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# List of Abbreviations

| | |
|---|---|
| AA | Archäologischer Anzeiger |
| AAAS | Les Annales Archéologiques Arabes Syriennes |
| AASOR | Annual of the American Schools of Oriental Research |
| ADAJ | Annual of the Department of Antiquities of Jordan |
| AfO | Archiv für Orientforschung |
| AJA | American Journal of Archaeology |
| AUSS | Andrews University Seminary Studies |
| BA | Biblical Archaeologist |
| BAR | British Archaeological Reports |
| BASOR | Bulletin of the American Schools of Oriental Research |
| CRAI | Comptes Rendus de l'Académie des Inscriptions et Belles Lettres |
| JAOS | Journal of the American Oriental Society |
| JMA | Journal of Mediterranean Archaeology |
| JNES | Journal of Near Eastern Studies |
| JPOS | Journal of the Palestine Oriental Society |
| JRA | Journal of Roman Archaeology |
| JRS | Journal of Roman Studies |
| LA | Liber Annuus |
| LIMC | Lexicon Iconographicum Mythologiae Classicae |
| MA | Mediterranean Archaeology |
| PEFQS | Palestine Exploration Fund Quarterly Statement |
| PEQ | Palestine Exploration Quarterly |
| QDAP | Quarterly of the Department of Antiquities of Palestine |
| RB | Revue Biblique |
| SHAJ | Studies in the History and Archaeology of Jordan |
| WA | World Archaeology |
| ZDPV | Zeitschrift des Deutschen Palästina-Vereins |

# System of Transliteration from Arabic

***Consonents***

| | | | |
|---|---|---|---|
| ء | ’ *(except where initial)* | ض | ḍ |
| ب | b | ط | ṭ |
| ت | t | ظ | dh |
| ث | th | ع | ‘ |
| ج | j | غ | gh |
| ح | ḥ | ف | f |
| خ | kh | ق | q |
| د | d | ك | k |
| ذ | dh | ل | l |
| ر | r | م | m |
| ز | z | ن | n |
| س | s | هـ | h |
| ش | sh | و | w |
| ص | ṣ | ي | y |
| ـة ة | a *or* at | ـه ه | a *or* ah |

***Long Vowels***

| | |
|---|---|
| ا، ى | ā |
| و | ū |
| ي | ī |

***Short Vowels***

| | |
|---|---|
| ـَ | a |
| ـُ | u |
| ـِ | i |

***Common Nouns***

| | | | |
|---|---|---|---|
| تل | Tall | دير | Dayr |
| جبل | Jabal | عين | ‘Ayn |
| خربة | Khirbat | وادي | Wādī |

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# THE DANISH - GERMAN JARASH NORTH-WEST QUARTER PROJECT 2013: PRELIMINARY FIELD REPORT

*Georg Kalaitzoglou, Achim Lichtenberger and Rubina Raja*

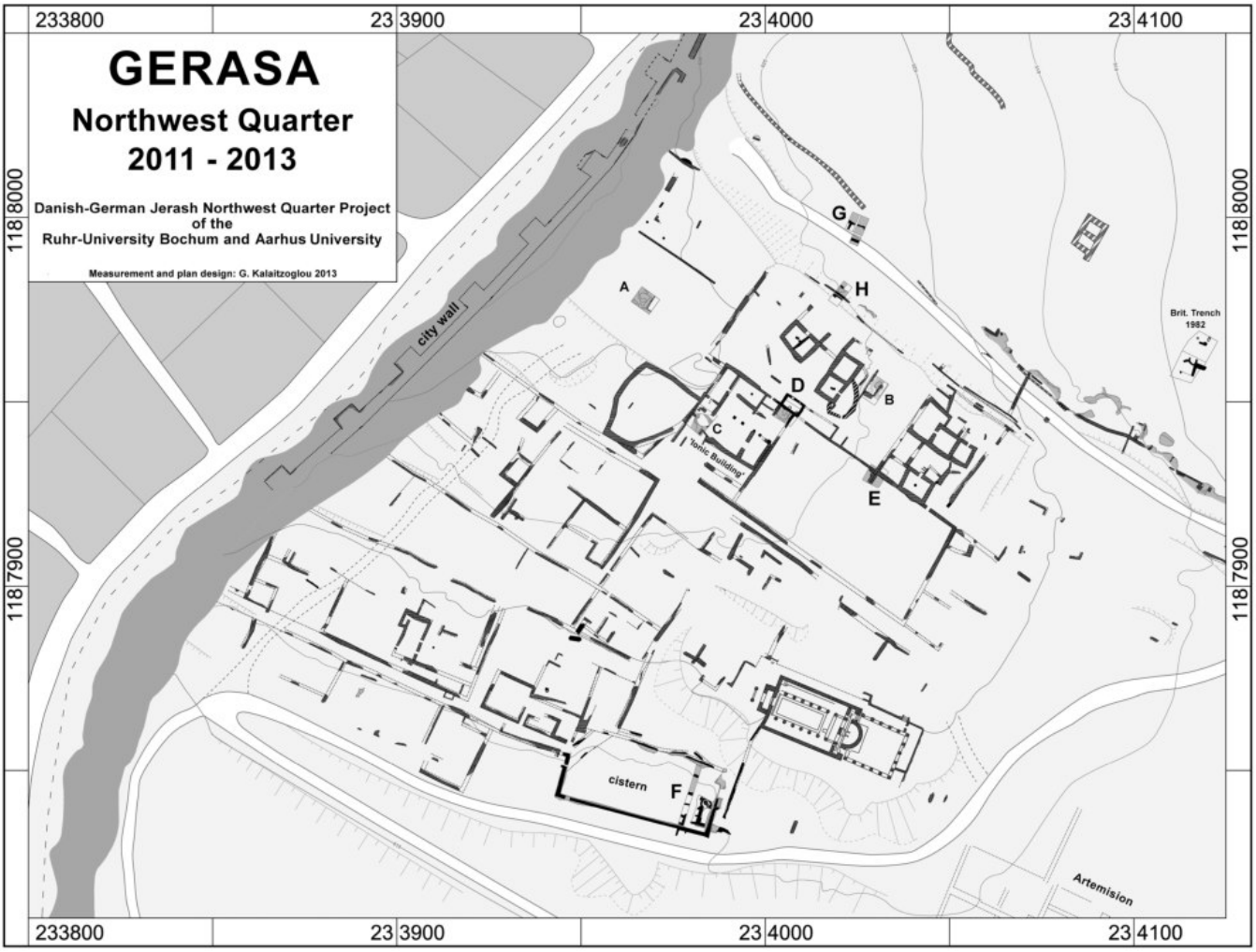
## Introduction

Between 21 July and 30 August, 2013, the Danish - German team from the University of Aarhus, Denmark and Ruhr - Universität Bochum, Germany conducted its third season in the north-west quarter of the ancient city of Gerasa, modern Jarash, in northern Jordan. On the basis of the results of the 2011 and 2012 seasons, which included architectural, geodetic and geophysical surveys and excavation of three trenches, it was decided to lay out five additional trenches in the 2013 season.[1] These were chosen to gain further insight into the settlement history of the north-west quarter of the city, which is the highest area within the ancient city walls and which since 2011 has been the focus of the team's research in Jarash. The project is directed by Achim Lichtenberger (Ruhr - Universität Bochum) and Rubina Raja (Aarhus University) and funded by the Carlsberg Foundation, Deutsche Forschungsgemeinschaft (DFG) and H. P. Hjerl Hansen Mindefondet for Dansk Palæstinaforskning.[2] We would like to thank the acting Director General of the Department of Antiquities, Fares A. K. Hmoud for the permission to undertake the 2013 season and the Director of the Department of Antiquities in Jarash, Dr Rafe Harahsheh for his support and the support of his staff during our season. Furthermore thanks go to our representatives Dr Mohamed Abu Abileh and Adnan Mujalli, who were an invaluable help during our season.

The principal aim of the season was to gain a more detailed insight into the settlement history of the hill. Additional aims were to extend the geodetic net of fixed points for further investigations and to map the remains of a trench excavated in 1982.[3] In total, five trenches D-H **(Fig. 1)** were laid out on top of the hill on its northern slope and in the large cistern on the southern slope of the hill.

Trenches D and E were excavated in order to investigate the Islamic period hamlet on top of the hill. Trench D was located at the east corner of the so-called 'Ionic Building'[4] to better understand the development of this prominent structure in the north-west quarter. Trench E was laid out some 30 m south-east of Trench D over the west corner of a Mamluk building to clarify broad north - south anomalies displayed in the magnetogram of 2011 and also to clarify the relationship between the so-called 'Ionic Building', the large terrace south-east of it and the buildings situated north of the terrace.[5]

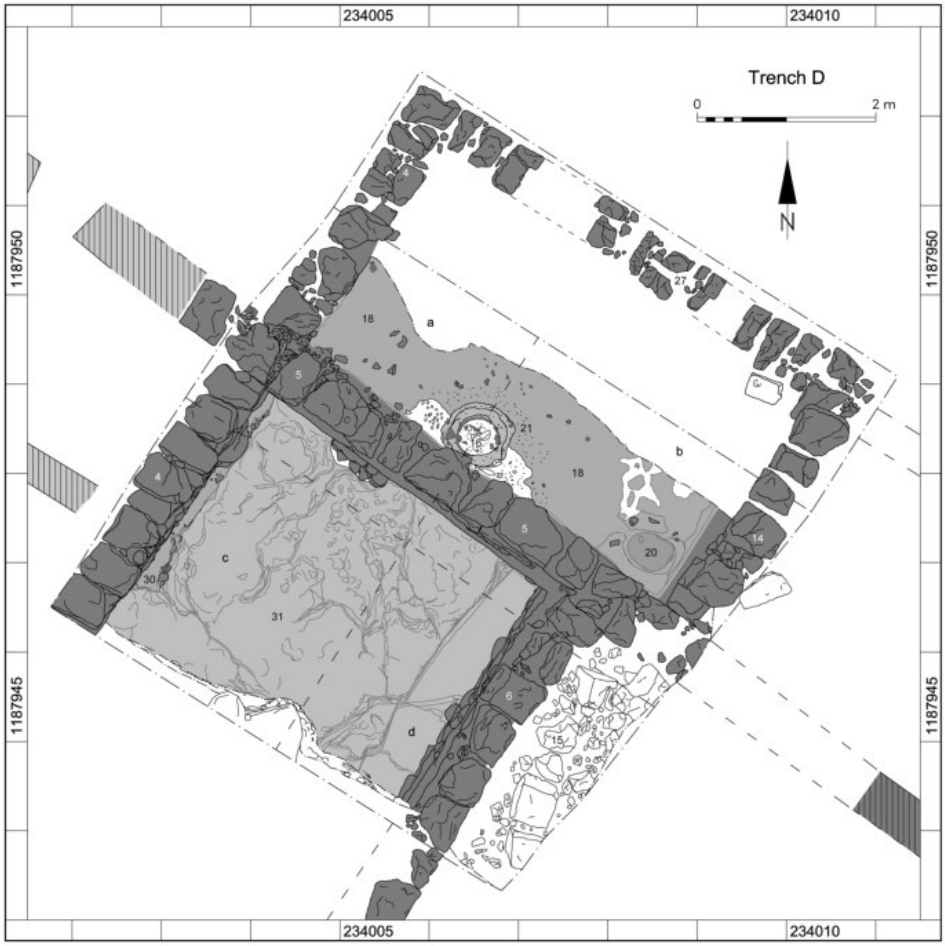
1. See Lichtenberger and Raja 2012, Kalaitzoglou *et al*. 2012 for the 2011 season and Kalaitzoglou, Lichtenberger and Raja 2013 and Lichtenberger, Raja and Sørensen 2013 for the 2012 season.
2. The team consisted of the two directors Achim Lichtenberger and Rubina Raja, head of the field team Georg Kalaitzoglou, head of the registration team Annette Højen Sørensen, architect Jens Christian Pinborg, conservator Helle Strehle, photographer Michael Benecke and the field and registration team: Dorothea Csitneki, Philip Ebeling, Eicke Granser, Anne Ditte Kougstrup Høj, Hans-Peter Klossek, Signe Krag, Signe Bruun Kristensen, Nadia Schmidt Larsen, Anders Meander, Anders Olesen, Cathrin Pogoda, Anne Riedel and Stefan Riedel. Holger Schwarzer (Münster University) analyzed all glass finds from the 2012 and 2013 seasons and the geologist Alf Lindroos (Åbo University, Finland) took mortar samples for Accelerator Mass Spectrometry (AMS) analysis.
3. Clark and Bowsher 1986. This trench was laid out in order to trace the course of the North Decumanus.
4. The name derives from spolia of Ionic capitals being incorporated within this building.
5. For the geophysical results see Kalaitzoglou *et al*. 2012.




*1. Plan of the north-west quarter with Trenches A - C (2012) and D - H (2013).*

Trench F was located in the large rectangular cistern on the southern slope of the hill. The aims of this trench and an additional sondage were to investigate the original use and later re-use of the cistern. Trench G was laid out on the northern slope of the hill, on the line of the presumed course of the North Decumanus, in order to examine the urban development of the north-west quarter and the North Decumanus within the urban system of Jarash. On the northern ridge of the hill Trench H was laid out south of Trench G in order to clarify the relationship between the built structures on the hill, the partly visible terracing of the sloping terrain, and the bedrock.

In 2013 a total area of 153 m² were investigated in detail and of this 137 m² were excavated to bedrock or until the oldest structures were reached. This was in line with the overall objective of the project which was to understand the chronological development of the area by reaching bedrock or virgin soil without removing ancient built structures. All trenches were backfilled at the end of the season. Although the relative chronology of the trenches was reconstructed, in most cases a refined absolute dating of the various features will be subject to further ceramic and artifact studies. The majority of the finds point to an overall Byzantine to Mamluk date. Nonetheless, a greater proportion of artifacts recovered in the 2013 season than in the 2012 season can be related to earlier periods (Hellenistic to Roman). A representative sample of the finds from the 2013 season is published in this volume of ADAJ (see Lichtenberger, Raja and Sørensen).




*2. Trench D: excavated structures.*

**Trench D**

*General Characteristics*

Trench D was laid out over the east corner of the so-called 'Ionic Building', measuring c. 5 m x 5 m and later extended to the north and east to c. 7.3 m x 6 m **(Fig. 2)**.[6] An area measuring 23.25 m2 was excavated to the deepest levels, 3.5 m² were investigated and documented at a superficial level. The chronological sequence in this area begins with quarrying traces of an indeterminate date (Phase 1) and with houses dating to the Byzantine to Early Islamic periods (Phase 2), followed by an extensive re-use and re-building in the Ayyubid - Mamluk periods (Phase 3).

The excavation of the west corner in 2012 (Trench C) demonstrated that the 'Ionic Building' was a roughly rectangular courtyard house of c. 465 m² constructed in Ayyubid - Mamluk times over buildings and other structures such as a cave - cistern dating to the Byzantine and Early Islamic periods. The main objective of Trench D was to further clarify the chronology and function of the complex. Furthermore it was an aim to understand the relationship between the older structures and a long east - west wall that is traceable on the surface for 75 m and seems to be part of the overall extensive terracing system, which characterizes the north-west quarter.

During excavation it became clear that the north wall (ev. 5)[7] did not stop at the east corner of the Ayyubid - Mamluk phase of the 'Ionic Building' but continued beyond it towards the east. Excavation showed that the Early Islamic phase, extended north of the later perimeter wall of the Ayyubid - Mamluk house. The

6. The trench supervisor was Stefan Riedel.

7. Instead of 'locus' or 'unit' we use the term 'evidence' to label archaeological complexes, assemblages and also finds *in situ.*

walls, including the north wall (ev. 27) of the earlier north room, were documented but the room itself was only excavated in the southern part adjacent to the 'Ionic Building'. The north room, which is fairly narrow, measured 4.75 m in length and 2.80 m in width, in total c. 13 m². In the earlier south room the southern wall could not be traced. Only a poorly preserved wall, visible on the surface, outside the trench's west corner might have belonged to this older construction phase. Thus the room would have measured 3.9 m in width and about 4 m to 4.5 m in length, of which 3.25 m were excavated.

*Phases 1 and 2*

The first traces of human activity in Trench D are the walls and faces of a surface stone quarry uncovered only in the south room (Phase 1, ev. 31 in Sectors C and D). The remains are more distinct than in the Trenches A and C, excavated in the 2012 season, where most often carved grooves and tool marks indicated quarrying activity. In Trench D quarry walls about 0.3 m to 0.5 m high and a stepped surface attest a quarry pit. The bedrock slopes towards the east, or was worked in steps in eastern direction. All later structures (Phases 2 and 3) were built over this stone quarry, and the north room (Phase 2) was set into a corner of the quarry walls, which gave the room its orientation, while the south room (Phase 2) was built over a 0.4 m to 0.8 m higher, and mostly unworked, part of the bedrock sloping from west to east.

The east - west wall (ev. 5) was in its first phase (Phase 2) erected on top of one of these quarry walls. It is obvious that the western wall (ev. 4) belongs to the same construction phase, because it is integrated with the east - west wall (ev. 5) and also forms the western boundary of the north and the south rooms. The perimeter of the south room (to the east) was formed by the wall (ev. 6), which runs against the east - west wall (ev. 5). However, it seems to have continued in a southerly direction for approximately 17 m beyond the trench limits, visible on the surface. The boundaries of the north room are the east - west wall (ev. 5) to the south, the wall (ev. 4) towards the west, the wall (ev. 27) to the north and towards the east the wall (ev. 14). All walls extending to the north are bonded at the corners and therefore were part of one construction phase. The east wall (ev. 14) was set against the wall (ev. 5) but not in line with the east wall of the south room, thus forming a slightly broader north room. Although both rooms belong to the same construction phase and are linked by the east - west wall (ev. 5) and the west wall (ev. 4) the plan of this oldest building complex is not strictly symmetrical. As far as we can see there was no access from one room to the other, neither through a door nor by a path, showing that we are dealing with independent architectural units, which were situated on different floor levels.

The masonry of the walls of the earliest buildings (Phase 2) has characteristic features, which are typical for this phase.[8] Unlike two-face masonry, larger blocks were used only on the outside faces, and on the inside rubble was set into clay, which was subsequently covered by plaster.

North Room **(Fig. 3)**

This room was found in an undisturbed condition. The long rectangular room, measuring c.13 m², was accessible from the north only through a 0.79 m wide door in the western part of the north wall (ev. 27). In the eastern part of the same wall a small (0.36 m wide) window gave light. On the inner wall faces and the inner sides of the door and window a smooth whitish plaster was partly preserved. The floor (ev. 18) was made of mortar and was unevenly levelled (between 624.68 m asl[9] and

8. The same kind of masonry was used for the earliest walls in Trench E and for the earliest house excavated 2012 in Trench C. A similar masonry was used for Building B of Stratum V in the Umayyad Citadel of Amman, see Ahn 2010: 20-22 (giving a date for Stratum V between 735 ± 10 years and the earthquake of 747-8 [correct 749 AD]). The Early Islamic wall W550 excavated in square D30 during the trial excavation at the railroad in Ramla shows identical features to ours. See Haddad 2010 with fig. 7 and 10.

9. 'Above sea level' refers to the Jordan geodetic net.



*3. Trench D: installation in the north room (view from north).*

624.77 m asl). In the south-east corner a small basin (ev. 20) was sunk 0.3 - 0.35 m into the floor and lined with mortar. The rim of the basin was raised slightly above floor level and it had two inflows, one from the west and one from the north. In front of the middle of the south wall (ev. 5) a round oven was excavated in situ (ev. 21). It was c. 0.25 m high and the upper part (neck to shoulder) was constructed of of a large storage jar (0.47 m diameter) which was set upside down into a round clay structure (c. 0.8 m diameter).[10] The clay was hardened by fire and the hearth was filled with ash and charcoal (ev. 16). The hearth was either used for cooking or was preheated for baking bread.[11] On the eastern side, between the hearth and the south wall a large iron knife (cat. no. 133, cf. report by Lichtenberger, Raja and Sørensen, this volume) was found in situ partly covered by the oven clay and the ash. The installations and the sparse inventory on the floor suggest that the north room functioned as a kitchen.

On the mortar floor (ev. 18) some coins but no intact vessels or greater amounts of broken pottery were found. The coins range from the mid-3rd to the 5th century AD but the associated pottery dates from the Late Byzantine to Early Umayyad period, giving a more realistic date for the structure.[12] The room was largely filled up with debris (ev. 13, 17, 19) containing not only stones of the collapsed walls and a homogeneous yellowish clayish soil but also large quantities of pot sherds, some Byzantine glass finds (a goblet foot, cat. no. 170, cf. report by Lichtenberger, Raja and Sørensen, this volume) and parts of broken roof tiles. However, the most recent finds date to the Umayyad period. Also, the basin was filled with the same material but contained two Roman coins, a bronze pin, a serpentinite spindle whorl, some pottery sherds, a fragment of a roof tile, two iron nails and two non-diagnostic iron objects, an iron key (cat. no. 132, cf. report by Lichtenberger, Raja and Sørensen, this volume) and two rounded stones. The preserved height of the walls (the south wall stands up to 2.9 m) and the large amount of homogenous fill indicate that this room originally had more than one storey and that the debris derives from the collapse of an upper storey. The fact that some sherds in the upper part of the debris are of Mamluk date and that some may date to the Abbasid period (ev. 13 and cat. no. 99 for example, cf. report by Lichtenberger, Raja and Sørensen, this volume) indicate a disturbance of this layer. The finds in the lower part of the debris cannot be dated later than the Umayyad period. Neither the walls nor the plaster on the walls and the floor show traces of repairs or restorations. Hence the construction of the room most likely took place not long before its destruction.

South Room

No entrance to the south room (which extended over a minimum of 13.40 m²) was found and owing to later disturbances (construction of Phase 3) no additional installations were preserved. A door might have been situated in the unexcavated south wall. Inside the room, remains of a plastered floor (ev. 30) were found,

10. As part of an original structure the jar was kept in situ.
11. This kind of clay oven belongs to the tabun oven types that were used through history not only for baking bread but also for cooking. For tabun ovens in general see McQuitty 1984 and Obeidat 2010.
12. Cf. for the problem of the discrepancy between the date suggested by coin finds and the date suggested by pottery: Lichtenberger, Raja and Sørensen (in this volume).

preserved only immediately adjacent to the west wall (ev. 4). This floor lay at an average of 625.54 m asl over a brownish clay (ev 32) similar to the residual clay, which earlier had been filled in to cover the sloping bedrock (ev 32) and to provide a more or less levelled ground. In the west corner of the trench the floor runs against the bedrock (625.76 m asl), which indicates that the bedrock was unworked and an uneven surface existed in the south room. It is clear that the floor belongs to the oldest building phase and that it was therefore contemporary with the floor of the north room. However, the difference (c. 0.8 m asl) between the floors reinforces the conclusion that there are different building phases and structures on either side of the east - west wall (ev. 5). No further archaeological features belonging to this phase (Phase 2) were found in the south room as the extremely invasive Ayyubid - Mamluk reconstruction included a razing of almost the entire area to bedrock.

*Phase 3*

Unlike the results of the 2012 season, there were no hints of a second Early Islamic building phase in Trench D which could have been contemporary with the construction and use of the cistern excavated in Trench C. Thus in this part of the complex the Ayyubid - Mamluk phase follows on stratigraphically from the Early Islamic phase. For the construction of the Ayyubid - Mamluk courtyard house the east - west wall (ev. 5) was used as the northern boundary of the entire complex. The east wall (ev. 6) formed its eastern limit and the southern part of the older west wall (ev. 4) was also reused. This is evident by a thinner wall visible on the surface, which was buin the west wall (ev 4) and another surface wall situated 4 m west of it. Thus the older walls were reused to form the east corner of the new building complex and forming a room on top of the earlier south room (Phase 2). The area of the north room was not integrated into the 'Ionic Building' and left untouched. On top of the debris (ev. 13) of the north room (Phase 2) the collapse (ev. 7) of the 'Ionic Building's' north wall (ev. 5) was found mixed with Ayyubid - Mamluk finds. This points to the conclusion that the terrain north of the Ayyubid - Mamluk house was much higher in Phase 3 than in former times (Phase 2).

