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PETER M. FISCHER & TERESA BÜRGE

The New Swedish Cyprus Expedition 2016: Excavations at Hala Sultan Tekke (The Söderberg Expedition)

Preliminary Results. With contributions by L. Recht, D. Kofel and D. Kaniewski, N. Marriner & C. Morhange

Abstract*

In the seventh season at the Bronze Age city of Hala Sultan Tekke excavations continued in City Quarter 1 (CQ1) where georadar indicated stone structures to the south of the area excavated in 2010–2012. Massive domestic structures, which belong to three phases of occupation (Strata 1–3), were exposed. Both the most recent Stratum 1, and Stratum 2 were destroyed in a conflagration. The three phases are preliminarily dated to the 13th and 12th centuries BC. Excavations were also carried out in Area A, roughly 600 m to the south-east of CQ1. Seven circular anomalies indicated by our geomagnetic survey were excavated. Two were pits of modern date, and three were identified as Late Cypriot wells. Another anomaly turned out to represent a rich Late Cypriot offering pit with figurines and more than 60 ceramic vessels. Amongst the Mycenaean vessels are several "chariot kraters" and a large vessel with the oversized image of a female robed in a splendidly adorned Minoan-style dress. The remaining anomaly probably represents a tomb of a very wealthy family so far containing, *inter alia*, 80 locally produced and imported vessels, gold jewellery, weapons, scarabs, and seals. The material in the offering pit and the tomb reflects far-reaching intercultural connections in the period from the 16th to the 13th centuries BC.

Keywords: Cyprus, Late Bronze Age, Hala Sultan Tekke, tombs, settlement

Introduction

Hala Sultan Tekke (*Fig. 1*) is a large Bronze Age city close to the famous homonymous mosque near the international airport of Larnaca on the south coast of Cyprus. The city flourished mainly in the later part of the Late Bronze Age around 1200 BC but recent excavations have demonstrated that there is also evidence that the settlement began in the 16th century BC.

The history of the excavations at Hala Sultan Tekke goes back to 1894 when J.L. Myres opened a number of trenches west of the Salt Lake without finding any cultural layers except for stray sherds. The "excavations" of the British Museum at Hala Sultan Tekke in 1897 and 1898 are described by Bailey.[1] The low scientific standard of this endeavour even considering the period when they took place becomes quite instantly clear when studying Bailey's report.[2] No doubt, the main objective of these expeditions was to find rich tombs in order to supply

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[1] Bailey 1976, 1–32.

[2] Cf. Fischer 2012a, 74.

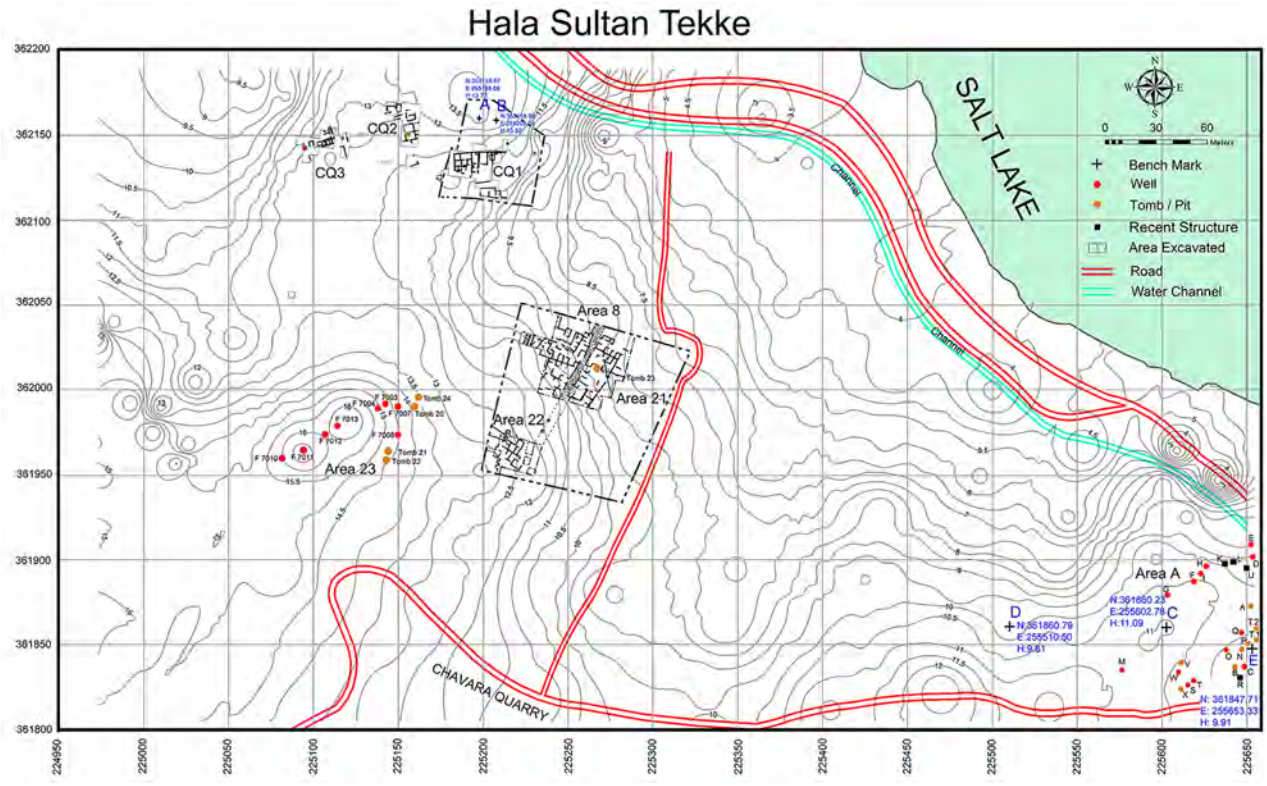

Fig. 1. Topographic map (from west to east): CQ3, CQ2, CQ1, Area 8, and Area A (drawing by M. Al-Bataineh and T. Bürge).

the British Museum with spectacular finds. Some tombs were excavated but most of the discovered tombs were looted.

The Cypriot Department of Antiquities has been long-engaged at Hala Sultan Tekke, particularly in 1968, when V. Karageorghis excavated two Late Bronze Age tombs with rich contents to the west of the mosque.[3] In the 1970s and 1980s additional tombs were (re)excavated by the Swedish mission directed by P. Åström (see references below).

Regular excavations in the settlement of Hala Sultan Tekke started at the beginning of the 1970s and continued intermittently for more than three decades until 2005. Selected results from the excavations in and around Area 8 were published as preliminary reports together with a number of specialized studies.[4] The most recent excavations under the direction of P.M. Fischer from the University of Gothenburg began in 2010 and have continued on an annual basis.[5] The seventh season of excavations lasted from 9 May to 10 June 2016.

As in previous seasons, the main objectives of the field work in 2016 were the search for the oldest city of Hala Sultan Tekke, and the disclosure of the total extent of the city. As the consequence of an advanced grant by the Swedish Research Council[6] to the director of the excavations, an additional objective became the integration of the material from the excavations at Hala Sultan Tekke into the study of the "Sea Peoples Phenomenon", i.e. the effect of various factors which led to migration around 1200 BC which is the period of the so called "crisis years".

In 2016 the seventh season of the excavations at the Bronze Age city of Hala Sultan Tekke excavations continued in City Quarter 1 (CQ1, former Area 6; *Fig. 2*), where excavations had taken place in 2010–2012. Georadar investigations indicated stone structures to the south of the fenced area, in response to which the fence was moved 15 m southwards and the area of the previous excavations was extended. An area comprising 165 square metres, which includes Trenches 7D, 24A–D and 25A, was opened up to the south-east of the former excavations. The new excavations brought to light a combined small-scale industrial/domestic quarter which was occupied in three

[3] Karageorghis 1976.
[4] *HST* 1–12.
[5] Fischer 2011; 2012b; Fischer & Bürge 2013; 2014; 2015; 2016.
[6] Swedish Research Council project 2015-01192: *The Collapse of Bronze Age Societies in the Eastern Mediterranean. Sea Peoples in Cyprus?* The project will be carried out from 2016 to 2019/20.

Fig. 2. Aerial photograph of CQ1 (by P.M. Fischer and T. Bürge).

phases which are dated roughly to the 13th and 12th centuries BC.[7] Following our traditional way of presenting the preliminary results of excavation, the three phases of occupation will be presented as excavated, i.e. starting with Stratum 1 which is just below colluvial/ploughed soil, followed by Stratum 2 and finally Stratum 3, which was just reached at the end of the season.[8]

Additional excavation took place in Area A which is on a plateau some 600 m to the south-east of CQ1 and near the mosque of Hala Sultan Tekke. In 2013, a surface survey in Area A led to the discovery and subsequent excavation of a reused well, the Late Cypriot Tomb A.[9] Following the discovery of this tomb, magnetic prospecting supported by a georadar survey was carried out in 2014.[10] The geophysical surveys, which covered an area of 1.10 hectares, indicated more than 80 circular anomalies ("pits") of which pits B–Q were excavated during the 2014 and 2015 seasons. They turned out to represent Late Cypriot wells and offering pits, and a cemented stone platform of more recent date.[11] In 2016, seven more pits (R–X) were excavated and resulted in spectacular finds. Of these pits, Offering Pit V and Tomb X proved to be of the utmost importance as regards the pre-13th/12th century BC occupation of the city.

Results of the excavations in CQ1

STRATUM 1

In 2012 it had been observed that the most recent phase of occupation, Stratum 1 (*Fig. 3*), suffered from disturbances in the southern part of the exposed compound. This situation was also reflected in the excavations of of 2016, where the uppermost part of Stratum 1 mainly in Trenches 7D and 25A in the northern part of the extended area (corresponding to the southern part of the former excavations) showed signs of disturbances caused by farming.

In the southern part of the new area of excavations, i.e. Trenches 24A–D, there is a feature (L577) which is more recent than the remainder of Stratum 1. This makes it necessary to subdivide Stratum 1 into Stratum 1A and B.

[7] Fischer 2011; 2012 b; Fischer & Bürge 2013.
[8] When all information for the final report is available the phases of occupation will be presented chronologically (SIMA forthcoming).
[9] Fischer & Bürge 2015.
[10] Trinks 2015.
[11] Fischer & Bürge 2016.

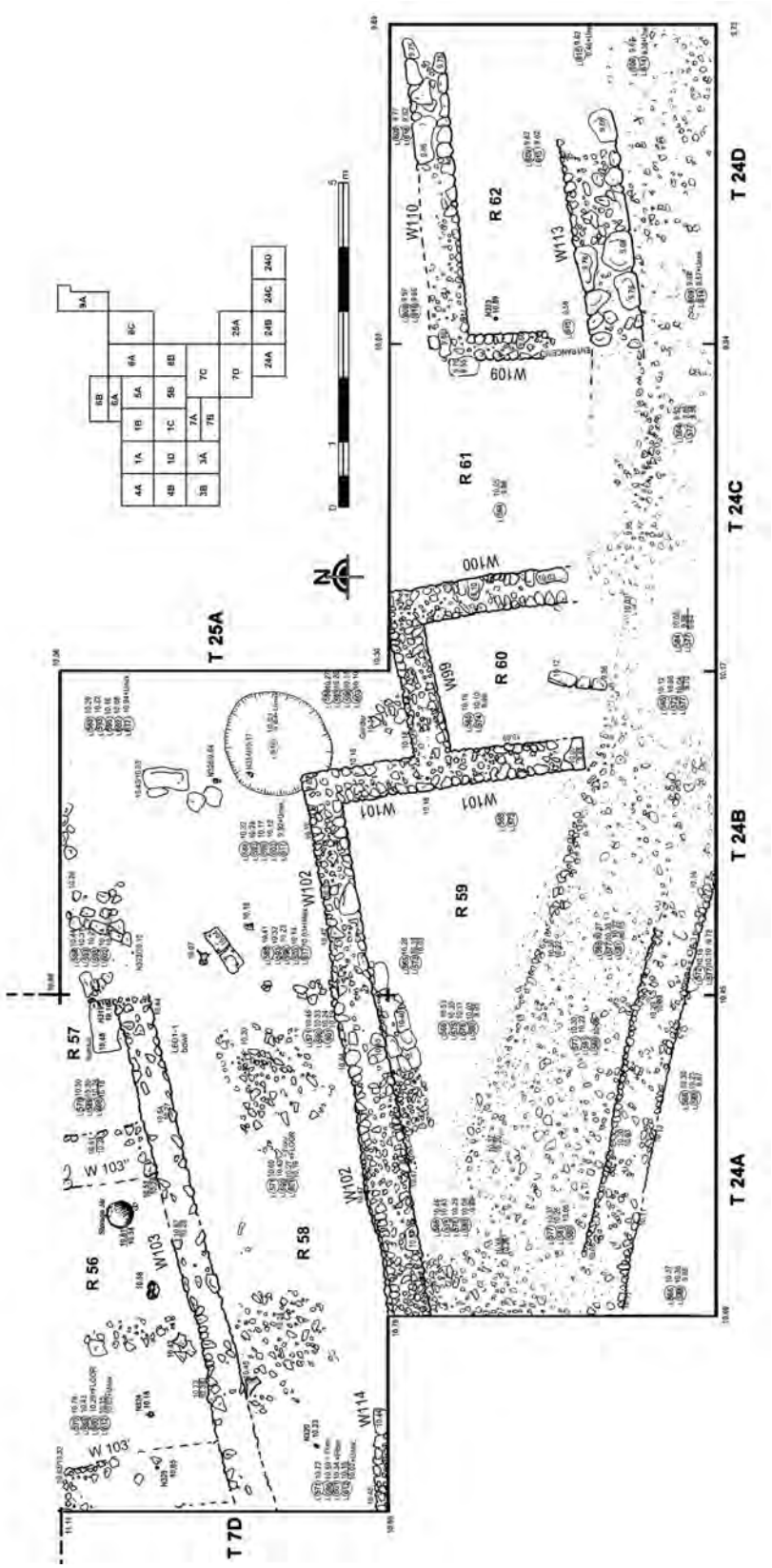

Fig. 3. Stratum 1, CQ1, Trenches 7D, 25A, 24A–D (drawing by M. Al-Bataineh).

STRATUM 1A

This is the most recent feature which partly covers all southern trenches and runs through Trenches 24A–D. It consists of a flattened stone surface of approximately 1.50–2 m width and 0.10–0.15 m thickness which slopes down from north-west to south-east (L577). This feature resembles a terrace retaining wall insofar that its southern end is lined by a wall-like support, whereas north of it the stones were arranged to create a flat surface. It is also possible, although not likely, that it was built to support a wall, namely the western extension of W102 to the north. An argument against this theory is that the stones of the terrace wall do not reach W102 in its entire length, viz. the terrace wall has a diverging direction in relation to W102 which runs from west-south-west to east-north-east. All of the sherds, which were found intermingled with the relatively small stones which make up the terrace, are Late Cypriot and mainly from pithoi. The handle of a plain jar with a potmark (L577-1), a fragment of a Red-on-Black ware bowl (L577-2), and the leg of a figurine of White Painted ware (L577-3) also come from this feature.

STRATUM 1B

Two compounds, which are separated from each other by an open space, most likely a courtyard (R58), belong to this phase of occupation. The northern compound consists of two walled spaces, R56 and R57, and the southern one of four walled spaces, R59–62.

Northern compound (R56, R57)

The northern compound is much disturbed and the walls were found in disorder. W103 is just visible, while the exact location of the assumed perpendicular walls, W103' and W103" can only be located with difficulty.

In addition to numerous loose pithos sherds, the walled space R56 contained the complete rim of a pithos (L570-2) and sherds of several Canaanite jars (one is L570-1) deposited on the uppermost floor of Stratum 1B (L589; the fill above the floor is L570). Below this floor was another floor (L600) with bone fragments, coarse wares, and cooking pot fragments, and sherds of White Painted Wheel-made ware. In addition, parts of a necklace with five beads of ivory and faience (N324) were found on the floor of L600. R56 was used for storage and food processing.

R57, a walled space to the east of R56, has roughly the same find situation, with two floors and finds of pottery of pithoi, coarse wares, and cooking pots. Amongst the latter is an almost complete jug of Coarse ware (N319; *Fig. 5:1*) on the more recent floor (L600) which was found inside the remains of a bath tub (L600-1; *Fig. 4*). Originally, the bath tub was placed on a havara floor against the northern façade of W103.

A White Painted Wheel-made bowl (L601-1; *Fig. 5:5*) comes from the area south-west of the bath tub.

Fig 4. Coarse ware jug and bathtub from Stratum 1, CQ1 in situ (photograph by P.M. Fischer).

Courtyard (R58)

R58 is an open space between the two compounds. It has a width of roughly 3 m and a length of at least 15 m. It is bordered by W103 to the north and W102 to the south. Here, too, are two compact layers ("floors"), L590 and L601, and L596 and L602. To the west in L590, intermingled with ash, were a stone quern and many fragments of pithoi, Canaanite jars, coarse ware, and cooking pots. On the lower floor L601 are the remains of a stone pavement, a lead sling bullet (N320), and a faience cylindrical bead (N326).

To the east, the soil is also very ashy. There are several hearths, the ash of which however is not responsible for the general ashy appearance of the soil in this relatively large space. There are two large grinding stones and four loom weights (N314, 52 g; N322, 138 g; N325, 115 g; L596-2, only partly preserved), which – in addition to the preparation of food – add to other activities carried out in the courtyard. Parts of a Canaanite jar were found close to a feature of burnt mudbrick; other finds from the western part of the courtyard include the rim and neck of a pithos (L590-1) and a wheel-made Bucchero juglet (L590-2 in *Fig. 5:2*). The eastern part yielded a large jug of Plain White Wheel-made ware (L617-1), two deep bowls of White Painted Wheel-made ware (L596-4 in *Fig. 5:4*, L602-2), two fragments of what were most likely kraters of the same ware (L596-3, L602-1 in *Fig. 5:3*), and a fragment of a closed vessel of White Painted Wheel-made ware, which depicts a bird (L596-1). There are also some flat working stones to the north-east. A circular pit was dug at the north-eastern corner of W102/W101 (L610). The pit has a diameter of 1.60 m. It partly destroyed the corner of W102/101 of Stratum 2.

