SVENSKA INSTITUTEN I ATHEN OCH ROM
INSTITUTUM ATHENIENSE ATQUE INSTITUTUM ROMANUM REGNI SUECIAE

Opuscula

Annual of the Swedish Institutes at Athens and Rome

18
2025

STOCKHOLM

EDITORIAL COMMITTEE
Prof. Henrik Gerding, Lund, Chairman
Dr Mikael Johansson, Gothenburg, Vice-chairman
Mrs Marie Grönberg, Stockholm, Treasurer
Dr Susanne Carlsson, Stockholm, Secretary
Prof. Gunnel Ekroth, Uppsala
Dr Therese Emanuelsson-Paulson, Stockholm
Dr Johan Eriksson, Uppsala
Dr Ulf R. Hansson, Rome
Prof. Christer Henriksén, Uppsala
Dr Jenny Wallensten, Athens
Mr Julian Wareing, Stockholm
Dr Lewis Webb, Gothenburg

EDITOR
Dr Julia Habetzeder

SECRETARY'S & EDITOR'S ADDRESS
Department of Archaeology and Classical Studies
Stockholm University
106 91 Stockholm, Sweden
secretary@ecsi.se | editor@ecsi.se

DISTRIBUTOR
Eddy.se AB
Box 1310
621 24 Visby, Sweden

For general information, see https://ecsi.se
For subscriptions, prices and delivery, see https://ecsi.bokorder.se
Published with the aid of a grant from The Swedish Research Council (2023-00215)
The English text was revised by Rebecca Montague, Hindon, Salisbury, UK

The text of this work is licenced under a Creative Commons Attribution 4.0 International Licence (CC BY 4.0). To view a copy of this licence, visit https://creativecommons.org/licenses/by/4.0/. All figures are reproduced with the permission of the rights holders acknowledged in captions. The figures are expressly excluded from the CC BY license covering the text; they may not be reproduced, copied, transmitted, or manipulated without consent from the owners, who reserve all rights.

Opuscula is a peer reviewed journal. Contributions to *Opuscula* should be sent to the Secretary of the Editorial Committee before 1 November every year. Contributors are requested to include an abstract summarizing the main points and principal conclusions of their article. For style of references to be adopted, see https://ecsi.se.

ISSN 2000-0898
ISBN 978-91-977799-7-5
© Svenska institutet i Athen and Svenska institutet i Rom
Printed by PrintBest (Viljandi, Estonia) via Italgraf Media AB (Stockholm, Sweden) 2025
Cover illustration from Susan M. Dixon in this volume, p. 252, fig. 5. Cover illustration edited by Julia Habetzeder.

PETER M. FISCHER & RAINER FELDBACHER with contributions by TERESA BÜRGE, JARIS DARWIN, ANE DYBKJÆR, ROPERTOS GEORGIOU, SORIN HERMON, DOMINIKA KOFEL, KIRSI O. LORENTZ, YUKO MIYAUCHI, RAPHAEL MOREAU, RAHAF ORABI & VALENTINA VASSALLO

The New Swedish Cyprus Expedition: The 2023 and 2024 excavations at the Late Bronze Age cemetery of Hala Sultan Tekke

Preliminary results

Abstract

The 14th and 15th excavation seasons at the Late Bronze Age site of Hala Sultan Tekke focused on the excavation of tombs threatened by agricultural activities and erosion. Magnetic anomalies detected in 2017 aligned with concentrations of sherds in the ploughed soil, revealing six tombs: the partly looted Chamber Tomb VV and the intact Chamber Tombs XX, YY, ZZ, AB East and AB West. These stratified tombs, with successive interments, complement the occupation sequence of the 25+ ha city, where excavations have been ongoing since 2010. The rich mortuary goods, dating mainly to the 14th–13th centuries BC, confirm Hala Sultan Tekke's role as a major Mediterranean trade hub. Material evidence indicates connections with Mycenaean, Minoan, Hittite, Levantine and Egyptian cultures, extending as far as Sardinia, the Baltic, Mesopotamia, Afghanistan and India. The tombs also provide insights into Late Cypriot mortuary customs.*

Keywords: archaeometry, Cyprus, funerary archaeology, Hala Sultan Tekke, Late Bronze Age, rites

https://doi.org/10.30549/opathrom-18-02

Introduction

The Late Bronze Age city of Hala Sultan Tekke, which flourished from approximately 1630 to 1150 BC, is situated on the south-eastern coast of Cyprus along the Larnaca Salt Lake close to the international airport of Larnaca (*Fig. 1*).[1] The salt lake, which today is isolated from the open sea owing to siltation of the coastline, was a protected bay of the Mediterranean in the Late Bronze Age and thus provided excellent anchorage.[2] The sheltered harbour enabled the export of coveted goods, primarily copper; such merchant enterprise explains the noticeable wealth of the people of Hala Sultan Tekke, or at least its ruling class, that is demonstrated by luxurious imports.[3]

Following a period of pre-modern-standard excavations in the 1890s,[4] controlled rescue excavations started in 1968, focusing on two partly looted Late Bronze Age tombs with impressive contents, located just to the west of the mosque

* The authors sincerely thank the Department of Antiquities of Cyprus (DAC) for granting excavation permits—Dr Marina Solomidou-Ieronymidou, then-director, for 2023, and Dr Giorgos Georgiou for 2024. We are especially grateful to Dr Vasiliki Kassianidou, Deputy Minister of Culture of Cyprus, for her genuine interest and support in this project. We extend our deep appreciation to H.E. Anders Hagelberg and H.E. Martin Hagström, former and current ambassadors at the Swedish Embassy in Nicosia, for their keen interest in the expedition and invaluable support. We also acknowledge the insightful discussions with esteemed colleagues, including Drs Manfred Bietak, Teresa Bürge, Timothy Clayden, Jürg Eggler, Albrecht Jockenhövel, Reinhard Jung, Tzveta Manolova, Joseph Maran, Nicolò Marchetti, Hartmut Matthäus, Vassiliki Pliastika, Cemal Pulak, Laerke Recht and David Reese. Our sincere thanks go to Andreani Papageorgiou and Christodoulos Sofokleous for their skilled work as the expedition's surveyors, as well as to all the dedicated team members—without whom these results would not have been possible. We also appreciate the invaluable logistical support provided by Mr Petros Georgiou, a former DAC employee, and Mrs Dina Georgiou. Special recognition goes to Paulina Staszkiewicz for her expert restoration of ceramic vessels and to Elena Peri for her meticulous digitized object drawings. Finally, this study would not have been possible without the generous financial support of the Gösta and Susi Enbom Foundation at the Royal Swedish Academy of Letters, History and Antiquities, the Institute for Aegean Prehistory (INSTAP)—with special thanks to Malcolm H. Wiener and Tom Brogan—the Royal Society of Arts and Sciences in Gothenburg, Sweden, the Swedish Birgit and Gad Rausing Foundation and the Cypriot Leventis Foundation.

[1] No coordinates are given for the location of features, as agreed with the Department of Antiquities of Cyprus.

[2] Devillers *et al.* 2015.

[3] Fischer 2023.

[4] Bailey 1976; Fischer 2012.

Fig. 1. Drone photograph of Hala Sultan Tekke with City Quarters 1–4 and Area A indicated; mosque in the background; Larnaca Salt Lake to the north-east; Mediterranean Sea and Larnaca International Airport to the east. Photograph and copyright: P.M. Fischer.

from which Hala Sultan Tekke derives its name.[5] Excavations in the city were intermittently carried out from the 1970s until 2004, under the direction of Paul Åström of the University of Gothenburg, Sweden.[6]

The current project under the direction of Peter M. Fischer and supported by the Department of Antiquities of Cyprus started in 2010. From 2010 to 2019, excavations mainly took place in the city.[7] Following several geophysical investigations, including ground-penetrating radar and magnetometry surveys supported by air photography and surface surveys, excavations in Area A began in 2014[8] and have continued to the present day. In the course of the project, this area became recognized as the cemetery of the city (or one of its cemeteries).[9] The Area A excavations have concentrated on safeguarding and recording tombs which are vulnerable to destruction by farming practices.[10] The material remains of the tombs—each of which was in use for an extended period between the late 17th century BC and the first half of the 12th century BC—most often contain stratified, successive interments of individuals. Consequently, the sequence of interments represents an excellent complement to the stratigraphy of the city and offers the chance to compare and classify, for instance, minor single sherds from the settled areas with corresponding complete objects from the cemetery.

In this paper, the primary results of the excavations of Chamber Tombs VV, XX, YY, ZZ, AB East and AB West are presented. These tombs were located during surface and magnetometry surveys and excavated in May–June of both 2023 and 2024. It should be emphasized that the study of the bioarchaeological material, mortuary goods and other objects is ongoing and will continue for an extended time owing to the numerous entombed individuals and hundreds of objects. This report includes the preliminary bioarchaeological investigation of Chamber Tombs VV, XX and YY. Bioarchaeological results for Chamber Tombs ZZ, AB East and AB West will be presented in a future study, due to the short period between the end of the 2024 campaign in June and the 1 November 2024 deadline for this report.

The comparative chronology and approximate absolute dates which are used in this report can be studied in *Table 1*.

Area A. The extramural cemetery

Apart from a few minor constructions, the settlement and cemetery of Hala Sultan Tekke are not covered by modern structures and thus are ideal for archaeological research. The cemetery covers several hectares on a slightly raised plateau at *c.* 10–13 m above sea level (masl; Area A in *Fig. 1*). Over the centuries, farming and erosion have affected the uppermost parts of man-made structures. During the initial surveys, various objects—mainly pottery sherds but also essentially complete pots, objects of

[5] Karageorghis 1976.
[6] E.g., Åström 1986.
[7] Fischer & Bürge 2018; 2020.
[8] Fischer and Satraki in Fischer & Bürge 2014, 86–88.
[9] Fischer & Bürge 2017; 2021.
[10] Fischer & Bürge 2022; 2023; Fischer & Feldbacher 2025.

Table 1. Comparative chronology of the Cypriot, Late Helladic and Minoan cultures. The division of the periods is floating, and the absolute dates are rounded up or down by the author (PMF) to fit, approximately, the periodization of the listed cultures in a single table (cf., Fischer 2023, table 1).

Late Cypriot (LC)	Anatolia	Late Helladic (LH)	Late Minoan (LM)	Levant	Egypt	Approx. dates BC
LC IA1–2	Old Hittite	LH I	LM IA	MB III	Hyksos	1630–1560
LC IB	Old Hittite	LH IIA	LM IB	LB IA	18th Dyn.	1560–1450
	(Middle Hittite)					
LC IIA(–B)	Middle Hittite	LH IIB	LM II	LBA IB	18th Dyn.	1450–1400
LC II(A–)B	Imperial Hittite	LH IIIA1–2	LM IIIA1–2	LBA IIA	18th Dyn.	1400–1300
LC IIC1–2	Imperial Hittite	LH IIIB1–2	LM IIIB	LBA IIB	19th Dyn.	1300–1200
LC IIIA1–2	Neo-Hittite I	LH IIIC	LM IIIC	Iron Age IA	20th Dyn.	1200–1100

faience, as well as human bones—were visible on the surface as the result of ploughing and illicit digging, the latter most likely occurring during the 19th century AD. The subsequent ground-penetrating radar surveys turned out to be of limited value in locating structures at depths of below roughly 0.5 m from the surface.[11] This can be explained by the clay-rich soil into which the tombs, ritual pits and reused wells were dug. This particular soil type caused the severe attenuation of the electromagnetic waves of the radar equipment, preventing them from penetrating more deeply than some decimetres from the surface. By contrast, down to a depth of approximately 2 m from the surface, magnetometry surveys indicated numerous man-made "pits" as figure-8-shaped or roughly circular geophysical anomalies, distinct from undisturbed natural soil. Subsequent excavations in Area A revealed no architectural remains.[12]

The ritual pits exposed by the expedition contained numerous objects, most of them broken but complete, but no human remains.[13] Three types of tomb were found: chamber tombs, shaft tombs and reused wells. In general, the chamber and the shaft tombs contained interments associated with a multitude of objects, whereas the recycled wells served for the interment of individuals of obvious low rank, as there were no mortuary gifts and hardly any personal belongings. This would indicate that the deceased interred in wells were deprived of most personal goods before they were buried.

It should be emphasized that the statistics presented of the number of finds of various materials will be adjusted upwards when all broken objects have been mended and conserved.

Chamber Tomb VV

South-south-east of the cluster of three tombs (Chamber Tombs RR, SS, TT) and the Ritual Pit SS-S,[14] another concentration of pottery sherds and broken faience vessels was observed on the surface of a field which had been used for farming for many centuries. In this area, the magnetometry survey map showed several anthropogenic features, including Chamber Tomb VV (*Figs 2–6*). During the excavations, the substantial depth of colluvial (ploughed) soil was found to contain numerous larger pieces of broken pottery and scattered human remains. These were the first indications that this Late Cypriot chamber tomb had been disturbed in the past.

Below the colluvial soil, two chambers were exposed. They are orientated north–south, giving the tomb a figure-8 shape. The tomb's maximum dimensions are 4.40 (north–south) × 3.0 m (east–west), with the narrow central part 1.75 m. No articulated skeletons were found. The position of the dislocated human bones and mortuary goods demonstrated that the tomb robbers concentrated on the central parts of the tomb. Nevertheless, numerous scattered human bones could be recovered and the minimum number of eleven individuals established (see the bioarchaeological report in *Appendix 1*). Contexts mainly along the northern, western and southern margins of the tomb contained a total of 88 registered items (*Table 2*).[15]

In addition to a considerable number of loose sherds, there were at least 23 complete or almost complete ceramic vessels and many pieces of jewellery, overlooked by the looters (see the position of finds and features in *Fig. 4a*, and the western section in *Fig. 4b*). The ceramics include locally produced and imported pottery (*Fig. 5*). The former consists of three Base-ring I jugs, a juglet and jug of Base-ring II, four White Slip II bowls (mature–late), a Plain White bowl and juglet, and a White Shaved juglet (selected Cypriot pottery in *Fig. 5*

[11] Cf. Fischer & Feldbacher 2025.
[12] E.g., Fischer & Bürge 2017; Fischer 2019.
[13] Bürge 2017; 2018.
[14] Fischer & Bürge 2019; 2020; 2021; 2022; 2023.
[15] The classification and chronology of the pottery in the tables are preliminary and only listed when reasonably defined.

Fig. 2. Orthophotograph of Chamber Tombs VV, XX, YY, ZZ, AB East and AB West during fieldwork. By P.M. Fischer, W. Zhiyun, R. Feldbacher & A. Papageorgiou. Copyright: P.M. Fischer.

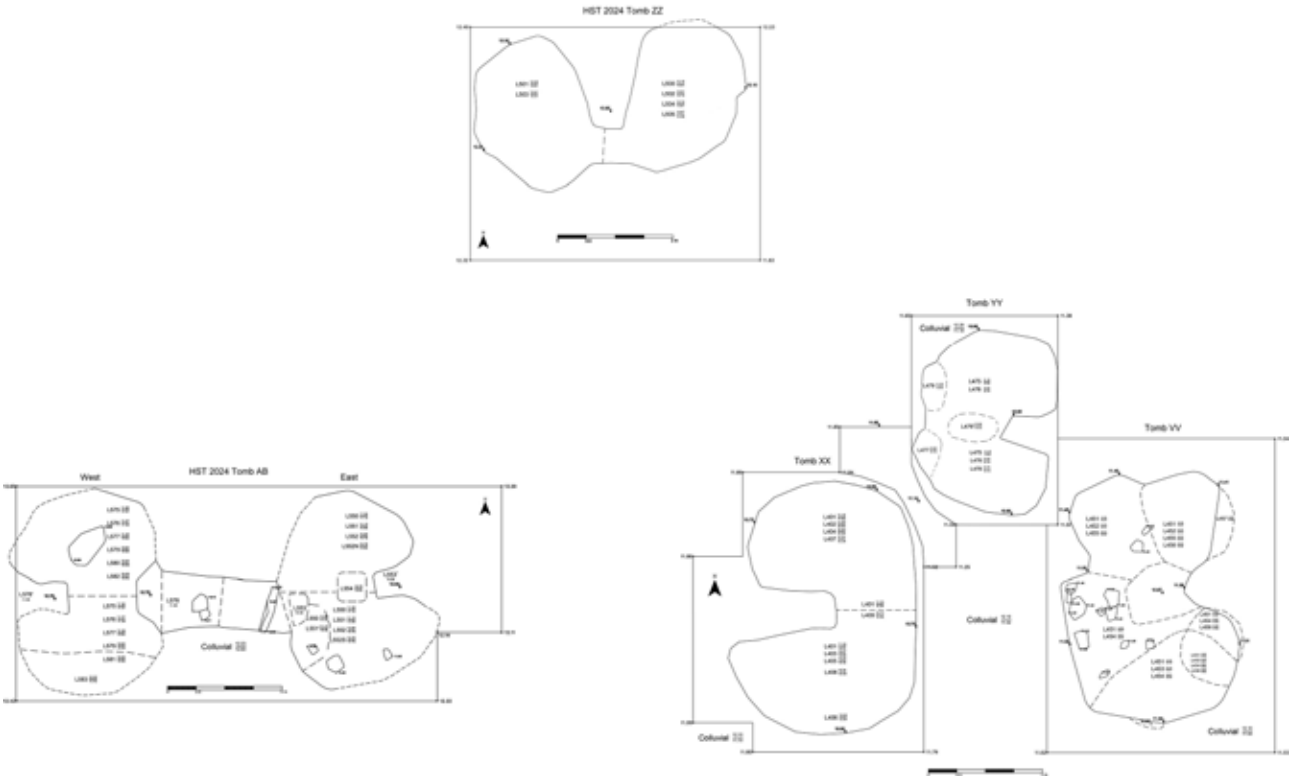


Fig. 3. Position of Chamber Tombs VV, XX, YY, ZZ, AB East and AB West. Plan by A. Papageorgiou & C. Sofokleous. Copyright: P.M. Fischer.

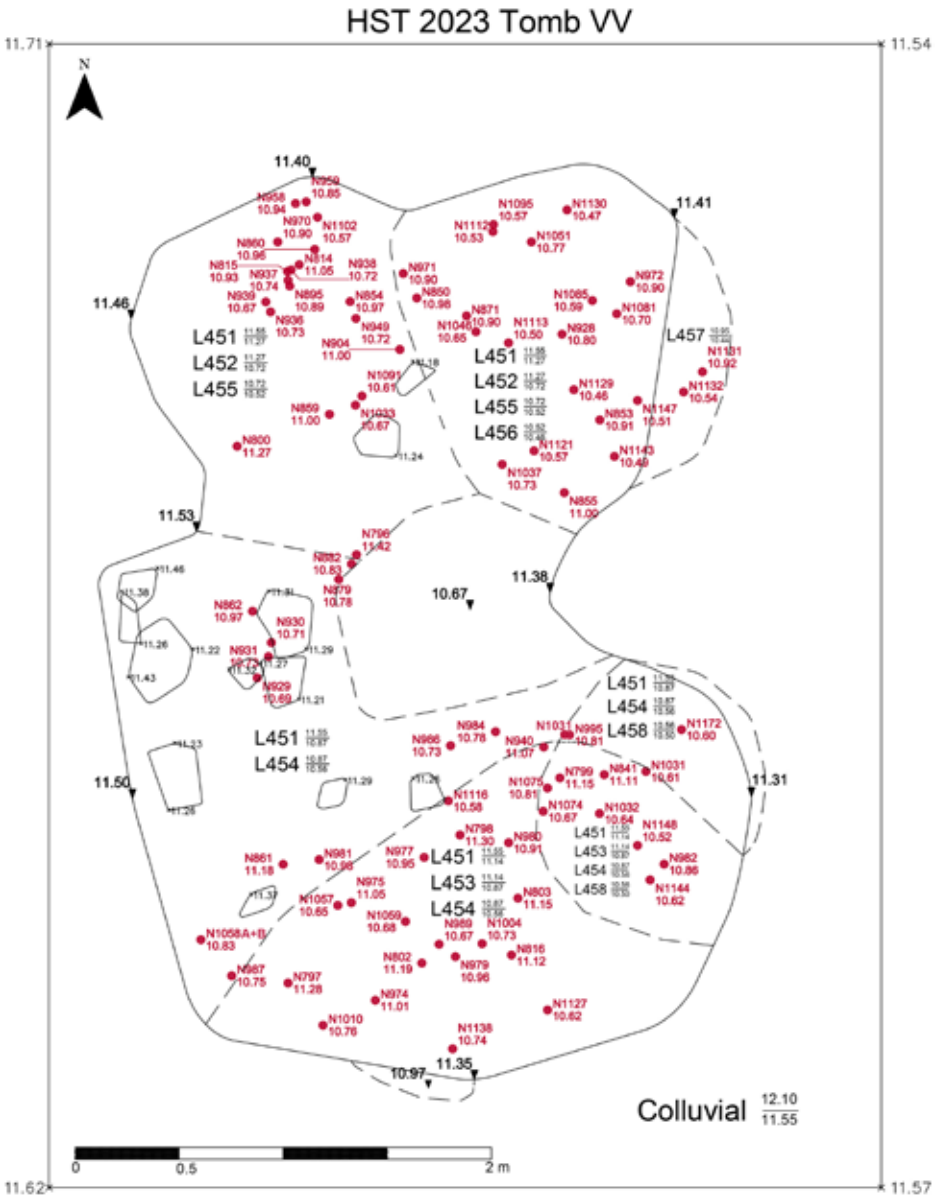


Fig. 4a. Chamber Tomb VV: plan with positions of loci and finds. By A. Papageorgiou & C. Sofokleous. Copyright: P.M. Fischer.

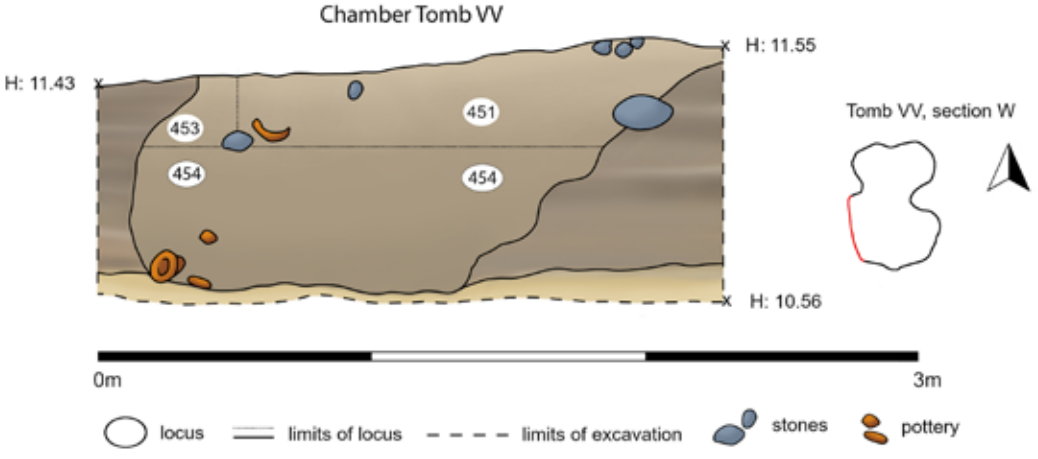


Fig. 4b. Western section of Chamber Tomb VV. Drawing by M. Pelc. Copyright: P.M. Fischer.

Table 2. Finds from Chamber Tomb VV arranged by locus, then material, then object type.

Find	Locus	Material	Type of object	Shape
802	451	calcite	Egyptian	chalice
798	451	clay	Base-ring I	jug
862	451	clay	Base-ring II	juglet
796	451	clay	Mycenaean, LH IIIA2	krater
803	451	clay	Plain White Wheel-made	bowl
799	451	clay	White Slip II (mature–late)	bowl
797	451	faience	Egyptian	bowl
861	451	lead	weight	folded band
853	452	clay	Base-ring I	large jug
800	452	clay	Mycenaean, LH IIIA2–B1	mug
814	452	clay	Mycenaean, LH IIIA1	chalice
971	452	clay	Mycenaean, LH IIIA2	jug
1075	452	clay	Mycenaean, LH IIIA2	chariot krater
937	452	clay	Plain White Wheel-made	juglet
854	452	clay	Red Lustrous Wheel-made	spindle bottle
855	452	clay	Red Lustrous Wheel-made	lentoid flask
871	452	clay	White Shaved	juglet
928	452	clay	White Slip II (late)	bowl
850	452	faience	bead	disc
904	452	faience	bead	irregular
949	452	faience	bead	disc

Table 2 continued.

Find	Locus	Material	Type of object	Shape
958	452	faience	bead	lentoid
972	452	faience	bead	ellipsoid
860	452	faience	Egyptian	juglet
895	452	faience	Egyptian blue bead	cylindrical
936	452	glass	bead	ellipsoid
938	452	glass	bead	ellipsoid
939	452	glass	bead	ellipsoid
959	452	glass	bead	ellipsoid
859	452	gold	bead	globular, collared
815	452	ivory	distaff	
970	452	paste	scarab	
979	453	amber	scarab?	
977	453	clay	sling bullet	ellipsoid
980	453	glass	bead	disc
816	453	gold	bead	disc
841	453	gold	bead	globular, collared
940	453	gold	bead	disc
974	453	gold	bead	connected spirals
975	453	gold	bead	connected spirals
981	453	gold	bead	globular, collared
1058B	454	amber	bead	irregular
1010	454	clay	Base-ring II	bowl
1074	454	clay	Minoan?	krater
879	454	clay	Mycenaean, LH IIIA2	piriform jar
989	454	clay	White Slip II (late)	bowl
1127	454	faience	beads (3)	globular, lentoid
929	454	faience	Egyptian blue bead	lentoid
986	454	gold	bead	disc

upper part). The imported vessels (*Fig. 5* centre in second row and lower part) comprise eight Mycenaean/Minoan vessels, which include a mug (N800), chalice (N814), stirrup (N1131) and piriform jar (N879), a dipper (N1334), a Mycenaean chariot krater (incomplete, not illustrated) and parts of a Minoan krater (N1074).

Additional imported ceramics are a spindle bottle and a lentoid flask of Anatolian Red Lustrous Wheel-made ware (N855). A wheel-made, faience-like flask was found, covered with a hard and very crackled slip, greenish-yellow in colour and almost glaze-like. This vessel has been classified as Kassite/Middle Babylonian (N1143).[16] Among the Egyptian imports, the stem of a chalice (N802), parts of a blue/beige faience bowl with brown decoration (N797), sherds of two faience juglets(?) and numerous beads of Egyptian blue and glass should be mentioned.

Finds of other materials include 38 pieces of gold adornments, mainly pendants and beads, and a mouth piece (arranged in *Fig. 6*; see Chamber Tomb XX for the discussion of the gold objects). There are two cylinder seals (N1102 of haematite, and N931 of chlorite). The former is capped by two profiled covers of gold and was likely worn as a pendant. Two amber objects were found—one is very corroded and formed in the shape of a scarab, while the other is a spherical bead. Another partly broken scarab of steatite depicts a possible sphinx (N970).[17] Other finds include a dagger of bronze (N1148, *Fig. 25*) and parts of two ivory distaffs.

[16] Classification suggested by Timothy Claydon at the University of Oxford, to whom we are grateful.

[17] Studied by Jürg Eggler at the University of Fribourg with our thanks.

Table 2 continued.

Find	Locus	Material	Type of object	Shape
1059	454	gold	bead	disc
1138	454	gold	bead	disc
1058A	454	gold	bead	globular, collared
987	454	gold	bead	disc
982	454	gold	beads (2)	disc
1116	454	gold	beads (2)	disc (1), globular, collared (1)
995	454	gold	beads (3)	disc (2), globular (1)
1004	454	gold	beads (3)	disc (1), globular, collared (2)
1144	454	gold	beads (6)	disc (2), globular (1), globular, collared (1), spirals (2)
930	454	gold	gold (3)	globular, collared
882	454	gold	mouth-piece	sheet metal
984	454	gold	pendant	bovine head
1032	454	gold	pendant	bovine head
931	454	haematite?	cylinder seal	
1057	454	ivory	distaff	
1033	455	faience	bead	cylinder
1113	455	faience	bead	4 connected cylinders
1091	455	faience	beads (2)	double globular (1), lentoid (1)
1121	455	faience	beads (2)	lentoid
1085	455	faience	beads (3)	cylinder (1, Egyptian blue), lentoid (2)
1051	455	faience	Egyptian blue bead	cylinder

Table 2 continued.

Find	Locus	Material	Type of object	Shape
1095	455	faience	jug	fluted profile (only parts preserved)
1081	455	glass	bead	depressed globular, collared
1046	455	glass/ faience	beads (4)	lentoid (3, glass), cylinder (1, Egyptian blue)
1112	455	glass/ faience	beads (4)	lentoid+disc (2, glass), cylinder (2, Egyptian blue)
1037	455	gold	cap	stepped profile
1102	455	gold/ haematite	cap+cylinder seal	
1130	456	bronze/ gold/ ivory/ faience	pendant+bead	S-shaped with beads
1129	456	faience/ bronze	beads (5)+pin	elliptoid
1131	457	clay	Mycenaean, LH IIIA2	stirrup jar
1147	457	faience	beads (5)	barrel (4), disc (1, Egyptian blue)
1143	457	faience	Egyptian	closed vessel
1132	457	faience/ ivory	beads (3)	elliptoid (2), cylinder (1, ivory)
1148	458	bronze	small dagger	leaf with three rivets
1172-2	458	faience	beads (3)	globular (2), flower-shaped (1)
1172-1	458	gold	beads (4)	globular collared (1), spiral (1), discs (2)

PRELIMINARY ANALYSIS OF CHAMBER TOMB VV

Examined together, the objects from Chamber Tomb VV suggest a use period from the 14th to the early 13th centuries BC. The tomb has been disturbed and partly looted, obviously carried out in haste. It is difficult to determine when this happened but most likely in the 19th century AD when premodern excavations were carried out and looting was a serious problem.[18] The exceptional remaining finds indicate that the tomb was used for individuals of considerable wealth, judging by the 38 pieces of gold jewellery and the imports from a vast area of cultures. As in many other tombs at Hala Sultan Tekke, objects imported from the Mycenaean, Minoan, Egyptian, Anatolian and Levantine spheres are common.

Owing to the disturbances in the tomb and, as the result, the absence of useful stratigraphic information, the chronology of the tomb is mainly based on the pottery. The five more or less complete Cypriot-produced Base-ring vessels include Base-ring I and II. White Slip I is absent but there are four bowls of White Slip II (mature–late). The Base-ring and White Slip wares point to a date in the second half of the 14th century BC and the beginning of the 13th century BC. The seven Mycenaean vessels cover the period from LH IIIA2 (e.g., the chalice [N814] with the curve-stemmed spiral FM 49) to the beginning of LH IIIB1 (the mug [N800] with the N-pattern FM 60 which also would fit LH IIIA2).[19] The flask with hard, almost glazed, crackled slip and a solid base ubiquitous in this type of

[18] Bailey 1976; Fischer 2012.

[19] For the motifs and shapes of Mycenaean pottery see Furumark 1972; Mountjoy 1986; 1993.


N1010
N862
N798
N937
N1334
N1125
N928
N800
N879
N1131
N814
N1074
N797
N802
N855
N1143
0
5
10cm

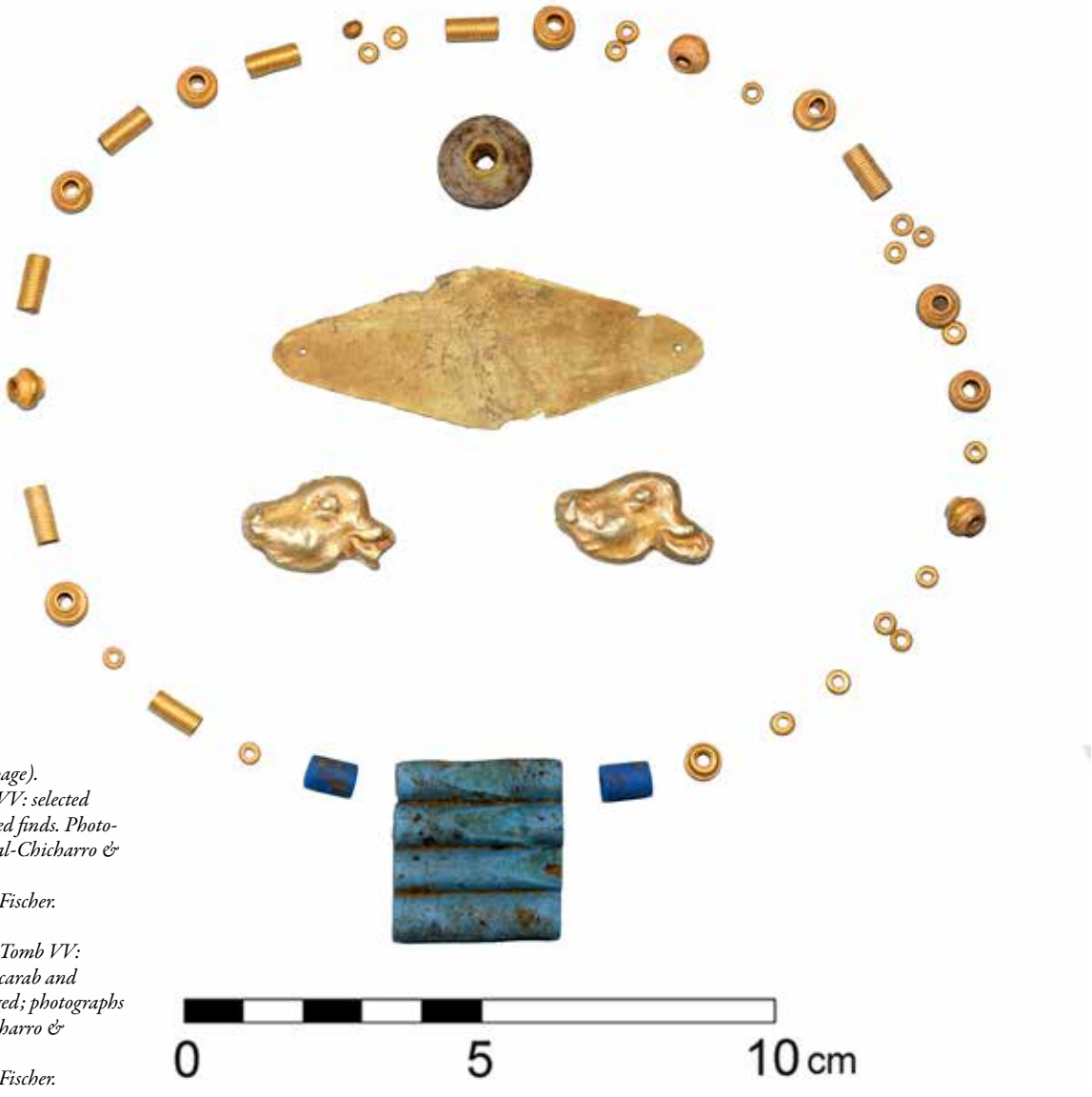


Fig. 5 (previous page). Chamber Tomb VV: selected local and imported finds. Photographs by L. Avial-Chicharro & P.M. Fischer. Copyright: P.M. Fischer.

