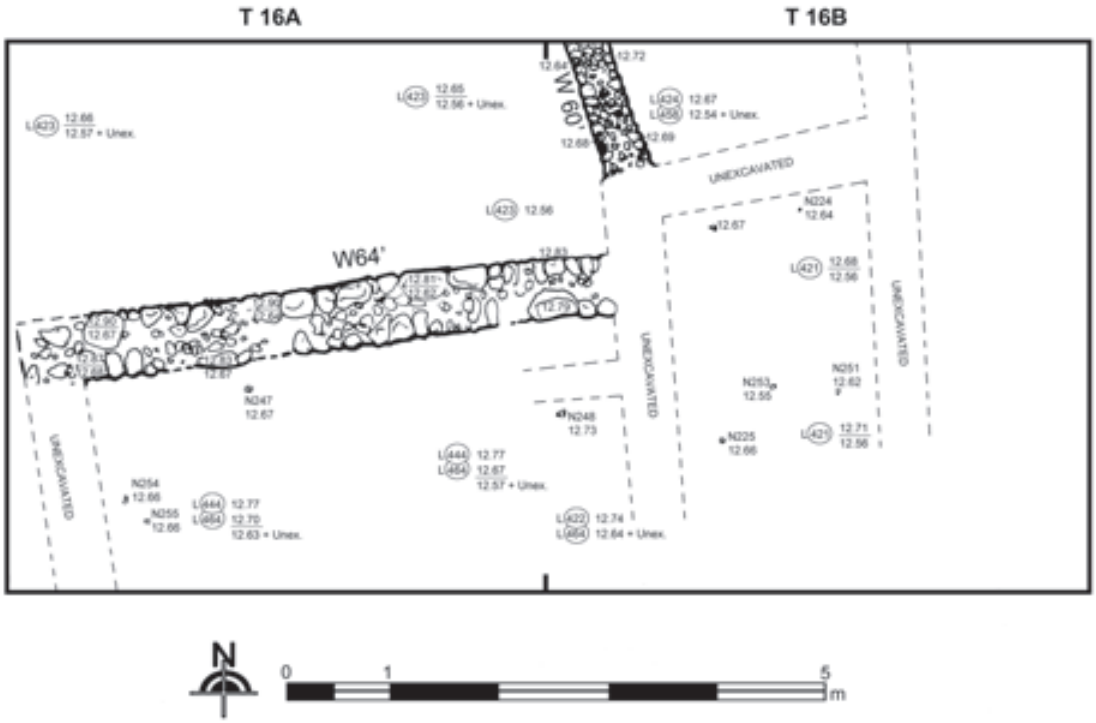


Fig. 10. Stratum 2, Area 6W, northern part (drawing by M. Al-Bataineh and T. Bürge).

[12] For the remainder of Stratum 2, which was excavated in 2013 see Fischer & Bürge 2014, 71, fig. 14.

[13] For the XRF-analysed jewellery see *Table 3*.

[14] There is certainly a pictorial representation on one side. However, the corrosion of the surface of the amulet does not yet allow any interpretation. Cleaning and conservation work will be undertaken by the Department of Antiquities in Nicosia.

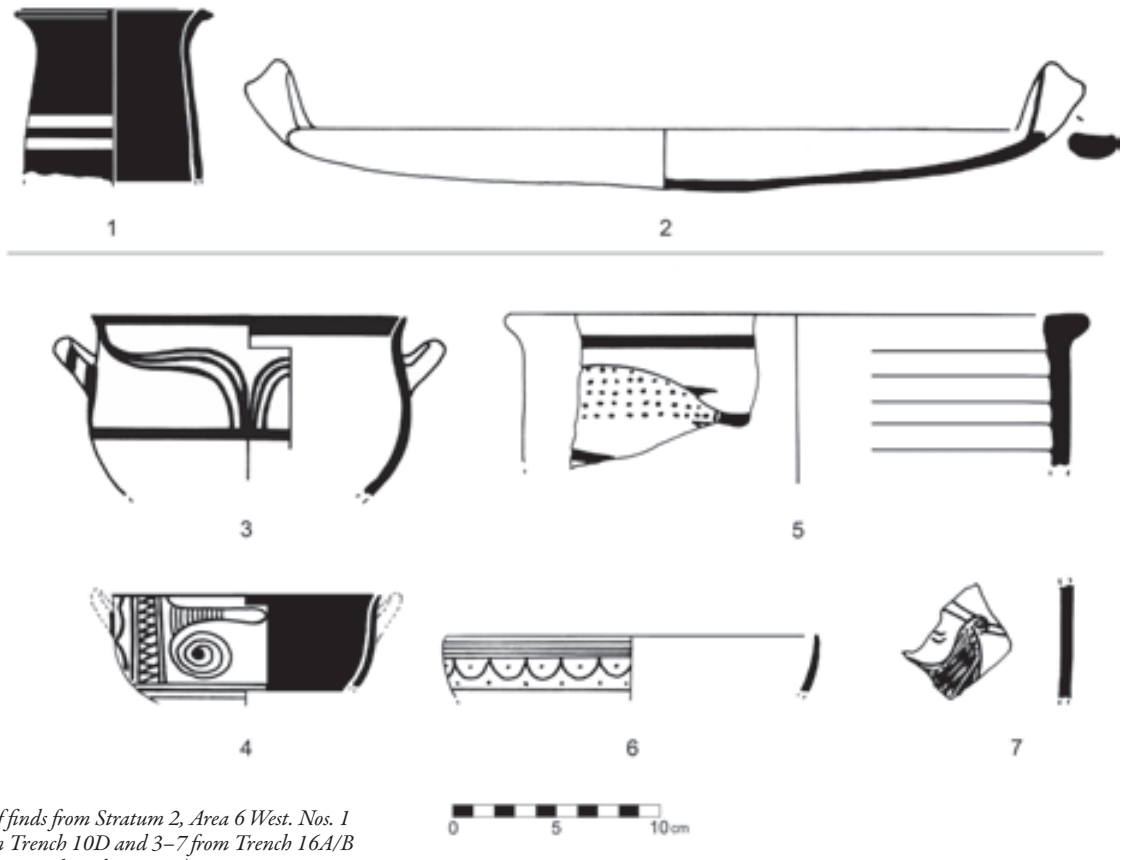


Fig. 11. Collection of finds from Stratum 2, Area 6 West. Nos. 1 and 2 are from pit in Trench 10D and 3–7 from Trench 16A/B (drawing by M. Al-Bataineh and T. Bürge).

with a gold pendant (*Fig. 12:2*) and a sheet of silver which was attached to the item (weight 1 g; N254; *Fig. 12:4*), two gold earrings and a melted lump of silver where another gold ring was embedded (weight 10 g; N255; *Fig. 12:1*). Another find is a helmet shell, *Phalium* sp. (*Fig. 13*).[15]

A PIT IN TRENCH 10D, STRATUM 2

Complementary excavations were carried out in T10D where the outlines of a pit (L433, L434) could be recognized at floor level of Stratum 2 in the western part of the trench in 2013 (*Fig. 14*). The pit has a diameter of roughly 1 m and contained several hewn limestone blocks, most likely water channels, an almost cylindrical, slightly tapering, clay tube which is open on both sides (N234), a baking tray or frying pan of Coarse ware (L434-1; *Fig. 11:2*) and a Base-ring II jug with painted decoration (L434-2; *Fig. 11:1*). An extraordinary find from this feature is a doughnut-shaped piece of copper alloy weighing almost exactly 1.5 kg (N233; *Fig. 15*). The pit is certainly

Fig. 12. Gold and silver jewellery from destruction layer Stratum 2, Area 6 West. Observe the silver amulet (black arrow) and gold ring (red arrow) in melted silver jewellery (photograph by T. Bürge and P.M. Fischer).

[15] The information on this shell has kindly been given by D. Reese.

Fig. 13. Helmet shell (Phalium sp.; photograph by T. Bürge).

Fig. 15. Doughnut-shaped ingot N233 of 1.5 kg from pit in Trench 10D (photograph by T. Bürge).

Fig. 14. Pit in Trench 10D with doughnut-shaped ingot N233 and clay tube N234 in situ *(photograph by P.M. Fischer).*

associated with the copper production plant nearby, where 300 kg of remains from copper-working of tapped slag, furnace walls, fragments of at least five tuyères, crucible fragments, copper/bronze fragments and pieces of raw copper were found in 2013.[16]

Results from the excavations in Area 6W: Trenches 14B, 14C and 19B (*Figs. 16a* and *16b*, *17*)

These excavations took place in the hitherto most westerly part of the investigated areas at a spot which represents the eastern limits of a 50 m × 40 m compound discovered during the georadar survey in 2014 following the exposure of a test trench (T14B) from 2013. The test trench revealed stone-built structures and three figurines: a bird-faced female figurine of Base-ring Ware (N207), a Mycenaean figurine of a horse (N214) and a bichrome-decorated figurine of a likely female of Base-ring Ware (N215).[17] The area of excavation was later on extended towards the south (T14C, 19B) where a fragment of a White Slip II tankard (Coll-1; *Fig. 18:3*) and a cylindrical collared bead of an orangish-red stone (most likely carnelian) was found in the transitional layer between colluvial soil and Stratum 1.

In the northern part of the exposed area there is a wall (W55), approximately 5 m long and running north by north-west to south by south-east. W55 is associated with a drain 0.2 m wide along the western façade (L408, L448). This drain contained a Base-ring II bowl (L408-1) and two cooking pots (L408-2, -3).

The wall has been disturbed by a rhomboid pit (L405, L417), which also affected parts west and east of W55 and the drain. The head of the aforementioned Mycenaean horse figurine (N214) was discovered on top of the pit in 2013. The area east of W55 is covered by a havara floor (L400). A stone structure, possibly a bench, was built against the north-western part of W55. A fireplace (L400') was found next to it.

[16] Fischer & Bürge 2014, 72.

[17] Fischer & Bürge 2014, 78, figs. 22–24.

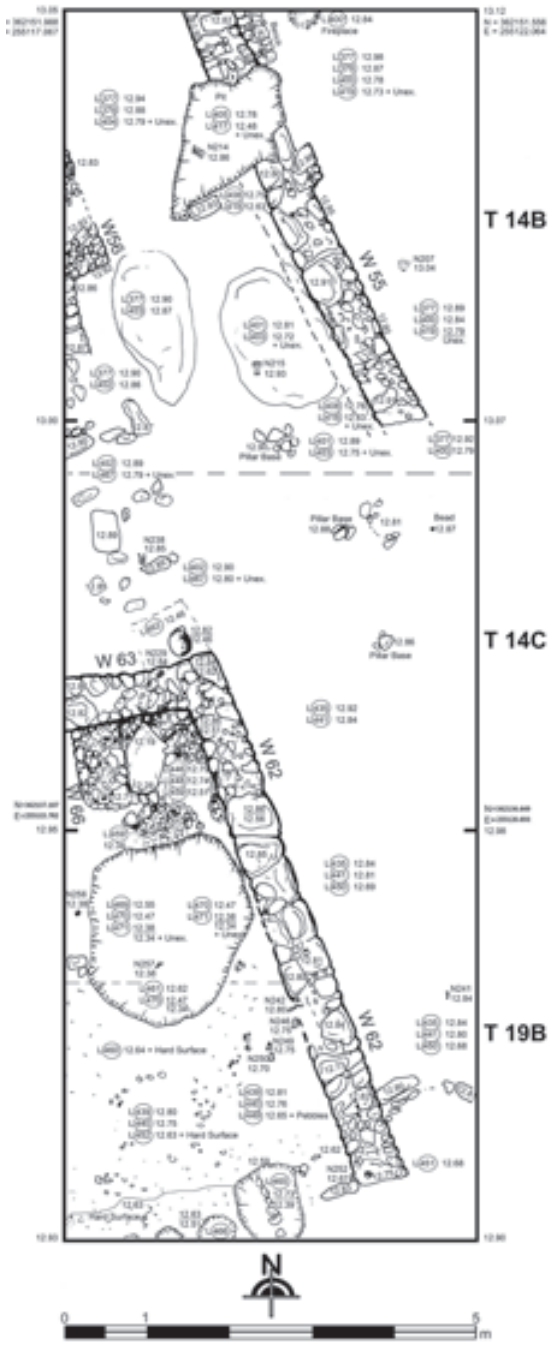


Fig. 16a (left). Plan of Trenches 14B and C, and 19B (drawing by M. Al-Bataineh).

Fig. 16b (above). Aerial photograph of Trenches 14B and C, and 19B (photograph by T. Bürge and P.M. Fischer).

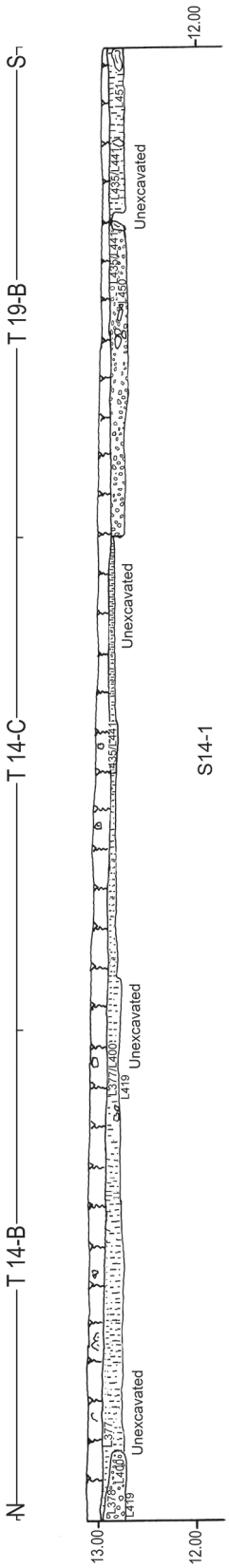


Fig. 17 (right). Section 14-1, east section Trenches 14B and C, and 19B (drawing by M. Al-Bataineh).

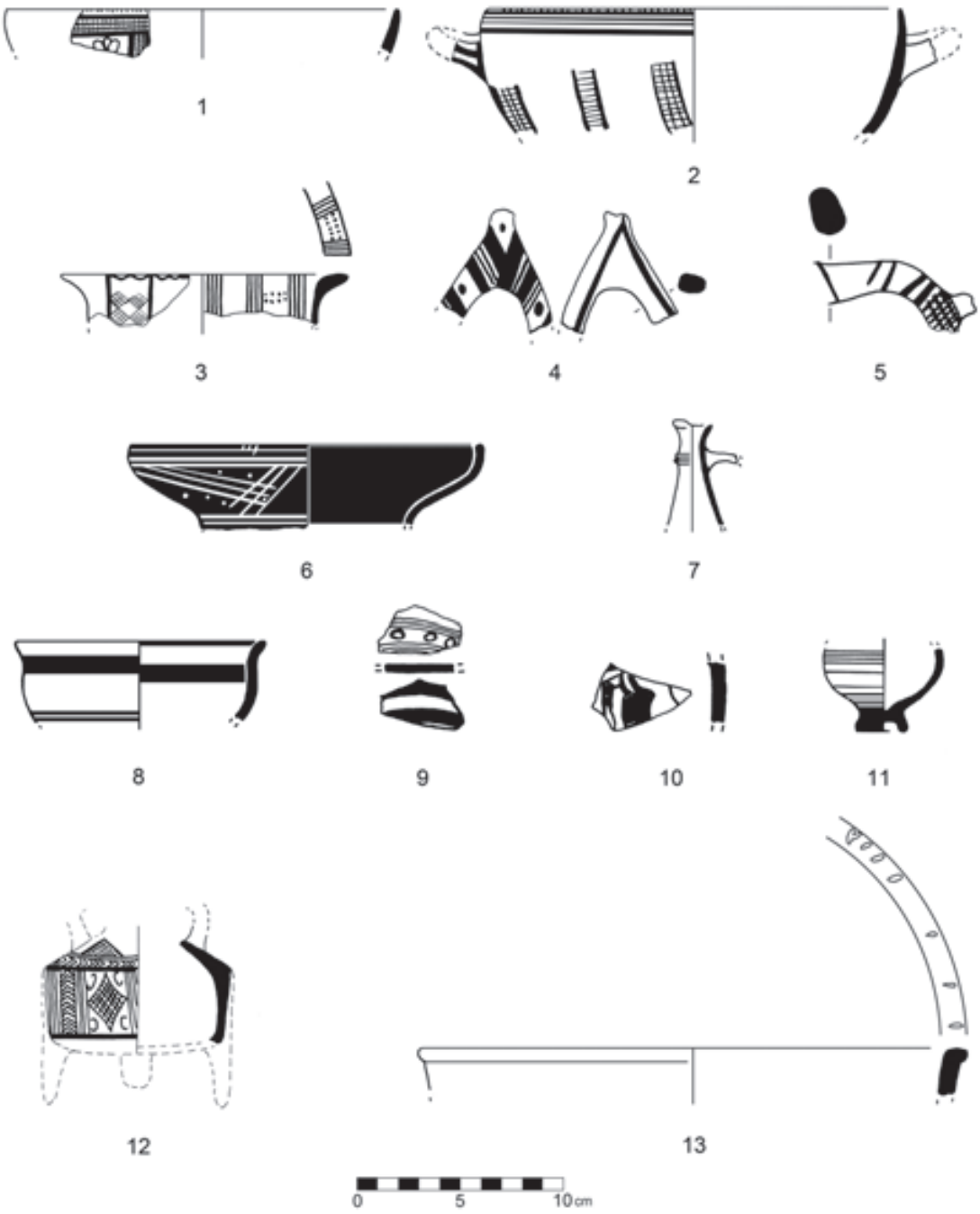


Fig. 18. Collection of finds from Trenches 14B and C, and 19B (drawing by M. Al-Bataineh).

West of W55 another pit was discovered (L401). The head of a Base-ring human figurine (N215) was discovered on top of the pit in 2013. It contained a handle of a large pithos (L401-1), a Base-ring II bowl (L401-2), the rim, neck and handle of a Base-ring I trefoil-mouthed juglet (L401-3; *Fig. 18:7*), five fragments of White Slip II bowls (L401-4; *Fig. 18:2*; L401-5, -6, -7, -8; *Fig. 18:4*) and approximately a hundred small White Slip II fragments. A stone-built structure, only partly exposed ("W56"), runs parallel to W55.

In the southern part of the exposed area, there is another structure, at least 5.4 m long: W66, W63 and W62. The stone-paved area between W66 and W62 contains a hearth (L459') and a large fragment of an ashlar block. There is a circular depression to the south of the hearth, approximately 2 m in diameter (L469, L470, L471), which contained the lower part of a Mycenaean miniature piriform jar (L471-1; *Fig. 18:11*). Other finds from this space are a WPGS alabastron (L440-7; *Fig. 18:12*), a White Slip II bowl (L440-5; *Fig. 18:1*), a handle of a White Slip II bowl (L461-1; *Fig. 18:5*), a Base-ring II bowl with white decoration (L449-2; *Fig. 18:6*), a Mycenaean cup (L440-3; *Fig. 18:8*), a bronze knife (N242), four loom weights (N246, N249, N250 and N252), a bronze ring (N256) and bronze tweezers (N257). Additional finds from north of W62 and east of W63 are a White Shaved juglet (L462-1), a Plain White wheel-made jar (L462-2), a Coarse ware cooking pot with incisions on the rim (L435-8; *Fig. 18:13*), a fragment of a Mycenaean open vessel (L441-1; *Fig. 18:9*), a fragment of a Mycenaean pictorial (?) krater (L435-10; *Fig. 18:10*), a pendant or tool of dark grey stone (N238), a broken loom weight (L461-3), a small stone object of rectangular shape, possibly a gaming piece (L461-4), and a bronze handle (N241).

A more detailed interpretation of this area must await extended excavations.

Results of the excavations in Area A (*Fig. 19*)

TOMB A BY B. STOLLE; PIT B AND WELLS C–E BY P.M. FISCHER & T. BÜRGE

Tomb A, which is in the heavily eroded area on a steep slope opposite the road that passes the mosque of Hala Sultan Tekke and that was partly excavated in 2013,[18] was further investigated. In 2014 the geophysical survey with georadar and a magnetometer covered an area of 1.1 hectares north-west and west of the mosque of Hala Sultan Tekke and west of Tomb

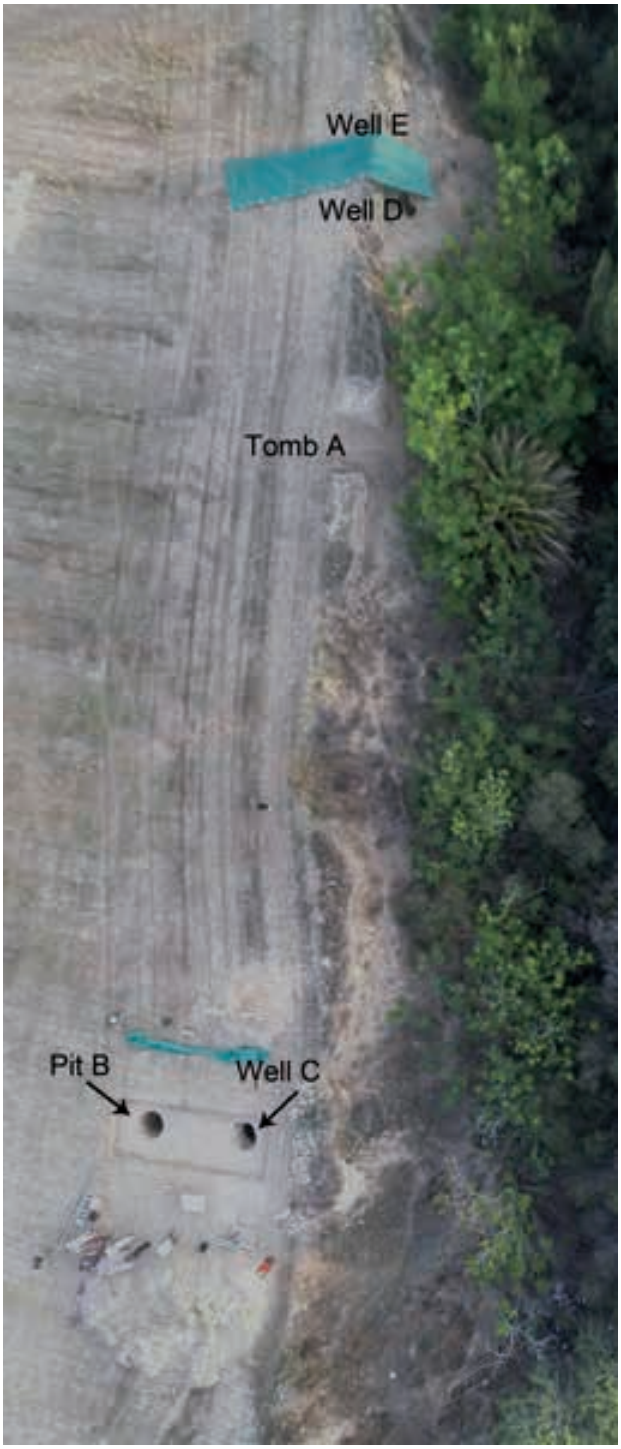


Fig. 19. Aerial photograph of Area A (photograph by T. Bürge and P.M. Fischer).