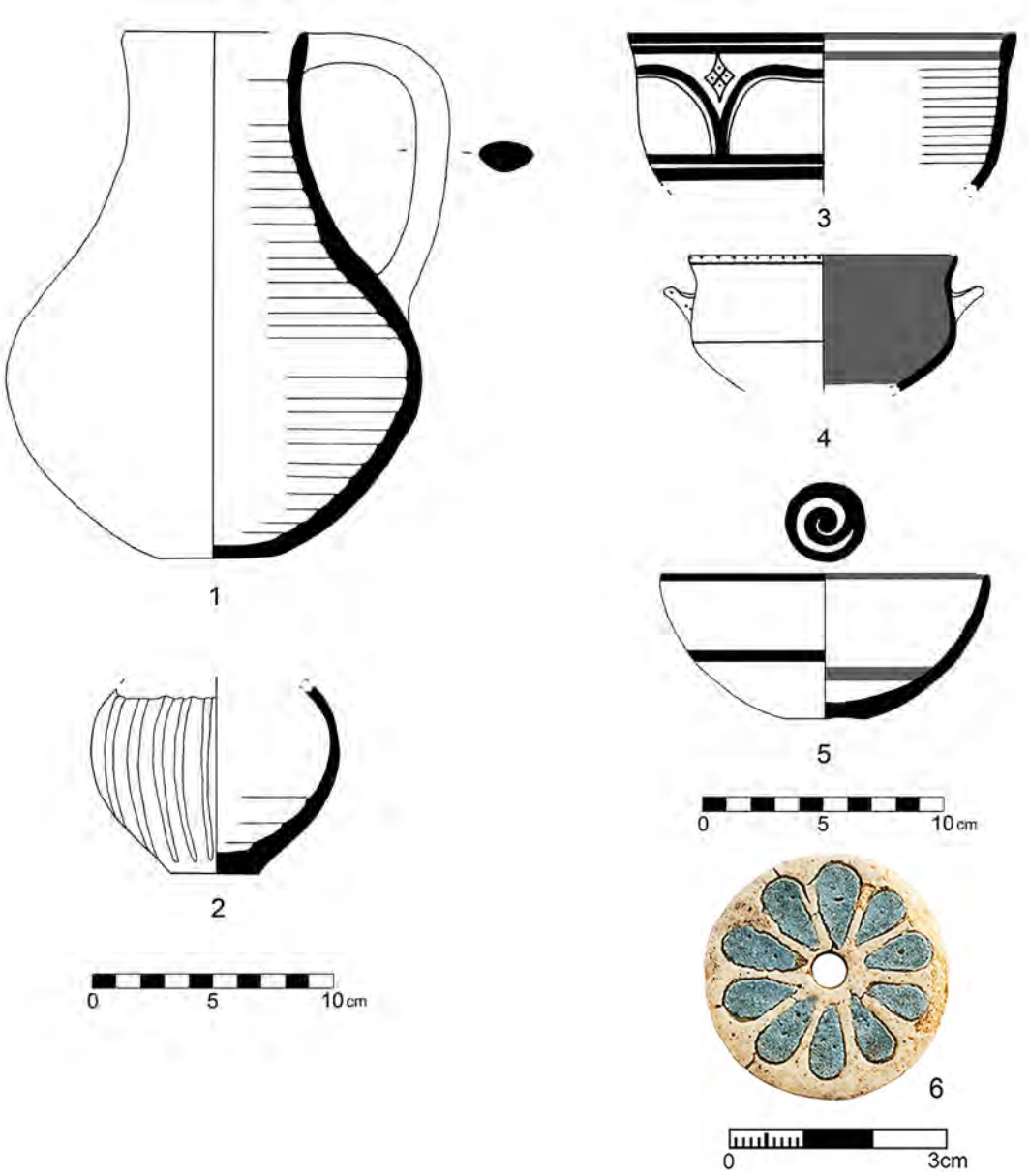

Fig. 5. Collection of finds from CQ1, Stratum 1 (drawing by M. Al-Bataineh and T. Bürge; photograph by P.M. Fischer).

In summary, the activities which were carried out in the courtyard include food processing and storing, and small-scale textile production.

Southern compound (R59–62)

R59 is bordered by W101 and W102, of which the latter represents a reused and rebuilt wall from Stratum 2. W102 appears to have been in the process of collapsing towards the south, and a retaining structure was therefore built against it. R59 is just below the terrace-retaining structure from Stratum 1A. Here as well,[12] two surfaces were exposed: L581 and L580, the latter being a havara floor. Except for sherds there are no other finds which would hint at the use of this area. It seems, however, to represent an outdoor area.

R60 is located to the east of R59. It is a small, 2 m × 2 m, roofed space bordered by W101, W99, and W100. It is open towards the south. The next room to the east, R61, is an open or partly roofed space, roughly 3.50 m wide, bordered by W100, W109, and possibly W113. Further to the east is R62 which is a 2 m wide roofed space of which the eastern limits

[12] See the situation in the courtyard to the north.

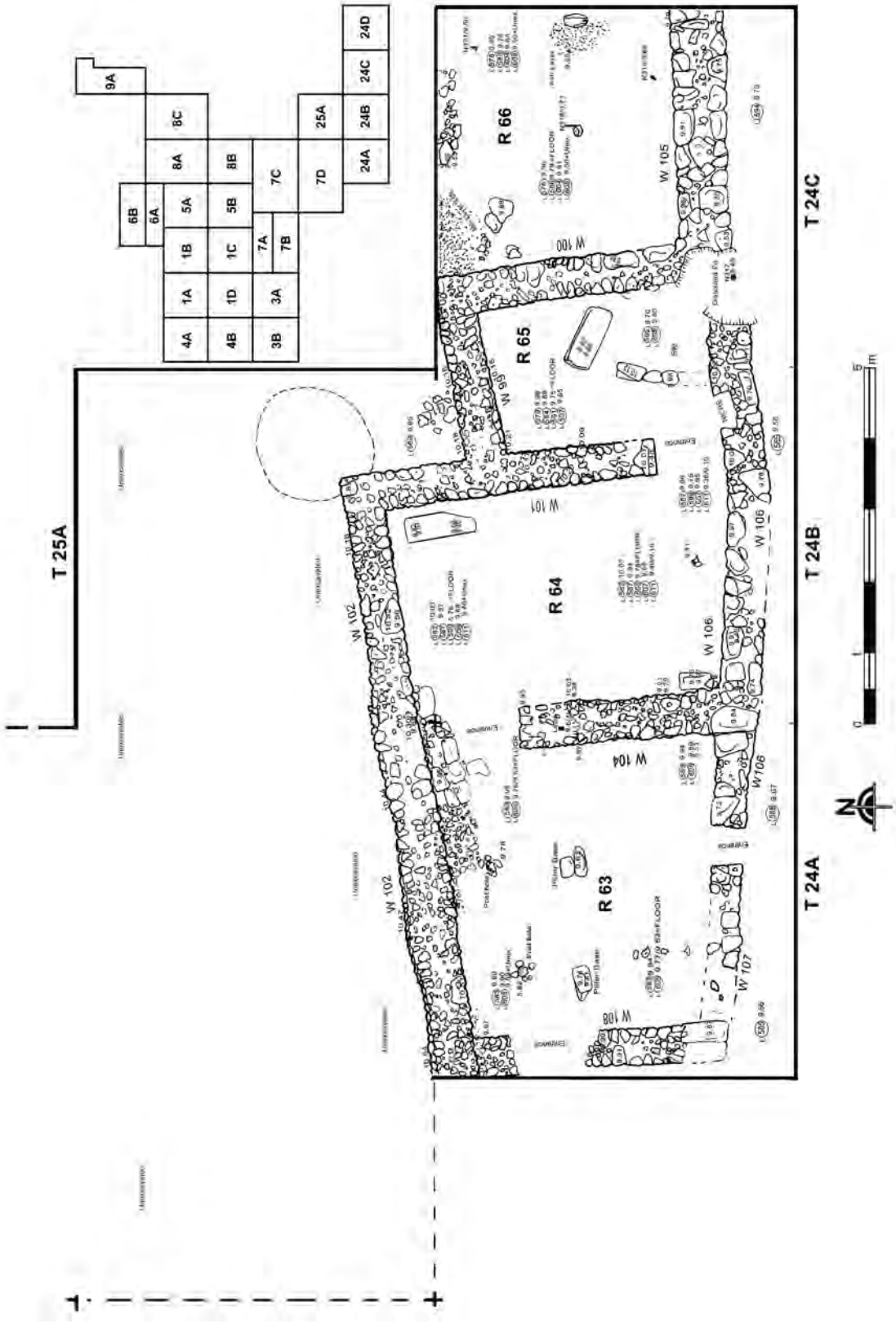

Fig. 6. Stratum 2, CQ1, Trenches 7D, 25A, 24A–C (drawing by M. Al-Bataineh).

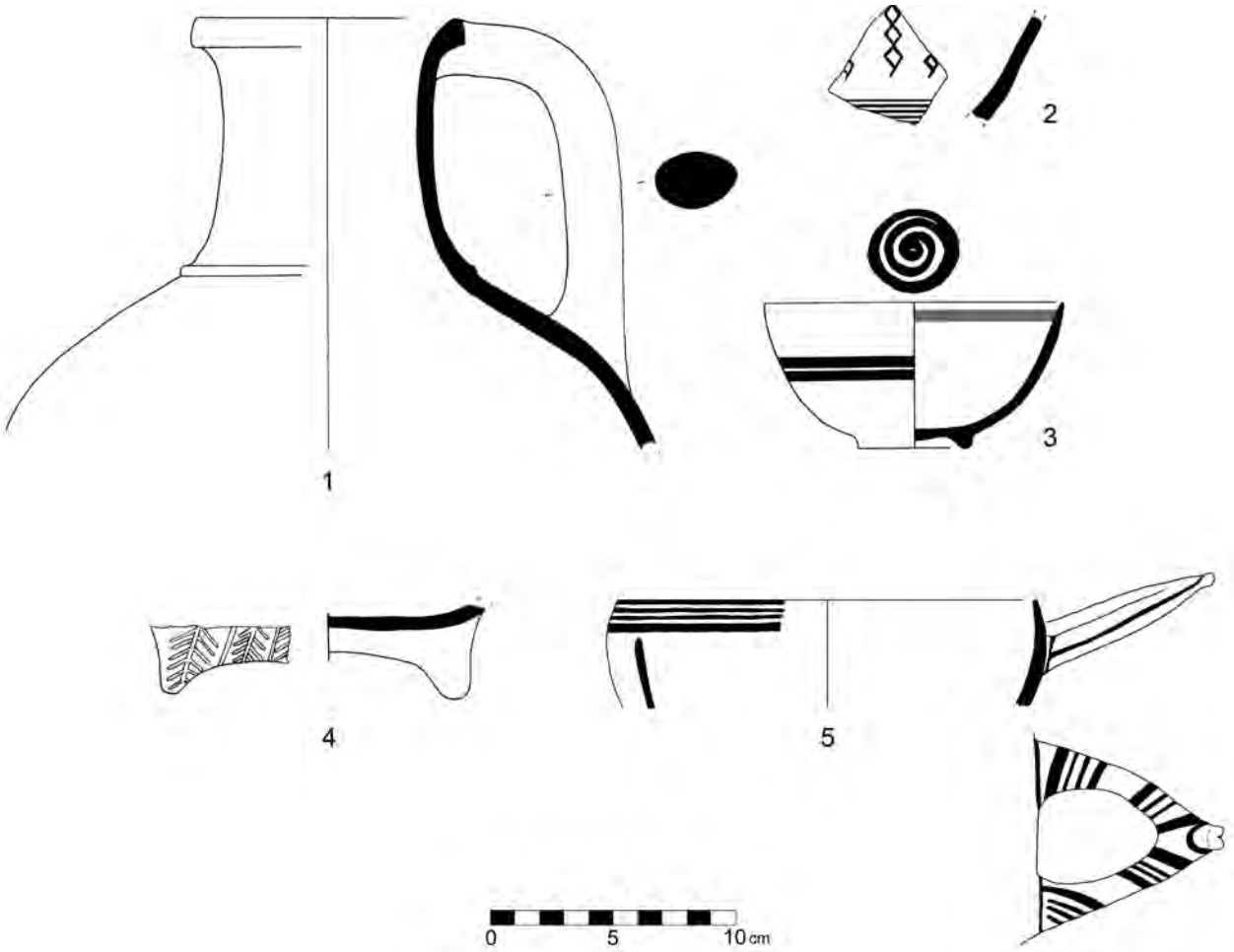

Fig. 7. Collection of finds from CQ1, Stratum 2 (drawing by M. Al-Bataineh and T. Bürge).

have not yet been exposed. It is bordered by W109, W110, and W113. A white faience "button", decorated with blue petal inlays, was found in the north-western corner of R62 (N323; *Fig. 5:6*).

The lack of finds in the southern compound, i.e. the small number of sherds and the absence of diagnostic pottery, is striking. There are two possible explanations: one is the position of the structures and finds close to the surface; another is the possibility that the people who are responsible for Stratum 1A cleaned the area.

STRATUM 2

In the area of the northern compound this phase of occupation was not reached in 2016. In the southern part, though, several roofed spaces of Stratum 2, R63–66, were exposed (*Fig. 6*).

R63 is bordered by W108, W102, W104, and W106/107. A large ashlar block is built into W108. The trapezoidal room measures approximately 4 m × 3/4 m and could be entered from three sides: via W108 (width of entrance 1.20 m), via W104 (width of entrance 1.20 m), and via W106/107 (width of entrance 0.60 m). There are two havara floors, L583 and L605. Two postholes belong to the upper floor L583. In the midst of the space are two pillar bases (in L605) which functioned as the foundation of a wooden roof support belonging to the lower floor. A lead ingot (N315; see Appendix 1 and *Fig. 23*) was buried approximately at the level of the foundation of W104. According to the average of three XRF analyses it consists of Pb 98.58% (error 0.13%). Its dimensions (cm) and weight are: L 8, W 7.50, Th 3; 1,287 g.

R64 measures 3 m × 4.30/4.80 m and is bordered by W104, W102, W101, and W106. There are two entrances: one from R63 (W104) and the other in W101 (width 1.20 m). A long ashlar block with dimensions of 0.90 m × 0.30 m × 0.25 m was exposed in the north-eastern part of the room along W101. A vessel support of Plain ware (L582-1; *Fig. 7:4*)

was found in the fill above the floor, whereas the floor (L599) contained no finds of interest. The foundation fill below the floor (L606/607, L611) yielded a wall bracket (L606-1), the leg of a tripod cooking pot (L607-1), the upper part of a large Plain White Wheel-made jar (L611-1; *Fig. 7:1*), five White Painted Wheel-made ware vessels including a globular bowl (L611-2; *Fig. 7:3*), a krater (L607-1), a kylix (L611-6; *Fig. 7:2*), the base of a bowl (L611-5), the upper part of a jug (L611-10), the fragments of two White Slip II bowls (L611-7 in *Fig. 7:5*, L611-8), a fragment of a Mycenaean (LH IIIA2–B) conical rhyton, a part of a Mycenaean large piriform jar (L611-9), and the base of a stone container (L611-4).

R65 is a roofed space bordered by W101, W99, W100, and W106. The only entrance (1 m wide), which connects this space with R64, is in W101. The room measures 2 m × 3 m. A 0.25 m deep and 0.50 m long recess is in W106 next to the entrance. The southern limits of R65 are disturbed by an approximately 1 m diameter circular pit which was most likely dug in the following phase. At the bottom of the pit two lead objects were found: a sling bullet-like object weighing 82 g which was rolled-in into a sheet of lead, also weighing 82 g (N317). In the central-eastern part of the room there is a large ashlar block which seems to have fallen down. A curved, stone-lined structure is partly preserved, and was originally built against the south-eastern corner of the room. It may have functioned as a silo. The floor of the room contained no other finds of interest.

R66 is an open space which is only partly exposed. It is bordered by W100 and W105. A stone platform, which continues towards the north into the as yet unexposed area, was partly exposed. There are areas with substantial remains of ash: one is in the northern part, and the other is in the eastern part of the exposed area. Finds from the floor of this space (L586) include the lower part of a small jug of White Painted Wheel-made ware (L586-1), the head of a bull figurine of White Painted ware (L586-2), a sphendonoid hollow-cast bronze weight filled with 30g of lead (N316),[13] and a complete decorated wall bracket of fired clay (N318): it was broken and mended with strings in antiquity using three pairs of holes drilled along the fracture. A fired clay loom weight weighing 55 g (N321) comes from the fill below the floor (L604). The floor of the room yielded a number of organic remains, *inter alia* grape seeds, cereals, and olive stones (see Appendix 2).

[13] This weight most likely corresponds to three Syrian *shekels* or Egyptian *qedets* of *c.* 9.30–9.40 g (cf. Petruso 1984; Lassen 2000, 233–235; Pulak 2000, 257–264). The corrosion products may have added to the original weight. We would like to thank Cemal Pulak for drawing attention to these systems of weight.

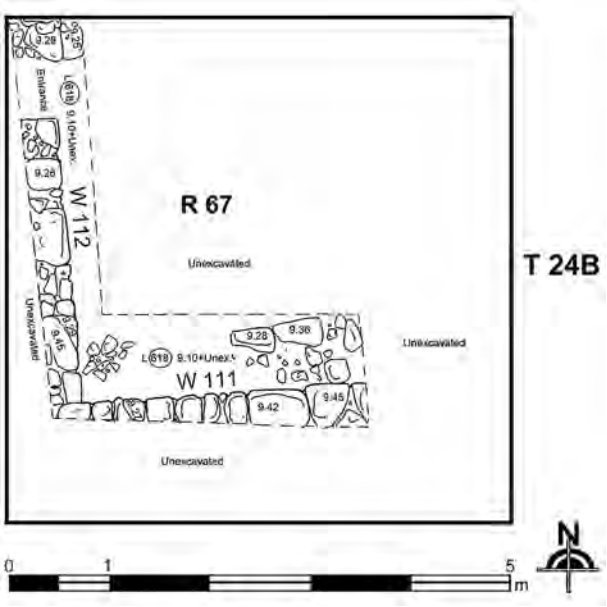

Fig. 8. Stratum 3, CQ1, Trench 24B (drawing by M. Al-Bataineh).

STRATUM 3

The oldest phase of occupation in City Quarter 1 was exposed in a test trench in Trench 24B (*Fig. 8*). There are two perpendicular walls, W111 and W112, which form a space, R67, with an entrance 0.60 m wide in the northern exposed part of W112. The pottery from just above L618 gives the impression of being older than that of Stratum 2. This phase of occupation will be exposed in 2017.

Results of the 2016 excavations in Area A

INTRODUCTION

Area A, which represents a more than 1 ha large plateau approximately 10 m above sea level, is some 600 m to the east-south-east of CQ1 (see *Fig. 1*). It is situated immediately west of the mosque of Hala Sultan Tekke from which it is separated by a road and an artificial channel several metres deep which was dug in the 1950s. According to unverified rumours, workers who were digging this channel found rich tombs about which the local authorities were not informed. In the 1960s, erosion exposed two tombs in the western section of the channel. These two tombs, Tomb 1 and 2, were excavated in 1968.[14]

[14] Karageorghis 1976, 70–89.

Tomb 1 is from the end of Late Cypriot IIB to the end of Late Cypriot IIC, viz. the end of the 14th century to around 1200 BC, and Tomb 2 is from Late Cypriot IB to just before the end of Late Cypriot IIC, viz. the end of the 15th century to the last quarter of the 13th century BC. Today, Area A is used for intensive farming, which is very unfortunate for the buried archaeological remains because everywhere in the area ploughing and erosion had brought to light ancient remains.