Fig. 6. Chamber Tomb VV: cylinder seals, a scarab and jewellery. Arranged; photographs by L. Avial-Chicharro & P.M. Fischer. Copyright: P.M. Fischer.

vessel fits into the Middle Babylonian period when the Kassites ruled most of Babylonia (see, e.g., the "Kassite flask" from Kish).[20] Enkomi produced a small "bucket" of faience which is similar to buckets from Kish,[21] but to the authors' best knowledge the Hala Sultan Tekke flask seems to be the first of Kassite provenance in Cyprus. Preliminarily, the small dagger of bronze (N1148, *Fig. 25* below) is classified as a Cypriot product.

[20] Clayden 1992.

[21] Murray *et al.* 1900, 36, fig. 63, 35.

Chamber Tomb XX

In contrast to Chamber Tomb VV, this chamber tomb was not disturbed after the most recent burials in the Late Cypriot period (*Figs 2*, *3*, *7–18*). The tomb is located 2 m west of Chamber Tomb VV. It mirrors almost exactly the former as regards the figure-8 shape and size (4.40 m north–south × 3.0 m east–west). Stratigraphical considerations made it necessary to separate the find contexts into four portions (here designated "Layers"): Layer 1. Locus (hereafter L)401 (both chambers); Layer 2/1. L402 (northern chamber) and L403 (southern chamber); Layer 2/2. L404 (northern chamber) and L405 + L406 (both southern chamber); and, Layer 3. L407 (northern chamber) and L408 (southern chamber). The layers of entombments and mortuary goods cover *in toto* 0.53 m, viz. from 11.00 masl (L402/403, Layer 2/1) to 10.47 masl (L407/408, Layer 3).

The tomb contained a minimum of 29 individuals, and the mortuary goods consist of 299 objects *in toto* (see *Appendix 1* for the bioarchaeological report; *Table 3* for the lists of finds).

Layer 1 (L401; the plan of this layer is superimposed in *Fig. 7*) was defined when the outline of the tomb could be discerned and the first three objects had appeared: a Canaanite jar (N899), a Mycenaean jug (N805; shown among the imports in *Fig. 14*) and a bead of turquoise. No skeletons occurred in this layer. The virtually intact Mycenaean narrow-necked jug is decorated with three palm tree motifs.

Layer 2/1 (L402, northern chamber; L403, southern chamber, *Fig. 7*) comprises the most recent entombments. It contains 86 complete/intact objects in the northern chamber and 81 in the southern chamber. The concentration of finds in the western part of the northern chamber (L402), and to some extent also in the western part of the southern chamber (L403), occurred when objects and skeletal remains were moved to make space for the most recent interments of Individuals B (adult female), G, H and I (three sub-adults) in the northern chamber (*Fig. 35* left).[22]

The general repertoire of finds—both the objects moved in antiquity as well as those belonging to the most recent burials—does not differ between the chambers. Locally produced pottery from both chambers (selection in *Figs 9–11*) include: 37 White Slip II mature–late bowls; 23 vessels of Base-ring ware (12 Base-ring I vessels, mainly jugs and a few juglets, and eleven Base-ring II vessels, mainly jugs and a few juglets, as well as one bowl); 13 Plain White vessels (mainly bowls and juglets, and one jug); six Bucchero juglets; four Monochrome bowls; three White Painted vessels (two bowls, one juglet); and two White Shaved juglets.

Imported pottery comprises 29 vessels of Minoan/Mycenaean provenance which include alabastra, bowls, chalices, cups, a feeding bottle and flask, and piriform and stirrup jars (selection in *Figs 12–14*). Among the Minoan vessels is an intact krater with two large octopus motifs (N900, *Fig. 14*), and among the Mycenaean vessels are a complete chariot krater which contained a bronze ladle with a loop handle (N806, N813, *Fig. 14*), two mugs (N1021, N1015, *Fig. 12*), and several cups and bowls (*Fig. 12*). The Mycenaean imports include also a Psi-figurine (N1114), and another figurine of a bovine (N915, *Fig. 15*).

The 16 bronzes recorded consist of knives, daggers with ivory inlays on both sides of the handles, a spear head, hinges and nails, a ladle (see above), mirror, bracelet, bowl and ring (all included in *Fig. 25*). An ivory cup shows a cobra in addition to incised geometric motifs (N1082, *Fig. 15*). Other objects of ivory are decorated discs (N1227, *Fig. 15*), distaffs, including one with the head depicting a pomegranate (N1141, *Fig. 15*), inlays and a spindle whorl. An intact Egyptian bowl of faience is decorated with images of the deity Hathor, who is depicted as a cow in a marsh environment with papyrus and a pond with a fish (N876, *Fig. 15*). Another Egyptian bowl of faience is decorated with a flower motif (N921, *Fig. 15*). There are 16 objects of gold comprising a diadem with motifs of bucrania and flowers, rings, crescent-shaped earrings, hair rings and various pendants, some of whose granulation resembles the figure "8" (*Fig. 16*). Two Egyptian bottles of multicoloured glass are also part of the mortuary gifts or personal belongings.

Layer 2/2 (L404, northern chamber; L405 + L406 southern chamber, *Figs 8*, *35 left*) contains earlier entombments. Eleven complete/intact objects are from the northern chamber and 82 are from the southern chamber. Locally produced pottery from both chambers includes: two Base-ring I and 13 Base-ring II bowls, juglets and jugs; ten bowls of White Slip II mature–late; four White Painted Wheel-made bowls and jars; three Plain White (two bowls, one juglet); two White Shaved juglets; and two Bucchero juglets (selection in *Figs 9–11*). A miniature cauldron (N1216, *Fig. 10*) and a bovine rhyton (N1145, *Fig. 10*), both of Base-ring II ware, should be highlighted. Imported pottery comprises twelve Minoan/Mycenaean vessels (*Figs 12*, *13*), and a Levantine, roughly spherical flask (N1189, *Fig. 14*). The Aegean ceramics comprise cups, chalices, mugs, alabastra, bowls, piriform jars, a large krater decorated with mirrored semicircles between three vertical lines (N1192, *Fig. 14*), an skilfully manufactured bowl with two octopus motifs painted in white, red and dark brown (N1215, *Fig. 13*) and a Phi-figurine of which the originally attached plait is missing (N1086, *Fig. 15*). The 20 objects of gold include a fairly heavy diadem (23.14 g) with caprines, felines and flowers in repoussé (N1205, *Fig. 16*). Others are a finger ring, earrings, pendants, beads and a gold leaf used as

[22] Layers (*Figs 7*, *8*, *17a*) and associated individuals (*Fig. 35*) will be synchronized in a future study.

a mouth piece (N1193, *Fig. 16*). The seven objects of bronze include a dagger, arm ring, finger ring, ladle and spear head (see discussion below and *Fig. 25*). Silver is represented by an earring and a finger ring. Among the objects of faience, mainly beads, is a multicoloured Egyptian bowl of which the base is missing (N1222, *Fig. 15*). The twelve objects of ivory are distaffs, spindle whorls, and a profiled lid. Objects of stone include nine skilfully knapped arrow heads of various types of minerals (N1221, *Fig. 15*) and a bead of turquoise. A bovine astragalus should be mentioned. There are also several pointed objects of ivory (N1224, *Fig. 15*).

Layer 3 contains the earliest interments of the tomb (L407, northern chamber, L408 southern chamber; *Fig. 17a*, *35 right*). The western section with the dromos indicated is shown in *Fig. 17b*. There are 23 objects in the northern chamber and 13 in the southern chamber (selection of objects from both chambers in *Fig. 18*). Cypriot pottery comprises Base-ring II (N1273), White Slip II (N1260), White Shaved and Plain White. Imported pottery is restricted to two Mycenaean bowls (N1272, N1316). There are two objects of gold: a bead (N1245) and the centre part of a distaff head with a gold-plated bronze nail (N1288). There are four plain silver rings with circular sections and overlapping ends. Eight items are of bronze (all in *Fig. 25*) and include rings, bracelets, spear-butt-spikes (N1258, N1269) and fishing hooks (N1329), as well as a rare cylinder seal (N1248, *Fig. 18*; see below and *Appendix 3*). Objects of ivory comprise six decorated distaffs (e.g., N1268, N1288, N1317, *Fig. 18*) and a fairly large scarab (2.54 × 1.65 × 1.2 cm) of elephant ivory (N1271). Other objects are of bone, faience and glass.

The articulated bones of a partly preserved caprine were found on the floor of the northern chamber.

PRELIMINARY ANALYSIS OF CHAMBER TOMB XX

All evidence taken together, the chronology of the objects suggests a period of use for this tomb from the second half of the 14th to the early 13th centuries BC. In total, the tomb contained a minimum of 29 individuals (*Appendix 1* and *Fig. 35*)

The number (299) and diversity of the personal belongings and mortuary gifts in this chamber tomb is impressive, thus ranking Chamber Tomb XX among the most outstanding at Hala Sultan Tekke, maybe one of the richest ever of the Late Cypriot period. Although the locally produced high-quality pottery belongs to the standard repertoire of the second half of the Late Cypriot period, the imported artefacts are exquisite and point to family members of considerable wealth. They may have been traders engaged in interregional trade, primarily with the Aegean and Egypt according to the nature of the objects. Several of the 44 Aegean-imported vessels, including a large Mycenaean krater (N1192, *Fig. 14*) and a chariot krater (N806, *Fig. 14*), have pictorial or intricate geometric decorations. The shape and the decoration are best placed in late LH IIIA2. The context of one of the two ladles of bronze (N813, *Figs 14, 25*), which was placed inside the chariot krater N806 (*Fig. 14*), where also numerous bones of birds were found, has a parallel to a corresponding context in Chamber Tomb SS, where bowls were placed inside kraters.[23] The other bronze ladle (N1194 in *Fig.* 25) was found near another Mycenaean krater, maybe originally placed inside. Several interpretations of this context are possible: it could point to the consumption of foodstuff inside the tomb, maybe on the occasion of the funeral or as part of secondary rites; it may demonstrate that these vessels were personal items which were placed next to the deceased; or, it may indicate that they represent mortuary offerings to honour this specific individual. A jug (N805, *Fig. 14*) has three palm tree motifs (derivates of FM 15, Palm II). Two mugs (N1021, N1015, FS 225/226, *Fig. 12*) have delicate geometric patterns. A large bowl (N1052, FS 210, FM 17, FM 18, *Fig. 13*) shows flower motifs, and another bowl (N1215, FS 209, FM 21, *Fig. 13*) is skilfully painted with octopus motifs in red, dark brown and white. The figurines, a Psi-type (N1114) and bovine (N915) in Level 2/1, and a Phi-type in Level 2/2 (N1086, *Fig. 15*), may also be connected to burial rites which took place inside the tomb. All these imports can be dated to LH IIIA2 or possibly early LH IIIB1.

In international collections, the three Egyptian-imported bowls of faience with dark brown decoration (N876, N921, N1222, *Fig. 15*) are generally dated to the second half of the 18th Dynasty.[24] The raw material of the ivory cup with incised geometric motifs and a cobra (N1082, *Fig. 15*) was most likely imported from Egypt. However, it was probably manufactured on Cyprus, as is the case with the other objects of ivory, such as the decorated discs (e.g., N1227, *Fig. 15*), projectile points (N1224, *Fig. 15*), distaffs (selection of decorated distaffs in *Fig. 18*), inlays and spindle whorls.

In addition to material obtained from recycling for the production of gold jewellery, much of the raw material for the 38 gold objects from Chamber Tomb XX was possibly imported from the Nubian mines in Egypt, considering the contemporaneous imports of numerous objects from Egypt.[25] In addition to Egyptian material, other imports of objects from the Aegean, Anatolia, Levant, Sardinia, Mesopotamia and beyond have been confirmed and presented in previous publications.[26] Nevertheless, one should also consider other gold-producing areas where Cypriot objects have been discovered, such as the Balkans. The occurrence of Cypriot-produced oxhide ingots in the Late Bronze Age—especially

[23] Fischer & Bürge 2022, 38, fig. 19.

[24] E.g., the catalogue of the Museum of Fine Arts 1982, 142–144.

[25] See the XRF analyses of a pilot study of gold jewellery from a nearby contemporaneous tomb by Kassianidou and Charalambous referred to in Fischer 2023, 18, table 4. Further analyses are planned.

[26] Fischer 2019; 2023; Gradoli *et al.* 2020.

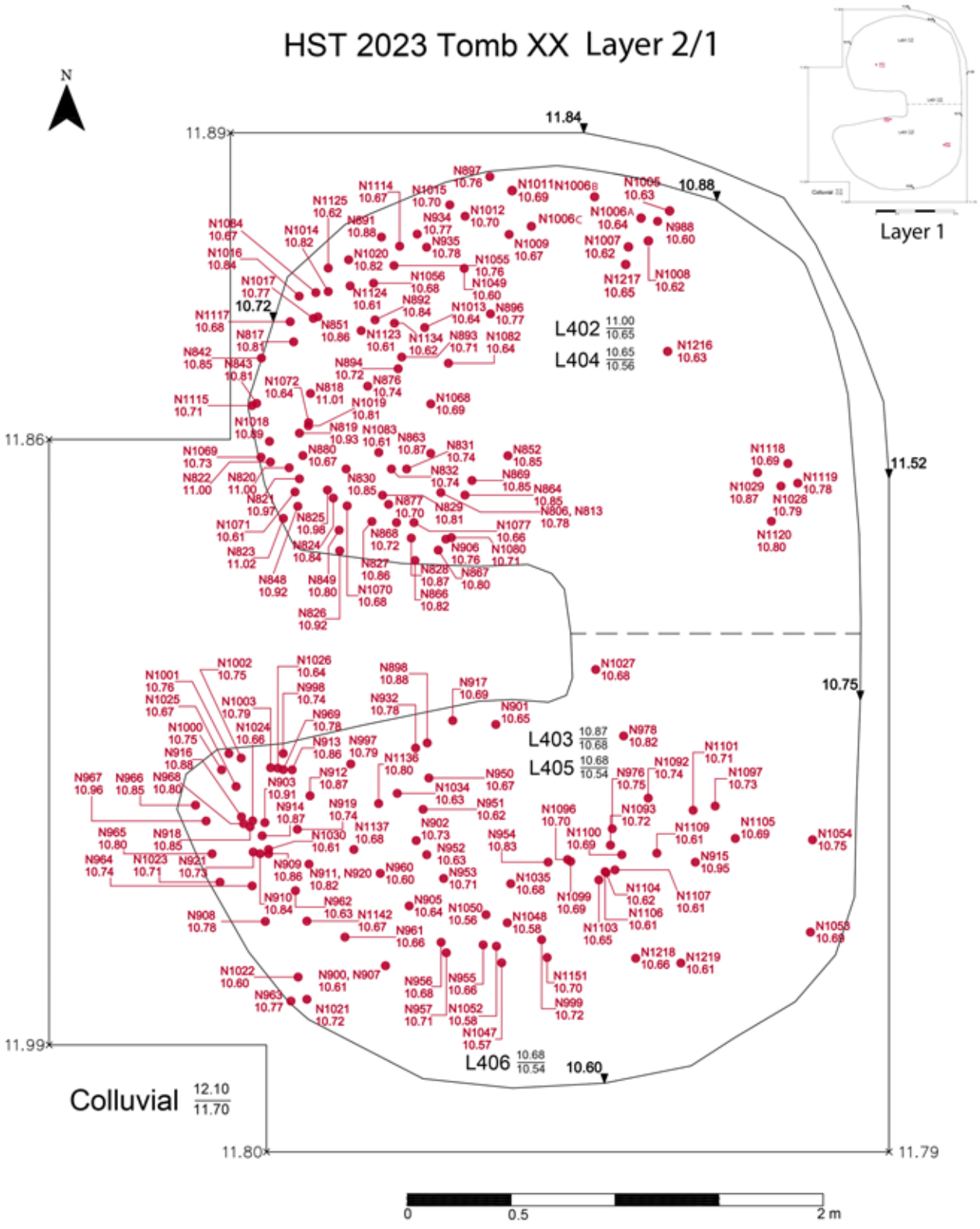


Fig. 7. Chamber Tomb XX: plan of Layer 1 (superimposed) and Layer 2/1 with positions of loci and finds. By A. Papageorgiou, C. Sofokleous, R. Feldbacher & P.M. Fischer. Copyright: P.M. Fischer.

Fig. 8. Chamber Tomb XX: plan of Layer 2/2 with positions of loci and finds. By A. Papageorgiou, C. Sofokleous, R. Feldbacher & P.M. Fischer. Copyright: P.M. Fischer.

Table 3. Finds from Chamber Tomb XX arranged by locus, then material, then object type.

Find	Locus	Material	Type of object	Shape
899	401	clay	Canaanite	jar
805	401	clay	Mycenaean	jug
870	401	turquoise	bead	barrel
1084	402	bronze	bowl	rounded profile
832	402	bronze	bowl	rounded profile
892	402	bronze	knife	Siána type
1083	402	bronze	knife	Siána type
813	402	bronze	ladle	bowl and handle
988	402	bronze	mirror	disc
1230	402	bronze	figurine?	part of
1028	402	clay	Base-ring	jug
824	402	clay	Base-ring I	jug
863	402	clay	Base-ring I	jug
1012	402	clay	Base-ring I	juglet
1017	402	clay	Base-ring I	jug
1038	402	clay	Base-ring I	jug
1117	402	clay	Base-ring I	jug
820	402	clay	Base-ring II	juglet
868	402	clay	Base-ring II	jug
877	402	clay	Base-ring II	jug
1049	402	clay	Base-ring II	bowl
1070	402	clay	Base-ring II	jug
1071	402	clay	Base-ring II	jug
1072	402	clay	Base-ring II	jug
1079	402	clay	Base-ring II	jug
1080	402	clay	Base-ring II	jug
826	402	clay	Bucchero	juglet
828	402	clay	Bucchero	jug
830	402	clay	Bucchero	juglet
852	402	clay	Bucchero	juglet
867	402	clay	Bucchero	juglet
822	402	clay	Monochrome	bowl
817	402	clay	Mycenaean	chalice
823	402	clay	Mycenaean	cup
1114	402	clay	Mycenaean	figurine, Psi
1069	402	clay	Mycenaean, LH IIA2–B1	alabastron
806	402	clay	Mycenaean, LH IIIA2	krater
849	402	clay	Mycenaean, LH IIIA2	piriform jar
1015	402	clay	Mycenaean, LH IIIA2	cup
1019	402	clay	Mycenaean, LH IIIA2	piriform jar
1115	402	clay	Mycenaean, LH IIIA2–B1	juglet
843	402	clay	Mycenaean, LH IIIB1?	alabastron
1007	402	clay	Mycenaean/White Painted Wheel-made?	bowl
821	402	clay	Plain	bowl
825	402	clay	Plain White	bowl
851	402	clay	Plain White	juglet
896	402	clay	Plain White	jug
1013	402	clay	Plain White	juglet
1077	402	clay	Plain White	bowl
1133	402	clay	Plain White	bowl
1118	402	clay	Plain White hand-made	juglet
893	402	clay	White Painted	bowl
1009	402	clay	White Painted	juglet
891	402	clay	White Painted Wheel-made	bowl
831	402	clay	White Shaved	juglet
864	402	clay	White Shaved	juglet
818	402	clay	White Slip II	bowl
819	402	clay	White Slip II	bowl
866	402	clay	White Slip II	bowl
880	402	clay	White Slip II	bowl
1011	402	clay	White Slip II	bowl
1119	402	clay	White Slip II	bowl
1124	402	clay	White Slip II	bowl
842	402	clay	White Slip II (late)	bowl
848	402	clay	White Slip II (late)	bowl
894	402	clay	White Slip II (late)	bowl
1005	402	clay	White Slip II (late)	bowl
1006	402	clay	White Slip II (late)	bowl
1020	402	clay	White Slip II (late)	bowl
1029	402	clay	White Slip II (late)	bowl
1055	402	clay	White Slip II (late)	bowl
1076	402	clay	White Slip II (late)	bowl
827	402	clay	White Slip II (mature)	bowl
829	402	clay	White Slip II (mature)	bowl
847	402	clay	White Slip II (mature)	bowl
1018	402	clay	White Slip II (mature)	bowl
1120	402	clay	White Slip II (mature)	bowl
1123	402	clay	White Slip II (mature/late)	bowl

Table 3 continued.

Table 3 continued.

Find	Locus	Material	Type of object	Shape
1125	402	clay	White Slip II (mature/late)	bowl
876	402	faience	Egyptian	bowl, Hathor
897	402	glass	Egyptian	bottle, multi-coloured
1008	402	glass	Egyptian	bottle, multi-coloured
N1056	402	gold	diadem	decorated with bucrania
1082	402	ivory	"cup"	cobra+geometrics
1068	402	ivory	disc	disc
1134	402	ivory	disc	flower motifs
1111	402	ivory	distaff?	roughly conical
1231	402	ivory	distaff, head	rounded top
935	402	ivory	inlays	various shapes, incised
869	402	ivory	spindle whorl	discoid
1225	402	tur-quoise, faience	beads (2)	discoid, globular
950	403	black stone	spindle whorl	rounded conical
976	403	bronze	bracelet	fragmentary
1030	403	bronze	bracelet	overlapping ends
901	403	bronze	dagger	Pertosa Type B
998	403	bronze	hinge	sheet metal
1003	403	bronze	hinge	sheet metal
1098	403	bronze	nail	
934	403	bronze	pendant?	sheet metal
1107	403	bronze	ring	ring with bezel
1054	403	bronze	spear-butt-spike	
952	403	clay	Base-ring	juglet
909	403	clay	Base-ring I	jug
914	403	clay	Base-ring I	jug
954	403	clay	Base-ring I	jug
964	403	clay	Base-ring I	jug
962	403	clay	Base-ring I	jug
960	403	clay	Base-ring II	juglet
1026	403	clay	Base-ring II	jug
956	403	clay	Bucchero	juglet
900	403	clay	Minoan	krater
907	403	clay	Monochrome	bowl
967	403	clay	Monochrome	bowl
1078	403	clay	Monochrome	bowl
902	403	clay	Mycenaean	large piriform jar
915	403	clay	Mycenaean	figurine, bovine
1002	403	clay	Mycenaean	jar (piriform?)
968	403	clay	Mycenaean	stirrup jar

Table 3 continued.

Find	Locus	Material	Type of object	Shape
997	403	clay	Mycenaean	chalice
969	403	clay	Mycenaean, LH IIIA2	juglet
1021	403	clay	Mycenaean, LH IIIA2	cup
1052	403	clay	Mycenaean, LH IIIA2	bowl
1034	403	clay	Mycenaean, LH IIIA2	shallow bowl
898	403	clay	Mycenaean, LH IIIA2	chalice
903	403	clay	Mycenaean, LH IIIA2	globular flask
908	403	clay	Mycenaean, LH IIIA2	piriform jar
917	403	clay	Mycenaean, LH IIIA2	feeding bottle
918	403	clay	Mycenaean, LH IIIA2	bowl
957	403	clay	Mycenaean, LH IIIA2	chalice
1053	403	clay	Mycenaean, LH IIIA2?	stirrup jar
1050	403	clay	Mycenaean, LH IIIA2?	vessel
905	403	clay	Mycenaean, LH IIIB1?	jug
910	403	clay	Plain White	juglet
920	403	clay	Plain White	juglet
965	403	clay	Plain White	juglet
999	403	clay	Plain White	jug
1025	403	clay	Plain White	juglet
911	403	clay	White Slip II	bowl
916	403	clay	White Slip II	bowl
955	403	clay	White Slip II	bowl
966	403	clay	White Slip II	bowl (large)
1000	403	clay	White Slip II	bowl
1024	403	clay	White Slip II	bowl
1027	403	clay	White Slip II	bowl
912	403	clay	White Slip II (mature)	bowl
913	403	clay	White Slip II (mature)	bowl
919	403	clay	White Slip II (mature)	bowl
1022	403	clay	White Slip II (mature)	bowl
1023	403	clay	White Slip II (mature)	bowl
932	403	clay	White Slip II (late)	bowl

Table 3 continued.

Find	Locus	Material	Type of object	Shape
953	403	clay	White Slip II (late)	bowl
963	403	clay	White Slip II (mature)	bowl
921	403	faience	Egyptian	bowl, flower
1035	403	glass	Egyptian	bottle, multi-coloured
1093	403	gold	earring	crescent
1103	403	gold	earring	crescent
1105	403	gold	earring	crescent
1096	403	gold	earrings (2)	crescent
1100	403	gold	hair ring	overlapping ends
1137	403	gold	hair ring	curved sheet metal
1142	403	gold	hair ring	overlapping ends
1047	403	gold	pendant	8-shaped
1092	403	gold	pendant	8-shaped
1097	403	gold	pendant	8-shaped
1099	403	gold	pendant	8-shaped
1101	403	gold	pendant	8-shaped
1104	403	gold	pendant	8-shaped
1109	403	gold	pendants (5)	8-shaped
978	403	gold	ring	ring
1106	403	gold	seal ring	perforated bezel (signs?)
1048	403	ivory	inlays	various shapes, pierced
1094	404	bone	astragalus	
1128B	404	bone	spindle whorl	plain
1088	404	clay	Base-ring II	jug
1216	404	clay	Base-ring II	miniature cauldron
1086	404	clay	Mycenaean	figurine, Phi
1089	404	clay	Mycenaean, LH IIIA2	piriform jar
1090	404	clay	Mycenaean, LH IIIA2–B1	alabastron
1087	404	clay	White Slip II (mature)	bowl
1108	404	clay	White Slip II (mature)	bowl
1217	404	gold	earring	bovine head
1110	404	gold	earring	ring with twisted shaft
1128A	404	gold	pendant	ring with twisted shaft
1128C	404	gold	sheet	folded
1232	405	bronze	arm ring	ring-shaped
1198	405	bronze	bracelet	fragments
1233	405	bronze	dagger	three rivets
1213	405	bronze	object	
1177	405	bronze	plate	plate

Table 3 continued.

Find	Locus	Material	Type of object	Shape
1171	405	bronze	ring	plain, overlapping ends
1167	405	bronze	spear-butt-spike	
1182	405	clay	Base-ring I	juglet
1234	405	clay	Base-ring I	jug
1145	405	clay	Base-ring II	bovine rhyton
1152	405	clay	Base-ring II	bowl
1153	405	clay	Base-ring II	juglet
1154	405	clay	Base-ring II	juglet with trefoil mouth
1156	405	clay	Base-ring II	jug
1160	405	clay	Base-ring II	jug
1161	405	clay	Base-ring II	jug
1164	405	clay	Base-ring II	jug
1166	405	clay	Base-ring II	jug
1170	405	clay	Base-ring II	juglet
1146	405	clay	Bucchero	juglet
1163	405	clay	Bucchero	juglet
1197	405	clay	Mycenaean, LH IIIA2	alabastron (straight-sided)
1162	405	clay	Mycenaean, LH IIIA2	chalice
1169	405	clay	Mycenaean, LH IIIA2–(B1)	cup
1168	405	clay	Mycenaean, LH IIIA2–B1	shallow cup
1155	405	clay	White Painted Wheel-made	small three-handled jar
1179	405	clay	White Painted Wheel-made	small three-handled jar
1165	405	clay	White Shaved	juglet
1180	405	clay	White Shaved	juglet
1157	405	clay	White Slip II (mature)	bowl
1159	405	clay	White Slip II (mature)	bowl
1158	405	clay	White Slip II (late)	bowl
1173	405	clay	Plain White	juglet
1178	405	faience	beads (2)	globular (1), elongated (1)
1150	405	gold	bead, pendants (3)	disc (1), 8-shaped (2), seed-shaped (1)
1193	405	gold	mouth piece	spiral decoration
1174	405	gold	pendant	8-shaped
1175	405	gold	pendant	8-shaped
1229	405	gold/ bronze	rivet	head of
1135	405	gold, faience, bronze	beads (25)	various shapes
1140	405	ivory	button	semi-globular

Table 3 continued.

Find	Locus	Material	Type of object	Shape
1235	405	ivory	distaff	incised
1139	405	ivory	distaff, head	reversed conical
1136	405	ivory	lid	incised concentric circles (2)
1149	405	ivory	distaff, part	incised
1201	405	ivory	distaff, part (?)	drop-shaped
1141	405	ivory	distaff, parts (2)	cylindrical end, pomegranate top
1195	405	ivory	plates (10)	incised decorations
1184	405	ivory	spindle whorl	conical
1176	405	paste	scarab	
1185	405	silver	earring, foil	plain, sheet of metal
1194	406	bronze	ladle	bent shaft
1210	406	bronze	undefined object	roughly spherical
1206	406	clay	Base-ring II	jug
1189	406	clay	Levantine	flask
1192	406	clay	Mycenaean, LH IIIA2	krater
1211	406	clay	Mycenaean, LH IIIA2	piriform jar (small)
1215	406	clay	Mycenaean, LH IIIA2	bowl
1219	406	clay	Mycenaean, LH IIIA2	alabastron (straight-sided)
1190	406	clay	Mycenaean, LH IIIB1?	shallow bowl
1187	406	clay	Plain White	bowl
1212	406	clay	Plain White	bowl
1186	406	clay	White Painted Wheel-made	shallow bowl
1191	406	clay	White Painted Wheel-made	bowl
1196	406	clay	White Slip II (late)	bowl
1202	406	clay	White Slip II (late)	bowl
1207	406	clay	White Slip II (mature)	bowl
1214	406	clay	White Slip II (mature)	bowl
1188	406	clay	White Slip II	bowl
1222	406	faience	Egyptian	bowl
1205	406	gold	diadem	decorated with caprines, felines
1208	406	gold	mouth piece	leaf-shaped
1203	406	gold	pendant	8-shaped
1204	406	gold	pendant	8-shaped
1218	406	gold	pendant	8-shaped
1220	406	gold	pendant	8-shaped
1200	406	gold	ring	half circle
1209	406	ivory	box inlay	rectangular
1227	406	ivory	discs (3)	disc

Table 3 continued.

Find	Locus	Material	Type of object	Shape
1224	406	ivory	projectile points (4)	rod
1226	406	ivory, bronze, gold	nail	conoid, nail-shaped
1223	406	silver	ring	overlapping ends
1221	406	stone	arrowheads of various minerals (9)	arrow
1228	406	turquoise	bead	cylindrical
1287	407	bone	pendant	pierced turtle bone
1249	407	bronze	?	stepped profile
1259	407	bronze	bracelet	round, overlapping ends
1282	407	bronze	bracelet	round, closed
1286	407	bronze	bracelet	round, closed
1329	407	bronze	fishing hooks (4)	various sizes
1258	407	bronze	spear-butt-spike	
1269	407	bronze	spear-butt-spike	
1273	407	clay	Base-ring II	bowl
1272	407	clay	Mycenaean	mug
1316	407	clay	Mycenaean	bowl
1278	407	clay	Plain White	jug
1242	407	clay	White Shaved	juglet
1260	407	clay	White Slip II	bowl
1281	407	glass	bead	globular
1241	407	glass	handle of juglet	
1318	407	ivory	button	geometric incisions
1268	407	ivory	distaff	incisions
1317	407	ivory	distaff	reversed conical
1283	407	ivory	distaff, head	reversed conical
1307	407	ivory	distaff, head	reversed conical
1277	407	lead	net weights (12)	bent sheet metal
1314	407	silver	ring	overlapping ends
1243	408	bronze	earring	crescent
1261	408	bronze	earring?	irregular
1247	408	bronze	ring	overlapping ends
1248	408	bronze	cylinder seal	
1270	408	faience	Egyptian blue	disc
1245	408	gold	bead	globular, collared
1240	408	gold	pendant	8-shaped
1263	408	ivory	distaff	pointed
1271	408	ivory	scarab	with hieroglyphs
1288	408	ivory/ gold	distaff	decorated with centre piece of gold
1244	408	silver	ring	overlapping ends
1246	408	silver	ring	overlapping ends
1262	408	silver	ring	closed

Fig. 9. Chamber Tomb XX: selection of locally produced Base-ring I jugs. Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

Fig. 10. Chamber Tomb XX: selection of locally produced pottery including a bovine rhyton. Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

Fig. 11. Chamber Tomb XX: selection of locally produced pottery. Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

in the easternmost Balkans, primarily Bulgaria—confirms connections between these areas, either direct or via middlemen.[27] The chemical analyses of the Bulgarian oxhide ingots show a good isotopic match with those from the Uluburun shipwreck, and indicate a stronger overlap with the Larnaca mining area rather than with the Solea Axis, although other mines cannot be excluded.[28] Consequently, the rich gold mine of Ada Tepe or other nearby mines and rivers in southern Bulgaria definitely should be considered as potential sources of gold exported to the Mediterranean, although scientific proof or, for instance, evidence of imported ceramics from this area in Cyprus have not yet been provided (or recognized). Ada Tepe is the oldest known open-pit mine in the south-eastern Balkans for mining gold from host rocks in large quantities. It is suggested that the mine probably started operation in the early 15th century BC and continued to function until the end of the Bronze Age.[29] This period aligns with the life span of the city of Hala Sultan Tekke.