[18] Fischer & Satraki 2014. Tomb A is just north of Tombs 1 and 2, which were excavated by Karageorghis (1976, 70–89).

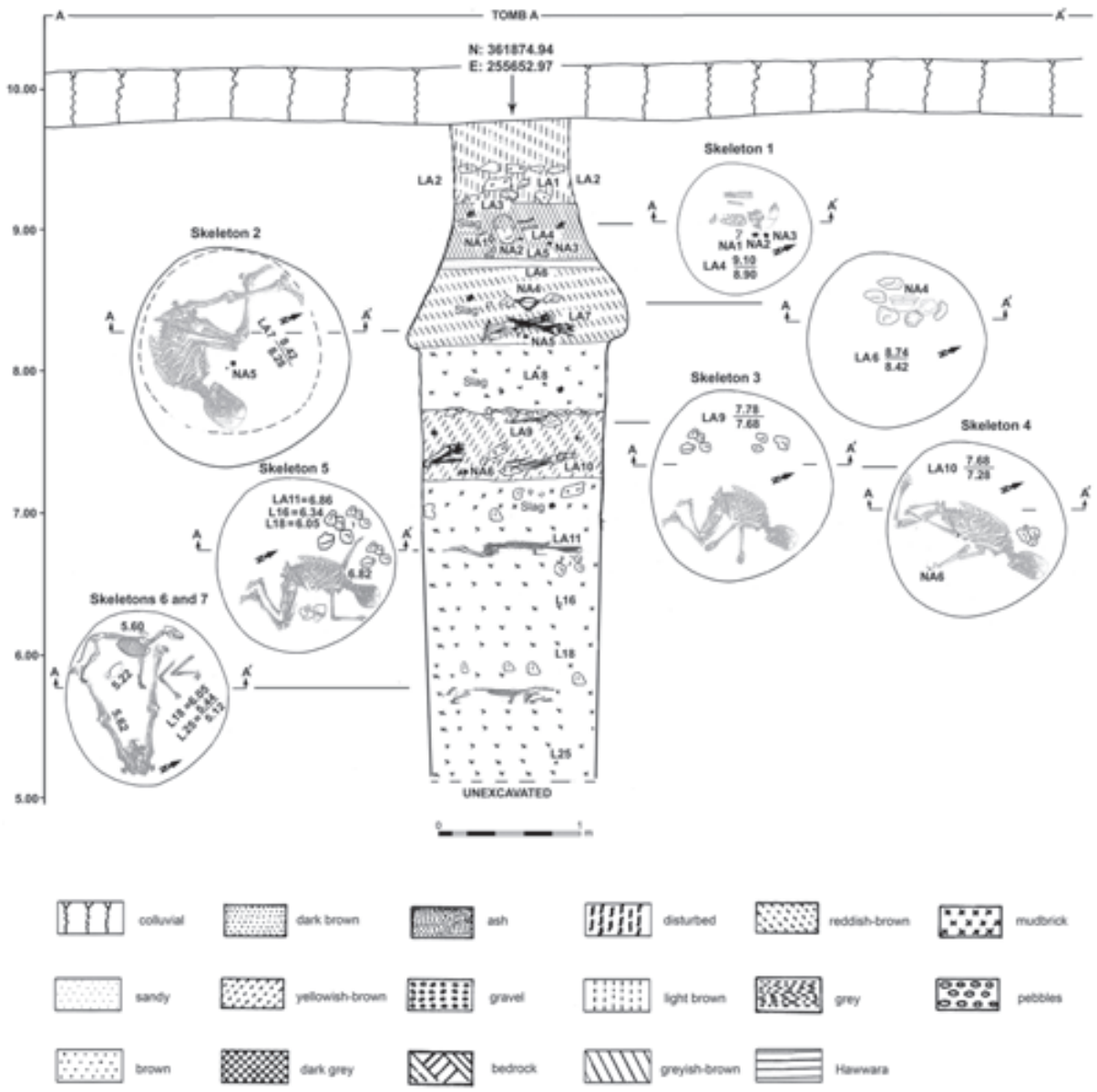


Fig. 20. Plan of Tomb A (drawing of M. Al-Bataineh).

A (Area A). More than 80 circular anomalies were indicated. Two of these circular anomalies (Pit B and Well C), which were detected on the plateau close to the eroded area, were exposed in order to verify the geophysical results. Two additional human-made circular cuts (Wells D and E), which were exposed due to erosion to the north of Tomb A during our survey in 2013, were also investigated.

CONTINUED EXCAVATIONS OF TOMB A (*FIG. 20*)

The excavations from 2013 exposed a plastered well which was reused as a tomb. It has a circular section of somewhat varying diameter: from 0.8 m just below colluvial soil it widens deeper down to approximately 1.4 m and then stays at 1.2 m for the rest of its extent. Four human skeletons in descending layers and several personal items and tomb gifts were found before

the excavations came to a halt.[19] Except for a bowl (NA4), possibly connected with Skeleton 2, none of the "burials" contained tomb gifts and the individuals seemed dumped rather than buried. In June 2014 the shaft was re-opened and excavation continued down to a depth of 5 m from surface. A total of three more skeletons were discovered—two humans and one dog (*Canis familiaris*).

Skeletons and stratigraphy

Skeleton 5, L 11 and 16

L 11 and 16 consist of nine courses of tightly packed stones (*c.* 10–30 cm in height). The sandy soil between the stones contained some copper slag. Skeleton 5 was discovered beneath the first course of stones. The skeleton was oriented north-east to south-west. The cranium was severely twisted at the neck and facing north. It was lying on its left side with both legs bent at hip and knees. The right arm was angled with the hand resting on top of the right clavicle (collarbone). The left arm was found in front of the body, with the elbow bent and the hand next to the mandible. The state of preservation is good. With the exception of some wrist and ankle bones, all bones are accounted for. The right temporal bone of the cranium was fragmented, probably caused by the compression of roots *post mortem*. Based on characteristics of the pelvis, cranium and teeth, the skeleton is estimated to be a woman between 19–27 years of age. Measurements of the left femur gave a stature of approximately 153 cm, according to Trotter's formulae.[20] The vertebral column shows signs of long-term physical stress, visible as Schmorl's nodes (impressions in the vertebral bodies) and osteophytes (bony outgrowth) at the *ligamenta flava* (spinal ligaments) in most lumbar and thoracic vertebrae. Some of the posterior arches of the cervical vertebrae are slightly asymmetric. The articular joints of the vertebrae show no pathological changes. A healed rib fracture was detected on the 6th or 7th rib of the left side. The fracture resulted in a loose fusion of the broken rib to the rib below. The dentition of the skeleton bears signs of malnutrition or childhood diseases,[21] as shown by the presence of enamel hypoplasia. Neither caries nor tartar was noted.

No burial gifts were present, only a fragment of a humerus of an equine/bovine and a part of a stone loom weight were found. The wall of the former well was continuously covered with a layer of fine clay. Two steps, some 20 cm apart, were discovered: they were hewn in the northern and southern sides.

Fig. 21. Deformed cranium from Tomb A; caries (blue arrows), purulent osteitis (red arrows) (photograph by B. Stolle; X-ray by P.M. Fischer).

Skeleton 6, L 18 (*Fig. 21*)

L 18 consisted of different soil types. Two distinct areas could be distinguished. The southern and middle part of the well contained quite compact soil with greyish mudbricks. In contrast, the soil was rather loose and sandy at the northern outline. Several pieces of ore/slag and some fragments of carnivore bones were found. Skeleton 6 was found in a very unnatural position. The posterior side of the pelvis was found at the eastern border of the shaft. The entire lower body was facing downwards. The right leg was stretching straight southwest, slightly bent upwards at the knee. The foot was located in the third step of the southern wall. The talus (ankle bone) was found disarticulated under the shaft of the right tibia (shinbone) and fibula (calf bone). The left femur went parallel to the right femur. The leg was bent at the knee and tibia and fibula were directed north-west. The foot was positioned at the western border of the shaft. The right radius, ulna (bones of the forearm) and hand were lying underneath the right femur oriented north-east to south-west. They were still articulated but disconnected from the humerus. The left arm was still entirely articulated. The humerus was lying in a horizontal north-east to south-west position along the body, while the forearm was flexed downwards. The hand was found next to the pelvis. The upper body was folded forwards. The spine was disarticulated at the lower thoracic vertebrae. The skull was located underneath the pelvis. The state of preservation, espe-

[19] Fischer & Satraki 2014.
[20] White *et al.* 2012.
[21] Fischer & Norén 1988.

cially regarding the torso, is slightly poorer than in Skeleton 5. However, most bones are accounted for. An exception is the left clavicle and the right humerus. The latter was probably collected with the general bones.

An ocular and x-ray analysis of the dentition in the right mandible suggests an age of approximately around 25 years based on the pronounced attrition, root caries, the serious loss of jaw bone (periodontal disease), which rarely occurs to such an extent during adolescence, and the deposition of secondary dentine. At the same time the progress of epiphyseal growth and fusion of the entire skeleton would uniformly indicate the skeleton to be only around 15 years old.[22] Estimation of sex was not possible.

The most notable feature of this skeleton is the artificially deformed cranium, which is elongated upwards and backwards. The metopic suture on the frontal bone of the cranium, which has normally disappeared between the age of two and four, is still visible. This might be a genetic trait, or a result of the cranial deformation.[23] Also the right clavicle shows signs of deformation, as its acromial end is distinctly flattened. Since the left collarbone is missing it is not possible to say if the flattening existed on both sides. No fractures were detected on the cranium. However a severe compression fracture was detected on the body of the last thoracic vertebra (T12). The teeth are covered with a chalky-white layer, which is similar to tartar, and show a severe degree of attrition. The X-ray analysis of the right mandible (*Fig. 21*) reveals severe caries which even affected the roots, periodontal disease and the destruction of periapical bone due to purulent processes. One wisdom tooth (38) is missing: it is probable that the tooth has never grown, since none of the other three wisdom teeth were present (wisdom teeth can be absent to some extent, roughly 25% in a modern population).

No burial gifts were present. Two additional steps, also with *c.* 20 cm in between, were discovered in the northern and southern wall of this locus, making it four in total on each side.

Skeleton 7, L 18 (*Fig. 22*)
Skeleton 7, a dog (*Canis familiaris*), represents the first non-human skeleton in the shaft. The dog was lying in the western part of the shaft on approximately the same level as Skeleton 6. The left leg of Skeleton 6 was lying on top of the dog. The animal was lying on its left side in a north to south position along the western border of the shaft (with the tail to the south and the head to the north). Both hind legs were extended south-eastwards. The left front leg was also extended south-eastwards, while the right front leg was bent close to the body. The neck and cranium were turned 180 degrees towards the south and were lying underneath the rib cage. The state of preservation is very good and the skeleton is mainly complete. Epiphyseal fusion indicates the dog to be fully grown. Given the absence of the baculum (penis bone) and the faint sagittal crest (ridge of bone on top of the skull) the dog might be female. Based on measurements of both radii and the right tibia the stature of the dog could be estimated at around 50 cm.[24] The length of the cranium is *c.* 19 cm. One of the first phalanges on the left front leg shows a healed fracture, which caused the second phalange to develop arthritic changes (osteophytes) on its articular surface. This injury might be related to a thickening in the lower part of the right radius, due to greater stress on the healthy leg. The teeth of the dog show the same white-chalky cover as Skeleton 6, but not as severe, possibly tartar.

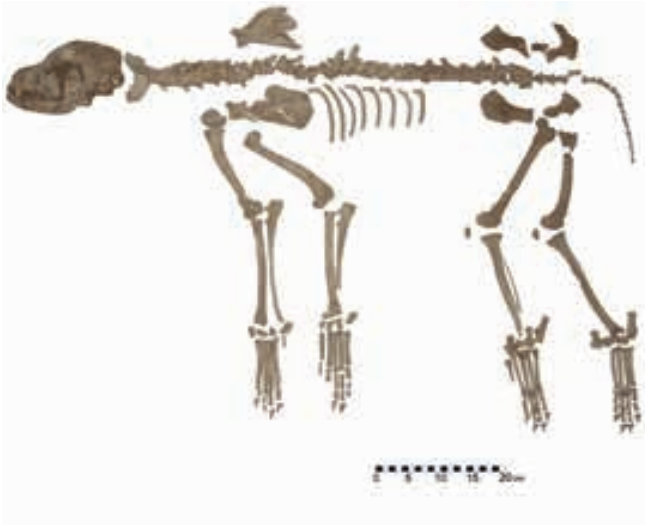


Fig. 22. Canid from Tomb A (photograph by B. Stolle).

L25
L25 consisted of a fill layer of about 25 cm with quite soft soil. It contained several stones, sherds and pieces of ore/slag. Fragments of the cranium of a caprine and an almost complete White Shaved juglet (L25-1) were found. L25 was the last locus to be excavated during this season. The tomb could not be excavated completely in 2014 and the excavations stopped at a level of 5 m from surface (or 5.10 masl). The tomb was not backfilled but secured with wood and soil.

[22] Ubelaker 1999.
[23] Fischer 1986, 10.
[24] Ekman 1973.

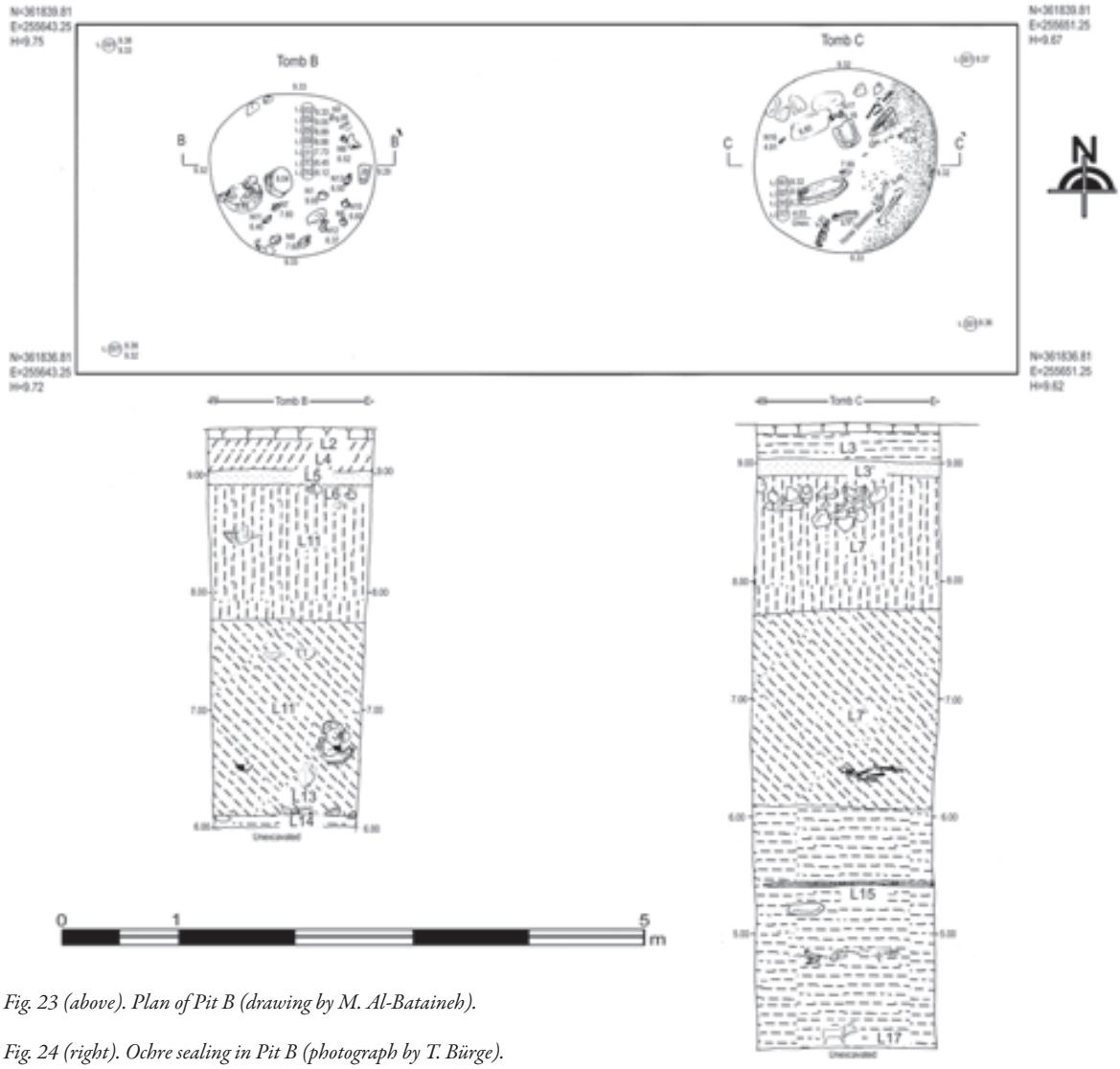
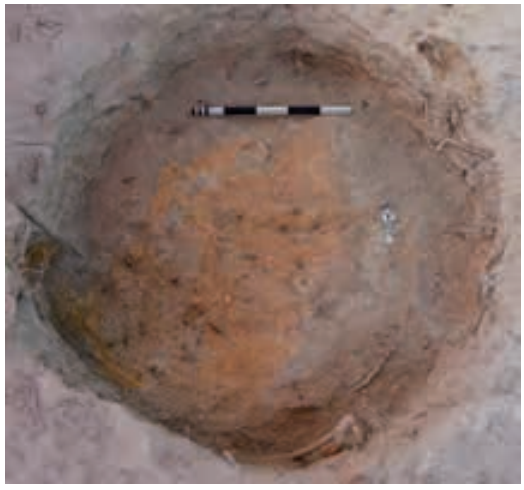


Fig. 23 (above). Plan of Pit B (drawing by M. Al-Bataineh).

Fig. 24 (right). Ochre sealing in Pit B (photograph by T. Bürge).



PIT B (*FIG. 23* LEFT)

After the removal of 0.3 m deep colluvial soil a circular area of roughly 1 m with a dense vegetation of roots was exposed, viz. the beginning of the shaft. Another 0.2 m deeper several finds were made: an intact Mycenaean alabastron (N1 in L2; *Fig. 25a:8*, *25b:6*), an intact Mycenaean juglet (N2 in L2; *Fig. 25a:12*) and parts of a frying pan/baking tray of Coarse ware (L2-3).

Below a layer of yellowish-orange soil (L5), which is a mixture of ochre and limestone (*Fig. 24*), several other complete objects were found fairly close together: a loom weight of fired clay (N4) lying inside a complete White Slip II bowl (N3; *Fig. 25a:2*, *25b:2*), another White Slip II bowl (L6-7), a bowl of

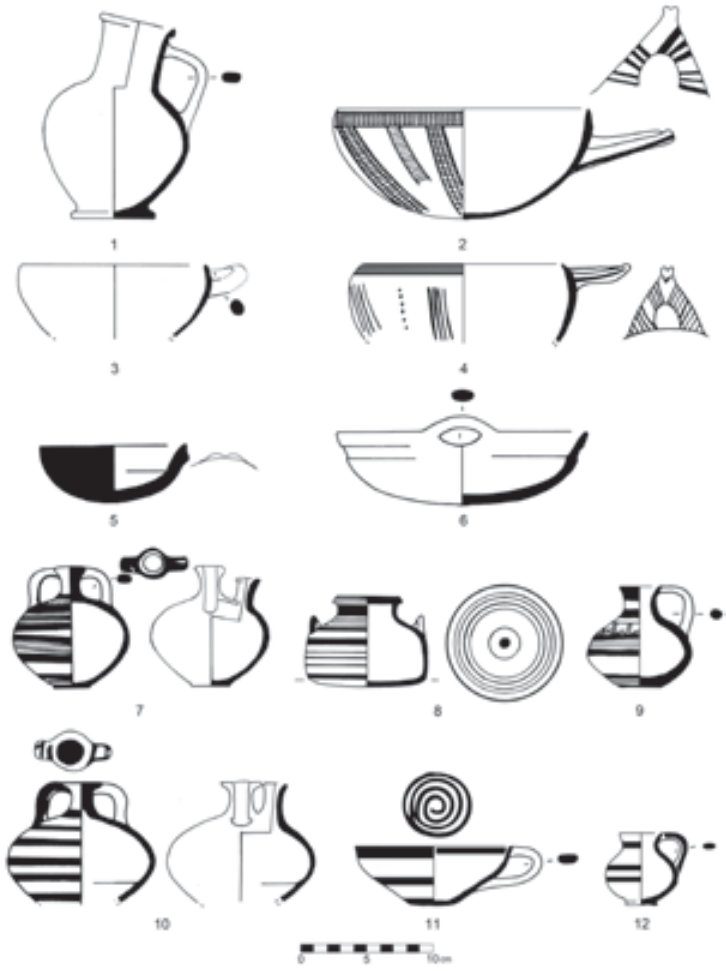


Fig. 25a. Collection of finds from Pit B (drawing by M. Al-Bataineh).