When this part of the building was constructed in the Ayyubid - Mamluk periods the older floor (ev. 30, Phase 2) was removed and razed to bedrock **(Fig. 4)**. Thereafter it was deliberately refilled to a much higher level. On top of the refilled material (ev. 25, 26) and a fill layer of limestone gravel (ev. 24) a clay floor was laid out (ev. 23 and 29) c. 0.5 m above the older mortar floor.[13] This is confirmed by pieces of red-painted wall plaster that had fallen on this level (bottom of ev. 10 and 11). Pieces of multi-colored but mostly red-painted plaster were found still in situ sticking to all three walls. Pottery was found scattered sparsely on the floor level, but the decay deposits inside (ev. 10, 11, 8, 9 and 2)[14] and outside the room (ev. 7 and 15) were interspersed with roof tile fragments, pottery and some small finds. The youngest datable artifacts stem from the Mamluk period. In ev. 2, the upper part of the deposit, two handmade miniature-vessels were




*4. Trench D: the Ayyubid - Mamluk floor (ev. 23) in the south room (view from south).*

13. The average elevation of the surface is 626.03 m asl.

14. The evidences are given in the order from the deepest to highest position above the clay floor.

found, one with a lid (cat. no 117-118, cf. report by Lichtenberger , Raja and Sørensen, this volume). Worth mentioning are Ayyubid - Mamluk pottery sherds found in ev. 9 which join with sherds from Trench E (cat. no. 37, cf. report by Lichtenberger, Raja and Sørensen in this volume). In the north-west corner of the room the torso of an almost life-size marble statue of the Artemis Rospigliosi-type (cat. no. 146, cf. report by Lichtenberger, Raja and Sørensen, this volume) was found in the collapse. It had been dressed and reused as building material in the upper part of the north or west wall.

**Trench E**

*General Characteristics*

Trench E was laid out across the south-west corner of an Ayyubid - Mamluk house complex, north of the large courtyard and east of the 'Ionic Building', measuring c. 5 m x 5 m **(Figs. 5 and 6)**.[15] Later, the tops of the walls around the trench were cleaned and documented resulting in a sounding area of 29 m² and an excavated area of c. 20.5 m². Bedrock was reached in almost all parts of the trench, except in the north-eastern sector, where excavation was stopped on a paved surface.




*5. Trench E: excavated structures*

15. Trench supervisor was Cathrin Pogoda.

The main objective of excavating Trench E was to clarify the possible relation between the 'Ionic Building' and the Ayyubid - Mamluk complex. Furthermore, the date and structural context of the east - west wall (ev. 5 in Trench D) and tracing one of the c. 5 m broad, roughly north - south anomalies detected in the 2011 season in the geomagnetic survey were objectives to be clarified.[16] Four main phases were encountered in the trench and the chronological sequence established was as follows; Phase 1 - the first traces of human activity are the quarry marks which cannot be dated absolutely, Phase 2 - a north - south clay water pressure pipe, Phase 3 - several walls dating to the Byzantine to Umayyad periods with several subphases, and Phase 4 - Ayyubid - Mamluk structures belonging to a house complex.

Trenches D and E are related to each other, which is demonstrated by the nature of the evidence encountered. In addition to another large Ayyubid - Mamluk building the main corresponding feature was the continuation of the long east - west wall (Phase 3, ev. 5, but labelled in Trench E with evs 2 and 4a). This wall links the first traceable building structures (Phase 3 in Trench D) in both trenches over a distance of 24 m and thus allows the conclusion that in this phase (Phase 2 in Trench D) not only free standing isolated houses were erected on top of the hill but an extensive complex was planned and realized. The pressure pipe attests to a well-planned water supply system in this area.

*Phase 1*

The worked bedrock of a quarry was reached in the south-eastern part of the trench, c. 1.20 to 1.30 m below the surface (ev. 25 in Sector D, ev. 30 in Sector C and ev. 46 in Sector A) **(Fig. 6)**. In Sector A the trench was not excavated down to the rock surface as a paved floor dating to the pre-Ayyubid - Mamluk period was found and preserved. Visible are an east - west quarry wall and another quarry wall to the south (0.6 m wide). Later in Phase 3 the walls, evs 4a and 11, were constructed on top of these quarry walls. The latter quarry wall (under ev. 11) was cut on both sides and preserved to a maximum height of 0.6 m. As the difference in altitude between the west and east sides of this quarry wall is between 0.55 m and 0.6 m, stones up to a size of c. 0.5 m could have been quarried here. In Trench D the quarry wall under wall ev. 4 runs roughly parallel to the north - south oriented quarry wall in Trench E (ev. 11). Thus it can be assumed that organized quarrying activity took place on a large scale in this part of the north-west quarter. With an altitude of 622.26 m asl in the north and 621.96 m asl in the south the rock surface slopes approximately 10% towards south. The difference in altitude between the quarry surfaces measured more than 2.50 m from Trench D to Trench E and approximately. 6.50 m from Trench A (2012 season) to Trench E.

Although a natural hole in the bedrock (ev. 29) in the south of Sector C was carefully excavated to explore whether this could contain possible earlier material an absolute dating of the quarry in Trench E was not possible, as the hole only yielded small fragments of unidentifiable, worn pottery.



*6. Trench E: overview from south.*

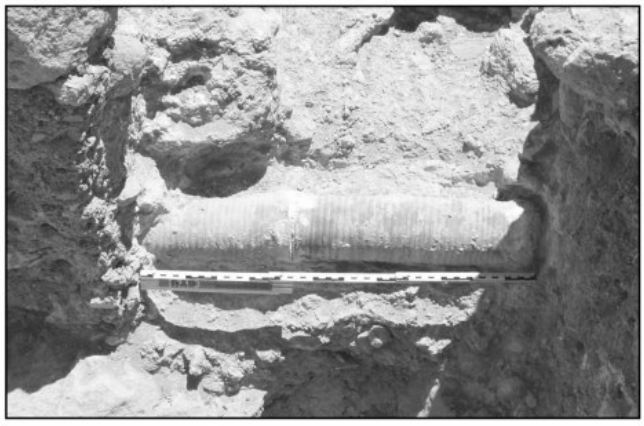
16. Cf. Kalaitzoglou *et al*. 2012.

*Phase 2*

After the use of the area as a quarry, a north - south pressure clay water pipe was constructed on the west side of the quarry wall (ev. 11) **(Figs. 7 and 8)**. It consisted of ribbed pipe segments with a length of c. 0.36 m and a diameter of 10.5 cm at both ends. They were connected with mortar of a very strong consistency. The pipe was also traced in the northern (ev. 53) as well as the southern (ev. 52) part of the trench. The pipe was situated on top of a 10 cm-thick fill (ev. 28 and ev. 50), which lay directly on bedrock and contained finds from Roman to possibly Byzantine times. The pipe was surrounded by another fill layer (ev. 47) and a mortar layer (ev. 57) on top of the pipe to protect it. In ev. 47, Roman and Byzantine pottery dominated the artifacts This assemblage was attached to the quarry wall (ev. 11) with mortar. Another later wall was constructed on top of the pipe and the quarry wall (ev. 11). The sequence in the north-western corner of Sector A shows that the clay pipe was constructed earlier than the walls of Phase 3. The surface of the clay water pipe and mortar construction constituted a floor level, which was older than the east - west wall (ev. 2) that connected the structures in Trench E with those in Trench D. As the northern face of this wall (ev. 2) was constructed on top of a 0.2 m earth fill (ev. 37 and ev. 41) above this surface it can be concluded that when it was constructed it respected the pre-existing water pipe.[17] Although the northern face of the wall ev. 2 was built on this fill, the southern face made of rubble was built on the rock. This shows that the wall ev. 2 was initially planned on bedrock and the heavy stones of the northern face were founded intentionally on a higher level above the water pipe. Although it was impossible to excavate the part of the southern wall face of ev. 2, which runs above the water pipe, without destroying other walls, it may be concluded that it was probably




*7. Trench E: clay water pipe (evs 52 and 53) crossing the trench (view from north-west).*



*8. Trench E: clay water pipe (ev. 52) (view from west).*

constructed over the water pipe (ev. 53) or at least left a gap for it. The 'floor' level belonging to the water pipe was destroyed and removed in most parts by the building activities of Phase 3. Parts of it and of the foundation fill (ev. 28) were preserved under later fill layers[18] only in Sector C, west of the southern part of the water pipe (ev. 52), as this area was not built over. The water pipe seems to run in a southerly direction against the natural slope.[19] A slightly disproportionate incline is not unusual for pressure pipes; later earthquakes could also have caused changes in the general inclination of the terrain. The dating of the water pipe has to await final analysis of the finds in the construction fills (ev. 28, ev. 47 and ev. 50) and the AMS-dating of the mortar samples taken

17. It is impossible to decide if the water pipe was still in use, but this would explain its protection.
18. Evs 13 and 27.
19. The difference in altitude between the northern and southern part measures 0.29 m in a distance of 4.75 m.

from the segment fitting of the water pipe ev. 52. The ribbed clay pipe is not datable with sufficient precision as these types of pipe are attested from the Early Roman period until well into Byzantine and Early Islamic periods.[20]

*Phase 3*

The walls of this phase formed a cross in the trench, with its centre below the south-west corner of the Ayyubid - Mamluk building complex. The wall ev. 2 originates in the west and connects the structures in Trench D with those in Trench E. Only its southern face rests on bedrock. The continuation of wall ev. 2 in an easterly direction is wall 4a. This wall can be traced over a distance of 4.5 m, of which 2.1 m were cleaned and excavated. The excavated part shows that the wall was erected on a quarry wall. The wall ev. 11 led from the south to the point of the wall intersection and continued as wall ev. 3a in a northerly direction for at least 4.6 m, 2.5 m of which were excavated. Whilst the southern part (ev. 11) was built on a quarry wall, the northern part (ev. 3a) seems to have been built on bedrock. This shows that the stone quarry formed an angle to the south-east between two quarry walls, which gave the orientation for the constructions of Phase 3. The walls of this phase formed four rectangular spaces with the center above the corner of this angle.

Doorways or connecting passages between these four units were not found in Trench E. This is the same situation as discovered in Trench D. Another comparable feature to Trench D is the difference in altitude between the floors of the rooms. This would also have hindered or prevented communication between them. In the south-east room the floor lay c. 1.1 m deeper than north of the wall ev. 4a and the later floor is situated c. 1.0 m higher as in the area west of wall ev. 3.[21]

The walls are built in the same technique as those in Trench D. In Trench E, however, the inner wall faces were constructed of rubble. It suggests a change in the building technique as well as building orientation used respectively in Trenches D and E.

South-East Room

Following the orientation of the stone quarry was a room that was excavated in the angle opening to the south-east, the walls of which (ev. 4a and ev. 11) rested on the quarry walls. The inner wall face and the bedrock were lined with plaster (ev. 40). The floor was mortared (ev. 24) and was only preserved in the south-eastern corner of the trench. It lay on a thin layer of brownish clay (ev. 26) that functioned as a type of foundation and to level the uneven rock surface (ev. 25). In the remaining parts of the room no mortar floor was found, only a layer of yellowish clay (ev. 20). This layer is either a later beaten earth floor or part of debris similar to those unearthed in the north room of Trench D. Given that wall collapse is missing in the south-east room and because it was intentionally refilled the collapse deposits must have been removed in later times.

So-called North-East Room

In the northern part of Sector B it was only possible to excavate a limited area of approximately 2.6 m² in the angle between the walls ev. 4a and ev. 3a. The stratigraphy in this area was partly disturbed by illicit digging and the collapse of heavy wall stones, but it was possible to identify two floors at different levels belonging to two different building phases. In the deepest level (c. 1.2 m to 1.3 m below the surface), a stone pavement (ev. 43) was found. The stone slabs were embedded into clay and mortar (ev. 55). A pavement was constructed against walls ev. 4a and ev. 3 and was covered by a thin layer of silty soil (ev. 42) which seems

20. Similar types of ribbed clay pipes were used in the Paneas aqueduct which was in use from Roman to Late Roman times (Hartal 2009: 37-38 [with table 2.8. for measurements] and pp. 105-106 [summary of the dating]).

21. The approximate elevations of the floor surfaces are 621.90 m asl in Sector D, 623.00 m asl in Sector A and 622.05 m asl also in Sector A.

to be a natural slump. This soil contained some pottery of Byzantine to Early Islamic date but no remains of wall plaster was found, which suggests that ev. 43 was the pavement of an open space or a lane situated north of the south-east room.

North-West Room

The area excavated in Sector A, north of wall ev. 2, measured only 1.3 m². For this reason only preliminary conclusions about the layout of this room are possible. As already mentioned wall ev. 2 was erected on a fill (ev. 37 and ev. 41) to respect the water pipe. Above this fill a layer of small stones (ev. 36) was laid out as a foundation for a thin mortar floor (ev. 35). Both layers abut the southern wall ev. 2. Although no plaster was found on the northern face of wall ev. 2 and the western face of wall ev. 3 could not be excavated, the mortar floor ev. 35 suggests that the area was an interior space in Sector A. A collapse of debris in Phase 3 could not be traced in this room. The latest finds from the floor foundation (ev. 36) date from the Byzantine period to Early Islamic times.

So-Called South-West Room

West of wall ev. 11 and south of wall ev. 2, an open space or courtyard appears to have been situated west of the south-east room as no traces of a floor or installation were found. The bedrock here was covered by layers of fill up to the modern surface. Of these, the lowest originate from the construction of the water pipe. The fill layers above them are rich in ceramics (ev. 13 and ev. 27) but they can hardly be distinguished from one another. They abut the water pipe (ev. 52, Phase 2) and southern side of wall ev. 2 (Phase 3), which demonstrates that this area was filled up to a level c. 20 cm above the water pipe in the third phase. Sometime later, two wall-like structures were erected on these fill layers. These structures are preserved to a height of one course only. Structure ev. 9 has a width of 0.65 m and was constructed to the west against the older wall ev. 11. It runs above the water pipe in south - north direction against the older wall ev. 2. Mortar was used as a binding agent at its base and between the larger stones. Another narrow (c. 20 cm) row of stones (ev. 16) was laid on the same level parallel to the northern part of the wall structure ev. 9. This structure is built without mortar but also seems to run against wall ev. 2. The gap between both structures was filled with soil and small stones. Whereas the wall-like structure ev. 9 could have served as additional protection for the water pipe, the structure designated ev. 16, cannot be explained in this way. Both structures must belong to Phase 3 or a later building alteration because they were covered by the fill layer ev. 10, which was found covering all of the area south of the Ayyubid - Mamluk building complex, and the collapse[22] of the Ayyubid - Mamluk walls was found lying on top of it. It is difficult to establish the function of another wall (ev. 2b), which is 45 cm thick and built from the south for a length of c. 1.5 m against the older wall ev. 2. This wall ran in an easterly direction over the structures ev. 16 and ev. 9 and stopped at the older wall ev. 11. Along its course the wall slopes distinctly. As it is neither a stairway nor a wall collapse an interpretation must remain open. Nevertheless it is clear that wall ev. 2b must be later than both the wall-like structures ev. 9 and ev. 16 because it was built on the fill layer ev. 27, which runs against these structures.

*Phase 4*

In Trench E only the south-west corner of the Ayyubid - Mamluk house complex was investigated. The construction of this building displays an effort similar to that undertaken for the construction of the 'Ionic Building'. Of the walls belonging to Phase 3 only the southern wall ev. 4a and north - south wall ev. 3a were reused. This means that the south-east corner of this

22. Trench H: excavated structures

later building was situated above the intersection point of the older cross wall. It appears that the older walls were not strong enough to offer full support and therefore the southern and the western walls were supported by an additional wall face **(Fig. 9)**. Against the southern wall a 30 - 40 cm thick wall face (ev. 4b) was constructed in the interior of the building. Its foundation fill (ev. 38) was laid over the remains of Phase 3. Above this foundation a simple clay floor (ev. 22) was constructed and was later covered by the collapse of the younger building (ev. 5, ev. 17 and ev. 21). The simple floor and absence of wall plaster suggest that it was a courtyard or a stable, rather than an internal room. This room was situated in the south-west corner of the Ayyubid - Mamluk building. The outside of the western building limits was strengthened by a wall face (ev. 3b) of c. 60 cm thickness. It was not possible to excavate the western wall face completely but the sequence of deposits in this sector proves that the exterior area had been refilled (ev. 31) and protected by a dense layer of stone packing (ev. 12). The top of this packing probably corresponds to the street level outside the building to the west. This is indicated by the wall debris which more or less correlates with the modern surface that scarcely covered the east - west wall ev. 2. An apparently large-scale levelling and filling event had taken place south of the building complex as well. Both the unused area in the south-western part of the trench and the south-east room (ev. 10, ev. 14, ev. 18 and ev. 19) were deliberately filled up to the preserved height of the older walls (Phase 3). Noteworthy in particular is the deliberate fill in the south-east room (ev. 18 and ev. 19) which is remarkably deep, directly above the clay layer (ev. 20) and contains large amounts of pottery. The composition and condition of the pottery is similar to the Early Byzantine to Early Islamic pottery found in 2012 in Trench B. As this fill was rich in pottery and was concentrated at the east baulk of Trench E, it is likely that it extended in an easterly direction. West of the older walls, ev. 11 and ev. 9, a corresponding concentration of pottery is absent, although large numbers of mixed sherds were found. Above these fill layers the collapse of the Ayyubid - Mamluk house was found.[23] This kind of constructional effort outside the building complex can only be explained if the large courtyard measuring 50 m x 28 m and extending south of the Ayyubid - Mamluk building complex was built in this phase. To achieve this it would have been necessary to level the older building structures and to fill in the terrain up to the requisite level. A construction project like this could only have been realized through greater than household-level organisation. Partners in such a project could have been the residents of the 'Ionic Building' that limits the court to the west. Not only were both buildings linked by the reuse of the same older walls and by their positioning at the large courtyard, but also by a join found between potsherds (cat. no. 37) in the Ayyubid - Mamluk debris in Trench D (ev. 9) and Trench E (ev. 17).




*9. Trench E Sector B: foundation fill (ev. 38) under Ayyubid - Mamluk wall ev. 4b (view from north).*

## Trench F

*General Outline and Structures*

Trench F was positioned to investigate the large rectangular cistern on the south slope of

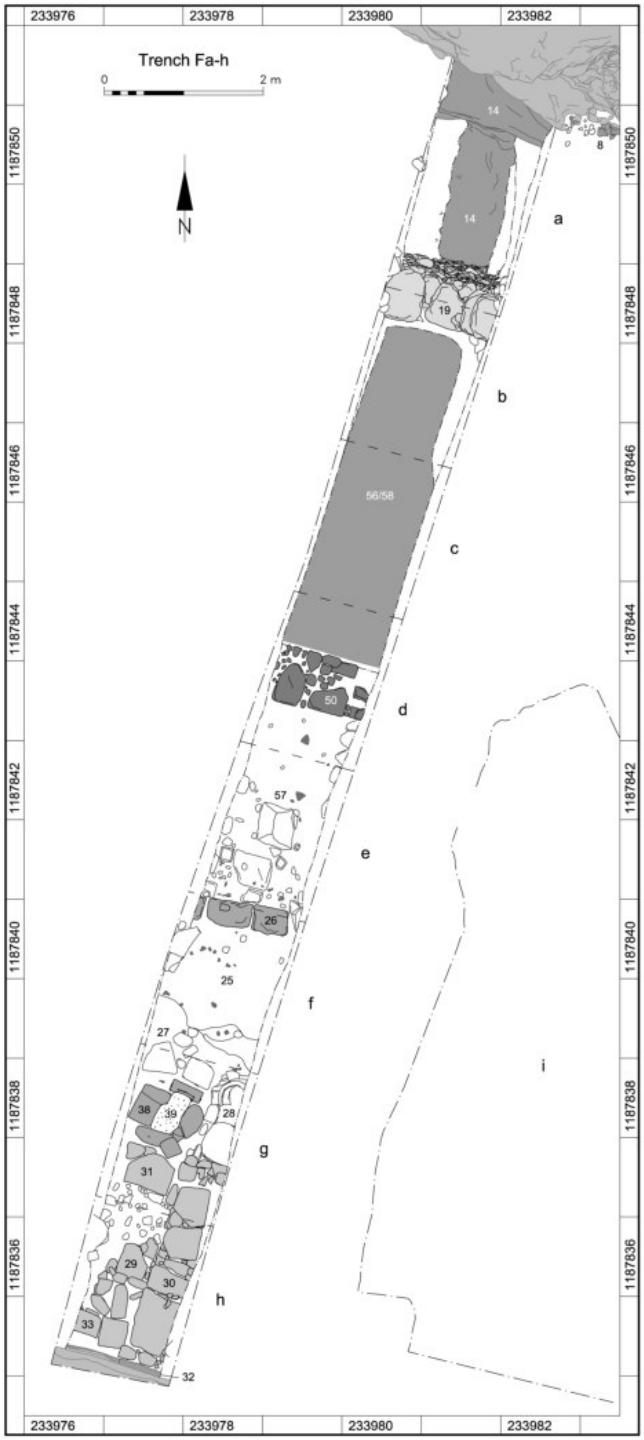
23. The evidences in stratigraphic order are evs 48, 49, 5, 17, 21(partly), 6, 8, 33 and 32.

the hill.[24] As it is the largest water reservoir inside the walls of ancient Gerasa and is situated high above the valley in the north-west quarter this structure is of special importance for understanding the water supply of the city. A trial trench[25] 17 m long and 1.5 m wide (c. 25.2 m²) was laid out in the eastern part of the cistern from north to south to gain insight into the building technique **(Figs.10, 11, 12 and 15)**. One aim was to clarify whether a sediment basin could be detected along the northern side of the cistern. An additional cistern discovered in 2012 in a karst cave under the south-eastern part of the rectangular cistern also required further investigation in order to understand the chronology of the cistern's various phases. This cave was lined with mortar and accessed from the surface by a well pit and well head. Owing to the collapse of the cave ceiling, the cave cistern became accessible from the south-east corner of the rectangular reservoir. A thick plaster lining sealed the inner surface of the large cistern. Excavation of this area (Sector I) was intended to locate the well head visible inside the cave, to explore the function of the rectangular walling and to clarify the chronological relationship between both cisterns.