The study of the provenance of the elaborate gold diadems depicting bucrania, felines, caprines and geometric motifs in repoussé, as well as gold bulls-head ornaments (earrings and pendants) is beyond the scope of this paper (see *Fig. 16*). Corresponding objects have been discussed by several authors debating Cypriot, Minoan, Mycenaean, Egyptian and Near Eastern influences.[30] Tentatively, we suggest that most of these objects were produced on Cyprus.

Compared with the numerous Aegean and Egyptian imports, objects from the Levant are rare. Among the few from this area are a Canaanite jar (N899) and a spherical flask (N1189, both in *Fig. 14*), the latter most likely from the northern Levant.[31] Surprisingly, there are no objects which are clearly related to Anatolia. The absence of Red Lustrous

[27] Athanassov *et al.* 2020.
[28] Athanassov *et al.* 2020, 342–344.
[29] Tsintsov *et al.* 2016; Horejs & Jung 2018; Popov & Jockenhövel 2018.
[30] E.g., Marinatos 2010; Konstantinidi-Syvridi 2016.
[31] Fischer 2023, 5.

Fig. 12. Chamber Tomb XX: selection of Mycenaean pottery. Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

Fig. 13. Chamber Tomb XX: selection of Mycenaean pottery. Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

Fig. 14. Chamber Tomb XX: selection of Minoan, Mycenaean and Levantine pottery. Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

Fig. 15. Chamber Tomb XX: Mycenaean figurines, ivory objects, arrowheads and Egyptian imports. Photographs by P.M. Fischer & L. Avial-Chicharro. Copyright: P.M. Fischer.

Wheel-made vessels is remarkable since this ware is common in most of the other tombs at Hala Sultan Tekke. This might be related to the entombed probably kin-based individuals' trade involving mainly the Aegean and Egypt, pointing to specialization in trade distributed between the high-ranking families of Hala Sultan Tekke.

Objects of minerals include, in addition to beads of turquoise, nine small arrowheads which might have been used for hunting birds (N1221, *Fig. 15*). The 34 bronzes are mainly of local production, but a mirror (N988, *Fig. 25*) was imported from the Aegean.[32] Another likely import from southern Italy is the dagger of the "Pertosa" Type B (N901, *Fig. 25*).[33] The rare cylinder seal of bronze (N1248, *Fig. 18*) is discussed after the report on Chamber Tomb ZZ, exam-

[32] Feldbacher *et al.* 2024; see the overview on mirrors in Alvarez 2023.
[33] Jung 2009, 137, fig. 4.

Fig. 16. Chamber Tomb XX: gold jewellery with magnifications of details. Arranged and photographed by P.M. Fischer & R. Feldbacher. Copyright: P.M. Fischer.

ined together with another cylinder seal of haematite from Chamber Tomb ZZ.

Among the finds of organic material (*Fig. 18*) is a decorated distaff of ivory with a gold button in the centre of the distaff's head (N1288). This object type is the first of its kind from the current project and adds to the other impressive mortuary goods found, which include additional decorated distaffs of ivory. The scarab of elephant ivory (N1271) is incised with hieroglyphs showing the signs for a gold collar, life, protection and papyrus. A date in the early 18th Dynasty or even earlier has been suggested, indicating that the scarab is an heirloom.[34] Other items of organic material are four pointed "pins" of ivory (N1224; 8–9 cm long, diameters 0.6–0.7 cm, *Fig. 15*) which are interpreted as projectile points.[35]

[34] Information from Jürg Eggler, University of Fribourg.
[35] Cf. e.g., Vitezović 2018.

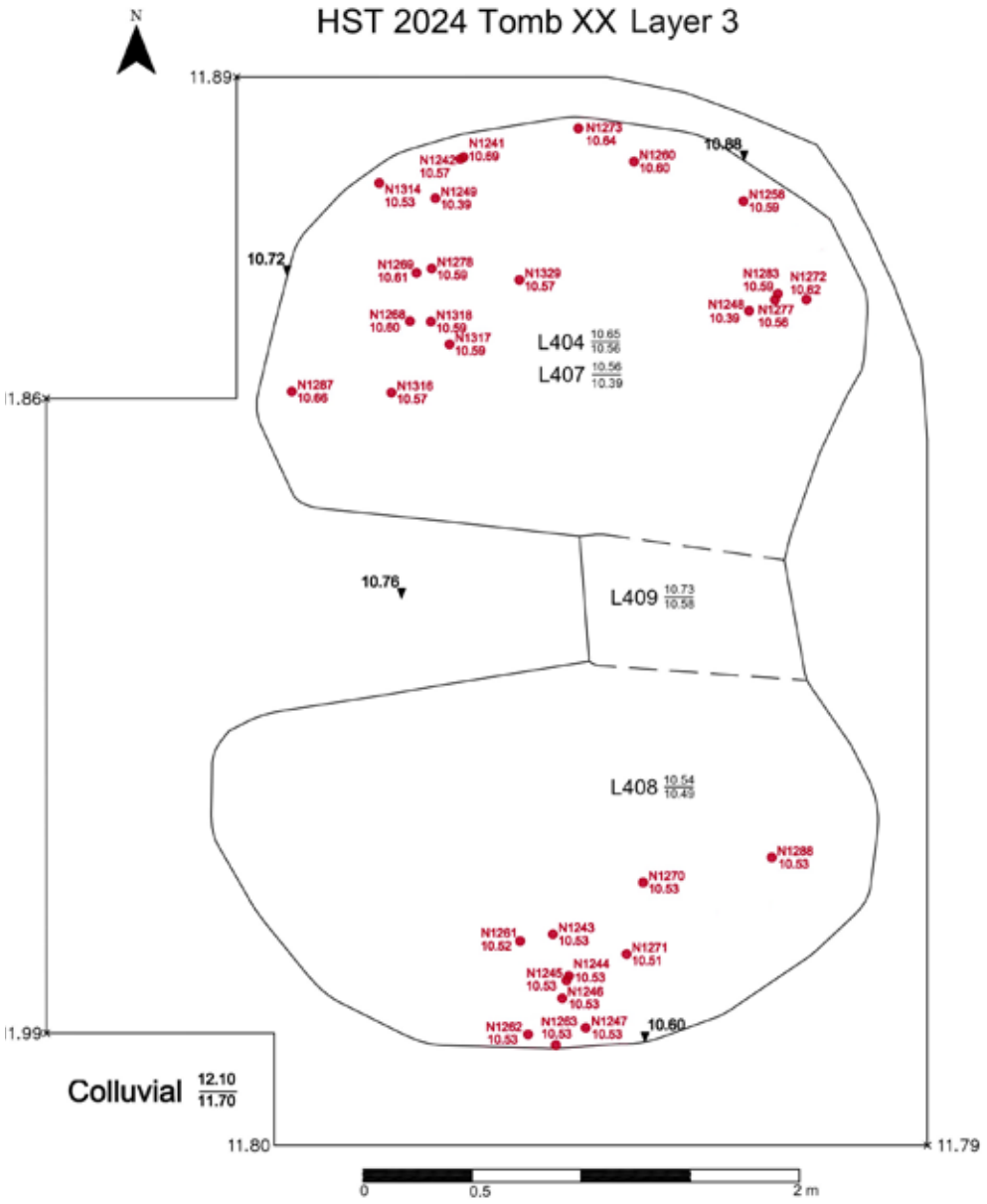


Fig. 17a (left). Chamber Tomb XX: plan of Layer 3 with positions of loci and finds. By A. Papageorgiou, C. Sofokleous, R. Feldbacher & P.M. Fischer. Copyright: P.M. Fischer.

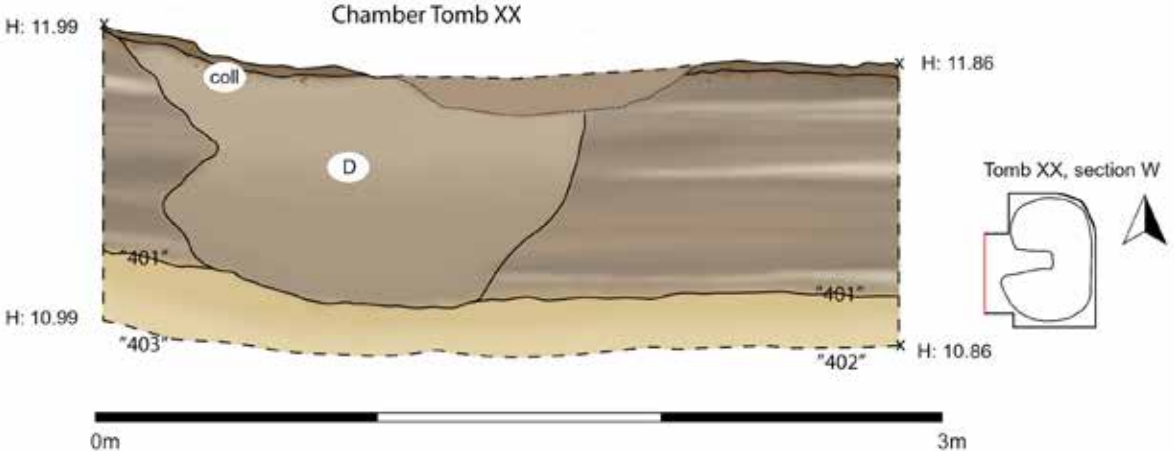


Fig. 17b (below). Chamber Tomb XX: western section. D = dromos; coll = colluvial soil; "..." = projected locus; line = limits of locus; dotted line = limits of excavation. Drawing by M. Pelc. Copyright: P.M. Fischer.

Fig. 18. Chamber Tomb XX: selection of finds from Layer 3 (tomb's floor). Photographs by P.M. Fischer & L. Avial-Chicharro. Copyright: P.M. Fischer.

The bones on the floor of the northern chamber belong to a caprine (sheep or goat), obviously an offering to the deceased. Of the preserved skeletal remains, a humerus and radius/ulna, and the separate bones of the calcaneus, astragalus and one carpal come from the right side of the animal, while a femur and tibia are from the left side. Most of the bones are fused, but the proximal trochanter of the femur still shows the fusion line, suggesting that the caprine is over one year but under 3.5 years of age.[36]

Chamber Tomb YY

This small chamber tomb is also figure-8 shaped (3.70 × 2.40 m, *Figs 2*, *3*, *19–24*). It is positioned just to the north of Chamber Tombs VV and XX. The layers of skeletal deposits and mortuary goods cover *in toto* 0.44 m, viz. from 11.18 masl (L475) to 10.74 masl (L476/478). The two distinct burial layers are designated Layers 1 and 2. The latest entombments include individuals who were found in articulated positions. The minimum number of individuals in Chamber Tomb YY is 17 (an articulated skeleton is shown in *Fig. 20*).[37] Personal belongings and funerary offerings are represented by 135 objects of fired clay, faience, gold, bronze, amber, carnelian and ivory, most of them intact or complete (*Table 4*).

Layer 1 (*Fig. 19*) comprises 57 locally produced vessels, including 26 vessels of Base-ring I and II (the latter most numerous) represented by bowls, juglets and jugs. White Slip I is missing but there are 19 White Slip II (mature) bowls. Other Cypriot ceramic wares include Bucchero, Monochrome, Plain wares, White Painted VI and White Shaved (selected local vessels in *Fig. 21* upper half). Imported pottery consists of 15 Mycenaean/Minoan vessels comprising alabastra, bowls, piriform jars, kraters, a juglet and a flask (selected imports in *Fig. 21* lower half). A complete but inadequately fired and consequently very brittle Mycenaean krater, the tentatively designated "Charging Horse Krater", is decorated, *inter alia*, with horses and a male figure with a dagger (N941). Inside the krater, an intact Base-ring II bowl was found (N996). Another Mycenaean krater, the "Dolphin Krater", is decorated with five dolphins (N810). A Mycenaean figurine shows a bovine and an individual controlling the animal by reins from behind (N925).

The 27 objects of gold include a diadem with flower motifs, a ring, pendants, beads, and ear- and hair rings (*Fig. 22*). Six of the pendants have star-like decorations in repoussé, another pendant is crescent-shaped. Other finds are beads of amber, carnelian, faience and Egyptian blue, and a bee-shaped ivory pendant (the latter in *Fig. 22* top centre), and a bronze knife with two rivets (N983, *Fig. 25*). Layer 2 is just above the bottom of the tomb. It contained 18 objects. The four Base-ring II vessels comprise a bowl, two jugs and two juglets. White Slip II (mature) is represented by six bowls. Additional juglets are Bucchero and White Shaved wares. The six Mycenaean vessels comprise three piriform jars, two chariot kraters (one is N1250, *Fig. 24*), and a skilfully executed beaked jug (N1420, *Fig. 24*).

PRELIMINARY ANALYSIS OF CHAMBER TOMB YY

The Mycenaean beaked jug (N1420) from Layer 2 is traditionally dated to LH IIIA1 (*c.* 1400–1350 BC).[38] The remainder of the imported and locally produced pottery suggests a date in the second half of the 14th century BC with some vessels which could have been produced at the beginning of the 13th century BC. Consequently, the tomb was likely used from the second quarter of the 14th to the transition between the 14th/13th centuries BC.

Although very close to the larger Chamber Tombs XX and VV, Chamber Tomb YY lacks any stratigraphic connection to the former two. It appears that the intention of the builders of these three tombs was to have them in close proximity but clearly delineated. This situation can be interpreted as tombs for three nuclear families who are related to each other. Considering the small dimensions of the tomb, the number of precious and exotic objects (see *Figs 21–24*) is remarkable. The entombed individuals certainly belonged to élite groups of the city.

The Mycenaean krater N941 (*Fig. 21* lower part), the "Charging Horse Krater", was complete but in extremely bad condition. The taphonomic environment surrounding the krater was certainly not the cause of the bad state of preservation because other vessels, such as the nearby Mycenaean "Dolphin Krater" (N810, *Fig. 21*), survived very well. Obviously insufficiently fired, the soft fabric fractured in layers as soon as the vessel was detached from the surrounding supporting soil. To preserve as much as possible, the krater was reinforced with plaster, but when removing it, much of the decoration splintered from the fabric of the vessel and remained in the surrounding soil. However, it was possible to take numerous useful photographs, both *in situ* and after the removal, to document the decorative scenes as much as possible. The paintings depict a dressed male individual with a dagger (*Fig. 21:1*), of which only the hilt is shown, facing an elegantly painted moving horse. Behind the individual is another animal (possibly a horse?) of which parts of a leg and the hind part is

[36] Information from David Reese, University of Yale.

[37] Layers (*Figs 19*, *23*) and associated individuals (*Fig. 36*) will be synchronized in a future study.

[38] Cf. Mountjoy 1986, 59, fig. 67

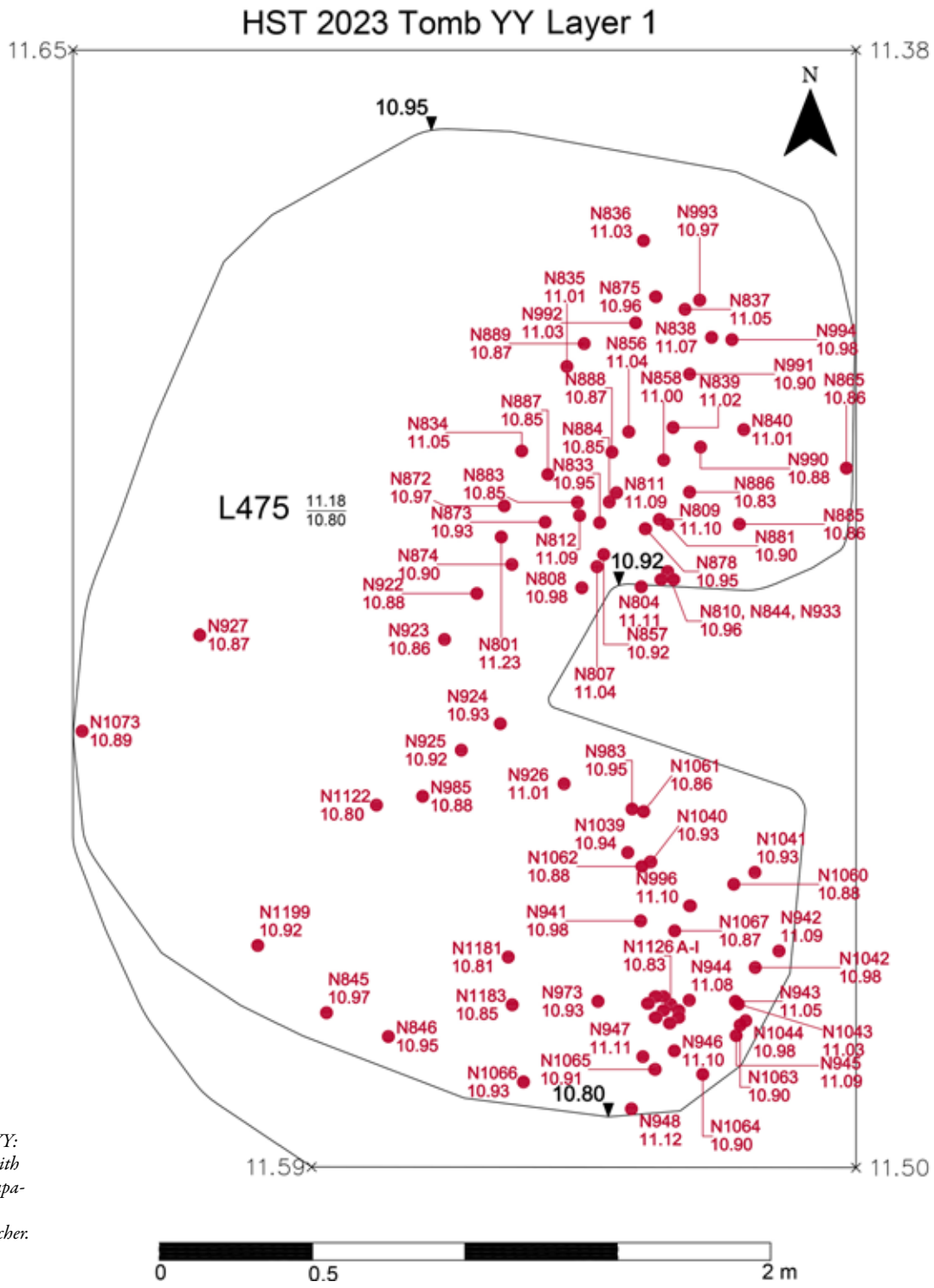


Fig. 19. Chamber Tomb YY: plan of Layer 1 (L475) with positions of finds. By A. Papageorgiou, C. Sofokleous, R. Feldbacher & P.M. Fischer. Copyright: P.M. Fischer.

preserved. This animal is standing in or moving to the opposite direction to the first horse. The other side shows another horse below and to the left of the handle (*Fig. 21:2*), and the hind part of another horse to the right. An additional horse is shown in *Fig. 21:3*. The decoration shows the horses one after another, but the commonly illustrated chariot is missing. Other decorative elements consist, *inter alia*, of papyrus (FM 11), rosette (FM 17), quirks (FM 48) and curved stripes (FM 67; see also the "Dolphin Krater" N810). All decorative elements and the vessel shape taken together suggest produc-

Table 4. Finds from Chamber Tomb YY arranged by locus, then material, then object type.

Find	Locus	Material	Type of object	Shape
1126I	475	amber	beads (2)	globular
983	475	bronze	dagger	large, rivets (2)
1126D	475	carnel-ian	beads (2)	ellipsoid, globular
808	475	clay	Base-ring I	jug, trefoil
835	475	clay	Base-ring I	jug
881	475	clay	Base-ring I	jug
801	475	clay	Base-ring I or II	bowl
804	475	clay	Base-ring II	juglet
809	475	clay	Base-ring II	juglet
811	475	clay	Base-ring II	juglet
840	475	clay	Base-ring II	jug
846	475	clay	Base-ring II	jug
858	475	clay	Base-ring II	jug
865	475	clay	Base-ring II	jug
872	475	clay	Base-ring II	jug
878	475	clay	Base-ring II	jug
883	475	clay	Base-ring II	jug
886	475	clay	Base-ring II	jug
933	475	clay	Base-ring II	bowl
943	475	clay	Base-ring II	jug
944	475	clay	Base-ring II	jug
990	475	clay	Base-ring II	jug
996	475	clay	Base-ring II	bowl
1039	475	clay	Base-ring II	juglet
1040	475	clay	Base-ring II	jug
1042	475	clay	Base-ring II	jug
1043	475	clay	Base-ring II	jug
1061	475	clay	Base-ring II	juglet
1062	475	clay	Base-ring II	juglet
1066	475	clay	Base-ring II	juglet
1199	475	clay	Base-ring II	jug
838	475	clay	Bucchero	juglet
1073	475	clay	Minoan?	krater
833	475	clay	Monochrome	bowl
875	475	clay	Mycenaean	juglet
925	475	clay	Mycenaean	figurine
994	475	clay	Mycenaean	krater
1063	475	clay	Mycenaean	piriform jar
810	475	clay	Mycenaean, LH IIIA2	krater, dolphins. The "Dolphin Krater"
807	475	clay	Mycenaean, LH IIIA2–B1	alabastron
812	475	clay	Mycenaean, LH IIIA2–B1	alabastron
837	475	clay	Mycenaean, LH IIIA2–B1	piriform jar
874	475	clay	Mycenaean, LH IIIA2–B1	flask

Table 4 continued.

Find	Locus	Material	Type of object	Shape
941	475	clay	Mycenaean, LH IIIA2–B1	Krater. The "Charg-ing Horse Krater"
945	475	clay	Mycenaean, LH IIIA2–B1	alabastron
1064	475	clay	Mycenaean, LH IIIA2–B1	bowl
1065	475	clay	Mycenaean, LH IIIA2–B1	piriform jar
923	475	clay	Mycenaean, LH IIIB1?	piriform jar
922	475	clay	Plain White	bowl
946	475	clay	Plain White	jug
947	475	clay	Plain White	jug
973	475	clay	Plain White	jug
993	475	clay	Plain White	bowl
1041	475	clay	Plain White	bowl
1060	475	clay	Plain White	bowl
873	475	clay	White Painted VI	spouted juglet
927	475	clay	White Shaved	juglet
990	475	clay	White Shaved	juglet
1122	475	clay	White Shaved	juglet
836	475	clay	White Slip II	bowl
839	475	clay	White Slip II	bowl
844	475	clay	White Slip II	bowl
834	475	clay	White Slip II (mature)	bowl
856	475	clay	White Slip II (mature)	bowl
857	475	clay	White Slip II (mature)	bowl
884	475	clay	White Slip II (mature)	bowl
885	475	clay	White Slip II (mature)	bowl
887	475	clay	White Slip II (mature)	bowl
888	475	clay	White Slip II (mature)	bowl
889	475	clay	White Slip II (mature)	bowl
924	475	clay	White Slip II (mature)	bowl
926	475	clay	White Slip II (mature)	bowl
942	475	clay	White Slip II (mature)	bowl
948	475	clay	White Slip II (mature)	bowl
991	475	clay	White Slip II (mature)	bowl
992	475	clay	White Slip II (mature)	bowl

Table 4 continued.

Find	Locus	Material	Type of object	Shape
1044	475	clay	White Slip II (mature)	bowl
1067	475	clay	White Slip II (mature)	bowl
1126B	475	faience	Egyptian blue bead	elliptoid
1126A	475	faience	beads (11)	elliptoid, globular
845	475	gold	diadem	flower motifs
1126H	475	gold	pendant	crescent
1181	475	gold	ring	incisions
985	475	gold	caps (2)	stepped caps of seal
1126E	475	gold	beads (10)	globular, collared (7), cylindrical (3)
1126G	475	gold	hair rings (2)	overlapping ends
1183	475	gold, faience	earrings (2), beads (2)	plain rings (2), elliptoid (1), globular (1)
1126F	475	gold	pendants (6)	star-decoration, large (5), small (1)
1126C	475	ivory	pendant	bee-shaped
1252	476	clay	Base-ring II	jug
1253	476	clay	Base-ring II	jug

Table 4 continued.

Find	Locus	Material	Type of object	Shape
1266	476	clay	Base-ring II	juglet
1250	476	clay	Mycenaean	krater
1255	476	clay	Mycenaean	piriform jar
1333	476	clay	Mycenaean	piriform jar
1420	476	clay	Mycenaean	beaked jug
890	476	clay	Mycenaean, LH IIIA2	chariot krater
1265	476	clay	White Shaved	juglet
1251	476	clay	White Slip II	bowl
1254	476	clay	White Slip II	bowl
1256	476	clay	White Slip II	bowl
1257	476	clay	White Slip II	bowl
1303	476	clay	White Slip II	bowl
1237	477	clay	Bucchero	juglet
1239	477	clay	Mycenaean	krater
1236	477	clay	Mycenaean	piriform jar (small)
1238	477	clay	White Slip II (mature)	bowl
1264	479	clay	Base-ring II	bowl

Fig. 20. Chamber Tomb YY: Individual A in L475. Photograph by R. Feldbacher. Copyright: P.M. Fischer.

Fig. 21. Chamber Tomb YY: selected pottery from L475; local (upper two rows) and Mycenaean (lower three rows). Photographs by P.M. Fischer & L. Avial-Chicharro. Copyright: P.M. Fischer.

Fig. 22. Chamber Tomb YY: gold jewellery from L475 with magnifications of details. Arranged and photographed by P.M. Fischer & R. Feldbacher. Copyright: P.M. Fischer.

tion in LH IIIA2, a conclusion supported by other Mycenaean vessels from this tomb. However, the beaked jug N1420 (FS 144) decorated with argonaut motifs (FM 22) seems to be of earlier date, LH IIIA1 (*Fig. 24*). Chariot krater N1250 also derives from the same context, viz. the central pit L476', where it was standing on the floor of the tomb (*Fig. 24*). The krater depicts two sets of chariots on either side. This together with the style of the chariot box and filler motifs fit kraters dated to late LH IIIA1–early LH IIIA2, or around 1350 BC.[39]

Among the 27 objects of gold are pendants, the shapes and star-like decorations of which resemble jewellery from the Uluburun shipwreck (dendrochronologically dated to 1320 BC ±15 years);[40] see, for example, N1126F and N1126F' together with four other related pendants from Chamber Tomb YY, as well as the crescent-shaped pendant N1126H (*Fig. 22*). Although the items from the Uluburun shipwreck are larger and the decorations not entirely identical, they certainly are related. The jewellery and cargo of the Uluburun ship, including numerous Cypriot oxhide ingots, provide additional evidence about trade routes between Cyprus and the Levant.[41]

[39] See krater 74.51.964 in the Metropolitan Museum which is dated LH IIIA1 (late), 1375–1350 BC, or krater 1897,0401.1076 (Enkomi Tomb 67) in the British Museum which is dated to LH IIIA1, 1400–1375 BC (this seems to be a too early date). Discussed with Laerke Recht at the University of Graz, to whom we are grateful.

[40] Manning *et al.* 2009.

[41] The first author (PMF) is very much indebted to Cemal Pulak who provided valuable information on the jewellery of the Uluburun shipwreck and numerous illustrations.

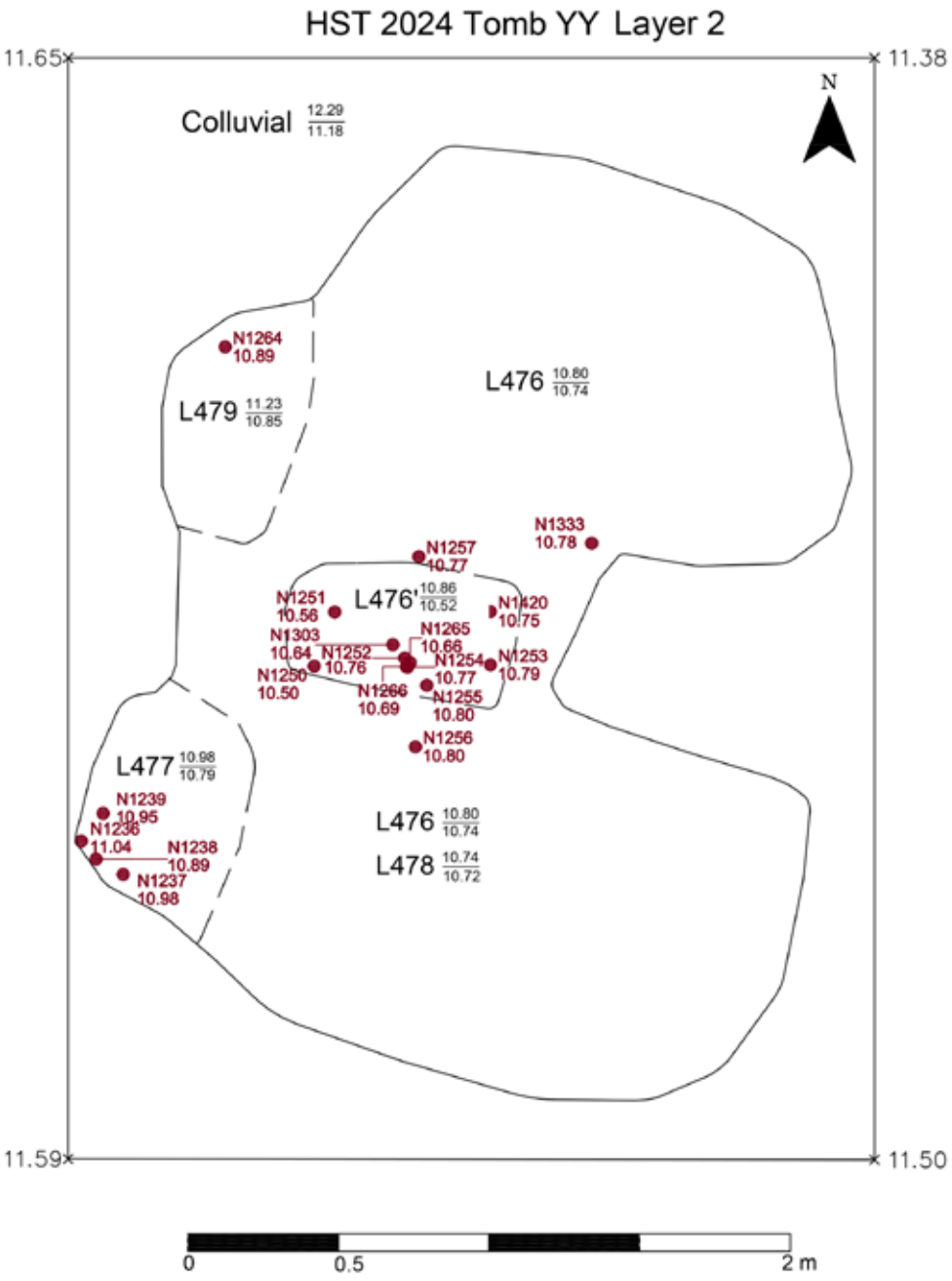


Fig. 23. Chamber Tomb YY: plan of Layer 2 (tomb's floor) with positions of loci and finds. By A. Papageorgiou, C. Sofokleous, R. Feldbacher & P.M. Fischer.
Copyright: P.M. Fischer.

This tomb, too, did not contain any objects which are related to Anatolia. Notably, although Red Lustrous Wheel-made ware is common in most of the other tombs at Hala Sultan Tekke, it is missing from Chamber Tomb YY (as well as Chamber Tomb XX, see above). Objects of Levantine origin are missing as well. This might reflect the same situation as proposed for the individuals of Chamber Tomb XX, viz. (some of) the entombed groups were mainly involved in interregional contacts with the Aegean and probably Egypt.

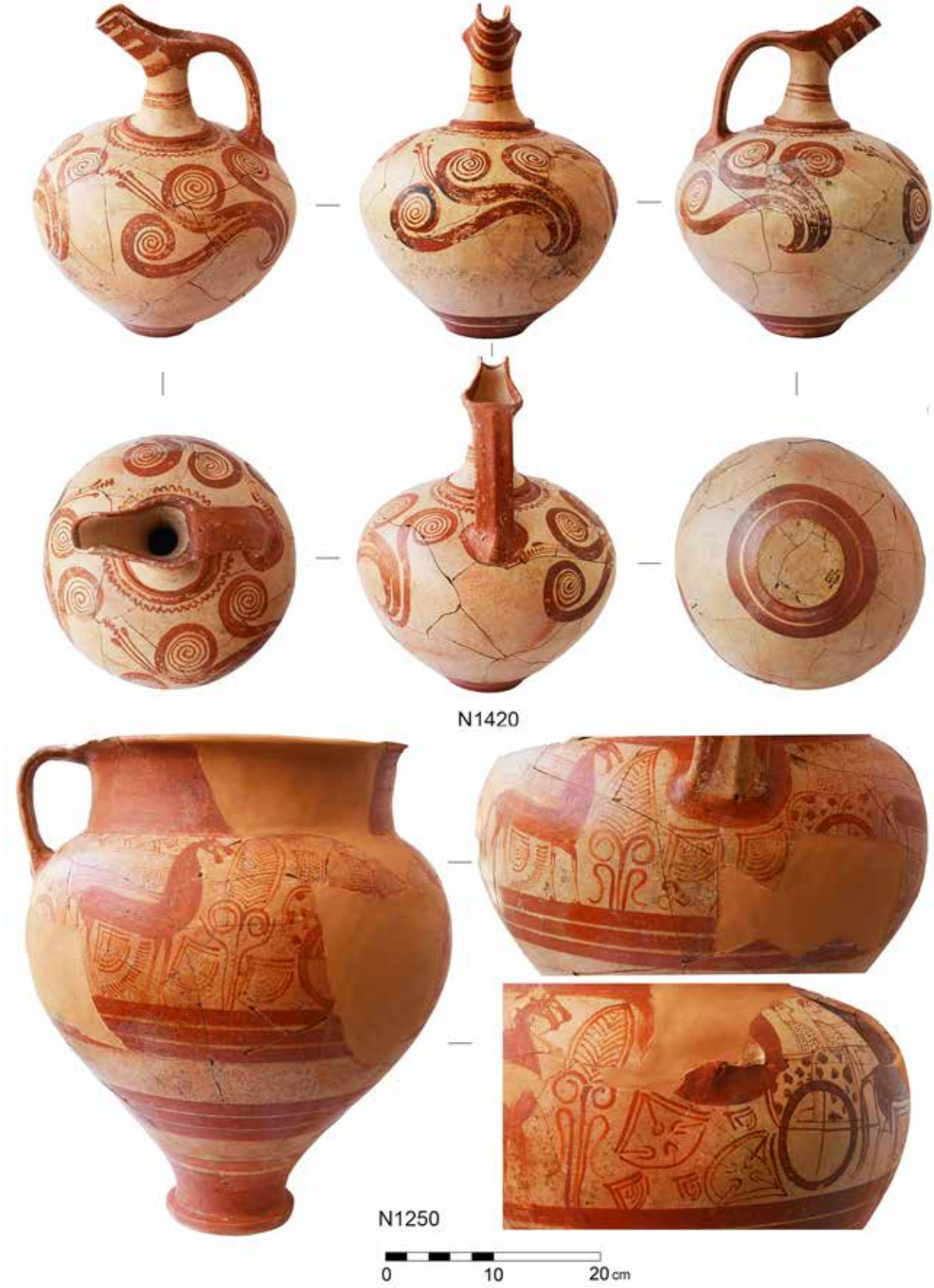


Fig. 24. Chamber Tomb YY: LH IIIA1 (late) beaked jug and an early LH IIIA2 chariot krater from Layer 2. Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

Reflections on the bronzes from Chamber Tombs VV, XX and YY

BY PETER M. FISCHER

In addition to a few minor, rather corroded and broken bronze objects, consisting of pins, rings and plates primarily coming from the looted Chamber Tomb VV, the two seasons produced 36 virtually intact objects of bronze (conserved selection in *Fig. 25*). With the exception of two objects, a dagger from Chamber Tomb VV (N1148, obviously overlooked by the looters), and a dagger from Chamber Tomb YY (N983), all the others derive from Chamber Tomb XX. The small dagger N1148 from Chamber Tomb VV is classified as a Cypriot product,[42] and N983 from the same tomb as an import from the Aegean (see the discussion on the Siána knives below).