Fig. 25b. Collection of finds from Pit B (photograph by T. Bürge).

Monochrome ware (L6-3; *Fig. 25a:3*), a cooking pot (L6-2), a lamp (L6-5), a frying pan of Coarse ware (L6-6; *Fig. 25a:6*, *25b:4*), the vertical part of a wall bracket (L6-1) and a bone shuttle (L6-4). The layer of ochre-coloured soil seems to have been used to "seal off" the finds.

The next layer of soil (L11, L13) contained a Mycenaean juglet (N6; *Fig. 25a:9; 25b:7*), a Mycenaean shallow cup (N7; *Fig. 25a:11*), two Mycenaean stirrup jars (N9; *Fig. 25a:7*, *25b:5*; N10; *Fig. 25a:10*), the upper part of a White Painted wheel-made trefoil-mouthed jug (L11-3), the rim of a Plain White wheel-made jar (L11-4), two White Slip II late bowls (N8, L11-1; *Fig. 25a:4*), the lower part of a Bucchero hand-made jug (L11-2), a Base-ring II juglet (N12; *Fig. 25a:1*, *25b:1*), two small hand-made, wheel-finished, bowls with a vestigial handles and black slip and a highly burnished surface (N11, N13; *Fig. 25a:5*, *25b:3*), and a stone grinder (L11-5). Between 300 and 400 fragments of scale armour (?) were positioned along the outlines of the shaft (see Appendix 3). The shaft ended at a depth of 6 masl. It was backfilled at the end of the season.

The contents of the shaft were found virtually undisturbed, which can be seen by the complete/intact vessels and the unbroken ochre "sealing".

WELL C (*FIG. 23* RIGHT)

This feature is approximately 2 m east of Pit B. After removing the 0.3 m deep colluvial soil a circular area of roughly 1.5 m with a dense vegetation of roots was exposed, viz. the beginning of the shaft. The uppermost part of the shaft was sealed

Fig. 26. Equid from Well C (photograph by B. Stolle).

by several large stones, amongst them the part of a basin. The shaft has a plastered wall all the way to the bottom of our excavations where silted, damp, clay was reached (at a level of 4 masl). It was backfilled at the end of the season.

Finds from the upper part of the shaft include a loom weight (N14). Below a layer of ash at a depth of 4.90 masl a complete skeleton of an equid (*Fig. 26*) was found together with a cylinder seal of haematite (N16; *Fig. 27*). It covered the entire shaft, lying in a bent position. Most of the bones are preserved, but in a fairly poor condition, especially the cranium and the mandible. The front of the equid shows a higher degree of fragmentation and the hind legs are best preserved. Approximately 0.7 m further down, at a depth of 4.18 masl, a complete Base-ring figurine of a bull (N17; *Fig. 28*) was found. The fill contained numerous fragments of pottery and a fairly large amount of bones.

This feature is definitely not a tomb but a well which obviously dried out and was later reused to bury and dump material.

WELL D (*FIG. 29, TABLE 1*)

This circular feature is some 17 m north of Tomb A on the eroded steep slope. The upper portion of the 1 m wide shaft, which was partly sealed by a layer of stones, had been disturbed by ploughing and erosion. This feature was quickly interpreted as a well: the wall of the well was coated with fine clay, and there were a number of steps dug into the north-western and south-eastern parts of the wall of the well at regular intervals of approximately 40 cm.

A loom weight with a seal impression (N5; *Fig. 30:3*) was found below the sealing stones. Further down a biconical disc of fired clay (N15; *Fig. 30:4*) came to light, followed by the skeleton of a sheep, below which a Base-ring II bowl was found (N18; *Fig. 30:1*). At the bottom of the excavated shaft were a Mycenaean bull figurine (N21; *Fig. 30:5*), four cooking pots (L23-1, -2, -3, -7; one on *Fig. 30:2*) and a large krater of White Painted wheel-made ware (L24-1). Excavations came to a halt at 3.28 masl because of practical problems: one was that the air in the narrow well became unbreathable and another was the narrowness of the shaft which made excavation very difficult. The well was secured with wood and soil at the end of the season.

Fig. 27. Cylinder seal N16 and impression from Well C (drawing and photograph by T. Bürge).

Fig. 28. Bull of Base-ring ware N17 from Well C (drawing and photograph by T. Bürge).

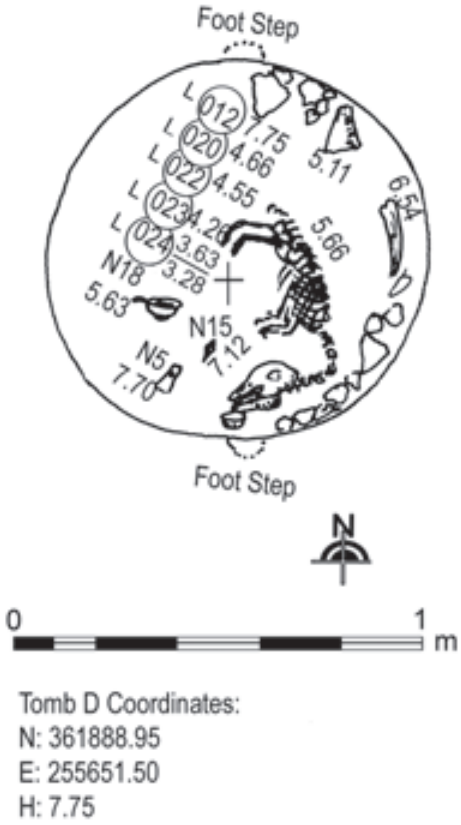


Fig. 29. Plan of Well D (drawing by M. Al-Bataineh).

Table 1. Position of steps and dimensions (width/height) in Well D.

Steps	*NW*		*SE*	
	Level	*Dimension*	*Level*	*Dimension*
Step 1	7.35	14/18	–	–
Step 2	6.93	14/17	–	–
Step 3	6.43	13/21	6.43	12/19
Step 4	5.97	19/20	6.06	11/19
Step 5	5.55	14/22	5.53	15/20
Step 6	5.04	16/24	5.01	16/20
Step 7	4.43	17/22	4.45	16/21

WELL E (*FIG. 31*, *TABLE 2*)

This circular feature is some 6 m north of Well D on the eroded steep slope. It has a diameter of 0.80 m. The uppermost part had been disturbed by ploughing and erosion. This was another well, the upper part of which was partly sealed by a layer of stones. The wall of the well was coated with fine clay. There are a number of steps at regular distances, approximately 40 cm apart, dug into the east-north-eastern and west-south-western parts of the wall of the well.

Finds from this well include a Mycenaean bull figurine (N19; *Fig. 30:9*), a loom weight (N20), a cooking pot of Coarse ware (L23-1; *Fig. 30:6*), a White Slip II bowl (L21-3; *Fig. 30:7*) and a White shaved juglet (L19-1; *Fig. 30:8*). The excavations stopped at 5.13 masl because the narrowness of the shaft made it difficult to continue. Also this well was secured with wood and soil at the end of the season.

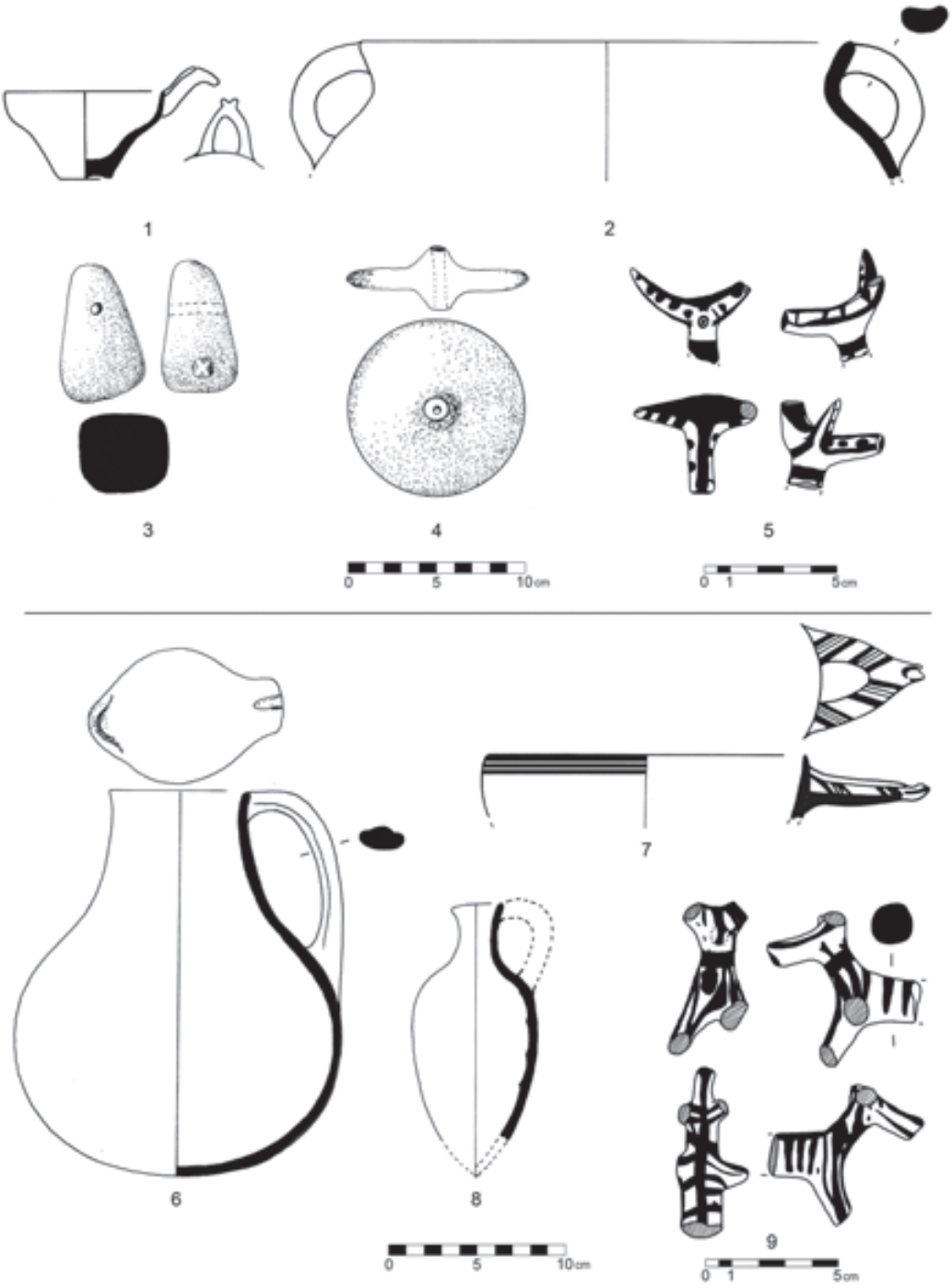


Fig. 30. Collection of finds from Well D (upper) and Well E (lower; drawing by M. Al-Bataineh and T. Bürge).

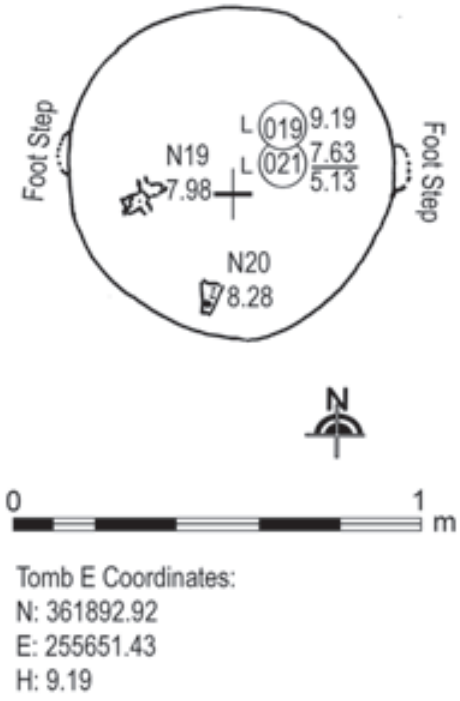


Fig. 31. Plan of Well E (drawing by M. Al-Bataineh).

Table 2. Position of steps and dimensions (width/height) in Well E.

Steps	*ENE*		*WSW*	
	Level	*Dimension*	*Level*	*Dimension*
Step 1	7.23	22/11	7.09	16.5/11
Step 2	6.88	25/12	6.78	25.5/13.5
Step 3	6.48	26.5/12	6.37	25/13.5
Step 4	6.09	25/14.5	5.97	26.5/12.5
Step 5	5.66	25.5/18	5.58	24/14
Step 6	5.28	25.5/17	–	–

Discussion and conclusions

TECHNICAL SUPPORT

The application of a number of advanced technical devices contributed to a large extent to a successful season in 2014. The georadar and magnetometer survey of a 0.35 hectare area west of Area 6 and the probable street that was discovered in 2013 indicated another new city quarter with a compound 50 m × 40 m in area. The geophysical survey confirmed our hypothesis, which was based on surface finds, that the city continues to the west. The same geophysical devices were also used in an area of 1.1 hectares north-west and west of the mosque of Hala Sultan Tekke (Area A). More than 80 circular anomalies with an approximate diameter varying from 1 m to 1.5 m were indicated and interpreted as tombs or wells. In summary, the pre-excavation survey saved the project considerable time and will reduce the financial resources required, because the outcomes of our prospecting enabled us to excavate in targeted areas. In addition, a number of new discoveries were only possible with geophysical methods.

Following the established practice of the excavator an electromagnetic detector was utilized throughout the excavations.[25] The detector was used for the discovery of metal objects that are otherwise very difficult or sometimes impossible to find, for instance, small beads encrusted with soil and lead objects which often look like stones. An additional advantage of this hand-held device is that it indicated the presence of artefacts and allowed the definition of size and shape before the object was brought to light: extreme care could therefore be taken during excavation, obviating possible damage to the object, when the size and its depth were known in advance.

The continued use of our industrial vacuum cleaner enabled us to clean soil surfaces in order to discover minuscule changes structure and colour. Mudbrick structures would have escaped discovery by only using brushes which smudge surfaces more than they clean.

The value of everyday aerial photography for documentation and the planning of the field work could be demonstrated by our GPS and transmitter-controlled quadcopter drone. Also in windy conditions our helicopter was able to hover in a predestined position to within 0.60–0.90 m thanks to the advanced GPS function, thus providing excellent photographs of the area of excavations (see also the contour map in *Fig. 32* which is based on aerial photographs taken with the quadcopter). The original camera (FC40, 720p/30FPS), which came with the drone, did not fulfil our demands concerning high resolution photography. It was replaced by a Hero 3+ Black Edition camera with a 12MP photo resolution and up to 30 frames/second, and a high-frame (video) rate of 1440p/48FPS. Although the Hero camera was slightly heavier than the original, the drone could still be in the air for roughly 15 minutes before the battery had to be changed. The drone was used on a daily basis for the documentation of the progress of the excavations, in both camera and video modes

[25] These devices are erroneously also called "metal detectors". Our detector indicated a number of different materials in addition to finds of metal, the nature of which can also be indicated, i.e. the differentiation between magnetic and non-magnetic metals (Fischer 1980).

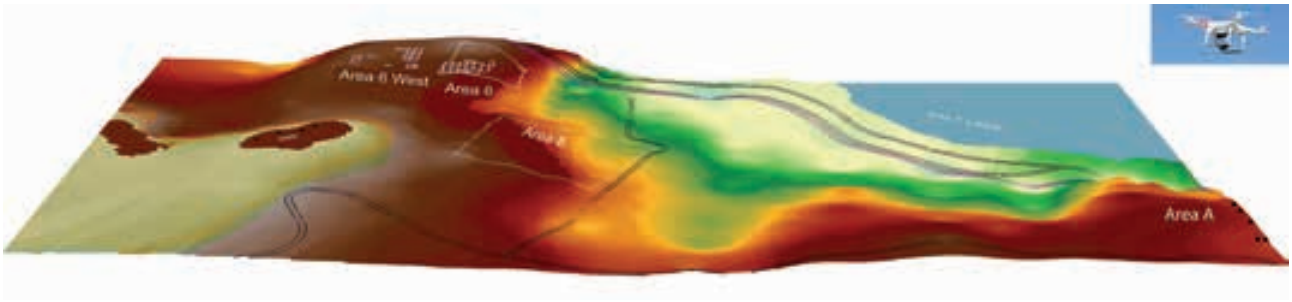


Fig. 32. Digital elevation map (DEM) of the investigated area at Hala Sultan Tekke (looking north) based on aerial photography with the quadcopter drone (small photograph). There is some vertical exaggeration in order to accentuate the profile.

Fig. 33. Hand-held XRF-device.

and for detailed photographs of important find contexts thus eliminating the time-consuming process when photo towers or other mechanical arrangements are used (and then only useful for a spatially restricted area). The photographs were processed on a daily basis with Photoshop Lightroom 5 (Adobe) in order to remove the fisheye effect of the camera.

A portable XRF-device was used in 2014 (*Fig. 33*). It enabled the expedition to identify instantly various materials (*Table 3*). Each reading/analysis took 30 seconds. Elements from 12Mg to 92U were measured quantitatively with varying detection limits.

The relatively high silicon and aluminium contents in some of our analyses are the result of corroded surfaces where these elements were enriched after lengthy contact with soil. Hypothetically, if one reduces these two elements, the values of the remaining main constituents should be somewhat increased. In addition to objects from this season, the large fibula from 2013 (N133) from R30,[26] the south-easternmost space of the exposed domestic and industrial compound, was also analysed (see *Table 3*). It was not possible to drill down to get a sample of uncorroded metal, viz. free from impurities such as silicon and aluminium as a result of contact with soil, considering the brittle structure of the fibula. Therefore the relatively high silicon (20.21%, error 0.23%) and to some extent the aluminium (2.21%, error 0.38%) values should be reduced and the main constituents, copper and tin, should be increased.

Also the copper alloy ingot (N233) shows a high silicon value (13.52%; error 0.29%; see *Table 3*).

THE EXTENSION OF THE EXCAVATIONS FROM 2013

Stratum I (*Fig. 4a*)

The excavations of the combined domestic and industrial compound in Area 6W, which was partly excavated in 2013, resulted in new discoveries. Room 22 (R22) was completely excavated. Numerous tools which are related to textile production and the remains of purple colour in a destroyed basin indicate that the function of this room was to produce textiles and to dye them. The area north and east of R22, where remains of walls were not found, was obviously an outdoor area where food was prepared on a pebble hearth. It should, however, be kept in mind that many structures are quite superficial, and centuries of farming might have destroyed and removed stone-built structures: numerous blocks of stone lying on surface support this hypothesis. Finds from this outdoor area include the fragment of a faience bowl of "Egyptian Blue"/calcium copper silicate (N230): XRF-analysis demonstrated contents of copper of 14.44% (error 0.06%) and calcium of 6.13% (error 0.1%).

Another only partly exposed compound consisting of R39–42 is north-west of R22. The function of R39 could not be determined whereas R40 is a domestic space with a pillar-

[26] Bürge 2014.

Table 3. Selection of XRF-analysed finds (reference to the find numbers are in the text).

Object	*Find*	*Position*	*Material*	*Composition% (error)% of major elements in decreasing order*							
Cylinder seal	N16	well	haematite	Fe 93.52% (0.70%)	Si 4.04% (0.17%)	Mn 1.17% (0.12%)	P 0.46 (0.05%)	V 0.27% (0.02%)	Ti 0.21% (0.06%)		
Fibula	N133	settlement	bronze	Cu 73.51% (0.37%)	Si 20.21% (0.23%)	Sn 3.01% (0.05%)	Al 2.21% (0.38%)	Fe 0.49% (0.02%)			
Amulet	N224	settlement	silver	Ag 91.5% (0.77%)	Si 4.48% (0.21%)	Al 2.46% (0.69%	Fe 0.86% (0.11%)	Cr 0.32% (0.07%)	Bi 0.23% (0.02%)		
Ingot	N233	settlement	bronze	Cu 80.58% (0.53%)	Si 13.52% (0.29%)	Sn 2.21% (0.04%)	Fe 1.56% (0.04%)	Ni 0.39% (0.02%)	S 0.36% (0.11%)	V 0.15% (0.01%)	Pb 0.04% (<0.01%)
Earring	N251	settlement	gold/ silver	Au 55.52% (0.43%)	Ag 33.30% (0.27%)	Si 6.48% (0.28%)	Cu 5.72% (0.10%)				
Earring/ silver-gold plaque	N254	settlement	silver/ gold	Ag 60.76% (0.39%)	Au 31.84% (0.023%)	Cu 5.37% (0.10%)	Si 1.02% (0.14%)	Cr 0.37% (0.04%)	Fe 0.23% (0.06%)		
Earring/ silver plaque	N254	settlement	silver	Ag 88.93% (0.81%)	Si 6.35% (0.26%)	Al 2.35% (0.73%)	Cu 0.36% (0.03%)				
Earring/ silver ring	N254	settlement	silver	Ag 94.94% (1.11%)	Al 2.34% (1.04%)	Si 1.53% (0.21%)	Bi 0.55% (0.03%)	Fe 0.37% (0.10%)			
Earrings	N255	settlement	gold/ silver	Au 50.47% (0.47%)	Ag 47.19 % (0.62%)						
Jewellery melted	N255	settlement	silver	Ag 96.79% (0.77%)	Cr 0.32% (0.03%)	Bi 0.26% (0.02%)					

supported roof. Amongst the numerous finds from this room is a stirrup jar (L398-4) which has been exposed to fire after it was broken (*Figs. 7:5* and *8*). It has a carefully executed thick red and burnished decoration of horizontal lines, scales and hatched lozenges resembling Late Helladic IIIC (LH IIIC) counterparts but, overall, our locally produced vessel is of higher quality than the Mycenaean originals: extremely well fired with an excellent surface treatment. R41 again is a combined domestic/working space, and R42 an open space where food was prepared and olives were processed. The area south of the compound from 2013 suffered heavily from ploughing and many contexts are disturbed. There is, however, a broken composite stone anchor in a pit (*Fig. 9a* and *b*).