In 2013, the present expedition carried out a surface survey which led to the discovery of several human disturbances in the shape of pits in the western section of the channel opposite the mosque, i.e. in the same section where Tombs 1 and 2 were found. One of them, Tomb A, was excavated from 2013[15] to 2015.[16] Tomb A, which is some 20 m to the north of Tomb 2 from 1968, turned out to be an abandoned well which was reused for the burial of seven individuals.

Based on the promising results of the surface survey, a georadar and geomagnetic survey was carried out in Area A in 2014.[17] It covered roughly 100 m × 100 m and resulted in the discovery of more than 80 circular anomalies.[18] In the same year, four of these anomalies were investigated in the southeastern part of Area A in order to check the geophysical results (*Fig. 9*). They turned out to represent an offering pit with important finds of local and imported pottery (Pit B) which dates from Late Cypriot IIC, viz. the 13th century BC, and three wells (Wells C–E) with additional material from the same period but also earlier material. Well C yielded a complete bull of Base-ring I ware and a haematite cylinder seal.[19]

In addition to complementary excavations of Tomb A another eleven of the magnetic anomalies (F–Q) were investigated in 2015. The following anomalies turned out to be wells which were abandoned and backfilled in the 13th and 12th centuries BC, viz. Late Cypriot IIC and early Late Cypriot IIIA: Wells F, G, H, I, M, O, and Q. Anomaly K contained a platform of cement, maybe of Ottoman date, which was probably used as the foundation for a strategically placed cannon in order to cover most of the Salt Lake. Anomaly L did not contain any finds of interest and may represent a natural depression. The other two, N and P, were preliminarily identified as offering pits dating to Late Cypriot IB, viz. roughly the 15th century BC.[20] These two pits which contained several complete vessels are possibly associated with the earliest burials in Tombs 1 and 2 from 1968.

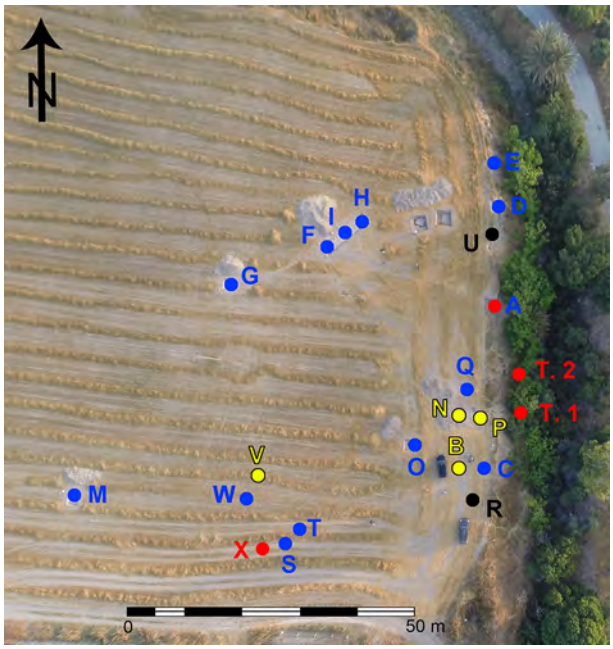

Fig. 9. Aerial photograph of Area A with the positions of the excavated geophysical anomalies. Symbols: blue = wells, yellow = offering pits, red = tombs, and black = modern "features" (by T. Bürge and P.M. Fischer).

In 2016 another seven of the geophysical anomalies[21] were investigated, viz. R, S, T, U, V, W, and X (*Fig. 9*). The results are presented below.

Anomaly R

The magnetometer survey indicated a geophysical anomaly roughly 1 m in diameter and just 7 m south of Offering Pit B and Well C. However, our sounding revealed only natural layers with a slight depression of the soil.

Wells S and T

Roughly 30 m west-south-west of Offering Pit B is a group of three anomalies, approximately 1 m apart. Two of them were exposed.

Geophysical anomaly S (L44; Well S in *Fig. 10*) is a circular well with a diameter of 1.10–1.12 m. Amongst the finds are a deep bowl of White Painted Wheel-made ware (L44-1; *Fig. 11:2*), the lower part of a large mug of the same ware decorated with fish (L44-3; *Fig. 11:1*), the base of a Mycenaean (LH IIIA) alabas-

[15] Fischer & Satraki 2014.
[16] Fischer & Bürge 2015, 41–44.
[17] Trinks 2015.
[18] All features were recorded in GIS which enabled us to pinpoint the centre of each anomaly in the field within a few centimetres. This made it possible to reduce the size of each trench to just include the anomaly with some margins, thus saving time and resources.
[19] Fischer & Bürge 2015.
[20] Fischer & Bürge 2016.

[21] When we started to expose geophysical anomalies, we considered them as "pits in the ground". However, in the course of their exposure as soon as their specific functions became obvious, their terms were changed according to their intended functions. This is reflected in the terminology of the headings.

Fig. 10. Aerial photograph of Area A: Pit V, Well W, Tomb X, Well T, and Well S (by P.M. Fischer and T. Bürge).

tron (L44-2), and the head of a bronze nail (N56). Steps cut in to the side of this feature, which were used to climb down, started at a depth of 0.80 m below the surface. This access feature resembles those found in several other wells which were excavated by the expedition during previous seasons.[22] After identifying this feature as another well, excavations were abandoned at a depth of 1.10 m below surface. Some of the pottery, specifically the deep bowl and the large mug with the fish motifs, hints at a backfill of the well in the 12th century BC. This backfill also contained remains of earlier periods exemplified, for instance, by the LH IIIA alabastron.

Anomaly T (L45; Well T in *Fig. 10*) is also circular with a diameter of 1.08 m. Sherds and some bones together with a broken limestone basin and numerous pieces of copper slag and charcoal were found. The sherds give the impression of having been secondarily fired. Again, there are steps cut in to the side of the feature which started approximately 1 m below surface. The nature of this clay-lined feature and the steps indicate that this feature was a well. Excavations were abandoned at a depth of 1.28 m below the surface. Only a small number of fragmented sherds were found in the fill of this well. In addition to plain wares there are sherds of Coarse, Canaanite, Pithos, White Painted Wheel-made, Base-ring I and II, White Slip I and II, White Lustrous Wheel-made, Monochrome, Red-on-Red, and Red-on-Black wares. The pottery suggests that the well was backfilled in the 14th or 13th centuries and included pottery of even older date.

Anomaly U

This 3 m × 2 m large geophysical anomaly is just to the southwest of Well D from 2014.[23] A straight line of darker soil crossing the feature seems to be of fairly recent date. The disorder in the pit and the absence of *in situ* Late Cypriot pottery gives the impression of a "recently" excavated feature. It is not unlikely that this feature was excavated by the British expedition in the late 19th century when British Museum representatives searched for rewarding tombs.[24] The pit was abandoned after excavating down to approximately 0.50 m.

Offering Pit V

The geophysical anomaly which corresponds to this feature (L46) is characterized by two connected pits (L46 West and L46 East) and a small extension in the north-eastern part of L46 East. This feature was dug into fairly soft, clay-rich soil. It represents a sort of double-pit which resembles a recumbent figure 8, approximately 4 m × 2 m in size and orientated east – west. In order to include the entire anomaly, a 5 m × 3 m trench was opened up. All soil was meticulously sieved.

In the centre of this roughly 8-shaped feature was a concentration of large blocks of stones. The function of these blocks was to seal the feature which meant that there was access to both pits from just one centrally situated circular "entrance", a sort of *stomion*.

A considerable amount of Mycenaean pictorial sherds of high quality vessels showing advanced decorations of humans, animals, plants, and geometric motifs were found in the nearby ploughed soil. This meant that farming had dislocated finds from the uppermost part of this feature. This explained in the course of processing and mending missing sherds of almost complete vessels despite meticulous sieving.

After excavating down to 0.40 m to 0.50 m from the surface the concentration of sherds in the already sherd-rich soil fill drastically increased. Intermingled with these sherds were a Mycenaean Psi-figurine (N57; *Fig. 15:7*) and a Mycenaean horse figurine (N58), the latter of which is part of a chariot group with at least two horses. Sherds from the same vessels were found scattered over the entire double-pit. In total, at

[22] Fischer & Bürge 2015 and 2016.

[23] Fischer & Bürge 2015, 47–49.

[24] Fischer 2012a, 74.

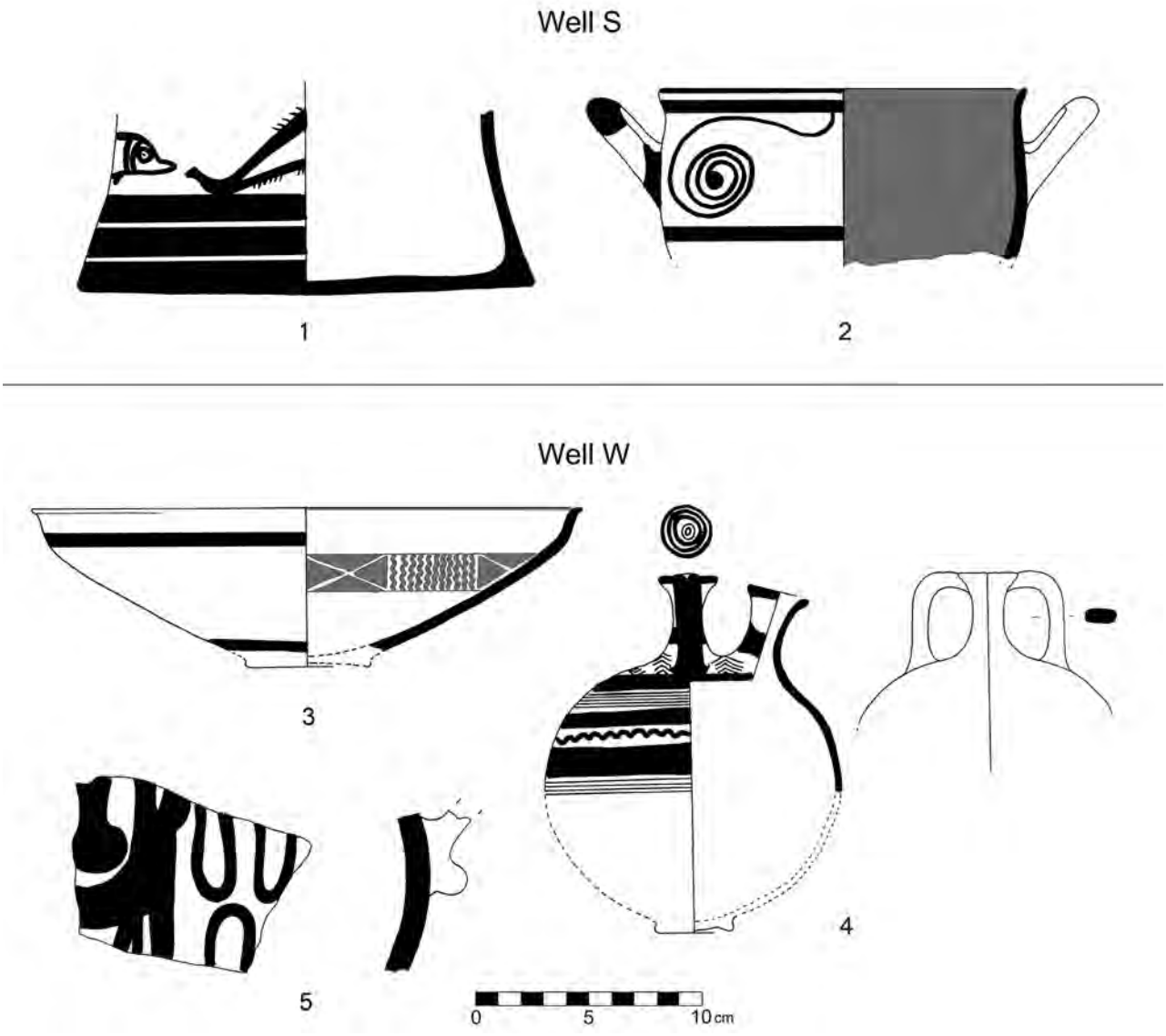

Fig. 11. Collection of pottery from Area A, Well S (nos. 1 and 2), and Well W (nos. 3–5; drawing by M. Al-Bataineh).

least 60 complete vessels or vessels with complete profiles were found.[25] The sherd material gave the impression that vessels were intentionally broken ("killed") and thrown into the pits. It also became clear that some of the bases of large vessels were deliberately cut to form cups, which pointed to their secondary use as drinking vessels before they were discarded into the double-pit.

Human remains

Only a very small number of human skeletal remains was found in this relatively large feature. The total amount of bones corresponds only to a very small fraction of one single human skeleton. The scant human remains including two mandibular teeth, an incisor and a molar, were most likely deposited in the double-pit together with soil which obviously was taken from somewhere else. This precludes the interpretation of this feature as a tomb.

[25] Restoration work is ongoing and the total number of vessels will certainly increase.

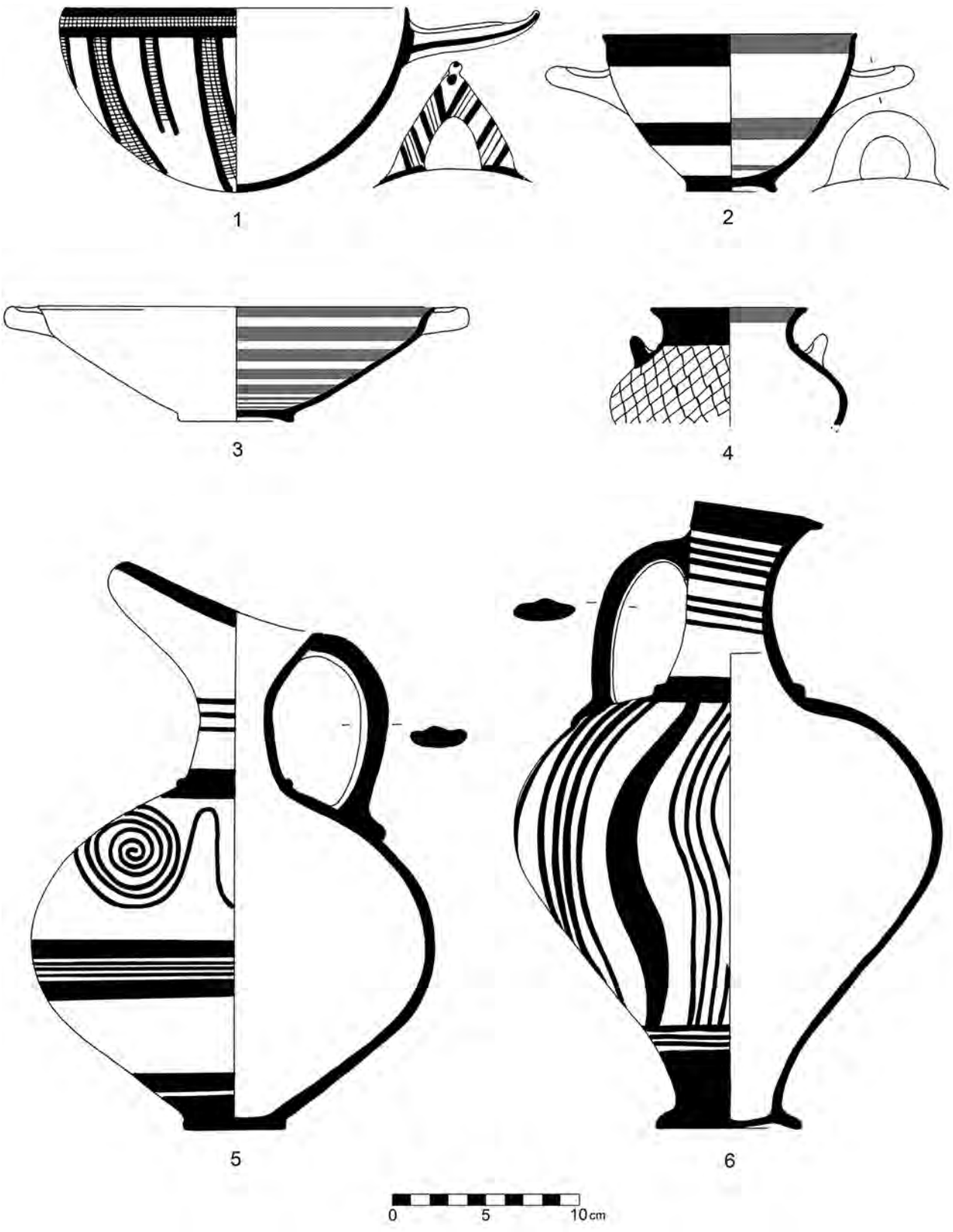

Fig. 12. Selected pottery from Area A, Pit V (drawing by M. Al-Bataineh).

The finds

Except for a small fragment of a faience bowl (L46-54) there are only finds of pottery in Pit V. Considering the large number of fragments it was not possible to reconstruct all vessels in the short time at our disposal between the excavation and the present report. Therefore, only the reconstructed vessels, which have complete profiles or when large parts of the profile were preserved, will be listed (60 so far). Further conservation and study of the material will certainly increase the number of vessels.

Amongst the locally produced wares are eleven White Slip II bowls (L46-8, L46-9, L46-10, L46-11, L46-12, L46-17, L46-21, L46-28, L46-29, L46-30 in *Fig. 12:1*, L46-44), two Base-ring I jugs with plastic decoration (L46-31, L46-32), three Base-ring II jugs with painted decoration (L46-2, L46-47, L46-52), a Base-ring II juglet with painted decoration (L46-46), three Base-ring bowls (L46-7, L46-25, L46-50), a Base-ring jug or juglet (L46-49), and a Base-ring juglet (L46-19; *Fig. 15:3*). In addition, two jugs of Bucchero ware (L46-48, L46-51) have been reconstructed so far. White-Painted Wheel-made ware from Pit V includes five shallow bowls (L46-4, L46-14 in *Fig. 12:3*, L46-18, L46-23, L46-57), a deep bowl (L46-56; *Fig. 12:2*), a spouted juglet of possible Mycenaean type (L46-13; *Fig. 15:2*), and a jug (L46-1). Another bowl is of Plain-White Wheel-made ware (L46-16). A handle of a jug of Plain ware (L46-55) with a potmark should be mentioned. There is also a White shaved juglet (L46-15; *Fig. 15:1*).

The feature also contained two Red Lustrous Wheel-made spindle bottles (L46-26, L46-27). In order to contribute to the study of the provenance of this enigmatic ware petrography and neutron activation analyses are underway.

A total of 19 Mycenaean imports have been recorded so far: six piriform jars (L46-5, L46-6, L46-42 in *Figs. 12:4, 15:6*,[26] L46-43, L46-45, L46-53), two straight-sided alabastra (L46-3, L46-22), a jug (L46-40; *Fig. 13:1*), a juglet (L46-39), a jug with cutaway neck (L46-20; *Fig. 12:6*), a beaked jug (L46-33; *Figs. 12:5, 15:8*), a stirrup jar (L46-41), a flask (FS 190/192, L46-24; *Fig. 15:5*), and a krater (FS 8/9, L46-38). There are four Mycenaean amphoroid kraters (FS 54/55) which have pictorial motifs: one is decorated with geometric motifs and a bird (L46-37), two depict chariots (L46-34 in *Fig. 14*, L46-35), and the fourth vessel, of which only the lower part is preserved, has the depiction of a female, a part of a chariot, and another possible person (L46-36; *Figs. 13:2, 15:4*).