The remainder of the bronzes are from Chamber Tomb XX and include a few Cypriot-produced items, including a deep bowl (N832),[43] and four spear-butt-spikes (N1054, N1167, N1258 and N1269).[44] Spear-butt-spikes have also been recovered from Tombs I and V at Toumba tou Skourou. However, these specimens date to Middle Cypriot III–Late Cypriot IA[45] and are thus much earlier than those from the current excavation, demonstrating the long-life span of these objects in Cyprus. This is confirmed by a corresponding spear-butt-spike from Enkomi Level IIIA (cited above) which is dated to LC IIIA, viz. more recent than our tombs. A remarkably well-manufactured arm ring (N1232) with a twisted bronze wire connecting the ends of the ring is preliminarily classified as a local product, as are two small hinges (N1003), most likely from a wooden box, a base of a pair of tweezers (N998), and another partially preserved object (N1230) which may be the lower part of a figurine. The four fishing hooks (N1329), obviously meant to catch fish of varying sizes, are standard types with corresponding items in the city where they are dated to LC IIIA.[46]

Several of the imported bronzes from Chamber Tomb XX are classified as Aegean-produced with the likely exception of the dagger with the leaf-shaped blade (N901). The latter, an Italian-type dagger, is related to the group of "Pertosa daggers" which typologically have been divided into two groups: Type A, with parallel edges, and the more unusual Type B, with leaf-shaped blades: this latter type matches N901.[47] The original Pertosa-type dagger appears in the Italian Middle Bronze Age 3 period which corresponds to LH IIIA.[48] It is at home in southern and central Italy and does not occur further north than Lazio, but imitations were produced in the Mycenaean sphere of culture at the end of the 13th and beginning of the 12th centuries BC. Our dagger cannot be dated later than early in LH IIIB1 or just after 1300 BC according to the associated Mycenaean pottery and the Egyptian finds. This is quite early in the life span of this type of dagger, which may point to a direct import from southern Italy. Previously excavated contexts at Hala Sultan Tekke, dating to the 13th century BC, produced Nuragic pottery from southern Sardinia.[49] To some extent, this supports the hypothesis that the Pertosa Type B dagger from 2023 represents a direct import from roughly the same area although culturally diverse. Chemical and lead isotope analyses are needed to confirm this hypothesis.

Another dagger with a short tang and three rivets is an Aegean type (N1233). A remarkably similar but larger dagger with gold-plated rivets comes from Mycenae, Tomb 82, dated roughly to LH II–IIIA.[50] Gold-plated rivets next to bronze weapons have been found during the 2023 season of excavation at Hala Sultan Tekke (N1229, N1226, N1130).

The three knives N892, N1083 and N983 (the latter from Chamber Tomb YY) belong to a group of objects known in the literature as "Siána knives" and produced in the Aegean.[51] A previously excavated Siána knife (N205*, Fig. 25* inside frame) with intact handles of ivory comes from Chamber Tomb RR at Hala Sultan Tekke.[52]

The mirror N988 with two small holes is of Minoan origin[53] and quite different to the Cypriot types with tangs.[54] The two ladles (N813 and N1194) are rare finds classified as Mycenaean or Minoan products.[55] Although the shape of the Gournes ladle (see *Note 51*) is similar to ours, it is much smaller and resembles more a miniature ladle maybe used in mortuary rituals.

It is remarkable that there are so many imported bronze objects from these three tombs. It confirms again the intense interregional connections with the Aegean (and beyond), something also reflected by the mass of recorded Mycenaean/Minoan and other imported pottery (see *Tables 2–4*).

---

[42] Cf. Toumba tou Skourou in Vermeule & Wolsky 1990, pl. 100.

[43] See the principal type in Matthäus 1980, 277–279, pl. 49:416.

[44] Vermeule & Wolsky 1990, pl. 103; Enkomi in Dikaios 1969, pl. 163.

[45] Vermeule & Wolsky 1990, 396.

[46] Fischer & Bürge 2018, 470, fig. 4.27:17.

[47] Jung 2009, 137, fig. 4, Type B.

[48] Jung & Mehofer 2013.

[49] E.g., Bürge & Fischer 2019; Gradoli *et al.* 2020.

[50] "Tanged Daggers, Variant B" in Papadopoulos 1998, 15 and pl. 9:68.

[51] Sandars 1955; Paschalides 2018; see also the selection from various sites in the Aegean and western Anatolia in Roháček 2018, 68–77, especially figs 6, 7.

[52] Fischer & Bürge 2020, 96, fig. 25:6.

[53] Feldbacher *et al.* 2024.

[54] Catling 1964, 225, b.3, pl. 40.

[55] Matthäus 1980, 297, 298, pl. 52:450 from Chamber Tomb 2 at Gournes, Crete.

Fig. 25. Chamber Tombs VV, XX and YY: bronze and gold-plated objects. Conservation by E. Loizides and O. Makri, photographs by A. Georgiadou, A. Athanasiou & P.M. Fischer. Copyright: P.M. Fischer.

General information on the Chamber Tombs ZZ, AB East and AB West

These tombs, located near Chamber Tombs VV, XX and YY, are in an area where pottery sherds, including parts of a Mycenaean chariot krater and an almost intact juglet of Bucchero ware, were found in the colluvial, ploughed soil.

The report on these tombs which were exposed in 2024 is very preliminary because further fieldwork is necessary as the tombs have not yet been fully excavated. The numerous human remains and mortuary objects permitted only a very slow progress due to our meticulous excavation procedures. There are niches and other features which need further examination. The bioarchaeological report on Chamber Tombs ZZ, AB East and AB West will be presented in a future study due to insufficient time between the end of the 2024 campaign and the submission of this report (see 'Introduction').

At the end of the 2024 campaign, after backfilling all the tombs, the area was fenced and secured with metal rods and sheets and covered by a layer of soil.

Chamber Tomb ZZ

The southernmost portion of Chamber Tomb ZZ is 4.5 m north-west of the north-western margin of Chamber Tomb XX. The figure-8 shape of Tomb ZZ is similar to that of Chamber Tombs VV, XX and YY (*Figs 2*, *3*). However, the chambers of Tomb ZZ are orientated east–west whereas those of the latter are aligned north–south. The maximum dimensions are 4.75 m east–west and 2.75 north–south with the narrow connection part at 0.6 m. By the end of the 2024 excavation season, the eastern chamber had been divided into L500, L502, L504 and L505, and the western chamber into L501 and L503.

So far, a depth of 0.36 cm of burial layers—measured from the uppermost find in L502 (the Minoan stirrup jar N1267 in *Fig. 28* at 10.90 masl, at a distance of approximately 1.5 m below the ploughed surface) to the lowest find in L505 (the faience bead N1552 at 10.59 masl in *Fig. 26*)—were exposed in 2024.

The tomb's original backfill is represented by L500/L501. L502 (eastern chamber) and L503 (western chamber) contain the most recent burial layers. In the eastern chamber, L504 and L505 (just reached in 2024) are interments of older date.

The classification and distribution of the 152 objects can be seen in *Table 5* and a selection in *Figs 27*, *28*. The most common locally produced ceramic vessels are of Base-ring I and II wares (14) represented by bowls, juglets, jug, a spindle bottle and a lentoid flask, followed by White Slip II bowls (13) whereas White Slip I is missing. Other Cypriot ceramic wares include Bucchero, Monochrome, Plain wares and White Shaved. Imported pottery consists of 34 Mycenaean/Minoan vessels comprising alabastra, bowls, piriform jars, kraters, juglets, jugs, stirrup jars, a spouted juglet, a plate and a cup. Anatolian ceramic imports are a lentoid flask and a spindle bottle of Red Lustrous Wheel-made ware. A few beads of faience should be mentioned, too. The 21 objects of bronze comprise nine arrowheads, three fishing hooks, three rings, two hinges and a 12.5 cm short dagger with three rivets. Other items of metal are four boat-shaped fishing lures of lead and two rings of silver. Objects of stone are a biconical spindle whorl of serpentine, and seven skilfully executed arrowheads of various minerals. There is also a cylinder seal of haematite (N1378). Items of organic materials are a spindle whorl of bone and ten objects of ivory. Among the latter are two distaffs and eight pointed "pins".

PRELIMINARY ANALYSIS OF CHAMBER TOMB ZZ

The pottery suggests a preliminary date in the second half of the 14th century BC. The first find from the most recent burial layer (L502) is the stirrup jar N1267 which shows Minoan traits and should be dated to LM/LH IIIA2 (*Fig. 28*).[56] Other vessels showing Minoan features include the juglets N1279,[57] N1371, N1398 and N1463 (*Fig. 28*). The Mycenaean small piriform jars N1312, N1342, N1417, N1465 and others are all at home in LH IIIA2 (*Fig. 27*). The few Base-ring I and the numerous Base-ring II vessels together with the White Slip II bowls, most of them of the "mature" type, as well as other locally produced ceramics do not contradict the suggested date for the Aegean pottery. It should be highlighted that a third of the ceramic vessels (34%) are imports from the Aegean whereas only two, a spindle bottle (N1500) and a lentoid flask (N1310), are from Anatolia (*Fig. 28*).

The cylinder seal of haematite (N1378, *Fig. 28*) is discussed below and in *Appendix 3*. The nine arrowheads of various minerals, although generally more slender, have excellent parallels to the equally number of arrowheads from Chamber Tomb XX, and might have been used for hunting birds. The small dagger N1548 with three rivets has a parallel in Chamber Tomb VV (see N1148 and references above) and is classified as a Cypriot product. The four boat-shaped fishing lures of lead which are pierced at the "bow and stern" are the first of this type from the cemetery (N1368 in *Fig. 28*, which is the most complete of these four with a weight of 125 g). A very similar object has been found in CQ4 of the city (N439, 153 g).[58] These weights may point to the professional identity of the associated entombed individuals, possibly fishermen or seafarers. Among the

[56] See e.g., Kanta 1980, fig. 107:4, a related stirrup jar with similar decoration from Episkopi in Ierapetra on Crete.

[57] For the decoration see Kanta 1980, figs 75:4, 139:2–3.

[58] Fischer & Bürge 2020, 89, fig. 19:2. See the study of these objects in Fischer & Manolova 2025.

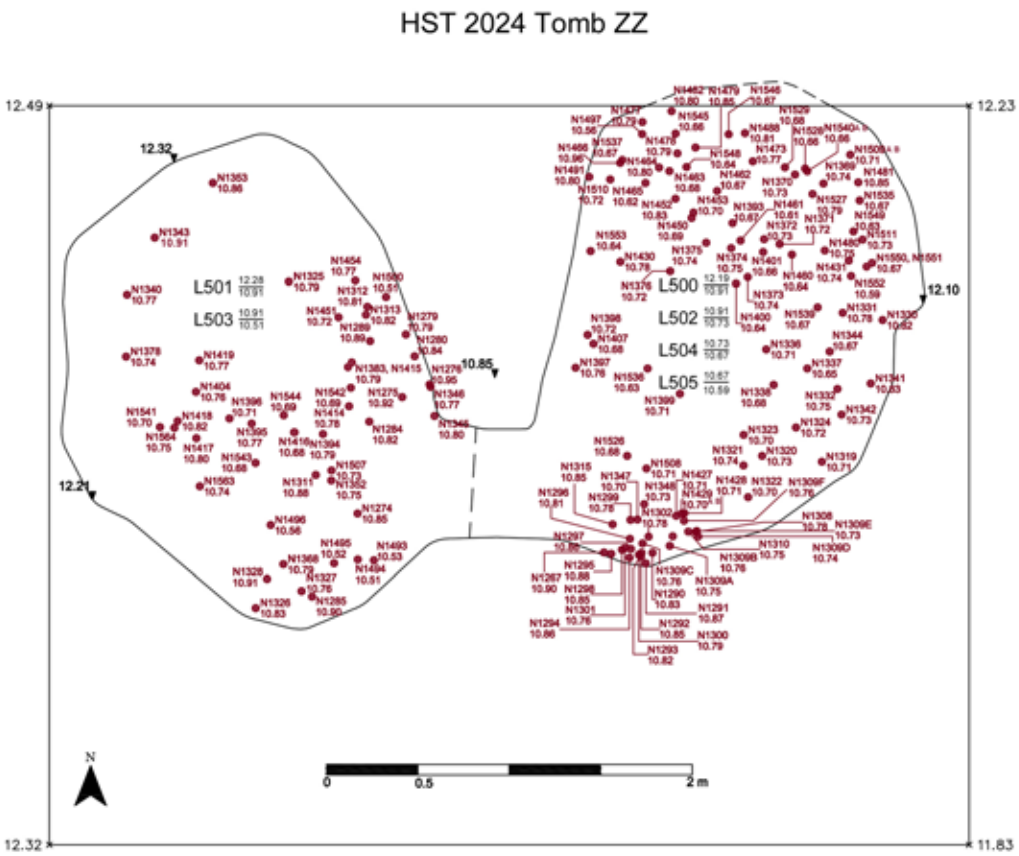


Fig. 26. Chamber Tomb ZZ: plan with positions of loci and finds. By A. Papageorgiou, C. Sofokleous, R. Feldbacher & P.M. Fischer. Copyright: P.M. Fischer.

Table 5. Finds from Chamber Tomb ZZ arranged by locus, then material, then object type.

Find	Locus	Material	Type of object	Shape
1290	502	bronze	arrowhead	pointed leaf shape with tang
1291	502	bronze	arrowhead	pointed leaf shape with tang
1292	502	bronze	arrowhead	pointed leaf shape with tang
1293	502	bronze	arrowhead	pointed leaf shape with tang
1294	502	bronze	arrowhead	pointed leaf shape with tang
1295	502	bronze	arrowhead	pointed leaf shape with tang
1296	502	bronze	arrowhead	pointed leaf shape with tang
1302	502	bronze	arrowhead	pointed leaf shape with tang
1323	502	clay	Base-ring	bowl
1374	502	clay	Base-ring I/II	jug
1284	502	clay	Base-ring II	spindle bottle (miniature)
1322	502	clay	Base-ring II	juglet
1330	502	clay	Base-ring II	jug

Table 5 continued.

Find	Locus	Material	Type of object	Shape
1341	502	clay	Base-ring II	jug
1373	502	clay	Base-ring II	jug
1430	502	clay	Canaanite	jar
1267	502	clay	Minoan	stirrup jar
1298	502	clay	Mycenaean	piriform jar (small)
1342	502	clay	Mycenaean	piriform jar
1376	502	clay	Mycenaean	stirrup jar
1372	502	clay	Mycenaean	kylix
1371	502	clay	Mycenaean?	juglet
1289	502	clay	Plain White	jug
1320	502	clay	Plain White	juglet
1310	502	clay	Red Lustrous Wheel-made	lentoid flask
1319	502	clay	White Shaved	juglet
1321	502	clay	White Shaved	juglet
1375	502	clay	White Shaved	juglet
1332	502	clay	White Slip II	bowl
1370	502	clay	White Slip II	bowl
1331	502	clay	White Slip II (mature)	bowl

Table 5 continued.

Find	Locus	Material	Type of object	Shape
1369	502	clay	White Slip II (mature)	bowl
1431	502	clay	White Slip II (mature)	bowl
1300	502	ivory	projectile point	
1301	502	ivory	projectile point	
1308	502	ivory	projectile point	
1315	502	ivory	projectile point	
1297	502	stone	arrowhead	
1309A	502	stone	arrowhead	
1309B	502	stone	arrowhead	
1309C	502	stone	arrowhead	
1309D	502	stone	arrowhead	
1309E	502	stone	arrowhead	
1309F	502	stone	arrowhead	
1299	502	stone	spindle whorl	biconical
1345	503	bronze	fishing hook	
1542	503	bronze	fishing hook	
1543	503	bronze	fishing hook	
1276	503	clay	Base-ring I	juglet
1493	503	clay	Base-ring I	juglet
1280	503	clay	Base-ring II	jug
1327	503	clay	Base-ring II	juglet
1416	503	clay	Base-ring II	jug
1419	503	clay	Base-ring II	jug
1495	503	clay	Base-ring II	lentoid flask
1275	503	clay	Bucchero	juglet
1279	503	clay	Minoan?	juglet
1313	503	clay	Minoan?	juglet
1311	503	clay	Monochrome	jug
1285	503	clay	Mycenaean	alabastron
1312	503	clay	Mycenaean	piriform jar
1326	503	clay	Mycenaean	alabastron
1328	503	clay	Mycenaean	alabastron

Table 5 continued.

Find	Locus	Material	Type of object	Shape
1404	503	clay	Mycenaean	piriform jar
1417	503	clay	Mycenaean	piriform jar
1494	503	clay	Mycenaean	piriform jar
1325	503	clay	Plain White	jug
1395	503	clay	Plain White	jug
1500	503	clay	Red Lustrous Wheel-made	spindle bottle
1274	503	clay	White Shaved	juglet
1346	503	clay	White Shaved	juglet (miniature)
1353	503	clay	White Shaved	juglet
1383	503	clay	White Shaved	juglet
1340	503	clay	White Slip II	bowl
1343	503	clay	White Slip II	bowl
1414	503	clay	White Slip II	bowl
1418	503	clay	White Slip II	bowl
1454	503	clay	White Slip II	bowl
1324	503	clay	White Slip II (mature)	bowl
1394	503	clay	White Slip II (mature)	bowl
1396	503	clay	White Slip II (mature)	bowl
1415	503	clay	White Slip II (mature)	bowl
1563	503	faience	beads (3)	biconical/fluted
1378	503	haema-tite	seal	
1352	503	ivory	distaff	incisions, geo-metric pattern
1451	503	ivory	distaff, head	reversed conical
1507	503	ivory	spindle whorl	hemispherical, incisions
1368	503	lead	lure	boat-shaped
1564	503	lead	lure	boat-shaped
1496	503	lead	lure	boat-shaped
1541	503	lead	lure	boat-shaped

mortuary goods of organic material are seven pointed "pins" of ivory which are interpreted as projectile points.[59]

The final discussion of this tomb has to await until it has been completely excavated. Our preliminary interpretation of the profession of some of the entombed individuals is that they were engaged in hunting, fishing and seafaring, and that the surplus from the prey and catches enabled them to acquire sophisticated pottery, mainly from the Aegean.

[59] Cf. above the identical projectile points from Chamber Tomb XX.

Report on two cylinder seals

BY TERESA BÜRGE & ANE DYBKJÆR

The two seals from the 2024 season of excavation add to the 31 seals hitherto known from Hala Sultan Tekke. Of these, 16 come from the most recent series of excavations undertaken from 2010 onwards[60] and 15 were found in previous seasons.[61]

[60] Bürge 2016; Fischer & Bürge 2019, 306, fig. 20.4; Fischer & Bürge 2020, 98–99; 2022, 24, fig. 9.

[61] Webb 2002, 114–115; Gubel & Smith 2010.

Table 5 continued.

Find	Locus	Material	Type of object	Shape
1544	503	silver	ring	overlapping ends
1427	504	bronze	arrowhead	pointed leaf shape with tang
1526	504	bronze	arrowhead	pointed leaf shape with tang
1509A	504	bronze	bracelet	open ends
1509B	504	bronze	bracelet	overlapping ends
1393	504	bronze	hinge	bent sheet metal
1453	504	bronze	hinge	bent sheet metal
1529	504	bronze	ring	overlapping ends
1336	504	clay	Base-ring	jug
1347	504	clay	Base-ring II	juglet
1401	504	clay	Base-ring II	juglet
1462	504	clay	Base-ring II	jug
1488	504	clay	Base-ring II	bowl
1510	504	clay	Base-ring II	jug
1397	504	clay	Bucchero	juglet
1398	504	clay	Minoan	jug
1481	504	clay	Minoan	jug
1477	504	clay	Minoan?	juglet
1400	504	clay	Minoan?	juglet
1461	504	clay	Minoan?	spouted juglet
1338	504	clay	Mycenaean	piriform jar
1344	504	clay	Mycenaean	plate
1407	504	clay	Mycenaean	piriform jar
1464	504	clay	Mycenaean	carinated bowl
1465	504	clay	Mycenaean	piriform jar
1491	504	clay	Mycenaean	krater
1497	504	clay	Mycenaean	piriform jar
1480	504	clay	Mycenaean	piriform jar
1466	504	clay	Mycenaean?	bowl
1399	504	clay	Mycenaean/ Minoan	alabastron
1463	504	clay	Mycenaean?	juglet

Table 5 continued.

Find	Locus	Material	Type of object	Shape
1337	504	clay	Mycenaean?	juglet
1452	504	clay	White Painted Wheel-made	bowl
1460	504	clay	White Shaved	juglet
1473	504	clay	White Shaved	juglet
1478	504	clay	White Slip II	bowl
1479	504	clay	White Slip II	bowl
1482	504	clay	White Slip II	bowl
1450	504	clay	White Slip II (mature)	bowl
1527	504	clay	White Slip II (mature)	bowl
1511	504	clay	White Slip II (mature)	bowl
1348	504	ivory	projectile point	
1428	504	ivory	projectile point	
1508	504	ivory	projectile point	
1528	504	silver	ring	overlapping ends
1429A	504	stone	arrowhead	
1429B	504	stone	arrowhead	
1539	505	bone	spindle whorl	hemispherical, incisions
1548	505	bronze	dagger	large, rivets (3)
1540A	505	bronze	ring	closed
1540B	505	bronze	ring	closed
1537	505	clay	Base-ring I	juglet
1546	505	clay	Base-ring I	juglet
1535	505	clay	Mycenaean	cup
1549	505	clay	Plain White	rounded bowl
1550	505	clay	Plain White	rounded bowl
1551	505	clay	Plain White	rounded bowl
1553	505	clay	Plain White	juglet
1536	505	clay	White Shaved	juglet
1545	505	clay	White Shaved	juglet
1552	505	faience	Egyptian blue bead	cylindrical

CYLINDER SEAL N1248

Cylinder seal of copper alloy; height 2.5 cm, diameter 1.0 cm, weight 7.65 g (*Fig. 18* and *Appendix 3*). Intact, but encrusted and corroded which has affected the visibility of the motifs. The seal was found in L407 on the floor of Chamber Tomb XX.

The seal depicts a human figure with upraised arms wearing a robe. On either side of the figure are two horned animals, most likely caprids. One of them is standing on its hind legs, the other one is depicted head-down. Various filling (?) motifs which are unclear due to corrosion occupy the space between the figures.

Discussion

Cylinder seals of metal are rare in Bronze Age Western Asia and on Cyprus. These are mainly made of copper or copper alloys.[62]

[62] Kenna 1971, 30–31; Joyner *et al.* 2006, 139; Salje (1990, 140) lists only eight seals, of which four were found in Syria (National Museum Aleppo M 6061, unprovenanced; Marcopoli Collection Aleppo no. 657 with Hittite inscription, for which see Teissier 1984, 300–301; Ashmolean Museum AN1913.71, unprovenanced; R.S. 26.037 from Ugarit), and four on Cyprus (Louvre AO 1523, possibly from Enkomi; British Museum BM 1900.6-15.55 from Enkomi; no. 1218

Fig. 27. Chamber Tomb ZZ: selected pottery; local (upper half) and Mycenaean (lower half). Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

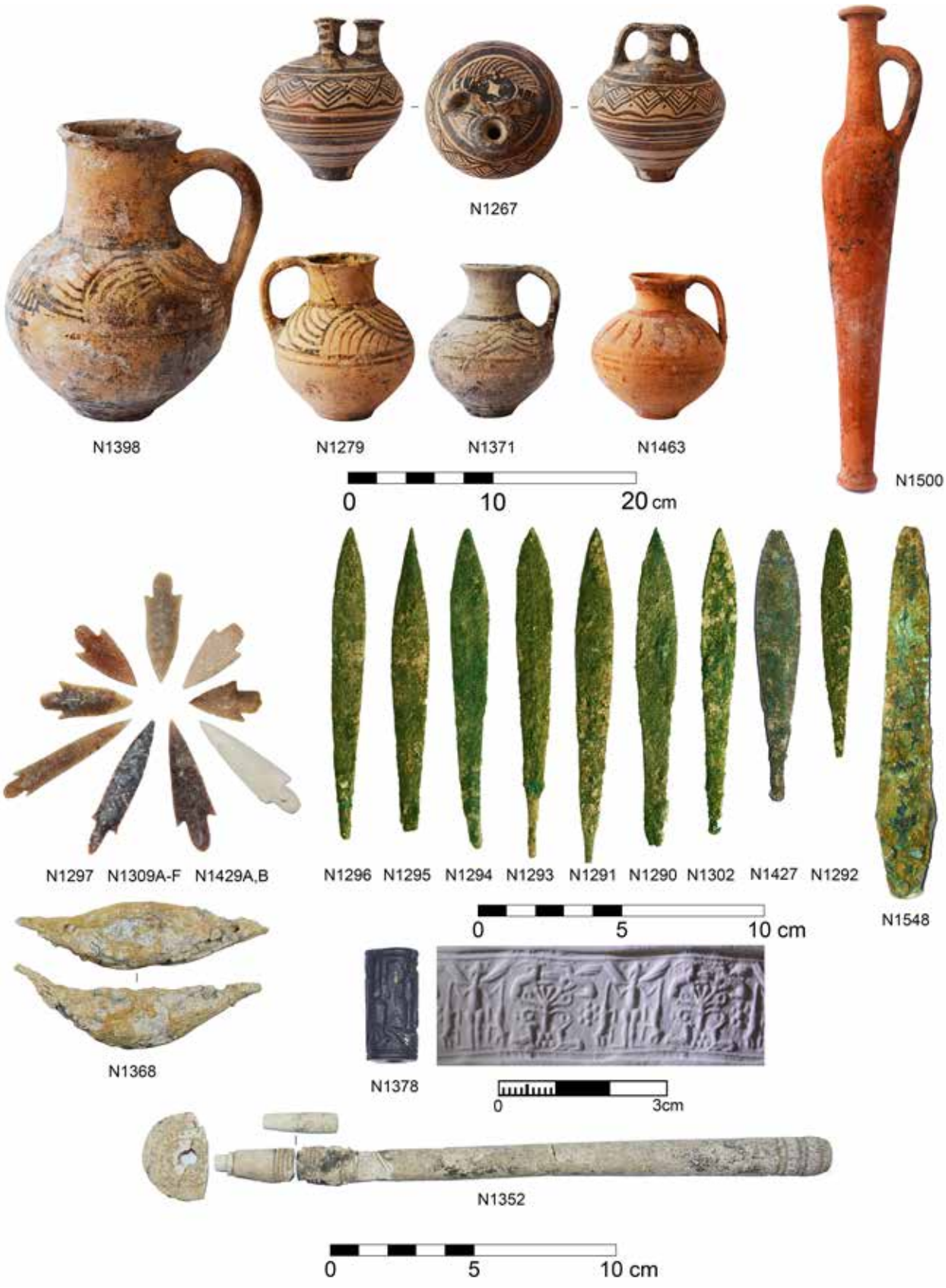


Fig. 28. Chamber Tomb ZZ: Minoan and Anatolian pottery, arrowheads, dagger, net weight, cylinder seal and distaff. Photographs by P.M. Fischer & L. Avial-Chicharro. Copyright: P.M. Fischer.

In addition, there is a copper seal with a lead core most probably found on the island.[63]

Although the iconographic and stylistic details are unclear due to the corrosion, the scene on seal N1248 belongs to the "master/mistress of animals" motif, which was common throughout the Bronze Age Near East and Aegean.[64] At Hala Sultan Tekke it occurs, *inter alia*, on cylinder seal N1378 from Chamber Tomb ZZ (see below), and on seal N544 from Chamber Tomb SS.[65]

Considering the plasticity of the figures, we may exclude that the seal belongs to the Cypriot Common Style group which is characterized by linear and schematic engraving. An iconographical parallel is a haematite cylinder seal from a tomb at Minet-el-Beida.[66] The find context of this tomb is dated to the period Ugarit Récent 2, i.e., *c.* 1450–1350 BC. Due to its unclear iconography, the seal itself does not provide any further chronological indication.

CYLINDER SEAL N1378

Cylinder seal of haematite; height: 1.9 cm, diameter: 0.9 cm, weight: 3.76 g (*Fig. 28* and *Appendix 3*). Intact, only slightly worn, very small parts chipped off at the upper edge (ancient). The seal was found in L503 of Chamber Tomb ZZ some metres to the north-west of Chamber Tomb XX.

From right to left (on the impression), the seal depicts a winged anthropomorphic figure, naked except for a hat, holding two animals by their tails. To the left of the motif is a tree flanked by two recumbent horned animals on either side at the bottom, and another antithetical pair of seated animals on top of the tree. The anthropomorphic figure is shown frontally but facing to the left; beneath the hat, the face has a prominent nose. The two animals hanging down have long tails and no horns and could thus possibly depict dogs. The tree is depicted from bottom to top by five dots, the trunk is one straight line, and four volute branches emerge from the trunk, two from each side opposite each other. At the top of the tree four additional branches point upwards and end in prominent dots, possibly indicating fruits. The bottom recumbent pair of animals have their heads upwards, directed towards each other. They can be identified as antelopes or gazelles by their long, straight horns. The top pair consists of a griffin, characterized by the wing, and possibly a (wild) goat, as suggested by its curved horn.

Between the top animal pair is a filling motif composed of a dot and three dashes which may possibly depict a celestial body.[67] In between the tree and the naked figure is a six-petalled rosette. In addition, two dots are between the wings and the head of the anthropomorphic figure and another one to the right of the tree.

Discussion

The tree flanked by one or more pairs of animals is a common motif in Mittani and Cypriot-style glyptic, as is the "master/mistress of animal" (see above). A close iconographic parallel to our tree is on a seal impression from Nuzi.[68] This type of bouquet tree with volute branches also occurs on Mittani Common Style cylinder seals recovered from Alalakh dating from the late 15th to the 14th centuries BC.[69] A syntactic parallel, i.e., a tree flanked by pairs of horned animals and a pair of griffins on the top, and animal-headed and anthropomorphic figures next to or holding animals, is on a cylinder seal from Hala Sultan Tekke, Tomb 4.[70] However, it is stylistically very different from our N1378 and belongs to the group of Cypriot Elaborate Style seals.

An interesting detail on our seal is that the horned animals at the bottom of the tree have their heads facing forwards, and not turned backwards, as is the most common way of depicting them in Cypriot and Mittani style glyptics. A parallel to this head stance is on a seal from Alalakh[71] and on various seal impressions from Nuzi.[72]

Both motifs and style correspond well to the Mittani Common Style, while motifs and stylistic features typical of Cypriot-style seals are absent. Typical of the Mittani style is the deep and rounded modelling by drilling, in addition to the linear engraving. Macroscopic examination suggests that at least two, if not three sizes of drill were used, as evidenced, for instance, by the knees of the anthropomorphic figure or by the two horned ani-

from Enkomi for which see Dikaios 1969, pl. 179:10; Porada 1971, 795; Louvre AO 701, provenance unclear).

[63] Salje 1990, 140; Delaporte 1923, pl. 106:25 (Louvre AO 701).

[64] E.g., Younger 1988, 182–183; Amiet 1992, 147–156; Barclay 2001; Cornelius 2009.

[65] Fischer & Bürge 2022, 24 fig. 9, 48.

[66] R.S. 1.002 (Louvre AO 11.732); see Schaeffer-Forrer 1983, 8–9; Amiet 1992, 189, 192, 198, fig. 85 no. 472.

[67] Schaeffer-Forrer 1983, 43, R.S. 17.024 and 133, R.S. 23.437 refers to similar motifs as "*signe astral*" and "*comète*", respectively. Comparable motifs with five dashes are also referred to as hands (e.g., Delaporte 1923, 197, no. A941; Schaeffer-Forrer 1983, 44, R.S. 20.043).

[68] Porada 1947, pl. XXIII, no. 474.

[69] Collon 1982, 12, and further examples therein.

[70] Kenna 1971, 28, pl. XVII, no. 71.

[71] Collon 1982, 95, no. 75 (inv. no. AT/38/184); from the Level IV Palace, approximately second half of 15th to first half of 14th centuries BC. For a discussion on the dating of Late Bronze Age Alalakh see Mullins 2010, 61–62; Yener 2013; Yener *et al.* 2019, 2–3.

[72] E.g., Stein 1993, nos 11, 52, 221, 271, 438; the archive of Šilwa-Teššup on which the impressions were found spans five generations ranging from *c.* 1440–1330 BC; see Stein 1993, 19, 100–105.