The larger cistern was filled with rubble and waste from the surrounding walls and buildings



*10. Trench F: overview from south.*




*11. Trench F Sectors A - H: excavated structures.*

and showed evidence of considerable reuse **(Fig. 13)**. The secondary use of large cisterns as a site for the construction of other buildings is

24. Trench supervisor was Anne Ditte Kougstrup Høj. For the large cistern cf. Lichtenberger and Raja 2012.

25. This trench was sectioned from north to south in Sectors A - H, each 2 m in length.

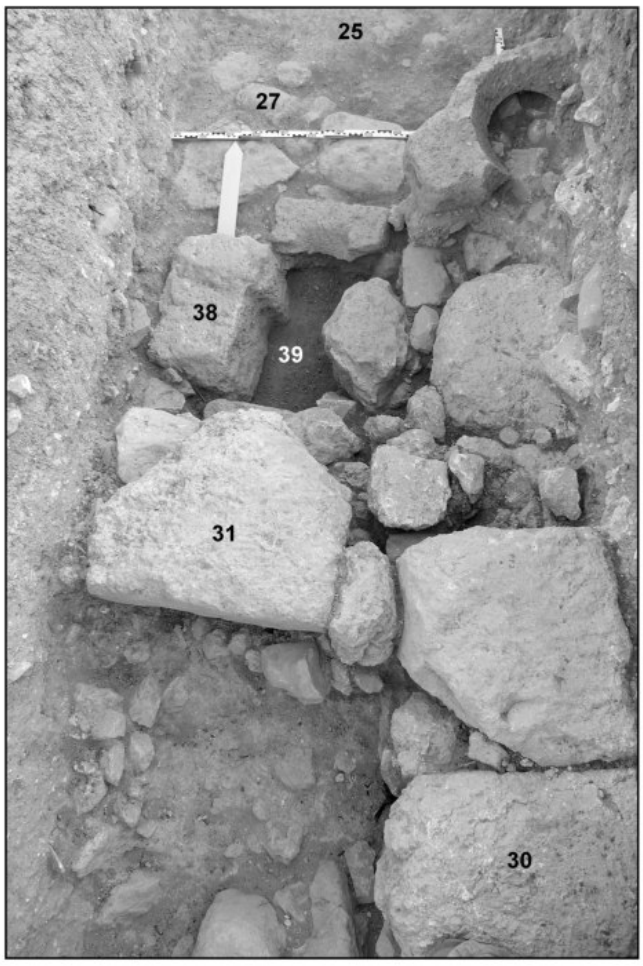



*12. Trench F Sector I: excavated structures.*

occasionally attested in the region.[26] During our investigation, no evidence for a sediment basin was found. The cistern was probably constructed around 100 AD and was in use until at least the 5th century AD. After this, the cistern was used as a construction site for other buildings, along with the smaller cave cistern under the large cistern. This secondary phase of use continued until around the Byzantine to Early Islamic periods when all structures were intentionally covered.

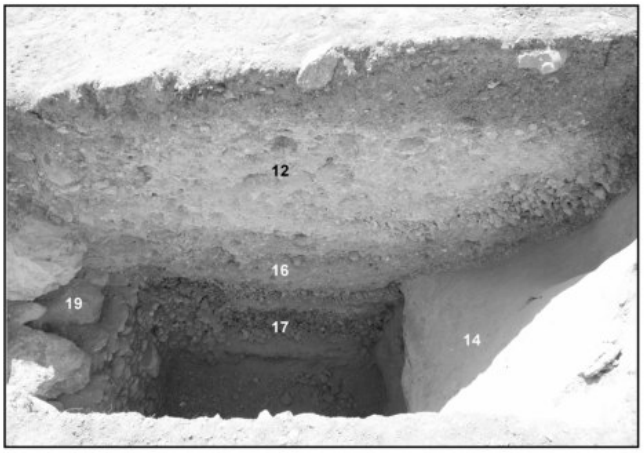
In the northern part of the trial trench (Sector B), a dry masonry wall (ev. 19) was found standing directly on the mortar base of the cistern (ev. 14) **(Fig. 14)**. The wall was relatively thin but measured 3 m in height and continued for an indeterminate length parallel to the northern rock edge, which constitutes the northern limit of the large cistern. Further south, two much lower walls (ev. 50 and ev. 25) were discovered in the trench under debris. These walls were roughly east - west orientated and continued for a distance of c. 2.5 m parallel to each other. In the southern sectors of the trench further wall structures (ev. 26 and ev. 33) were unearthed, associated with a clay floor (ev. 25) and an oven (ev. 38) and partly built against the southern rock wall **(Fig. 13)**.

Sector I in the south-east corner of the large cistern yielded numerous multi-phase structures, which are mostly connected to the use of the cave cistern under the older rectangular cistern. Parts of these structures include an older wall (ev. 3), built against the southern rock face, and an open rectangle of walls (ev. 2 and ev. 5) that encloses both the collapsed cave ceiling and an open karst cave under the eastern rock face **(Figs. 12 and 15)**. This wall enclosure separates the south-east




*13. Trench F: floor (ev. 25) and oven (ev. 38) in Sector G (view from south).*

26. Cf. e.g. the later reuse of the Bethesda pool in Jerusalem: Gibson and Dauphin 2011.




*14. Trench F Sector A: fill north of wall ev. 19 (view from east).*

corner containing the open caves from the rest of the large cistern. Furthermore a well head (ev. 44) was found above the cave cistern, which was surrounded by a semi-circle of walls (ev. 37 and ev. 43) that obviously was erected over an older structure (ev. 36) with similar function.

Owing to the fact that a space of 1.8 m between the trial trench and the south-eastern Sector I was left unexcavated, it is not possible to link the structures in both parts directly. For interpretation and dating we have to rely on the finds and comparison with other contemporaneous, similar structures. Excavation of this area is one of the future aims of the project.

*Large Rectangular Cistern*

The cistern measures c. 40 m x 18 m and is surrounded on all sides by double-walls built on top of the bedrock. The southern rock wall is covered in a compact lime mortar, while the south and east walls show signs of vertical tool marks. The northern face has no such traces of tool marks. The bulging surface is lined with a compact but relatively soft mortar plastering (ev. 8 and ev. 14), which in Sector A is in its original condition. Clefts and small natural cavities were in filled, as in the case of the small karst cave (ev. 6) directly north of Sector A. This cave was filled at first from above with large stones (ev. 13), which were found to lie on a fine soil (ev. 11), most likely washed in. Finally the horizontal opening to the south was closed with mortar. Remains of this mortar (ev. 7) were found on both sides of the opening. The fill in the karst cave served as a foundation for a wall situated on the northern rock edge. At the northern side of the cistern, traces of quarrying were documented predating the construction of the cistern.

The base of the cistern is not even but rises towards the north-eastern and south-eastern corners. Its average elevation is c. 611.35 m asl. The deepest point identified so far is situated above the collapsed cave and is approximately 0.5 m deeper (610.80 m asl) than average. In order to calculate the reservoir capacity, maximum fill level is needed. At 614.70 m asl, the top of the eastern and southern rock walls are approximately the same height, but the northern rock cliff and the walls on it are standing up to 2 m higher (616.00 m to 616.83 m asl). The western limit of the cistern is critical in this regard; it has a height of 613.40 m asl and gives a maximum depth of c. 2 m. This, roughly estimated, gives a minimum capacity of 1,440 cubic m for the cistern [27], which could be greater if the south and the west side were further built up with a walled enclosure. Although part of the north side has an elevation of more than 2.5 m above this filling level, this side was completely lined with mortar. This might point to the fact that water flowed into the cistern from the north. How this worked in detail is not yet clear as a sediment basin has not been found in the cistern and the bedrock of the northern side remained unworked, thus the water could have flowed in from the north following the slope gradient. Only further excavation in future seasons can answer this question.

Currently the dating of the cistern is an open question. Carved grooves and quarry marks on the walls at different levels at the north side of the cistern show it to be later than the quarrying in this area. Compared with features found around the much later buildings on the

27. This is about 25% more than calculated on base of the surveyresults. See Lichtenberger and Raja 2012.



*15. Trench F Sector I: well head over cave cistern (overview from east).*

top of the hill, a date compatible with the later occupational phases of the north-west quarter is most likely. The only way of dating the building of the cistern is via the mortar lining. Thus, during the 2013 season, 22 samples were taken by Alf Lindroos (Åbo University, Finland) from six stratigraphically relevant points inside and outside the cistern for refined radiocarbon dating by AMS.[28] Even though it seems too early for final conclusions, some preliminary observations can be made. One of the samples already dated stems from the mortar lining from the south side of the cistern in Sector H. [29] Against this mortar, walls evs 30 and 33 were built in a later phase when the cistern was used for domestic purposes. This sample provides the surprisingly early date of 73 - 215 AD with a narrow margin of error. Another sample[30] from the south side was taken from the mortar covering the wall ev. 3 in the south-east corner of the cistern, against which more recent wall ev. 5 was built. It gives a very limited but highly precise date of c. 100 AD, which concurs with the first assay. The first sample comes from a place where the mortar plastering is only one layer thick and where there are no visible repairs, indicating that the date should correspond to the first mortar lining of the cistern. The second sample, however, could stem from a later repair with very similar mortar. A third date comes from the north side of the cistern. The sample originates from a strong but thin layer of mortar on the rock surface west of Sector A.[31] Inclusions of tesserae hint at a later date. A date of 328 - 428 AD was given for this sample and confirms that it belongs either to a repair or a renewal of the mortar lining. That such an event took place 200 to 350 years after the first plastering implies that the large rectangular cistern was in use for this entire time span or even longer, well into the 5th century AD.

The large water reservoir on the south slope is one of the oldest constructions unearthed in the north-west quarter of Gerasa and seems to have played an important role in the water supply from the early 2nd century into the 5th century AD. Since no other structures of this period have been found in the north-west quarter it remains an open question as to who was supplied with water from the cistern. Further excavations will hopefully clarify the possible connection between the cistern and the pressure water pipe discovered in Trench E, which leads in a southerly direction to the cistern. The early date for the cistern also suggests that the traces of a stone pit at its northern side are older than the cistern or at least contemporary with it.

*Later Use of the Large Rectangular Cistern*
Sectors A - H

It appears that the northern half of the cistern remained free from building activities. This may have been for safety reasons, as the northern rock cliff is about 5.5 m in height. The use of the cistern interior seems to have started with the construction of a 0.5 m high platform above the base. Wall ev. 50 comprises its northern limit. This was probably erected to protect the structures from water collecting in the cistern during rain. The structures were set into the platform or were built on it. To the north of this platform is a

28. All samples will be analysed by means of a grant from the Carlsberg Foundation. Three samples have been dated already.
29. Sample no. J13-F-S-M-7.
30. Sample no. J13-F-S-M-16–19.
31. Sample no. J13-F-S-M-3.

simple floor (ev. 56) that formed the base of the older cistern and was repaired from time to time with small stones and mortar. About 2.5 m south of wall ev. 50 is another wall (ev. 26). It is only 30 cm thick and is made of one course of stones laid in a row. Its east - west orientation is slightly different from wall ev. 50. Wall ev. 26 seems too thin to have been used as a building wall but towards the south an associated clay floor (ev. 25) was found, which points at an interior space on a slightly higher level (10 cm) than the northern part of the platform. The superstructure may have been constructed of mud brick or wood but, in the very limited area excavated, conclusive traces were not detected. The floor foundation (ev. 27) consisted of stone packing which contained an integrated oven (ev. 38) **(Fig. 13)**. The oven is roughly rectangular and made of four stones, of which one is a reused grinding stone. The oven was found filled with ashes and charcoal (ev. 39). A little to the south, a wall corner (ev. 30 and ev. 31) was built on a fill layer consisting mostly of stones above the clay floor (ev. 25). The walls abut the plastered rock wall (ev. 32) in the south. Another thinner wall (ev. 33) is built parallel to the rock wall and abuts the north - south side of the wall angle. This wall is also built on the stone packing and should therefore be part of the rectangular structure above the clay floor. The space between walls evs 31 and 33 measures only 1.6 m, seemingly too narrow to have been a living space. More probable is that it was an enclosure for a staircase parallel to the rock wall that gave access to the cistern's interior. The observation that the structure is set against the southern rock wall at a higher level than the other structures favours this interpretation. All these structures were covered by fill layers[32] and, in front of the southern rock face, also by the collapsed walls (ev. 10 and ev. 20) on top of it. The latest pottery from some of these fill layers (ev. 23 and ev. 29) seems to date from the Late Byzantine to Umayyad periods, perhaps giving only a slightly earlier date for the covered structures.

The most recent structure unearthed in the trench is wall ev. 19 which was found in Sector B, c. 2 m in front of the cistern's north side **(Fig. 14)**. This wall, erected immediately over the mortar base (ev. 14) of the cistern, was preserved to a height of 3 m with a thickness of only 0.55 m. It is constructed of dry-stone masonry using smaller stones in the lower parts, many no more than fist size, but with larger blocks in the upper courses. No traces of mortar were detected as a binding agent or lining for the wall faces. This fragile stonework, proportionately too thin for its height, would not have been able to stand on its own and probably was not meant to apart from its upper course which was built of large boulders (ev. 15). This wall achieves stability only from the deliberate tipping of fill against it on its southern side. In the north the wall is supported by an extremely loose fill of rubble (ev. 12, ev. 16 and ev 17), which was filled in several places up to the tops of the walls and contained pottery only in the lower parts. The upper layer consists of almost pure lime gravel (ev. 12), the origin and function of which remains unclear. The loose tipping on the north side is completely different from the fill layers to the south of wall ev. 9. These contain more soil and layers of large stones, and are more compact.[33] The deposits in the south cover every structure in the trial trench, giving a stratigraphically confirmed later date for the fills. The most recent finds identified so far in the lowest of these layers (ev. 52) date from the Byzantine to the Umayyad periods. On these layers, parts of wall ev. 15 were found to have fallen in a southerly direction, perhaps as a result of erosion. Most probably wall ev. 19 was constructed gradually whilst the surroundings were filled in. The fact that the wall is standing on the mortar base proves that this part of the cistern was cleaned out prior to construction. Without further

32. Evidences 21 - 24, 29 and 51.

33. The evidences in stratigraphic order are: 15, 21, 40, 52 and 51.

research we can only conjecture about the function of such an extensive building project

Sector I **(Figs 12, 15 and 16)**

The oldest built structure in the south-east corner of the cistern is the abovementioned wall ev. 3. It is built against the southern edge of the cistern and is lined with mortar plastering (ev. 4). According to preliminary dating, the wall could belong to the earliest phase of the cistern, even though its orientation is c. 1.7 m north of an ideal straight southern boundary line. After the cistern fell out of use as a water reservoir, a wall one course thick (ev. 5) was built against the mortar lining (ev. 4) of older wall ev. 3. The wall face was built of larger stones and faces north, while the mortar was kept in good condition behind the wall core on the south side. Another wall (ev. 2) is connected to wall ev. 5 and diverges from it to the north. The wall (ev 2) is built of two stepped faces and is placed directly on the uneven base of the cistern. Gaps were managed with stones and soil. Owing to the building technique and its low height, it is unlikely that this wall could be an installation dating to the time the cistern was in use. A wall to the north corresponding to wall ev 5 seems to be absent, but could have disappeared during the course of later construction activity. It appears that these walls enclose the collapsed ceiling of the cave cistern from two sides. This could represent the first use of the cave cistern and there is perhaps a connection with the joist supports along the eastern rock face, above the mouth of the horizontal karst cave. Some smaller walls diverge from this rectangular wall enclosure in a westerly direction, but it is still unknown how they correlate with the structures in the trial trench.

At some point either contemporary with this enclosure or slightly later, the cave was converted into a cistern and the vertical well shaft was sunk. A round millstone was set on top of the shaft as a well head (ev. 44). This well was encircled with a mortar floor (ev. 55) laid on the mortar plastering of the large cistern (ev. 1) up to the well head. A short wall segment could belong to this first phase of the cave cistern; it was unearthed 0.9 m north-west of the well head and is aligned roughly north - south, but owing to later building activity and the limited area excavated a direct relation with this phase cannot be proven.

At a date after this first phase a second phase is attested in which the well was used. In this second phase the mortar floor (ev. 55) was covered with a layer of sandy fill (ev. 49); on top of this a poorly constructed wall (ev. 37 and ev. 43) was built in the shape of an irregular three-quarter circle around the well head. Thus, fill layer ev. 49 served both as a foundation for the walls and as a floor. The latest pottery in the feature dates to the Byzantine to Umayyad periods, giving an earlier date for the first use of the well. In this phase the cistern was supplied with water via a square channel (ev. 54) made of stone slabs and mortar **(Fig. 16)**. The channel was partially sunk into the later floor (ev. 49) or was built at the same time on the mortar floor (ev. 55) of the preceding phase, effectively placing it between the well head and the eastern corner of the wall enclosure (ev 43). This indicates that the channel was built after the enclosure. From this corner the channel continued almost vertically to the upper edge of the rock face, where a square rock-cut channel supplied it with water. Owing to the fact that the northern and eastern parts of the enclosure wall (ev. 43) were set against and into the debris and fill in the cistern, it seems that the structures of this phase belong to the latest levels excavated in the large cistern. A relationship between the extensive filling operations and wall ev. 19 may be possible but cannot be demonstrated at this time. In any case it is certain that the remains of this last use phase were covered by deliberate infilling; the well head (ev. 44) was closed with a large stone and the surrounding area filled up with a stony fill (ev. 46). Above this, another fill layer (ev. 53) interspersed with stones was found, covering all the wall structures. Since the latest finds are Byzantine to Umayyad in date, the last use of the well cannot have lasted long. Above this infilling, only surface rubble (ev. 2) was encountered.




*16. Trench F Sector I: rock-cut channel and channel ev. 54 (view from west).*

The concentration of millstone fragments in the cistern is remarkable. In other parts of the north-west quarter, fragments of millstones were rarely found. In the fill layers above the remains of the occupation phases, not only numerous small fragments were found but also a large broken capstan mill (in ev. 24), fragments of a stone mortar and the handle fitting of another capstan mill (ev. 40). Fragments of a quern were built into oven ev. 38 and in the older wall ev. 36 in Sector I. Even the well head (ev. 44) was made of a round millstone. No mill or grinding stones was found intact or *in situ*. The finds include simple grinding stones, fragments of slewing querns (of so-called Olynthian type) which are known from the 4th century BC and - like the round querns of Roman times (of which some fragments also were found) - can be operated by a single person. We can add some fragments and larger parts of broken capstan mills (miliaria), which have to be processed by two persons or by mules. Such a concentration of different types of milling stones for flour, representing different stages of technical development, seems to be a unique feature of the north-west quarter.

**Trench G**

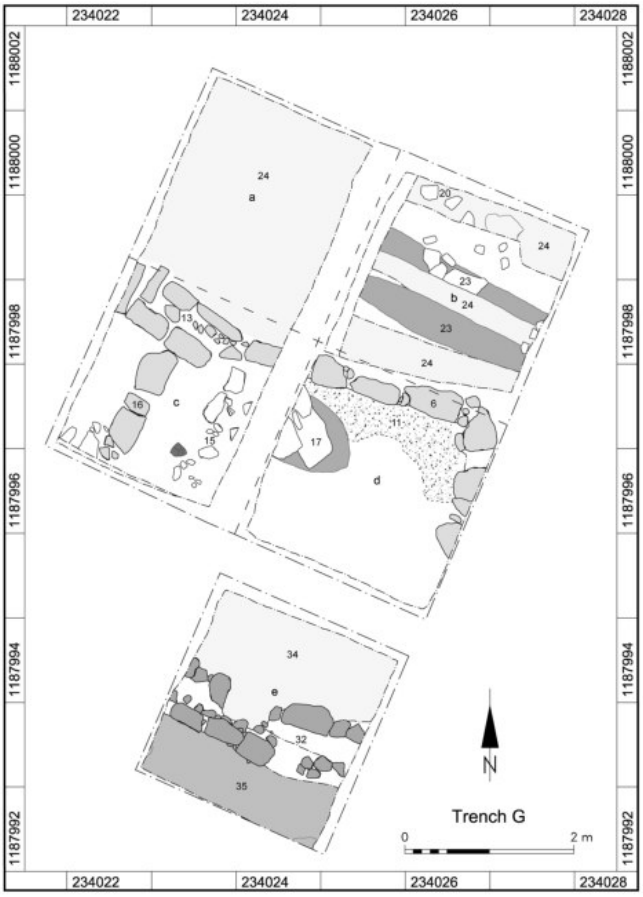
*General Outline and Structures*

This trench was excavated to investigate the North Decumanus that was assumed to continue from the northern Tetrapylon in a westerly direction to the supposed North-West Gate **(Figs. 17 and 18)**. The positioning of Trench G is the result of an ideal hypothetical line between the visible eastern end of the North Decumanus north of the North Theater and the supposed position of the north-western city gate. The latter seems to have been indicated by a later wall blocking the gate and find spots of inscription blocks that can be related to the gate.[34] In 1982, excavations were undertaken further to the east on this supposed alignment by an Anglo - American team; these reached bedrock in places but yielded only ambiguous results.

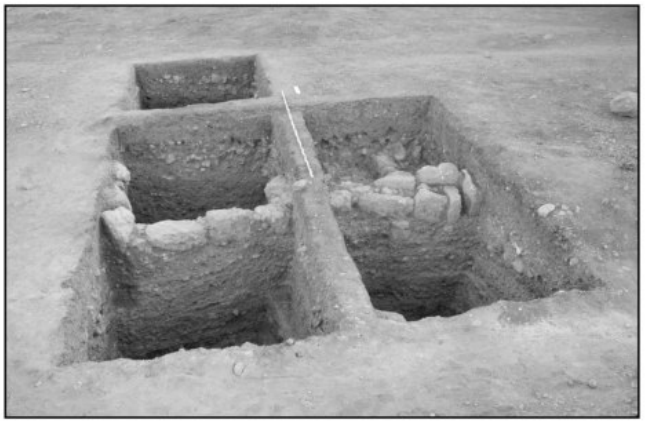
To track the possible course of the North Decumanus, a 5 m x 5 m trench was laid out and later extended towards the south by means of an additional sector (Sector F).[35] In total c. 31.6 m² were explored with a north to south extent of 8 m. Apart from Sector C, in which excavation was blocked by the structures exposed, virgin soil or bedrock was reached in all remaining sectors. In the northern sectors, virgin soil was reached approximately 2.6 m below the ground surface (approximately 3.4 m in the southernmost

34. C. B. Welles in Kraeling 1938: 397-398. It was never doubted that limestone fragments forming a flat arch might be the lintel of a North-West Gate. The topographical map by C. S. Fisher (Kraeling 1938: plan I) shows the North Tetrapylon connected with the supposed North-West Gate by a street that shifts southwards and is not linked with the Cardo at a right angle.

35. Trench supervisor was Anders Olesen.




*17. Trench G: excavated structures.*



*18. Trench G: overview from north.*

Sector F). This difference in elevation mirrors the modern ground surface and not ancient levels. The numerous strata located between ground surface and virgin soil result mostly from anthropogenic activity and to a lesser degree from natural processes of erosion and deposition. Between the fill layers, mostly modest structures were found; these can be attributed to three phases. Moreover they indicate that this area was always free of dense construction and was only used occasionally. It is clear that the North Decumanus never reached this western area, which has an impact on our understanding of the urban expansion of Roman Gerasa in this area.

*Phase 1*

The first discernable utilisation of this area is evidenced by east - west wall ev. 32 in Sector F **(Fig. 20)**. This wall was built of coarse stones and consisted of two wall faces resting on different levels (c. 65 cm above bedrock; c. 1 m above virgin soil); only one course was preserved. The wall rests on dark fill layers (ev. 33 and ev. 28) originating from the north, the colour of which derives from organic inclusions such as charcoal and olive pits. The fill layer (ev. 33) south of wall ev 32 did not display such prominent stratification. An associated surface was not detected. In the adjacent Sector D and in the northern Sectors A and B similar fill layers were encountered, some of which contained considerable quantities of organic material, as well as concentrations of stones, mortar and occupation debris.[36] Intentional structures could only rarely be identified within the fill or else could not be interpreted properly, e.g. two flat mortar lines (ev. 23) in Sector B that run parallel to each other and converge near the east baulk, where they abut some stones **(Fig. 21)**. In most cases we have to deal with features that are not easy to interpret, e.g. mortar pile ev. 21 that was surrounded by an earth fill. Surprisingly, this fill yielded numerous tiny coins displaying signs of exposure to heat. According to their position and orientation, the fill layers and debris layers seem mostly to come from a northerly direction. The pottery is mixed but includes numerous well-preserved sherds of Roman date. The most recent artifacts so far identified in the earliest levels (ev. 28 and ev. 33) might date to the

36. Evidences from Sector D include: 28, 22 and 26. Evidences from Sector B are: 21, 23 and 20.

Abbasid period, but some could be even Ayyubid or Early Mamluk. Therefore, all fill layers and the structures above them must be later, with the finds of Roman date being later intrusions.