[26] This vessel may be a local copy.

Comments and dating

Locally produced and Mycenaean imported pottery hint at the length of the period during which this feature was used. Since the study of the pottery is not yet finished, only selected vessels will be discussed.

The well-stratified excavations at Tell el-ᶜAjjul with reference material from Cyprus, the Levant, and Egypt brought to light "early", "normal/mature", and "late" White Slip II.[27] According to the Tell el-ᶜAjjul classification, the "early type" is missing in the White Slip material of this feature, and only "normal/mature" (see one in *Fig. 12:1*) and "late" are represented. At Tell el-ᶜAjjul "normal/mature" White Slip II is dated to Late Cypriot IIA–B.[28] The Base-ring I and II vessels are insecure chronological indicators: Base-ring I has a long life span and Base-ring II was used parallel with Base-ring I. The latest Base-ring II can be dated to the outgoing 13th century. The deep bowl of White Painted Wheel-made ware (L46-56; *Fig. 12:2*) has a pre-LC IIIA shape and decoration. The shallow bowls with carinated rim (L46-4, L46-14 in *Fig. 12:3*, L46-18, L46-23, L46-57) are attested from the LC IIC–IIIA period.[29]

The earliest Mycenaean imports are represented, for instance, by a beaked jug (FS 144/145; L46-33; *Figs. 12:5, 15:8*) decorated with curve-stemmed spirals (FM 49) on the shoulder/belly and a tassel (FM 72) below the handle. A beaked jug from LH IIIA1 Ialysos/Rhodes[30] shows the same decoration, which makes a date of our beaked jug into the LH IIIA1 period likely. In addition, one of the piriform jars (FS 47; L46-42; *Figs. 12:4, 15:6*) with scale pattern (FM 70) may be dated in the LH IIIA1 period. However, the fabric and surface treatment is more at home in the local pottery repertoire, which has been confirmed by our ongoing petrographic study. The jug with cutaway neck (FS 132/133, L46-20; *Fig. 12:6*) and curved stripes (FM 67) is attested from LH IIIA1, for instance, at Vourvatsi/Attica,[31] and remains almost identical until LH IIIA2 late, after which it dies out.[32]

Nevertheless, the great majority of the recorded Mycenaean vessels with complete or almost complete profiles, which comprise mainly kraters and closed shapes, can be dated to the LH IIIA2–B period. There is an import in the shape of a narrow-necked jug (FS 120; L46-40; *Fig. 13:1*), the decoration, fabric, and surface treatment of which strongly suggest an import from the Minoan sphere of culture. The shape is attested from the LH IIIA2 period[33] until the LH IIIB1 period. The

[27] Fischer 2003, 277.
[28] Fischer 2003, 289.
[29] See references in Kling 1989, 132 and fig. 5b.
[30] Mountjoy 1999, 991, fig. 401:10.
[31] Mountjoy 1986, 58, fig. 66:1.
[32] Mountjoy 1986, 75.
[33] Mountjoy 1986, 67.

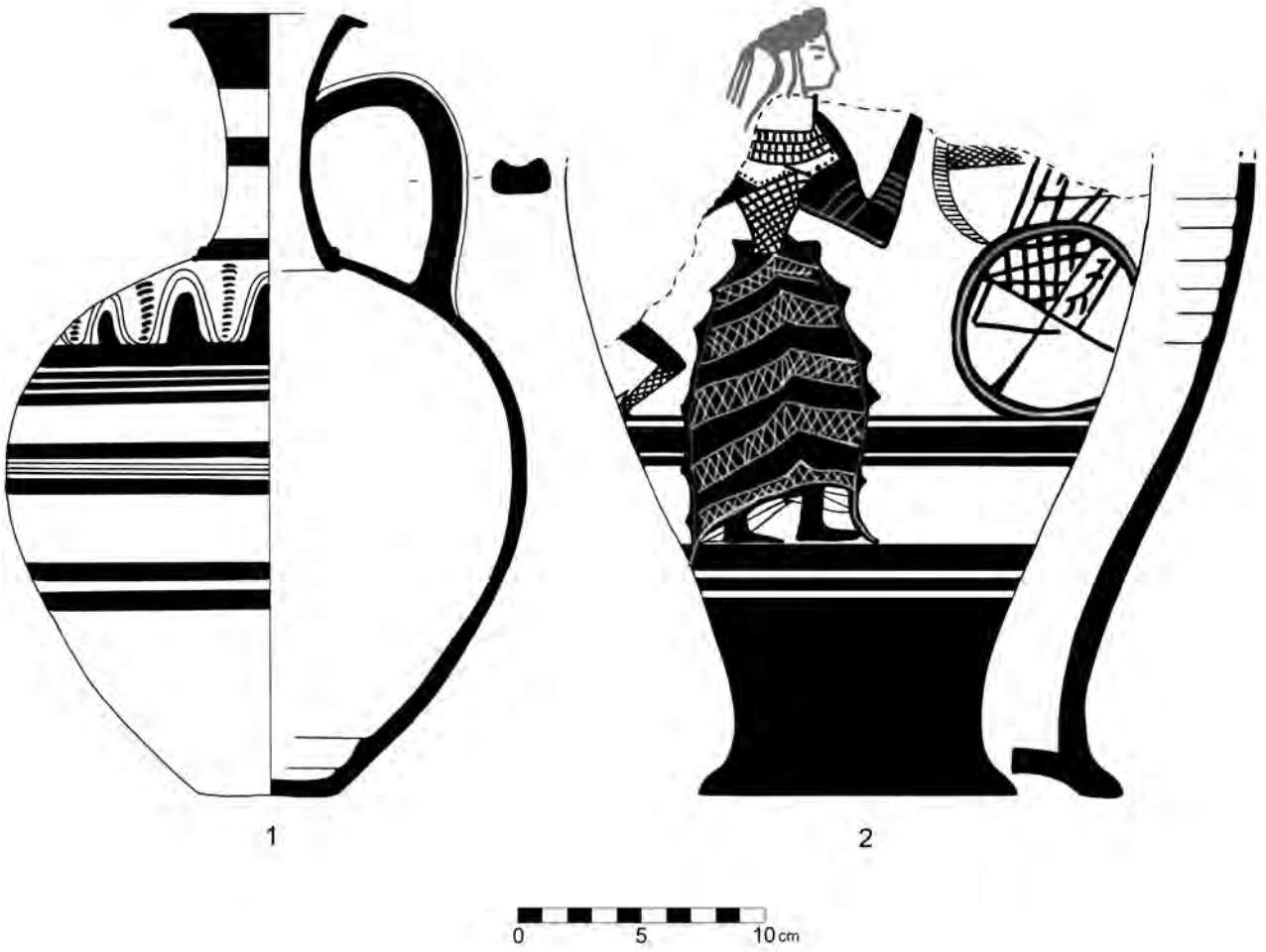

Fig. 13. Selected pottery from Area A, Pit V (drawing by M. Al-Bataineh).

decoration on the shoulder with semicircles (FM 43) and parallel arcs in between has a parallel on a stirrup jar from LM/LH IIIA2 Karpathos/Dodecanese.[34]

The lower part of the vessel with the large female figure next to a chariot and another minor individual (L46-36; *Figs. 13:2, 15:4*) belongs to a large amphoroid krater. The decoration of this vessel is unusual in many respects, maybe even unique. The pictorial decoration is applied on the lower part of the vessel, which usually is decorated only with horizontal bands. Female figures appear on Mycenaean kraters with chariots but are always very stylized. Our female with the bell-shaped dress with panels and volants, who is painted in great detail, closely resembles representations of females on Aegean wall paintings and seals.[35] A very remote and much more stylized "parallel" is a fragment of a krater from Kouklia/Palaipaphos.[36] We suggest a LH IIIA2 date for our vessel.

The amphoroid kraters with chariot scenes on both sides (FS 53–55; L46-34; L46-35) could almost completely be reconstructed. The first, L46-34 (*Fig. 14*), which depicts two chariots with two people and a pair of horses on each side, is moving from left to right. There are details in white paint and an "H"-shaped potmark under the base of this vessel. On the second chariot krater (L46-35) the chariots, horses, and people are moving from right to left. The direction is unusual, as by far the most frequent direction is from left to right. Similar

[34] Mountjoy 1999, 976, fig. 397:13.

[35] See e.g. Immerwahr 1990, pls. 22, 23, 55, 56, 57; see also the compilation by Warren 2005, 140–141.

[36] Vermeule & Karageorghis 1982, no. III. 11.

Fig. 14. Chariot krater L48-34 from Area A, Pit V (drawing by M. Al-Bataineh).

chariots are known from Cyprus,[37] Ugarit,[38] and Tel Dan.[39] Compared to the other chariot krater the decoration is more sloppily executed and the details in white paint are missing. A good parallel as regards style, fill motifs, and execution comes from Ugarit and was dated to the LH IIIB (ripe pictorial) period.[40]

Some of the Mycenaean imports can be dated to the LH IIIA1 period (or roughly the first half of the 14th century BC). However, the majority of the pottery should be dated from the LH IIIA2 to the LH IIIB period, i.e. from 1350–1200 BC. There are no sherds which can be dated to a period later than LH IIIB or LC IIC. As this time span of *c.* 200 years seems relatively long for one single deposition episode, it is evident that more than one deposition is reflected in the backfill of this pit. The pit contained exclusively pottery, mainly fine tableware, and two figurines. We suggest that many objects were broken and deposited in the course of rituals very likely in connection with the burials in Tomb X (see below) and/or other nearby tombs.

Well W

This anomaly (L47; *Fig. 10*) is located approximately 1.50 m south-west of the western margins of Pit V. It turned out to be a pit with a diameter of roughly 1.25 m. After removing the uppermost fill and excavating down to 0.50 m from surface, a layer of yellowish-brown ochre covered the central part of the pit. Below this layer of

[37] Vermeule & Karageorghis 1982, nos. IV.2, 27, 48, 65–67 and V.1, 2.
[38] Yon & Karageorghis 2000, 216, fig. 6, no. 39; 243 pl. I, no. 39/VK 12.
[39] Ben-Dov 2002, 100–102, 110–111.
[40] Yon & Karageorghis 2000, 217, fig. 7, no. 40; 243, pl. I, no. 40/VK 10.

Fig. 15. Selected pottery from Area A, Pit V (drawing by M. Al-Bataineh).

ochre was a concentration of burnt bones, shells, and many pieces of copper slag. Finds from Pit W include a head of an anthropomorphic figurine of Base-ring ware (L47-1), a Monochrome ware bowl with a long straight handle (L47-2), the handle of a Plain ware jar with a potmark (L47-3), the upper part of a White shaved juglet (L47-5), a Coarse ware lamp (L47-6), a fragment of a Minoan transport stirrup-jar with octopus motif (L47-4; *Fig. 11:5*), preliminarily dated to the Late Minoan IIIB period,[41] a Mycenaean (LH IIIB2) shallow bowl (L47-7; *Fig. 11:3*), and the upper part of a Mycenaean (LH IIIA2) globular stirrup jar (L47-8; *Fig. 11:4*). This feature also turned out to have been a well. After it went out of use it was reused for the discard of refuse. Excavations came to a halt at a depth of approximately 1 m from the surface.

The pottery suggests a date of the backfill to the later part of the 13th century, according to the latest datable sherd. Pottery explicitly datable to the 12th century could not be found in this feature.

[41] See Haskell *et al*. 2011, 20, group B.

Fig. 16. Aerial photograph of Area A, Tomb X (by P.M. Fischer and T. Bürge).

Tomb X

This double-anomaly (L48 West, L48 East) is approximately 10 m south-south-east of Offering Pit V and just to the north of and very close to the dirt road which passes the horse stables to the south (*Fig. 9*). On the magnetometer map it is almost identical in shape and orientation with Offering Pit V, approximately 3–4 m × 2 m in size and orientated east – west. This feature too was dug into fairly soft, clay-rich soil. In order to include the entire anomaly, a 5 m × 3 m trench was opened up.

In the course of the exposure of this feature it became clear that its shape indeed is almost identical with that of Offering Pit V, resembling a recumbent figure 8 orientated exactly west-east (*Fig. 16*). Cut into this double-pit and fairly centrally placed with a slight deviation towards west, an approximately 1 m wide circular feature, which turned out to be a shaft with backfilled and somewhat darker soil. This feature was cut from just below the ploughed soil.

As in Offering Pit V, this double-pit contained a large amount of pottery. Some of the pottery which was originally within the pit was scattered in the ploughed layer above the pit. This serves as an explanation why – despite meticulous sieving – pieces of almost complete vessels are missing due to agricultural activities (see also Offering Pit V above).[42] Nevertheless, the contents of this double-pit revealed a major difference in comparison to Offering Pit V, namely, that there were also a significant number of human skeletal remains in addition to non-ceramic finds, all of which were virtually absent in Offering Pit V.

[42] We investigated the ploughed soil surrounding the tomb which resulted in the discovery of a few matching pieces of pottery. However, the majority of missing pieces could not be found.

Human remains

Approximately 0.70 m from the surface a disarticulated human skull was encountered in the north-eastern portion of this feature, confirming its function as a tomb. In general, the bones are fragmented, and many disarticulated human bones and teeth were discovered scattered mainly along the periphery of the tomb.

Consequently, the estimation of the minimum number of buried individuals and their age at death is based on the teeth, through analysis of their number and degree of development[43] and attrition.[44] The minimum number and estimated age of the buried individuals in L48-West is as follows: one infant 5–6 years, one infant 6–8 years, two infants 8–10 years, and four adults: two are between 20 and 30 and two around 40 years old. The minimum number and estimated age of the buried individuals in L48-East is as follows: four infants 6–9 years, five adults of whom three are roughly 20–30 years and two around 40 years. This gives a total number of 17 individuals comprising eight infants and nine adults.

The finds

Finds from the tomb include numerous pieces of jewellery. There are 40 beads of various materials: carnelian (30 beads; L48-16A), amethyst (N82), turquoise (N63), paste (L48-16B), glass (N71), and gold (N83). An amulet of white (painted) faience depicts the Egyptian god Bes (N67) with oversized genitals. Finds of gold include two pairs of gold earrings (N77, N79), and a decorated leaf of gold which was used as a diadem (N69). There are also bronze finds in the shape of a bowl (L48-26) and a dagger with three rivets (N70), an ivory lid (N85), and three spindle whorls of black limestone (N74, N81, N84). Amongst the inscribed/incised items are two gold-mounted scarabs of steatite (N75 in *Fig. 17:2*, N78 in *Fig. 17:1*), another plain scarab of steatite (N86; *Fig. 17:3*), and five cylinder seals of haematite (N64 in *Fig. 18:1*, N73 in *Fig. 18:2*, N76 in *Fig. 18:3*), chlorite or haematite (N72 in *Fig. 18:4*), and steatite (N80; *Fig. 18:5*).

The pottery recorded so far includes a large number of locally made and imported vessels (80 so far). The locally produced vessels include six of Plain White Wheel-made ware including bowls (L48-18, L48-29, L48-74), jugs (L48-31, L48-58), and a krater (L48-75); seven bowls (L48-7, L48-8, L48-11, L48-12 in *Fig. 20:2*, L48-13, L48-19, L48-27) and a small jar[45] (L48-35) all of White Painted Wheel-made ware;

[43] AlQahtani *et al*. 2010.
[44] Fischer 1986, 25.
[45] The small jar resembles both Levantine-produced Late Bronze Age pottery but also Late Cypriot IIIB Proto White Painted.

Fig. 17. Scarabs from Area A, Tomb X (photograph by P.M. Fischer).

a White shaved juglet (L48-28); a bowl of White Painted VI ware (L48-36; *Fig. 19:1*); a bowl of White Slip I ware (L48-38; *Figs. 19:2, 21:1*); three bowls of early White Slip II ware (L48-24, L48-32 in *Fig. 21:3*, L48-39); 19 mature White Slip II bowls (L48-5, L48-17, L48-34, L48-43, L48-44, L48-45, L48-46, L48-47, L48-48, L48-50, L48-51, L48-52, L48-53, L48-66, L48-69, N59, N62) including two very large and deep examples (L48-14, L48-21 in *Fig. 21:2*); seven Base-ring I vessels including a bowl (L48-63), two tankards (L48-25, N66 in *Fig. 21:6*), a jug (L48-6), two juglets (L48-55, L48-62), and a double juglet (N61; *Fig. 21:7*); eight vessels of Base-ring II including three bowls (L48-9, L48-54, L48-61), three jugs (L48-57, L48-60, L48-70), a juglet (L48-68), and a lentoid flask (L48-67); and a juglet (L48-33) and a jug (L48-56) of Bucchero ware. There are also eight Red Lustrous Wheel-made ware vessels including seven spindle bottles (L48-2 in *Fig. 21:4*, L48-40, L48-64, L48-65, L48-71, L48-72, L48-73) and a platter (L48-3; *Fig. 21:5*).[46]

Imports include 14 Mycenaean vessels, amongst them six bowls (L48-1, L48-15 in *Figs. 20:3, 22:1*, L48-20, L48-37 in *Fig. 20:1*, L48-41, L48-42), a krater decorated with fish (L48-22; *Figs. 20:4, 22:3*), a jug (L48-4; *Fig. 22:2*), a beaked jug (L48-49; *Fig. 19:3*), a piriform jar (L48-23; *Fig. 22:6*), two stirrup jars (L48-30, L48-59), a straight-sided alabastron (N68; *Fig. 22:5*), and a plain stemmed cup (N65; *Fig. 22:4*).

There is also a Levantine import in the shape of a lentoid flask (N60), which according to our petrographic analyses was produced along the north-western littoral of Israel, more specifically in the region south of the Carmel coast to Tell Qasile.[47]

The scarabs[48]

The first scarab (N78; *Fig. 17:1*) is of fired steatite and is gold-mounted. On the base it shows the figure of the pharaoh wearing a short apron and holding a sceptre. To the right is a cartouche *men-kheper-re*, the throne name of Thutmosis III. Remains of blue glaze survive on the steatite. The second scarab is also of fired steatite and is gold-mounted (N75; *Fig. 17:2*). The base shows an *uraeus* and a reed leaf or the feather of *maʿat*. The third scarab (N86; *Fig. 17:3*) is of fired steatite and shows a *djed*-pillar flanked by two *uraei*.

The cylinder seals

Three of the cylinder seals are of haematite (N64, N73, N76), one is of chlorite or haematite (N72),[49] and one of steatite (N80). All seals are depicted mainly in Cypriot style:

[46] As regards their provenance, see above.

[47] All petrographic analyses were carried out by Paula Waiman Barak, University of Haifa.