This year's excavations confirmed earlier observations that pointed to a catastrophic event which destroyed the most recent occupation of the city: ash, destroyed but complete objects of high quality, intact small vessels which were left behind—all indicate destruction and abandonment. According to the ceramic evidence this phase of occupation can be dated to Late Cypriote IIIA2 (LC IIIA2), roughly the mid-12th century BC.

Stratum 2 (*Fig. 10*)

This layer of occupation is only partly exposed. There are several stone structures which were built in this phase and, later on, reused in Stratum 1. Others again, which are provisionally associated with Stratum 1, might also have been built in Stratum 2 but altered in Stratum 1. Regardless of the preliminary stratigraphical division of the stone structures, there is a second havara floor below the floor from Stratum 1 from where a number of spectacular finds of jewellery derived (*Fig. 12*): a silver amulet, a bead of a disc-shaped black stone, a gold earring with an attached profiled plate of gold with a possible representation of a bull, a bronze ring, a silver earring with a gold pendant and a sheet of silver which was attached to the item, two gold earrings and a melted lump of silver in which another gold ring was embedded. These finds together with finds from 2013 which include the "Horned God Krater" point to a compound where a rich guild of craftsmen, who specialized in copper/bronze and textile production, lived.

Another find from Stratum 2 is a helmet shell, *Phalium* sp., which is sometimes called *Semicassis* or *Cassis* (*Fig. 13*). Complete shells have sometimes been found in Cypriote graves but

they are less common in settlements.[27] The enlarged outer lip of *Phalium* species shells are sometimes found in excavations, either collected water-worn on the beach or cut from the body of the fresh shell. Some from the prehistoric Near East have been holed as pendants, and even if not holed they could have been tied to be strung.

Complementary excavations inside the exposed area from 2013 revealed a 1 m wide pit (*Fig. 14*). Amongst the finds from this pit are several hewn limestone blocks, most likely water channels, an almost cylindrical, slightly tapering, clay tube of unknown function, which is open on both sides, and a doughnut-shaped ingot of copper alloy weighing almost exactly 1.5 kg (*Fig. 15*). The pit is clearly associated with the copper production plant nearby, where objects related to the production of copper and bronze were found in 2013.[28]

According to the ceramic evidence this phase of occupation can be dated to LC IIIA1, roughly the beginning of the 12th century BC.

Another city quarter

The interpretation of the prospected area from 2012 indicated in its most westerly part some stone-built structures. A test trench in 2013 verified these structures and encouraged us to extend the geophysical prospecting in 2014 (see above). This led to the discovery of a 50 m × 40 m compound of which only a small part of the easternmost structures was exposed in 2014 (see Appendix 1). The compound is west of a street which separates the new city quarter from the area where copper/textiles were produced. The stratigraphy of the small exposed area is not yet clear, however, the size of the building, the widths of the walls, as indicated by georadar, and several finds point to an important structure. Amongst the finds are anthropoid and animal figurines and several objects of bronze.

AREA A (*FIGS. 2* AND *19*)

TOMB A BY B. STOLLE; PIT B AND WELLS C–E BY P.M. FISCHER & T. BÜRGE

Guided by the detailed geophysical results and our survey along the eroded steep slope opposite the mosque of Hala Sultan Tekke (see Appendix 1) four new anomalies were investigated (Pit B, Wells C–E) and the excavations of Tomb A from 2013 continued (*Fig. 20*).

Tomb A

This year's excavation confirmed that Tomb A is a reused well. The steps cut into the sides, which enabled people to climb down and up, and the clay coating of the shaft support this claim. Like the four skeletons which were excavated in 2013, the positions of Skeletons 5–7 indicate that they too were dumped rather than buried. The bodies came into the well at different occasions,[29] although Skeletons 6 and 7 could be an exception: given their position relative to each other they were most probably contemporary. The White Shaved juglet does not give any more precise hints concerning chronology because this type of pottery had quite a long life span. However, a date in the Late Cypriote period, not too early and not too late, is most likely.

There is no pattern regarding the age and sex of the skeletons. The pathological condition of the vertebral column in Skeleton 5 is quite unusual for a woman of that age. It would suggest that she had been under severe physical stress for quite some time. Based on the health status Skeleton 5 might be a hard-working person of rather low social status.

All the individuals in the well seem to have been dumped and except for the WPGS bowl (NA4) no obvious burial gifts were found. However, some items of value, considered to be personal belongings, were found near Skeletons 1, 2 and 4 (NA1–6).[30] Nevertheless, the careless deposition without tomb gifts would rather suggest that they were of a lower social status considering the rich tombs found in the area. Conversely, artificial cranial deformation has often been associated with individuals of higher social or different cultural status (see *Fig. 21*).[31] Cranial deformation was a common practice in Cyprus since the Neolithic. It has been found at both Hala Sultan Tekke and other Late Cypriote sites (such as Enkomi).[32] Even though the type of deformation that Skeleton 6 shows is rare in Cyprus,[33] these individuals were normally buried in fairly rich tombs.[34] This makes not only the position but also the location of Skeleton 6 unusual. The individual might have been deposited in the well by accident or by intent. The way in which the dog is involved in this is difficult to determine. Some factors (position, absent skull fractures etc.) point to the possibility that the well was still filled with water at the time of the body's deposition. At the same time the compression fracture on T12 is situated at the place where the spine was dislocated. This could suggest a "hard landing". It is, however, impossible to tell if the compression occurred *ante* or *peri mortem*. The high degree of dental attrition of Skeleton 6 might have been caused by sand in the food or the diet itself. Extreme attrition has been noted before in skeletons from

[27] D. Reese pers. comm. (e-mail 18 August 2014).
[28] Fischer & Bürge 2014.
[29] Fischer & Satraki 2014.
[30] Fischer & Satraki 2014.
[31] Lorentz 2009.
[32] Fischer 1986, 11.
[33] Lorentz 2009.
[34] Fischer 1986, 11; Schulte-Campbell 1983, 252.

Hala Sultan Tekke.[35] An estimation of the age of Skeleton 6 has so far been inconclusive (15 to around 25 years).

Except for the careless deposition of the bodies, so far there is no pattern detectable between the seven skeletons in the well. Isotope analysis, to investigate diet or origin, would in the future provide a possibility of an increased understanding of this complex context.

Pit B and Well C

These two features are close together, and are related to each other (*Figs. 23–26*). Well C is a deep, reused, well with several most interesting finds, for instance, the complete bull of Base-ring ware, the skeleton of an equid and the cylinder seal of haematite.

The Base-ring bull (N17; *Fig. 28*) from Well C has a height of 10 cm and a length of 15 cm. It is virtually complete (there is only a minor old break of the tip of the left horn). The surface is medium grey with a dark greyish-brown wash applied irregularly which resembles a brindled fur. There is no white decoration which is typical of Base-ring II ware. Tail and eyes are applied, and a bridle and the muzzle are indicated by incisions. Two parallel incised lines from the neck to the foreleg are on either side of the body. They may be part of the bridle arrangement. There are three somewhat irregular holes on the belly and none on the back—all done before firing—, which is unusual for Base-ring bull figures. It has no handle on the upper part of the body, as many bulls of this ware have and which are termed *askoi*. In addition, we also find the term *rhyton* inappropriate because there is no hole in the muzzle. The bull was obviously deposited in Well C on purpose and not dropped by accident. Therefore, we consider the complete bull figurine from deeper down the well an offering. The three holes on the belly seem to be related to the offering ceremony.

The cylinder seal (N16; *Fig. 27*) from the same structure is of haematite (see also *Table 3*, which, for the main constituent, iron, shows 93.52%, error 0.7%). It is almost intact, only a small segment on the upper part is missing. It is 1.8 cm high and has a diameter of 0.6 cm. The diameter of the hole is 0.3 cm. Three human figures are depicted walking towards the left. Two of them are holding horned animals, most likely gazelles or stags, in one hand. One of these persons is holding a pole with a round object on top of it, possibly a standard or a weapon. The other person is holding its arm up. The third person is somewhat different from the other two: it is wearing a skirt which ends above the knees but it has no headdress, while there is no skirt visible on the other two persons, who might be naked but wearing a pointed headdress. The arms are folded on its chest. Next to it there is another standard or weapon, and next to that there is a sun. The two animals held by the persons on their hind legs hang headlong. The remaining figure is more intricate to explain but it is most likely an animal, possibly a gazelle or stag like the other two animals. It is standing upright with bent knees. The forelegs are visible at the upper part of the body. It has a long, narrow neck. The upper part of the figure is again not clear: an eye is indicated by a circle, enclosed by two lines which depict the head. The muzzle, indicated by a line, is directed to the left. A line (?) on top of the head could be interpreted as a horn. The whole scene depicts a hunt, where two gazelles or stags have already been hunted down and one is still alive. The seal is in the Mitannian Common Style, where such hunting scenes are common. One parallel comes from Hazor (Stratum 1A, temple in Area H, dated to LB II, i.e. beginning of 13th century BC).[36] Another close parallel is a Middle Assyrian seal from Tell Mohammad ᶜArab, northern Mesopotamia,[37] another one comes from Assur.[38] The long front legs of the animal standing upright on our seal are striking and resemble the forelegs of one of the stags on a seal from Ugarit (dated to around 1550–1400 BC).[39] Another seal of haematite from Ugarit (dated to around 1450–1350)[40] represents the closest parallel to our object: it depicts a person carrying two hunted gazelles, another person with a javelin and a third with a branch.

A virtually complete skeleton of an equid comes from Well C (*Fig. 26*).[41] The dentition of the equid was completely collected. According to the morphology of the teeth the equid is a stallion of 7 to 9 years age. Measurements were taken on the right metatarsal, which allows the height of the animal to be estimated at approximately 109 cm.[42] Comparing measurements with previously analysed equid bones from Hala Sultan Tekke indicates that the equid was probably a donkey (*Equus asinus*).[43] No pathological features were recorded. According to the hitherto published zooarchaeological material, donkeys seem in general to be more common than horses at Hala Sultan Tekke.[44] Furthermore, Jonsson suggested that the deposition of dead equids in wells has been practised, e.g. during times of war.[45] This could also be the case with this equid.

The relation of the cylinder seal of haematite to the complete skeleton of the equid is difficult to assess: the seal may

[35] Fischer 1980, 139–148; Schulte-Campbell 1983, 250.

[36] Yadin 1961, pl. CCCXIX:3 and 4; description and discussion in Beck 1961, 315–316.
[37] Roaf 1983, 94, pl. 4: MA101; see also discussion and parallels of the same seal in Collon 1987, 62–63, no. 262.
[38] Moortgat 1966², 137 and pl. 68, no. 565.
[39] Schaeffer-Forrer 1983, 81 (R.S. 3.326).
[40] Schaeffer-Forrer 1983, 9 (R.S. 2.001).
[41] The equid was investigated by B. Stolle.
[42] Ekman 1973.
[43] Jonsson 1983, 229; Ekman 1977, 174.
[44] Jonsson 1983, 229; Ekman 1977, 174.
[45] Jonsson 1983, 222.

have been lost when the equid was buried or it has been deposited on purpose in order to honour a favourite animal.

Pit B did not contain any human osteological material but numerous complete and even intact finds (*Fig. 25a* and *b*). These include Mycenaean imports of LH IIIA–B date, locally made pottery of White Slip II and Base-ring I and II wares, and black slipped and burnished bowls. A date in the 13th century is suggested. We suggest that Pit B was neither a well nor a tomb but that it functioned primarily for the deposition of offerings during a ritual in order to provide life-saving water in the nearby Well C, which was starting to dry up. We also put forward the hypothesis that the ochre sealing in Pit B has had some ritual importance. Nevertheless, the explanation that Pit B presents a cenotaph cannot completely be ruled out.

Wells D and E

These structures were in fact wells in which hewn steps facilitated climbing up and down during their construction and for cleaning and maintenance purposes (*Figs. 29–31*). Secondary deposits include the skeleton of a sheep, pottery, and tools.

It is quite surprising that there are several wells in an area where rich tombs were found, since it can be anticipated that the builder of these structures was aware of the inconvenience of having a fresh water resource close to burials.[46] Well C, for instance, is only a couple of metres away from the rich Tombs 1 and 2 with numerous skeletons. The likelihood that the wells are of older date than the tombs should also be considered. Nevertheless, there is, so far, no older material in the wells than that from the tombs.

Future prospects

The excavations in 2015 will concentrate on the new city quarter to the west and the continued exposure of the large compound. Complimentary excavations will be carried out in Area 6 West, viz. the area close to the old Area 6. In addition Tomb A and other threatened structures in Area A will be further investigated and secured.

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[46] Cf. Tombs 1 and 2 in Karageorghis 1976, 70–89.

Appendix 1: The geophysical survey at Hala Sultan Tekke. An overview

BY I. TRINKS*

Introduction

In 2010 and 2012 the author in collaboration with Prof. Peter Fischer, University of Gothenburg conducted two successful geophysical archaeological prospection pilot studies at Dromolaxia-Vizatzia/Hala Sultan Tekke in Cyprus.[47] In 2013 the accidental discovery and rescue excavation of assumed Bronze Age tombs in the eastern part of the settlement area of Hala Sultan Tekke prompted the idea of surveying a field approximately one hectare in size west of the mosque with ground penetrating radar (GPR) and magnetometer prospection. The goal of the survey was the detection and non-invasive documentation of possible tombs and additional structures of archaeological interest. The survey was scheduled as a five-day fieldwork campaign using GPR measurements at 25 cm and Foerster magnetometer measurements at 50 cm parallel profile spacing. It was decided that, time permitting, further prospection measurements in Area 6W to the west of the city quarters, which were discovered in 2012, would be attempted. Between 18 and 24 May 2014 the author, assisted by archaeologists Klaus Löcker and Ralf Totschnig, conducted the survey as described below on behalf of Archeo Prospections® Vienna.

Description of the fieldwork

As a first step the co-ordinate fix-points used in 2012 in and near Area 6 were resurveyed using a Realtime Kinematic Global Positioning System. It could be confirmed that the data acquired and mapped in 2012 had been correctly georeferenced. First, due to its higher speed compared to GPR measurements, a magnetometer survey using four Foerster gradiometer probes (65 cm vertical field gradient) mounted on a manually operated one-wheeled cart were conducted over Area A, which measured approximately one hectare. The probes were mounted with 50 cm cross-line spacing and the inline sampling interval was 10 cm. The survey grid was marked with lines on the ground surface and high inline positioning accuracy was achieved by use of an odometer wheel. After completion of the primary survey an additional area located to the west of the area mapped with GPR was surveyed with magnetics, as well as an area already surveyed in 2012. The data were processed and imaged as georeferenced greyscale maps with several, amplitude-clip-off ranges ranging from narrow to wide.

Fig. 34. GPR measurements in Area A with the three-channel 500 MHz system.

The high-resolution GPR survey was conducted with a Sensors & Software PulseEkkoPro three-channel 500 MHz system mounted in a modified SmartCart (*Fig. 34*). The crossline antenna and profile spacing was 25 cm. Over the course of two days approximately one hectare was surveyed under constant dry weather conditions. The data were processed using the ApRad data processing and visualization software developed at the Austrian Central Institute for Geodynamics and Meteorology by A. Hinterleitner. Processing steps included the interpolation of the 2D GPR profiles to a 3D data volume, gain correction, average trace removal, frequency filtering, depth conversion, Hilbert transformation, and subsequent clipping into horizontal georeferenced GPR depth-slices of 5, 10, 20, 30, 40 and 50 cm thickness. An additional 3,500 square metres of yet unexplored area were mapped with GPR measurements to the west of the 2012 investigated survey area.

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[47] Trinks *et al.* 2013. The test survey in 2010 was supported with a grant provided by the Stiftelsen Enboms Donationsfond, The Royal Swedish Academy of Letters, History & Antiquities. The 2012 campaign was supported financially and in kind by Archeo Prospections® Vienna through archaeologist Klaus Löcker and geometer Sebastian Flöry.

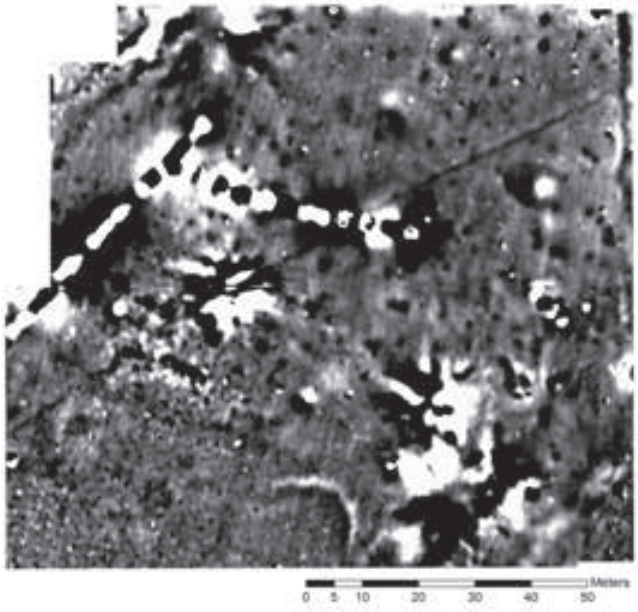

Fig. 35a (above). Magnetogram (white/black range : -8/+16 nT) of the possible cemetery in Area A.

Fig. 35b (right). Interpretation of Fig. 35a.

Results

AREA A

The magnetic data of the area, where a cemetery is assumed, show, apart from linear anomalies caused by modern utility lines, numerous anomalies that are likely to have been caused by backfilled pits. Close to the rich tombs which were excavated in 1967[48] the most prominent of these anomalies have been interpreted as burial pits. The concentration of over 80 corresponding anomalies suggests a large prehistoric cemetery of at least 4,500 square metres. Strong anomalies caused by modern utilities in the area possibly overshadow additional pits/burials. The assumed pit or burial features are limited to approximately one half of the survey area, with the other half being dominated by a strongly magnetic, dendritic, most likely thermoremanent magnetized structure, possibly an oven or large hearth (*Fig. 35a* and *b*). While this anomaly is rather large, it is expected that a possibly oven or kiln and associated remains (slag) are present in the ground. Additionally, several linear anomalies and structures are visible in the data, suggesting the presence of building remains, wall foundations and other architectural structures that are likely to stand in relation to the cemetery assumed nearby.

The GPR data from the same area show several linear structures, which apart from the modern utility lines are likely to originate from remains of walls. According to the GPR depth-slice images, remains of architecture exist both within as well as outside the area of the assumed cemetery. The discovery of parts of plastered ceiling at the eastern margins of the surveyed area by the author in 2014 suggests that further substantial tomb structures may be present in the area. The pit anomalies in the magnetic data are not interpretable as such in the GPR data alone. This observation underlines the value of the combined use of GPR and magnetometer prospection at this site.

AREA 6W

The GPR data from the western part of Area 6W show substantial remains of a large building compound consisting of many connected rooms. An extensive strongly reflective area south of it indicates further building debris (coinciding with a heap of rubble on the surface), suggesting an even larger compound (*Fig. 36a*). Remains of several massive walls suggest that this architecture may have been more prominent or stately, possibly palatial. A simple interpretation of the structures that are easily recognizable in the data is shown in *Fig. 36b*. Considering the soil and survey conditions it is clear that

[48] Karageorghis 1976.

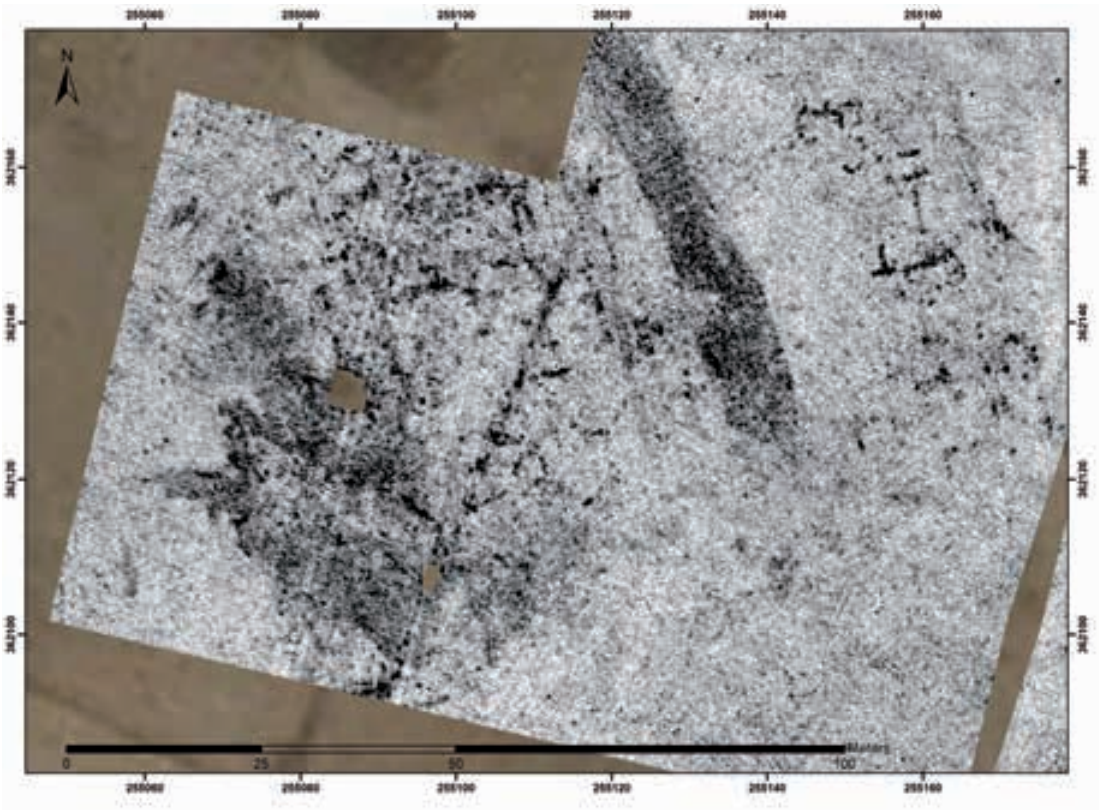

Fig. 36a. GPR measurements in Area 6 West with the three-channel 500 MHz system.