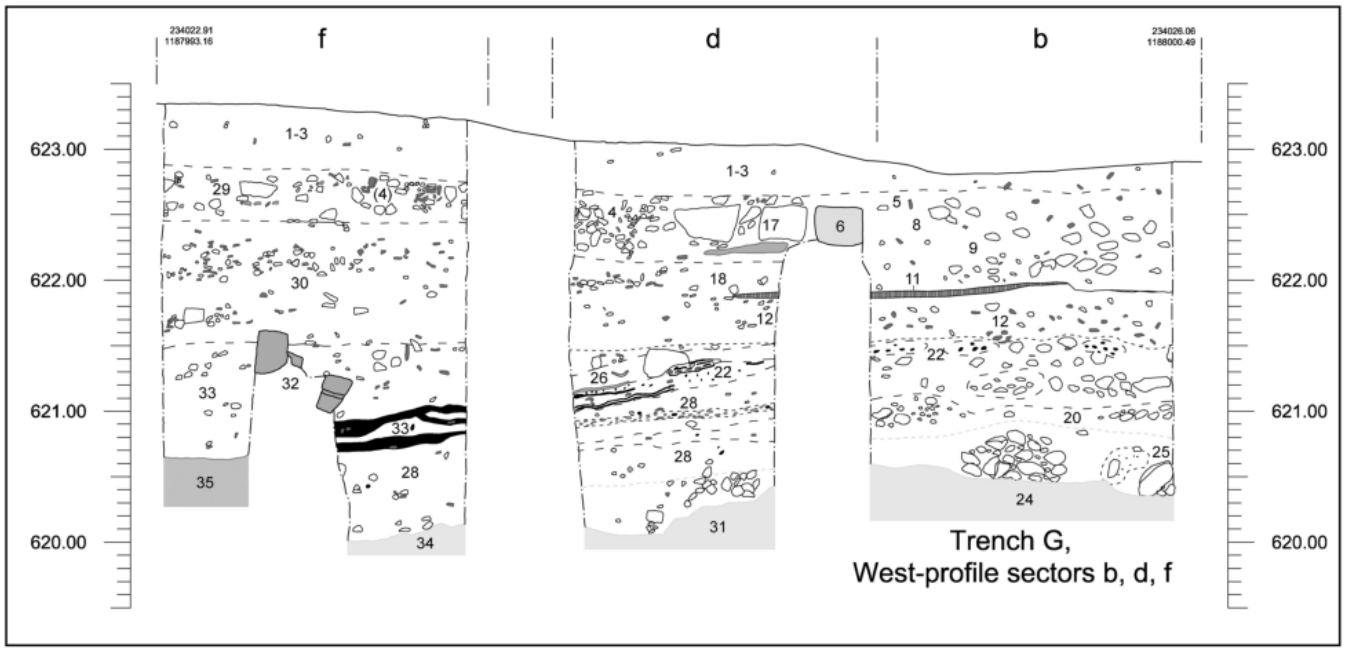
The simple wall structure ev. 32 was covered with further fill layers containing occupation waste (ev. 30) up to the structure's foundation in Phase 3.

*Phase 2*

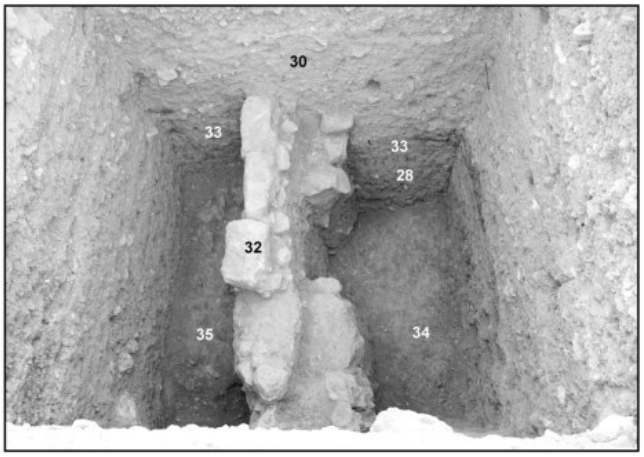
An ordinary earth road is the main feature of the second phase. This was found above the fill layers, described above, crossing the northern Sectors B and A from east to west **(Figs. 19 and 21)**. To it belongs a thick very compact foundation layer (ev. 12), which was deposited above the deeper fill layers. This foundation deposit is interspersed with large amounts of small pottery sherds, of which some are of Middle Islamic Green Ware and of Mamluk wares, which appear to be the most recent. A thin whitish layer of lime gravel (ev. 11) sealed the road. In Sector A it was less well preserved than in Sector B and in Sector D it disappears under the younger structures of Phase 3. Thus, the width of the road can be only be estimated as c. 1.4 m. The compact foundation layer (ev. 12) was detected in all three sectors. As is visible in the west baulk of Sector B, the surface of the road rises towards the north, which could indicate a strong use or a long useful life that caused the wear and could also explain the strong compression of its foundations.

*Phase 3*

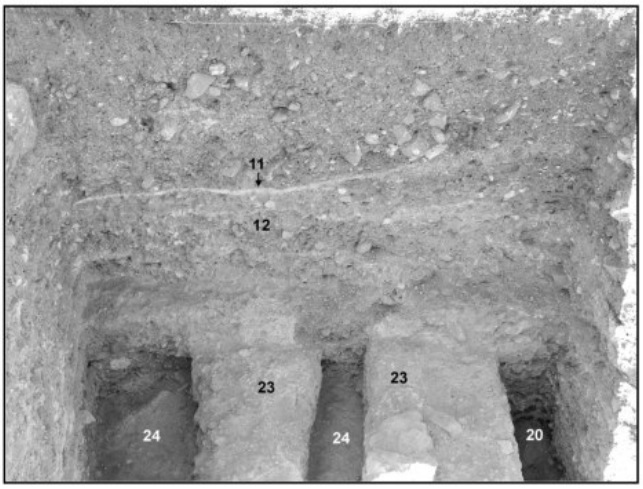
Only 50 to 60 cm under the surface, a wall crossed Sectors C and D from west to east; in front of the eastern baulk it turned in a southerly direction. The wall comprises two sections, built in different techniques but interlocked. Whereas the eastern wall (ev. 6) is made of larger oblong stones that are arranged in a row, the western wall (ev. 13) is constructed of the same kinds of stone but laid in two faces. The wall was founded on a soil fill with embedded mortar 'bands' (ev. 18 and ev. 17) c. 30 to 40 cm above the Phase 2 earth road (ev. 11 and ev. 12). It was most probably not a wall belonging to a building, since the wall was only one course high and the area south of it was backfilled with a stone and clay packing. In Sector C another wall (ev. 16) was found within the terrace running from the south and abutting wall ev. 13, meaning that it was built later. The wall probably belongs to a compartment system in the interior of the terrace. It was backfilled (ev. 15) to the top not only with soil but also with medium-sized




*19. Trench G: west section of Sectors B, D and F.*




*20. Trench G Sector F: Phase 1 wall (ev. 32) (view from east).*




*21. Trench G Sector B: earth road in the west section (view from east).*

stones, roof tile fragments and larger sherds. It is similar to the stone packing (ev. 4) lying on it and abutting the terrace wall (ev. 6 and ev. 13). Fills with similar compositions were found in many contexts even in deeper levels, but they seem to concentrate in the northern sections of the trench.

In summary, Trench G attains its importance more from the features that were not discovered than from the features that were. The full length of the North Decumanus was not determined, but the excavation results illustrate that in the vicinity of Trench G it never existed.[37] Also a possible city gate becomes dispensable in the presumed location and we need to reassess the form and dimension of the northwestern part of Roman Gerasa within the city walls.

For reconstructing the palaeo-environment and the ancient ground level trench G provides us with the following information: In the trench the uneven surface of the virgin soil measures in the north 620.45 m asl, in the center 620.30 m asl and 620.00 m asl in the south. Because the bedrock reaches 620.65 m asl at the southern end of sector f the softer virgin soil shows a gentle base slope towards south, but, this is balanced by the bedrock. A more or less horizontal ground level is also indicated by the deep sounding in trench H about 10 m away, where the top of the virgin soil was reached at 619.90 m asl. The outcome of this is an almost plain terrace north of the cliff in trench H that declines towards east. This situation was the result of heavy erosion processes, which washed away older layers, and apparently took place sometime before the Middle Islamic period.

**Trench H**

*General Outline and Structures*

This trench was laid out to explore the northern slope of the north-west quarter **(Fig. 22)**.[38] Of special interest was the building history and function of the terrace and retaining walls of which some parts, belonging to different building phases, were already visible on the surface. It was expected that the northern boundary of the hill, exposed to erosion in particular, would have had a special retaining system. Furthermore the trench was intended to establish a link between Trench G lying 20 m to the north and last year's Trench B, some 25 m to the south-east. Hence a trench, 3 m wide and at first 6 m long, was excavated downslope and later extended 1 m towards north for a deep sondage. The area explored measured in total app. 19m². In contrast to what was expected, massive retaining constructions were not found but instead there were indications of a common

37. The same situation was encountered re. the South Decumanus: Gawlikowski 1986: 109; Zayadine 1986: 8.

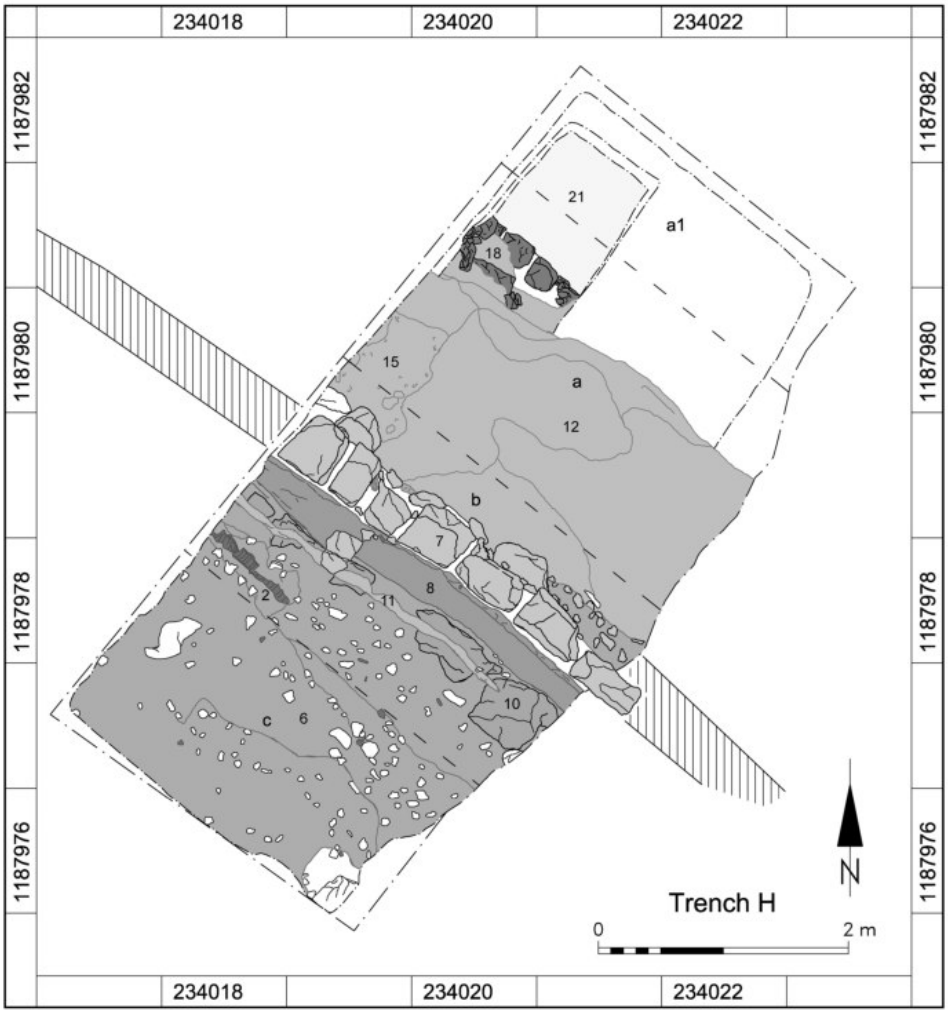
38. Trench supervisor was Stefan Riedel.

water supply, in the form of a covered canal and a pressure pipe running along the edge of the slope **(Fig. 23)**. The deeper northern part of the trench yielded important new results for the morphology of the ancient topography. With an elevational difference of c. 7 m between virgin soil in the north and the retaining walls in the south, this turned out to be much steeper than the modern terrain **(Fig. 24)**. The unearthed area of bedrock, standing relatively high up, shows no traces of quarrying. The soft, raw rock does not seem to have been suitable for quarrying in the same way as the bedrock exposed in other trenches. The evidence in the deep sondage of Trench H and in Trench G shows that the geological situation changes to the north. No solid rock was found in the deepest levels, but instead there was a solidified yellowish deposit containing a natural aggregation of gypsum. In places this deposit is interspersed with solid rock. Based on these results, the northern limits of the large quarry should be situated somewhere upslope, further to the south.

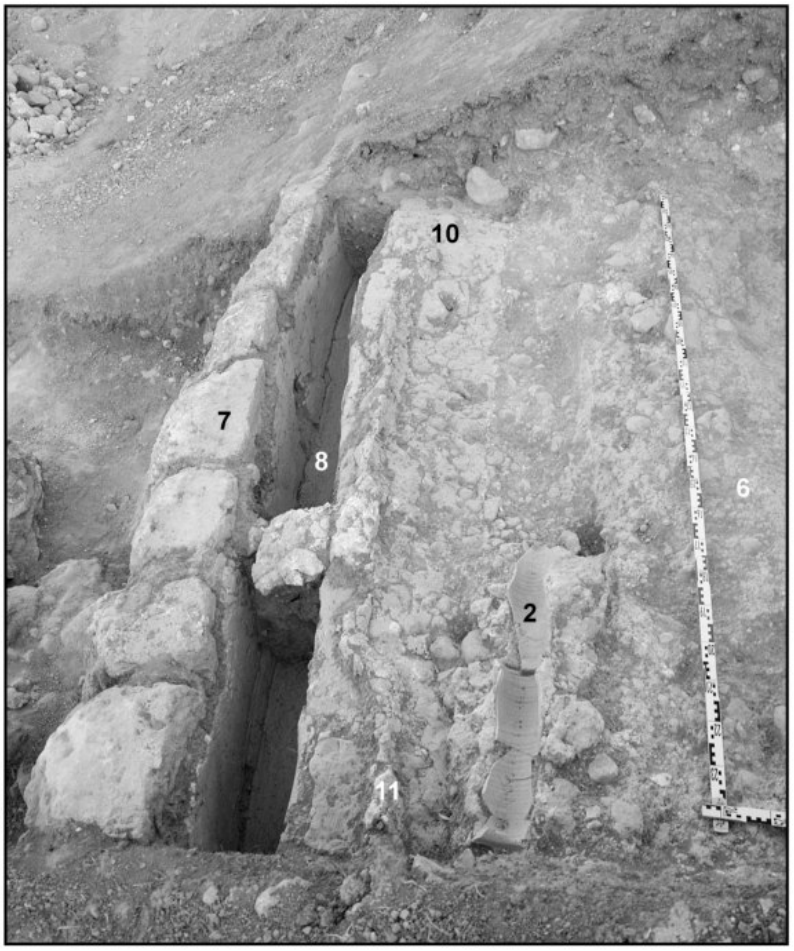
The water pipes seem to have been in use until the Byzantine or Early Islamic period. The same is true of the supporting wall at the northern edge. Some finds from the erosional fill at the north side point to some kind of occupation of the north-west quarter during the Hellenistic period.

*Water Pipes*

Close to the slope, an uneven mortar surface was excavated (ev. 6), apparently running along the slope edge and extending further south **(Fig. 23)**. It was covered by mixed layers of debris (ev. 1, ev. 3 and ev. 4) with a depth of 0.9 m, of which the upper parts seem to have been deposited in recent times. The northern boundary of this




*22. Trench H: excavated structures.*




*23. Trench H Sector B: retaining walls and water pipes (view from west).*

mortar surface is a well-built ashlar wall (ev. 10) that is also visible at some points on the slope outside the trench. That the wall and the mortar surface are linked to each other suggests they are largely contemporaneous, but that wall ev. 10 was constructed first. At a later date a rectangular water canal (ev. 8) was built from the north against wall ev. 10, running from north-west to south-east along the edge of the slope. To build the canal, another wall (ev. 7) was constructed 30 to 40 cm from the northern face of wall ev. 10. This more ordinary wall has only one face and was founded on the low-lying and uneven rock (ev. 12) using mortar. The canal emerging between the walls was dressed with 3 cm thick plaster and measures 27 cm in width and 45 to 48 cm in depth. In the 3 m wide section, the canal has an inclination of between 8 to 10%, which seems to be too steep for the design. It was covered by small stone slabs applied into mortar (ev. 11) at both ends; the mortar bedding and one covering slab have been preserved.

Later, approximately 0.5 m south of the canal a clay water pipe (ev. 2) was placed on the mortar surface (ev. 6) in segments and with dimensions similar to the pipe discovered in Trench E. Because the water pipe was found directly under the surface, only its lower half was preserved in the west of the trench, however more fragments and distinct traces on the mortar surface indicate that the water pipe clearly ran along the slope. Its position on the mortar surface, embedded in a thin mortar layer, demonstrates that the water pipe is later than the canal and that the pipe must have been covered with at least soil to protect it. A buff clay deposit (ev. 5), found in places as a thin layer above the mortar surface, could originate from such a fill. Thus, it becomes clear that the mortar surface (ev. 6) is not only older than the clay water pipe but

was also taken out of operation and backfilled.

For the moment it is not possible to suggest precise dates for these features, but the pottery found in the fill of the canal (ev. 8) is predominantly Byzantine to Umayyad, with an unpainted Mamluk sherd. In addition, in the buff clay layer (ev. 5) we found primarily Roman pottery, but also another unpainted sherd that seems to be Mamluk in date. That said, neither the canal nor the covering fill of the water pipe are compatible with a Mamluk date. It is most likely that in this exposed position, erosion processes are responsible for the accumulation of chronological mixed material.

*Deep Sondage*

The bedrock (ev. 12) above and south of the deep sounding was covered with eroded material (ev.9). In the deep sondage, a wall with one face was found (ev. 18) built against the steep rock slope, apparently to support and cover it **(Fig. 24)**. Wall ev. 18 rests on virgin soil (ev. 21) at 620.12m asl to 620.17 m asl and was preserved to a height of 1.55 m. As visible in the west baulk, its upper part had collapsed but some remaining stones give an original height of c. 2.35 m. An associated occupation layer was not found. The wall base was surrounded by a 65 cm thick foundation layer (ev. 20) consisting of soil and stones, with relatively numerous pottery sherds embedded in it. The most recent artifacts in this foundation layer date from the Late Byzantine to Umayyad periods, providing a terminus ante quem for the wall. North of the wall (ev. 18), the virgin soil lies about 10 cm (619.90 m asl) deeper than under the wall itself, giving evidence of the erosion processes taking place even after the retaining wall was erected.

The area north of the cliff yields indications for a turbulent erosion history. It is filled with numerous layers[39] of material washed downslope and the collapse of wall ev. 18, all accumulated at the foot of the cliff. The finds in these layers are chronologically mixed but the oldest material, dating back to Hellenistic and Roman times (cat. no. 1-3, 5-7, 43, 154, cf. report by Lichtenberger, Raja and Sørensen in this volume), was discovered in the uppermost layers. This is both an indicator of inverted stratigraphy and evidence for occupation on the top of the hill in the earliest phase.

## Concluding Remarks about the Sequence of Building and Use Phases Within the Excavated Areas

The results of the 2013 excavation season enable us to trace the history of the north-west quarter back to the Roman and perhaps also the Hellenistic periods. The large cistern is Roman in its original layout and was used until at least the earlier Byzantine era, when it was reused for other purposes. A correspondingly early date could match the system of clay water pipes discovered this year that certainly predated the Early Umayyad structures on the hilltop[40]. This also would imply an earlier date for the open stone pit on the hill that is the earliest activity thought to have taken place in the north-west quarter. The absence of a Roman North Decumanus in this area must be taken as an opportunity to reconsider the Roman city plan and the role of the north-west quarter within the city.

We now know that the north-west quarter was




*24. Trench H Sector A1: upper part of the deep sondage (view from east).*

39. Evidences 13, 14, 16, 17 and 19.

40. For a preliminary study of the water supply of Gerasa see Seigne 2004.

occupied during the Byzantine period, but in the Early Islamic period a large-scale building complex is encountered in which rooms were arranged along a central wall on the crest of the hill. In this phase intensive building activity seems to have taken place. Although some very rare finds of the Abbasid and following eras are also present in small amounts, the next major building phase dates to the Ayyubid - Mamluk period.

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# The Danish-German Jarash Northwest Quarter Project 2013
# Preliminary Registration Report

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## Introduction

The present report highlights a relevant number of objects from the 2013 campaign.[1] The first part of the report will be devoted to the general characteristics of the five trenches, the pottery and small finds from these trenches as well as give a summary of the general find assemblages of the 2013 campaign. Included at the end of this report are two shorter reports on the glass finds from the 2012 and 2013 campaigns by Holger Schwarzer and the find coins from the 2012 and 2013 campaigns by Stefan Riedel.

During the six weeks of campaign the registration registered a total of about 120.000 objects. This corresponded to around the same amount as during the 2012 campaign. Of these a total amount of 1.923 objects were basis-registered (described, drawn, and photographed) and furthermore several finds were conserved. As during the 2012 campaign all finds were processed and this registration report thus represents the entire corpus of objects excavated during the 2013 campaign. The catalogue which contains 180 objects discusses the general features within the assemblages as well as some more characteristic objects. Emphasis is on the installations in trench D described below and in the field report by Kalaitzoglou, Lichtenberger and Raja in this volume due to the nature of the context and the finds from the trench.

The object groups found during the 2013 campaign are similar to the 2012 campaign object groups in number and general shapes. However, from the 2013 campaign a much better representation of Roman period objects is observed. A small amount of pottery, which could be taken to be Abbasid, has come to light. However, due to the stratigraphical lack of Abbasid evidence these pieces probably need to be attributed to the Late Umayyad phase. This conclusion shows that our detailed stratigraphic observations contribute to a better chronological understanding of the development of pottery in the Early Islamic periods as well as the dynamics concerning continuity and change between the Umayyad and Abbasid periods.

## Trenches

On the basis of the overall so-called "total registration", which is the initial sorting process applied to the material, an attempt has been made to quantify certain ware groups in the material from the 2013 campaign.[2] The statistic is presented below in tables 1-5. The distinct groups of Ayyubid/Mamluk painted and unpainted Islamic Glazed wares, Green Ware, Grey Ware, Reddish/Red-brown Ware, Jerash Bowls, Orange Ware, Roman Red Slipped

1.Acknowledgements: We wish to thank John Lund and Jakob Munk Højte for the valuable input on the red slipped pottery, Frauke Kenkel for discussions and input on pottery wares and Ingemann Schnetler, Claus Heilmann-Clausen, and Walter Friedrich for input on fossils and geology. Christoph Eger gave valuable advice on the metal finds. Furthermore we would like to thank the DFG (Deutsche Forschungsgemeinschaft) as well as the Carlsberg Foundation and the H. P. Hjerl Hansen Mindefondet for Dansk Palæstinaforskning for their financial support for the project.