[48] We would like to thank Othmar Keel, Fribourg, for his comments on the scarabs and references.

[49] It is often difficult to distinguish haematite from chlorite with the naked eye. XRF analyses will be carried out during the next season of excavation in 2017 in order to verify the material of the seal.

Fig. 18. Cylinder seals from Area A, Tomb X (photograph by T. Bürge).

– N64 (*Fig. 18:1*) shows a human figure holding a stick, a quadruped to the left and a bow and arrow in front of the animal. To the right of the human is a standard.

– N73 (*Fig. 18:2*) belongs to the group of Cypriot Common Style seals[50] and is engraved with a human figure standing next to a palm tree with a large bucranium in between and several filling motifs, such as an "ingot-shaped" oblique cross, a circle with central drilling, and lines. The seal is engraved in an angular manner and corresponds to a standardized scheme of Cypriot style seals. Similar seals are known, e.g., from Hala Sultan Tekke,[51] Enkomi,[52] and Tell Abu Hawam.[53]

– N76 (*Fig. 18:3*) depicts three human figures, most likely females, in long robes with upraised arms. Two of them are holding horned animals – stags or gazelles – which hang down head first. Next to the third figure is a standing animal – judging from the paws a lion. Above is a bucranium and a sun symbol. Two Cypriote seals from Ugarit[54] show a similar motif with stags but are not as rich in detail as our seal.

– N72 (*Fig. 18:4*) depicts a female figure with bent arms. Next to her are a lion (?) and another quadruped standing/sitting opposite each other. Above the lion is a scorpion and above the quadruped another, smaller, quadruped. Four dots arranged in a lozenge are drilled in between the arm of the human and the quadrupeds. The motif may be interpreted as "mistress of the animals".

– N80 (*Fig. 18:5*) shows a human figure and two quadrupeds, which are carved lengthwise, next to it. A tree is between the two animals. Several drilled dots fill the empty spaces around the figures. A relatively close parallel is a steatite seal from Tomb 3 at Maroni,[55] which depicts a tree and attendant animals.

Comments and dating

The sequence of the burials of the 17 individuals comprising eight infants and nine adults could not be fully established. The obvious disorder amongst the skeletons and finds should be explained by the reuse of the tomb for the burial of additional individuals. At the end of the life span of this Late Cypriot tomb it had been reopened once again in order to prepare it for additional burial(s), which is reflected in the circular feature in the centre of the double pit starting from just below the ploughed soil. Buried skeletons and finds were swept aside along the periphery of the tomb where the majority of the intact vessels were found. Due to unknown reasons the tomb was closed again without any further human interments taking place, as no additional *in situ* burials were found. Possible explanations are that this tomb was accidentally opened by people who prepared it for another burial, or

[50] Porada 1948, 194 (Group XII); esp. pl. XI, no. 55 (from Kourion).

[51] Porada 1976, 98, fig. 77, pp. 101–103, fig. 80; from Tomb 1, dated from LC IIB–C, *c.* 1320–1200 BC.

[52] Kenna 1971, no. 114 = British Museum BM 1897,0401.696.

[53] Hamilton 1935, 64–65, pl. XXVI, no. 514; from Stratum V, dated to 1400–1230 BC.

[54] Amiet 1992, 191, no. 455; 192, no. 472; dated to Ugarit-Récent 2 (1450–1300 BC).

[55] Kenna 1971, no. 17; Johnson 1980, no. 45 = British Museum BM 1898,1201.17; context dated to 1550–1375 BC.

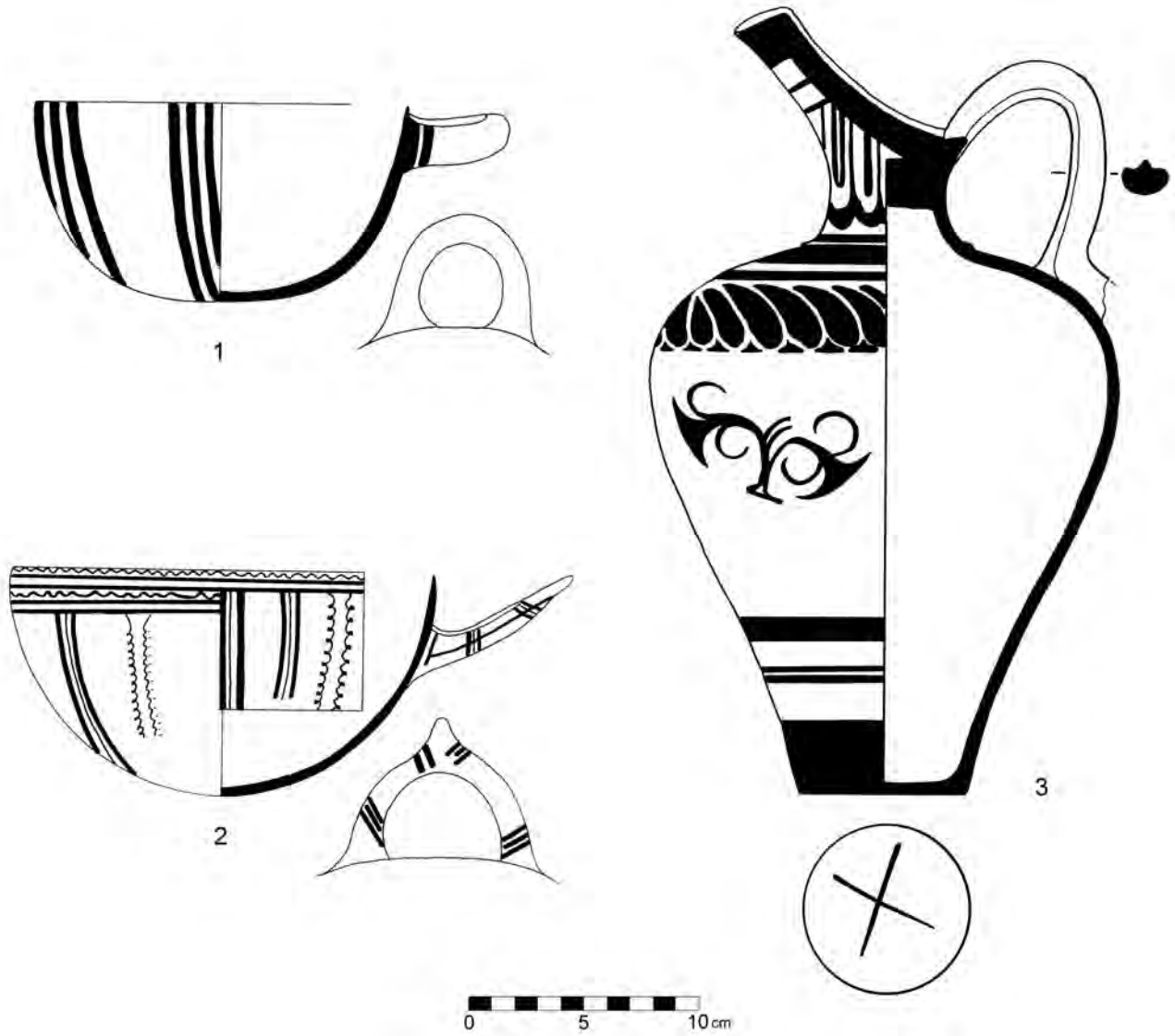

Fig. 19. Selected pottery from Area A, Tomb X (drawing by M. Al-Bataineh).

for use as a well and who were not aware of the presence of a tomb. When they realized that they in fact were digging into a tomb they closed it again without looting it.

The quality of the finds, which comprised many imports and valuable jewellery of gold and precious stones, points to individuals of high rank. The question if this tomb was used for related individuals, which seems to be most likely, may be answered by DNA and their movements by $87^{Sr}/86^{Sr}$ analyses.[56]

Amongst the earliest vessels are a bowl of White Painted VI ware (L48-36; *Fig. 19:1*),[57] a White Slip I bowl (L48-38; *Figs. 19:2, 21:1*), and a Mycenaean imported beaked jug (L48-49; *Fig. 19:3*). The beaked jug (FS 141) should be dated to Late Helladic IIA,[58] which places it amongst the earliest Mycenaean imports to Cyprus. Such an excellently executed import could have been kept for some time. Consequently, we must consider

[56] Samples have been taken and analyses are underway.

[57] See the suggested chronology for White Painted VI, i.e. Late Cypriot IA1–IB1, in Åström 1972, 700.

[58] Cf. the shape in Mountjoy 1986, 29–30 with parallels from Mycenae and Prosymna (fig. 27) but here with different decorations.

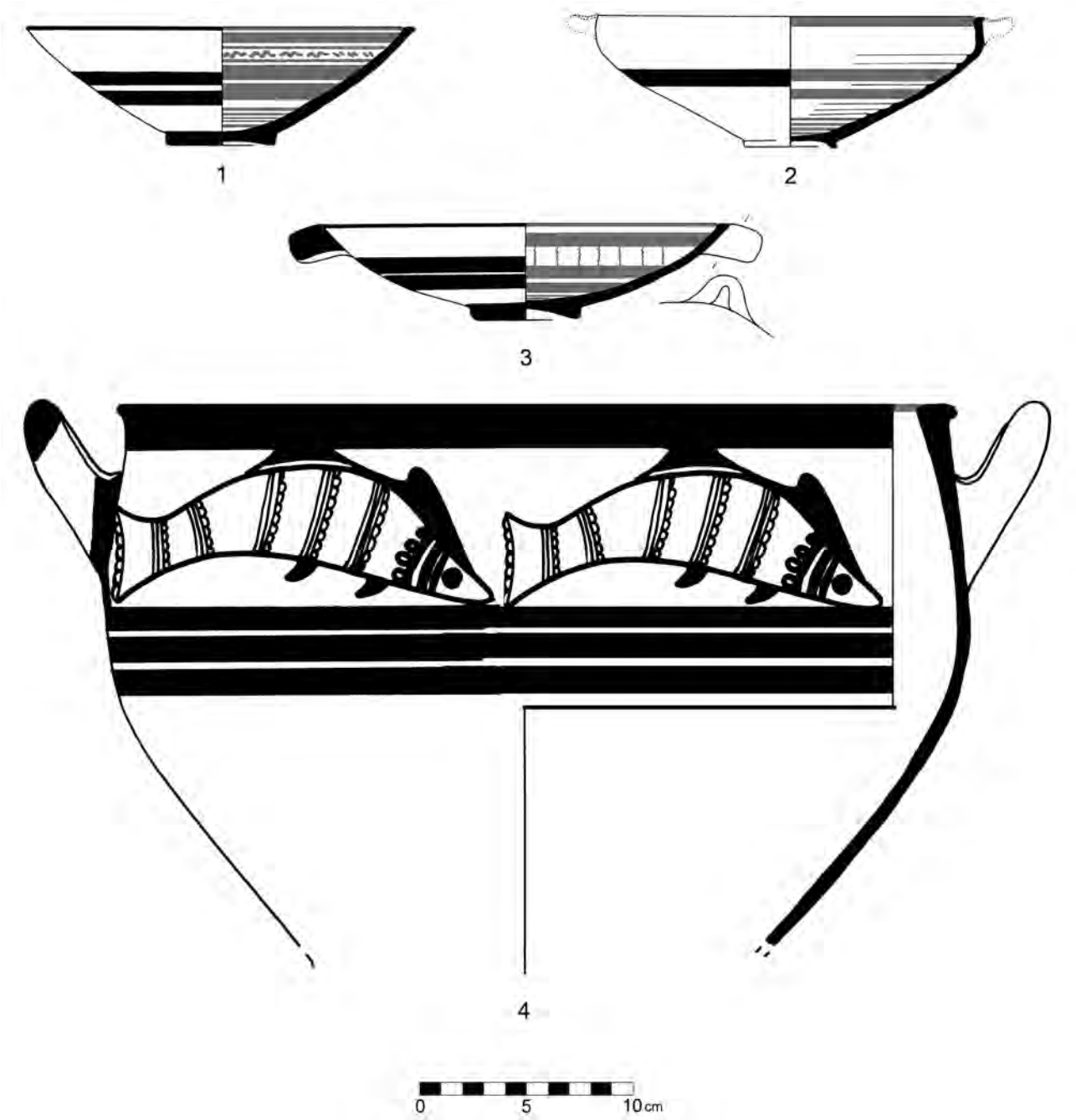

Fig. 20. Selected pottery from Area A, Tomb X (drawing by M. Al-Bataineh).

the heirloom factor as regards chronology. Most of the other Mycenaean imports are from the LH IIIA2–B period.

Another find which provides the earliest possible date of the tomb is the gold-mounted steatite scarab with the cartouche of Thutmosis III (*men-kheper-re*; *Fig. 17:1*). Although there is no total consensus on the starting date of the 53/54 years of the reign of Thutmosis III, we are on fairly safe grounds within a few decades. For many years, the conventional chronology, 1479–1425 BC, dominated amongst Egyptologists.[59] In recent years this chronology has been challenged. Nowadays it seems that a "high/early chronology" for the Year 1 of Thutmosis III, viz. 1493 BC (and to a lesser extent 1504 BC), is generally preferred by Egyptologists and people relying on radiocarbon dates.[60]

[59] Kitchen 1987, 52.
[60] Aston 2012.

Fig. 21. Selected pottery from Area A, Tomb X (photograph by P.M. Fischer and T Bürge).

Fig. 22. Selected pottery from Area A, Tomb X (photograph by P.M. Fischer and T Bürge).

One should be aware that the cartouche of Thutmosis III was used long after his reign. Alternatively, scarabs with his cartouche could have been kept as heirlooms for a considerable period of time. These observations limit the chronological value of our scarab. According to O. Keel[61] (personal communication) the somewhat stylized engraving of the hieroglyphs points to a date after his reign, maybe as late as the 13th century BC or 19th Dynasty. In any case, this scarab provides a *terminus post quem*.[62]

The latest possible date of the tomb is provided by numerous bowls executed in White Slip II mature/late style and some Mycenaean imported pottery: the Mycenaean "fish krater" (FS 281; L48-22; *Figs. 20:4, 22:3*) can be dated to the early LH IIIB period, i.e. roughly the first half of the 13th century.[63] The shallow bowls (FS 296) with n-pattern (L48-37 in *Fig. 20:1*, L48-42) can be dated to the LH IIIB period.[64] In addition, locally made shallow bowls of Mycenaean style (L48-11, L48-12 in *Fig. 20:2*, L48-13, L48-27) and another bowl, which is most likely a Mycenaean import (L48-15; *Figs. 20:3, 22:1*) of the same shape, are dated from LH IIIB or possibly to early IIIC (or LC IIC to early IIIA).[65] There is no other pottery which may be dated later than the LC IIC to IIIA transition. In summary, Tomb X contained material which is dated from roughly 1550 to 1200 BC.

General Conclusions

CQ1

Excavations in the southern part of CQ1 exposed three phases of occupation. Stratum 1 was divided into an earlier (1B) and a later (1A) subphase. Subphase 1A is mainly characterized by the addition of a retaining or terracing structure. The two compounds of Stratum 1B, which were partly exposed in 2016, are separated by a courtyard, which was used for living, storage, food preparation, and textile production.

Stratum 2 is only partly exposed. The information based on the finds from the roofed spaces R63, R64, and R65 is limited but clearly these spaces had a domestic function. The lead ingot weighing more than 1 kg which was buried approximately at the level of the foundation of W104 separating R63 from R64, seems to present a foundation deposit. R66 appears to have been a courtyard where a complete incised wall bracket of fired clay, which was mended in antiquity, was discovered.

The oldest occupation layer as yet known in this area, Stratum 3, is only exposed in a small test trench. Further exposure of Stratum 3 will shed more light on the chronology of this phase.

AREA A

The results from the four seasons of exploration of Area A (2013–2016) demonstrate that this area had two main functions: firstly, it was used for burials and ritual offerings; and secondly, it was a source of water from numerous wells. Area A is a plateau roughly 10 m above sea level. As regards wells, our deepest excavations of Wells A and C reached approximately 5 m below the surface at which depth they were halted for safety considerations. At this depth the moisture content of the soil had increased drastically. Therefore, we can assume that another metre or so deeper down water would have been available. However, one has to keep in mind that today's hydrological situation may be different from that some 3,000 years ago. Nevertheless, the numerous Late Cypriot wells in Area A demonstrate that people indeed found the area convenient for sourcing their supply of water. Therefore, the fact that all of the wells which we excavated had been backfilled at the later part of Late Cypriot II, possible during the transition from Late Cypriot IIC to IIIA, i.e. around 1200 BC, is puzzling. It seems that they were backfilled because their intended function ceased, that is they failed to produce enough usable water. Could this be another piece of evidence for the 3200 BC climatic event (drought)?[66]

Considering the second function of Area A, it should be highlighted that a Late Cypriot cemetery is a rare phenomenon and most of the known burials from this period are placed intramurally.[67] In Area A, though, the evidence for a cemetery is backed up by our recently discovered tombs in addition to tombs which were excavated there during the last decades. Tomb X – together with Tomb 2[68] – are so far the oldest burials in Area A: their earliest possible date is Late Cypriot IB (or even IA2) or the 16th century BC. Consequently, our Tomb X contained material which is dated from roughly 1550 to 1200 BC.

[61] Keel, personal communication, 23 of June 2016.
[62] As regards jewellery the "heirloom factor" must be taken into account when discussing chronology. Jewellery, and to some extent exclusive pottery and items of more durable materials, were certainly kept for some time. Consequently, an indeterminate time lapse between production date and the final date of deposition must be considered.
[63] The shape appears in LH IIIB1, see Mountjoy 1986, 93; a close parallel is a krater from Cyprus in Vermeule & Karageorghis 1982, no. V.128, which is dated to the LH IIIB period on typological and stylistic grounds.
[64] See also the parallel from Hala Sultan Tekke, Tomb 2, in Karageorghis 1976, 84, no. 205.
[65] See references in Kling 1989, 132 with further references, and fig. 5b.
[66] See e.g. Kaniewski *et al*. 2015; see also Appendix 3.
[67] Keswani 2004, 86–88.
[68] Karageorghis 1976, 89.

Pit V contained a number of depositions dating from approximately 1400 –1200 BC. As no vessel from this pit was intact, and some sherds were broken in places which do not break easily, it is likely that the tableware and the figurines were broken deliberately and afterwards deposited in the pit. It is possible that the function of this feature was the same or similar to that of Offering Pits B and P, although these contained mainly intact, complete or almost complete objects of pottery including cooking vessels and many imports, textile production tools, wall brackets, and ivory objects.

In summary, the earliest traces of activities in Area A are from the 16th century BC and are represented by White Painted VI, White Slip I bowls, both monochrome and bichrome decorated, the Late Helladic IIA beaked jug, and – with some reservation – one of the gold-mounted scarabs with the cartouche of Thutmosis III. At the other end of the life span of Area A is, for instance, Tomb A which contained early LC IIIA material, viz. the 12th century BC. These observations suggest a time span for the use of Area A as a cemetery from the 16th to the 12th century BC. Since our excavations in the city only revealed material from the 13th and 12th centuries BC one has to ask the question: where exactly in the area of Hala Sultan Tekke is the settlement to which these tombs belong? Geophysical prospecting will continue in the seasons to come in order to trace architectural remains closer to Area A.