Fig. 36b. Simple interpretation of the additionally surveyed western part of Area 6 West showing a large building complex.

further, less well-expressed or preserved architectural remains are to be expected in the subsurface. A high-definition GPR or Electromagnetic Induction (EMI) Survey would be advisable for a more detailed non-invasive investigation of this area.

Due to the shallow depth of the detected structures, all areas surveyed in 2012 and 2014 should only be used agriculturally as pasture. Ploughing with powerful tractors is very likely to destroy the detected archaeological remains in few years. The archaeological prospection surveys conducted in 2014 have once again demonstrated that the most promising sustainable approach for the investigation and understanding of the structure and layout of this major Cypriote prehistoric site would be a large-scale (60–100 ha) non-destructive geophysical archaeological prospection survey using a combination of high-resolution GPR and magnetics.[49] Comparable non-invasive prospection approaches can be found at the Late Cypriote sites of Maroni[50] and Kalavasos-Ayios Dhimitrio.[51] High-resolution EMI survey and laser scanning or airborne structure-from-motion measurements for the generation of a detailed topography model would complement this state-of-the-art archaeological approach, to the considerable benefit of a much-needed, long-term site management plan.

[49] Trinks *et al.* 2012.
[50] Manning *et al.* 2014.
[51] Urban *et al.* 2014.

Appendix 2: Pottery studies: Mycenaean and Aegean imports, and rhyta

Mycenaean and Aegean pottery from Hala Sultan Tekke 2013 and 2014

BY L. MAZZOTTA & L. RECHT

INTRODUCTION*

At Hala Sultan Tekke, as is common at Late Bronze Age sites on Cyprus, Aegean or Mycenaean-imported pottery is an important part of the ceramic assemblage, especially as it provides important data contextual evidence and clues to the site's broader connections on Cyprus and in the Eastern Mediterranean. Here we present the Aegean/Mycenaean pottery from the 2014 excavations, along with some further conclusions concerning the collection from the 2013 season, and continuing the analysis from 2013.[52] We will describe the nature of the combined assemblages in terms of chronology, shapes, functions and the implications of their presence at Hala Sultan Tekke for trade networks and local production.

COLLECTION AND ASSEMBLAGE

During processing of the pottery for each locus from the 2013 and 2014 seasons, the Mycenaean sherds were separated from the remainder of the assemblage. These were then analysed, recording trench, locus, stratum, type of sherd (body sherd, rim, base, handle, complete vessel) and, whenever possible, shape (open, closed, jar, bowl, cup etc.), size, decoration, date and functional category. Shape and decoration were categories according to Furumark's system whenever possible, and the functional classes the same as those used in 2013 (see below). The studied sherds from 2013 come exclusively from the settlement, while the sherds from 2014 originate partly from the settlement, partly from Area A, an area of burials, offering pits

* We would like to thank Prof. Peter Fischer for the opportunity to participate in the excavations at Hala Sultan Tekke and permission to study the Mycenaean pottery. We are also grateful to MA Teresa Bürge for assistance and advice, Prof. Giampaolo Graziadio and Prof. Mario Benzi for helpful discussions concerning chronology and south-eastern Aegean relations, and Dr Caitlin Chaves Yates for language corrections.

[52] See Mazzotta & Trecarichi 2014.

and wells. From the settlement, we have a total of 312 sherds (210 from 2013 and 102 from 2014), and 93 from Area A.

The majority of the pottery consists of sherds—there are very few complete vessels, and these all come from tombs or wells. They are instead from settlement contexts that suggest reuse in floors or fills. This means that in most cases[53] we do not have their primary use context, and consequently their merit as tools for precise dating is limited, according to Mazzotta and Trecarichi.[54]

"AEGEAN" VS "MYCENAEAN" POTTERY AND LOCAL IMITATIONS

The sherds were categorized based on technology, morphology and decoration; we do *not* include sherds of local production that imitate the Mycenaean style.[55] We use the word "Mycenaean" as shorthand to refer to the pottery imported from the Aegean into Cyprus; however, these "Mycenaean" sherds include sherds which we have labelled "Aegean".[56] That is, they are imports from the Aegean sphere, but do not appear to come exclusively from Mainland Greece. They may instead have been transported from islands like Rhodes[57] or Kos, but in most cases it is not possible to determine their place of manufacture more precisely other than to suggest that they were part of a south-eastern Aegean *koine*.[58] In this study, the distinction between Aegean and Mycenaean pottery is made on the basis of macroscopic technological analyses, since differences in shapes and systems of decoration are minimal: "Aegean" sherds are usually characterized by a high content of mica, orange-reddish fabric, fine to medium-fine clay, and dull to matt paint (sometimes careless painted and careless surface treated), rather than the typically light pink-yellowish-brown fabric, fine clay and lustrous shine paint of the Mycenaean Mainland production. Even following these characteristics, we acknowledge that it is not always easy to determine, even broadly, the original place of production of a specific sherd and to differentiate between Mycenaean production from the Peloponnese and Mainland Greece, Mycenaean production from the south-east Aegean and local imitations of Mycenaean production.

CHRONOLOGICAL DISTRIBUTION

With the possible exception of a handful of sherds, which could date as early as LH IIA–B, all of the sherds and vessels belong within LH III (*Fig. 37*). Apart from the possible LH II sherds, the earliest examples occur in LH IIIA1 and some may be dated as late as LH IIIC Middle. However, there is a clear clustering from LH IIIA2 to LH IIIB2; this pattern is clear in both Stratum 1 and Stratum 2 from 2013, and in both settlement and Area A from 2014. These dates refer to manufacture, but it is likely that they found their way from the Aegean to Hala Sultan Tekke not long after manufacture since they are found mainly in settlement contexts. The decrease in Mycenaean imports from Mainland Greece in LH IIIC coincides both with the rise of a LH IIIC Middle south-east Aegean *koine* and with an increase in the production of local pottery[59] which to some extent imitates the techniques and shapes of the Mycenaean pottery, suggesting either a restriction in access to the imported pottery (and its contents), or that it was beginning to lose its value. The former seems more likely, given the broader historical circumstances of the period and possible change or collapse of certain trade routes.

SHAPES AND FUNCTION

In some cases, we were able to identify the specific shapes of the vessels. From a typological point of view, piriform jars and stirrup jars (total of 72) are by far the most common, but kraters also form a significant part of the assemblage (total of 47). Bowls (22), cups (17), kylikes (14) and rhyta (8) are less numerous, and alabastra (3), chalices (3), jugs (3), goblets (2), feeding bottles (1) and mugs (1) are rare. The sherds were also divided into open and closed vessels, and placed in functional classes[60] based on: tableware

[53] Possible exceptions include part of a deep bowl and the lower part of a miniature piriform jar from floor-like surfaces in Trench 19B (L452 and L471).

[54] Mazzotta & Trecarichi 2014.

[55] This production is essentially that of WPWM III, see Mazzotta & Trecarichi 2014.

[56] There is as yet no exact consensus on terminology. Mountjoy (1999), throughout refers to it as "regional Mycenaean" pottery; Buchholz (1999), throughout uses "Aegean" where it is not possible to decide the exact origin—including Crete and Mainland Greece; Leonard (1994, 6–7) prefers "Aegean" or "Late Helladic"; and van Wijngaarden (2002, 3) wants to limit the term "Mycenaean" to the Greek Mainland, while recognizing that it is not always easy to distinguish from other Aegean types. The terminology becomes even more muddled concerning local productions that imitate pottery from various parts of the Aegean. Lehmann, who himself prefers "Aegean-style" or "Aegeanizing pottery", provides a good discussion of the topic. See Lehmann 2013, esp. 306–309.

[57] See Benzi 1992, 209–226.

[58] Except in a few instances, where we can with some certainly determine a south-east Aegean provenance based on style—for example two fragments from a globular stirrup jar from Area A, TBL13 (HST14TBL13-2) dated to LH IIIC Early–Middle developed and an almost complete shallow cup FS 220 from Area A, TBL11 (HST14TBL11N7) dated to LH IIIA2–B (personal discussion with Prof. Mario Benzi; cf. Mountjoy 1999, ch. 11 and Benzi 1992, 69–103, 121–122).

[59] See for example the nearly complete piriform jar found in Stratum 1 in 2013, which appears Mycenaean in style, but is marked as local production by its decoration and manufacturing technique (Fischer & Bürge 2014).

[60] See also Mazzotta & Trecarichi 2014 for explanation of the classification and further literature on the subject. For the functional classifica-

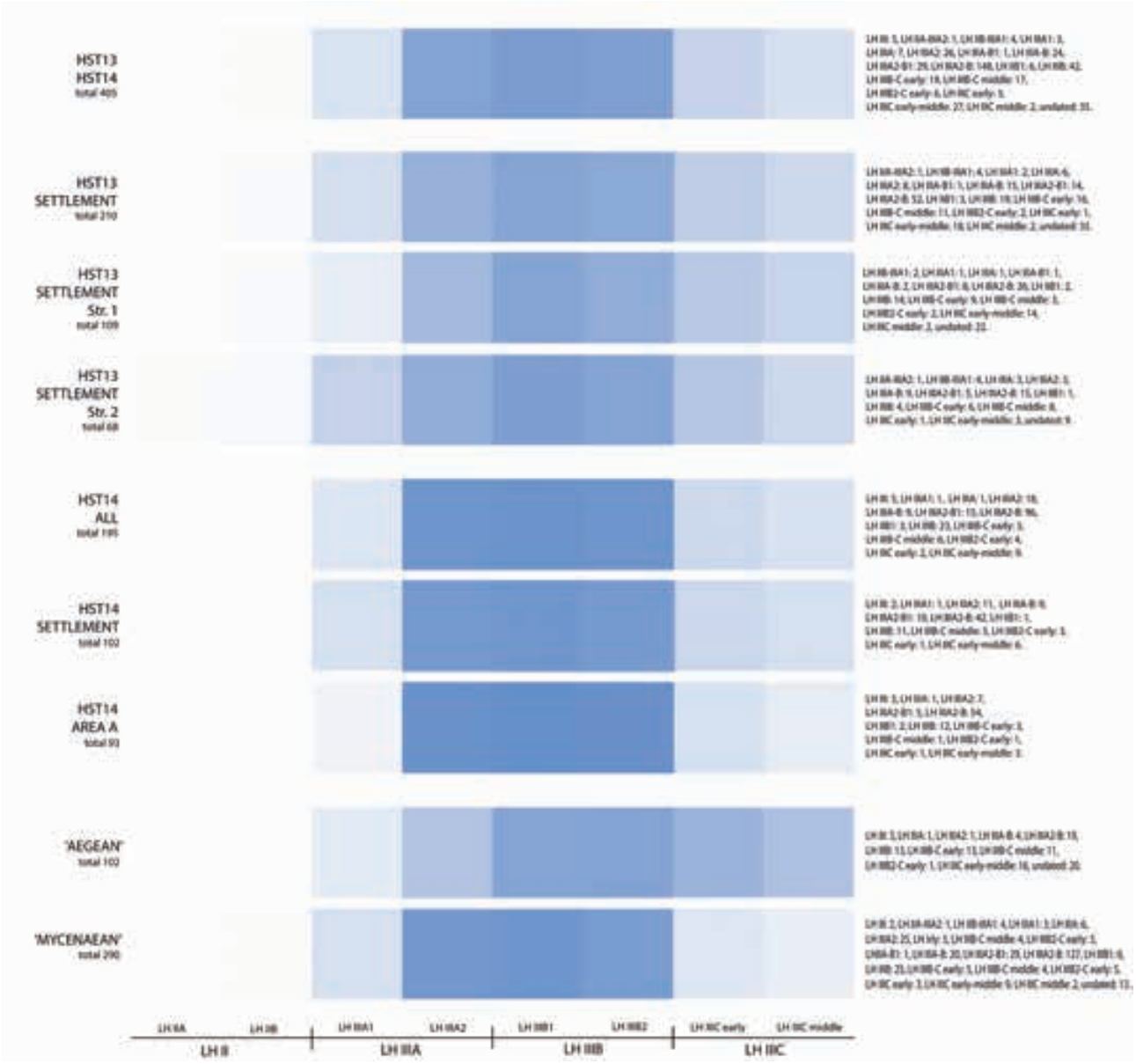

Fig. 37. Chronological distribution of Mycenaean and Aegean pottery in percentages (shaded), HST13 and HST14. The total of HST13 includes sherds assigned to Stratum 3 (and some which could not be assigned to a specific stratum). The "Aegean" and "Mycenaean" categories come from both HST13 and HST14, and only include sherds where the assignment to either category could be made with some level of confidence.

(F1), sub-divided into drinking sets (F1.1; further divided into F1.1a mixing vessels, F1.1b pouring vessels and F1.1c drinking vessels) and eating/drinking vessels (F1.2); small containers (F2); storage vessels (F3); and ritual vessels (F4).[61] Overall, the sherds are almost evenly distributed between

tion used both here and in Mazzotta & Trecarichi 2014 see in particular Graziadio & Pezzi 2013.

[61] This category here only contains conical rhyta; we have decided to keep them in this category although they are likely to not have been used only for ritual purposes, but also as filtering vessels, perhaps as a part of ritual.

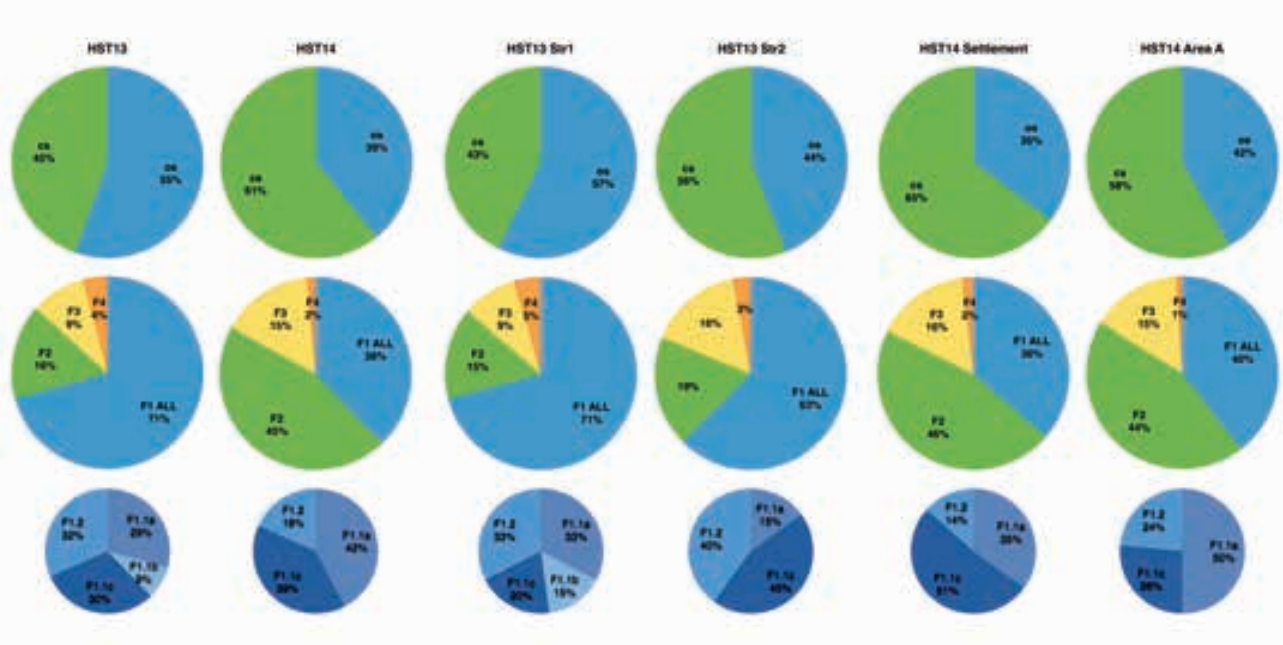

Fig. 38. Distribution of open (os) and closed (cs) shapes; distribution of functions F1–F4. HST 13 and HST14.

open and closed vessels (*Fig. 38*). A difference is detectable between Stratum 1 and 2 in 2013,[62] where open vessels were slightly more popular in Stratum 1, and vice versa in Stratum 2, and between the excavations in 2013 and 2014, which may reflect that we have reached lower strata in 2014, thus corresponding more closely to Stratum 2 of 2013. When moving to the functional categories, we see a strong preference for vessels of the F1 and F2 types (*Fig. 38*). In the 2013 assemblage, F1 shapes predominate, and these are still very important in the 2014 assemblage, but F2 vessels become even more visible. This distribution means that Mycenaean shapes most appreciated by the Cypriots were tableware (71% in the 2013 assemblage, 38% in the 2014 assemblage) and small containers (16% in the 2013 assemblage, 45% in the 2014 assemblage).

Among the F1 tableware, mixing vessels (F1.1a: kraters —29% in the 2013 assemblage, 42% in the 2014 assemblage), drinking vessels (F1.1c: cups and kylikes—30% in the 2013 assemblage, 39% in the 2014 assemblage) and eating/drinking vessels (F1.2: deep bowls—32% in the 2013 assemblage, 18% in the 2014 assemblage) far outnumber the few pouring vessels (F1.1b: only found in the 2013 assemblage, where it constitutes 9%). In the 2014 assemblage, we can also note a difference between Area A and the settlement within the F1 vessels: kraters are the most common type in Area A (50%), while cups are kylikes dominate in the settlement (51%).

The F1 types of vessels must have been imported for their function, and given that they are tableware, they would have been very visible, objects that would have been displayed to dinner guests, having both a practical and a social function. In contrast, the small containers are more likely to have been imported for their contents.[63] Containers like alabastra and small to medium-sized stirrup and piriform jars would have held a fairly precious content, for example wine, olive oil or aromatic oils produced in the Aegean. These uses suggest that Mycenaean pottery effected a certain sense of status, but their relatively high frequency across sites (but usually in low percentages of the total pottery assemblages) on the island and in many different contexts at the same site (as at Hala Sultan Tekke) means that not just the wealthiest people could afford this level of luxury.[64] That is not to detract symbolic or social

[62] For 2014, the sherds have not been divided into strata in this appendix, because much disturbance of the soil has taken place due to modern ploughing activity, and as a consequence, very few Mycenaean sherds can with certainty be assigned to Stratum 2.

[63] See also Steel 1998, 286.

[64] Steel (1998, 292) and McGeough (2007, 360–361) see Aegean pottery as luxury items. Steel is able to identify a distinction between the use of certain shapes in élite and non-élite activities, with drinking sets (equal to our F1 category) being only available to or used by élites, mostly

value from the Mycenaean pottery; on the contrary, status would have been gained precisely due to the élite association, and the pottery would be one strategy of non-élites to emulate élite status or élite activities.[65] It is possible, as suggested by McGeough based on tablets from Ugarit, that access to these goods was mainly or only available through élite mediators.[66]

SPATIAL DISTRIBUTION

Discussing first the spatial distribution of the Area 6W sherds excavated in 2014, we can initially note a clear preference of closed shapes, and that all sherds cluster in outdoor areas; the few sherds found inside buildings come from loci above the building itself (in T16B), and therefore belong to later events. The sherds are clearly concentrated in the open spaces of T12A and especially T12B. The fact that most of the sherds are here found in open spaces attest to the low stratigraphic reliability of these sherds; the broken ceramic material was most likely used in various fill layers to create walking surfaces, a suggestion supported by the large amount of WPWM ware also recorded here. However, the concentration of closed vessels and F2/F3 types indicate that the fill itself may originally have come from a limited area where the focus was not on eating and drinking, but rather on storage and perhaps trade of the precious commodities held by small containers.

For Trenches 14B, 14C and 19B (*Fig. 39*), we have a more homogenous distribution of open and closed shapes, with two main areas of concentration; west of Wall 55 in T14B and west of Wall 62 in T19B. The area west of Wall 55 is probably an outdoor/covered outdoor working area with a pebble surface, and the sherds here appear to come from a fill, presenting a situation parallel to that in the outdoor area of T12A–B. We can again note the prevalence of closed shapes/F2 shapes. The area west of Wall 62 is instead an indoor area with a sequence of white calcareous floors, and a more even distribution of the types of pottery. The sherds here are more likely to have a higher level of stratigraphic reliability, and do not appear to constitute part of a fill in the same manner as the other areas. The difference in distribution in these two areas may in fact reflect the different nature and function of the two spaces.

The distribution of the sherds from 2013 is less revealing, but we may note that in Stratum 1, all types cluster in the northern area, in trenches 12D and 12C, immediately south of the 2014 trenches 12A and 12B, where we saw a clear concentration. The interpretation of these as fill to create outdoor walking areas can also be applied here—the sherds that may have come from "inside" a building still belong to Stratum 1, but actually come from loci above the structures. In Stratum 2, we instead have a situation where it seems that the majority of the sherds come from indoors areas. This could in some cases indicate a more secure stratigraphic context, for example in Rooms 33 and 34 in the east of T10C. The sherds here come from tableware vessels, which may hint at the function of these rooms.

CYPRUS IN THE EASTERN MEDITERRANEAN

The presence of Mycenaean pottery at Hala Sultan Tekke confirms the already well-known fact that Cyprus had extensive contact with surrounding areas. From the "Aegean" pottery, we can further note that pottery was imported not just from the Greek Mycenaean influenced Mainland, but also from what has traditionally been considered "peripheral" areas of the Aegean, perhaps a south-east Aegean *koine*. In the data so far, we do not detect a preference for specific shapes or functions in relation to origin—there is a fairly equal distribution of shapes in the "Mycenaean" and "Aegean" categories—so it is not the case that specific shapes (or products) were selected from certain parts of the Aegean. However, there is a slight chronological distinction, where it appears that the "Aegean" pottery is more prominent in LH IIIC,[67] when the Mycenaean decreases (*Fig. 37*). This supports the suggestion that Mycenaean pottery was beginning to be restricted due to a limitation of Mycenaean commerce to the east, and other venues were sought to replace the goods acquired. Similar conclusions have been reached for Syria and the Levant, where imported Aegean and Mycenaean vessels increasingly appear to be replaced by local production imitation the Aegean style in LH IIIC—as well as by Cypriote manufacture imitating the Aegean style.[68] It could then be the case that the Cypriote import of Aegean pottery and the local Cypriote production intensified not only to fulfil demand on Cyprus itself, but also in order to export to the east.[69]

in funerary contexts, while small containers (equal to our F2 category) were also used by the "middle class". Our current dataset from Hala Sultan Tekke does not allow the same distinction, but it is possible that the addition of more material will shed light on this in the future.