2. During the last days of excavation it was however decided to dump un-counted material after washing in order not to leave behind a backlog. Only material from already well-known evidences was dumped without sorting.

Wares (note that the ESA, ARS and other local and imported wares are grouped together) and Hellenistic Black Glazed have been selected in this quantifying process for presentation in the catalogue. Buff Ware and other Abbasid-Ayyubid wares (which will be elaborated upon in the final publication) have been grouped together in the tables presented below. With the reservation for possible counting and calculation errors a table showing the percentages of these ware groups in the total amount of objects has been made separately for each of the trenches (D-H) below.

**General Characteristics of Trench D**

The total number of pottery [3] found in Trench D is 4.933. Of these 3.45% were kept. The number of registered objects is rather high from this trench which is due to the high amount of well-preserved objects and the intact installations in the trench (cf. below and field report, this volume).

The larger part of the pottery material which is not represented by **Table 1** was made up by various, yet undescribed, coarse and ribbed plain wares, in total counting 3058 pieces. All types of fine wares are listed in the table and the scarcity of these fine wares, apart from the Middle Islamic "Hand-Made Geometrically-Painted Ware" (HMGPW)[4] is noteworthy. As the south room of the trench belonged to a Mamluk house the relatively high amount of Ayyubid/Mamluk finds is not surprising.

The material from the uppermost evidences of trench D is a mix of Ayyubid/Mamluk pottery of the HMGPW and unpainted Ayyubid/Mamluk and earlier wares. The following evidences have yielded Ayyubid/Mamluk wares: 0, 1, 2, 7, 8, 9, 10, 12, 13, 24, 25, 29 and 32.

Apart from the intact installations in the North Room, described below, the evidences in the trench are mostly mixed and it was also possible to make a join between the trenches as an Ayyubid/Mamluk base in two pieces was found fragmented respectively in trench D evidence 9 and trench E evidence 17 (cat. no. 37).

*North Room*

Trench D has yielded a room with intact installations – the North Room (cf. field report this volume) as well as a much more destroyed room to the south.

Of specific interest in relation to the North Room is the fact that Ayyubid/Mamluk finds have not been detected below evidence 13; neither have any identified Abbasid objects. In evidence 13 (a fill layer above the intact installations) a small amount of wall plaster was found and some Grey Ware which likewise carried traces of plaster.

The date of the installations in the North Room, the oven/tabun and the basin is judging by the fill Byzantine or perhaps early Umayyad as indicated by a Jerash Lamp handle (cat. no. 52) found in evidence 16 (the tabun). The oven/tabun itself was constructed from a hand-made pithos with an attached (wheel made?) rim (cf. also registration report) placed up-side-down. The few sherds from the pithos which was examined in the registration seem to be of a handmade

**Table 1**

| Ayyubid/ Mamluk HMGPW | Ayyubid/ Mamluk Undecorated | Abbasid-Ayyubid | Islamic Glazed | Grey Ware (Byz-Uma) | Reddish /Red Brown ware | Jerash Bowls | Red Slipped Fine ware (Rom-Byz) | Unspecified (mainly coarse and ribbed wares) |
|---|---|---|---|---|---|---|---|---|
| 2.62% | Max. 5.43% | 1.05% | 0.06% | 20.54% | 8.05% | 0.08% | 0.18% | Max. 61.99% |

3. Excluded from this total number are bricks, tiles, water pipes, suspensura, and terracotta figurines.

4. Johns (1998).

(grey?) ware pithos. The fragments analysed in the process of registration were undecorated. However a grey ware sherd from a hand-made storage jar with combed decoration was located. The coins, glass, the key and the pottery found in and around the North Room installations (ev. 16-19 cat. nos.175-177, 166, 132, 23, 65, 84, 142, 144) date to the Roman-Byzantine-Umayyad periods. There is no evidence which stems from earlier periods. The large blade (cat. no. 133), which was found against the wall behind the tabun has a parallel from Ein Boqeq and it does seem reasonable to date it contemporary with the use of the installations in the room due to its position on the floor of the room. The finds from the North Room thus tentatively indicate a use not later than the Umayyad period.

*South Room*

In the south room of trench D Ayyubid/Mamluk undecorated pottery was found in evidences which continued until bedrock (evidence 32 being the lowest evidence level). In the lower strata it mainly consisted of unpainted handmade body fragments and was mixed with Early Bronze Age (cat. no. 180) and later material. The torso of an Artemis Rospigliosi type marble sculpture, cut in the shape of a wall stone, was found in the collapse from the wall. It had formerly been used as a stone in the wall in the room along. It was found along side Ayyubid-Mamluk material and painted wall plaster (cat. nos. 146, 34-38, 40, 117-118, 148-149).

Primarily in evidences 10 and 29 fragments of wall painting were uncovered. The decoration consisted mainly of parallel bands of different colours (red, yellow, black, blue, and pink) and varying width. The quantity of wall plaster was rather high in evidences 10 and 29 and some of these fragments were painted. Ayyubid/Mamluk pottery from evidences 10 and 29 were joined (cat. no. 36) and it is most likely that the plastered and painted fragments from the two evidences belong to the same building phase (cf. field report this volume). Mamluk wall paintings are in general scarce in the Levant.[5]The paintings uncovered in trench D are very fragmentary and it has not been possible to join any fragments or distinguish any ornamental decoration. A few fragments do, however, attest to lines in different colours and the use of string impressions, which are normally used as guidelines in the paining process.

Evidence 30 held remains of an older plastered

5. The best preserved Islamic paintings are the famous Umayyad Qusayr Amra paintings from Jordan (Ettinghausen (1962). Recently fragments of Umayyad paintings from Gabal Says (Bloch (2011) have been published and the elaborate floor and mural paintings from shahr-e Gur in Iran are also well known (CAIS – the Circle of Iranian Studies: *http://www.cais-soas.com/News/2006/February2006/19-02.htm*). In Syria the Umayyad palace of Qasr el-Heir el Gharbi (Schlumberger (1986) has yielded figurative wall-paintings. Later examples of Arab paintings do exist, especially the paintings in the palace at Samarra, Iraq has yielded rich figurative decorations from the Abbasid period. (Ettinghausen (1962). In the Cappella Palatina of Palermo, Sicily, dated to the mid 12th century ceiling paintings are very well preserved (Ettinghausen, (1962), pp. 44-50; Ettinghausen (1942); Racioppi (2014): *http://www.discoverislamicart.org/database_item.php?id=monument;ISL;it;Mon01;10;en and cp* ). The technique used for these are however tempera on wood. The paintings of Cappella Palatina were most probably executed by a (Fatimid?)Arab painter by order of the Norman ruler, Roger II. The city of Cairo in Egypt has likewise yielded figurative paintings from the rule of the Fatimid Caliphate e.g. in a hammam in Cairo (Cruikshank Dodd (1997/98), p. 270, fig. 17; Ettinghausen (1942), fig. 23-24).However, during the Abbasid, Fatimid, Ayyubid and Mamluk periods figurative paintings are primarily known as miniature paintings used as book illustrations (Cf. Ettinghausen (1942); Ettinghausen (1962)). According to Watson one of the churches in Pella was decorated with paintings (Watson (2008), p. 459) and the monograph by Cruishank Dodd concerned with the medieval painting primarily from the Crusader Period during the reign of the Mamluks likewise emphasise the Medieval Christian church paintings (Cruikshank Dodd (2004); cf. also her 1997/98 article for the Christian Paintings in the Lebanon). Arab architectural decoration was generally focused on e.g. calligraphy and the ornamentations in e.g. the *Beveled Style* and other nonfigurative ornamental styles. This pattern, however, does not exclude the existence of not non-figurative murals.

floor (cf. registration report in this volume). Fragments of plaster were also uncovered in evidence7. These were, however, thick and unpainted and may also stem from a plastered floor.

Towards the lower parts of the south room just above bedrock a rather homogenous fill of unpainted, thick walled, handmade vessel fragments were found. The fill in evidence 25 was mixed with a coin, a few glass fragments and a few wheel made ceramic fragments. The material mostly consisted of undiagnostic fragments, but a date in the later medieval period seems reasonable for this context. For this reason it is included in the relatively high percentage of undecorated Ayyubid/Mamluk handmade pottery in the table above.

**Trench E**

Trench E yielded a large amount of pottery; in total 38.199 sherds were found but only 0.61% was kept, a total of 234. The objects represented in **Table 2** are, as above in **Table 1** concerning trench D, chronological markers – especially fine wares and the remaining group of mainly plain and coarse wares are grouped together and shown in the last column. A similar approach has been applied to all the tables. The amount of fine ware is even scarcer here than in Trench D and the majority of the material consisted of ribbed plain wares primarily of the Byzantine-Umayyad period. One part of the trench seems to have been filled with the same kind of dump as seen in trench B during the 2012 campaign that is a Byzantine-Umayyad fill consisting primarily of ribbed plain wares (see Lichtenberger, Raja and Sørensen in *ADAJ* 57.

Ayyubid/Mamluk pottery has been located in the following evidences: 1, 7, 8, 10, 14, 17, 32 and 49 – most evidences are located in the upper layers of the trench and the amount of Ayyubid/Mamluk pottery is rather low – and might in some instances be regarded as intrusions. The evidences yielding most Ayyubid/Mamluk is evidence 8, where all the material found was very worn, evidence 10 in which much older material is mixed and in evidence 17 where a painted Ayyubid/Mamluk piece of a base was found, which joined with a piece from evidence 9 in trench D (cat. no. 37) (cf. above).

The evidences surrounding the intact water-pipe described in the field report (this volume) running north-south will be AMS (accelerator mass spectrometry) dated and results are pending. However, the ceramic evidence might give a preliminary indication of the construction date. In evidence 50 below the water pipe in sector a, a worn rim of an Eastern Sigillata A ware bowl was found, which point to the piece being older and thus not contemporary with the fill. In evidence 44 above the water pipe no fine wares were found and only very few diagnostic sherds were found. However, the evidence did not contain any Grey Ware or later wares but contained an Orange Ware rim which points to a date in the Roman-Byzantine period. Furthermore cooking pot rims of a Late Roman date with a ridge on top of the rim were also found.[6] In addition some ribbed plain wares were located in this evidence. Evidence 47 covered and ran against the bedrock and

**Table 2**

| Ayyubid/Mamluk HMGPW | Ayyubid/ Mamluk Unpainted | Abbasid/ Ayyubid | Islamic Glazed | Grey Ware (Byz-Uma) | Reddish /Red Brown ware | Jerash Bowls | Red Slipped Fine ware (Rom-Byz) | Unspecified (mainly coarse and ribbed wares) |
|---|---|---|---|---|---|---|---|---|
| 0.14% | 0.04% | 0.03% | 0.005% | 11.16% | 0.57% | 0.33% | 0.18% | 87.54% |

6. Compare with Hisban, Gerber (2012), fig. 3.31 and the present catalogue no. 85.

did not contain any Grey Ware, only one small piece of fine ware, handmade storage jars and two pinched handles which point to a Roman or Byzantine date. In sum, the evidences below and just above the water pipe suggest a date before the production of Grey Ware in the Roman or the early Byzantine period.

The general picture, however, emerging from the trench is a mixture of mainly Byzantine-Umayyad material with a few objects of older and younger date. The lower parts of the trench around the water pipe are, as described, somewhat earlier.

**Trench F**

Trench F was, as described in the field report (this volume) a long trial trench stretching across the vast cistern as well as a large area around the cave to the west. The total amount of pottery counted was 17.683. Of these 1.07% was kept a total of 190 fragments. Considering the large area in the cistern covered by this trench the number of finds is considerably lower than in the other trenches.

Grey Ware is prominent in trench F whereas later Islamic wares are almost non-existent. Grey Ware was produced in the Byzantine-Umayyad periods in Jerash and seems to be scarce before and after. The remaining part of the material from the trench consists of various ribbed household and storage wares.

One evidence, 17, consisted primarily of Roman fine and plain ware shapes (cat. nos. 4, 107), but with a few possibly later finds. This will, however, need further investigation in order to give a firm conclusion.

The clearings in sector i yielded a fill typical of the Byzantine-Umayyad period consisting mainly of ribbed wares. The Grey Ware was prominent.

Significant and worth noting in trench F is the nearly complete absence of Ayyubid/Mamluk HMGPW. This type of pottery was only attested once, in evidence 15 where one piece of geometric painted ware was found. The context of evidence 15 is mixed and the sherd may be counted as an intrusion.

The general picture emerging from the study of the objects from the cistern is that it primarily consisted of Byzantine-Umayyad fills of the very characteristic wares of the period – especially the Grey and the Reddish/Red Brown ware.

**Trench G**

257 pottery fragments, i.e. 0.6% of the total amount of 43.756 ceramic finds from this trench was kept.

The ceramic material from trench G is within the topsoil evidences characterised by worn and broken pieces of mostly locally produced Grey and ribbed plain household wares. Especially the upper evidences in the trench have yielded a mixture of Roman-Byzantine-Umayyad material. From evidence 12 and below the occurrences of Grey Ware is scarce if present at all. Intrusions of Umayyad pottery comparable with pottery from Pella and Ayyubid/Mamluk

**Table 3**

| Ayyubid/Mamluk HMGPW | Green Ware | Orange Ware | Abbasid/ Ayyubid | Grey Ware | Reddish/ Red Brown ware | Jerash Bowls | Red Slipped Fine ware (Rom-Byz) | Unspecified (mainly coarse and ribbed wares) |
|---|---|---|---|---|---|---|---|---|
| 0.006% | 0.01% | 0.01% | 0.02% | 27.12% | 2.77% | 0.4% | 0.15% | 69.51% |

**Table 4**

| Ayybid/Mamluk HMGPW | Ayyubid/ Mamluk undecorated | Abbassid/ Ayyubid | Green Ware | Orange Ware | Grey Ware | Reddish/Red Brown ware | Jerash Bowls | Red slipped fine ware (Rom-Byz) | Unspecified (mainly coarse and ribbed wares) |
|---|---|---|---|---|---|---|---|---|---|
| 0.005% | 0.07% | 0.03% | 0.06% | Min. 0.12% | 11.23% | 0.27% | 0.12% | 0.35% | 87.7% |

pottery are found in evidence 28.[7] The main body of material from evidence 12 and below thus seems to be of Roman-Byzantine date but with younger intrusions. The amount of Grey Ware is remarkably lower than in trenches D and F but the amount corresponds well with the material evidence of the neighbouring trench H and in trench E.

In trench G Ayyubid/Mamluk pottery was found in evidences 12, 20, 23, 28, 33 and possibly in 30. The number of sherds is very low and consists primarily of the unpainted handmade wares as indicated in **Table 4**.

**Trench H**

A total of 10.187 ceramic fragments were registered from trench H. Of these 1.1% was kept which is a total of 112 fragments. As in the tables 1-4 the total amount of sherds are represented.

In trench H a fair amount of the various Roman wares (plain household wares and fine wares (ESA, LRC)) located this year was found in e.g. evidences 13 and 14 mixed with Byzantine and Umayyad material as well as few Abbasid, Hellenistic (cat. nos. 1-2) and Nabataean (cat. no. 3) fragments. Worth noting is the amount of Roman fine wares found in the trench which is just below 1% of the total amount of pottery from the trench. Apart from the HMGPW in trench D these Roman/Byzantine red slipped wares make up the largest quantity of fine wares found in any of the trenches during the 2013 campaign. The Roman activity on the hill is thus quite apparent on the northern slope within the ceramic and small find record. An imported stone mug fragment probably from the first century AD is one of the more conspicuous finds from the trench (cat. no. 137). Such vessels were found in settlements with Jewish population and occur in some places in Jordan[8].

In trench H Ayyubid/Mamluk unpainted pottery was found in small quantities in the evidences 5, 8, 9, 13, 14 and 16 but is not significant in the general picture of the trench.

**Finds**

The variety of finds from the 2013 campaign attests to everyday life and production in the Northwest Quarter in Jerash during several historical periods – from the Hellenistic to the present day with the possible appearance of a few Bronze Age ceramic fragments (cat. no. 180). Local production is attested through pottery wasters (cat. no. 150), a mould (cat. no. 128) and fragmentary crucibles (cat. no. 151). Spindle whorls (cat. nos. 143-144) were also found in a small number, but only one possible loom weight of a conical shape has been recovered from the site (cat. no. 145) (cf. below for a presentation of the glass and coin material).

The animal bones from the campaign were found in most evidences throughout the Northwest Quarter and represent among other horses, sheep, cows and pigs – i.e. larger

7. Smith (1973), pl. 91.C no. 1112.
8. Most of the vessels are from the Peraia; they are attested at Mount Nebo (Saller 1967, 41-43), in Khirbat Umm ad-Dananir (McGovern 1989, 127), Machaerus (Loffreda 1996, 116f. Fig. 53), Callirrhoe (Clamer 1997, Tf. 14; Strobel and Wimmer 2003, Tf. 13f.) and at the Baptism Site (Abu Shmeis and Waheeb, 2002, 565).

**Table 5**

| Ayyubid/ Mamluk unpainted | Abbasid/ Ayyubid | Green Ware | Grey Ware | Reddish/Red Brown ware | Jerash Bowls | Red slipped fine ware (Rom-Byz) | Hellenistic Black Glazed | Unspecified (mainly coarse and ribbed wares) |
|---|---|---|---|---|---|---|---|---|
| 0.15% | 0.1% | 0.28% | 11.64% | 0.4% | 0.05% | 0.9% | 0.03% | 86.45% |

domesticated animals but also a fair amount of bird bones were recovered. The bones were often broken and found as fill in the various evidences but almost none showed traces of heating or cooking.

The iron objects recovered in the 2013 campaign were all quite corroded. They were mostly nails or smaller fragments of undiagnosed objects. The North Room of trench D yielded the find of a Roman iron key and a rather large knife blade which once was wrapped in textile and held in a leather scabbard (cat. nos. 132-133).

Within the amount of material from the campaign a variety of marine fossils were likewise recovered. Some of these might stem from the Parathetys ocean during the Tertiary period and will be studies in more detail for the final publication of the Northwest Quarter. Only one fossil, a Steinkern of a large gastropod, has been catalogued as it was found built into a wall in trench D and thus with certainty integrated in the human activities on the hill (cat.no. 152).

Many other find groups were likewise present in the excavation like architectural elements (cat. no. 147), bricks (cat. no. 119-120), tiles (cat. no. 121-122), stone vessels (cat. nos. 137), grinders (cat. nos. 140-142), mortars (cat. nos. 138-139), terracotta figurines (cat. nos. 124-127), one small gold piece (cat. nos. 136), one amber bead and a large fragment of a marble sculpture (cat. no. 146). The objects date to various periods. Most of these find groups are represented in the catalogue, however, as most contexts are mixed the selection of objects have been made to show the chronological, typological and material variety of the finds from the Northwest Quarter.

**General Observations**

Grey Ware pottery is the most characteristic ware which has been found in considerable amounts across the entire hill. Other plain ribbed household wares are also quite common and the general trend is the use of the well known locally produced pottery at least in the Roman, Byzantine and Umayyad periods. It would, however, be desirable to conduct more research on the other plain wares which are, like the Grey Ware, most likely of local manufacture and which represent a large amount of among other shapes jugs, jars and amphorae and which to a large extent are ribbed.

During the 2012 campaign all three trenches were placed on top of the hill and the amount of Roman slipped and unslipped pottery was quite low. In terms of locating more remains of the Roman period it proved successful to move some of the excavation activities to the slopes of the hill. Especially the northern slope yielded a relatively large amount of Roman pottery. The Roman unslipped household wares may have been locally produced, but here more comparative material is needed and local kilns from the period should also be investigated. The few Hellenistic objects from the campaign were also primarily found on the north slope of the hill (glass and pottery, cat. nos. 1-2, 153-154).

The Ayyubid/Mamluk presence on the hill is most apparent on its highest points within the "Mamluk hamlet"[9] and not on the slopes of the hill. The virtually absence of Islamic glazed wares is striking and certainly does not point towards a rich settlement at the site. Nonetheless, the wall-paintings may point in the direction of

9. Lichtenberger and Raja forthcoming.

a certain degree of luxury at least in phase 3 of the Ayyubid/Mamluk house in trench D (cf. field report in this volume). The slightly earlier period, the Abbasid period, is attested through the very small amounts of material also found scattered across the trenches on the hill either in the top soil or in disturbed and mixed fill layers.

The imports in the Northwest Quarter include Hellenistic Black Glazed pottery, Roman and Byzantine red slipped wares and a few other finds such as coins and glass but it would certainly be desirable to conduct more in depth research on the later imports – direct and indirect imports - through shapes applied in the workshops of Jarash.

**The Use of the Northwest Quarter**

The oldest human activity found on the hill was reported in 2012 by a Neolithic flint tool. Flint is not uncommon in the area and the nearby site of Tall Abu Sultan is a locality rich in flint tools. The oldest ceramic evidence from the Northwest Quarter hitherto attested are a few fragments of Bronze Age Pottery, Hellenistic glass and Hellenistic pottery fragments (mainly in trench H, Hellenistic glass was located in trenches H and E) suggesting that some activity took place on top of the hill during the earlier periods. Finds from the following early Roman period are represented by a few coins and Eastern Sigillata A pottery primarily found on the northern and southern slopes of the hill. Especially on the northern slope of the hill Late Roman pottery has been attested and other find groups like glass and coins also yield evidence from the late Roman and early Byzantine periods such as ARS and common wares in the Northwest Quarter. Large amounts of Byzantine and Umayyad pottery from the area does, as in most parts of the city, attest to a flourishing local production during these periods. The later Islamic periods are now attested in the Northwest Quarter but remain scarce until the construction of the Ayyubid/Mamluk hamlet on top of the hill.

**Ceramic Wares**

The characteristics of the different ware groups described in the previous report (Grey, Reddish/Red Brown, HMGPW and Jarash Bowl wares) will not be repeated but has been continued in the categories of this year. In 2013 it was possible to describe three new ware types which were found in the Northwest Quarter and further tentatively relate these to the Roman, Byzantine and Islamic periods. The places of production of these new wares are still unknown and will need further analyses to decide upon.

The 2009 revised edition of the Munsell Soil-Color Charts has been used for all colour readings during the 2013 campaign.

*Painted Buff Ware*

The Painted Buff Ware has only been found in a few examples, but is rather distinct (cat. no. 70). The ware has only been found in unstratified evidences and the dating of it relates to the shape of the vessels, the decoration and the comparison with stratified material from other excavations – primarily Pella and Bet She'an. The ware has a buff/light brown colour; it is rather finely levigated with a smooth surface, some small air pockets, few red-brown and black particles and a few lime eruptions on the exterior. It is hard fired, wheel made and brakes in clean sharp brakes. The ext. surface is: approximately 7.5YR 7/4 and the core varies between 5YR 6/6-6/8. The core is sometimes unevenly fired making the inner part of the core darker thus creating a sandwich core.

Comparable material from Bet She'an is dated to the Mamluk period, whereas the Pella material is tentatively placed in the Abbasid period or Fatimid-Mamluk period (cf. cat no. 70 for references). The ware thus corresponds to "Thin, decorated ware" and Group B in Pella. In the tables presented above the Buff Ware is counted within the Abbasid/Ayyubid column. The ware is rather rare in the excavation so far and is primarily found on top of the hill.