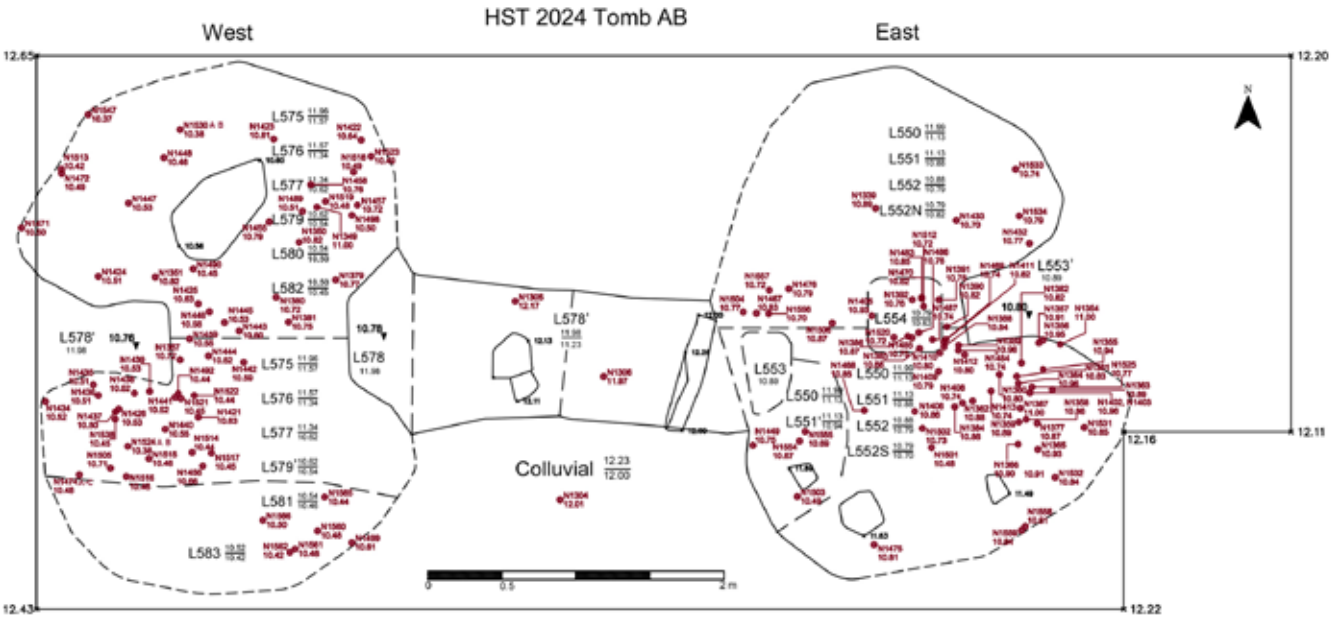


Fig. 29. Chamber Tomb AB East and West: plan with positions of loci and finds. By A. Papageorgiou, C. Sofokleous, R. Feldbacher & P.M. Fischer. Copyright: P.M. Fischer.

mals at the bottom. A dating of the seal in the period from the late 15th to the 14th centuries BC is proposed.

Chamber Tomb AB

This partly excavated chamber tomb is approximately 8.5 m south-west of Chamber Tomb ZZ and 8.5 m west of Chamber Tomb XX (*Figs 2, 3, 29–33*). It consists of two east–west orientated chambers, figure-8-shaped and orientated north–south, designated Chamber Tombs AB East and AB West. The two chambers are connected by a 2-m-long and 1.75-m-wide horizontal dromos (L578') with its floor at 11.23 masl. This connecting dromos was approached from the surface via another short vertical dromos just above its centre. The short dromos was blocked by two hewn stone plates that functioned as tomb markers. A reused stone anchor blocked the entrance to the eastern chamber.

Chamber Tomb AB East

The size of the eastern chamber is 3.5 m north–south × 2.7 east–west (*Fig. 29*). The locus below the colluvial soil is L550 (backfill of chamber). It is followed by the first burial layer L551 of which the south-western part (L551') contained an articulated skeleton. L553 (west) and L553' (east) are the protruding small platforms which give the chamber the figure-8 shape. The next, older burial layer is L552, which is divided into L552 North (N) and L552 South (S). L554 is a small test trench to locate the bottom of the tomb (likely at 10.63 masl in this area). The layers of entombments and mortuary goods cover (so far) 0.5 m in depth, viz. from 11.13 masl (L551/551') to 10.63 masl (L554).

The distribution of the 67 objects can be studied in *Table 6*.[73] Of these, 63 are of fired clay. Cypriot pottery comprises 19 vessels of Base-ring I and II, of which the latter type dominates (*Fig. 30* upper row). They include bowls, juglets, jugs and a spouted jug. Fourteen are White Slip II bowls. Other locally produced pottery includes Coarse ware, Monochrome, Plain White, and White Shaved (*Fig. 30* second row from the top). Imports comprise 15 Mycenaean vessels of alabastra, piriform jugs, a cup, a jug and a bowl (*Fig. 30* lower two rows). Anatolian imports are of Red Lustrous Wheel-made ware, including a bowl, a spindle bottle and a lentoid flask (N1554 *Fig. 30* third row down). Objects of other materials are rare, and include a bone shuttle, a fibula and spear-butt-spike of bronze (N1476 *Fig. 30* lowest row), and a stone polisher. A unique find is represented by a seated "bird-faced" female figurine (N1405 *Fig. 31*, presented in detail and discussed below).

PRELIMINARY ANALYSIS OF CHAMBER TOMB AB EAST

The Mycenaean pottery (24% of all ceramics, *Fig. 30*) suggests a date in the LH IIIA2 period, i.e., the second half of the 14th century BC. However, the shape and decoration

[73] *Table 6* also contains three objects from the colluvial soil (N1304–N1306).

Table 6. Finds from Chamber Tomb AB East arranged by locus, then material, then object type.

Find	Locus	Material	Type of object	Shape
1405	551	clay	Base-ring II	seated figurine
1354	551	clay	Base-ring II	jug
1356	551	clay	Base-ring II	jug
1357	551	clay	Base-ring II	jug
1358	551	clay	Base-ring II	jug
1359	551	clay	Base-ring II	jug
1360	551	clay	Base-ring II	jug
1387	551	clay	Base-ring II	jug
1406	551	clay	Base-ring II	jug
1355	551	clay	Base-ring I–II	jug
1339	551	clay	Mycenaean	piriform jar
1362	551	clay	Mycenaean	piriform jar
1377	551	clay	Mycenaean	bowl
1384	551	clay	Mycenaean	jug
1385	551	clay	Mycenaean	alabastron
1409	551	clay	Mycenaean	alabastron
1410	551	clay	Mycenaean	alabastron
1411	551	clay	Mycenaean	alabastron
1412	551	clay	Mycenaean	alabastron
1413	551	clay	Mycenaean	alabastron
1361	551	clay	Plain White	jug
1364	551	clay	White Slip II	bowl
1365	551	clay	White Slip II	bowl
1366	551	clay	White Slip II	bowl
1382	551	clay	White Slip II	bowl
1386	551	clay	White Slip II	bowl
1388	551	clay	White Slip II	bowl
1392	551	clay	White Slip II	bowl
1402	551	clay	White Slip II	bowl
1403	551	clay	White Slip II	bowl
1363	551	clay	White Slip II (mature)	bowl
1504	552	bronze	fibula?	
1476	552	bronze	spear-butt-spike	
1487	552	clay	Base-ring I	juglet
1555	552	clay	Base-ring I	spouted jug
1556	552	clay	Base-ring I	juglet
1390	552	clay	Base-ring II	bowl
1391	552	clay	Base-ring II	jug

Table 6 continued.

Find	Locus	Material	Type of object	Shape
1449	552	clay	Base-ring II	jug
1467	552	clay	Base-ring II	bowl
1468	552	clay	Base-ring II	jug
1469	552	clay	Base-ring II	jug
1502	552	clay	Base-ring II	jug
1475	552	clay	Coarse	cooking pot?
1433	552	clay	Monochrome	juglet
1389	552	clay	Mycenaean	piriform jar
1432	552	clay	Mycenaean	alabastron
1483	552	clay	Mycenaean	cup
1501	552	clay	Mycenaean	alabastron (miniature)
1512	552	clay	Mycenaean	piriform jar (small)
1533	552	clay	Mycenaean	piriform jar (miniature)
1534	552	clay	Mycenaean	juglet, miniature
1484	552	clay	Plain White	carinated bowl
1531	552	clay	Plain White	jug
1559	552	clay	Plain White	rounded bowl
1525	552	clay	Red Lustrous Wheel-made	spindle bottle
1554	552	clay	Red Lustrous Wheel-made	lentoid flask
1558	552	clay	Red Lustrous Wheel-made	bowl
1486	552	clay	White Shaved	juglet
1557	552	clay	White Shaved	juglet
1408	552	clay	White Slip II	bowl
1470	552	clay	White Slip II	bowl
1503	552	clay	White Slip II	bowl
1485	552	clay	White Slip II (mature)	bowl
1532	552	clay	White Slip II	bowl
1506	552	stone	pestle	conical
1520	554	bone	shuttle	pointed
1306	collu-vium	clay	loom weight	pyramidal
1304	collu-vium	clay	Plain White	juglet
1305	collu-vium	stone	loom weight/ net weight	disc

(curved-stemmed spirals [FM 49] on a bright slip) of an alabastron (N1432) from the lowest part of the exposed burial layers (L552) matches both the LH IIIA1 and 2 repertoires of alabastra. Other Mycenaean vessels with decorations of curved spirals are a shallow cup (N1483) and a small piriform jar (N1512), both from L552. The smallest Mycenaean vessels recovered so far from the cemetery are a miniature piriform jar (N1533, 7.7 cm high) and a miniature juglet (N1534, 6.5 cm high), coming from L552. Considering the numerous child burials, we suggest that they were used as toys. A spear-butt-spike of bronze (N1476) has parallels in the neighbouring Chamber Tomb XX (see discussion above).

Fig. 30. Chamber Tomb AB East: selected pottery; local (upper half) and Mycenaean (lower half). Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

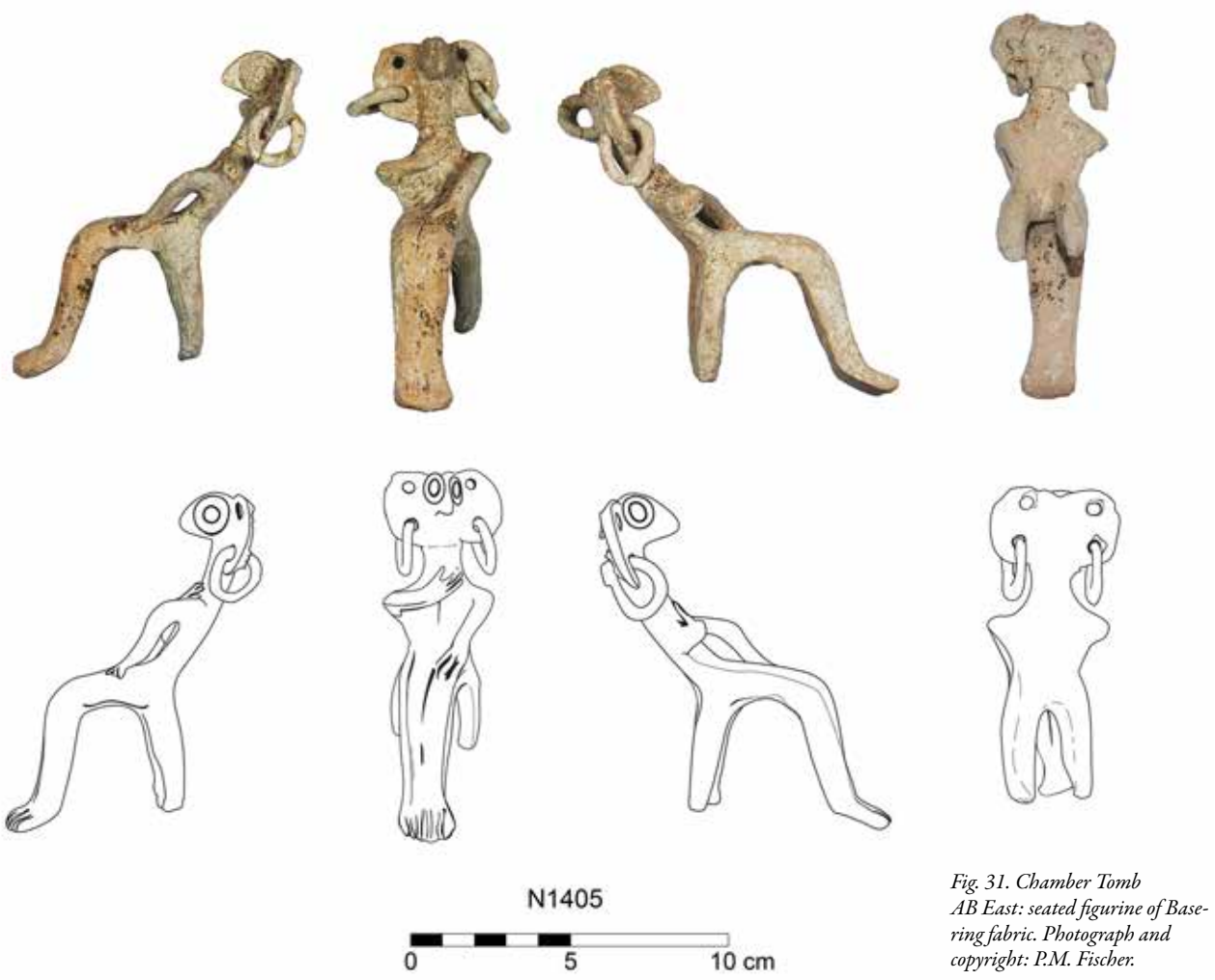


Fig. 31. Chamber Tomb AB East: seated figurine of Base-ring fabric. Photograph and copyright: P.M. Fischer.

Report on the seated Type A figurine N1405 from Chamber Tomb AB East

BY JARIS DARWIN & PETER M. FISCHER

The nearly complete "bird-faced" (Type A) seated figurine is made of Base-ring II fabric, broken left ear and earring repaired; height 8.5 cm (stool legs to head), length 12.7 cm (feet to head), width 4.2 cm (nose to back of head), weight 59 g (*Fig. 31*).

This figurine was found in Tomb AB East in L551, located partially under a cranium which was placed face-down in an east–west orientation. The figurine was oriented in a similar manner, lying sideways with the head towards the west, the feet and chair legs towards the east, and its nose facing south. While "bird-faced" figurines are one of the two most common forms of coroplastic art during the Late Cypriot period (LC, *c.* 1630–1050 BC), its specific form is unique; to the authors' best knowledge, no other examples of seated "bird-faced" figurines exist. Of the over 100 "bird-faced" figurines recovered across Cyprus, all occupy a standing position. Type B, the second main figurine type with human faces, has both seated and standing variations, and thus this new "bird-faced" figurine form offers an interesting example for comparison and future study.[74]

BACKGROUND AND PRODUCTION

Coroplasts produced two main figurine types during the LC period: "bird-faced" figurines, alternatively known as Type A or earring figurines, and flathead figurines, also described as Type B or normal faced figurines. The earliest datable examples of both figurines come from LC IIA contexts, at Tomb 100 in

[74] See Mantzourani & Vavouranakis 2022 for an overview of Bronze Age Cypriot figurines.

Fig. 32. Chamber Tomb AB West: selected local pottery. Photographs by L. Avial-Chicharro. Copyright: P.M. Fischer.

Katydhata, and Cypriot Tomb 19 in Area III, Level IIIB at Enkomi.[75] Made from Base-ring II ware, Type A and B figurines have been found across Cyprus and are roughly divided equally between tomb and settlement contexts, with some examples originating in sanctuaries.[76] Type A figurines were hand-made, like much of the other local ceramic and coroplastic material

[75] Knox 2016, 58.

[76] Knapp 2006, 140; Knox 2012, 176; Alexandrou 2016, 299, 308–309, 311.

Fig. 33. Chamber Tomb AB West: selected Late Helladic and Anatolian pottery, Egyptian objects of glass and calcite, gold diadem and ivory distaff. Photographs P.M. Fischer & L. Avial-Chicharro. Copyright: P.M. Fischer.

dating to the LC period in Cyprus.[77] The bird-shaped head, from which this figurine type derives its name, was made by pinching clay to form a simple face with a prominent nose. It does not denote the intentional rendering of avian features, but was rather a useful coroplastic technique, one which can be seen in the Near East as well as Cyprus.[78]

The use of similar production techniques and the repeating styles of Type A figurines has led some scholars to argue that they were mass-produced.[79] Type A figurines do have common characteristic styles and features attributed to them. However, there is enough variation in their rendering and minor details such as arm positioning, navel application/appearance and decoration to argue against standardization and mass production. Instead, they were probably produced

[77] Steel 2020, 4.
[78] Knox 2012, 179.
[79] See e.g., Karageorghis 1993, 1; Knapp & Manning 2013, 391.

in small batches.[80] The coroplast could have made small figurine batches and then sold or traded them to different people around Cyprus. This would account for the almost identical nature of some figurines, found at different sites and in different contexts from around the island.[81] N1405 can be used to further support this conclusion. If the Type A figurines were mass-produced, multiple examples of seated Type A figurines would likely have been found, and yet this is not the case. A number of other marked differences in the rendering of this figurine—the lack of incised pubic triangle and moulded breasts, discussed below—further substantiate a tradition of small or single-batch production.

FURTHER OBSERVATIONS

The dimensions of N1405 are slightly below the 14 cm average height of other solid Base-ring II fabric figurines, but above the 10.3 cm average height of seated Type B figurines.[82] The largest known example of a seated Type B figurine is 12.7 cm, found at Maroni.[83] These dimensions match those of N1405, which depicts a seated female figure with large, pierced ears. The left arm rests below the hip on the left leg of the figurine, while the right arm is placed on the left shoulder. The figurine's eyes are made from clay pellets, incised with concentric circles and added to the face.[84] The figurine has four ear piercings; the lower two holes have ceramic earrings, while the upper two holes remain empty. Type A figurines generally had two piercings in each ear, but did not always have earrings.[85] The left earring and ear have been mended. The head of the figurine would have been added to the torso when the clay was still wet and smoothed onto the body. This procedure ensured a more secure final product, with less chance of fractures or breaks forming.[86]

A single necklace was depicted with an incision all the way around the neck. This detail seems to have subsequently destabilized the attachment of the head to the body, as both pieces were found together as though attached, but had been broken in antiquity or during the period after deposition. Also of note, the figurine does not have an incised pubic area or moulded breasts, features which are characteristic of almost all other Type A figurines.

After the legs were moulded from clay, they were pressed together, joining and flattening the feet. This process could obscure the line of separation between the two legs, leading the coroplast to reinstate the leg division using a tool.[87] Such a process seems to have occurred during the manufacturing of this seated figurine. A small incision was made underneath the legs, potentially to delineate one leg from the other. A longer incision performs the same role on the front of the figurine, although it is not continuous. Four long, deep incisions were made at the base of the legs, representing feet, and several smaller incisions were made between these lines.

Two rolls of clay were attached to the bottom of the figurine, likely representing the legs of the chair and giving the artefact its seated posture. Constantina Alexandrou writes that these protrusions allowed (Type B) seated figurines to stand on their own.[88] This contrasts the standing Type A and B figurines which were made almost exclusively with downturned toes, forcing them to be held or placed in a supine position.[89] However, in the case of N1405, the figurine could not stand on its own. The chair legs were too short, and the upper portion of the figurine was too heavy, so that when placed on a flat surface, N1405 would topple backwards. It would be worth examining the other seated Type B figurines to ascertain whether this was a unique phenomenon, or if such specimens faced a similar issue. Whether or not Base-ring II fabric figurines could stand on their own impacts the interpretation of their use. The seated nature of some such figurines similarly plays a role in how they are interpreted (discussed briefly below).

The seated posture of this figurine is unique to the Type A coroplastic corpus, while there are only twelve examples of seated Type B figurines. The seated Type B figurines come from a variety of contexts: tombs (3), settlements (2), uncertain (2), unknown (5).[90] An examination of both Type A figurines and the seated Type B figurines is thus important for contextualizing this new figurine.

Comparing the leg design of this Type A figurine with known examples of seated Type B figurines, one specimen has incised lines to represent toes or feet.[91] Most other seated Type B figurines lack incised lines at the bottom of the legs, and Type A figurines are rarely depicted with toe incisions either.[92] The lack of pubic triangle on this figurine is especially noteworthy, as all seated Type B figurines are depicted with an incised pubic area.[93] Some seated Type B figurines do lack

[80] Knox 2016, 60.
[81] Knox 2012, 187.
[82] Knox 2012, 265; 2016, 58.
[83] Karageorghis 1993, 13; Knox 2012, 265.
[84] Discussed by Karageorghis 1993, 3; experimental archaeological work in making Base-ring II fabric figurines is conducted by Alexandrou 2016, see especially ch. 2.
[85] Alexandrou 2016, 63.
[86] Alexandrou 2016, 74–75.
[87] Alexandrou 2016, 75.
[88] Alexandrou 2016, 94.
[89] Morris 1985, 166.
[90] Knox 2012, 265.
[91] See Karageorghis 1993, pl. X, no. 7, cat. no. C(ii)I.
[92] Alexandrou 2016, 57, 65.
[93] Alexandrou 2016, 398–399.

breasts, as is the case with this specimen.[94] Alternatively, only three Type A figurines have been recovered without breasts. The arm positioning of this figurine also aligns with one gesture known on seated Type B figurines: the arms are attached onto the body, while the right hand rests on the left shoulder.[95]

At Hala Sultan Tekke, eight other examples of Type A figurines have been published (with additional fragmented figurines still awaiting publication), seven of which originate in tomb contexts.[96] During excavations by the Department of Antiquities, a solid and hollow version of Type A figurines (both complete) were recovered in Tomb 1 (LC IIC) and Tomb 2 (LC IB–IIC), respectively.[97] Recently, four complete Type A figurines were found in Tomb RR, dating to the LC IIB period.[98] These figurines are hollow and range from 20 to 25 cm in height. Three of the figurines were found at around the same level, suggesting similar deposition periods, while the fourth specimen was likely associated with a later burial.[99] Excavations by the British Museum in the 19th century revealed a complete solid Type A figurine in the LC II Tomb VIII.[100] Finally, the head of a Type A figurine was found in Test Trench 14B in the settlement during the New Swedish Cyprus Expedition in 2013.[101] This fragment was recovered from Stratum 1, the most recent occupation layer dating to the first half of the LC III period.[102]

Very few Base-ring II fabric figurines found deriving from burials are associated with *in situ* contexts; excluding the four Type A figurines from Tomb RR, as well as the current specimen, only six other figurines of this type have been recovered from known mortuary contexts.[103] The recent discoveries at Hala Sultan Tekke thus nearly double this. The association of N1405 with a cranium is noteworthy. A hollow Type B figurine from Tomb 1 at Dromolaxia-*Trypes*, also in the Larnaca area, was recovered close to three crania.[104] Additionally, a hollow Type A figurine, from Burial B of Tomb 19 at Episkopi-*Bamboula*, was found next to four crania.[105] While these figurines may have been placed with the crania during secondary burial treatments, N1405 provides further evidence for the intentional association of Base-ring II fabric figurines with crania. Unfortunately, the seated Type B figurines recovered from mortuary settings—Tomb 28 at Katydhata and Tombs 25 and 14 at Maroni—were not preserved in their original location.[106]

DISCUSSION

The context of figurines is critical for understanding how they may have been used in antiquity. Interpretation of Base-ring II fabric figurines is an ongoing open discussion.[107] Only a few comments, related primarily to the use of this new Type A figurine, will be made here. There is a prevailing tendency in archaeology to see female figurines as "goddesses", without considering their context or characteristics.[108] Base-ring II fabric figurines have fallen victim to this biased interpretive approach. Seated Type B figurines have been interpreted as enthroned (mother) deities, based on their posture and drawing on evidence from other areas of the Mediterranean and Near East; Type A figurines have been discussed as fertility goddesses, especially due to their supposed connection to similar-looking female figurines from northern Syria.[109] However, the mortuary and settlement contexts of Base-ring II fabric figurines would suggest they represent something other than a deity, and although some specimens originate in sanctuary contexts, this is never the case for seated Base-ring II fabric figurines. Further, it is unlikely that Type A figurines are based on Near Eastern precursors (primarily the Orontes "*Type Classique*" style), given the nearly 600-year gap between when the Syrian-type figurines were used (2300–2000 BC) and when the first Type A figurines are dated (*c.* 1450 BC).[110] It is

[94] Alexandrou 2016, 67.

[95] Alexandrou 2016, 59, 68.

[96] Four of these figurines were catalogued by Alexandrou 2016, 300, while the other four were published more recently, Fischer & Bürge 2022, 19; Fischer 2024, 76–80.

[97] Karageorghis 1976, 78, 89; Samaes & Nys 2010, 16–17; Alexandrou 2016, 300.

[98] Fischer 2024, 76.

[99] Fischer & Bürge 2022, 19–20.

[100] Bailey 1976, 5, 29; Alexandrou 2016, 316.

[101] Fischer & Bürge 2014, 77.

[102] Fischer & Bürge 2014, 61; Blattner in Fischer & Bürge 2014, 93.

[103] Alexandrou 2016, 191.

[104] Lubsen-Admiraal 1982, 40; Alexandrou 2016, 457.

[105] Alexandrou 2016, 194–195, 455.

[106] Alexandrou 2016, 459, 461–462.

[107] See Morris 1985; Karageorghis 1993; Budin 2003; 2006; Knapp 2006; Knox 2012; 2016.

[108] This phenomenon—"goddess theory"—is discussed by Knox and can be traced back to the 19th-century ideas of the psychoanalyst Bachofen, who argued that women in prehistory only had major political and social roles because of their relationship to their offspring. A well-known archaeological example of the application of goddess theory is Evan's interpretation of the faience figurines from Knossos as "snake goddesses". Discussed by Knox 2012, 29. See Bachofen 1861 for the origin of this misogynistic theory. See Hultkrantz 1961, 75 and Merrillees 1988 for examples of work which assumes that these female figures are goddesses.

[109] Coldstream 1986, 11; Budin 2003, 132; Lesure 2011, 161, 173; Alexandrou 2016, 94. A naked female figure does not necessarily equate to a fertility goddess either but may simply be representative of sexuality and pleasure. See Serwint 2016, 410, *contra* Bolger 1996, 366.

[110] Rather than direct influence, it is more likely that an ongoing process of interaction contributed to the similar styles between Syrian and Cypriot figurines. Knox suggests that the Orontes-style figurines

thus more likely that N1405 represents an ancestor,[111] or acts as marker of status, as discussed by Daisy Knox.[112] Following the latter theory, earrings could act as symbols of transmutable wealth. Gold earrings which conform to weight standards have been found in LC tombs, substantiating the theory that these objects may have been worn to demonstrate wealth. Displaying a figurine like N1405 in a public space (settlement or tomb) may have been a way to illustrate one's status in both life and in death.

CONCLUSIONS

N1405 is a unique artefact, adding a second major category to the Type A coroplastic corpus. This figurine incorporates typological elements of both solid Type A figurines and seated Type B figurines. The mortuary context of N1405 aligns with some previously recorded cases, especially the association of crania with Base-ring II fabric figurines, while also providing the first example of preserved *in situ* context for a seated figurine of this type. Continued excavation work in Chamber Tomb AB East will hopefully provide more evidence for the interpretation and use of this rare figurine, contributing to a more holistic understanding of Base-ring II fabric figurines, as well as the tombs of Hala Sultan Tekke.

Chamber Tomb AB West

The size of the western chamber is 3.6 m north–south × 2.7 m east–west (*Fig. 29*). The loci below the colluvial soil that forms the backfill of the chamber are L575 and L576. L578 (east) and L578' (west) are the protruding small platforms which give the chamber the figure-8 shape. Below the backfill of L576 is the most recent burial layer L577 with skeletal remains and mortuary goods, followed by L579, L580 and L582 to the north, and L579', L581 and L583 to the south. The layers of interments and artefacts cover (so far) 0.92 m in depth, viz. from 11.34 masl (L577, 577') to 10.42 masl (L582/583).

The distribution of the 79 objects can be studied in *Table 7*. Of these 48 are of fired clay. Cypriot pottery comprises nine vessels of Base-ring I and II of which the latter type dominates (*Fig. 32* upper row). They include bowls, jugs and a juglet. Thirteen are White Slip II bowls. Other locally produced pottery includes Plain White, and White Shaved (*Fig. 32* lower two rows). Imports comprise nine Minoan/Mycenaean vessels: a chalice, a bowl, a globular flask, a stirrup jar and five piriform jars (*Fig. 33* upper two rows). There is also the upper half of a Mycenaean figurine which seems to have had been attached to a vessel. Four Red Lustrous Wheel-made spindle bottles (among them N1547 in *Fig. 33*) are Anatolian imports. Objects of bronze comprise a ring and three bracelets. A toe ring and plaques of silver, and a diadem of gold decorated with double spirals should be mentioned (the latter N1472). Objects of ivory are two distaffs, one decorated with rosettes and other incisions (N1499), and one plain. Two Egyptian imports are represented by objects of calcite: a complete juglet (N1471) and a fragmentary bowl with a complete profile. Other finds are a spool-shaped object of fired clay, a whetstone and a pendant of glass in the shape of a pomegranate (N1538).

PRELIMINARY ANALYSIS OF CHAMBER TOMB AB WEST

The Mycenaean pottery (19% of all ceramics, *Fig. 33*) suggests a date in the LH IIIA2 period, i.e., the second half of the 14th century BC. The flask (N1459; FS 189, FM 14, Palm) fits well into the LH IIIA2 repertoire as well as the shallow cup (N1456; FS 220). The small piriform jars (N1505, N1560, N1561) are preliminarily classified as Minoan. The spindle bottle of Red Lustrous Wheel-made ware (N1547, *Fig. 33* upper right) belongs to Anatolian repertoire of pottery which is common in the tombs of Hala Sultan Tekke. Two finds are classified as Egyptian imports: the pomegranate-shaped pendant of glass (N1538) and the calcite juglet without handles (N1471). The general shape of the calcite juglet resembles that from Chamber Tomb UU (excavated 2022 and 2023) which was described as an Egyptian copy of the popular Base-ring I jugs and juglets.[113]

Summary and future research

The results of the fieldwork in 2023 and 2024 in the Late Bronze Age cemetery of the harbour city of Hala Sultan Tekke have enriched our knowledge on the interregional connections and the mortuary practices of the city's élite. While additional cemeteries may exist in areas not covered by our geophysical surveys, Area A remains the only location where only tombs, associated offering pits, and wells have been discovered—without any architectural remains. Other tombs, most of them looted, are in the settlement, viz. in Areas 8, 23, and CQ2. Intra-urban tombs have been found at several other sites, including Enkomi-*Ayios Iakovos*, Morphou-*Toumba tou Skourou*, Alassa, Kalavasos-*Ayios Dimitrios*, and Kition. The fact that there is an area outside the

may have been kept as heirlooms or the like, and thus have impacted the stylistic characteristics of Type A figurines in this manner). See Knox 2016, 62.

[111] Morris 1985.

[112] Knox 2016, 64.

[113] Fischer & Bürge 2023, 35–36.

Table 7. Finds from Chamber Tomb AB West arranged by locus, then material, then object type.

Find	Locus	Material	Type of object	Shape
1381	577	clay	Base-ring II	jug
1349	577	clay	Mycenaean	chalice/funnel
1351	577	clay	Mycenaean	figurine
1380	577	clay	Mycenaean	piriform jar
1457	577	clay	Mycenaean	stirrup jar
1350	577	clay	Plain White	jug
1379	577	clay	White Slip II	bowl
1426	579	calcite	Egyptian	bowl
1435	579	clay	Base-ring I	juglet
1422	579	clay	Base-ring II	jug
1423	579	clay	Base-ring II	jug
1436	579	clay	Base-ring II	jug
1437	579	clay	Base-ring II	jug
1505	579	clay	Minoan	piriform jar
1445	579	clay	Mycenaean	piriform jar
1456	579	clay	Mycenaean	bowl
1459	579	clay	Mycenaean	globular flask
1424	579	clay	Plain White	jug
1442	579	clay	Plain White	carinated bowl
1455	579	clay	Plain White	jug
1458	579	clay	Plain White	bowl
1444	579	clay	tool	cylindrical
1367	579	stone	whetstone	irregular
1421	579	clay	White Slip II	bowl
1425	579	clay	White Slip II	bowl
1438	579	clay	White Slip II	bowl
1439	579	clay	White Slip II	bowl
1440	579	clay	White Slip II	bowl
1446	579	clay	White Slip II	bowl
1434	579	clay	White Slip II (mature)	bowl
1441	579	clay	White Slip II (mature)	bowl
1443	579	clay	White Slip II (mature)	bowl
1447	579	clay	White Slip II (mature)	bowl
1448	579	clay	White Slip II (mature)	bowl

Table 7 continued.

Find	Locus	Material	Type of object	Shape
1471	580	calcite	Egyptian	juglet
1472	580	gold	diadem	double spirals decoration
1490	580	ivory	distaff	rounded ends
1489	580	silver	toe ring	overlapping ends
1474 A-B-C	581	bronze, glass	bracelet, beads (2)	overlapping ends, globular
1515	581	clay	Mycenaean	piriform jar
1516	581	clay	Plain White	juglet
1517	581	clay	Red Lustrous Wheel-made	spindle bottle
1522	581	clay	White Shaved	juglet
1514	581	clay	White Slip II (mature)	bowl
1524A	581	faience	beads (19)	globular, fluted
1538	581	glass	pendant	pomegranate
1499	581	ivory	distaff	incised decoration
1524B	581	silver	plaques	sheet metal
1530A +B	582	bronze	bracelets (2)	intertwined bracelets
1513	582	clay	Base-ring I	juglet
1523	582	clay	Base-ring I	jug
1518	582	clay	Base-ring I–II	bowl
1498	582	clay	Red Lustrous Wheel-made	spindle bottle
1519	582	clay	Red Lustrous Wheel-made	spindle bottle
1547	582	clay	Red Lustrous Wheel-made	spindle bottle
1521	582	clay	White Shaved	juglet (miniature)
1566	583	bronze	ring	overlapping ends
1562	583	clay	Base-ring	bowl
1560	583	clay	Minoan (Mycenaean)	piriform jar (small)
1561	583	clay	Minoan (Mycenaean)	piriform jar (small)
1565	583	clay	Red Lustrous Wheel-made	spindle bottle

city of Hala Sultan Tekke which is reserved for interments and associated burial customs is unusual in Late Bronze Age Cyprus, where intramural tombs dominate. A likely explanation for the separation of the city of the dead from that of the living could be the far-reaching intercultural networks and character of the population of Hala Sultan Tekke who came into contact with peoples who performed varying burial customs, including the establishment of separate cemeteries. This may indicate a mixed population—a hypothesis that can only be resolved through aDNA analysis.