[65] See also Aspiotis 2003, 13–18 for a discussion of Mycenaean pottery as a luxury item and the social and symbolic value given it by élite usage and transformation of objects (at Ugarit, but equally valid for Cyprus).

[66] McGeough 2007, 360–261.

[67] In her study of the LH IIIC Middle period in the Aegean, Marina Thomatos reached the conclusion that although the palaces had collapsed, there were still ruling centres, albeit not as strong—and other regions, such as the south-east Aegean with Rhodes, experiencing a floruit during this period. See Thomatos 2006, 252–260.

[68] See Lehmann 2013, throughout, but esp. 315–316.

[69] Incidentally, there is evidence of Cypriote merchants/craftsmen residing at Ugarit, not only from the material found there, but also in the textual records. See McGeough 2007, 362–363.

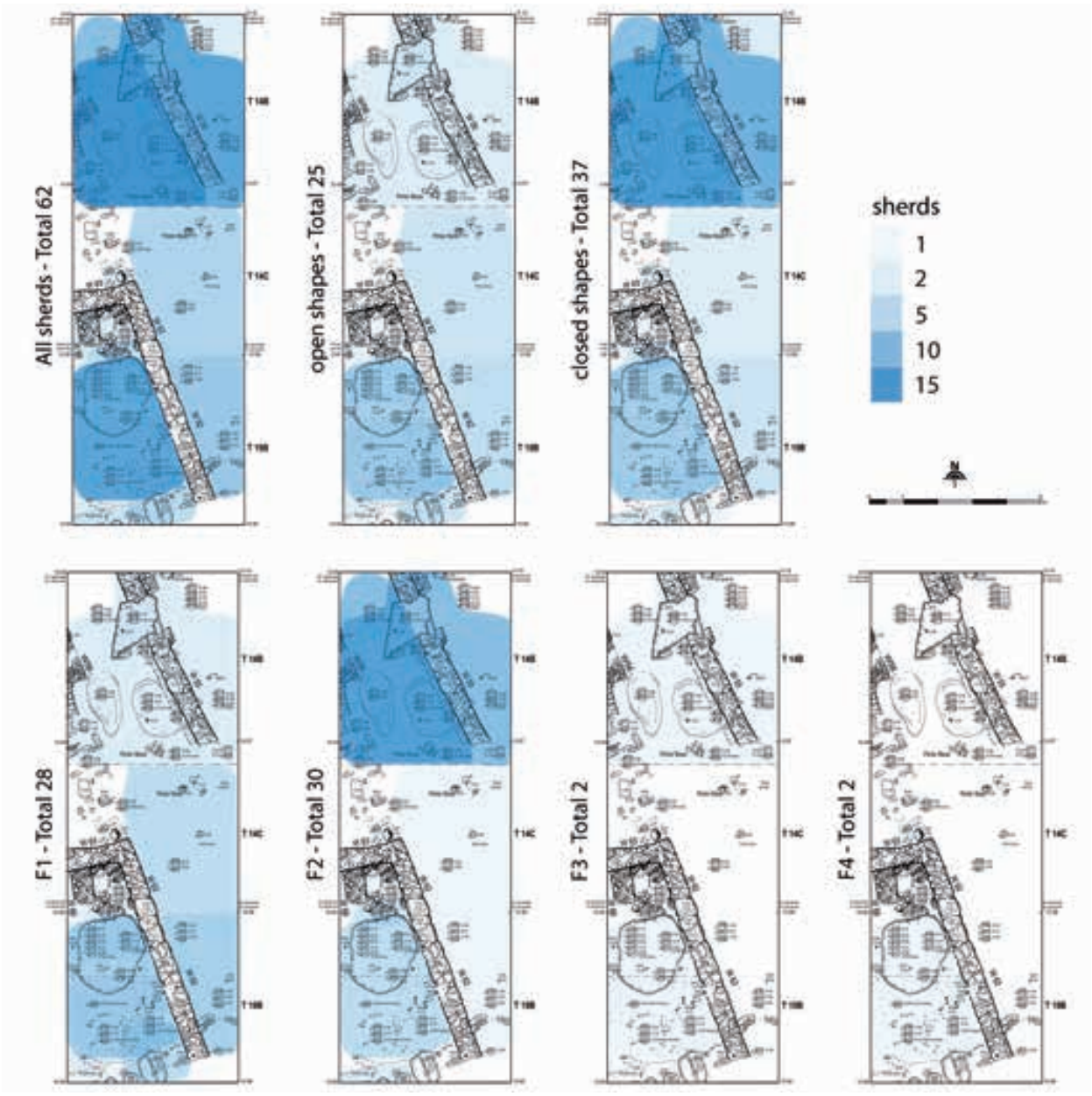

Fig. 39. Spatial concentration of Mycenaean and Aegean pottery, HST14 Trenches 14B, 14C, 19B. All sherds, open-closed shapes and functional distribution. A detailed plan of the trenches is in Fig. 16a.

CONCLUSIONS

The "Mycenaean" pottery from Hala Sultan Tekke from the 2013 and 2014 seasons mainly consists of shapes of various types of tableware and small containers. Larger storage vessels and ritual/industrial vessels are less common. From a technological point of view, the pottery can be divided into "Mycenaean", which probably originates from the Greek Mainland, and "Aegean", whose origin we cannot in most cases pinpoint more specifically, but at least some appears to come from south-east Aegean islands like Rhodes. No difference was detected in shape between these two categories, but there is a chronological indication that the Mycenaean pottery was more common in LH IIIA–B, while the Aegean pottery becomes more prominent in LH IIIC Early–Middle.

This overview can be placed in the general picture of eastern Mediterranean exchange, where Mycenaean and Aegean pottery does continue to be found, but Cypriote and local productions imitation the Aegean style of pottery is on the rise in LH IIIC.

Rhyta at Late Bronze Age Hala Sultan Tekke

BY L. RECHT & L. MAZZOTTA

INTRODUCTION

During the excavation seasons of 2013 and 2014, eight possible rhyta fragments were found at Hala Sultan Tekke.[70] Apart from no. 1, which possibly dates as early as LH IIA, the fragments all belong to Mycenaean conical rhyta of the LH IIIA–B period, and can be added to fragments from a further eight examples found in previous excavations at the site. Since Aegean-imported rhyta are relatively rare on Cyprus, these constitute a significant addition to the examples known to date. We here provide a catalogue with the examples from Hala Sultan Tekke, along with a brief discussion of their function and context within Cyprus and the eastern Mediterranean.

THE HALA SULTAN TEKKE FRAGMENTS

With the exception of three examples, the sherds all belong to Type III in Robert Koehl's classification system of rhyta.[71] Rhyta are vessels with one larger, "primary" opening, and a second, smaller opening, usually around 0.5 cm in diameter.[72] Type III rhyta are vessels that are footless (and consequently not able to stand upright on their own) and with a wide primary opening.

The Hala Sultan Tekke conical rhyta are characterized by their straight sides, relatively thick wall and often uneven, not burnished interior. The fragments are not large enough to determine if they belong to the straight conical or convex conical type, since convex conical rhyta do also have parts of the profile where they are straight. The three fragments that are not conical are nos. 10, 15 and 16.[73] No. 10 probably belongs to a piriform rhyton of Type II or III, footless with a narrow or wide primary opening. No. 15 is instead a jug-shaped rhyta, belonging to Type IV, footed with a wide primary opening; and no. 16 is a fragment from a so-called "fish" rhyton, Type II figural, footless with a narrow opening.

ARCHAEOLOGICAL CONTEXTS AND STATE OF PRESERVATION

The Hala Sultan Tekke rhyta presented here are all fragmentary; no complete vessels were found, and only in two cases do we have several fragments probably belonging to the same vessel (nos. 12 and 13). Their fragmentary state of preservation, and the type of context show that they are not found *in situ*, in the sense that they are not found as they had been used when they were complete vessels; the find contexts instead represent reuse of the vessels as sherds primarily in fill deposits. However, we *can* be fairly certain that the complete vessels were at some point in use at Hala Sultan Tekke, and this in itself is quite remarkable for Late Bronze Age Cyprus, because this vessel type is quite rare, and only at Enkomi do we find a similar concentration. What is especially significant about the Hala Sultan Tekke rhyta is that we have so many from settlement contexts, whereas to date, the majority come from tombs (*Fig. 40*).

RHYTA AT HALA SULTAN TEKKE—TYPES AND FUNCTIONS

Furumark and Mountjoy classify conical rhyta as closed vessels,[74] largely because they typically have an unfurnished interior. However, this is slightly deceptive in terms of function, because they are not closed in the sense that they are able to hold their content in the way a jug or jar can—nor in fact in the way common open shapes can. Their shape makes it unlikely that they were used for usual types of pouring, storage or drinking/eating. In order to hold their contents for a longer period of time, the secondary opening would have to have been plugged. From the Aegean, there is no evidence for such a practice, but there are small indications that local transformations of the function took place elsewhere: depictions of rhyta on Egyptian wall-paintings may in a few cases be understood to show a plug for the rhyton.[75] Rather than being a container for keeping its contents, the conical rhyton may have been used in small scale production as a kind of filter, for example as a tool for flavouring wine, as suggested by Koehl.[76]

Strainers for this purpose must have been made of a perishable material, as these are not found with rhyta in the Aegean.

[70] The fragments are presented in the catalogue at the end; numbers refer to this catalogue.
[71] Koehl 2006.
[72] See Koehl 2006, 5–7 for discussion and 9–12 for exceptions.
[73] The numbers refer to the catalogue.
[74] See Furumark 1941 and Mountjoy 1986, 1999 throughout.
[75] See e.g. Brack & Brack 1980, pl. 37b, Tomb of Horemheb.
[76] Koehl 1990, 356–357; 2006, 269. This idea is supported by the one conical rhyton subjected to chemical analysis from the Aegean; it appears to have contained wine and barley beer. See Tzedakis & Martlew 1999, 171, no. 164.

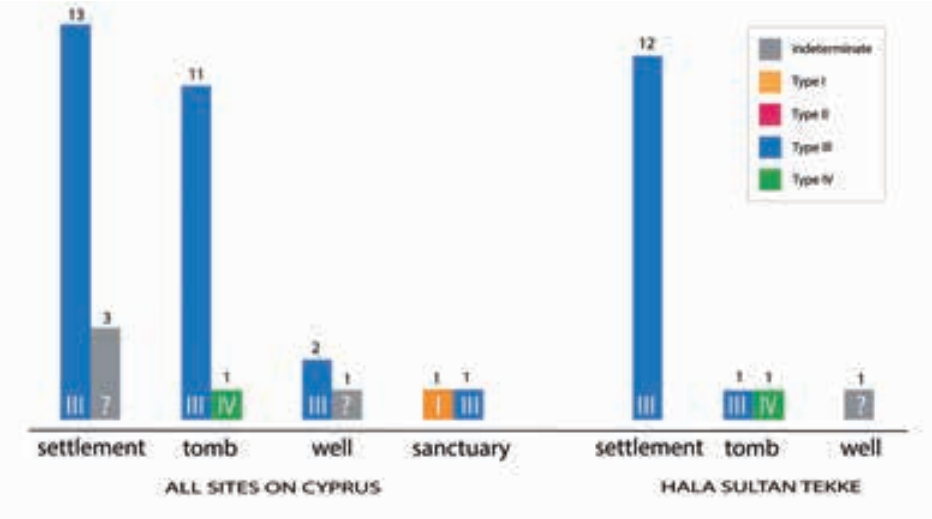

Fig. 40. Distribution of archaeological contexts of Aegean-imported rhyta on Cyprus.

However, as with the plug, there are hints of local adaptations of usage, because rhyta and strainers have been found placed together (at the Egyptian site of Tell el-Dab'a, conical rhyta made of local clay and with separate but fitting strainers[77]) or with strainer as part of the actual rhyta (at Ugarit, a Base Ring rhyton with plastic bovine head decoration[78]). Although strainer vessels have been found at Hala Sultan Tekke,[79] they are not as of yet associated with rhyta.

Due to the characteristics of this unique shape, it therefore seems that conical rhyta were not imported to Cyprus for the sake of their content, but must instead have been valued for their function and/or symbolic associations. Those symbolic association may relate both to the vessels as exotic prestige items and to their possible use in ritual contexts. If they were in fact used as filters in final-stage wine/beer production, that in itself would not constitute ritual action, but this production may have been part of a broader ritual which could have included feasting and the consumption of alcoholic beverages.

RHYTA IN CYPRUS AND THE EASTERN MEDITERRANEAN

While pottery imported from the Aegean is common at Late Bronze Cypriote sites, rhyta are rarely included in the assemblages—in fact, only Hala Sultan Tekke and Enkomi have substantial amounts (see *Fig. 41*). At these sites, there is a very clear preference for Type III rhyta, primarily of the conical and piriform types, but also a few head-shaped rhyta. When we turn our attention to the production of rhyta in local wares, the pattern is very different (see *Fig. 42*). Only three examples of Type III rhyta occur,[80] with the majority consisting of Type I figural rhyta. These are mostly bovine rhyta, footed with a narrow primary opening.[81] This variation in local and imported rhyta types supports the functional conclusion that the types were in fact used for different purposes. The Type I rhyta would have required a definite pouring action, for example suitable for libations.

Interestingly, more Type III Cypriot-produced rhyta have been found outside Cyprus than on the island itself; at nearby Ugarit and its harbour Minet el-Beida on the Levantine coast, five Cypriote piriform rhyta have been found. Although the total number of examples is quite low, this suggest local production deliberately aimed at export eastward, a case which is mirrored in the Mycenaean production of hedgehog rhyta.[82] Cyprus may have acted as an intermediary in the trade from Mycenae and the rest of the Aegean to the Levantine coast[83] (especially Ugarit), in some cases itself producing imitations of the Aegean shapes to fulfil demands.

[77] See Hein 1994, 244–245, nos. 310 and 314.
[78] See Schaeffer 1936, 110, fig. 4; Yon 1980, pl. 13.3.
[79] Usually belonging to spouts of locally made closed vessels, rather than the open type from Egypt, see e.g. Åström 1989, 73–74, fig. 136f; Åström *et al.* 1983, 110, fig. 322c; Hult 1981, 31, fig. 80a.
[80] One piriform with an internal cone from Enkomi, Koehl 2006, no. C3; one unique ivory conical from Atheniou, Dothan & Ben-Tor 1972, 208; Koehl 2006, no. C9; and one conical decorated faience from Kition, Koehl 2006, no. C10. See also references for *Fig. 3*. All these are unusual types of rhyta even in Aegean contexts due to their special features, material and/or decoration.
[81] The majority are found at Enkomi, see British Museum Terracottas A6, A25-A29, A31 and A54; also Dikaios 1969, 101, pl. 131.32.
[82] See Recht 2014.
[83] For further discussions on this topic, see e.g. Graziadio 1997, 687–691; Knapp & Cherry 1994, 30–32, 131–132; Whittaker 1992; Cline 1994, 37, 61, 63; Gilmour 1992, 115, 118. For post-firing Cypro-Minoan potmarks on Mycenaean pottery found in the Levant as evidence of Cypriote intermediary trade, see Hirschfeld 1992, 315–319 and 1993, 311, 318. For Cypriot-Levantine relations, see also Knapp 1996.

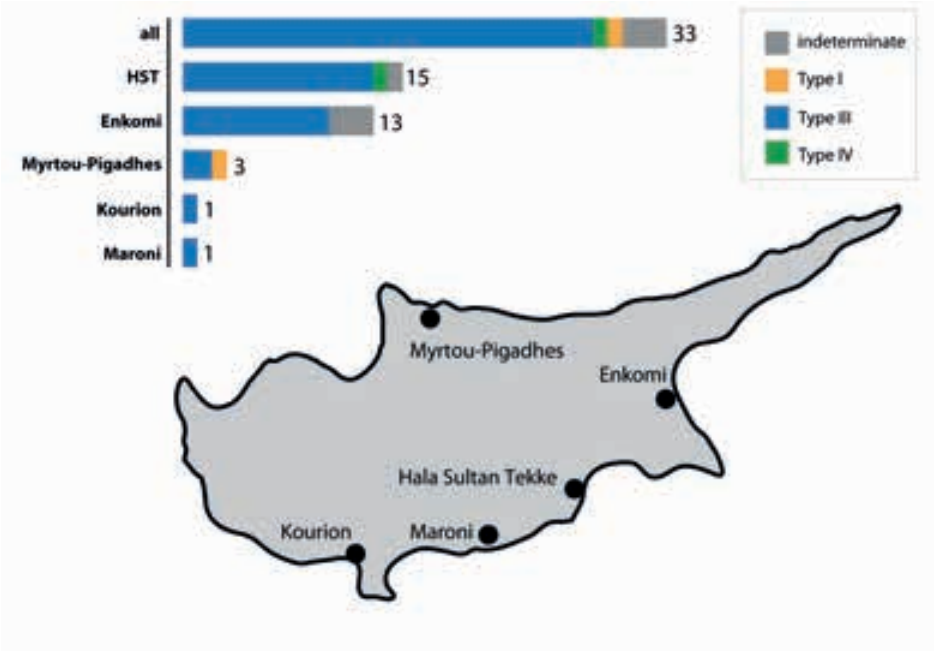

Fig. 41. Late Bronze Age sites on Cyprus with Aegean rhyta and their distribution. Data for Figs. 40–41 *comes from: Åström 1989, figs. 143, 147; Åström* et al. *1983, figs. 56h, 330h; British Museum Vases C601, C603-C607; Courtois 1981, figs. 150.3, 159 (284 and 108); Dikaios 1969, pls. 67.7, 69.20, 110.2–3, 131.32a, 131.37, 164.2–3, 210.47–48; Karageorghis 1963, pl. 33.1; Koehl 2006, nos. 61, 357, 358, 359, 400, 403, 588, 591, 600, 607, 615, 697, 704, 1149; Megaw 1952, fig. 2; Murray* et al. *1900, figs. 6(983), 67 (1077), 68 (1091), 75 (1114), 124 (28); Öbrink 1979, figs. 150h, 159a; 180a–e; Schaeffer 1932, pl IV.1, IV.3; Schaeffer 1936, fig. 4. Smith 1925, pl. 11.2; Taylor 1957, fig. 20 (187); Vermeule & Karageorghis 1982, V.125 and V.132; Yon 1980, pls. 13–14.*

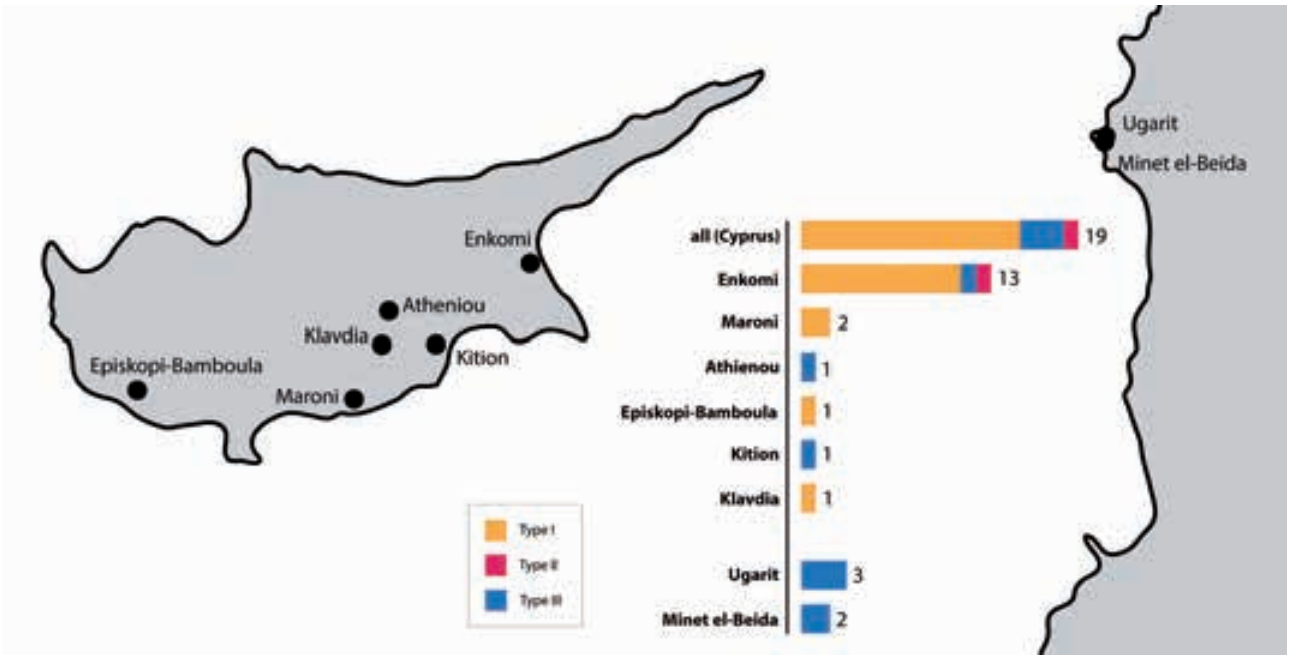

Fig. 42. Distribution of Late Bronze Age Cypriot-produced rhyta. Data used comes from: British Museum Vase C705, Terracottas A6, A25–A29, A31, A41, A54; Dikaios 1969, pls. 131.32, 136, 137.20, 137.21; Dothan & Ben-Tor 1972, 208; Koehl 2006, nos. C1, C2, C3–C9, C10; Malmgren 2003, pl. 12b; Murray et al. *1900, figs. 62 (1240), 71 (958), 74 (1176), 109 (94); Smith 1925, pls. 5.23, 5.25.*

CONCLUSION

The small but significant number of Aegean-imported rhyta found in excavations at Hala Sultan Tekke constitute an important addition to the few examples already known from controlled excavations. What is more, many come from settlement contexts, which is unusual for this shape. Conical/Type III rhyta predominate, indicating a use related to liquid, in particular last-stage production of wine or beer, perhaps corresponding to events which also involve the many Aegean and Mycenaean vessels related to drinking and eating. A similar pattern at a much more extensive scale can be seen in the Levant in Ugarit, where the textual evidence shows strong and systematic economic relations with Cyprus.[84] In Ugarit/Minet-el-Beida, Aegean conical rhyta are abundant and not only attested in ritual and funerary contexts,[85] but also in different settlement contexts from many areas of the site,[86] both belonging to "middle class" and to wealthier households, and often associated with Mycenaean and Cypriote mixing and drinking sets.