*Green Ware*

The Green ware pottery has a rather rough undecorated surface with a green hue throughout. Iron may have produced the green colour. The ware is wheel made and fired crisp. It is medium levigated containing quartz and reddish-brown inclusions. The core of the ware varies between 5Y 6/6 – 6/4 and 2.5Y 6/6. The surface of the ware is approximately 5Y 6/4. The shapes of the ware are primarily long necked jugs, jars and a few tile fragments. The ware is found primarily on the northern slope of the hill and is regarded as an Islamic ware possibly of the Abbasid period (cat. nos. 77-78).

*Orange Ware*

The Orange ware pottery has mainly been located within the Late Roman/Byzantine material of trench G but also in trenches H and A from the 2012 campaign. It is not found in any significant amount. It is characterised especially by the strong orange hue on the surfaces of the vessels. The surface is furthermore mottled and the surface colours thus range between 2.5 YR 6/8 and 5/8 and into a more yellowish hue 7.5 YR 7/6. The mottling can be around 2.5 YR 5/8 and sometimes less visible. The ware is medium levigated with a large amount of lime, some quarts in small pebble and as very fine glittering spots, a few black, a few reddish brown, and air pockets occur occasionally – indicating that the clay was not always well settled. Characteristic is the medium to large amounts of white inclusions which are visible on the surface. The core of the ware is sometimes sandwich layered the outer layers being app. 2.5YR 5/8 the inner reduced and thus yellowish brown. The clay is hard fired and wheel made and the shapes are open vessels like larger bowls, basins and cooking pots. The shapes are mainly placed within the late Roman and early Byzantine material (cat. nos. 63, 85, 107).

The ware is most probably a plain ware and thus a slightly coarser version of the Jarash Bowl ware described in the report of the 2012 season.

**The Coins** (Stefan Riedel)

In the first two excavation campaigns in the Northwest Quarter of Jerash a total of 199 coins were found. 64 stem from the 2012 campaign and 135 from the 2013 campaign. All coins are copper alloys and their weight ranges from less than 0,5 g to more than 20 g. The excavated coins are not surprisingly heavily corroded and incrusted and most of them show traces of use, which makes it almost impossible to make precise observations without previous professional cleaning. Some coins which seemed to be from promising contexts or in their own rights worth to have a closer look at were cleaned and conserved during the 2012 and 2013 campaigns[10].

Generally, it must be mentioned that in no case the studied coins are of value concerning the dating of the contexts they were found in. This holds especially true for undisturbed contexts such as collapses. The coins were all older than most of the other finds from the same contexts and often coins of different dates were found in the same contexts. The contexts in question date to the Byzantine period and mainly to the Islamic period. This circumstance indicates that the coins in Jarash circulated for quite a long time and were not directly replaced by new emissions[11] but probably used according to

10. I am very grateful to Helle Strehle for carrying out the cleaning and conservation work of these coins enabling the studies presented here.

11. Especially Byzantine coins were still used in the region at least until the reform of Abd al-Mailk around the end of the 7th century (cf. Heidemann 1998, p. 95–99; Bellinger 1938, p. 20). This basically concerns the influx of Byzantine copper coins but it might also be assumed that older coins were still in use without countermarking or overstriking them. The example of an overstruck Diocletian coin about 400 years later (Heidemann 1998, p. 98) at least proves that older coins were still circulating. The long circulation of Byzantine coins within the Byzantine Empire itself is also witnessed in hoard finds (cf. Gândilă 2009, p.162).

their metal's value. The presence of Roman and Byzantine coins in later period contexts (e.g. in the North-room of trench D, ev. 17, 18 and 19 – of late Byzantine to early Umayyad date) also contributes to this suggestion. Furthermore, it is remarkable that almost no coins from the Islamic period were recovered.[12] Most of the coins are of light weight and diameter (less than 1g and around 1cm in diameter or less) which indicates that they are Byzantine nummi although they are often too badly preserved to test this hypothesis. Generally, the coins found and studied range in date from the early Roman to the early Islamic period with a peak in Byzantine times.

The following catalogue gives an overview of some of the better preserved and cleaned coins which nevertheless represent the spectrum of the numismatic material from the Northwest Quarter recovered up to now.

**Glass Finds** (Holger Schwarzer)

During the campaign in 2013 almost 300 glass items, generally quite fragmented, came to light in trenches D–H in the Northwest Quarter of Jerash. Most of them stem from the middle/late Roman and early Byzantine/early Umayyad periods.[13] The vessels were predominantly free-blown and are likely to have had a local origin. All Hellenistic, Roman and Byzantine pieces were found in later strata of Islamic date and their original contexts are lost.

Early period material is rarely encountered among the glass finds. Only a few sherds can be assigned to the Hellenistic period. They belong to cast grooved bowls showing a conical or hemispherical shape (cat. nos. 153-154). The early Roman imperial period does not seem to be represented. Typical leading forms of the 1st and early 2nd centuries AD are completely missing. The majority of the Roman glass vessels – as far as determinable – can be dated to after the middle of the 2nd until the late 4th centuries AD. They are mostly characterized by a dark weathering. Some types of bowls representing common dishes should be mentioned, such as examples with a crimped strip-handle (cat. no. 155), examples with a high folded base-ring (cat. no. 156), examples with a horizontal double fold in the glass wall (cat. no. 159) and examples with a broad out-folded rim (cat. no. 160). Several other forms and types were also attested and await the final publication. The fine tableware occurs only in one small fragment of a cut-decorated bowl, which is certainly an import (cat. no. 157).

The production of some vessel types ranged from the mid-/late Roman period into the early Byzantine period. This applies for instance to bottles and jugs with a thick trail below the rim (cat. no. 158) or a spiral trail around the neck (cat. no. 161). It is the same with conical goblets (cat. no. 163), double kohl tubes (cat. no. 164), cups decorated with a blue spiral trail (cat. no. 165), and mould-blown flasks or jugs with vertical ribs (cat. no. 162). Glass certainly of the early Byzantine period include polycandelon lamps with a stemmed hollow foot (cat. no. 167) and different goblet types like those with a hollow stem and a foot with tubular edge (cat. no. 168). White weathering is characteristic for the glass from this period.

Sometimes one cannot decide whether an object has its origin in an early Byzantine or in an early Umayyad glass factory because no

12. So far, only two coins might belong to the Islamic period. One found 2012 beneath a collapse within trench C (cf. report on the 2012 campaign), which probably dates to the time after the coinage reform carried out by Abd al-Malik and another one from the 2013 campaign (from a mixed layer in the large cistern, i.e. trench F), which has not been cleaned but seems to bear three lines of Arabic letters on its reverse.

13. «Early Byzantine» means here – in contrast to the usual definition in the archaeological research of the Near East – the whole period from the division of the Roman empire in 395 AD and the Sassanian (614 AD)/Islamic (635 AD) conquest of Gerasa. In my opinion this allows a less problematic comparison with other areas of the Byzantine empire, where the internal chronology (early, mid and late Byzantine) has a different framework.

differences in material and shape are visible.[14] Such difficulties relate to goblets such as those with a solid stem and a solid foot (cat. no. 169) and those with a solid foot and a solid stem with one knob (cat. no. 170) as well as to polycandelon lamps with solid knobbed stems (cat. no. 171). They suggest a continuous production of local Byzantine glassmakers under the new Islamic rulers.

Without a significant context it is impossible to verify the date of two monochrome beads (cat. no. 172) – the only glass jewellery that was found – as well as of three single glass tesserae (cat. no. 173) whose associated mosaics are lost. Cast window panes, also represented in the finds from the Northwest Quarter (cat. no. 174), were used in Jarash throughout the period from the mid-Roman times to the early Islamic period.

**Chronology**

Hellenistic: 332 BC – 63 BC
Roman: 63 BC – early 4th century AD
Byzantine: early 4th century AD – late 5th century AD
Late Byzantine: late 5th century AD – mid-7th century AD
Umayyad: 7th century AD – end of 8th century AD
Abbasid: 9th century AD – 10th century AD
Fatimid: 11th century AD – 12th century AD
Ayyubid: 12th century AD – mid-13th century AD
Mamluk: mid-13th century AD – 15th century AD

**Catalogue**

The drawings of the catalogued objects were produced by architect Jens Christian Pinborg, archaeology students Dorothea Csitneki, Eicke Grasner, Signe Krag, Signe Bruun Kristensen and Nadia Schmidt-Larsen. They were prepared for publication by Signe Bruun Kristensen. Photos were taken by photographer Michael Benecke and archaeology student Philip Ebeling.

***Arrangement of Catalogue:***

Inventory number
Title
Figure/Illustration
Measurements (in cm)
Munsell (when not described in the described ware groups)
Description (incl. material)
*References*
Date

***Arrangement of the Coin Catalogue:***

Inventory number
Figure/-s
Material, denomination
Weight (in g), diameter (in cm), die position
Mint, minting authority
Description
*References*
Date

***Catalogue Abbreviations:***

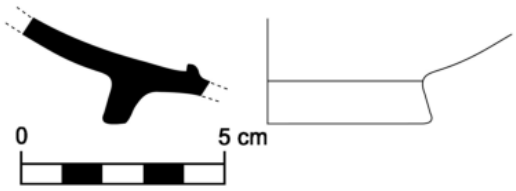
AE: Copper-alloy (‘bronze’)
D: Depth
diam.: diameter (in cm)
ext: exterior
h: die position (‘hour’ – clockwise)
H: Height
int: interior
L: Length
Obv.: obverse
Rev.: reverse

**Fine Ware**

**Hellenistic (PE)**

1.
J13-Ha/a1-13-14
Base, fragmented.
Fig. 1.
Munsell: core1: Black/Grey spots in the brown core, 10YR 7/2; core2: GLEY1 4/N; int.: 10YR

14. For discussion of that problem see Meyer (1989).

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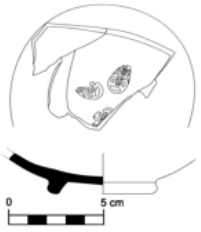


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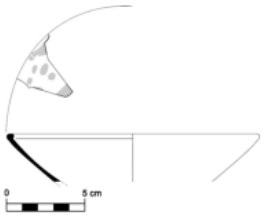


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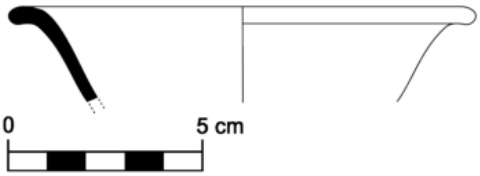


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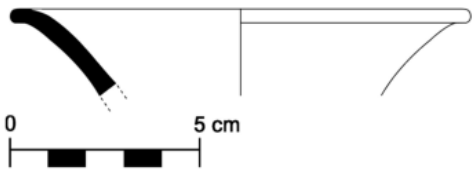


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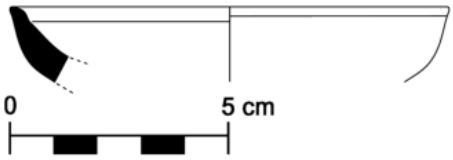


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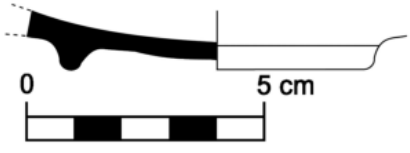


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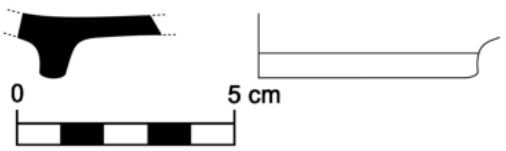


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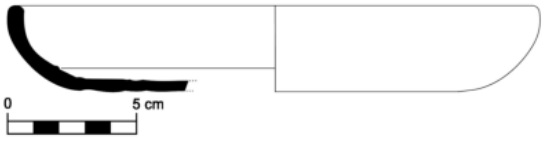


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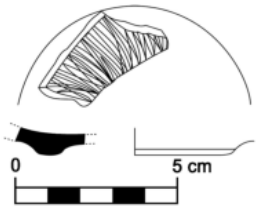


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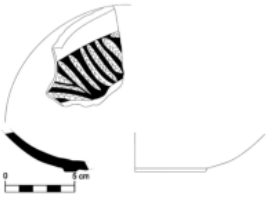


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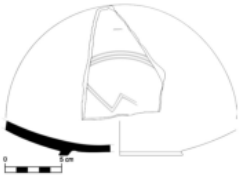


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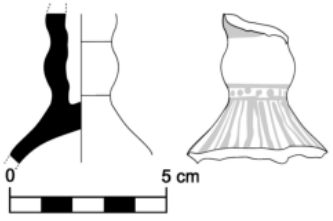



14

14/1; ext.: 10YR 14/1.
Diam. (base): 8, (rim): 2; H.: 2.5; L.: 6.3; T. (max.): 0.8, (min.) 0.4.
Fish plate; medium fired and finely levigated and well settled clay.
*References:* Metzger (1969), 47-48, 23; pl. 12, 23; Kenkel (2012), taf. 15, Sa2.8,
2nd – 1st century BC.

2.
J13-Ha/a1-13-31
Base, fragmented.
Fig. 2.
Munsell: core: 5YR 4/4; slip: 10YR 2/1 + GLEY 1 2,5/N.
Diam. 5.8; H.: 2, 15; L.: 7.5; T.: 0.4.
Black Glazed bowl or plate; hard-fired and finely levigated clay; deco.: three oval shaped stamps with floral motifs. Irregularly set.
*References:* Rotroff (1997), Form: 843, fig. 57.
Late 2nd – 1st century BC.

**Nabataean (PE)**
3.
J13-Ha/a1-13-55
Rim, fragmented.
Fig. 3.
Munsell: core: 2.5YR 6/6; int.: 5/6 7.5YR; ext.: 2.5YR 6/6; slip: 2.5YR 7/2.
Diam.: 16; H.: 2; L.: 3.1; T.: 0.1.
Plate or open bowl, hard-fired and finely levigated; painted deco.: dark-brownish spots.
*References*: Hammond (1965), Bowl no. 15, pl. LIX; Zayadine, (1974), no. 21; pl. LXII, 21, pl. LXIV, 3; Schmid (1993), fig. 111, 113.
1st century AD.

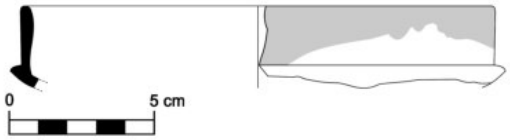
**Eastern Sigillata A (ESA) / (Çandarlı ware) (PE)**
*Rims*
4.
J13-Fa-17-16
Rim, fragmented.
Fig. 4.
Munsell: core: 10YR 7/4; slipped int. and ext.: 10R 4/6.
Diam. (rim): 12; H.: 2.4; L.: 6.5; T. (max.): 0.45; (min.): 0.3.
Bowl. The rim is rounded and folded outwards. Hard fired, rather finely and well-settled clay.
*References*: Kenkel (2012), taf. 10, ETS10.3.
Early Roman (1st century BC – mid 1st century AD).

5.
J13-Ha/a1-14-4
Rim, fragmented.
Fig. 5.
Munsell: core: 7.5YR 8/3; slipped int. and ext.: 10R 4/6.
Diam. (rim): 12; H.: 2.2; L.: 6.6; T. (max.): 0.5; (min.): 0.3.
Rim of an open vessel. The rim is round to square; hard fired, finely levigated and well-settled clay. Wheel marks visible below slip.
*References*: Kenkel (2012), taf. 10, ETS10.3.

Early Roman (1st century BC – mid 1st century AD).
6.
J13-Ha-13-13A
Rim, fragmented.
Fig. 6.
Munsell: core: 7.5YR 8/3; slipped int. and ext.: 2.5YR 4/6.
Diam. (rim): 10; H.: 1.7; L.: 3,1; W. (rim): 0.3; T. (max): 0.7; (min.): 0.4.
Bowl. Hard-fired and very finely levigated clay.
*References*: Hayes (1972), ESA Form 3, 321; fig. 64 Form 3.
Roman (Late 2nd – early 3rd century AD).

*Bases*
7.
J13-Ha/a1-13-26
Fig. 7.
Base, fragmented.
Munsell: core: 2.5Y 4/8, slip: 10R 4/8.
Diam.: 6.6; H.: 1.2; L.: 6.2; T. (max.): 0.5, (min.): 0.3.
Bowl/plate, Hard fired and finely levigated with some air pockets.
*References*: Hayes (1992), fig. 71, 11; Hayes

**15**

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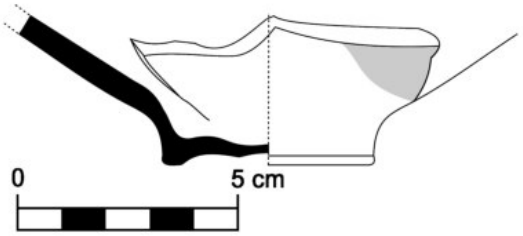
**17**




**18**

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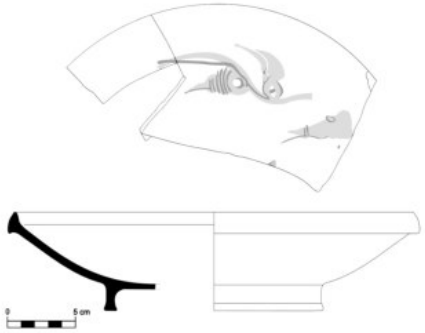

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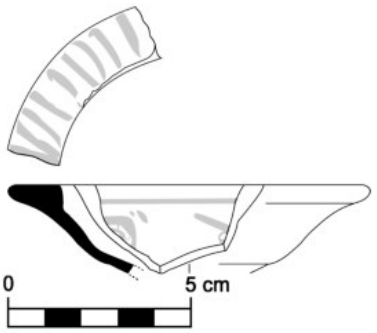


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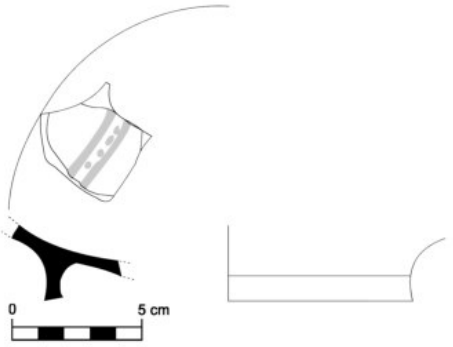
**23**

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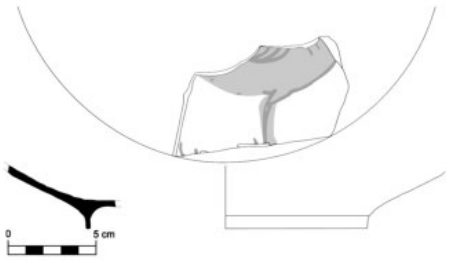


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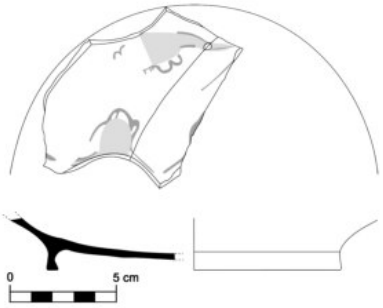


(1997), fig. 20, 7; 19, 2.
Early Roman (1st century AD).

8.
J13-Fc-15-23
Base, fragmented.
Fig. 8.
Munsell: core: 2.5YR 7/6; slipped int. and ext.: 7.5YR 5/8.
Diam. base: 10; H.: 1.5; L.: 5; W.: 0.8; T.: 0.5.
Bowl, hard fired and rather finely levigated clay.
*References*: Kenkel (2012), taf. 11, ETS10.6.
Early Roman (Late 1st century BC – mid 1st century AD).

**African Red Slip (ARS) (PE)**
*Rims*
9.
J13-Ec-27-52 and 53.
Fig. 9.
Rim and base, fragmented.
Munsell: core: 2.5YR 6/2; int.: 2.5YR 6/8; ext.: 2.5YR 6/8.
Diam. base: 16; rim: 20.5; H.: 2.2; L.:15.7; T. (max.): 0.5; (min.): 0.3.
Bowl, hard-fired and rather coarse clay.
*References*: Hayes (1972), ARS Form 181; Rasson (1986), fig. 17, 2.
Roman (Late 2nd – 4th century AD).

10.
J13-Gf-30-34
Rim, fragmented.
Fig.10.
Munsell: core, int. and ext.: 10R 5/8.
Diam. (rim): 34, H.: 1.2; L.: 8.5; W. (rim): 1.1; T.: 0.6.
Open shaped vessel. Rim is decorated with an incised line, following the wheel marks. Hard fired and finely levigated clay with some air pockets; deco.: incised line circulating rim at int.
*References*: Hayes (1972), ARS Form 67, fig. 19, no. 28.
Byzantine (1st half of 5th century AD).

*Bases*
11.
J13-Ec-13-36
Fig. 11.
Base, fragmented.
Munsell: core, int., ext. and slip: 2.5YR 6/6.
Diam.: 6, H.: 0.4; L.: 4,0; W.: 0.8, T. (max.): 0.4; (min.): 0.3.
Bowl or plate, hard-fired and finely levigated clay with some air pockets; deco.: thin, impressed lines, radiating from the centre towards the rim.
*References*: Hayes (1972), ARS Form 91.
Byzantine (2nd half of the 5th century AD).

12.
J13-Gf-33-8
Base, fragmented.
Fig. 12.
Munsell: core, int. and ext.: 10R 5/8
Diam. (base): 10; H.: 2.8; L.: 8.0; W.: 0.4; T. (max.): 0.8; (min.): 0.6.
Plate or bowl, hard-fired and finely levigated clay; deco: on the int. face impressed lines, feather-rouletting.
*References*: Hayes (1972), ARS Form 91 B.
Byzantine (450-530 AD).

**Late Roman C (LRC)** (PE)
13.
J13-F-0-3
Base, fragmented.
Fig. 13.
Munsell: core, int., ext. and slip: 10R 5/8.
Diam. base: 11; H.: 3.1; L.: 9.7; T. (max.): 1.1 (rim); (min.): 0.95.
Hard fired, medium levigated and well-settled clay. Incised deco. int.: three parallel, horizontal grooves running along the body. Two parallel lines in a zig-zag-pattern in the centre.
*References*: Form: Hayes (1972) LRC 3, no. 19.
Late Byzantine (6th century AD).