In general, the material from the wells is of more recent date: the backfill of the wells is mainly of 14th to 12th century BC date and one of the wells (Well G) contained material which can possibly be dated to the early Iron Age.[69]

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[69] Fischer & Bürge 2016, 53.

Appendix 1

A lead ingot and lead production at Late Bronze Age Hala Sultan Tekke

BY LAERKE RECHT

Description and context

During the 2016 season at Hala Sultan Tekke, a lead ingot (N315) was discovered (*Fig. 23*).[70] The ingot is flat and roughly rectangular, resembling at first glance a wall stone (L 8 cm, W 7.50 cm, Th 3 cm, weight 1.287 kg). XRF analysis revealed that it is almost pure lead with only a small amount of silver and other elements: Pb 99.58, Fe 0.09, trace elements of Al, Si, and Ti.[71]

The ingot was found in L583 (Stratum 2) in Trench 24A in the entrance between R63 in T24A and R64 in T24B (see *Fig. 6*). The soil in this entrance, an extension from Wall 104 to Wall 102, was significantly different from the havara-like surfaces on either side in the rooms. It instead contained many small stones and darker, looser soil, suggesting a fill. The ingot may have been deliberately placed in this threshold "fill" as a building deposit.

Fig. 23. Lead ingot N315 from CQ1, Stratum 2 (photograph by T. Bürge)

[70] I would like to thank Peter M. Fischer for suggesting the topic of this appendix, and for the opportunity to participate in the excavations at Hala Sultan Tekke. The excavation of the trench within which the ingot was found was carried out by Peter M. Fischer, Lorenzo Mazzotta, Wilhelm Jansson, Azael Varas, Nicolas Frendin, Juuli Ahola, and the author. Thanks are also due to Emma Saunders for reviewing the language of this paper, and to Giampaolo Graziadio for helpful comments.

[71] XRF analysis courtesy of Peter M. Fischer. The distribution of the main elements shows the average of three analyses of the surface of the object from which all oxides had been removed prior to the analysis.

Lead and lead ingots

Lead is usually not considered a prestige metal due to its lack of lustre. Instead, it has the characteristics of a high level of formability, high density, a low melting point, and high resistance to corrosion. Historically, lead may have been the first metal to be obtained by smelting.[72] Lead is malleable enough to be manipulated by hand, and we see that, for example, fishermen took advantage of this by bringing sheets of lead with them on the boat which were then folded into sinkers when required.[73] Lead was used for a wide range of purposes in the ancient world, including for fishing equipment, balance weights, architectural elements, in shipbuilding, statues and figurines (or parts thereof), vessel repairs, pigment, various decorative elements, medicinal purposes, glaze compounds, writing (both on and with), and in hunting and warfare as sling bullets.[74] Several of these have been found at Hala Sultan Tekke.

Lead can be alloyed with copper and tin. It naturally occurs together with silver because a very small amount of silver can be found in certain types of lead ore (e.g. galena/lead sulphide, see e.g. Laurion). The silver is extracted through the process of cupellation, which requires large amounts of lead. Cupellation may already have occurred in the Bronze Age,[75] but there is no evidence of this particular process at Hala Sultan Tekke. Less well-known or widely discussed than their copper cousins, lead ingots have been found in a number of places in the Eastern Mediterranean. From Cyprus itself, lead ingots have been reported at Enkomi, but of very different types from the Hala Sultan Tekke example. Lead ingots have also been found at possible shipwreck sites off the coast of Israel.[76]

Most notable are the large amounts of lead and lead ingots from Ugarit and Ras Ibn Hani. At Ugarit, lead and lead ingots come from the palace and the "Temple hourrite". The finds from Ras Ibn Hani include twelve lead ingots from the North Palace. Six of these were found together, representing a total weight of 280 kg and interestingly, one small ingot was found in the threshold between two of the palace rooms (between Rooms XXXIX and XXI).[77]

Many of the items identified as ingots have irregular oval or circular shapes and have one or several holes pierced through. In contrast, the shape of the Hala Sultan Tekke ingot is not a common one.[78] Of the lead ingot typology developed by Brown,[79] the Hala Sultan Tekke ingot does not exactly match any of the categories, but there seems to have been limited standardization of lead ingots in general. Although more triangular than rectangular in shape, the ingots from Ras Ibn Hani are perhaps the closest parallels to the Hala Sultan Tekke ingot,[80] and the "small" ingot placed in the threshold the closest in terms of size (weighing 530 g). However, they appear to have been cut from larger plano-convex or bun-shaped ingots that were too heavy to carry.

Metal ingots are depicted in Egyptian tomb paintings at Thebes, with copper oxhide ingots being particularly recognizable; torus-shaped ones may also be depicted, as on the West Wall of the Hall in the Tomb of Rekhmire.[81] It is tempting to correlate the flat, square shapes on the second register with the Hala Sultan Tekke ingot, but unfortunately, the shape is too undiagnostic to be safely identified.

Import and lead production at Hala Sultan Tekke

As there are no convenient sources of lead ores on Cyprus, lead had to be imported. The nearest source is most likely the ores of the Taurus Mountains in Anatolia, about 100 km from the northern coast of Cyprus. Some lead items from Hala Sultan Tekke have in fact been identified as consistent with this source.[82] Lead also appears to have been imported from Sardinia. This may come as a surprise due to the distance from Cyprus, but the two had strong (and possibly direct) relations in the later part of the Late Bronze Age. This is especially demonstrated by the oxhide ingots and other Cypriot

[72] See Stos-Gale & Gale 1982, 467; Moorey 1994, 294.
[73] Galili *et al*. 2002, 190.
[74] Moorey 1994, 293; Nriagu 1983, 205, 310.
[75] There is some evidence indicating cupellation at, for example, Ras Ibn Hani and Ugarit, where litharge (a waste product of cupellation) has been found (Dardaillon 2012, 175). However, litharge can also be used for pigments, for example (Sotiropoulou *et al*. 2010).
[76] For Enkomi, see Courtois 1984, 48, nos. 422–425. Muhly is likely right in only accepting no. 423 as a fairly certain example of an ingot (1988, 263). Unfortunately the weight is not given for any of these objects. For Israel, see Raban & Galili 1985; Wachsmann & Raveh 1984.
[77] See Schaeffer 1938, 317; Dardaillon 2012, 171–172 for Ugarit, and Lagarce *et al*. 1987, 282–284 (279 for plan marking ingots) for Ras Ibn Hani. The large total weights from the two sites are given as 70 kg from the palace at Ugarit alone, and 500 kg from the North Palace in Ras Ibn Hani (Dardaillon 2012, 171, table 18.1, Bounni *et al*. 1998, 48). A general weight of 18–25 kg for each ingot is given, which supports the notion that the somewhat smaller Hala Sultan Tekke ingot was intended for the production of smaller items like those found at the site.
[78] Another possible ingot from Hala Sultan Tekke is also reported in Fischer 1980, 39 (N1271).
[79] See Brown 2011, 92, Table 4.1.
[80] For illustrations, see Lagarce *et al*. 1987, fig. 7; Bounni *et al*. 1998, 170, fig. 143.
[81] See Davies 1943, pl. XVIII.
[82] The lead isotope analysis for the examples cited here were carried out by Zofia A. Stos-Gale and Noël H. Gale: Stos-Gale & Gale 2010, 394, 398, 399, tab. 2, 4, 5 for Hala Sultan Tekke samples. For Cypriot finds in Sardinia, see Lo Schiavo 2012.

Fig. 24. Lead objects from CQ1–3 (a: sling bullets, b: net weights, c: bead; photograph by P.M. Fischer and T. Bürge).

finds in Sardinia. To date, the connection between the two is not very clear from finds in Cyprus, but the results from the lead isotope analyses could suggest that what was traded in return included lead. Of even greater surprise may be the apparent origin of lead from deposits in the Massif Central in south-eastern France – including one of the analysed objects from Åström's excavations at Hala Sultan Tekke (N1185A).

That lead objects were produced at Hala Sultan Tekke itself is also evidenced by the presence of melted lead. Several such pieces have been found, and indeed, two were found along with a partially preserved cooking pot inside an oven which must have been used precisely for the production of lead objects (L149', R17).[83] The specific objects made in this instance are not known, but the ingot has a suitable size for almost any of the types of lead finds at Hala Sultan Tekke, which are all of a fairly small size.

[83] See Fischer 2012 b, 98.

Lead objects found at Hala Sultan Tekke (Table 1)[84]

SLING BULLETS

By far the most common type of lead artefact found at Hala Sultan Tekke is the sling bullet (*Fig. 24:a*). A total of 71 sling bullets has been found so far. They come in fairly standardized shapes, but different types are clearly discernible: they are usually ellipsoid, but an unusual type that came to light during the 2015 season is the truncated-cylindrical shape (N301, N302, N311; *Fig. 24a* right).[85] The purpose or advantage of this particular shape is not yet understood, but it does not seem accidental or as a result of use/damage, as the shape is symmetrical at either end. The ellipsoid examples often have casting lines on the sides from a mould, but they are not standardized enough to have come from the same mould. Possibly the moulds were single-use, or a "tree-mould" with many spaces for bullets were used.[86] The lead sling bullets from Hala Sultan Tekke weigh between 29 and 56 g (with an average of 40 g), and the ingot may thus have provided raw material for 23–44 sling bullets.[87]

Historically, sling bullets have been used for warfare, small game hunting, and as a herder's aid to protect their animals. Experimental and ethnographic studies have shown that a skilled slinger can shoot sling bullets over significant distances, and slingers appear to have been a good match even for archers.[88] In an experimental study with a trained but unprofessional slinger, the following average ranges were obtained, using a 36.82 g projectile: lead biconical 170 m, lead sphere 147 m, clay biconical 146 m, clay sphere 105 m.[89] This provides good evidence for why the lead biconical/ellipsoid shape was the most popular. The importance of slingers in the army is well-attested for later periods, but the sling can be traced back at least to the Neolithic in both Greece and the Near East. The lead sling bullets from Hala Sultan Tekke could have been used for hunting or for military purposes (clay sling bul-

[84] The objects discussed in this section and included in the catalogue are from published data from the "old" Swedish excavations, and all discovered objects (some partly published or in process of publication) from the new excavations (2010–2016).
[85] See Fischer & Bürge 2016, 45–46, fig. 14.
[86] Cf. example from Olynthus illustrated in Korfmann 1973, 40.
[87] Preliminary XRF analysis of sling bullet N264 (carried out by Peter M. Fischer) shows a similarly high level of purity (Pb 99.64%, Bi 0.14%), even if it does not exactly match the composition of the ingot.
[88] For a good discussion of the role of sling bullets, see Korfmann 1973, esp. 37, 39.
[89] See Skov 2013, 75.

lets have also been found at Hala Sultan Tekke).[90] The fact that some of the bullets are inscribed with Cypro-Minoan signs could support the idea of military use (N1144, N1166, N1172, N1176, N2001)[91]. We do not know the meaning of the signs – in later Greek times, they relate to army divisions, commanders, or even comprise taunts at the enemy.

FISHING TACKLE: NET WEIGHTS[92]

The second-most common type of lead artefact found at Hala Sultan Tekke is fishing gear in the form of net weights (34 in total, *Fig. 24:b*). Of these, the rectangular, folded-over type is most often found and recognizable. They are a fairly common occurrence at harbour and shipwreck sites – 107 were found on the Uluburun shipwreck and 18 on the Cape Gelidonya shipwreck.[93] The other types of net weights come in a variety of shapes and usually have a hole for attachment to the net. One net would require many weights, but it is currently not known exactly how many. It has been suggested that the Uluburun examples compile "sets" of 21 sinkers/weights for a single net, and a possible reconstruction of the arrangement of weights is offered by Galili *et al*.

WEIGHTS, BEADS, AND SPINDLE WHORLS

It is not always possible to distinguish with certainty between these items as they all tend to be fairly small, geometric shapes with a central hole (*Fig. 24:c*). Some of these may in fact also have served as net weights, and the "beads" could have been for jewellery/decoration or spindle whorls. However, a few examples of weights can be identified because they lack any kind of piercing (e.g. N1181A[94]). Such weights were used in trading activities and could even have served a pre-monetary function.

ARCHITECTURE: FILLING

The architectural uses of lead apparently so abundant elsewhere[95] are rare in Cyprus. At Hala Sultan Tekke Area 8, there is one fascinating example of molten lead having been poured between the slabs of what might have served as a kind of "bathroom" (N1085)[96]. The lead may in this case have worked as a kind of waterproofing.[97]

LUMPS AND PIECES

Amorphous and irregular pieces of lead have been found throughout the site. Some of these are melted pieces, and it is assumed that they are all either waste products or particularly corroded pieces (although significant corrosion of lead is not common).

UNUSUAL AND UNIDENTIFIED PIECES OF LEAD

Amongst those are "buttons", an escutcheon, the handle of a cup, a pendant, a decorated finger ring, and an enigmatic sheet of lead wrapped around another leaf-shaped, pierced piece of lead, both with exactly the same weight (N317; see main report). A number of the lead objects have not yet been further identified. They have clear and deliberate shapes, so that we can be certain they are not simply waste products. However, their exact purpose has not been determined.

Conclusion

If the ingot is in fact a foundation deposit, as suggested by its placement, it may not be without precedent in the Near East. As we have seen, a lead ingot was found in a doorway at the North Palace in Ras Ibn Hani, and inscribed lead plaques also occur in Near Eastern foundation deposits.[98] At Hala Sultan Tekke, another building deposit may be represented by the discovery of a bronze spearhead found directly below a flat stone close to a threshold (N4).[99] It cannot be ruled out that the ingot ended in its location by chance, since this part of the wall/entrance is not as clearly defined as just north of it. It was in any case taken out of circulation, but the range of lead finds at the site illustrates the types of objects that could have been produced from it, with evidence that such production did indeed occur at Hala Sultan Tekke.

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[90] Vutiropulos 1991 for Greece; Horejs 2015, 153 for the Near East; Stolle 2013 for clay sling bullets at Hala Sultan Tekke.

[91] *HST* 7, 7, 41, 43; Fischer 1980, 30, fig. 5B; *HST* 11, 33, 34, 37, fig. 45a; Fischer 1980, 28, fig. 5D; *HST* 11, 13, 33, 34, 37, fig. 45b; *HST* 8, 59, 68, 69.

[92] Also referred to as net sinkers. A typology of net weights/sinkers is presented in Galili *et al*. 2002. The lead examples all functionto sink/hold the net down.

[93] For Uluburun see Pulak 1988, 32; for Cape Gelidonya see Bass *et al*. 1967, 131, fig. 139 (L1). For reconstruction of weight arrangement, see Galili *et al*. 2002, 195, fig. 15.

[94] Fischer 1980, 38.

[95] E.g. Egypt and later in the Near East; see Nriagu 1983, 237–240.

[96] *HST* 4, 81, 85, 90, fig. 154.

[97] This lead sealing was already suggested by a strong signal during a preliminary check with the metal detector.

[98] See Andrae 1935, 42; Moorey 1994, 295–296.

[99] See Fischer 2011, 79.

Table 1. Lead objects from Hala Sultan Tekke

type	find #	object	notes	str	CQ	context	g/cm	reference
sling bullet	N1144	sling bullet	inscribed			Area 8, Room 10, F1232, Layer 4	42/3×1.6×1.6	*HST* 7, 7, 41, 43
	N1161	sling bullet				Area 8	32/3.3×1.3×1.3	Fischer 1980, 30, fig. 5A
	N1166	sling bullet	inscribed			Area 8	40/3.4×1.5×1.4	Fischer 1980, 30, fig. 5B
	N1167A	sling bullet				Area 8, underneath lime plaque	43/3.6×1.6×1.3	Fischer 1980, 30, fig. 5C
	N1172	sling bullet	lentoid, inscribed			Area 8 East, F1321, Layer 3	47/3.6×1.6×1.5	*HST* 11, 33, 34, 37, fig. 45a. Fischer 1980, 28, fig. 5D
	N1176	sling bullet	lentoid, inscribed			Area 8 East, F1315, Layer 3	45/3.6×1.6×1.4	*HST* 11, 13, 33, 34, 37, fig. 45b
	N1179A	sling bullet				Area 8 South, excavation depth 9 cm	3.4×1.5	Fischer 1980, 36
	N1186	sling bullet				Area 8 South, excavation depth 3 cm	3.1×1.5	Fischer 1980, 36
	N1187	sling bullet				Area 8 South, excavation depth 11 cm	3.4×1.9	Fischer 1980, 36
	N1189	sling bullet				Area 22 East, excavation depth 5 cm	3.6×1.5	Fischer 1980, 38
	N1191	sling bullet				Area 8 South, excavation depth 15 cm	3.6×1.9	Fischer 1980, 36
	N1194	sling bullet				Area 8 South, excavation depth 16 cm	3.2×1.6	Fischer 1980, 36
	N1198	sling bullet				Area 22 East, excavation depth 4 cm	3.3×1.6	Fischer 1980, 38
	N1200	sling bullet				Area 22 East, excavation depth 10 cm	2.8×2.5	Fischer 1980, 38
	N1201	sling bullet				Area 22 East, excavation depth 8 cm	3.6×1.4	Fischer 1980, 38
	N1202	sling bullet				Area 22 East, excavation depth 5 cm	3.8×2.0×0.9	Fischer 1980, 38
	N1211	sling bullet				Area 8 South, excavation depth 5 cm	3.8×1.6	Fischer 1980, 36
	N1223	sling bullet				Area 8 South, excavation depth 28 cm	3.4×1.7	Fischer 1980, 36
	N1254	sling bullet				Area 8 South, excavation depth 6 cm	3.4×1.6	Fischer 1980, 36
	N1255	sling bullet				Area 8 South, excavation depth 6 cm	3.5×1.7	Fischer 1980, 36
	N1258	sling bullet				Area 8 South, surface	3.2×1.6	Fischer 1980, 36
	N1264	sling bullet				Area 8 South, excavation depth 10 cm	2.6×1.6	Fischer 1980, 36
	N1268	sling bullet				Area 22 North, excavation depth 6 cm	3.5×1.7	Fischer 1980, 39
	N1272	sling bullet				Area 22 North, surface	3.6×1.6	Fischer 1980, 39
	N1274	sling bullet				Area 22 North, surface	2.6×1.6	Fischer 1980, 39
	N1277	sling bullet				Area 22 North, surface	3.1×1.5	Fischer 1980, 39
	N1278	sling bullet				Area 8 West, surface	3.6×1.4	Fischer 1980, 38
	N1279	sling bullet				Area 8 West, surface	3.2×1.9	Fischer 1980, 38
	N1304	sling bullet				Area 8 South, surface	3.0×1.4	Fischer 1980, 37
	N1309	sling bullet				Area 8 South, surface	3.3×1.5	Fischer 1980, 37
	N1313	sling bullet				Area 8 South, excavation depth 6 cm	3.5×1.7×1.4	Fischer 1980, 37
	N1321	sling bullet	oval			Area 8 South, excavation depth 3 cm	3.3×2.0×1.5	Fischer 1980, 37
	N1322	sling bullet				Area 8 South, excavation depth 3 cm	3.8×1.5	Fischer 1980, 37
	N1323	sling bullet				Area 8 South, excavation depth 3 cm	4.1×1.5	Fischer 1980, 37
	N1324	sling bullet				Area 8 South, excavation depth 3 cm	4.0×1.6	Fischer 1980, 37
	N1326	sling bullet				Area 8 South, excavation depth 4 cm	3.5×1.6	Fischer 1980, 37
	N1330	sling bullet				Area 8 South, excavation depth 4 cm	3.4×1.6	Fischer 1980, 37
	N2001	sling bullet	ellipsoid, inscribed			Area 6, F2002, Layer 3	45/3.7×1.8×1.6	*HST* 8, 59, 68, 69
	N2100	sling bullet				Area 6 southern sector, F2125, Layer 2	34/3.2×1.5×1.5	*HST* 8, 106, 124
	N6029	sling bullet	ellipsoid			Area 22, F6072, Room 1, Layer 2	34/3.3×1.4×1.2	*HST* 5, 44, 45, 85, fig. 225
	N6091	sling bullet	ellipsoid			Area 22, F6270, Room 5, Layer 3	35/3.7×1.6×1	*HST* 5, 45, 47. Fischer 1980, 30, fig. 5E
	N6093	sling bullet	ellipsoid			Area 22, F6222, Room 15, Layer 2	46/3.4×1.8×1.4	*HST* 5, 45, 47. Fischer 1980, 30, fig. 5F
	N8	sling bullet		1	1	Area 6, between R2 and R6. T1A, L28	35/3.1×1.6×1.2	Fischer 2011, 79
	N9	sling bullet		1	1	Area 6, R6 near opening to R2. T1A, L33.	34/3.5×1.5×1.4	Fischer 2011, 79
	N55	sling bullet		1	1	Area 6, Room 1. T4A, L138	30/2.9×1.45	Fischer 2012, 93