A characteristic feature of Late Cypriot mortuary practice is the use of tombs over generations, which has again been demonstrated by the tombs excavated in 2023 and 2024. During antiquity, tombs were reopened, body parts were moved (and probably removed), and some skeletal remains and mortuary objects were rearranged before new individuals were entombed.

The chamber tombs from the two seasons are all figure-8-shaped and dug into clay-rich soil. They date the 14th and possibly the beginning of the 13th centuries BC, or LC II(A–)B late to LC IIC1 early (for the synchronization with neighbouring cultures see *Table 1*). Future tasks will include the complete excavation of Chamber Tombs ZZ, AB East and AB West.

It may come as a surprise that tombs with such sophisticated and valuable contents were simply dug into clayish soil without using any other constructional reinforcements, unless they were of perishable material no longer preserved. Conversely, these simple tombs might have been constructed in that way on purpose to conceal them and prevent them from being looted. Over time and as a result of these inconspicuous constructions, the roofs of most of them collapsed, breaking several objects but also sealing the tomb contexts, much to the benefit of the current research.

In addition to saving invaluable cultural remains from destruction and looting, this project continues to confirm the vast intercultural connections of the people of Hala Sultan Tekke in one of the most dynamic periods in human history. The tombs reported here contained numerous objects, primarily from the Mycenaean, Minoan and Egyptian cultural spheres, but also from Anatolia and the Levant, and for the first time from the Kassite (Middle Babylonian) empire. The prerequisite for this advance was intra-urban copper production and the presence of one of the best-protected harbours on the island. Owing to this sheltered harbour, Hala Sultan Tekke may also have functioned as an assembly and onward shipment point for copper ingots produced elsewhere on the island. The city became part of a global economic system in the 15th–13th centuries BC which peaked in the second half of the 14th and the beginning of the 13th centuries BC. Adding previously processed and published contexts, long-distance merchandise arrived from as far as Sardinia, Afghanistan and India, the Baltic Sea and Nubia.[114]

PETER M. FISCHER
Department of Historical Studies
University of Gothenburg
Contact: Dörjeskärsgatan 37
421 60 Västra Frölunda, Sweden
peter@fischerarchaeology.se

RAINER FELDBACHER
Capital Normal University
School of History
100089 Beijing, China
rainer.feldbacher@plus.ac.at

[114] Fischer 2023; see the imports of carnelian from India in Ludvik 2023.

Appendix 1. Human remains from Chamber Tombs VV, XX and YY

BY KIRSI O. LORENTZ & YUKO MIYAUCHI[115]

This section outlines the results of ongoing laboratory analyses of the human remains recovered from Chamber Tombs VV, XX and YY at Hala Sultan Tekke during the 2023 and 2024 excavation seasons. The Tomb VV excavation began and was completed during the 2023 season, while for Tombs XX and YY their excavation began in 2023 and was completed in 2024. We outline here the preliminary results of the macroscopic, metric and contextual analyses on these remains for the purposes of annual reporting on the progress of the work on human bioarchaeology at Hala Sultan Tekke. Comprehensive analyses of the human remains in the context of the relevant archaeological data, at tomb and site levels, will only be possible in the future, as this will require full consideration of all the previously excavated human remains, considered together with human remains still to be recovered via future field campaigns and evaluated in conjunction with fully analysed contextual archaeological data.

METHODS

The key methods used in the analyses of human remains focused upon here are outlined below. As there are no population-specific methods for Cypriot archaeological populations, a range of available methods derived from data on other populations are used—a current practice adopted globally, applied when and where no population-specific methods are available.

MNI: Estimation of the Minimum Number of Individuals (MNI) is based on the following criteria: (1) repetition of bone elements, or fragments from the same anatomical position in the skeleton; (2) age incompatibility; (3) considerable differences in size and/or morphology; and (4) incompatibility of pathologies.

Each of the discrete sets of cranial remains or complete crania found at the site was allocated a "Cran ID" in the field, prior to detailed inventory in the laboratory. Such a "Cran ID" does not therefore necessarily represent a complete cranium. Further, not all cranial remains within a single "Cran ID" necessarily originate from a single individual. Detailed inventory process in the laboratory was used to reveal the inventory of remains within what was perceived in the field as an assemblage of cranial remains.

Age at death: Defined here as the biological age of an individual at death, "age at death" was estimated taking advantage of the following existing methods: (1) auricular surface

[115] Both at the Cyprus Institute, Nicosia, Cyprus.

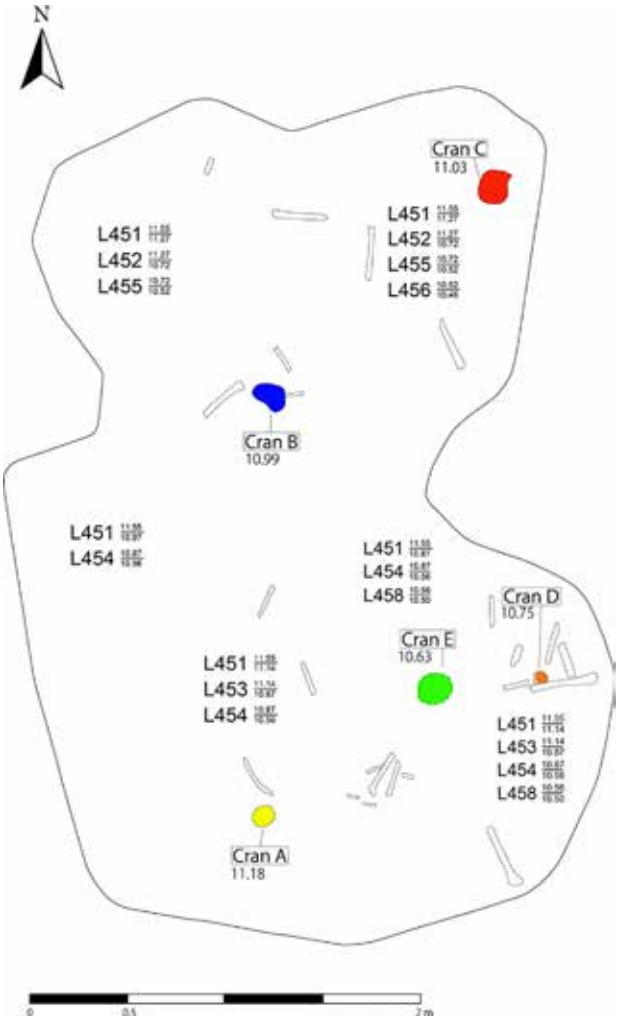


Fig. 34. Human skeletal remains from Chamber Tomb VV. Drawing by Y. Miyauchi. Copyright: P.M. Fischer.

morphology;[116] (2) stage of dental development;[117] (3) stage of skeletal development;[118] and (4) dental attrition.[119] Size comparison with reference casts of known-age modern skeletons was performed in order to obtain some very approximate age indication where no diagnostic regions/features were present, in order to obtain some rough indication of age order/series in the absence of any other data.[120]

Sex: Where available, sexually dimorphic skeletal features were used for estimating sex. These consisted of sexually dimorphic features of the cranium[121] and pelvis.[122]

Stature was estimated using the American white male and female formulae[123] and formulae for all population groups,[124] since there are no population-specific methods for stature estimation for Cypriot archaeological populations. As the human remains recovered were highly fragile and often already fragmented *in situ*, field measurements were prioritized to obtain some data for stature estimation, including, for example, measurements of larger long bones, which rarely if ever could be recovered complete for laboratory measurements. Where no complete-enough larger long bones were available, measurements of metacarpals[125] and metatarsals[126] were used for stature estimates.

Positional analysis: Identifiable bones were allocated an ID code (letter/s of the alphabet) and their spatial position within the mortuary feature recorded, to the extent possible. This was done to conduct positional analyses regarding the disposal of human remains within the tombs, contributing towards analyses of mortuary practices. In some cases, the high fragmentation of bone elements made this analysis impossible. Discrete or articulated or partially articulated individuals were allocated an "Ind ID" (individual ID). Further, perceived crania/concentrations of cranial fragments were assigned a "Cran ID" (cranium ID). The locations of both types of remains were recorded in detail. Bone element representation analysis will be conducted once all human remains recovered from each individual tomb and the exposed area of the site as a whole can be investigated.[127]

HUMAN REMAINS FROM CHAMBER TOMB VV

The Tomb VV excavation began and was completed during the 2023 season. The tomb seems to have been looted at some point prior to excavation, an inference based on the scattered and fragmented nature of the skeletal remains (*Fig. 34*) and the finds distribution (see above). Short descriptions of the cranial remains from Chamber Tomb VV are included in *Table 8*. The tomb did not contain articulated human skeletons.

MNI: Remains of at least eleven individuals (based on the mandibular right permanent first molar) were recovered from Chamber Tomb VV. There are no remains indicating the pres-

[116] Lovejoy *et al.* 1985.
[117] AlQahtani 2008.
[118] Schaefer *et al.* 2009.
[119] Lovejoy 1985.
[120] Bone cast from ©Bone Clones, Inc.: foetus SCM-186-D, 14–16 months old SC-187-DH, 5 years old SC-183-DH, and 13 years old FM-509-SET.
[121] Buikstra & Ubelaker 1994.
[122] Bruzek 2002.
[123] Trotter 1970.
[124] Sjøvold 1990.
[125] Meadows & Jantz 1992.
[126] Byers *et al.* 1989.
[127] Dodson & Wexler 1979.

Table 8. Chamber Tomb VV crania.

Locus	Individual/ Cranium ID	Description
452	Cran A	Orientation could not be determined due to high level of fragmentation
452	Cran B	Orientation could not be determined due to high level of fragmentation
452	Cran C	Cranium lying on its left side, facing north
454	Cran D	Non-adult cranium. Orientation could not be determined due to high level of fragmentation. Found close to Cran E, might belong to the same individual
454	Cran E	Non-adult cranium. Orientation could not be determined due to high level of fragmentation

Table 9. Biological profiles of Cran IDs A–E from Chamber Tomb VV. cba = cannot be assessed.

Cranium ID	Locus	Age at death	Sex
Cran A	452	Probable adult	Indeterminate
Cran B	452	Probable adult	Indeterminate
Cran C	452	Adult	Indeterminate
Cran D	454	Non-adult	cba
Cran E	454	2.5 years (±1 year)	cba

Table 10. Stature estimates derived from Chamber Tomb VV commingled metacarpal and metatarsal lengths.

Locus	Element	Side	Length (mm)	Meadows & Jantz 1992 (cm)		Byers *et al.* 1989 (cm)				
				Male	Female	Combined	All males	All females	European-American males	European-American females
452	First metacarpal	L	45.6	168.22 (±5.57)	165.85 (±5.57)					
454	Second metacarpal	R	66.1	168.86 (±5.15)	165.87 (±5.15)					
452	First metatarsal	R	63.5			170.08 (±6.54)	172.31 (±6.42)	166.56 (±5.61)	173.32 (±6.32)	169.11 (±4.96)
452	Second metatarsal	L	76.5			170.00 (±6.54)	172.22 (±6.98)	167.08 (±5.48)	173.25 (±7.01)	169.12 (±5.20)
455	Fourth metatarsal	R	71.8			172.02 (±6.85)	174.29 (±6.80)	168.94 (±5.99)	174.61 (±6.85)	170.99 (±5.75)
455	Fifth metatarsal (functional length)	R	68.0			178.16 (±7.60)	179.14 (±7.38)	172.14 (±6.33)	180.84 (±7.22)	173.64 (±6.33)
	Fifth metatarsal (morphological length)		76.3			174.46 (±7.12)	176.08 (±7.09)	170.03 (±6.36)	176.66 (±7.03)	171.38 (±6.49)

ence of any individuals below the expected age for the development of the permanent first molar.

Age at death and sex: *Table 9* lists the age-at-death estimates for Chamber Tomb VV crania. In addition, at least five non-adult individuals between the ages of 3.5 and 9.5 years (±1 year) were present, based on the presence of five mandibular right permanent first molars within the loose, commingled teeth recovered from Tomb VV, and their calcification stages. Due to the fragmentary nature of the skeletal remains, no sex diagnostic bone elements/regions were recovered from Tomb VV.

Stature: Due to the lack of any complete larger long bones, stature estimates are based on measurements of commingled metacarpals and metatarsals. Two different approaches were used for stature estimates, as listed in *Table 10*. Stature estimates were also calculated by the different sexes (in the absence of any sex diagnostics), and by different population group (in the absence of any population-specific methods).

Pathologies: The only pathologies observed were discovered within the commingled skeletal assemblages, including instances of linear enamel hypoplasia (LEH) and caries.

Summary of Chamber Tomb VV human remains

Chamber Tomb VV was devoid of any discrete or articulated individuals among the human skeletal material recovered. The MNI for the tomb is eleven. Though the data indicates that individuals of different ages were interred in the tomb, including adults, no sex diagnostic regions/bone elements were recovered. Compared to other tombs from the site of Hala Sultan Tekke, the number of bone elements recovered from Tomb VV is notably lower. Different lines of evidence indicate that Tomb VV was most likely looted at some point in time.

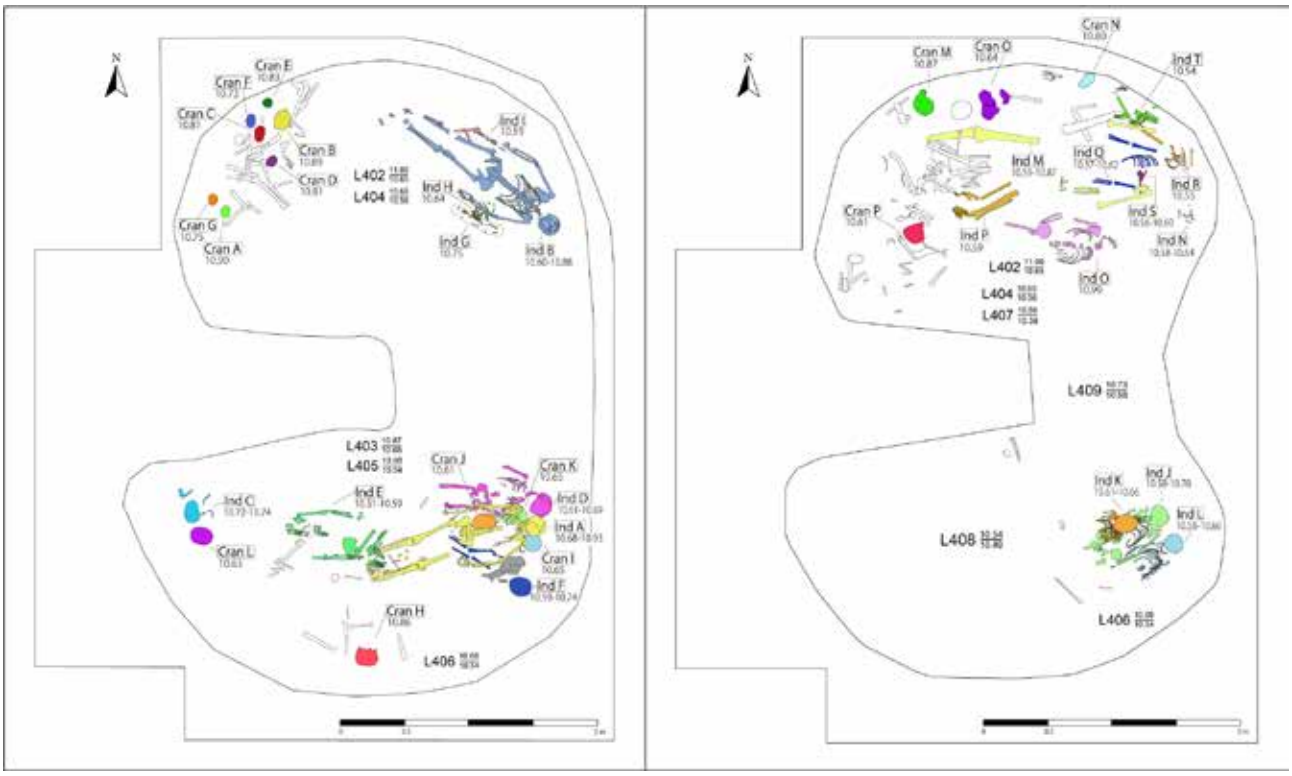


Fig. 35. Human skeletal remains from Chamber Tomb XX. Left: upper layers; right: lowest layer. Drawing by Y. Miyauchi. Copyright: P.M. Fischer.

HUMAN REMAINS FROM CHAMBER TOMB XX

The excavation of Chamber Tomb XX began in 2023 and was completed in 2024. The concentrations of human skeletal remains uncovered within this tomb (*Fig. 35*) contained skeletal remains in varying degrees of articulation: articulated, partially articulated, and disarticulated commingled remains. The human skeletal remains recovered from Tomb XX are listed in *Table 11*.

MNI: Chamber Tomb XX contained a minimum of 29 individuals, based on the 26 individuals represented by maxillary permanent first molars (26 left, and 26 right), together with at least three individuals that were below the expected age for permanent first molar development.

Age at death and sex: Of the 29 individuals recovered from Chamber Tomb XX, twelve are adults and 17 are non-adults. *Table 12* presents a summary of the estimates for age at death and sex for the discrete individuals and lettered crania. The commingled skeletal and dental remains and their apparent age ranges are consistent with the hypothesis that they derive from the discrete individuals and crania. The youngest individual represented by commingled dental remains recovered from the tomb is a 1.5 months (±3 months) infant. Sex estimation was possible for five adult individuals out of the total of twelve adults. These five individuals were all female or probably female (three articulated individuals and two discrete crania).

Stature: *Table 13* presents a summary of the stature estimates of the discrete adult individuals. Estimation from long bones, metacarpals and metatarsals are presented to enable comparison with other contexts.

Pathologies: *Antemortem* tooth loss (AMTL) was observed in six out of the seven adult mandibles recovered from the tomb. Possible periostitis (fibula) and a healed fracture (metacarpal) were observed within the commingled remains.

Summary of Chamber Tomb XX human remains

Articulated, partially articulated and disarticulated human skeletal remains were recovered from Chamber Tomb XX. The MNI for the tomb is 29. Both adults and non-adults were recovered from the tomb.

Sex estimation was possible for five adult individuals out of the total of twelve adults. These five individuals were all female or probably female (three articulated individuals and two discrete crania).

A concentration of non-adults, and a possible connection between an adult female and non-adults, were observed. In the south-east corner of the tomb non-adult Inds D, F,

Table 11. Chamber Tomb XX individuals and crania. NB. the ID "Cran E" was not allocated to any skeletal remains during excavation and recovery.

Individual/ Cranium ID	Locus	Description
Ind A	403	Discrete articulated individual (complete). The individual was found in an extended supine position (east–west), facing south.
Ind B	402	Discrete articulated individual (complete). The individual was found in an extended supine position (south-east–north-west), facing north-west.
Ind C	405	Not a discrete individual. Individual ID was given upon finding the cranium and clavicle, but post-cranial bones were not found *in situ*.
Ind D	406	Discrete articulated individual (mostly complete). The individual was found in an extended supine position (east–west), facing south-west.
Ind E	406	Discrete partly articulated individual. The individual was in a flexed position (east–west). The right leg was bent tightly and leaning to the left. The upper body was probably in a supine position.
Ind F	405	Discrete non-adult articulated individual (mostly complete). The individual was found in an extended supine position (east–west).
Ind G	402	Disarticulated non-adult individual. The individual was found next to the left arm of Ind B. The burial orientation is probably south-east–north-west.
Ind H	402	Disarticulated non-adult individual. The individual was found upon removing Ind G. Some bones might belong to Ind G. Burial position could not be determined as the remains were disturbed.
Ind I	402	Discrete non-adult articulated individual (partial) found underneath the right leg of Ind B. The burial orientation is probably south-east–north-west.
Ind J	408	Discrete non-adult articulated individual with no cranium (partial). Probably Cran K excavated in 2023 belongs to this individual. The individual was probably in extended supine position (north-east–south-west).
Ind K	408	Discrete non-adult articulated individual with no cranium (partial). Probably Cran J excavated in 2023 belongs to this individual. The individual was probably in supine position (north-east–south-west).
Ind L	408	Discrete non-adult articulated individual with no cranium (partial). Probably Cran I excavated in 2023 belongs to this individual. The individual was probably in supine position (north-east–south-west).
Ind M	407	Discrete partly articulated individual with no cranium. Ind Q was found on the chest of Ind M. The individual was in an extended supine position (east–west).
Ind N	407	Discrete non-adult articulated individual (partial) with no cranium. The burial orientation is probably south-east–north-west. A bronze bracelet (N1259) was found *in situ* on the left lower arm.
Ind O	407	Discrete non-adult articulated individual (partial) with no cranium. The individual was in an extended supine position (east–west).
Ind P	407	Discrete partly articulated non-adult individual (lower leg and foot only). These legs may belong to Ind Q.
Ind Q	407	Discrete non-adult articulated individual (partial) with no cranium. Found on the chest of Ind M. The burial orientation is probably east–west. Some of the bones could be mixed with Ind M.
Ind R	407	Discrete non-adult articulated individual (partial) with no cranium. The individual was probably in an extended supine position (south-east–north-west).
Ind S	407	Discrete non-adult articulated individual (partial) with no cranium. Burial position could not be determined as the remains were disturbed.
Ind T	407	Discrete partly articulated individual. The burial orientation is probably east–west.
Cran A	402	Burial position could not be determined due to the high fragmentation.
Cran B	402	Cranium found in an upright position, facing north. Gold diadem (N1056) was found underneath the cranium.
Cran C	402	Burial position could not be determined due to the high fragmentation.
Cran D	402	Non-adult parietal. This could be part of two (?) crania.
Cran F	402	Non-adult cranium found next to the bronze bowl N1084. Burial position could not be determined due to the preservation status.
Cran G	402	Non-adult cranium. Burial position could not be determined due to the high fragmentation.
Cran H	406	Cranium facing up, head pointing to the south.
Cran I	406	Non-adult cranium found next to the left humerus of Ind D. The cranium was in an upright position, facing south-west. Probably belongs to Ind L.
Cran J	406	Non-adult cranium found next to the left lower arm of Ind D. The cranium was in an upright position, facing south. Probably belongs to Ind K.
Cran K	406	Non-adult cranium. The cranium was on its left side down, facing south. Probably belongs to Ind J.
Cran L	405	Cranium found in upright position, facing west.
Cran M	407	Cranium found left side down, facing north-west.
Cran N	407	Non-adult cranium. The cranium was on its left side down, probably facing west.
Cran O	407	Non-adult cranium. The burial position could not be determined due to the high fragmentation.
Cran P	407	Cranium found probably left side down, facing west.

Individual/ Cranium ID	Locus	Age at death	Sex	Pathology	Non-metric traits
Ind A	403	30–34 years	female	AMTL	
Ind B	402	25–29 years	female	LEH	
Ind C	405	30–40 years	probable female	AMTL	
Ind D	406	9.5 years (±1 year)	cba	LEH	
Ind E	406	probable adult	indeterminate	AMTL	
Ind F	405	5.5 years (±1 year)	cba		Carabelli's trait
Ind G	402	perinate <2 years	cba		
Ind H	402	1.5–2.5 years (±1 year)	cba		
Ind I	402	9.5 years (±1 year)	cba		
Ind J	408	11.5–12.5 years (±1 year)	cba		
Ind K	408	6.5 years (±1 year)	cba		
Ind L	408	6.5–7.5 years (±1 year)	cba		
Ind M	407	probable adult	indeterminate		
Ind N	407	10.5 months (±6 months)–2.5 years (±1 year)	cba		
Ind O	407	10.5 years (±1 year)	cba		
Ind P	407	13–16 years	cba		
Ind Q	407	around 13 years	cba		
Ind R	407	2.5–5.5 years (±1 year)	cba		
Ind S	407	around 2 years	cba		
Ind T	407	probable young adult (<20 years)	indeterminate		
Cran A	402	probable adult	indeterminate		
Cran B	402	35–40 years	female	AMTL, peri-apical abscess?	
Cran C	402	probable adult	indeterminate		Carabelli's trait
Cran D	402	infant	cba		
Cran F	402	around 5 years	cba		
Cran G	402	2.5 years (±1 year)	cba		Carabelli's trait
Cran H	406	probable adult	indeterminate		
Cran I	406	6.5–7.5 years (±1 year)	cba	LEH	
Cran J	406	6.5 years (±1 year)	cba		Carabelli's trait
Cran K	406	11.5–12.5 years (±1 year)	cba	LEH	
Cran L	405	probable adult	indeterminate		
Cran M	407	24–30 years	probable female	periapical abscess	
Cran N	407	2.5 years (±1 year)	cba		
Cran O	407	4.5 years (±1 year)	cba		Carabelli's trait
Cran P	407	20–24 years	indeterminate		

Table 12. Biological profiles of individuals and crania from Chamber Tomb XX. cba = cannot be assessed; AMTL = antemortem *tooth loss; LEH = linear enamel hypoplasia.*

J, K and L were found in concentration, with Ind A placed on top of the concentration of non-adult remains. Different post-burial treatments may have been performed in the north and south chambers of Chamber Tomb XX. Commingled remains were concentrated in the north-western part of the tomb. Articulated individuals found in the south-eastern part of the tomb preserved their crania *in situ*. In the northern part of the tomb most of the discrete individuals were only partly articulated, except Ind B (fully articulated), and without crania in articulation.

These remains reflect complex mortuary programmes, consistent with evidence from other tombs excavated at Hala

Table 13. Stature estimates for discrete/articulated individuals from Chamber Tomb XX.

Individual ID	Sex	Element	Side	Length (cm)	Method				Stature (cm)
Ind A	female	humerus	L	28.0	Trotter 1970 (white female)				152.05 (±4.45)
					Sjøvold 1990				148.36 (±4.89)
		radius	L	21.5	Trotter 1970 (white female)				156.84 (±4.24)
					Sjøvold 1990				155.97 (±5.01)
		femur	R	41.0	Trotter 1970 (white female)				155.37 (±3.72)
					Sjøvold 1990				156.97 (±4.49)
		first metacarpal	L	3.81	Meadows & Jantz 1992 (female)				153.30 (±5.57)
		second metacarpal	R	5.73	Meadows & Jantz 1992 (female)				154.78 (±5.15)
		fourth metacarpal	R	4.95	Meadows & Jantz 1992 (female)				154.50 (±5.33)
		first metatarsal	R	5.45	Byers *et al.* 1989 (combined)				154.96 (±6.54)
					Byers *et al.* 1989 (all females)				154.06 (±5.61)
					Byers *et al.* 1989 (European-American females)				154.44 (±5.20)
		second metatarsal	R	6.27	Byers *et al.* 1989 (combined)				151.52 (±6.54)
					Byers *et al.* 1989 (all females)				151.21 (±5.61)
					Byers *et al.* 1989 (European-American females)				151.46 (±4.96)
		fourth metatarsal	R	6.06	Byers *et al.* 1989 (combined)				156.34 (±6.85)
					Byers *et al.* 1989 (all females)				155.61 (±5.99)
					Byers *et al.* 1989 (European-American females)				155.53 (±5.75)
Ind B	female	radius	L	22.0	Trotter 1970 (white female)				159.21 (±4.24)
					Sjøvold 1990				157.86 (±5.01)
				22.4[1]	Trotter 1970 (white female)				161.11 (±4.24)
					Sjøvold 1990				159.37 (±5.01)
		first metacarpal	R	4.21	Meadows & Jantz 1992 (female)				159.86 (±5.52)
			L	4.16	Meadows & Jantz 1992 (female)				159.16 (±5.57)
		third metacarpal	L	5.89	Meadows & Jantz 1992 (female)				159.26 (±5.19)
		fourth metacarpal	L	5.27	Meadows & Jantz 1992 (female)				159.52 (±5.27)
		fifth metacarpal	L	4.70	Meadows & Jantz 1992 (female)				157.52 (±5.47)
Ind E	indeterminate	third metacarpal	R	6.13	Meadows & Jantz 1992 (male)				164.38 (±5.36)
					Meadows & Jantz 1992 (female)				161.84 (±5.36)
					Byers *et al.* 1989 (cm)				
					combined	all males	all females	European-American males	European-American females
		first metatarsal	L	5.88	162.18 (±6.54)	165.59 (±6.42)	160.03 (±5.61)	166.18 (±6.32)	161.44 (±4.96)
		third metatarsal	R	6.88	165.57 (±6.76)	167.96 (±6.81)	163.41 (±5.97)	168.76 (±6.89)	164.70 (±5.75)
		fifth metatarsal (functional)	R	6.40	172.28 (±7.60)	174.43 (7.38)	167.62 (±6.33)	175.72 (±7.22)	168.72 (±6.33)
		fifth metatarsal (morphological)		7.15	168.32 (±7.12)	170.99 (±7.09	165.13 (±6.36)	171.28 (±7.03)	166.29 (±6.49)
		fifth metatarsal (functional)	L	6.25	170.08 (±7.60)	172.65 (±7.38)	165.93 (±6.33)	173.80 (±7.22)	166.88 (±6.33)
		fifth metatarsal (morphological)		7.03	166.78 (±7.12)	169.72 (±7.09)	163.91 (±6.36)	169.94 (±7.03)	165.02 (±6.49)
Ind M	indeterminate	second metacarpal	L	7.24	Meadows & Jantz 1992 (male)				176.88 (±5.10)
					Meadows & Jantz 1992 (female)				174.78 (±5.10)
		third metacarpal	L	6.87	Meadows & Jantz 1992 (male)				174.08 (±5.19)
					Meadows & Jantz 1992 (female)				171.98 (±5.19)

[1] Laboratory measurement using an osteometric board. The other long bone measurements are based on field measurement.

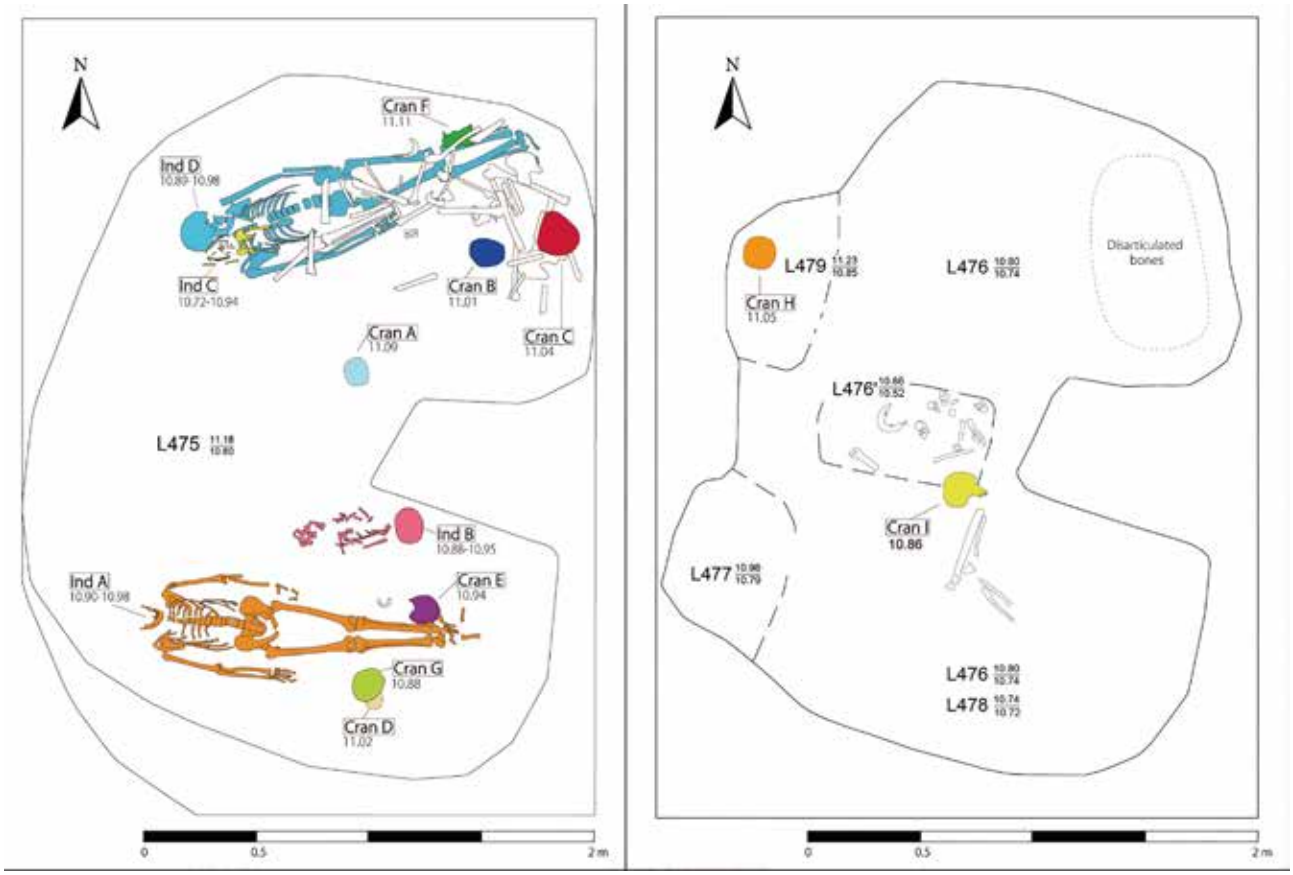


Fig. 36. Human skeletal remains from Chamber Tomb YY. Left: upper layer; right: lower layer. Drawing by Y. Miyauchi. Copyright: P.M. Fischer.