**White Painted Fine Ware**
14.
J13-Fa-10-11-2
Stem, fragmented.

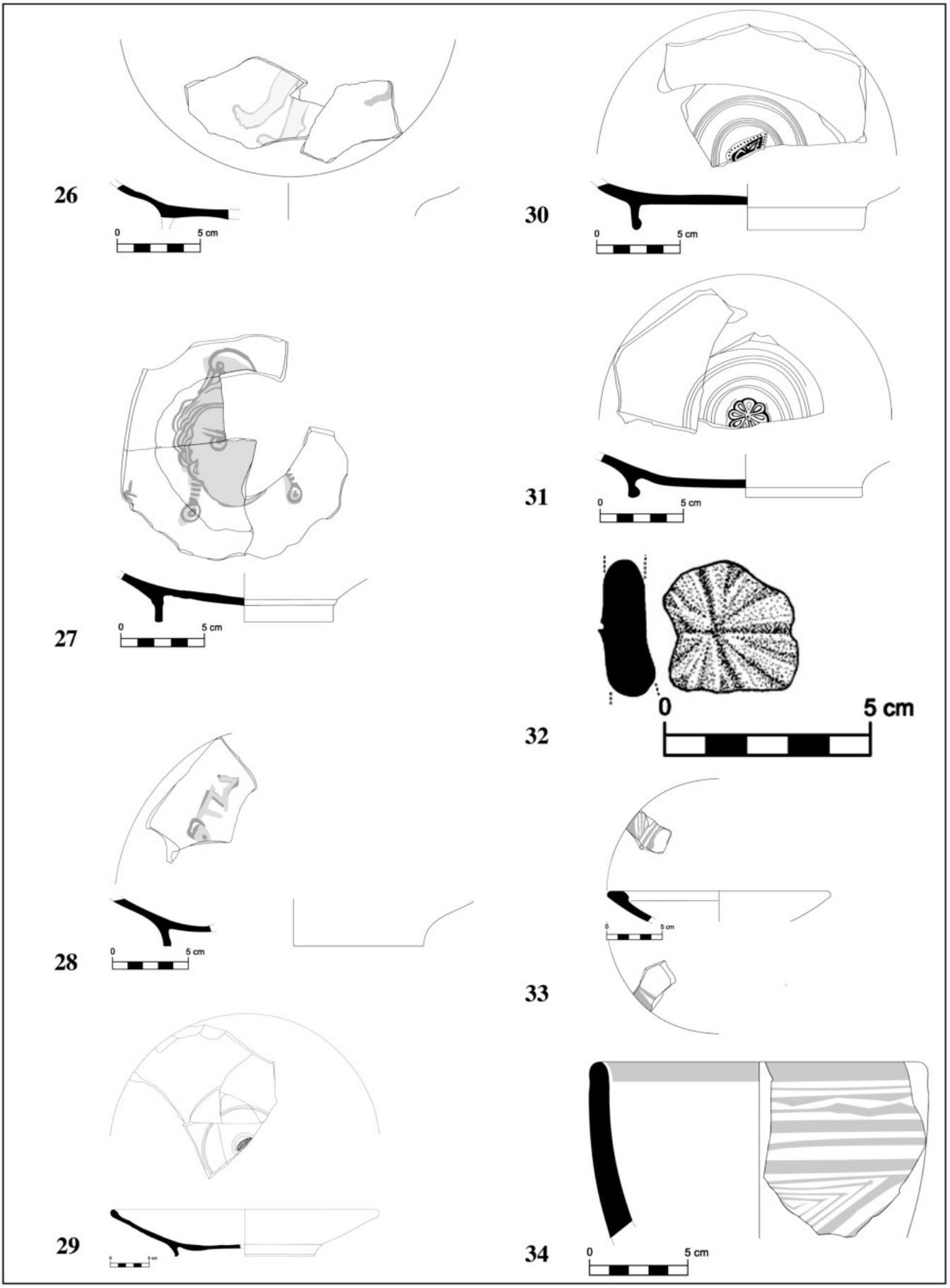

26
0
5 cm
27
0
5 cm
28
0
5 cm
29
30
0
5 cm
31
0
5 cm
32
0
5 cm
33
0
5 cm
34
0
5 cm

Fig. 14.
H.: 4.7.
Munsell: core: 2.5YR 5/8; int.: 2.5YR 5/8; paint: 2.5YR 3/4 and 10R 8/1.
Presumably a closed shape; small lime inclusions, hard fired; deco: treated with a white paint and red painted vertical lines ending at two horizontal lines with dots in between.
*References*: Uscatescu (1996), p. 311, fig. 41 no. 65.
Byzantine.

**Local Fine Wares** (PE)
*Rims*
15.
J13-Gf-33-10
Rim, fragmented.
Fig. 15.
Munsell: core1: 2.5YR 6/6; int.: 10R 4/8; ext.: 2.5YR 6/6; 10R 4/8.
Diam. (rim): 16; H.: 2.8; L.: 9.1; W. (rim): 0.5; T. (max.): 0.5; (min.): 0.4.
Local fine ware bowl, hard-fired and fine levigated clay, remains of paint on int. and ext. surface.
*References*: Braemer (1986), Fig. 8; Lapp (1961), p. 180, E. Qumrân II; Kenkel (2012), Taf. 11, ETS13.2; Uscatescu (1996), p. 253, no. 316, fig. 67, 316.
Early Roman (2nd half of 1st century AD).

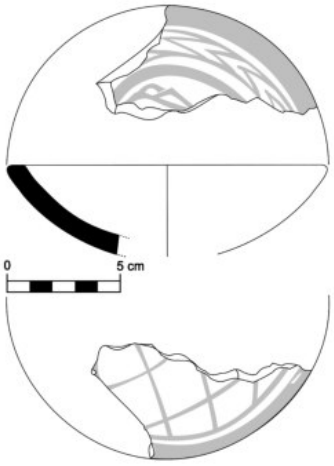
16.
J13-Gb-12-73-74-75
Rim, fragmented.
Fig. 16.
Munsell: core1: 10YR 4/1; core2: 2.5YR 6/6; int.: 10YR 8/4 – 2,5YR 6/6; ext.: 7.5YR 8/4; slip: 5YR 4/4; wash: GLEY2 4/10B; ext. painting: 5YR 6/4 – 2.5YR 5/8.
Diam. (rim): 18; H.: 3.5; L.: 15.6; W. (rim): 0.6; T. (max.): 0.7; (min.): 0.6.
Deep bowl, hard-fired and rather finely levigated clay. Very worn slip ext.
*References*: Rasson (1986), fig. 17, 2; Hayes (1972), ARS Form 181, Kraeling (1938), p. 558, fig. 36, no. 1.
Roman (2nd half of 2nd century – 1st half of 3rd century AD).

17.
J13-Gb-12-71
Rim with small part of base, fragmented.
Fig. 17.
Munsell: core: 2.5YR 6/6; int.: 2.5YR 3/3; ext.: 2.5YR 3/4 – 5YR 2.5II – 10YR 7/4.
Diam. (rim): 18; H.: 3.3; L.: 4.7; W. (rim): 0.6; T. (max.) 0.6; (min.): 0.5.
Bowl, hard-fired and medium levigated clay with air pockets. Slipped int. and partly ext. with a dark brown slip.
*References*: Rasson (1986), Fig. 17, 2; Hayes (1972), ARS Form 181.
Roman (2nd half of 2nd century – 1st half of 3rd century AD).

*Base*
18.
J13-Gf-33-9
Base, fragmented.
Fig. 18.
Munsell: core1: 2.5YR 6/6; int.: 10R 4/8, ext.: 2.5YR 6/6; slipped int.: 10R 4/8; paint ext.: 10R 4/8.
Diam. (base): 4.8; H.: 3.3; L.: 8.6; W. (base): 0.5; T. (max.): 0.6; (min.) 0.5.
Open shape, hard fired and medium levigated. Traces of paint or slip on the ext.
Not datable

**Jarash Bowls**[15] (NSL)
***Painted decoration***
*Rims*
T: Thickness
W: Width
Wt: weight
All measurements are given in cm.

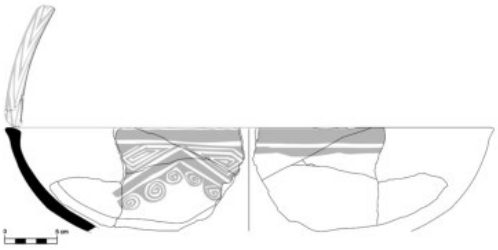
15. Munsell not indicated but follow the pattern of colours described in 2012 catalogue.




**35**




**38**



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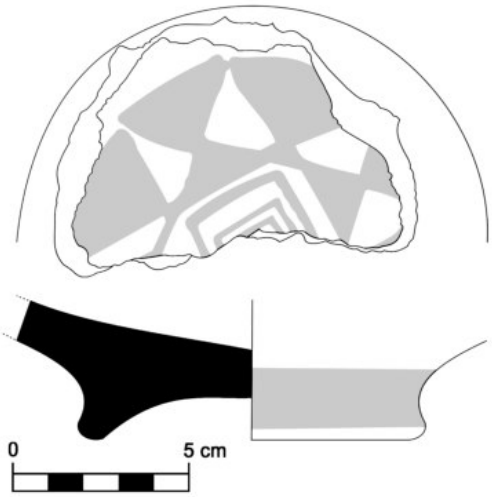


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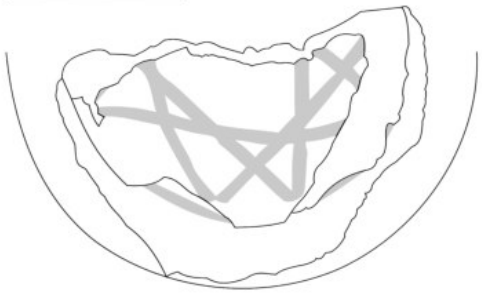

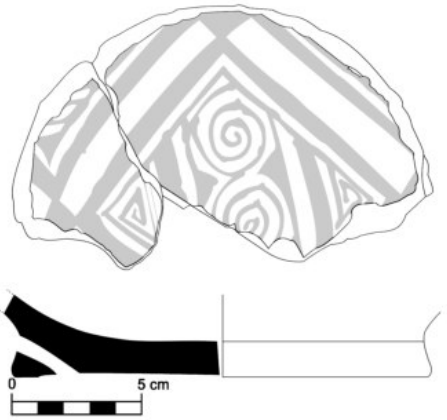


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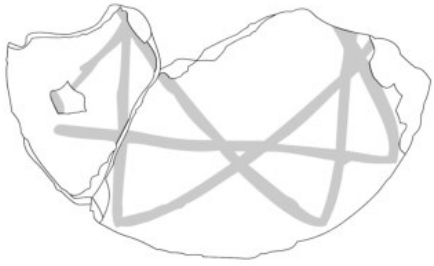

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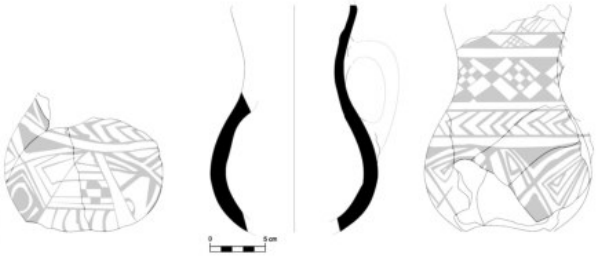

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SKr – Signe Krag
SR – Stefan Riedel

# Catalogue
# Danish-German Jarash Northwest Quarter Project 2013

19.
J13-Fc-40-84
Rim, fragmented.
Fig. 19.
Diam.: 28; H.: 2.5.
Outwards-flattened rim; deco.: reddish paint with white filling, floral?
*References*: rim shape: Watson (1989), p. 225, fig. 1.6a; deco: Uscatescu (1996), p. 324, fig. 59 no. 195.
Byzantine – Umayyad (6$^{th}$ – 7$^{th}$ century AD).

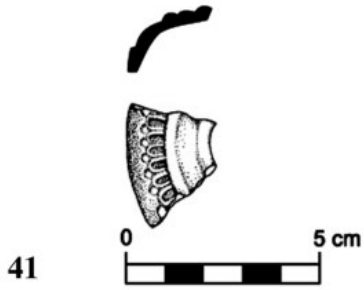
20.
J13-Ed-19-12
Rim and base, fragmented.
Fig. 20.
Diam.: 16; H.: 7.2.
Rim and raised ring base, half of the bowl is preserved, two joining fragments; deco.: white reddish painted decoration, stylized grapes.
*References*: rim shape: Watson (1989), p. 225, fig. 1.5f; deco.: Uscatescu (1996), p. 317, fig. 47 no. 149; deco.: Uscatescu (1996), p. 321, fig. 174.
Byzantine – Umayyad (6$^{th}$ – 7$^{th}$ century AD).

21.
J13-Fb-40-125
Rim, fragmented.
Fig. 21.
Diam.: 10; H.: 2.4.
Deco: white slip and painted pattern on the interior surface and painted red lines around the rim.
*References*: rim shape: Watson (1989), p. 225, fig.1d; deco.: Uscatescu (1996), p. 325, fig. 55 no. 206.
Byzantine – Umayyad (6$^{th}$ – 7$^{th}$ century AD).
22.
J13-Fc-52-12
Rim, fragmented.
Fig. 22.
Diam.: 34; H.: 2.7.
Flattened rim; deco.: painted Greek letters ('ΠΥ') int. below rim, reddish paint with white filling.
*References*: rim shape: Watson (1989), p. 225, fig. 1.2a; deco.; Uscatescu (1996), p. 336, fig. 66 no. 306.
Byzantine – Umayyad (6$^{th}$ – 7$^{th}$ century AD).

*Bases*
23.
J13-Dab-17-18
Base, fragmented.
Fig. 23.
Diam.: 14; H.: 3.1.
Raised ring base, fragmented body; deco.: two red painted lines running horizontally on the lower part of the body, white filling.
*References*: base shape: Uscatescu (1996), p. 314, fig. 44 no. 108; deco.: Watson (1989), p. 240, fig. 1.
Byzantine – Umayyad (6$^{th}$ – 7$^{th}$ century AD).

24.
J13-Eab-7-5
Base, fragmented.
Fig. 24.
Diam.: 16; H.: 3.6.
Raised ring base and fragmented body; deco.: painted figure (animal/bird) with white filling on the int. surface.
*References*: deco.: Uscatescu (1996), p. 332, fig. 62 no. 261; Watson (1989), p. 247, fig. 3.
Byzantine – Umayyad (6$^{th}$ – 7$^{th}$ century AD).

25.
J13-Ebd-14-30
Base, fragmented.
Fig. 25.

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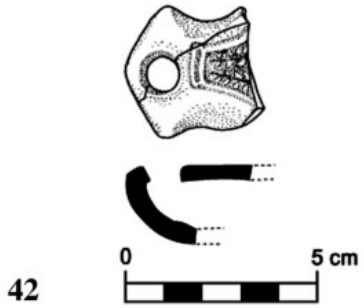


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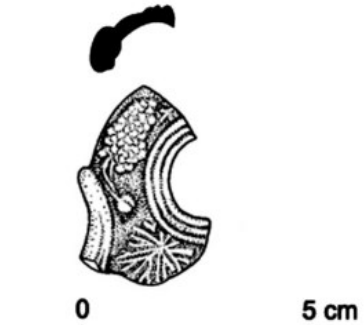


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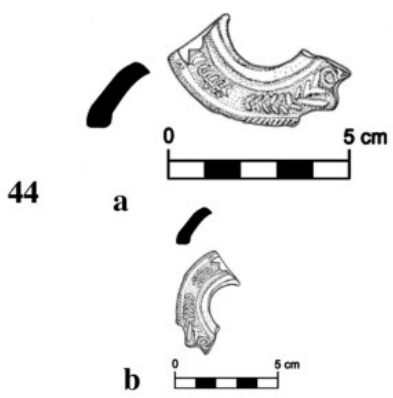


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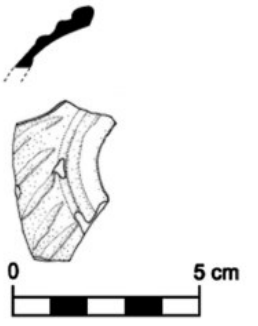


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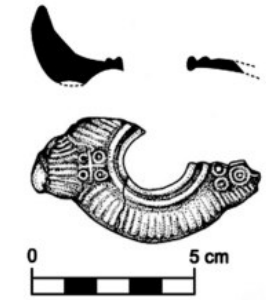


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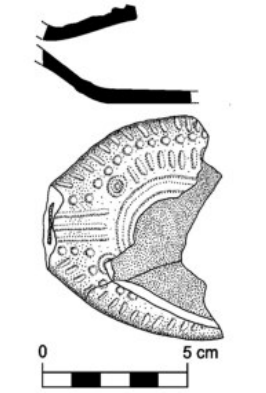


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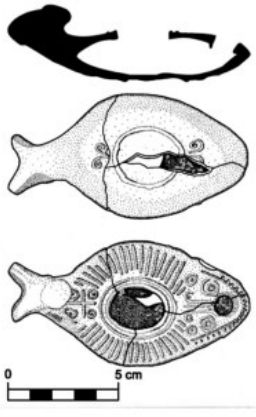


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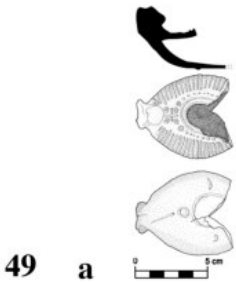


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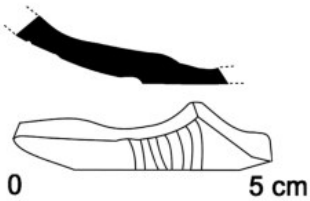


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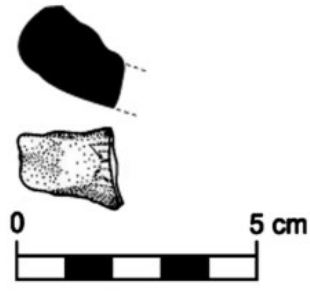



52

Diam.: 14; H.: 2.4.
Raised ring base, fragmented body, two joining pieces; deco.: painted on inside surface.
*References*: Uscatescu (1996) p. 334 fig. 64 no. 286; Watson (1989) p. 251, fig. 14.4.
Byzantine – Umayyad (6th – 7th century AD).

26.
J13-Ed-18-99 and 101
Base, fragmented.
Fig. 26.
Diam.: 15; H.: 2.
Ring base broken off; deco.: two front feet/paws (person/animal), drawn with reddish paint and white filling.
*References*: deco.: Uscatescu (1996), p. 322, fig. 52 no. 179.
Byzantine – Umayyad (6th – 7th century AD).

27.
J13-Fb-40-126
Jerash bowl base, well preserved.
Fig. 27.
Diam.: 10.6; H.: 2.9.
Raised base; deco.: painted face of human head wearing a Phrygian cap on int. surface with reddish paint and white filling.
*References*: base shape: Uscatescu (1996), p. 325, fig. 55 no. 203; deco.: Watson (1989), p. 248, fig. 12.6.
Byzantine – Umayyad (6th – 7th century AD).

28.
J13-Gf-30-6
Base, fragmented.
Fig. 28.
Diam.: 17; H.: 3.1.
Raised ring base; deco.: reddish painted Greek letters ('TΩ') with white filling.
*References*: base shape: Uscatescu (1996), p. 325, fig. 55 no. 203; deco.: Uscatescu (1996), p. 336, fig. 66 nos. 306 and 308.
Byzantine – Umayyad (6th – 7th century AD).

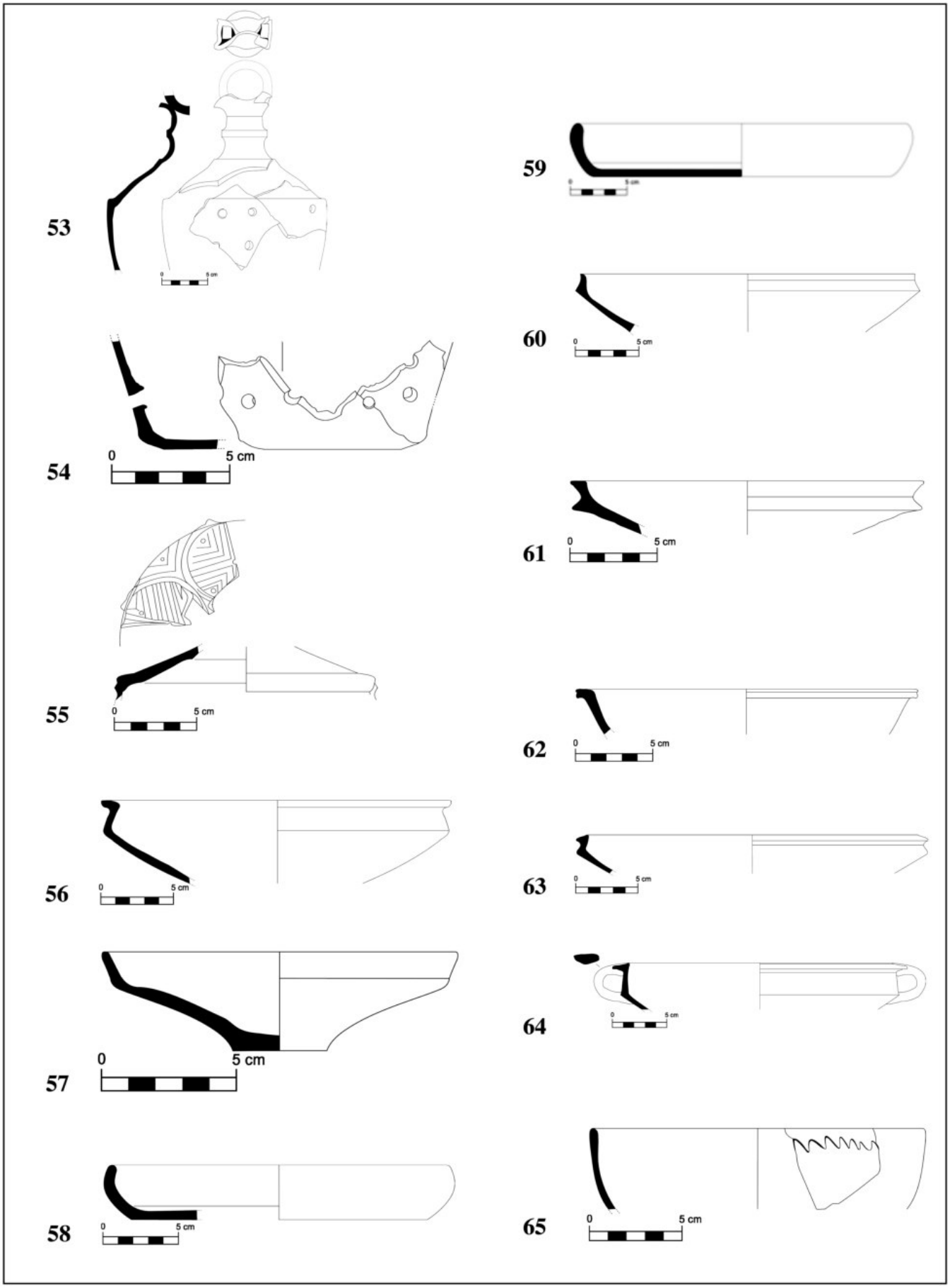
**Stamped decoration**
*Rim*
29.
J13-Fh-29-17
Rim and base, fragmented.
Fig. 29.
Diam.: 18; H.: 6.1
Intact profile of five joining pieces; deco.: stamped leaf ornament at centre and concentric incised lines encircling the stamp.
*References*: shape: Uscatescu (1996), p. 316, fig. 46 no. 140; deco.: Uscatescu (1996), p. 329, fig. 59 no. 243.
Byzantine – Umayyad (6th – 7th century AD).

*Bases*
30.
J13-Ebd-14-31
Base, fragmented.
Fig. 30.
Diam.: 14; H.: 2.7.
Raised ring base, fragmented body, two joining pieces; deco.: stamped leaf ornament and concentric incised lines encircling the stamped decoration.
*References*: base shape: Uscatescu (1996), p. 319, fig. 49 no. 164; deco.: Uscatescu (1996) no. 244; Lichtenberger, Raja and Sørensen (forthcoming), no. 28.
Byzantine – Umayyad (6th – 7th century AD).

31.
J13-Gd-4-9 and Gd-7-12
Base, fragmented.
Fig. 31.
Diam.: 14; H.: 2.5.
Raised ring base consisting of two joining fragments; deco.: stamped floral ornament, and concentric incised lines encircling the stamped decoration.
*References*: base shape: Uscatescu (1996), p. 329, fig. 59 no. 241; deco.: Uscatescu (1996), p. 330, fig. 60 no. 247, Watson (1989), p. 228, fig. 2b.iv.
Byzantine – Umayyad (6th – 7th century AD).