type	find #	object	notes	str	CQ	context	g/cm	reference
sling bullet	N96	sling bullet		1	1	Area 6, Room 19, T8A, L253	56/4×1.5	Fischer & Bürge 2013, 49
	N97	sling bullet		1	1	Area 6, Trench 9A, north of W26, L259	32/3.5×1.5	Fischer & Bürge 2013, 52
	N103	sling bullet		2	1	Area 6, T7B, L264	39/3.7×1.6	Fischer & Bürge 2013, 53
	N108	sling bullet		1	1	Area 6, Room 20. T8C, L280.	36/3.3×1.5	Fischer & Bürge 2013, 49
	N237	sling bullet		1	2	Area 6W, T12B, below L412	36/3.2×1.5	Fischer & Bürge 2015, 32
	N263	sling bullet		?	2	Area 6W, T12C	54/3.6×1.7	
	N264	sling bullet		2	3	Area 6W, T20B, L479	52/4.4×1.5-1.6	
	N265	sling bullet		2	3	Area 6W, T20B, L479	51/3.5×1.7	
	N266	sling bullet		2	3	Area 6W, T20B, L479	56/3.6×1.7	
	N268	sling bullet	horizontal lines, possibly from mold			T23A, L487	46/3.7×1.7	
	N279	sling bullet	heavily corroded	2	3	T20B, L507	38/3.5×1.6×1.4	
	N295	sling bullet		2	3	T23D, L535	44/3.4×1.6	
	N299	sling bullet		2	3	T23D, L549	29/3.1×1.5	
	N301	sling bullet	truncated, nearly cylindrical	2	3	T23D, L549	43/2.8×1.2×1.6	
	N302	sling bullet	truncated, nearly cylindrical	2	3	T23D, L549	35/2.9×1.6×1	
	N307	sling bullet	B.	2	3	T23D, L555	36/3.3×1.6	
	N307	sling bullet	F. truncated and cylindrical	2	3	T23D, L555	38/2.3×1.3-1.5	
	N307	sling bullet	E.	2	3	T23D, L555	37/3.4×1.6	
	N307	sling bullet	D.	2	3	T23D, L555	33/3.3×1.6	
	N307	sling bullet	C.	2	3	T23D, L555	35/3.5×1.5	
	N307	sling bullet	A.	2	3	T23D, L555	33/3.2×1.6	
	N308	sling bullet	slightly flattened	1	3	T23B, L557	45/3.3×1.8×1.5	
	N310	sling bullet	slightly flattened	1	3	T20C, L536	49/2.9×1.1-1.5	
	N311	sling bullet	truncated and almost cylindrical	2	3	T23D, L555	43/2.4×0.9-1.1	
	N320	sling bullet		1	1	T7D, L601	44/3.4×1.7	
net weight	N1100	net weight	rectangular folded over			Area 8, F1165, Layer 3		*HST* 4, 21, 81, 85, 90, fig. 155
	N1167B	net weight	2			Area 8, underneath lime plaque		Fischer 1980, 30, fig. 17
	N1167B	net weight	1			Area 8, underneath lime plaque		Fischer 1980, 30, fig. 17
	N1168A	net weight				Area 8 South, excavation depth 3 cm	3.4×0.9×0.2	Stos-Gale & Gale 2010, 399. Fischer 1980, 36.
	N1170A	net weight				Area 8 South, excavation depth 3 cm	3.5×0.8×0.2	Stos-Gale & Gale 2010, 399. Fischer 1980, 36
	N1171	net weight				Area 8 East, excavation depth 3 cm	2.3×1.6	Fischer 1980, 28, fig. 4
	N1177A	net weight				Area 23 West, excavation depth 10 cm	3.8×1.5×1.1	Stos-Gale & Gale 2010, 399. Fischer 1980, 39
	N1178	net weight	rectangular folded over			Area 8 East, 8 cm below surface	3.8×2.4	*HST* 11, 33. Fischer 1980, 28, fig. 8
	N1182A	net weight				Area 8 South, excavation depth 5 cm	2.3×1.8×0.4	Fischer 1980, 36
	N1214	net weight				Area 8 South, excavation depth 3 cm	2.6×1.0×0.5	Fischer 1980, 36
	N1253	net weight				Area 8 South, surface	1.9×1.5	Fischer 1980, 36
	N1259	net weight				Area 8 South, surface	2.7×2.2×0.2	Fischer 1980, 36
	N1261	net weight				Area 8 South, surface	1.6×1.4×1.0	Fischer 1980, 36
	N1273	net weight				Area 22 North, surface	3.1×2.0×0.7	Stos-Gale & Gale 2010, 399. Fischer 1980, 39
	N1275	net weight				Area 22 North, surface	2.5×1.8×0.6	Fischer 1980, 39
	N1276	net weight				Area 22 North, surface	3.4×1.4×0.8	Fischer 1980, 39
	N1282	net weight				Area 8 South, excavation depth 10 cm	4.8×1.0×0.4	Fischer 1980, 37
	N1290	net weight				Area 8 South, excavation depth 3 cm	3.7×1.0×0.6	Fischer 1980, 37
	N1310	net weight				Area 8 South, surface	2.0×1.9×0.3	Fischer 1980, 37
	N1383	net weight				Area 8 South, excavation depth 5 cm	3.8×1.2×0.5	Fischer 1980, 37

type	find #	object	notes	str	CQ	context	g/cm	reference
net weight	N6051	net weight	two bent oblong pieces together			Area 22, F6134, Room 6, Pit I		*HST* 5, 6, 44, 47, 85, fig. 226
	N6069	net weight	two sheets bent along long side			Area 22, F6183, Layer 2		*HST* 5, 44-45, 85, fig. 228
	N6083	net weight	two irregular lumps, possibly sinkers			Area 22, F6264, Pit I		*HST* 5, 5, 45, 85, fig. 230
	N220	net weight		1	2	Area 6W, north of W64. T16B, L397	21/4.7×1.2×0.7	Fischer & Bürge 2015, 34
	N240	net weight	A. rectangular folded over	1	2	Area 6W, north of W64. T16A, L427	15/5.4×1×0.5	Fischer & Bürge 2015, 34
	N240	net weight	B. rectangular folded over	1	2	Area 6W, north of W64. T16A, L437	15/6.0×1.1×0.6	Fischer & Bürge 2015, 34
	N267	net weight?	sphere, cast channel still attached	2	3	T23A, L477	20/1.4+0.6×0.4	
	N291	net weight	rectangular folded over	1	2	T16D, L540	13/5.1×0.8×0.6	
	N298	net weight	rectangular folded over	2	3	T23D, L549	27/4.1×1.3×0.8	
	N305	net weight	rectangular folded over	2	3	T23D, L555	26/4.2×1.5	
	unreg.	net weight?	bent piece, probably net weight			Trench 27, F8502		*HST* 9, 110
bead/weight	N1011	weight?	flat rough circular shape			Area 8, F1012, Layer 3	60/	*HST* 3, 62, 139, 140, 145, fig. 158-159
	N1160	weight	round, hole in centre			Area 8, excavation depth 10 cm	5.3×1.8	Fischer 1980, 30, figs. 11-12
	N1181A	weight	round			Area 22 East, excavation depth 11 cm	5.1×3.6	Fischer 1980, 38
	N1265	weight	cylindrical			Area 8 South, excavation depth 20 cm	4.3×3.0	Fischer 1980, 36
	N3002	weight	irregularly hemispherical, pierced			Area 8, F3023, surface		*HST* 9, 55, 56, fig. 83
	N43	weight?	biconical	1	1	Area 6, Room 11. T5B, L107	1.2×1.3	Fischer 2012, 98
	N217	bead	biconical	1	2	Area 6W, north of W68. T17B, L396	12/1.5×1.5	Fischer & Bürge 2015, 36
	N236	bead	biconical	1	2	Area 6W, T12B, below L412	12/1.3×1.5	Fischer & Bürge 2015, 32
	N261	weight?	dice-shaped	?	2	Area 6W, T12A	28/1.9×1×1.5	
	N262	bead	biconical	?	2	Area 6W, T12B	6/0.4×1×1.2	
	N316	weight?	lead/bronze oval object	2	1	T24C, L586	30/2.5×1.7	
spindle whorl	N1173A	spindle whorl				Area 8, excavation depth 3 cm	1.6×1.5	Fischer 1980, 36
	N1303	spindle whorl				Area 8 South, excavation depth 5 cm	2.1×1.6	Fischer 1980, 37
	N1314	spindle whorl				Area 8 South, excavation depth 5 cm	1.6×1.6	Fischer 1980, 37
	N1315	spindle whorl				Area 8 South, excavation depth 3 cm	1.3×1.2	Fischer 1980, 37
	N114	spindle whorl	biconical	2	1	Area 6. T7B, L283	6/1.4×1	Fischer & Bürge 2013, 53
	N275	spindle whorl?	globular, half preserved, pierced	2	3	T23D, L500	18/1.9×1	
ingot	N1271	ingot?				Area 22 North, surface	2.3×2.0×1.1	Fischer 1980, 39
	N315	ingot	rectangular	2	1	T24A, L583	1287/8×7.5×3	
other	N1085	filling				Area 8, Room 1		*HST* 4, 81, 85, 90, fig. 154
	N1106	finger ring	lead or lead-silver			Area 8, F1168, Layer 3		*HST* 4, 81, 90, fig. 196
	N1168	string				Area 8, underneath lime plaque	40×5	Fischer 1980, 30, fig. 18
	N1183A	escutcheon?				Area 8 South, excavation depth 22 cm	18.5×4.0×0.7	Fischer 1980, 36
	N1207	button				Area 22 East, excavation depth 5 cm	1.7×0.9	Fischer 1980, 38
	N1306	handle of cup				Area 8 South, excavation depth 8 cm	3.4×1.4×0.5	Fischer 1980, 37
	N1316	button				Area 8 South, excavation depth 5 cm	2.1×1.3	Fischer 1980, 37
	N1461/4	strip						Stos-Gale & Gale 2010, 399
	N6061	chisel?	square section			Area 22, F6165, Room 8, Layer 2		*HST* 5, 7, 44, 85, fig. 227
	N6074	pendant	drop-shaped, hollowed, incomplete			Area 22, F6134, Pit I		*HST* 5, 5, 6, 45, 85, fig. 229
	N52	toggle pin	bent	1	1	Area 6, Room 10. T4A, L138.	9,6	Fischer 2012, 98
	N317	sheet	B. sheet, wrapped around oval object	2	1	T24C, L594	82/6.3×4.2	

type	find #	object	notes	str	CQ	context	g/cm	reference
lump/melted	N1209	lump				Area 22 East, excavation depth 10 cm	6.3×3.9×2.2	Fischer 1980, 38
	N1210	lump	irregular piece			Area 22 East, excavation depth 3 cm	2.3×1.8×1.0	Stos-Gale & Gale 2010, 394. Fischer 1980, 38
	N1424	lump						Stos-Gale & Gale 2010, 394
	N1432	lump						Stos-Gale & Gale 2010, 394
	no. 239	lump				Tomb 2		*HST* 1, 85
	unreg.	melted lead	irregular piece			Area 23, Well, F7001/7007, 12.20m		*HST* 10, 73
	unreg.	melted lead	irregular			Area 6, Room 3		Fischer 2011, 79
	unreg.	melted lead	two lumps of melted lead			Area 6, Room 17, inside L149 (oven)	541/	Fischer 2012, 98
	unreg.	lump	irregular piece			Area 22 East, surface	2.5×2.2	Fischer 1980, 38
UD	N1173	UD	drop-shaped piece			Area 8 East, top of Layer 2 in baulk	1.8×1.5	*HST* 11, 33, 34, fig. 47. Fischer 1980, 28, fig. 6
	N1179	UD	oval piece			Area 8 East, 4 cm below surface	2.0×1.5	*HST* 11, 33. Fischer 1980, 28, fig. 9
	N1185A	UD	cross-shaped cast channel			Area 8 South, excavation depth 5 cm	3.8×2.9×1.8	Stos-Gale & Gale 2010, 397-398. Fischer 1980, 36
	N1461/5	UD	lead piece					Stos-Gale & Gale 2010, 399
	no. 240	UD	roughly circular			Tomb 2		*HST* 1, 85
	N135	UD	spherical object, indented	1	2	Area 6W, Room 30. T11B, L338	8/1.3×1.5	Fischer & Bürge 2014, 69
	N269	UD	two lead rings linked together	2	3	T23A, L487	16/3.3+2.3	
	N306	UD	elongated irregular shape	1	3	T20C, L551	13/5.2×1.2×0.4	
	N307	UD	E. irregular piece	2	3	T23D, L555	1.3×1.5×0.5	
	N317	UD	A. oval piece wrapped in sheet	2	1	T24C, L594	82/5×2	
	unreg.	UD	piece of lead			Area 8 East, F1334, Layer 3		*HST* 11, 21
	unreg.	UD	folded piece			Area 23, Well, F7010, 15.00m		*HST* 10, 101
	unreg.	UD	piece like top of finger			Area 23, Well, F7001/7007, 11.80m		*HST* 10, 73

Note: High find numbers refer to earlier excavations (1000–7000), low ones to the new excavations 2010–2016 (1–400).

Appendix 2

Preliminary archaeobotanical analysis

BY DOMINIKA KOFEL

Introduction

The archaeobotanical analyses of material from the 2016 season at Hala Sultan Tekke resulted in further information on the possible function of CQ1. Complementary analyses also were carried out in Area A. In the present study a brief overview and preliminary interpretation of the analysed material from 2016 will be presented.

Material and method

In total, 61 soil samples were collected from CQ1 and Area A: 32 samples were collected from fill/debris above and below a floor level, ten from ash/burned layers, eight samples from the contents of vesselsand the remaining came from miscellaneous layers of "pits" in Area A. From CQ1 22 samples came from Stratum 1 and 15 from Stratum 2.

A manual bucket flotation system was used. Each soil sample was dispersed in water and then gently stirred to release the botanical remains. Thereafter, the watery solution from the upper part of the bucket was poured through two sieves (0.50 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 lighter ones. Thereafter, they were sorted using a low-powered stereo/binocular microscope at 6.4–40× magnification. The macroscopic remains were identified based on the 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.[100] Forty-four soil samples from CQ1 and five from Area A offered material for more precise archaeobotanical analysis. All material was charred and in some instances badly damaged. The distribution and classification of the plant remains can be studied in *Table 2*.

[100] Many thanks to Prof. M. Lityńska-Zając, Institute of Archaeology and Ethnology PAS.

Plant remains

In addition to already determined plant remains from 2014[101] and 2015[102] some new plants were identified (*Table 2*). Amongst these are *Secale cereale* (rye), *Centaurea cyanus* (cornflower), *Lamium* cf. *purpureum* (red dead-nettle); and *Avena* sp. (oat) and *Bromus* sp. (brome grass) identified only to genus.

Rye (*Secale cereale*), together with barley and wheat, is one of the most common grain crops in the area and characteristic of the temperate regions of the Old World.[103] Rye can be used to produce flour, alcoholic beverages, and as animal fodder.[104] Recorded remains of rye in archaeological excavations are discouragingly few.[105] The earliest come from central Anatolia. The distribution pattern, however, is still unclear. According to Zohary *et al*.[106] recent studies suggest the arrival of rye to Europe via the Aegean Basin and the south of the Balkans. It seems that it reached Cyprus in the Ceramic Neolithic.[107]

Cornflower (*Centaurea cyanus*) of the Asteraceae family is an annual flowering plant. In the Mediterranean the flowers are eaten as a cooked vegetable or used as a garnish for salads.[108] Palynological studies show correspondence between the rise of cornflower and that of rye pollen. However, it seems that the increased number of *Centaurea cyanus* pollen grains is preceded by an increased presence of rye.[109] Cornflower is an invasive plant and occurred on Cyprus most probably as an association to the grain crops.[110] A similar situation has been demonstrated in ancient Egypt.[111] Cornflower contains many bioactive compounds, among others a blue anthocyanin and tannins[112] that were valued in the production of a blue dye,[113] used to colour fibres and for painting.[114] All parts of the plant were used as medicines thought to relieve fever. Moreover, its essences were used as a remedy for eye problems.[115]

Lamium cf. *purpureum* is an annual, flowering plant of the Lamiaceae family. It commonly occurs in fertile soils, in waste places, gardens, and agricultural fields.[116] The whole plant is

[101] Kofel 2015.
[102] Kofel 2016.
[103] Zohary *et al.* 2012, 62.
[104] Lityńska-Zając & Wasylikowa 2005, 99.
[105] Zohary *et al.* 2012, 65.
[106] Zohary *et al.* 2012, 66–67.
[107] Knapp 2013, 180.
[108] Wright 2001, 121.
[109] Lityńska-Zając 2005, 51.
[110] Groves & Di Castri 1991, 70.
[111] Wagenitz 1983.
[112] Kandeler & Wolfram 2009, 3297.
[113] Wright 2001, 121.
[114] Malo 2009, 4.
[115] Kandeler & Wolfram 2009, 3297.
[116] Lityńska-Zając 2005, 62.

astringent, diaphoretic, diuretic, purgative, and styptic. It contains the flavonoid quercetin and vitamin C and it is effective against some bacteria.[117] It might be used as an ingredient of ointments both for humans and animals.[118]

Another crop identified in our material was oat (*Avena* sp.). Due to lack of the floret bases it was impossible to estimate whether it comprised wild or domesticated species. It is suggested that domesticated oat was present on Cyprus together with other crops in the Ceramic Neolithic.[119] It was most likely a secondary crop that first occurred as weed infesting wheat and barley cultivation.[120]

Bromus sp. (brome grass), belongs to the family of grasses (Poaceae). It represents a genus of weeds that commonly associates with cultivation crops in the agricultural fields. Depending on the species it might be an annual or biennial plant that occur in a number of habitats.