Mycenaean rhyta in Ugarit seem to have had both practical and a social functions; they are vessels not only associated with ritual activities, but also the production and consumption of beverages. Further, having a symbolic value as exotic objects, they were means of signalling membership of élite households directly engaged in international trade or of emulating wealth and status by indicating at least an indirect participation in the same international connections. In light of the archaeological evidence, these social considerations can also be considered relevant to Cyprus and Hala Sultan Tekke in particular, underlining the role of Cyprus in the export of the "Aegean-style" rhyta to the Levantine Area. Finally, the types of rhyta imported to Cyprus are distinctly different from the locally made examples, suggesting a clear differentiation in function and a closer association to ritual of the local ones.

CATALOGUE OF RHYTA (*FIG. 43*)

FS and FM refer to shapes and motifs used by Furumark 1941 and Mountjoy 1986, 1999; Koehl Types refers to shapes used by Koehl 2006.

No. 1. Body sherd of conical rhyton (HST13T10AL311-1), *Fig. 43:a*.
Max H. as preserved 5.6 cm; Th. of wall 0.9–1.2 cm.
Description: Pink clay with pinkish buff slip, red-dark brown. paint. Spiral/floral decoration. Uneven interior.
Type: FS 199. Koehl Type III conical rhyton, probably convex.
Date: LH IIA/LH IIIA2.
Context: Area 6W, Trench 10A, Locus 311, Stratum 2/3, deep test trench, settlement.

No. 2. Body sherd of conical rhyton (HST13T10CL295), *Fig. 43:b*.
Max H. as preserved 3.7 cm; Th. of wall 1.0 cm.
Description: Pink clay, buff slip with bands of red.
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2–B.
Context: Area 6W, Trench 10C, Locus 295, first layer below colluvial soil, settlement.

No. 3. Body sherd of conical rhyton (HST13T10DL313), *Fig. 43:c*.
Max H. as preserved 4.6 cm; Th. of wall 1.5 cm.
Description: Pink to buff clay, buff slip with bands of red.
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2–B.
Context: Area 6W, Trench 10D, Locus 313, Room 35, Stratum 2, settlement.

No. 4. Body sherd of conical rhyton (HST13T12CL380-2), *Fig. 43:d*.
Max H. as preserved 6.7 cm; Th. of wall 1.3–1.5 cm.
Description: Buff clay with buff slip. Decoration in bands of dark brown and horizontal and vertical lines of light brown.
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIB1.
Context: Area 6W, Trench 12C, Locus 380, Stratum 1, settlement.

No. 5. Body sherd of conical rhyton (HST13T12CL380), *Fig. 43:e.*
Max H. as preserved 4.9 cm; Th. of wall 1.1–1.3 cm.
Description: Pink clay with buff slip and monochrome red paint on exterior as preserved.
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2–B.
Context: Area 6W, Trench 12C, Locus 380, Stratum 1, settlement.

No. 6. Body sherd of conical rhyton (HST14AreaATAL25), *Fig. 43:f*.
Max H. as preserved 5.4 cm; Th. of wall 1.2–1.4 cm.
Description: Pink-buff clay (with grey in section), buff slip and dark brown monochrome on exterior as preserved. Uneven interior.
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2–B.
Context: Area A, Tomb A, Locus 25, funerary?

[84] McGeough 2007, esp. 329–331 and Knapp 2006.
[85] See e.g. Yon 1987 for Temple aux Rhytons and Schaeffer 1949, 152, fig. 58.8; Courtois & Courtois 1978, 308 no. 15 for tombs.
[86] See e.g. Schaeffer 1949, 218, fig. 91.4, 224, fig. 94; Courtois & Courtois 1978, 308 no. 18.

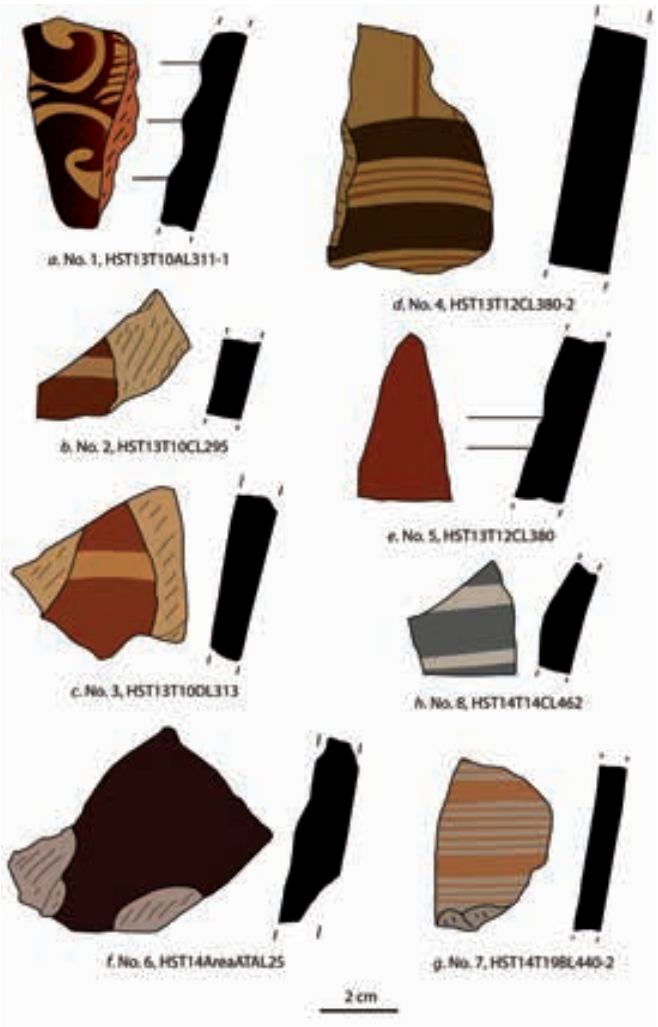

Fig. 43. Hala Sultan Tekke rhyta fragments found during 2013 and 2014 seasons. All drawings of ceramic materials are by Architect-Surveyor Muwafaq Al-Bataineh and we wish to thank him for his support. Graphic modifications of drawings are by the authors. Colours are approximate.

No. 7. Body sherd of conical rhyton (HST14T19BL440-2), *Fig. 43:g*.
Max H. as preserved 4.5 cm; Th. of wall 0.7–0.8 cm.
Description: Pink clay with buff slip and linear red decoration.
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2–B1.
Context: Trench 19B, Locus 440, settlement.

No. 8. Body sherd of conical rhyton (HST14T14CL462), *Fig. 43:h*.
Max H. as preserved 3.0 cm; Th. of wall 1–1.1 cm.
Description: Buff clay with buff slip and black linear decoration.
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2–B.
Context: Trench 14C, Locus 462, deep test trench, settlement.

No. 9. Body sherd of conical rhyton
Th. of wall 0.9 cm.
Description: "decorated with octopus head in orange-red paint with superimposed dots in white paint". FM 21:14.
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2.
Context: Area 6, FS 2122, settlement.
Bibliography: Åström *et al*. 1983, 110, fig. 330h.

No. 10. Body sherd, possibly from piriform rhyton
Th. of wall 0.4 cm.
Description: "Pinkish clay and slip, red decoration: four vertical wavy lines preserved". FM 53:33.
Type: FS 200?. Koehl Type II or III piriform rhyton?
Date: LH IIIA2?
Context: F1, Well.
Bibliography: Åström *et al*. 1983, 21, fig. 56h, 133.

No. 11. Body sherd from lower body, possibly conical rhyton
Description: "buff clay, lustrous buff slip, red decoration: slightly curved vertical bands, possibly part of a grass or reed pattern". FM 16:2.
Type: FS 199?. Koehl Type III conical rhyton, indeterminate?
Context: Area 22, F6119, Room 6, layer 2, settlement.
Bibliography: Öbrink 1979, 28, fig. 150h.

No. 12. Six body and rim sherds of conical rhyton
D. of rim 12 cm.
Description: "pinkish clay with buff core, pinkish buff slip, red decoration: band on rim, horizontal bands and lines alternating on body; (b) plain rim with two horizontal grooves below rim outside and (a, c–e) body sherds, one with two horizontal grooves (joining sherd in F6265 below) and one with carination" (F6216); "fragment of rhyton with two horizontal grooves framed by bands and lines" (F6265).
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2–B.
Context: Area 22, F6216 and F6265, Pit III inside Room 10, settlement.
Bibliography: Öbrink 1979, 40, fig. 180a–e (F6216), fig. 159a (F6265).

No. 13. Two body sherds of conical rhyton
D. 5–9 cm; Th. of wall 0.7–0.9 cm.
Description: "Two body sherds, most probably from the same rhyton made of very hard, buff to pinkish-yellow clay and yellow slip, painted decoration in lustrous black to dark brown (partly worn off), consisting of broad, encircling bands with thin lines in between".
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2–B1.
Context: Area 22, Square 1, F6517, possibly a hearth/contents of hearth, Layer 2, settlement but suggested that some of the material in this square comes from tombs.
Bibliography: Åström 1989, 78, fig. 143.

No. 14. Body sherd of conical rhyton
D. 8 cm (as preserved); Th. of wall 0.7–0.9 cm.
Description: "Part of body of conical rhyton, decorated with a scale pattern with two or three concentric circles within the scales, trace of an encircling horizontal band: yellowish-buff, very fine clay, dark brown painted decoration".
Type: FS 199. Koehl Type III conical rhyton, indeterminate.
Date: LH IIIA2.
Context: Area 22, Square 1, F6521, Layer 3, havara layer, settlement.
Bibliography: Åström 1989, 79–80, fig. 147.

No. 15. Fragment of jar rhyton
Max H. as preserved 8.7 cm; W 6.2 cm.
Description: "Fragment of shoulder with part of hollow ring. Wall of shoulder pierced into ring interior; diameter of perforation 0.8 cm. Very pale brown clay; very pale brown slip; reddish brown paint. On ring: antithetic quadrupeds, possibly goats; bordered quirks; lozenge filling (FM 73); unidentifiable floral design on lower sides".
Type: FS 203. Koehl Type IV jug rhyton.
Date: LH IIIB1.
Context: Tomb 9.
Bibliography: Koehl 2006, 215, no. 1149. Cf. Koehl 2006, no. 1147.

No. 16. Body sherd, possibly from figural fish rhyton
Th. of wall 0.3 cm.
Description: "Part of body of a relief decorated so-called fish rhyton: a horizontal, red-painted eye consisting of the oval pupil in relief (0.6 high), surrounded by two concentric ovals framing short vertical lines, above or below the eye are short vertical strokes".
Type: Koehl Type II figural: fish.
Date: LH IIIA2–B1.
Context: Area 22, Square 1, F6510, Layer 2, settlement.
Bibliography: Åström 1989, 76, fig. 158. Cf. Koehl 2006, no. 339–341; Schaeffer 1949, 222, fig. 93.4, from Ugarit.

Appendix 3: Plaques from Pit B

BY A. LINDQVIST

Introduction

Pit B contained several complete vessels and a set of finds of 369 fragments of small (*c.* 0.5–5 cm), thin plaques of unknown material (*Fig. 44*). All of these were found in the south-eastern edge of Pit B at a depth of roughly 3 m. They were all found concentrated together, some in a vertical position in rows, three-four plaques deep. The aim of this contribution is to shed light on the nature and function of these plaques.

General shapes

Due to the fragile nature of the plaques, the degree of fragmentation is very high. Only a few are believed to be close to their original size. This also means that many of the smaller fragments probably belong to one single plaque, making the total count considerably lower than 369. The majority of the fragments were found during the sifting of the soil. No other finds were made in direct contact with the plaques, but the deposit of Pit B contained several complete or largely complete Mycenaean and Cypriote vessels both above and below the level of the plaques, and one loom weight above (N1-13, see main report).

Two of the fragments are diamond-shaped and seem to be close to their original size: 3 cm wide and 4.2 and 5 cm high. Two different shapes could be noted. The first and most common is the diamond shape. The second is also possibly diamond-shaped, but with a less acute general angle and a small point at the end (*Fig. 44:1–4*).

Several of the larger plaques, and some of the smaller fragments, show small, man-made perforations, indicating that they may have been attached to another material. These perforations appear in sets of one to three, of varying orientation and shape. While some are close to each other, others are not.[87] Several different perforation shapes can be noted despite the effect of corrosion: round (*Fig. 44:5*), possibly triangular (*Fig. 44:4*), square (*Fig. 44:6*) and irregular (due to corrosion?; *Fig. 44:2*). The size also varies between 0.78 mm and 2.98 mm, with an average of approximately 1.72 mm.

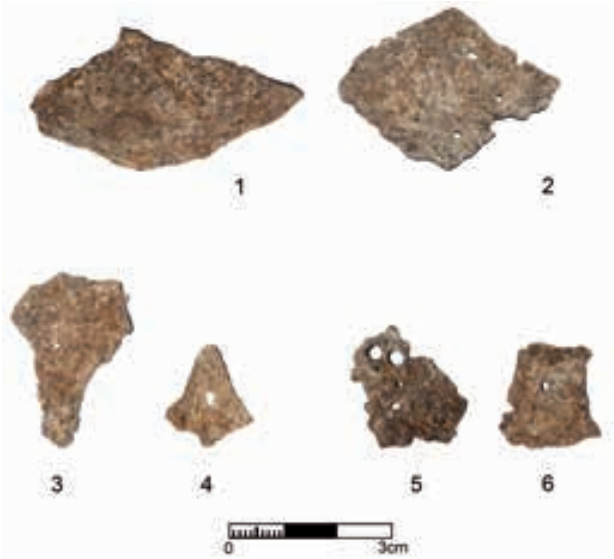

Fig. 44. Plaques from Pit B (photograph by A. Lindqvist).

Material

An XRF analysis was conducted on some of the thicker plaques, in order to identify the material of which they are made. The poor state of the material unfortunately meant that the analysis was not conclusive: the main metal component was iron, which made up around 10–15%, while silicon accounted for more than 50%. The plaques may represent very corroded iron.

Parallels

Throughout the Mediterranean settlements from the Late Bronze Age and Early Iron Age, various thin plaques of metal have been found. These have in many cases been attributed to a type of defensive equipment, a scale mail. The armour consisted of a large number of metal scales, measuring from *c.* 5 × 2.5 cm up to 11.8 × 6.3 cm, which had been stitched, or attached, to an undergarment. Karageorghis and Masson[88] note that the size of the scale determined its use. Smaller scales were used for areas that needed more flexibility, such as the neck and arms, while larger pieces were used to cover broad areas, like the chest and back. The scales were mostly made from bronze and, less commonly, from iron.[89] They are usually

[87] Regarding the discussion of the perforations, a selection has been made to sort out any perforations that are not believed to be of anthropic origin.

[88] Karageorghis & Masson 1975, 220.

[89] Maran 2004, 20–22 and Karageorghis & Masson 1975, 222.

of a rectangular shape on the top and show various shapes at the bottom, such as pointed, rounded and rectangular.[90] They also had several perforations, usually in very distinct patterns, which were used to fit all the scales together.[91]

Discussion

It is possible that our plaques belonged to a piece of armour, in the sense that they seem to be of the same size and form (*c.* 5 cm long and 3–4 cm wide). The two holes in *Fig. 44:5*, especially, are similar to the bronze armour scales from Gastria-Alaas that Karageorghis and Masson present in their study.[92] These scales were found during the excavations of the tombs at Gastria-Alaas and were dated to the 11th century BC.[93] Exactly the same type of scale was found in Enkomi.[94] The various perforations, especially regarding size, can possibly be attributed to different manufacturing techniques.[95] There are, however, some arguments against the scale armour. The first one is the shape. During the Late Bronze Age, a variety of shapes were used for production of scale armour, but none of these shapes matches these diamond plaques. The second is the material. Most armour scales are produced from bronze during this period. It is unlikely that anything but iron was the original main component of our plaques. It could have corroded over the years and been replaced by other components from the surrounding soil, such as silicon, which occur in rather high amounts according to our analysis.[96] There are examples of iron armour scales in the Eastern Mediterranean,[97] but they seem to be much more unusual and dated to the Iron Age. The third is the number of fragments: 369 fragments are not enough to manufacture a scale armour, even if all were complete. A full armour would require at least 680, and up to 3300, scales.[98] In that sense, these plaques cannot have been a complete armour. Instead they could have belonged to a smaller item, such as a decorative feature, or only a part of an armour has been deposited. Maran discusses the use of armour scales as *pars pro toto* dedications during the Late Bronze Age, and notes that often only a singular scale, or a very low number of scales, is found in various deposits.[99] Given the nature of the current deposit, where several complete or largely complete vessels were found without accompanying human remains, it is perhaps plausible that this item represents a votive gift, possibly fitting into the pattern of Maran's study. The total amount of excavated armour scales is, relatively speaking, low. Only about 500 scales have been found in the entire Mediterranean area.[100] This number is even lower for Cyprus and the Aegean, where only about ten have been found (among others, two in Enkomi, three in Gastria-Alaas, one in Mycenae and one at Pyla-Kokkinokremos).[101] According to Karageorghis and Masson, all of the Cypriote scales can be attributed to a Middle Eastern origin.[102] Despite several factors which are against the armour scales hypothesis, this is currently our most plausible interpretation of the plaques. As for the placement, a votive deposition seems to be likely according to the nature of the other finds in Pit B.

[90] Hulit 2002, fig. 1, 17, 26, 27, 28 and 30; Karageorghis & Masson 1975, 220.
[91] Hulit 2002, 83.
[92] Karageorghis & Masson 1975, 210, fig. 1a–c.
[93] Karageorghis & Masson 1975, 210.
[94] Karageorghis & Masson 1975, 211.
[95] See Rostoker & Gebhard 1980, 93–94; Rostoker 1986, 358 for suggestions at perforating thin sheets of metal.
[96] Neff *et al.* 2005, 526–527. See also for further notes on iron corrosion and intrusion of other materials.
[97] Maran 2004, 22.
[98] If one uses Hulit's table as an estimate of how many scales would be needed. Hulit 2002, table 1.
[99] Maran 2004, 24.
[100] Hulit 2002, fig. 81.
[101] Hulit 2002, fig. 81; Maran 2004, 21.
[102] Karageorghis & Masson 1975, 210.

Appendix 4: Preliminary archaeobotanical analysis

BY D. KOFEL

Introduction

Archaeobotany is a powerful tool for the study of the living conditions of ancient societies. The present study gives a brief overview and preliminary interpretation of the archaeobotanical material from the excavations at Hala Sultan Tekke in 2014.

Material and method

In total, 29 soil samples were collected from three areas. From Area 6, eight samples were taken from the baulk between Trenches 5A and B, which were excavated in 2011. From Area 6W come 19 samples from the entire area of excavation. Two samples are from Area A.

A manual bucket flotation system was used. Each soil sample was dispersed in water and then gently stirred to release the botanical remains. The watery solution from the upper part of the bucket was then poured through several sieves (0.5 mm and 0.25 mm mesh size). The next step was to pour fresh water onto the soil remains at the bottom of the bucket and the operation was repeated until no more soil was left. Sieves retained both the heavy and the light residues after silts and other particles smaller than 0.25 mm were rinsed through. Residues were dried and the heavy elements were separated from the light ones. Next they were sorted by using a low-powered stereo/binocular microscope at 1.5–4× magnification. The macroscopic remains were picked and identified on the basis of shape, surface and size. In order to make an accurate determination, identification keys and atlases were used as well as reference collection and communication with a botanical expert.[103] Only twenty soil samples offered material for archaeobotanical analysis. All the material except for one sample (Sample 5, Pit B, L5) was charred: this sample was mineralized. The plant remains for each area can be studied in *Table 4*. The plants that dominate in our material will be discussed below.

[103] Many thanks to Dr Renata Stachowicz-Rybka, W. Szafer Institute of Botany, Polish Academy of Science, Kraków .

Plant remains

Cerealia belong to the grass (Poacaea) family. The first cultivated species in the Eastern Mediterranean were wheat and barley. Other crops such as broomcorn millet and common oat are recorded in the Mediterranean area in the Bronze Age, although only rather rarely.[104] In the sample assemblage from 2014 it has not been possible to identify the genus of the cereals because of the state of preservation (badly charred and damaged). Only in one example was it possible to determine genus, and in none the species.

The incomplete cf. *Hordeum* sp. (barley) grain was derived from Sample 2 (T12A, L407). Even though it is often considered a component of poor people's bread, barley can withstand drier conditions and poorer soils than wheat. It is also the main component in beer fermentation.[105]

LINUM USITATISSIMUM

Flax was a principal oil and fibre source in the Old World.[106] The linseed is a source of edible and lighting oil while textile fibres can be obtained from the plant stems. In the assemblage of Pit B in Area A (L5), within the yellowish-orange layer of ochre and limestone, one incomplete mineralized flax capsule was identified (*Fig. 45*).

Fig. 45. Flax capsule: from Pit B (left) and a recent analogue (right; photograph by D. Kofel).

[104] Zohary *et al.* 2012, 20.
[105] Zohary *et al.* 2012, 52.
[106] Zohary *et al.* 2012, 101.

Table 4. List of plants identified in HST 14 samples. Con. = recent contamination.