Sultan Tekke (e.g., Tombs RR, SS, TT) and contemporaneous sites in Cyprus.[128]

HUMAN REMAINS FROM CHAMBER TOMB YY

Tomb YY excavation began in 2023 and was completed in 2024. In the south and north part of the tomb, concentrations of human skeletal remains were identified, with skeletal remains in varying degrees of articulation: articulated, partly articulated, and disarticulated commingled remains (*Fig. 36*). The human skeletal remains recovered from Chamber Tomb YY are listed in *Table 14*.

MNI: The Minimum Number of Individuals for Chamber Tomb YY is 17, based on 13 mandibular left permanent second premolars, and remains from at least four individuals below the age for incipient permanent second premolar calcification.

Age at death and sex: Of the 17 individuals recovered from Chamber Tomb YY, eight are adults, four are of indeterminate age and five are non-adults. *Table 15* lists the age-at-death and sex estimates for the discrete individuals and lettered crania from Tomb YY, displaying the range of different ages of individuals interred in the tomb. There are at least three non-adults younger than 2 years old, deriving from the commingled context. The youngest of these is a 1.5-month-old infant (±3 months). The other two sets of non-adult remains are estimated to relate to a 7.5–10.5-month-old (±3 months), and a 1.5–2.5-year-old (±1 year) infant. Sex estimation was possible for four adult individuals out of the total of eight adults. These four individuals were all male or probable males (two articulated individuals and two discrete crania).

Stature: Stature estimates for the discrete adult individuals from Chamber Tomb YY are presented in *Table 16*. In order

[128] Casa *et al.* in Fischer & Bürge 2021, 131–134; Placiente Robedizo *et al.* in Fischer & Bürge 2021, 126–129; Lorentz and Branca in Fischer & Bürge 2022, 54–55; Lorentz *et al.* in Fischer & Bürge 2022, 55–58; 2023, 40–51; Placiente Robedizo and Eriksson in Fischer & Bürge 2022, 51–54.

Table 14. Chamber Tomb YY: individuals and crania

Individual/Cranium ID	Locus	Description
Ind A	475S	Discrete articulated individual (complete). The individual was found in an extended supine position (east–west). The mandible was found *in situ*, but the cranium was missing.
Ind B	475S	Discrete non-adult articulated individual (upper body). The individual was probably in a supine position (east–west).
Ind C	475N	Discrete non-adult articulated individual (mostly complete). The individual was found in an extended supine position (east–west) on top of the right shoulder of Ind D.
Ind D	475N	Discrete articulated individual (complete). The individual was found in an extended supine position (south-west–north-east), facing north.
Cran A	475N	Non-adult cranium. Burial position could not be determined due to the high fragmentation.
Cran B	475N	Cranium found in an upright position, facing east.
Cran C	475N	Cranium found right side down, facing west.
Cran D	475S	Cranium found left side down.
Cran E	475S	Non-adult cranium found next to the left lower leg of Ind A. Right side down, facing north.
Cran F	475N	Part of a calvarium. Burial position could not be determined.
Cran G	475S	Burial position could not be determined due to the high fragmentation. Could be part of another cranium.
Cran H	479	Cranium found in the western niche. The cranium was found upside down, probably facing west.
Cran I	478	Cranium found left side down, facing east.

Table 15. Biological profiles of Chamber Tomb YY individuals and crania. cba = cannot be assessed; AMTL = antemortem *tooth loss.*

Individual/Cranium ID	Locus	Age at death	Sex	Pathology	Non-metric traits
Ind A	475S	40–49 years	male	AMTL	
Ind B	475S	5.5 years (±1 year)	cba		
Ind C	475N	around 5 years	cba		
Ind D	475N	40–50 years	female	AMTL, caries, periodontal disease	
Cran A	475N	<5 years	cba		
Cran B	475N	13.5–14.5 years (±1 year)	cba		Carabelli's trait
Cran C	475N	30–40 years	probable male		
Cran D	475S	30–35 years	indeterminate		
Cran E	475S	5.5 years (±1 year)	cba		Carabelli's trait
Cran F	475N	probable adult	indeterminate		
Cran G	475S	old non-adult/young adult	indeterminate		
Cran H	479	probable adult	indeterminate		
Cran I	478	30–35 years	probable male		

to enable comparison with other contexts, stature estimates based on both long bones and metacarpals are presented.

Pathologies: *Antemortem* tooth loss (AMTL) was observed in five out of seven adult mandibles recovered, potentially indicating a rather high occurrence of AMTL (though this study base is very small).

Summary of Chamber Tomb YY human remains

Remains from articulated, partially articulated and disarticulated individuals were recovered from Chamber Tomb YY. The MNI for the tomb is 17. Individuals from a wide age range are represented.

BIOARCHAEOLOGICAL CONCLUSIONS, SEASON 2023 AND 2024

This section outlines the preliminary results of macroscopic, metric and some contextual analyses of the human remains from Chamber Tombs VV, XX and YY from Hala Sultan Tekke. Comprehensive and definitive analysis of all the human remains recovered from Hala Sultan Tekke will be conducted in the future. Some observations are however already possible at this stage: (1) a wide age range is represented, individuals from infants to older adults were interred in the tombs; (2) sex ratio of adult individuals may have been differential in some tombs (e.g., Tombs XX and YY) though this cannot be stated definitively due to the significant number of individuals without sex

Individual ID	Sex	Element	Side	Length (cm)	Method	Stature (cm)
Ind A	male	radius	R	23.5	Trotter 1970 (white male)	167.84 (±4.32)
					Sjøvold 1990	163.53 (±5.01)
		femur	R	44.5	Trotter 1970 (white male)	167.32 (±3.27)
					Sjøvold 1990	166.46 (±4.49)
		tibia	R, L	35.5	Trotter 1970 (white male)	168.08 (±3.37)
					Sjøvold 1990	164.14 (±4.15)
		fibula	L	33.0	Trotter 1970 (white male)	160.22 (±3.29)
					Sjøvold 1990	154.78 (±4.10)
		first metacarpal	R	4.75	Meadows & Jantz 1992 (male)	170.57 (±5.52)
Ind D	probable male	humerus	R	33.5	Trotter 1970 (white male)	173.63 (±4.05)
					Sjøvold 1990	173.77 (±4.89)
		radius	R	25.0	Trotter 1970 (white male)	173.51 (±4.32)
					Sjøvold 1990	169.20 (±5.01)
		ulna	R	27.5	Trotter 1970 (white male)	175.80 (±4.32)
					Sjøvold 1990	173.61 (±4.91)
		femur	R, L	46.5	Trotter 1970 (white male)	172.08 (±3.27)
					Sjøvold 1990	171.88 (±4.49)
		fibula	R	37.0	Trotter 1970 (white male)	170.94 (±3.29)
					Sjøvold 1990	169.14 (±4.10)

Table 16. Stature estimates for discrete/articulated individuals from Chamber Tomb YY.

diagnostics; (3) successive episodes of interments introduced fleshed bodies to the tombs; (4) manipulation of interred individuals was performed, as skeletal elements or partially articulated body parts seem to have been moved, potentially in preparation for the placement of further interments within the tombs, following (partial) decomposition of soft tissues of prior interments or initiated by some ideological rationale, a ritual of secondary manipulation;[129] (5) grouping of non-adult individuals (Tomb XX); and (6) a possible female-and-child burial (Tomb XX) were also observed. Further analyses are ongoing, such as aDNA analyses, and synchrotron radiation enabled approaches, aimed at contributing towards understanding key questions about the site and the period. Such key questions include exploring human metal exposure (SR-micro XRF), pathologies (SXCT) and organic compound preservation (SR-FTIR), and require high-resolution structural and chemical data in micrometre and/or nanometre scales. Future excavation seasons are expected to significantly add to the study base, enabling further exploration of these key questions to better understand what life was like at Hala Sultan Tekke in its wider context.

[129] Cf. Webb 1999.

Appendix 2. Archaeobotanical remains

BY DOMINIKA KOFEL[130]

From Area A, 58 soil samples with volumes ranging from 0.01 to 25 litres underwent flotation. In addition, 42 samples from the city's CQ1 and CQ4, with volumes ranging from 2 to 13 litres, were studied.[131] CQ1 and CQ4 are a part of a densely built city centre of approximately 14 hectares and are located to the north-west of Area A.[132] Analysed soil samples from CQ1 and CQ4 were collected in 2019, however due to various circumstances sample processing was undertaken in 2023. All samples were processed by flotation, using meshes of 0.25 mm and 1.00 mm to catch the flot and residue respectively. All residues were dried and sorted to retain any ecofacts present. Flots and sorted botanical materials from the residues were scanned under a binocular microscope at magnifications up to 15×. In total, 54 samples yielded material for further analyses.

Charred plant remains were sorted, identified and counted.[133] The abundance of charred wood and other organic remains was estimated on the following scale: "x" (occasional) up to 10 items, "xx" (moderate) 11 to 50, "xxx" (abundant) 51 to approximately 250, "xxxx" (extremely abundant) over

[130] Nicolaus Copernicus University, Toruń, Poland.

[131] See preliminary report: Fischer & Bürge 2020.

[132] Fischer 2020.

[133] The nomenclature follows Cappers *et al.* 2006.

Table 17. List of taxa identified in samples from CQ1 and CQ4; x: ≤ 10, xx: 11 to 50, xxx: 51 to c. 250, xxxx: >250 items.

City Quarter	**CQ1**									**CQ4**								
Trench	7D	7D	7D	7D	24C/D	24E	25B	25C	25C	27A/D	27A/D	27A/D	27A/D	27D	28A	28A/B	28B	28B	29A/B
Locus	894	908	673	923	956L	943	889	952	937R	702	702	730A	702	702A	712	728	716	720	728
Sample number	4	8	12	10	14	33	5	22	34	38	3	18	31	9	30	11	21	28	2
Cerealia																			
Hordeum vulgare (grain)		1													1				
Triticum sp. (grain)							1											2	
Cerealia indet. (grain)	1					1			2			1		2		1		1	1
Other economic plants																			
Lens culinaris	1													1					
Olea europaea		1				1						2	1	2			1	1	
Vitis vinifera		2	1		3	1		1			1	1						2	
Other																			
cf. *Calepina irregularis*		7																	
Echium cf. *vulgare*		6																	
Fumaria officinalis		5																	
Vicia sp.										1									
Caryophyllaceae indet.						1													
Fabaceae indet.		1		1															
Poaceae indet.		6																	
indet.									1						x				
charred amorphous remains			x			x			x			x						x	x
Charcoal																			
<4 mm	xxxx	xxx	xxx	x	xx		xx	x	xx	x	xxx	xx	xxx	xx	xx	x		xxx	xx
>4 mm	xx	x	xx					x	x	x		xx						x	
beads																	x		
fish bone		x	x																
volume [l]	5	10	8	3	7	4	4	4	10	8	10	4	10	4	12	12	8	10	7
sorted [%]	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

250 (many hundreds). All plant macroremains were checked against botanical literature.[134]

The details of the processed soil samples, full species lists and the quantity of plant remains recovered from each sample are listed in *Tables 17* and *18*.

RESULTS

The majority of the carpological assemblages were charred. However, single finds of dewatered seeds and fruit were also noted. Modern roots, seeds and straw fragments were also present, but are not recorded within the tables.

CQ1 and CQ4

In four samples collected from CQ1 Trench 7D occasional grains of barley (*Hordeum vulgare*) and indeterminate cereals (*Cerealia* indet.) were discovered (*Table 17*). Moreover, in a sample taken from L908 an olive stone (*Olea europaea*) and common grape vine (*Vitis vinifera*) pips were recovered, along with seeds and fruit of wild species, including seeds similar to white ballmustard (cf. *Calepina irregularis*), fruits similar to viper's bugloss (*Echium* cf. *vulgare*), common fumitory (*Fumaria officinalis*), and some legume (Fabaceae indet.) and grass (Poaceae indet.) families. The archaeobotanical assemblage found in L908 most likely represents wild plants which were growing in the vicinity of the settlement and accidentally got burned.

[134] E.g., Cappers *et al.* 2006; Jacomet 2006.

Table 18. List of taxa identified in samples from Tombs UU, VV, XX and YY; x ≤ 10, xx = 11 to 50, xxx = 51 to c. 250, xxxx = >250 items.

Tomb	XX																								
Locus	401	401	402	402	402	402	402	402	402	403	403	403	403	403	403	403	403	403	402	402	402	403	403	403	404
Sample number	7	19	66	75	72	73	44	64	62	43	9	6	5	1	4	17	60	54	53	57	45	51	59	58	65
Find number	N805	N805		N823	N825	N842	N863	N868	N877	N900	N905	N908	N913	N914	N920	N920	N962	N965	N1009	N1012	N1013	N1021	N1026	N1028	N1089
Find type	Mycenaean jug	Mycenaean jug		Mycenaean cup	Plain White bowl	White Slip II bowl	Base-ring I jug	Base-ring II jug	Base-ring II jug	Minoan krater	Mycenaean LH III B1(?) jug	Mycenaean piriform jar	White Slip II bowl	Base-ring I jug	Plain White juglet	Plain White juglet	Base-ring II jug	Plain White juglet	White Painted juglet	Base-ring juglet	Plain White juglet	Mycenaean cup	Base-ring II jug	Base-ring jug	Mycenaean piriform jar
Cereals																									
Hordeum vulgare (grain)	2		18	2	1	4	2	1		2	18			1			1		2	3	4	2		2	1
Triticum sp. (grain)																				1					
Cerealia indet. (grain)	3	1	2	1			1			3	1									1	3	1			
Economic plants																									
Olea europaea							1				1								1						
Vitis vinifera								1			1	1													
cf. *Pistacia vera*																									
Other																									
Bromus sp.																						1			
Chrozophora sp.																									
Centaurea sp.																									
Papaver sp.																									
Fabaceae indet.																									
Poaceae indet.			1						2		2	1	1		1	1		2	1	1	1		1		
*rachis (frag.)																									
*straw (frag.)																			2						
pedicel indet.																									
organic slag	x		x	x	x		x			x			x	x	x		x	x	x	x	x	x		x	
indet.										1															
Charcoal																									
charcoal <4mm	x	xx	xx	x	x	x	xx		x	xx	xxx		x	x	x			x	xx	x	x	x	x	x	x
charcoal >4mm																								x	
volume [l]	3	1	25	0,5	1	1,5	5	0,5	1,5	15	2,5	2	2	1,5	0,5	0,5	0,5	1,5	1	0,5	1	1	1	0,5	0,5
sorted [%]	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 18 continued.

Tomb	**UU**	**VV**			**YY**						
Locus	312	452	452	452	475	475	475	475	475	475	475
Sample number	49	77	16	11	2	3	13	42	48	70	
Find number		N800	N855	N937	N875	N886	N947	N941	N1042	N837	
Find type		Mycenaean mug	Red Lustrous Wheel-made lentoid flask	Plain White Wheel-made juglet	Mycenean? Juglet	Base-ring II jug	Plain White jug	Mycenaean krater	Base-ring jug	Mycenaean piriform jar	
Cereals											
Hordeum vulgare (grain)	23	1		3	2			2			
Triticum sp. (grain)											
Cerealia indet. (grain)								1		2	
Economic plants											
Olea europaea											
Vitis vinifera											
cf. *Pistacia vera*	1										
Other											
Bromus sp.											
Chrozophora sp.										4	
Centaurea sp.										2	
Papaver sp.										1	
Fabaceae indet.										3	
Poaceae indet.	3		1	1	1	1	1		1	5	
*rachis (frag.)					1					3	
*straw (frag.)			1							2	
pedicel indet.	1										
organic slag	x			x			x	x	x		
indet.											
Charcoal											
charcoal <4mm	xxx	x	x	x	xx	x	x	xx		x	
charcoal >4mm	x						x	x			
volume [l]	4	0,25	0,5	0,5	2	2	1	20	1	2	
sorted [%]	100	100	100	100	100	100	100	100	100	100	

The assemblages from CQ4 are relatively small and sparse (*Table 17*). The material comprises occasional grains of barley (*Hordeum vulgare*), wheat (*Triticum* sp.) and indeterminate cereals (*Cerealia* indet.). Moreover, there are finds of lentils (*Lens culinaris*), olives (*Olea europaea*) and common grape vine (*Vitis vinifera*). Wild species are represented only by two seeds and fruit of vetches (*Vicia* sp.) and of the carnation family (Caryophyllaceae indet.). Most of the samples contained moderate to abundant charred wood fragments of less than 4 mm size, i.e., they were too small for further analyses.

Area A

Results from samples taken in Area A are presented in *Table 18*. In a sample taken from Tomb UU (L312), remains of a container of fired clay were discovered. In addition, the same sample comprised over 20 grains of barley (*Hordeum vulgare*). It seems that the grains had been deposited in the clay container, perhaps serving as (part of) a grave offering.

In Chamber Tomb VV, the contents of three ceramic vessels yielded material for further analyses. In the Mycenaean mug N800 two grains of barley (*Hordeum vulgare*) were noted. In the Plain White Wheel-made juglet N937 three grains of barley (*Hordeum vulgare*) and one grain of the wild grass family (Poaceae indet.) were identified. The Red Lustrous Wheel-made lentoid flask N855 contained a grain and a fragment of straw of the wild grass family (Poaceae indet.).

From Chamber Tomb XX, 25 samples were taken, all except for one (L402) from the interior of complete ceramic vessels. Most of the samples comprised occasional finds of barley (*Hordeum vulgare*), indeterminate cereals (*Cerealia* indet.), grains of the wild grass family (Poaceae indet.), and occasional to moderate charred wood fragments (<4 mm).

Two assemblages might indicate another grave offering: the first is the sample from L402, which consisted of 18 grains of barley (*Hordeum vulgare*), two grains of indeterminate cereals (*Cerealia* indet.), and one grain of the wild grass (Poaceae indet.) family; the second is the content of the Mycenaean LH III B1(?) jug N905, which yielded grains of barley (*Hordeum vulgare*), indeterminate cereal (*Cerealia* indet.), specimens from a wild grass family (Poaceae indet.), an olive (*Olea europaea*) stone, and a common grape vine (*Vitis vinifera*) pip. Both samples contained moderate to abundant charred wood fragments (<4 mm), which were not suitable for further analyses.

Six samples were taken from Chamber Tomb YY. Again, the content of one of the vessels, a Mycenaean LH IIIA2–B1 piriform jar (N837) from L475, stands out. It comprised grains of indeterminate cereals (*Cerealia* indet.), along with seeds and fruit of croton (*Chrozophora* sp.), centaury (*Centaurea* sp.) and poppy (*Papaver* sp.). In addition, there were finds of grains, rachis internodes and straw fragments of the wild grass fam-

ily (Poaceae indet.), and seeds and pods of the legume family (Fabaceae indet.). The content of N837 is similar to (although smaller than) the assemblage found in two vessels discovered in Chamber Tomb SS, Plain ware jug N387 and Base-ring I jug N457.[135] The similarity is based on the presence of flowering species along with cultivars.

DISCUSSION AND CONCLUSIONS

The results indicate that barley was not only an important cultivar but also used as a grave offering. Interestingly, as opposed to other tombs from Area A, i.e., Tombs RR and SS,[136] there were no finds of common fig (*Ficus carica*) seeds. There are at least two explanations. The first is that the various tombs might have had different meanings, for example, assigned to different social groups, and therefore different types of plant offerings were deposited. The second is that rituals of consumption in connection with the (re)opening of various tombs could have happened in different seasons of the year. Thus, not all the fruits and plants were accessible. Although fruits of fig (*Ficus carica*) could have been dried and stored throughout the whole year, at this stage it cannot be proven whether the seeds found in Tombs RR and SS derived from fresh or dried fruits. Another explanation for the absence of fig seeds in the assemblages from Tombs UU, VV, XX and YY are different ways and circumstances of deposition (e.g., involvement of fire or not), post-depositional processes and preservation, or sampling techniques. However, other grains and fruits are well preserved and represented in samples from all four tombs. Therefore, it seems that the discrepancy in the assemblages is due to (ritual) activities in Area A taking place during different seasons.

As pointed out by Carly Henkel and Evi Margaritis,[137] the use of food plants for ritual purposes in the Bronze Age contexts is better attested in other regions such as the Aegean, Central Europe and Anatolia. However, those finds represent mostly the cultivars and other edible species, whereas plant macroremains of possible burnt bouquets[138] are so far unique and have been recognized only in Cypriot Bronze Age contexts. Whether the deposition of bouquets in tombs is specific to Cyprus, or whether the findings of the possible bouquets in the tombs at Hala Sultan Tekke is due to thorough and systematic sampling at the site, remains a matter of further discussion.

[135] Kofel *et al.* 2024.

[136] Kofel in Fischer & Bürge 2020, 105–107; Kofel *et al.* 2024.

[137] Henkel & Margaritis 2022, 18.

[138] Kofel *et al.* 2024.

Appendix 3. Technical examination of two cylinder seals by 2D and 3D shape analysis and non-invasive analytical investigation

BY VALENTINA VASSALLO, RAHAF ORABI, RAPHAEL MOREAU, ROPERTOS GEORGIOU & SORIN HERMON[139]

The preliminary results of the technical examination of two cylinder seals (N1378 from Chamber Tomb ZZ, *Fig. 28*; N1248 from Chamber Tomb XX, *Fig. 18*, both also discussed above) from the Swedish excavations in 2024 at Hala Sultan Tekke are presented in this paper. The purpose of this examination is to shed light on the manufacturing processes, modes of production and the state of preservation of these artefacts. The applied methodology combines 2D documentation for qualitative examination, 3D documentation for quantitative shape analysis, and advanced non-invasive analytical methods.

METHODS

Large Format Panoramic Imaging: A Large Format (LF) imaging system was used for the 2D documentation and digital unwrapping of cylindrical surfaces of the two seals (*Fig. 37*). Large Format (LF) imaging can produce exceptional high-detail true colour RGB 48-bit colour images, and it can be used for a wide range of materials and sizes. The LF imaging system at APAC Labs (*Fig. 38*) can undertake panoramic cylindrical surface unwrapping, photomicrography, multispectral imaging for conservation archiving and documentation.[140] The LF imaging system is capable of producing a very high-resolution image and has a wide colour gamut and dynamic range output without chromatic aberration. The custom-built unit consists of a modular mechanical large format Sinar View camera system with adjustable bellows and attached on to a base rail, Apo-Macro-Sironar digital lens 120 mm f/5.6 specialized in large format photography, 4"×5" digital Better Light scanning back that can extract detailed panoramic images from tiny cylindrical objects, and an electrical precision Better Light motor base which works in synchronization with the digital back through the ViewFinder software. The image is captured by physically moving a tri-linear colour image sensor smoothly across the image plane, building up the image one line per colour at a time. The digital scanning back is able to capture red, green and blue pure colour data for each pixel in resolution settings of up to 8,000 pixels in height. The resulting images can be well over 1GB and provide much finer

[139] Andreas Pittas Art Characterization Laboratories (APAC Labs), Science and Technology in Archaeology and Culture Research Center (STARC), The Cyprus Institute. For Vasallo also Lund University, Department of Archaeology and Ancient History.

[140] Bakirtzis & Georgiou 2019.

Fig. 37. Cylinder seals excavated in 2024: N1378 (left, from Chamber Tomb ZZ) and N1248 (right, from Chamber Tomb XX). Images by R. Georgiou. Copyright: P.M. Fischer.

Fig. 38. The LF camera digital imaging system setup at APAC Labs' digital imaging facility. Image by APAC Labs. Copyright: P.M. Fischer.

detail and tone range than film or professional DSLR cameras. Specific imaging processing methods of the raw data were used to acquire a clearer view of the incisions on the cylindrical surfaces of the seals after the digital unwrapping. In particular, a succession of image segmentation methods is used. The ImageJ2 open-source framework, which is Java-based, is used for image processing and analysis through the Fiji software platform.[141] A series of 2D imaging software algorithms, such as the *Subtract Background* command, is used to visualize only the regions of interest, in this case, the incised elements. After, the *Enhanced Local Contrast* (CLAHE) command is employed with the ideal parametrization to give greyscale tone emphasis and saturation to the features. Finally, a *Find Edges* command is used to intensify and isolate edges of the spatial configuration of the incisions.

Structured light 3D scanner: A structured light scanner was used for the 3D documentation of the selected artefacts. Due to the objects' small size, this instrument is particularly appropriate for documenting the sub-millimetre range and obtaining a high-resolution result. An Aicon 3D system SmartSCAN, equipped with a 5.0-megapixel camera, set with close-range lenses featuring a field of view of 60 mm, was employed. A specific pipeline for the post-processing of the raw data was followed: after processing the point cloud in the scanner's proprietary software (Optocat), the files were exported and then post-processed using the proprietary software Geomagic Wrap;[142] finally, the data were manipulated in the open-source software MeshLab[143] and CloudCompare[144] for shape analysis.

Photogrammetry: A photogrammetric technique was employed to document the two cylindrical seals. The main interest in using this technique was to have a textured 3D model to be used for visualization purposes and dissemination. A Canon 80D equipped with a lens of 50 mm focal length was used for the photogrammetric campaign. A 360° round for each object, consisting respectively of 45 images for N1378 and of 32 images for N1248, was carried out to cover the entire surface of the selected objects. An image-based 3D modelling technique was applied for the digital reconstruction of the artefact. The RealityCapture[145] software was used for the post-processing and the creation of the 3D models.

Digital microscopy: The surface of the artefacts was studied at high magnification with a Hirox KH8700 digital microscope. The multi-focus function was used to study the relief of non-flat areas and obtain data for the shape analysis. With this method, we checked the possible presence of material residues on the artefacts (e.g., traces of pigments and dyes), studied the surface morphology, described the material texture and detected possible contamination or deposition on the artefacts' surface.

X-Ray Fluorescence analysis (XRF): The materials of the artefacts were studied with a MuSeSca3D scanner. Both cylinders seals were scanned following a flat plan as a classical photograph, thus the inner rim of each seal bore could not be studied with this method. The instrument was operated at 50kV, 600μA, with 100μm step size and 80ms dwell-time,

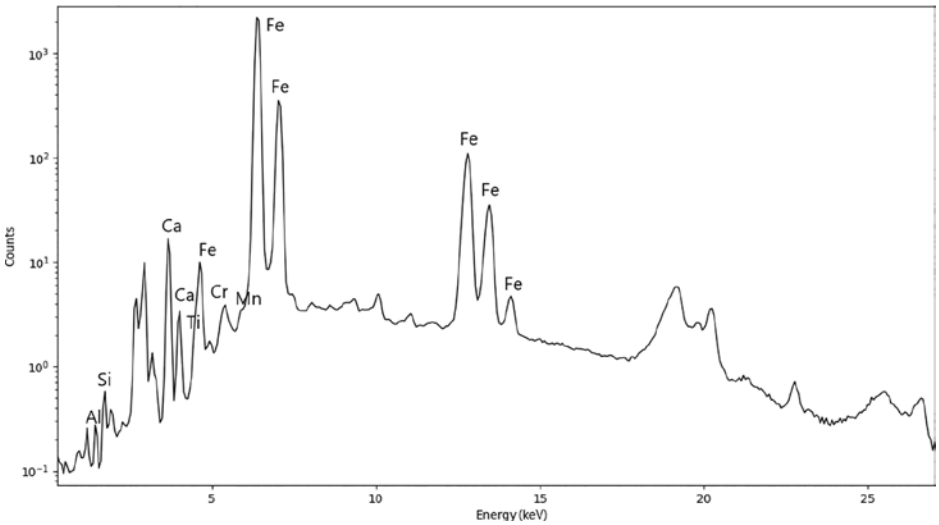
[141] Schindelin *et al.* 2012; Rueden *et al.* 2017.

[142] https://www.artec3d.com/3d-software/geomagic-wrap

[143] https://www.meshlab.net/; Cignoni *et al.* 2008.

[144] https://www.danielgm.net/cc/; Girardeau-Montaut 2006.

[145] https://www.capturingreality.com/



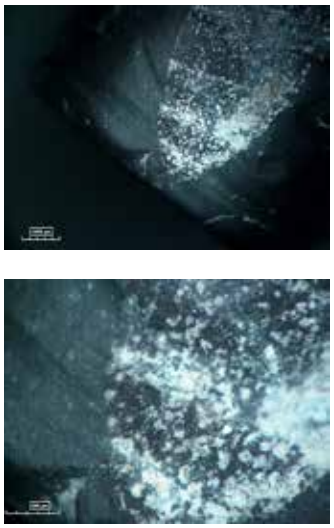


Fig. 39 (left). XRF spectrum of the seal N1378 material, with identified lines of aluminium, silicon, calcium, titanium, iron, chromium and manganese. Image by R. Moreau. Copyright: P.M. Fischer.

Fig. 40 (right). Digital microscopy images of seal N1378, showing the presence of white material on the surface: (a) the portion of the seal that preserves the white material and (b) magnification of the area. Images by R. Moreau & V. Vassallo. Copyright: P.M. Fischer.

no filter, air, Rh anode, and the mean XRF signature of each artefact was processed from the scanning results. XRF analysis identifies inorganic elements constituting the studied materials; however, this method is not sensitive to the low-Z elements (Z ≥13).

N1378: RESULTS AND DISCUSSION

Seal N1378 is made of dark material. The XRF spectrum of the material shows intense iron (Fe-K) lines, as well as calcium (Ca-K) lines. Low intensity lines of other elements such as aluminium (Al-K), silicon (Si-K), titanium (Ti-K), chromium (Cr-K) and manganese (Mn-K) are also present (*Fig. 39*). The Fe-K lines suggest that this seal is made of iron in its major part along with the other listed elements. A portion of the seal presents a high amount of white material, which may be related to the exposed part of where soil deposits may have crystallized (*Fig. 40a*). The presence of Ca-K is most likely due to environmental contamination, which corroborates the presence of the white spots observed at high magnification (*Fig. 40b*). A red cylindrical elongated particle was observed on the surface of the seal and close to one of the engraved features (*Fig. 41*). Due to its size and the instrument used for the elemental analysis, it was not possible to identify its material. Further tests with specific instruments could be carried out to investigate the nature of the particle.

Blue crystal-like particles were noticed under the microscope on the inner, and partially on the outer edges, of the seal bore (*Fig. 42*). The position of the particles and the type of instrument used to analyse the object did not provide indication of their nature. Further analyses with other instruments could contribute to their identification.

Microscopic observation of the seal's decorative pattern suggests the use of a tool capable of producing regular lines and rounded dots *(Fig. 43*). Engraved straight lines and traces of the swirling of the tool on the seal's material show the production activity of the artisan during the realization of the decoration. The Large Format imaging allowed the acquisition of high-resolution panoramic images of up to 150-megapixel resolution to visualize details of the whole engraved scene otherwise difficult to visualize in a single image. Imaging processing methods on the obtained images were applied after the digital unwrapping. In particular, a succession of image segmentation methods was used to visualize better the features of the composition. Thanks to the good state of conservation of cylinder seal N1378, the results of the image segmentation application are qualitatively clear, showing the various components of the scene in a single image (*Fig. 44*).

Beyond the bi-dimensional, qualitative documentation, seal N1378 was 3D digitally documented using the structured light scanner and photogrammetry. The surface was consistently covered except for the central bore of the seal. Indeed, the 3D scanner's light and the photographic camera cannot reach the inner part of the object: as a result, only the upper parts of the bore shape, from both sides, can be documented. Nevertheless, an accurate, textured 3D model of the object

Fig. 41. (a) Red cylindrical elongated particle observed on the surface of seal N1378 and close to one of the engraved features; (b) magnification of the particle. Images by R. Moreau & V. Vassallo. Copyright: P.M. Fischer.

Fig. 42. (a) Blue particles observed under the microscope on the inner edge of one side of the seal bore of seal N1378 and (b) their magnification. Images by R. Moreau & V. Vassallo. Copyright: P.M. Fischer.

Fig. 43. Microscopic images showing the features of seal N1378's decorative pattern, possibly made with the same tool capable of creating (a) lines and (b) rounded dots. Images by R. Moreau & V. Vassallo. Copyright: P.M. Fischer.

Fig. 44. Large Format image of cylinder seal N1378 after selective image processing carried out to emphasize the greyscale tone of the texture and saturation of the features for the intensification and better visualization of the engraving. Image by R. Georgiou. Copyright: P.M. Fischer.

Fig. 45. (a) Views of the 3D model of seal N1378 from different sides; (b) the unrolled seal with the application of MeshLab shaders, such as "lattice.gdp". Images by R. Orabi & V. Vassallo. Copyright: P.M. Fischer.

was obtained by integrating the two techniques (*Fig. 45a*) to carry out a quantitative analysis for the interpretation of its production. Some analyses conducted on the 3D model of the seal to visualize the engravings of the artefact better. First, CloudCompare software was used to unroll the cylinder onto a rectangular plane. Then, MeshLab shaders (e.g., "lattice.gdp") were applied to highlight the carvings of the seal. The 3D analysis confirmed the observation on the incised pattern made by the microscopy, suggesting the use of a tool able to both incise and create rounded shapes on the surface.

The 3D visual analysis of the unrolled seal shows a composition consisting of two scenes: one composed of four animal figures (e.g., antelopes) around a tree; and a winged human figure holding two animal figures (e.g., crocodiles) by their tails (*Fig. 45b*).

Thanks to the digital 3D representation of the small seal, precise measurements of the artefact can be calculated (*Table 19*). The 3D analysis confirms the overall excellent quality manufacturing of the seal. However, the digital positioning of the artefact on its central axis and the application of the Mesh-

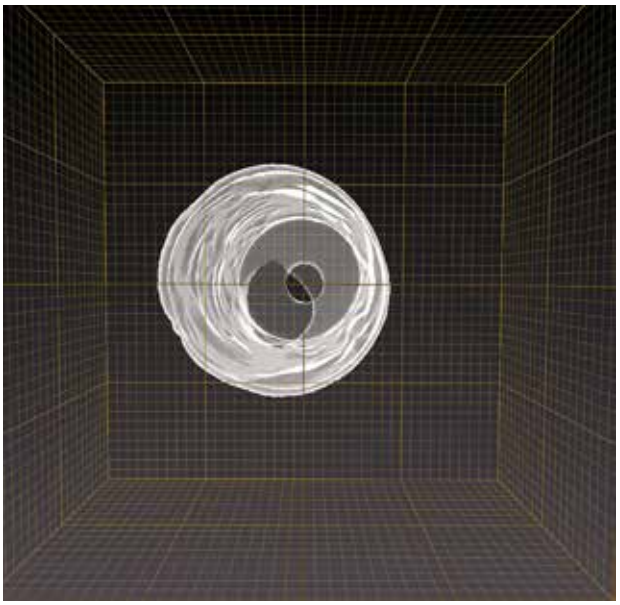


Fig. 46. Digital positioning of the artefact on its central axis and the application of the MeshLab "xray.gdp" shader shows a possible mistake made by the artisan during the creation of the bore. Image by V. Vassallo. Copyright: P.M. Fischer.