Interpretations

The number of samples collected in the 2016 season allowed the undertaking of a comparison between strata. However, no clear differences could be noticed. Within both layers – obviously close in time – there are mostly cereals and fragments of grape seeds and olive stones. The main problem in connection with the analytical procedures was the state of preservation. Most of the archaeobotanical remains were damaged, presumably due to the high temperature during burning. This factor limited the identification only to family and reduced the possibility to compare different species and occupation phases.

The contents of eight vessels were collected of which three yielded results. In a Canaanite jar from Trench 24C a single charred grain of indeterminate cereal and 23 uncharred seeds of common fumitory (*Fumaria officinalis*) were found. The seeds were most probably modern and brought to the area by ants or small rodents. However, the *Cerealia* grain presumably represents the content which was stored in the jar.

From Trench 24B a sample collected from the soil around a jar produced a grain of naked barley (*Hordeum vulgare nudum*). The find situation suggests that grain was originally stored in the jar, and due to post-depositional processes it was eventually found in the soil surrounding the sherds of this vessel.

Another grain was found in a Plain White Wheel-made jug (L48-31) discovered in the Late Bronze Age Tomb X. It contained a single grain of rye (*Fig. 25*) and some small fragments of charcoal. Both the grain and the context of the find is

Fig. 25. Secale cereale (rye) from Plain White Wheel-made jug (L48-31) from Tomb X (photograph by D. Kofel).

highly interesting. Finds of rye from periods before the Roman period are relatively rare in archaeological sites. The context of the find might suggest that it was offered as a tomb gift to the deceased. No other finds of rye are known from previous excavations at Hala Sultan Tekke in contrast to recorded finds of wheat and barley.[121] It might represent an import from Anatolia. It should be highlighted that the tomb material is older than that of the settlement. Nevertheless, the possibility of serious-scale rye cultivation in the 15th century BC on Cyprus is rather unlikely.

One more sample from Area A was of special interest: soil mixed with ochre in Well T contained *c.* 100 ml of coniferous wood charcoal, a single grain of naked barley, one fragment of a brome grass seed and one piece of an olive stone. The content does not seem to be accidental and most probably was connected with some sort of ritual undertaken while filling the pit. One should mention that in the area of ancient Kition (the centre of today's Larnaca) there are vast areas with ochre ("terra umbra").

The chance of contamination should always be considered. Ants or small rodents might have dislocated botanical remains. In order to avoid or at least diminish the risk of contamination future sampling will include the contents and the area around vessels.

Conclusions

This year analysis shed light on the possible contents of some vessels and storage practices in CQ1. It was not possible to undertake a comparison between assemblages of the two strata, a consequence of poor material preservation rather than the number of samples. Nevertheless, a hypothesis is that the areas around CQ2 and 3 (partly excavated 2013–2015) were areas of production whereas CQ1 was used for the storage of processed grains.

[117] Yalçın *et al*. 2007.
[118] Britton & Fletcher 1990.
[119] Knapp 2013, 180.
[120] Zohary *et al*. 2012, 69.
[121] Hjelmqvist 1976 and 1979; Kofel 2015 and 2016.

The samples from Area A show an interesting pattern of *Cerealia* grains usage. Seeds, grains, and olive stones might indicate some ritual or offering customs. The find of rye in the rich Late Bronze Age Tomb X from the Plain White Wheel-made jug L48-31 might imply its underestimated position among other cereals before the Roman period.

Table 2. List of taxa identified in samples from 2016

	CQ1												
No.	18	9	4	5	24	2	3	22	50	51	52	39	25
Trench	7D	7D	7D	7D	7D	7D	7D	7D	7D	7D	7D	7D	7D
Locus	570	570	589	589	590	590	590	600	600	600	600	600	600/601
Stratum	1	1	1	1	1	1	1	1	1	1	1	1	1
H	10,34	10,58	10,37	10,25	10,35	10,42	10,30	10,18	10,14	10,25	10,9	10,20	10,18
Grains													
Hordeum vulgare (barley)	1												
Hodeum vulgare nudum (naked barley)													
Triticum sp. (wheat)													
Triticum sp. (glume base)													
Secale cereale (rye)													
Avena sp. (oat)			2m										
Cerealia (cereals)	2fr	1	1		1				1	2	1		1
Poaceae/Cerealia indet (grass/ cereals indeterminate)				3									
Other economic plants													
Olea europaea (olive)						1fr				1			1fr
Vitis vinifera (common grape vine)	1fr			1fr			1fr	1	1				
Grasses, weeds and herbs													
Anthemis arvensis (corn chamomile)			3m?										
Bromus sp. (brome grass)													
Centaurea cyanus (cornflower)								1					
Echium vulgare (viper's bugloss)				1			1m						1m
Fumaria officinalis (common fumitory)													
Lamium cf. purpureum (red dead-nettle)							1						
Indeterminate		1		1				1m?				21s?	1
Charcoal		x						x	x				
Coniferous wood charcoal	x			x	x					x	x		x
Deciduous wood charcoal													

m = modern
s = seed
fr = fragment
min. = mineralized

	CQ1														
No.	14	43	46	31	45	47	17	26	27	34	36	41	59	30	38
Trench	7D	7D	24A	24B	24B	24B	24C	24C	24C	24C	24C	24C	24C	24C	24C
Locus	601	612	605	607	607	611	578	586	586	586	586	586	586	604	604
Stratum	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
H	10,23		9,59	9,64			9,79	9,71	9,60	9,68	9,6	9,6		9,65	9,55
Grains															
Hordeum vulgare (barley)								2							1
Hodeum vulgare nudum (naked barley)					1										
Triticum sp. (wheat)															1
Triticum sp. (glume base)														1	
Secale cereale (rye)															
Avena sp. (oat)															
Cerealia (cereals)	1, 2fr					1	1	17	4			1		4	10
Poaceae/Cerealia indet (grass/ cereals indeterminate)		1						2							
Other economic plants															
Olea europaea (olive)	3fr		1	1				2	13	6	1fr		2	5	4
Vitis vinifera (common grape vine)	1			1				23	1					1	3
Grasses, weeds and herbs															
Anthemis arvensis (corn chamomile)															
Bromus sp. (brome grass)															
Centaurea cyanus (cornflower)															
Echium vulgare (viper's bugloss)	1m														
Fumaria officinalis (common fumitory)							23m								
Lamium cf. purpureum (red deadnettle)								2							
Indeterminate							1	2						41	1
Charcoal		x	x	x	x	x				x			x	x	x
Coniferous wood charcoal	cf.x							x			cf.x				
Deciduous wood charcoal												x			

m = modern
s = seed
fr = fragment
min. = mineralized

	CQ1									AREA A				
No.	54	6	10	29	32	40	42	53	55	21	8	20	56	44
Trench	24C	24C	25A	25A	25A	25A	25A	25A	25A	Well T	Pit V	Well W	Well W	Tomb X
Locus	608	591	593	603	602	602	602	596	602	45	46	47	47	48-31
Stratum	2	2	1	1	1	1	1	1	1					
H	9,57	9,64	10,22		10,04	10,02	9,27	10,1	10,04		9.96	9,80		
Grains														
Hordeum vulgare (barley)			cf.1							1	cf. 1			
Hodeum vulgare nudum (naked barley)														
Triticum sp. (wheat)														
Triticum sp. (glume base)														
Secale cereale (rye)														1
Avena sp. (oat)				2										
Cerealia (cereals)	1	cf.1				1	1fr		1			4fr	1	
Poaceae/Cerealia indet (grass/ cereals indeterminate)			4											
Other economic plants														
Olea europaea (olive)	1					1		1		1				
Vitis vinifera (common grape vine)					1fr	1	1		1			1min		
Grasses, weeds and herbs														
Anthemis arvensis (corn chamomile)														
Bromus sp. (brome grass)										1				
Centaurea cyanus (cornflower)														
Echium vulgare (viper's bugloss)		1m												
Fumaria officinalis (common fumitory)														
Lamium cf. purpureum (red dead-nettle)														
Indeterminate						1								
Charcoal	x		x			x	x	x			x			x
Coniferous wood charcoal		x			x					x			x	
Deciduous wood charcoal									x			x		

m = modern
s = seed
fr = fragment
min. = mineralized

Appendix 3

Pollen-based climate reconstruction of Cyprus during the Late Bronze Age crisis

BY DAVID KANIEWSKI,[122] NICK MARRINER,[123] CHRISTOPHE MORHANGE,[124] & PETER M. FISCHER

Introduction

By the Late Bronze Age, the Eastern Mediterranean was at the centre of some of the most advanced civilizations in the world. In the Aegean, the Mycenaean culture was flourishing; in Anatolia, the Hittites had carved out a vast empire; in the Levant, the Canaanite coastal cities were prospering through trade routes stretching from Egypt to Mesopotamia; and in Egypt, the New Kingdom was at its apex.[125] However, around 1200 BC, at the end of the Late Bronze Age, the Eastern Mediterranean civilization declined or even collapsed.[126] The nearly contemporaneous decline of highly organized and powerful states warrants consideration of possible environmental causes likely to operate over such wide areas.[127] A climate shift occurring during the 13th–9th centuries BC may be of major interest in Mediterranean and West Asian environments where dry farming agro-production and pastoral nomadism were the primary or secondary subsistence systems.[128] Reduced precipitation may have strongly affected the outlying nomad habitats, and led rain-fed cereal agriculturalists to habitat-tracking when agro-innovations were not available.[129]

We focus on Cyprus, an island located at the heart of the ancient civilizations and trade routes of the Eastern Mediterranean during the Late Bronze Age.[130] Our purpose is to establish a quantitative climatic proxy based on pollen records from the Larnaca Salt Lake in order to detail the environmental context along the south-eastern Cypriot coast during the Late Bronze Age crisis. Today's Salt Lake, which in ancient times was connected to the sea, is an ideal archive for such reconstructions, since it has gradually accumulated sediment over many millennia. Furthermore, pollen preservation is generally excellent in such archives.

Methods

The continuous cores were sampled in May/June 2016, using a hand-corer in the Larnaca Salt Lake, near Hala Sultan Tekke (HST 1; *Fig. 26*), near Meneou (HST 2), and in the southern part of Larnaca's airport (HST 3). The layers identified in the cores will be radiocarbon dated by accelerator mass spectrometry (AMS) ^{14}C on short-lived samples.

Core HST 1 34°53'08.17"N, 33°36'45.12"E
Elevation: 0 m a.s.l.
Depth: 600 cm

Core HST 2 34°50'47.79"N, 33°36'46.47"E
Elevation: 2 m a.s.l.
Depth: 300 cm

Core HST 3 34°52'09.59"N, 33°37'22.18"E
Elevation: 0 m a.s.l.
Depth: 200 cm

Fig. 26. Coring at the Salt Lake in the area of the ancient harbour of Hala Sultan Tekke (photograph by P.M. Fischer and T. Bürge).

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[125] Drews 1993.
[126] Killebrew & Lehmann 2013; Cline 2014.
[127] Weiss 1982.
[128] Kaniewski *et al.* 2008; 2010.
[129] Lewis 1987; Staubwasser & Weiss 2006; Reuveny 2007.
[130] Kaniewski *et al.* 2013a.

Purposes

This report outlines the basics of the project of which any preliminary results are not yet available. We aim to detail the duration and severity of the 1200 cal yr BC drought event (also termed the 3.2 ka BP event) in several reconstructions from Cyprus, with focus on the crisis years, also termed Late Bronze Age collapse. This arid shift (*Figs. 27, 28*) was recently highlighted in a first study from Cyprus,[131] in an Eastern Mediterranean precipitation reconstruction, and at both coastal sites of Gibala-Tell Tweini (Syria)[132] and Tel Akko (Israel).[133] This period also corresponds with heightened storminess in the Central Mediterranean.[134] This published data set, along with palaeoclimate records, seems to support the hypothesis that the crisis at the end of the Late Bronze Age and the following collapse was a consequence of heightened aridity throughout the Near East and the Aegean.[135] We aim to show that the per-

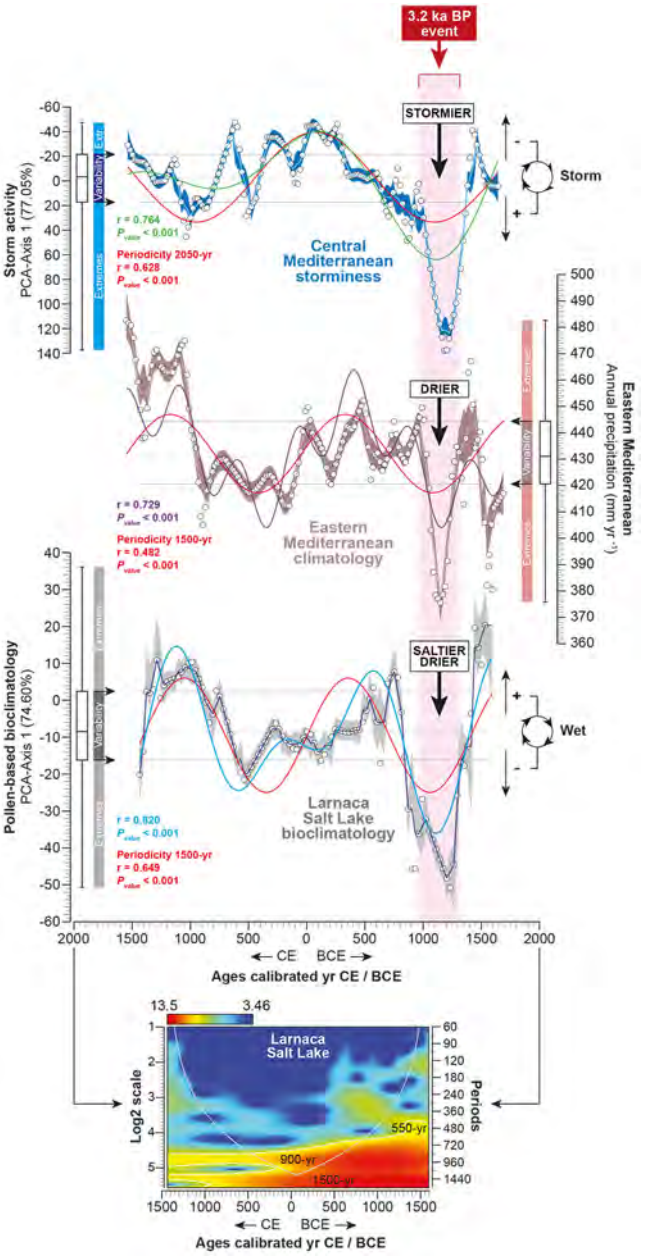

Fig. 27. The climate event at the end of the Late Bronze Age identified in the Central Mediterranean (Kaniewski et al. 2016), Eastern Mediterranean (Kaniewski et al. 2013b), and Cyprus (Kaniewski et al. 2013a).

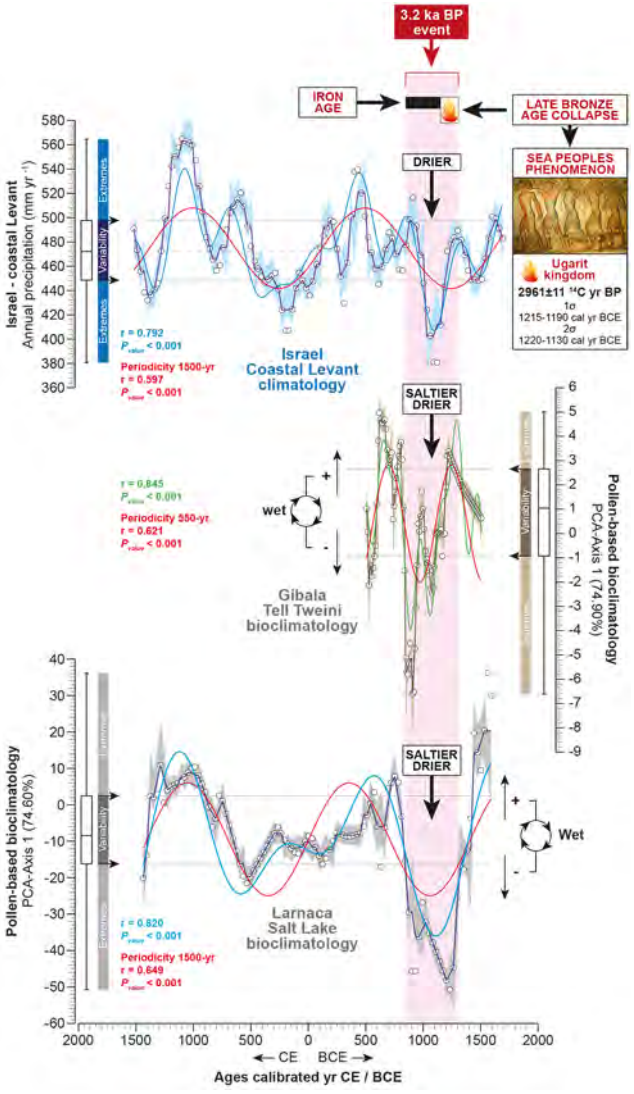

Fig. 28. The climate event at the end of the Late Bronze Age identified in Israel (Kaniewski et al. 2013b), Syria (Kaniewski et al. 2008, 2010), and Cyprus (Kaniewski et al. 2013a).

[131] Kaniewski *et al.* 2013a.
[132] Kaniewski *et al.* 2008; 2010 and 2011.
[133] Kaniewski *et al.* 2013b and 2014.
[134] Kaniewski *et al.* 2016.
[135] Kaniewski *et al.* 2015.

sistence of favourable freshwater inputs was critically important in sustaining farming, trade, and societal stability in this part of the Mediterranean.

Even if large uncertainties remain concerning the spatial dimensions of the 3.2 ka BP climate event, its duration, and how the circulation patterns were affected, it mainly underlines the agro-productive sensitivity of ancient Mediterranean societies to environmental changes. The proposed outcomes (crop failures and increased famine) and consequences (amplification of socio-economic crises and increased regional human migrations) linked to our new study will help to ascertain if a possible causal link between adverse climate pressures and societal crises can be drawn.

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