	AREA																			
	6		*6 West*																*A*	
Trench	*5B*	*5B*	*12A*	*12B*		*12A*	*12B*	*16A*	*18A*	*16A*		*19B*	*14C*	*16A/B*				*Pit B*	*Pit B*
Locus	*107*	*162*	*407*	*394*		*431*	*412*	*438*	*395*	*445*		*444*	*440*	*462*	*423*				*5*	*11*
Height	11.40–11.30	11.00 – 10.76	12.82	12.90	12.86	12.60	12.60	12.78	–	12.73	12.73	12.65	12.68	–	12.57	12.68	12.65	12.62	–	–
Sample no.			2	3	4	6	7	9	10	11	12	13	16	17	18	19	20	21	8	15
Cereal grains																				
Cerealia, indet.			1	2	2	2	3		3	1								5	1	
cf. *Hordeum* sp.			1																	
Oilseeds																				
Linum usitatissimum (capsule fragm.)																			1	
Olea europaea (stone fragm.)		7	5	1	3	3		8	1	19		11	1	2	4	22		28		
Olea europaea (stone)								1		2					4	2	3	3		
Other cultivated plants																				
Vitis vinifera (seeds)	1 (con.)	1	13		1	1				2						1		1		
Vitis vinifera (fragm.)			41	2	27	5	11				1							3		
Legumes																				
Fabaceae, indet.									1						1					
Grasses, weeds and herbs																				
cf. *Lithospermum* sp. (seed)								1												
Plantago sp. (seed)																				1 (con.)
Apiacea, indet.												1								
Poaceae, indet.												1								

OLEA EUROPAEA

The olive is considered one of the most important fruits of the Old World. The oil that is produced from olives has been used in gastronomy, as lighting and as a skin conditioner. It has always been a valuable article of trade and exchange.[107] It should be highlighted that almost all of the samples contained at least one fragment of olive stone (two samples in *Fig. 46*).

VITIS VINIFERA

Grapes and easily storable dried raisins were used as a sugar-rich fruit and for wine fermentation. Their importance for trade is well-known. Grapes are common remains in our samples (*Fig. 47*).

Fig. 47. Grape seeds from Sample 2 (photograph by D. Kofel).

Fig. 46. Complete and fragmented olive stones from Samples 13 and 18 (photograph by D. Kofel).

Interpretations

In general, there are several indicators which suggest olive oil and winemaking on a larger scale:[108] archaeobotanical remains should be of significant number, and an installation for production and storage facilities should be present. The latter are most commonly large vessels, pithoi. Indicators for small/household-scale production are, in addition to the relevant archaeobotanical remains, tools such as pestles and grinding stones and minor storage containers, for instance, jars, jugs and cooking pots.

Small-scale production of olive oil seems to have been carried out in the domestic compound of Stratum 1 in Trenches 16A and B. The olive oil might have been produced at household level by using small tools such as a pestle on grinding stones.[109] Two pestles (N247 and N243) and a grinding stone were recorded in L464 and L438, both of which produced olive stones. According to experimental studies broken olive stones are suggested to be indicative of olive oil extraction.[110] However, the shape of the edges of the broken stones is important. If the edges are plumed the fracture occurred in the past. If they are sharp it is a result of post-depositional activities. In the analysed material both sharp and plumed edges were noticed. Considering all the available evidence it seems that olive oil production occurred at the household level in Trenches 16A and B.

Remains of olives and grapes in hearths may point to direct consumption (spitting them into the fire) or indicate that they were collected from another place where production was carried out and then used as fuel.[111] Unfortunately the amount of material is too modest to estimate whether other activities, for instance, wine fermentation, were undertaken in this specific area.

The find of flax (*Linum usitatissimum*) might be considered a contamination. There are two main reasons to em-

[107] Zohary *et al.* 2012, 116.
[108] Margaritis & Jones 2006, 2007; Margaritis 2013.
[109] Margaritis 2013.
[110] Margaritis & Jones 2007, 383.
[111] Margaritis 2013, 751.

brace this hypothesis. Firstly, it derived from a context that is thought to be mainly a backfill, i.e. a secondary context. Secondly, referring to earlier archaeobotanical research it seems that flax was not common at the Hala Sultan Tekke site in the Bronze Age: it was found neither as botanical remains[112] nor as impressions in clay.[113] Due to lack of information about the quantity of the samples it could be suggested that the samples were too small and flax was missed.[114] To conclude, the flax from area A is a contamination that was found in Pit B due to soil backfilling.

Interestingly from all of the samples derived there is barely any cereal material that could indicate bread or beer consumption on the site. Out of 21 badly charred and damaged crop grains only one could be interpreted as *Hordeum* sp. (barley). It is impossible to draw any conclusions based only on one (incomplete) seed. Similarly Hjelmqvist did not record any domesticated cereal grains except for those which were found as impressions in clay and which were mainly of barley.[115] An explanation for this situation could be in the localization of the sampled material. It is possible that the sampled area (Trenches 12A, 12B, 16A and 16B) was mainly devoted to olive oil production for household needs or other small-scale activities. The presence of many hearths brings to mind an area for guardians or a place of meeting after dusk. That would explain the grape pips found in the hearth of Trench 12A. They could be part of fuel including pieces of bones and wood—all from Sample 2. The crop processing would have to be undertaken in another part of the area. While of course it is possible that the consumption also took place around the hearth.

Conclusions

The majority of samples derive from T12A/B and T16A/B. This situation influences our understanding of the situation in the other trenches (T14B/C, T18A and T19B). It seems that the finds of olive stones together with pestles indicate olive oil production on the household level in T16A/B. The remains of grape seeds in hearths scattered all over T12A/B–16A/B suggest use of the by-products of fruit as fuel. In the tomb area the find of flax highlights the importance of fibre or/and oil production. In summary, this preliminary archaeobotanical analysis contributes to a better understanding of the living conditions of the people of Hala Sultan Tekke.

[112] Hjelmqvist 1979.
[113] Hjelmqvist 1976.
[114] This does not seem likely considering the accuracy of Hjelmqvist's work.
[115] Hjelmqvist 1979, 120.

Bibliography

Aspiotis, Y. 2003. *Consuming material ambiguity: The social and symbolic implications of Mycenaean pottery in Ugarit*, M.A. thesis, University of Glasgow.

Åström, P. 1989. *Hala Sultan Tekke* 9. *Trenches 1972–1987 with an index for volumes 1–9* (SIMA, 45:9), Göteborg.

Åström, P. & B. Svensson 2007. 'Stone anchors', in *Hala Sultan Tekke* 12. *Tomb 24, stone anchors, faunal remains and pottery provenance* (SIMA, 45:12), eds. P. Åström & K. Nys, Göteborg, 31–49.

Åström, P., E. Åström, A. Hatziantoniou, K. Niklasson & U. Öbrink 1983. *Hala Sultan Tekke* 8. *Excavations 1971–79* (SIMA, 45:8), Göteborg.

Beck, P. 1961. 'Cylinder seals from the temple in Area H', in Y. Yadin, *Hazor* III–IV. *An account of the third and fourth seasons of excavations, 1957–1958*, Jerusalem, 310–321.

Benzi, M. 1992. *Rodi e la civiltà Micenea* (Incunabula Graeca, 94), Roma.

Brack, A. & A. Brack 1980. *Das Grab des Haremheb Theben Nr. 78*, Mainz.

Buchholz, H.-G. 1999. *Ugarit, Zypern und Ägäis: Kulturbeziehungen im zweiten Jahrtausend v. Chr.*, Münster.

Bürge, T. 2014. 'Appendix 4: A violin bow fibula from Hala Sultan Tekke 2013', in P.M. Fischer & T. Bürge, 'The New Swedish Cyprus Expedition 2013: Excavations at Hala Sultan Tekke. Preliminary results', *OpAthRom* 7, 95–96.

Cline, E.H. 1994. *Sailing the wine-dark sea: International trade and the Late Bronze Age Aegean* (BAR-IS, 591), Oxford.

Collon, D. 1987. *First impressions. Cylinder seals in the ancient Near East*, London.

Courtois, J.-C. 1981. *Alasia II. Les tombes d'Enkomi, le mobilier funéraire*, Paris.

Courtois, J.-C. & L. Courtois 1978. 'Corpus céramique de Ras Shamra-Ugarit, niveau historique: Deuxième partie', in *Ugaritica* VII, ed. F.-A.C. Schaeffer, Paris, 191–370.

Dikaios, P. 1969. *Enkomi. Excavations 1948–1958*, vol. 3, Mainz.

Dothan, T. & A. Ben-Tor 1972. 'Excavations at Athienou, Cyprus, 1971–2 (preliminary report)', *IEJ* 22:4, 201–208.

Ekman, J. 1973. *Early mediaeval Lund: The fauna and landscape: An osteological investigation of bone remains from the early mediaeval settlement* (Acta Archaeologica Lundensia, V), Lund.

Ekman, J. 1977. 'Animal bones from a Late Bronze Age settlement at Hala Sultan Tekke, Cyprus', in P. Åström *et al.*, *Hala Sultan Tekke* 3 (SIMA, 45:3), Göteborg, 166–174.

Fischer, P.M. 1980. 'Eine Untersuchung der Kiefernfragmente und Zähne aus zwei Gräbern von Trypes bei Dromolaxia, Cypern', *OpAth* 13, 139–148.

Fischer, P.M. 1986. *Prehistoric Cypriote skulls* (SIMA, 75), Göteborg.

Fischer, P.M. 2012. 'SIMA and the New Swedish Cyprus Expedition at Hala Sultan Tekke', in *Studies in Mediterranean archaeology: Fifty years on* (SIMA, 137), eds. J.M. Webb & D. Frankel, Göteborg, 73–80.

Fischer, P.M. & T. Bürge 2014. 'The New Swedish Cyprus Expedition 2013: Excavations at Hala Sultan Tekke. Preliminary results', *OpAthRom* 7, 61–106.

Fischer, P.M. & J.G. Norén 1988. 'Enamel defects in teeth from a prehistoric Cypriot population', *Ossa. International Journal of Skeletal Research* 13, 87–96.

Fischer, P.M. & A. Satraki 2014. 'Appendix 1: "Tomb" A from Hala Sultan Tekke 2013', in P.M. Fischer & T. Bürge, 'The New Swedish Cyprus Expedition 2013: Excavations at Hala Sultan Tekke. Preliminary results', *OpAthRom* 7, 86–88.

Furumark, A. 1941. *Mycenaean pottery: Analysis and classification*, Stockholm.

Gilmour, G. 1992. 'Mycenaean IIIA and IIIB pottery in the Levant and Cyprus', *RDAC* 1992, 113–128.

Graziadio, G. 1997. 'Le presenze cipriote in Italia nel quadro del commercio mediterraneo dei secoli XIV e XIII a.C.', *Studi classici e orientali* 46:2, 681–719.

Graziadio, G. & E. Pezzi 2013. 'Some considerations on the function of the Mycenaean pottery found in the Enkomi Tombs', *Pasiphae* 7, 67–76.

Hein, I. 1994. *Pharaonen und Fremde: Dynastien im Dunkel*, Wien & Cairo.

Hirschfeld, N. 1992. 'Cypriot marks on Mycenaean pottery', in *Mykenaïka* (BCH Suppl., 25), ed. J.-P. Olivier, Athens, 315–319.

Hirschfeld, N. 1993. 'Incised marks (post-firing) on Aegean wares', in *Wace and Blegen: Pottery as evidence for trade in the Aegean Bronze Age, 1939–1989*, eds. C. Zerner, P. Zerner & J. Winder, Amsterdam, 311–318.

Hjelmqvist, H. 1976. 'Grain impressions from Hala Sultan Tekke, Cyprus', in *Hala Sultan Tekke* 1. *Excavations 1897–1971* (SIMA, 45:1), eds. P. Åström, D.M. Bailey & V. Karageorghis, Göteborg, 120–122.

Hjelmqvist, H. 1979. 'Some economic plants and weeds from the Bronze Age of Cyprus', in *Hala Sultan Tekke* 5. *Excavations in Area 22, 1971–1973 and 1975–1978* (SIMA, 45:5), ed. U. Öbrink, Göteborg, 110–133.

Hulit, T.D. 2002. *Late Bronze Age scale armour in the Near East: An experimental investigation of materials, construction, and effectiveness, with a consideration of socio-economic implications*, Durham.

Hult, G. 1981. *Hala Sultan Tekke* 7. *Excavations in Area 8 in 1977* (SIMA, 45:7), Göteborg.

Jonsson, L. 1983. 'Animal and human bones from the Bronze Age settlement at Hala Sultan Tekke', in *Hala Sultan Tekke* 8 (SIMA, 45:8), eds. P. Åström, E. Åström, A. Hatziantoniou, K. Niklasson & U. Öbrink, Göteborg 1983, 222–246.

Karageorghis, V. 1963. *Cyprus: Cyprus Museum [Nicosia], Larnaca District Museum* (CVA Cyprus, I), Nicosia.

Karageorghis, V. 1976. 'Two Late Bronze Age Tombs from Hala Sultan Tekke', in *Hala Sultan Tekke* 1. *Excavations 1897–1971* (SIMA, 45:1), eds. P. Åström, D.M. Bailey & V. Karageorghis, Göteborg, 73–89.

Karageorghis, V. & Masson, E. 1975. 'A propos de la découverte d'écailles d'armure en bronze à Gastria – Alaas (Chypre)', *AA* 90, 209–222.

Kiely, T. 2011. *A catalogue of the ancient Cyprus collection at the British Museum*, https://www.britishmuseum.org/research/publications/online_research_catalogues/ancient_cyprus_british_museum.aspx

Knapp, A.B. 1996. *Sources for the history of Cyprus* vol. 2. *Near Eastern and Aegean texts from the third to the first millennia B.C.*, Altamont.

Knapp, A.B. & J.F. Cherry 1994. *Provenience studies and Bronze Age Cyprus: Production, exchange and politico-economic change* (Monographs in World Archaeology, 21), Madison.

Koehl, R. 1990. 'The rhyta from Akrotiri and some preliminary observations on their functions in selected contexts', in *Thera and the Aegean world* III:1, ed. D.A. Hardy, London, 350–362.

Koehl, R. 2006. *Aegean Bronze Age rhyta*, Philadelphia.

Lehmann, G. 2013. 'Aegean-style pottery in Syria and Lebanon during Iron Age I', in *The Philistines and other "Sea Peoples" in text and archaeology*, eds. A.E. Killebrew & G. Lehmann, Atlanta, Georgia, 265–328.

Leonard, A. 1994. *An index to the Late Bronze Age Aegean pottery from Syria-Palestine*, Jonsered.

Lorentz, K.O. 2009. 'Modifying the body: Headshaping in Cyprus', in *Medelhavsmuseet. Focus on the Mediterranean* 4, Värnamo, 21–27.

Malmgren, K. 2003. *Klavdhia-Tremithos: A Middle and Late Cypriote Bronze Age site*, Jonsered.

Manning, S.W., G.-M. Andreou, K.D. Fisher, P. Gerard-Little, C. Kearns, J.F. Leon, D.A. Sewell & T.M. Urban 2014. 'Becoming urban: Investigating the anatomy of the Maroni Late Bronze Age complex, Cyprus', *JMA* 27:1, 3–32.

Maran, J. 2004. 'The spreading of objects and ideas in the Late Bronze Age Eastern Mediterranean: Two case examples from the Argolid of the 13th and 12th Centuries B.C.', *BASOR* 336, 11–30.

Margaritis, E. 2013. 'Distinguishing exploitation, domestication, cultivation and production: The olive in the third millennium Aegean', *Antiquity* 87, 746–757.

Margaritis, E. & M. Jones 2006. 'Beyond cereals: Crop processing and Vitis vinifera L. Ethnography, experiment and charred grape remains from Hellenistic Greece', *JAS* 33, 784–805.

Margaritis, E. & M. Jones 2007. 'Crop processing of Olea europaea L.: An experimental approach for the interpretation of archaeobotanical olive remains', *Vegetation History and Archaeobotany* 17, 381–392.

Mazzotta, L. & A. Trecarichi 2014. 'Appendix 2: The Mycenaean-imported pottery from 2013', in P.M. Fischer & T. Bürge, 'The New Swedish Cyprus Expedition 2013: Excavations at Hala Sultan Tekke. Preliminary results', *OpAthRom* 7, 89–93.

McCaslin, D.E. 1978. 'The 1977 underwater report', in *Hala Sultan Tekke* 4 (SIMA, 45:4), Göteborg, 97–172.

McGeough, K.M. 2007. *Exchange relationships at Ugarit* (Ancient Near Eastern Studies Supplement, 26), Leuven, Paris & Dudley, Massachusetts.

Megaw, A.H.S. 1952. 'Archaeology in Cyprus, 1951', *JHS* 72, 113–117.

Moortgat, A. 1966[2]. *Vorderasiatische Rollsiegel. Ein Beitrag zur Geschichte der Steinschneidekunst*, Berlin.

Mountjoy, P.A. 1986. *Mycenaean decorated pottery: A guide to identification*, Göteborg.

Mountjoy, P.A. 1999. *Regional Mycenaean decorated pottery*, Rahden.

Murray, A.S., A.H. Smith & H.B. Walters 1900. *Excavations in Cyprus*, London.

Neff, D., P. Dillmann, L. Bellot-Gurlet & G. Beranger 2005. 'Corrosion of iron archaeological artefacts in soil: Characterisation of the corrosion system', *Corrosion Science* 47, 515–535.

Öbrink, U. 1979. *Hala Sultan Tekke* 5. *Excavations in Area 22, 1971–1973 and 1975–1978* (SIMA, 45:5), Göteborg.

Recht, L. 2014. 'Transformers Energize! Aegean Bronze Age rhyta in moments of transformation', in *Embodying value? The transformation of objects in and from the ancient world*, eds. A. Bokern & C. Rowan, Oxford, 35–51.

Roaf, M. 1983. 'Tell Mohammad 'Arab. Eski Mosul Dam Salvage Project. British Archaeological Expedition. Catalogue of Registered Objects', *Sumer* 39, 83–94.

Rostoker, W. 1986. 'Ancient techniques for making holes in sheet metal', *AJA* 90:1, 93–94.

Rostoker, W. & E.R. Gebhard. 1980. 'The sanctuary of Poseidon at Isthmia: Techniques of metal manufacture', *Hesperia* 49:4, 347–363.

Schaeffer, F.-A.C. 1932. 'Les Fouilles de Minet-el-Beida et de Ras-Shamra troisième campagne (printemps 1931): Rapport sommaire', *Syria* 13:1, 1–27.

Schaeffer, F.-A.C. 1936. 'Les Fouilles de Ras-Shamra-Ugarit septième campagne (printemps 1935): Rapport sommaire', *Syria* 17:2, 105–149.

Schaeffer, F.-A.C. 1949. *Ugaritica* II (Mission de Ras Shamra, V), Paris.

Schaeffer-Forrer, C.F.-A. 1983. *Corpus des cylindres-sceaux de Ras Shamra-Ugarit et d'Enkomi-Alasia* I (Synthèse, 13), Paris.

Schulte-Campbell, C. 1983. 'A Late Bronze Age Cypriote from Hala Sultan Tekke and another discussion of artificial cranial deformation', in *Hala Sultan Tekke* 8 (SIMA, 45:8), eds. P. Åström, E. Åström, A. Hatziantoniou, K. Niklasson & U. Öbrink, Göteborg, 249–252.

Smith, A.H. 1925. *CVA Great Britain* 1. *British Museum (Department of Greek and Roman Antiquities)* (Great Britain, I), London.

Steel, L. 1998. 'The social impact of Mycenaean imported pottery in Cyprus', *BSA* 93, 285–296.

Thomatos, M. 2006. *The final revival of the Aegean Bronze Age: A case study of the Argolid, Corinthia, Attica, Euboea, the Cyclades and the Dodecanese during LH IIIC Middle* (BAR-IS, 1498), Oxford.

Trinks, I., P.M. Fischer, K. Löcker & S. Flöry 2013. 'Hala Sultan Tekke revisited – archaeological GPR prospection on Cyprus 1980 and 2010/12', in *Archaeological prospection. Proceedings of the 10th International Conference, Vienna, May 29th – June 2nd, 2013*, eds. W. Neubauer, I. Trinks, R.B. Salisbury & C. Einwögerer, Wien, 285–287.

Trinks, I., W. Neubauer & M. Doneus 2012. 'Prospecting archaeological landscapes', in *Progress in cultural heritage preservation. 4th International Conference, EuroMed 2012', Limassol, Cyprus, October 29–November 3, 2012: Proceedings. Lemessos, Cyprus, 29.10.–03.11.2012*, eds. M. Ioannides, D. Fritsch, J. Leissner, R. Davies, F. Remondino & R. Caffo, Berlin & Heidelberg.

Tzedakis, Y. & H. Martlew 1999. *Minoans and Mycenaeans: Flavours of their time*, Athens.

Ubelaker, D.H. 1999. *Human skeletal remains: Excavation, analysis, interpretation*, Washington.

Urban, T.F., J.F. Leon, S.W. Manning & K.D. Fisher 2014. 'High resolution GPR mapping of Late Bronze Age architecture at Kalavasos-Ayios Dhimitrios, Cyprus', *Journal of Applied Geophysics* 107, 129–136.

van Wijngaarden, G.J. 2002. *Use and appreciation of Mycenaean pottery in the Levant, Cyprus and Italy (1600–1200 BC)*, Amsterdam.

Vermeule, E. & V. Karageorghis 1982. *Mycenaean pictorial vase painting*, Cambridge, Massachusetts & London.

White, T.D., M.T. Black & P.A. Folkens 2012. *Human osteology*, Amsterdam.

Whittaker, H. 1992. 'Contacts between the Aegean and the Levant in the Late Bronze Age', *Hydra* 10, 1–8.

Yadin, Y. 1961. *Hazor* III–IV. *An account of the third and fourth seasons of excavations, 1957–1958*, Jerusalem.

Yon, M. 1980. 'Rhytons chypriotes à Ougarit', *RDAC*, 79–83.

Yon, M. 1987. 'Les rhytons du sanctuaire', in *Ras Shamra-Ougarit* III. *Le centre de la ville*, ed. M. Yon, Paris, 343–350.

Zohary, D., M. Hopf & E. Weiss 2012. *Domestication of plants in the Old World: The origin and spread of domesticated plants in southwest Asia, Europe, and the Mediterranean Basin*, Oxford.