Lab "xray.gdp" shader shows a possible mistake made by the artisan during the creation of the bore. The digital measurements of the holes' diameter demonstrate their similarity but the one on the upper side (above the figures composing the scene) shows a lack of circularity possibly due to an error during the bore creation. The small mistake is confirmed by the lack of axiality of the hollow and the position of the upper hole not in a central position, as is the bottom one (*Fig. 46*). These elements lead us to conjecture that the artisan created the bore by drilling the object possibly from only one direction: from the side at the bottom of the figures working towards the upper part.

N1248: RESULTS AND DISCUSSION

Seal N1248 has a green colour and a corroded surface. Microscopy images at high magnification show the presence of sand-like particles all over the surface (*Fig. 47*). The XRF spectrum shows intense copper (Cu-K) lines, along with iron (Fe-K), calcium (Ca-K), titanium (Ti-K), vanadium (V-K), chromium (Cr-K), potassium (K-K), manganese (Mn) and silicon (Si-K) lines (*Fig. 48*). It is assumed that the presence of all eight elements other than copper is most probably due to environmental contamination leading to the formation of concretion on the surface of the seal along with the corroded copper. Microscopic observation showed the presence of engraved features on the surface, but the severe corrosion and concretions did not allow the elements to be clearly identified with this instrument.

Table 19. Digital measurements of the analysed objects: H = height; D = diameter of the object; d = diameter of the small holes.

	Maximum sizes (mm)		
	H	D	d
N1378	18.1	8.7	3.1
N1248	23.9	8.7	4.2

LF imaging allowed us to acquire high-resolution panoramic images up to 150-megapixel resolution aimed at visualizing details of the engraved scene difficult to decipher in a single image. The obtained image was therefore digitally unwrapped and imaging processing methods were applied to it. However, the result of the image segmentation method was not able to identify the decoration of the seal due to major corrosion of its surface (*Fig. 49*). Based on that, cylinder seal N1248 examination has been complemented with the quantitative analysis applied on the 3D model created by the integration of structural light laser scanning and photogrammetric techniques.

After this integration, an accurate 3D model of the object was obtained (*Fig. 50a*). The whole surface was covered through the digital acquisition process, except for the central bore, which was not accessible to the light pattern of the scanner and the camera field of view. Several analyses were applied to better analyse the object and obtain information on its manufacturing and production, as well as to identify the surface decoration currently not visible due to its bad state of preservation. The digital measurements calculated on the 3D object (*Table 19*) allowed us to assume a generally accurate production of the seal by the artisan. Indeed, the 3D digital observation of the object, the digital position of the cylindrical seal on the xyz-axes, and the application of the "xray.gdp" MeshLab shader allowed us to confirm such an assumption. The shape analysis shows that the creation of the cavity was possibly obtained by drilling from one side, most probably the one above the corroded figures. It might be that during the production of the object, there was a mistake in the bore drilling since a small break on the cavity side at the base of the corroded figures could be due to the deviation of the direction during the operation (*Fig. 47b*). Nevertheless, the current holes within the circular bases maintain a more or less central position, demonstrating the skill of the artisan in solving the issue. Several MeshLab shaders were applied to better visualize the incised decorations of the seal surface. The application of the MeshLab "Radiance scaling" shader (*Fig. 50a*) on the cylindrical 3D shape revealed the rough outline of some engraved figures of the decorative pattern but they were still not clearly visible. For that reason, it was decided to use further tools for their identification. CloudCompare software was used to unwrap the 3D mesh and

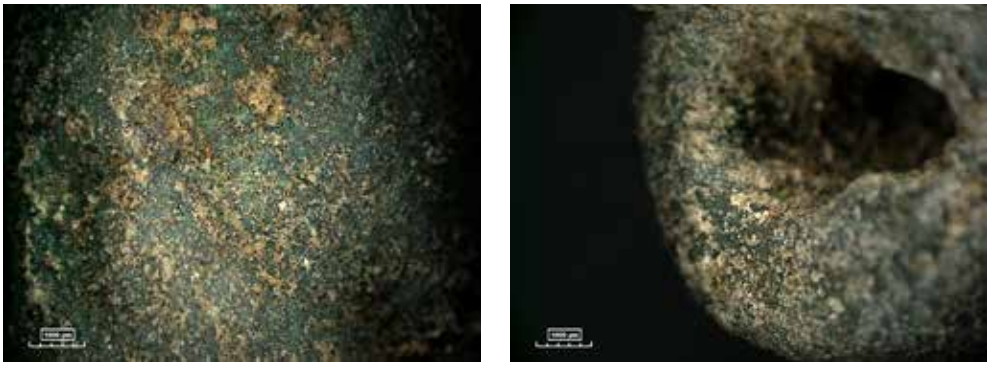


Fig. 47. Digital microscopy images of seal N1278, showing (a) the corroded metal and concretion on the surface and (b) details of its manufacture. Images by R. Moreau & V. Vassallo. Copyright: P.M. Fischer.

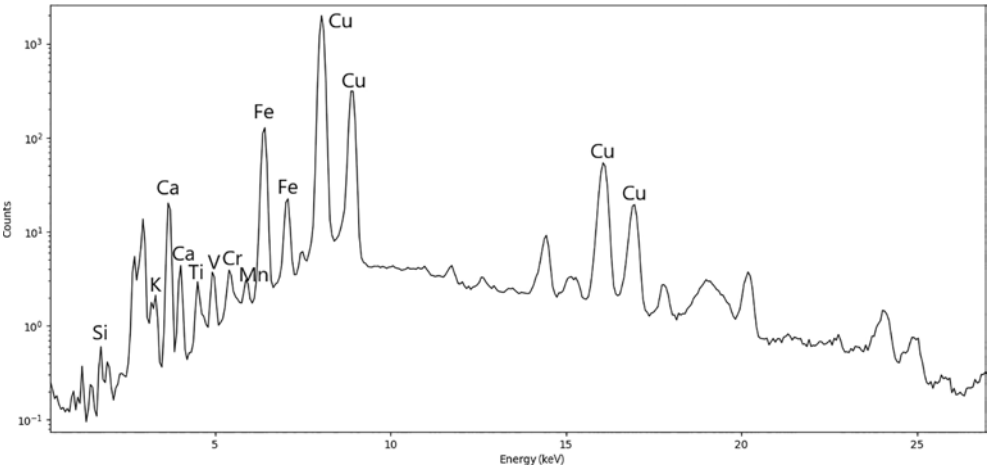


Fig. 48. XRF spectrum of seal N1278 material, with identified lines of silicon, potassium, calcium, titanium, vanadium, chromium, manganese, iron, and copper. Image by R. Moreau. Copyright: P.M. Fischer.

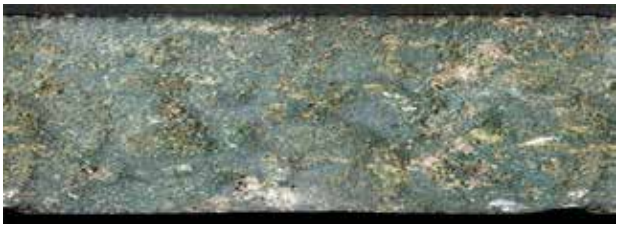


Fig. 49. Large Format image of cylinder seal N1248. The application of image processing on the LF image was not satisfactory due to the corrosion of the material. Image by R. Georgiou. Copyright: P.M. Fischer.

transform the cylindrical seal into a rectangular surface for further analysis. The application of MeshLab shaders (e.g., "lattice.gdp", "Radiance scaling") on the 3D unwrapped surface helped to better identify the carved figures (*Fig. 50b*). The scene revealed was composed of a human figure with a vest and two possible antithetic animal figures that fill the full height of the seal. Some other small decorations occupy the scene, but the bad state of preservation does not allow their full identification.

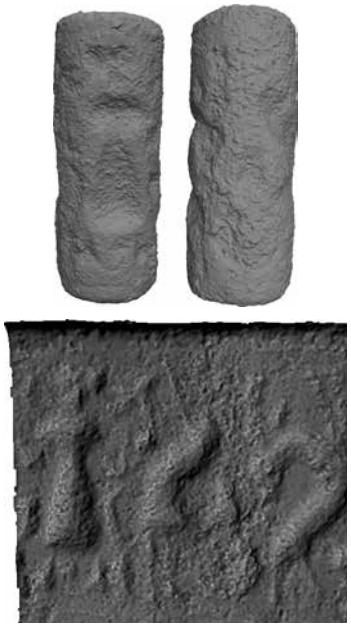


Fig. 50. (a) 3D model of the seal: the high quality of the geometry allows the visualization in more detail of all the engraved figures. (b) Seal N1248 visualized using MeshLab "Radiance Scaling" shader to outline the engraved figures. Images by R. Orabi & V. Vassallo. Copyright: P.M. Fischer.

Bibliography

Alexandrou, C. 2016. *Following the life-cycle of Base-ring female figurines in Late Bronze Age Cyprus*, Ph.D. thesis, University of Dublin.

AlQahtani, S.J. 2008. *Atlas of tooth development and eruption*, London. https://www.qmul.ac.uk/dentistry/atlas/

Alvarez, L. 2023. 'Histoire du miroir aux origines, du Proche-Orient à l'Ouest du Bassin méditerranéen (c. Vie Millénaire–Xe siècle av. n. è.)', *RA* 1:75, 15–65. https://doi.org/10.3917/arch.231.0015

Amiet, P. 1992. *Corpus des cylindres de Ras Shamra-Ougarit* vol. 2. *Sceaux-cylindres en hématite et pierres diverses* (Ras Shamra-Ougarit 9), Paris.

Åström, P. 1986. 'Hala Sultan Tekke—an international harbour town of the Late Cypriote Bronze Age', *OpAth* 16 (ActaAth-4° 34), 7–17.

Athanassov, B., D. Chernakov, K. Dimitrov, R. Krauß, H. Popov, R. Schwab, V. Slavchev & E. Pernicka 2020. 'A new look at the Late Bronze Age oxhide ingots from the Eastern Balkans', in *Objects, ideas and travelers. Contacts between the Balkans, the Aegean and western Anatolia during the Bronze and Early Iron Age. Volume to the memory of Alexandru Vulpe. Proceedings of the conference in Tulcea, 10–13 November, 2017* (Universitätsforschungen zur prähistorischen Archäologie 350), eds J. Maran, R. Bajenaru & S.-C. Ailincai, Bonn, 299–356.

Bachofen, J.J. 1861. *Das Mutterrecht*, Stuttgart.

Bailey, D.M. 1976. 'The British Museum Excavations at Hala Sultan Tekke in 1897 and 1898. The material in the British Museum', in *Hala Sultan Tekke* vol. 1. *Excavations 1897–1971* (SIMA 45:1), eds P. Åström, D.M. Bailey & V. Karageorghis, Gothenburg, 1–32.

Bakirtzis N. & R. Georgiou 2019. 'An imaging center for Cypriot and Eastern Mediterranean archaeology, art and cultural heritage at the Cyprus Institute. Preliminary report', *RDAC* 2018, 285–311.

Barclay, A.E. 2001. 'The Potnia Theron. Adaptation of a Near Eastern image', in *Potnia, deities and religion in the Aegean Bronze Age. Proceedings of the 8th International Aegean Conference, Göteborg University, 12–15 April 2000* (Aegaeum 22), eds R. Laffineur & R. Hägg, Liège & Austin, 373–386.

Bolger, D. 1996. 'Figurines, fertility, and the emergence of complex society in prehistoric Cyprus', *Current Anthropology* 37:2, 365–373. https://doi.org/10.1086/204500

Bruzek, J. 2002. 'A method for visual determination of sex, using the human hip bone', *American Journal of Physical Anthropology* 117:2, 157–168. https://doi.org/10.1002/ajpa.10012

Budin, S.L. 2003. *The origin of Aphrodite*, Bethesda.

Budin, S.L. 2006. 'Girl, woman, mother, goddess. Bronze Age Cypriot terracotta figurines', in *Medelhavsmuseet. Focus on the Mediterranean* vol. 5, eds S. Houby-Nielsen & S.N. Fischer, 76–88.

Buikstra, J.E. & D.H. Ubelaker 1994. *Standards for data collection from human skeletal remains*, Fayetteville.

Bürge, T. 2016. 'Recently discovered cylinder seals from Hala Sultan Tekke', in *Ancient Cyprus today. Museum collections and new research* (SIMA-PB 184), eds G. Bourogiannis & C. Mühlenbock, Uppsala, 229–237.

Bürge, T. 2017. 'Ritual depositions versus garbage pits. A re-evaluation of pottery deposits and offering pits at the Late Bronze Age city of Hala Sultan Tekke, Cyprus', *Ägypten und Levante* 27, 133–150. https://doi.org/10.1553/aeundl27s133

Bürge, T. 2018. 'Late Bronze Age offering pits from Hala Sultan Tekke, Cyprus. Diachronic perspectives of activities, ceremonies and rituals in a suburban area', in *Proceedings of the 10th International Congress on the Archaeology of the Ancient Near East*, eds B. Horejs, C. Schwall, V. Müller, M. Luciani, M. Ritter, M. Guidetti, R.B. Salisbury, F. Höflmayer & T. Bürge, Wiesbaden, 209–220. https://doi.org/10.2307/j.ctvcm4f86.21

Bürge, T. & P.M. Fischer 2019. 'Nuragic pottery from Hala Sultan Tekke. The Cypriot–Sardinian connection', *Ägypten und Levante* 29, 231–244. https://doi.org/10.1553/0x003b51ab

Byers, S., K. Akoshima & B. Curran 1989. 'Determination of adult stature from metatarsal length', *American Journal of Physical Anthropology* 79, 275–279. https://doi.org/10.1002/ajpa.1330790303

Cappers, R.T.J., R.M. Bekker & R. Neef 2006. *Digitale zadenatlas van Nederland*, Groningen.

Catling, H.W. 1964. *Cypriot bronzework in the Mycenaean world*, Oxford.

Cignoni, P., M. Callieri, M. Corsini, M. Dellepiane, F. Ganovelli & G. Ranzuglia 2008. 'MeshLab.

An open-source mesh processing tool', in *Eurographics Italian Chapter Conference*, eds V. Scarano, R.D. Chiara & U. Erra, Eindhoven, 129–136. https://doi.org/10.2312/LocalChapterEvents/ItalChap/ItalianChapConf2008/129-136

Clayden, T. 1992. 'Kish in the Kassite period (*c.* 1650–1150 B.C.)', *Iraq* 54, 141–155. https://doi.org/10.2307/4200359

Coldstream, J.N. 1986. *The originality of ancient Cypriot art*, Nicosia.

Collon, D. 1982. *The Alalakh cylinder seals. A new catalogue of the actual seals excavated by Sir Leonard Woolley at Tell Atchana, and from neighbouring sites on the Syrian–Turkish border* (BAR-IS 132), Oxford. https://doi.org/10.30861/9780860541615

Cornelius, I. 2009. 'Mistress-of-animals', in *Iconography of deities and demons in the ancient Near East*, eds J. Eggler & C. Uehlinger, Zurich, electronic pre-publication.

Delaporte, L. 1923. *Catalogue des cylindres, cachets et pierres gravées de style oriental (CCO) (CCL),* vol. 2. *Acquisitions*, Paris.

Devillers, B., M. Brown & C. Morhange 2015. 'Paleo-environmental evolution of the Larnaca Salt Lakes (Cyprus) and the relationship to second millennium BC settlement', *JAS Reports* 1, 73–80. http://dx.doi.org/10.1016/j.jasrep.2014.11.004

Dikaios, P. 1969. *Enkomi. Excavations 1948–1958* vol. 3a. *Plates*, Mainz am Rhein.

Dodson, P. & D. Wexler 1979. 'Taphonomic investigations of owl pellets', *Paleobiology* 5, 279–284. https://doi.org/10.1017/S0094837300006564

Feldbacher, R., L.E. Alvarez, Y. Miyauchi, K.O. Lorentz & P.M. Fischer 2024. 'An Aegean mirror from Hala Sultan Tekke, Cyprus', *OJA* 43:2, 153–172. https://doi.org/10.1111/ojoa.12292

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

Fischer, P.M. 2019. 'Hala Sultan Tekke, Cyprus. A Late Bronze Age trade metropolis', *NEA* 82:4, 236–247. https://doi.org/10.1086/705491

Fischer, P.M. 2020. 'The occupational history of the Bronze Age harbour city of Hala Sultan Tekke, Cyprus', *Ägypten und Levante* 29, 189–230. https://doi.org/10.1553/AEundL29s188

Fischer, P.M. 2023. 'Interregional trade at Hala Sultan Tekke, Cyprus. Analysis and chronology of imports', *JAS Reports* 47, article no. 103722. https://doi.org/10.1016/j.jasrep.2022.103722

Fischer, P.M. 2024. 'The cemetery of Hala Sultan Tekke, Cyprus. Further evidence of interculturality and burial customs in the Late Bronze Age', *NEA* 87:2, 74–99. https://doi.org/10.1086/729877

Fischer, P.M. & T. Bürge 2014. 'The New Swedish Cyprus Expedition 2013. Excavations at Hala Sultan Tekke. Preliminary results', *OpAthRom* 7, 61–106. https://doi.org/10.30549/opathrom-07-06

Fischer, P.M. & T. Bürge 2017. 'Tombs and offering pits at the Late Bronze Age metropolis of Hala Sultan Tekke, Cyprus', *BASOR* 377, 161–218. https://doi.org/10.5615/bullamerschoorie.377.0161

Fischer, P.M. & T. Bürge 2018. *Two Late Cypriot city quarters at Hala Sultan Tekke. The Söderberg Expedition 2010–2017* (SIMA 147), Uppsala.

Fischer, P.M. & T. Bürge 2019. 'The New Swedish Cyprus Expedition 2018. Excavations at Hala Sultan Tekke (The Söderberg Expedition). Preliminary results', *OpAthRom* 12, 287–326. https://doi.org/10.30549/opathrom-12-10

Fischer, P.M. & T. Bürge 2020. 'The New Swedish Cyprus Expedition 2019. Excavations at Hala Sultan Tekke (The Söderberg Expedition). Preliminary results', *OpAthRom* 13, 73–111. https://doi.org/10.30549/opathrom-13-03

Fischer, P.M. & T. Bürge 2021. 'The New Swedish Cyprus Expedition 2020 (The Söderberg Expedition). Excavations in the cemetery of Hala Sultan Tekke', *Ägypten und Levante* 31, 97–145. https://doi.org/10.1553/aeundl31s97

Fischer, P.M. & T. Bürge 2022. 'The New Swedish Cyprus Expedition (The Söderberg Expedition). Excavations at Hala Sultan Tekke 2020 and 2021', *OpAthRom* 15, 7–76. https://doi.org/10.30549/opathrom-15-02

Fischer, P.M. & T. Bürge 2023. 'The New Swedish Cyprus Expedition (The Söderberg Expedition). Excavations at Hala Sultan Tekke autumn 2021 and spring 2022', *OpAthRom* 16, 7–59. https://doi.org/10.30549/opathrom-16-02

Fischer, P.M. & R. Feldbacher 2025. 'The cemetery of Hala Sultan Tekke, Cyprus. Excavations of Late Bronze Age chamber tombs in 2023', *Ägypten und Levante* 34, 17–68. https://doi.org/10.1553/AEundL34s17

Fischer, P.M. & Z.V. Manolova 2025. 'Boat-shaped objects of lead from Late Bronze Age Hala Sultan Tekke, Cyprus, and the Uluburun shipwreck', *OJA* 44:3, 228–247. https://doi.org/10.1111/ojoa.12325

Furumark, A. 1972. *The Mycenaean pottery. Analysis and classification* (ActaAth-4° 20:1), Stockholm.

Girardeau-Montaut, J.-P. 2006. *Détection de changement sur des données géométriques tridimensionnelles*, Ph.D. thesis, Télécom Paris.

Gradoli, M.G., P. Waiman-Barak, T. Bürge, Z.C. Dunseth, J.H. Sterba, F. Lo Schiavo, M. Perra, S. Sabatini & P.M. Fischer 2020. 'Cyprus and Sardinia in the Late Bronze Age. Nuragic table ware at Hala Sultan Tekke', *JAS Reports* 33, article no. 102479. https://doi.org/10.1016/j.jasrep.2020.102479

Gubel, E. & J.S. Smith 2010. 'A cylinder seal from Hala Sultan Tekke, T.1 MLA 1173', *RDAC* 2010, 238–244.

Henkel, C. & E. Margaritis 2022. 'Examining the ritual landscape of Bronze Age Crete through the lens of archaeobotany', *Religions* 13:1, article no. 81. https://doi.org/10.3390/rel13010081

Horejs, B. & R. Jung 2018. 'Networks and cultural contacts to the Aegean', in *Technologies and interregional contacts in the Eastern Balkans during the Bronze Age*, eds S. Alexandrov, Y. Dimitrova, H. Popov, B. Horejs & K. Chukalev, 233–239.

Hultkrantz, A. 1961. 'Bachofen and the mother goddess', *Ethnos* 26:1–2, 75–85. https://doi.org/10.1080/00141844.1961.9980900

Jacomet, S. 2006. *Identification of cereal remains from archaeological sites*, Basel.

Joyner, L., R.S. Merrillees & C. Xenophontos 2006. 'The materials of the Cypriote Bronze Age cylinder and stamp seals in the Department of Greek and Roman Antiquities, the British Museum, London', *RDAC* 2006, 127–154.

Jung, R. 2009. 'I "bronzi internazionali" ed il loro contesto sociale fra Adriatico, Penisola Balcanica e coste Levantine', in *Dall'Egeo all'Adriatico. Organizzazioni sociali, modi di scambio e interazione in età postpalaziale (XII–XI sec. a. C.). Atti del seminario internazionale (Udine, 1–2 dicembre 2006)* (Studi e ricerche di protostoria mediterranea 8), eds E. Borgna & P. Càssola Guida, Rome, 129–157.

Jung, R. & M. Mehofer 2013. 'Mycenaean Greece and Bronze Age Italy. Cooperation, trade or war?', *Archäologisches Korrespondenzblatt* 43:2, 175–193.

Kanta, A. 1980. *The Late Minoan III period in Crete. A survey of sites, pottery and their distribution* (SIMA 58), Gothenburg.

Karageorghis, V. 1976. 'Two Late Bronze Age tombs from Hala Sultan Tekke', in *Hala Sultan Tekke* vol. 1. *Excavations 1897–1971* (SIMA 45:1), eds P. Åström, D.M. Bailey & V. Karageorghis, Gothenburg, 71–87.

Karageorghis, V. 1993. *The coroplastic art of ancient Cyprus* vol. 2. *Late Cypriot II–Cypro-Geometric III*, Nicosia.

Kenna, V.E.G. 1971. *Corpus of Cypriote antiquities* vol. 3. *Catalogue of the Cypriote seals of the Bronze Age in the British Museum* (SIMA 20:3), Gothenburg.

Knapp, A.B. 2006. 'Representations. Female figurines and social identity on protohistoric Cyprus', in *Medelhavsmuseet. Focus on the Mediterranean* vol. 5, eds S. Houby-Nielsen & S.N. Fischer, 137–144.

Knapp, A.B. & S.W. Manning 2013. *The archaeology of Cyprus. From earliest prehistory through the Bronze Age*, Cambridge.

Knox, D. 2012. *Making sense of figurines in Bronze Age Cyprus. A comprehensive analysis of Cypriot ceramic figurative material from EC I–LC IIIA (c. 2300 BC–c. 1100 BC)*, Ph.D. thesis, University of Manchester.

Knox, D. 2016. 'Figurines and complex identities in Late Bronze Age Cyprus', in *An archaeology of prehistoric bodies and embodied identities in the Eastern Mediterranean*, eds M. Mina, S. Triantaphyllou & Y. Papadatos, Oxford & Philadelphia, 32–38.

Kofel, D., T. Bürge & P.M. Fischer 2024. 'The social context of ritual in Late Bronze Age Cyprus. An archaeobotanical study from the cemetery of Hala Sultan Tekke', in *Dynamics and developments of social structures and networks in prehistoric and protohistoric Cyprus*, eds T. Bürge & L. Recht, Abingdon-on-Thames, 196–209. https://doi.org/10.4324/9781003320203-11

Konstantinidi-Syvridi, E. 2016. 'Gold bull's ornaments from the Tiryns Hoard and the distribution of the type in the LH IIIC periphery of the Mycenaean world', in *Archaios. Studies presented to Professor Thanasis I. Papadopoulos*, eds E. Papadopoulou-

Chrysikopoulou, V. Chrysikopoulos & G. Christakopoulou, Oxford, 127–135. https://doi.org/10.2307/j.ctvxw3ngx.22

Lesure, R.G. 2011. *Interpreting ancient figurines. Context, comparison and prehistoric art*, New York. https://doi.org/10.1017/cbo9780511973376

Lovejoy, C.O. 1985. 'Dental wear in the Libben population. Its functional pattern and role in the determination of adult skeletal age at death', *American Journal of Physical Anthropology* 68:1, 47–56. https://doi.org/10.1002/ajpa.1330680105

Lovejoy, C.O., R.S. Meindl, T.R. Pryzbeck & R.P. Mendforth 1985. 'Chronological metamorphosis of the auricular surface of the ilium. A new method for the determination of age at death', *American Journal of Physical Anthropology* 68:1, 15–28. https://doi.org/10.1002/ajpa.1330680103

Lubsen-Admiraal, S. 1982. 'Late Bronze Age tombs from Dromolaxia', *RDAC* 1982, 39–59.

Ludvik, G.E. 2023. 'Indus-style stone beads in the late third-millennium BCE southern Levant. The role of trade and curation in the distribution of high-value ornaments', *NEA* 86, 1, 4–15. https://doi.org/10.1086/723461

Manning, S.W., C. Pulak, B. Kromer, S. Talamo, C. Bronk Ramsey & M.W. Dee 2009. 'Absolute age of the Uluburun shipwreck. A key Late Bronze Age time-capsule for the East Mediterranean', in *Tree-rings, kings, and Old World archaeology and environment. Papers presented in honor of Peter Ian Kuniholm*, eds S.W. Manning & M.J. Bruce, Oxford & Oakville, 163–188.

Mantzourani, E. & G. Vavouranakis 2022. 'The anthropomorphic figurines of Cyprus in the Bronze Age. Style, local traditions and foreign associations', in *Beyond Cyprus. Investigating Cypriot connectivity in the Mediterranean from the Late Bronze Age to the end of the Classical period*, ed. G. Bourogiannis, Athens, 35–44.

Marinatos, N. 2010. *Minoan kingship and the Solar Goddess. A Near Eastern koine*, Urbana & Chicago.

Matthäus, H. 1980. *Die Bronzegefäße der kretisch–mykenischen Kultur*, Munich.

Meadows, L. & R.L. Jantz 1992. 'Estimation of stature from metacarpal length', *Journal of Forensic Sciences* 37:1, 147–154. https://doi.org/10.1520/JFS13222J

Merrillees, R.S. 1988. 'Mother and child. A Late Cypriote variation on an eternal theme', *Mediterranean Archaeology* 1, 42–56.

Morris, D. 1985. *The art of ancient Cyprus. With a check-list of the author's collection*, Oxford.

Mountjoy, P.A. 1986. *Mycenaean decorated pottery. A guide to dentification* (SIMA 73), Gothenburg.

Mountjoy, P.A. 1993. *Mycenaean pottery. An introduction* (Oxford University Committee for Archaeology. Monograph 36), Oxford.

Mullins, R.A. 2010. 'A comparative analysis of the Alalakh 2003–2004 season pottery with Woolley's Levels', in *Tell Atchana, ancient Alalalakh* vol. 1. *The 2003–2004 excavation seasons*, ed. K.A. Yener, Istanbul, 51–66.

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

Museum of Fine Arts 1982. *Egypt's golden age. The art of living in the New Kingdom, 1558–1085 B.C. Catalogue of the exhibition*, Boston.

Papadopoulos, T.J. 1998. *The Late Bronze Age daggers of the Aegean* vol. 1. *The Greek Mainland*, (Prähistorische Bronzefunde 6:11), Stuttgart.

Paschalides, C. 2018. *The Mycenaean cemetery at Achaia Clauss near Patras. People, material remains and culture in context*, Oxford. https://doi.org/10.2307/j.ctvndv85p

Popov, H. & A. Jockenhövel 2018. 'The Late Bronze Age mine at Ada Tepe', in *Technologies and interregional contacts in the Eastern Balkans during the Bronze Age,* eds S. Alexandrov, Y. Dimitrova, H. Popov, B. Horejs & K. Chukalev, 193–205.

Porada, E. 1947. *Seal impressions of Nuzi* (AASOR 24), New Haven.

Porada, E. 1971. 'Appendix I. Seals', in *Enkomi. Excavations 1948–1958* vol. 2. *Chronology, summary and conclusions, catalogue, appendices*, P. Dikaios, Mainz am Rhein, 783–810.

Roháček, M. 2018. 'A marriage of the Aegean and the Orient. Bronzes of the Siana Group reconsidered', *Studia Hercynia* 22:2, 52–82.

Rueden, C.T., J. Schindelin, M.C. Hiner, B.E. Dezonia, A.E. Walter, E.T. Arena & K.W. Eliceri 2017. 'ImageJ2. ImageJ for the next generation of scientific image data', *BMC Bioinformatics* 18:1, article no. 529. https://doi.org/10.1186/s12859-017-1934-z

Salje, B. 1990. *Der "Common Style" der Mitanni-Glyptik und die Glyptik der Levante und Zyperns in der späten Bronzezeit* (Baghdader Forschungen 11), Mainz am Rhein.

Samaes, M. & K. Nys 2010. 'T. 1, MLA 1173. An extra-urban tomb of the Late Bronze Age site near Hala Sultan Tekke', *RDAC*, 199–248.

Sandars, N. 1955. 'The antiquity of the one-edged bronze knife in the Aegean', *PPS* 20, 174–197. https://doi.org/10.1017/s0079497x00017540

Schaefer, M., S. Black & L. Scheuer 2009. *Juvenile osteology. A laboratory and field manual*, Amsterdam. https://doi.org/10.1016/B978-0-12-374635-1.X0001-X

Schaeffer-Forrer, C.F.-A. 1983. *Corpus des cylindres-sceaux de Ras Shamra-Ugarit et d'Enkomi-Alasia* vol. 1 (Synthèse 13), Paris.

Schindelin, J., I. Arganda-Carreras, E. Frise, V. Kaynig, M. Longair, T. Pietzsch & A. Cardona 2012. 'Fiji. An open-source platform for biological-image analysis', *Nature Methods* 9:7, 676–682. https://doi.org/10.1038/nmeth.2019

Serwint, N. 2016. 'Women and the art of ancient Cyprus', in *Women in antiquity. Real women across the ancient world*, eds S.L. Budin & J.M. Turfa, London & New York, 399–415. https://doi.org/10.4324/9781315621425-48

Sjøvold, T. 1990. 'Estimation of stature from long bones utilizing the line of organic correlation', *Human Evolution* 5, 431–447. https://doi.org/10.1007/BF02435593

Steel, L. 2020. 'Feats of clay. Considering the materiality of Late Bronze Age Cyprus', *Sustainability* 12:17, article no. 6942. https://doi.org/10.3390/su12176942

Stein, D. 1993. *The seal impressions* (Das Archiv des Šilwa-Teššup 8–9), Wiesbaden.

Teissier, B. 1984. *Ancient Near Eastern cylinder seals from the Marcopoli Collection*, Berkeley.

Trotter, M. 1970. 'Estimation of stature from intact long limb bones', in *Personal identification in mass disasters*, ed. T.D. Stewart, Washington D.C., 71–83.

Tsintsov, Z., N. Petrova & M. Mehofer 2016. 'Ancient gold mining at Ada Tepe, East Rhodopes, Bulgaria. Mineralogical features of au-containing fe-oxides/hydroxides from the Ada Tepe gold deposit. Their significance in clarifying the ancient gold mining', *Archaeologia Austriaca* 1, 109–118. https://doi.org/10.1553/archaeologia100s109

Vermeule, E.D.T. & F.Z. Wolsky 1990. *Toumba tou Skourou. A Bronze Age potters' quarter on Morphou Bay in Cyprus*, Cambridge, Massachusetts.

Vitezović, S. 2018. 'Fishing and hunting gear from osseous raw materials in the Early Neolithic from Serbia', *Quaternary International* 472:A, 38–48. https://doi.org/10.1016/j.quaint.2018.01.021

Webb, J.M. 1999. *Ritual architecture, iconography and practice in the Late Cypriot Bronze Age*, Jonsered.

Webb, J.M. 2002. 'Device, image, and coercion. The role of glyptic in the political economy of Late Bronze Age Cyprus', in *Script and seal use on Cyprus in the Bronze and Iron Ages* (Colloquia and Conference Papers 4), ed. J.S. Smith, Boston, 111–154.

Yener, K.A. 2013. 'New excavations at Alalakh. The 14th–12th centuries BC', in *Across the border. Late Bronze–Iron Age relations between Syria and Anatolia. Proceedings of a symposium held at the Research Center of Anatolian Studies, Koç University, Istanbul, May 31–June 1, 2010* (Ancient Near Eastern Studies, Supplement 42), ed. K.A. Yener, Leuven, 11–35.

Yener, K.A., M. Akar & M.T. Horowitz 2019. 'The 2006–10 field cycle. Periodization, research questions, and methodology', in *Tell Atchana, Alalakh* vol. 2. *The Late Bronze II city. 2006–2010 excavations season*, eds K.A. Yener, M. Akar & M.T. Horowitz, Istanbul, 1–10.

Younger, J.G. 1988. *The iconography of Late Minoan and Mycenaean sealstones and finger rings*, Bristol.