**Cut Ware / Kerbschnitt (AHS)**
32.
J13-Eb-17-5
Fig. 32.
Body, fragmented.
Munsell: core: 7.5R 4/1 and 5/6; int.: 7.5YR 6/3; ext.: 7.5YR 5/1.
H.: 3.2; L.: 2.8; T.: max: 0.88, min. 0.4.
Cut ware, small body fragment, reduced firing, deco.: Kerbschnitt
*References*: Example from Jerash – not identical deco. from Gawlikowski's 1982 excavation exhibited in Jerash Museum show case "Byzantine Age 324-630 A.D."; Gawlikowski (1996), p. 117; Stacey (2004), p. 93 fig. 5.6; Walmsley (1995), p. 668 "Ware 19", fig. 9.6-7; Avissar (2005), p. 49 fig. 2.10 no. 2.
Byzantine or Abbasid.

**Handmade Geometric Painted Ware (HGPW) (SBr)**
*Rims*
33.
J13-Dab-7-8
Rim, fragmented.
Fig. 33.
Munsell: core: 2.5YR 6/6; int.: 10YR 8/2 and 7.5YR 3/1, ext.: 10YR 8/2 and 7.5YR 3/1.
Diam.: 20; H.: 2.7; L.: 3.9; T. min.: 0.7; max.: 0.8.
Bowl, convex sloping neck and body with flattened out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sloping rim. Ledge at int. circulating rim; deco. int.: two horizontal lines, straight and wavy; ext.: two horizontal lines, circulating rim; rim: two horizontal lines framing four sloping lines.
*References*: deco.: Franken (1975), p. 184, no.: 1; shape: Walker (2009), p. 101, no. 3, Franken (1975), p. 178, no.1, Franken (1975), p. 182, no.14; Lichtenberger, Raja and Sørensen (forthcoming), fig. 38.
Late Ayyubid – Mamluk (Late 12th – 14th century AD).

34.
J13-D-9-3
Rim, fragmented.
Fig. 34.
Munsell: core: 5YR 7/6; int.: 7.5YR 7/6, ext.: 2.5YR 3/3; slip: 10YR 8/3.
Diam.: 16; H.: 8.9; L.: 7.7; T. min.: 0.9; max.: 1.
Jug; slightly out sloping neck/body. Rounded, straightened rim, vague ledge under rim ext.; painted deco. int.: two horizontal lines, straight and wavy; deco. ext.: six horizontal lines, not linear circulating rim; triangular pattern on body/neck; rim: dark line covering rim.
*References*: deco.: Franken (1975), p. 184, fig. 10; shape: Franken (1975), p. 182, fig. 22; Thuesen (1988), p. 228, no. 10.
Late Ayyubid – Mamluk (Late 12th – 14th century AD).

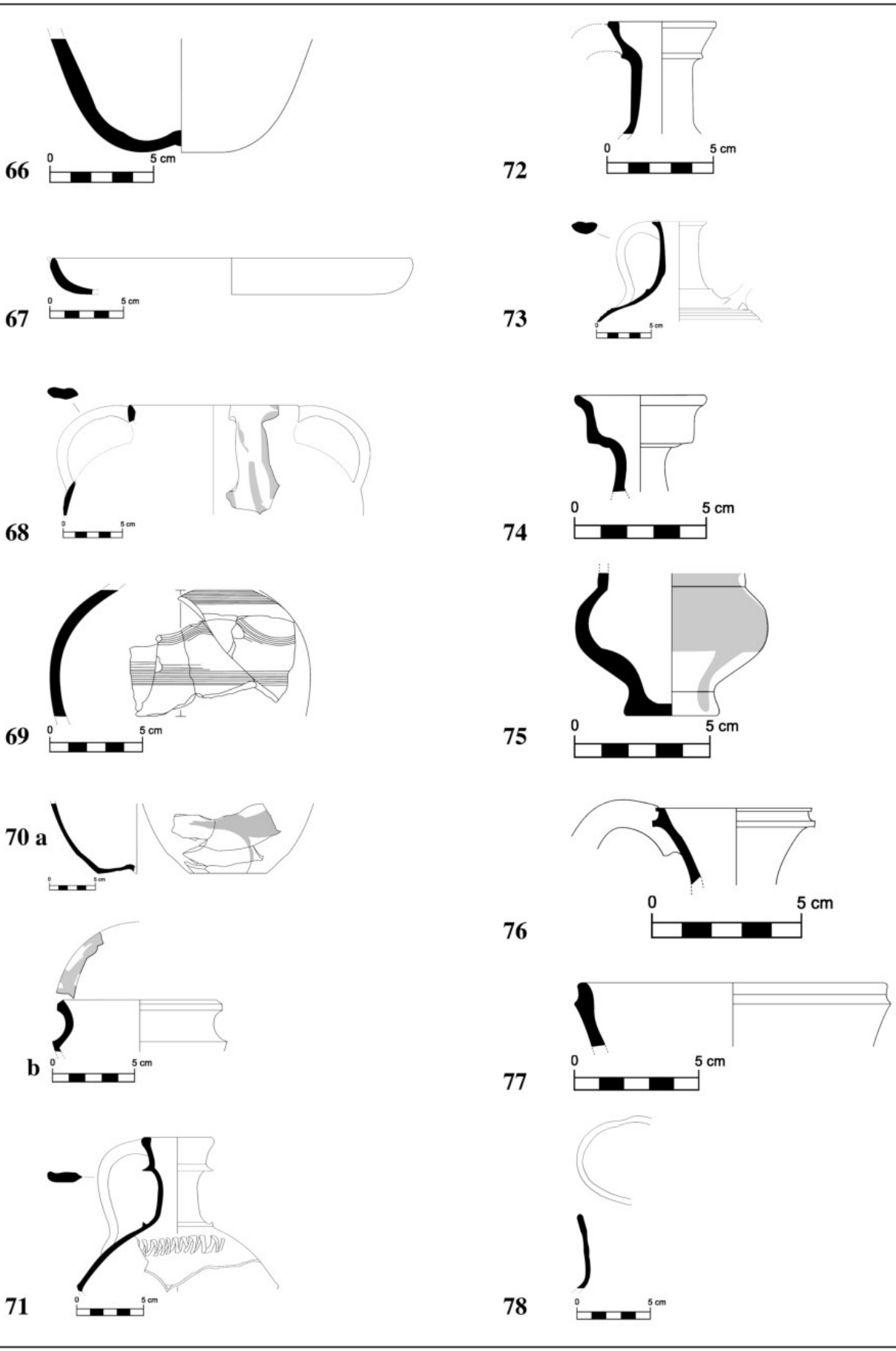
35.
J13-D-9-4
Rim, fragmented.
Fig. 35.
Munsell: core: 10YR 8/3 and 7.5YR 7/6; int.: 10YR 7/2 and 2.5YR 3/3 ext.: 10YR 8/2 and 2.5YR 3/4.
Diam.: 14; H.: 4.2; L.: 9.5; T. min.: 0.6; max.: 0.8.
Bowl, convex sloping neck/body, flattened rim; deco. int.: pointed lines circulating body, framed by two horizontal lines. Broad horizontal line encircling a geometric pattern; deco. ext.: crosshatched lines at covering outer surface, broad line circulating rim. Rim: dark line covering rim.
*References*: deco.: Tholbecq (1997-1998), p. 164, fig. 16, Franken (1975), p. 184, no. 16; Franken (1975), p. 195, no. 15.
Late Ayyubid – Mamluk (Late 12th – 14th century AD).

36.
J13-Dab-10-35 and Dab-29-6
Rim, fragmented.
Fig. 36.
Munsell: core: 5YR 6/4; int.: 7,5YR 7/3; ext.: 7,5YR 6/6; deco.: 10R 4/4.
Diam.: 46; H.: 9.9; L.: 17; T. min.: 0.8; max.: 1.5.
Bowl with convex sloping neck/body; flattened, out turned rim; ledge int., circulating rim; deco. int.: broad horizontal line circulating rim, geometric triangular pattern at upper body; geometric spirals following a broad pointed line at lower body; deco. ext.: two horizontal lines, straight and wavy, circulating rim; rim: crosshatched pattern framed by two horizontal lines.
*References*: deco.: Franken (1975), p. 197, fig. 16-20; shape: Thuesen (1988), p. 237, no.4 and p. 236, no. 4; Lichtenberger, Raja and Sørensen (forthcoming), fig. 40.
Late Ayyubid – Mamluk (Late 12th – 14th century AD).

*Bases*
37.
J13-D-9-2 and Eb-17-1
Base, fragmented.
Fig. 37.
Munsell: core: 2.5YR 6/6; int.: 7.5YR 7/6; ext.: 7.5YR 7/4; deco.: 7.5YR 3/2.
Diam.: 16; H.: 3.1; L.: 7.2; T. min.: 0.8; max.: 2.6.
Bowl/plate; base: flattened, concave at centre; but sloping body; piercing in base; deco.: int.: 2x4 dark lines framing the centre; centre: spiral patterns, triangular and circular; ext.: undecorated. Base: three black painted triangles, part of a star form.
*References*: deco.: Tholbecq (1997-1998) p. 164, fig. 16; Avissar (2005), p. 74 fig. 2.24 no. 6; shape: Franken (1975) p. 193, fig. 25-26; Lichtenberger, Raja and Sørensen (forthcoming), fig. 44.
Late Ayyubid – Mamluk (Late 12th – 14th century AD).

38.
J13-D-9-9
Base, fragmented.
Fig. 38.
Munsell: core: 10R 2/1; int.: 10R 3/3; ext.: 10R 4/6; deco.: 10YR 8/2.
Diam.: 5.5; H.: 6.2; L.: 12.7; T. min.: 0.9; max.: 1.2.
Jug, base concave at centre. Globular body; deco.: int.: chequered pattern flanked by two vertical wavy lines. Deco. very poorly preserved. Most likely from a jug similar to cat. no. 40.
*References*: Tolbecq (1997), p. 162 no. 8; Walmsley (2008), p. 134, fig. 27.
Late Ayyubid – Mamluk (Late 12th – 14th century AD).

39.
J13-Eab-8-9
Base, fragmented.
Fig. 39.
Munsell: core: 7.5YR 7/3; int.: 2.5YR 7/6 and 5YR 8/3; ext.: 7.5YR 7/3; deco.: 10R 3/1 and 10R 3/4.
Diam.: 9.9; H.: 3.9; L.: 6.7; T. min.: 1.2; max.: 3.3.
Bowl with disk base; deco. int.: chequered triangular pattern, circulating a squared spiral at centre. Two horizontal lines, straight and wavy; ext.: broad dark line circulating base and lower body; ext.: three black painted triangles, part of a star form.
*References*: Franken (1975), p. 193, fig. 3; Lichtenberger,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Raja and Sørensen, fig. 44; Walmsley (1997-98), fig. 10 no. 3; Avissar and Stern (2005), no. II.1.4.1 (fig. 3), II.4.4.1 (fig. 2); Avissar (2005), p. 74, fig. 2.24 no. 6.
Late Ayyubid – Mamluk (Late 12th – 14th century AD).
*Body*
40.
J13-Da-9-10,11 and Da-10-36
Body, fragmented.
Fig. 40.
Munsell: core: 2,5YR 4/8 and 7.5R 3/1 and 7.5R 5/8; int.: 10R 5/4 and 7.5 5/3; ext.: 2.5YR 5/8; deco.: white page: N/9.5 and white page 7.5YR 1/9 and 10R 4/4.
Diam. max: 14.5; H.: 20.3; L.: 14.5; T. min.: 0.5; max.: 1.3.
Jug with outwards sloping neck and globular body; handle not preserved, but attachments at mid neck and body are visible. Sandwich core at upper part of vessel, but not in the lower part; deco.: ext.: four sections of decorations at neck, shoulder and body; geometric patterns; pointed lines circulating shoulder, square geometric pattern at neck and mid body; chequered pattern at lower part of body. Deco. poorly preserved.
*References*: deco. and shape: Milwright (2001), p. 19, fig. 5; Walmsley (2008), p. 134, fig. 27; Walker (2009), p. 114 no. 9, Tholbecq (1997), p.162, no. 1; shape: Walker (2012), p. 584, fig. 4.24 no. 1.
Late Ayyubid – Mamluk (Late 12th – 14th century AD).

**Lamps (SKr)**
*Rims*
41.
J13-Gb-12-107
Rim and filling-hole, fragmented.
Fig. 41.
H.: 1.4; L.: 2.3; T.: 0.2 – 0.4.
Munsell: core: 7.5YR 8/4; int.: 7.5YR 8/4; ext.: 7.5YR 7/4; Slip: 2.5YR 4/6.
Moulded lamp with rounded body; hard fired; deco.: upper ext. surface, ovules, dots and curving lines; traces of a slip.
*References*: Loeschke (1919), typus VIII; Kennedy (1963), type 5, plate XXII, no. 507-508; Rosenthal and Sivan (1978), Broneer type XXV, no. 138, 145, 155, 157-159, 164; Bailey (1988), Q1952-1956; Kenkel (2012), gruppe 14, La 50, 58.
Roman (Late 1st – late 3rd century AD).

42.
J13-Gd-28-12
Rim, nozzle and wick-hole, fragmented.
Fig. 42.
H.: 2.6; L.: 3.6; T.: 0.4 – 0.5.
Munsell: core: 2.5YR 6/6; int.: 2.5YR 6/4; ext.: 1.5 YR 6/6; slip: 2.5YR 3/6.
Moulded Gerasa lamp; triangular nozzle; hard fired; sporadic, small lime inclusions; square rim; traces of fire int. and around wick-hole; deco.: upper ext. surface, relief in the shape of straight and curving grooves and oval-shaped dots; covered with slip.
*References*: Rosenthal and Sivan (1978), no. 391-393; Kehrberg (1989), no. 15-21.
Roman (2nd century AD).

43.
J13-Ha/Ha1-13-28
Rim and filling-hole, fragmented.
Fig. 43.
H.: 1.5; L.: 4.6; T.: 0.2 – 0.6.
Munsell: core: 7.5YR 6/2; int.: 7.5YR 6/3; ext.: 5YR 5/4 and 5YR 5/1.
Moulded Gerasa lamp with round body; hard fired; sporadic, small lime and quarts inclusions; rim is square; traces of fire on int. and ext. surfaces; deco.: upper ext. surface, relief in the shape of curving lines, a vine leaf and a grapevine; partially preserved carinated volute.
*References*: Rosenthal and Sivan (1978), no. 391-393, esp. no. 391; Kehrberg (1989), no. 15-21.
Roman (2nd century AD).

44.
J13-Ec-13-47
Rim, filling-hole and wick-hole, fragmented.
Fig. 44.
Diam. max (rim): 2.2; H.: 1.6; L.: 5; T.: 0.3 – 0.7.
Munsell: core: 5YR 7/4; int.: 5YR 6/4 and 5YR 3/1; ext.: 5YR 7/4; slip: 5YR 5/6.
Moulded lamp with round to slight oval body; hard fired; sporadic, small lime inclusions; rim is square; int. and ext. traces of fire; deco.: upper ext. surface, relief in the shape of pointed and curving lines, dots and a circle; traces of slip.
*References*: Da Costa (2001), fig. 5; Kehrberg (2001), fig. 5, a-b; Kenkel (2012), gruppe 18, variante B, La 88-89.
Byzantine (4th – 6th century AD).

45.
J13-Dab-29-7
Rim and filling-hole, fragmented.
Fig. 45.
H.: 1.6; L.: 4.3; T.: 0.25 – 0.7.
Munsell: core: 7.5YR 6/6; int.: 7.5YR 6/6; ext.: 7.5YR 6/6.
Moulded "candlestick" lamp with oval body; hard fired; small to medium, frequent lime inclusions; rim is square to round; deco.: upper ext. surface, relief in the shape of curving and oblique, ellipse-shaped lines.
*References*: Kennedy (1963), pl. XXVI, no. 658-659; Rosenthal and Sivan (1978), no. 475-485; Ball *et al.* (1986), pl. V, 14-15; Scholl (1986), group I, nos. 1; Zayadine (1986), pl. VI, 1, 4; Da Costa (2001), fig. 3, 5.
Byzantine – Umayyad (5th – early 8th century AD).

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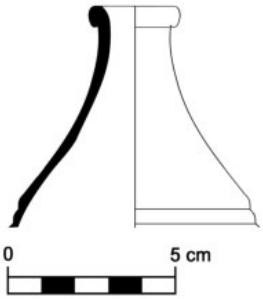


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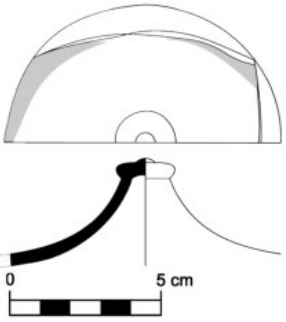


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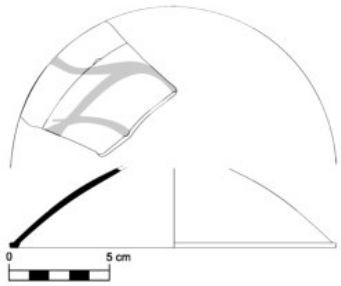


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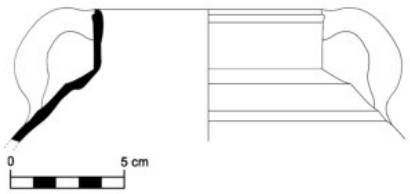


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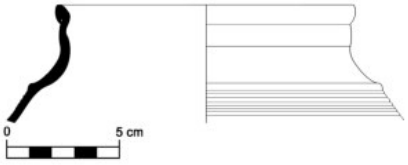


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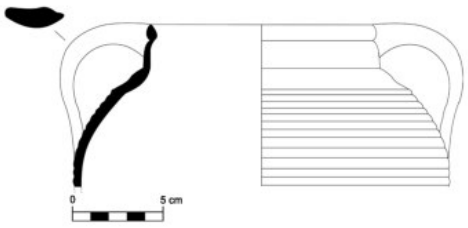


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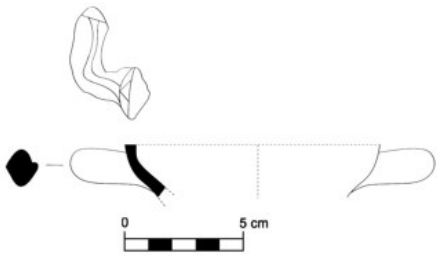


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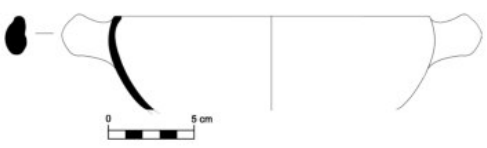


46.
J13-Ec-13-21and 27
Rim, filling-hole, wick-hole and handle, fragmented.
Fig. 46.
H.: 2.4; L.: 7; T.: 0.2 – 0.5.
Munsell: core: 5YR 5/6; int.: 5YR 6/4; ext.: 7.5YR 7/4.
Moulded Jerash lamp with teardrop-shaped body; handle is raised and curved; hard fired; rim is square to round; traces of fire around wick-hole; deco.: upper ext. surface, relief in the shape of curving and oblique lines, circles, dots and a cross.
*References*: Ball *et al*. (1986), pl. V, no. 16-15; Scholl (1986), group II, nos. 3.
Late Byzantine – Umayyad (Late 6th century – late 7th century AD).

47.
J13-Ed-19-6 and J13-Ed-20-24
Rim, filling-hole and base, fragmented.
Fig. 47.
H.: 3.4; L.: 7.6; T.: 0.3 – 0.6.
Munsell: core GLEY1 4/N; int.: GLEY1 4/N; ext.: GLEY1 5/N.
Moulded Jerash lamp with oval body; hard fired; frequent, small black and lime inclusions; rim is square; shallow ring-stand; deco.: upper ext. surface, relief in the shape of curving, straight and oblique lines, circles and dots; lower ext. surface, relief in the shape of a circle.
*References*: Scholl (1986), group II; Lichtenberger, Raja and Sørensen (forthcoming), no. 50.
Late Byzantine – Umayyad (Late 6th century – late 7th century AD).

48.
J13-Fd-40-11
Almost intact.
Fig. 48.
H.: 3.5; L.: 10.6; T.: 0.2 – 2.3.
Munsell: core: 10 YR 4/2; int.: 10YR 4/2; ext.: 10YR 4/2 and 2.5YR 5/4.
Moulded Jerash lamp with teardrop-shaped body; handmade zoomorphic handle; hard fired; frequent, small lime inclusions; rim is square; shallow ring-stand; int. and ext. traces of fire; dark traces of fire around wick-hole; deco.: upper ext. surface, relief in the shape of curving, straight and oblique lines, circles, dots and a cross; lower ext. surface, relief in the shape of circles and curving lines.
*References*: Ball *et al*. (1986), pl. V, fig. 19; (1989), no. 25-26; Scholl (1986), group III, nos. 4; Zayadine (1986), pl. VI, 2-3, 5-12; Lichtenberger, Raja and Sørensen (forthcoming), no. 53.
Late Byzantine – Umayyad (Late 6th century – middle of the 8th century AD).

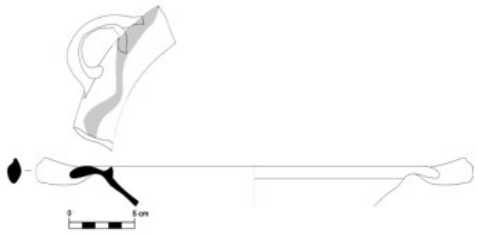
49.
J13-Fb-40-111
Rim, base, handle and filling-hole, partially intact.
Fig. 49.
H.: 4.2; L.: 5.8; T.: 0.2 – 1.3.
Munsell: core: 7.5YR 5/1; int.: 7.5YR 5/1; ext.: 7.5YR 5/1 and 7.5YR 7/3.
Moulded Jerash lamp with oval body; handmade zoomorphic handle; hard fired; frequent, small to medium lime inclusions; rim is square; shallow ring-stand; traces of fire on upper ext. surface; deco.: upper ext. surface, relief in the shape of curving and oblique lines, circles, dots and a cross; lower ext. surface, relief in the shape of circles, oblique and curving lines.
*References*: Ball *et al*. (1986), pl. V, fig. 19, 21; (1989), nos. 25-26; Scholl (1986), group III; Zayadine (1986), pl. VI, 2-3, 5-12.
Late Byzantine – Umayyad (7th century – middle of the 8th century AD).

*Bases*
50.
J13-Ha/Ha1-13-54
Base, fragment.
Fig. 50.
Diam. (base): 6; H.: 1.4; L.: 4.7; T.: 0.5 – 0.9.
Munsell: core: 7.5YR 8/3; int.: 2.5YR 3/3; slip: 10R 5/8.
Moulded lamp with round body; hard fired; sporadic, small grey/brown stone and lime inclusions; shallow ring-stand; deco.: lower ext. surface, circular groove; relief in the shape of slightly curving lines; surface covered with slip.
*References*: McNicoll *et al*. (1992), pl. 81, no. 1-3.
Late Hellenistic – early Roman (1st century BC).

51.
J13-Fa-17-8
Base, fragmented.
Fig. 51.
Max. Diam. (base): 1.8; H.: 0.9; L.: 3.8; T.: 0.1 – 0.2.
Munsell: core: 5YR 7/6; int.: 5YR 7/6; slip: 2.5 YR 4/6.
Moulded lamp with round body; slightly concave base; hard fired; sporadic, small stone and lime inclusions; deco.: lower ext. surface, circular groove; surface covered with slip.
*References*: Loeschcke (1919), type VIII; Rosenthal and Sivan (1978), Broneer type XXV, no. 387-390; Hadad (2001), type 7; Kenkel (2012), gruppe 13.
Roman (1st – 3rd century AD).

*Handle*
52.
J13-Dab-16-9
Handle, fragmented.
Fig. 52.
H.: 2.2; L.:1.7; T.: 1.2 – 1.5.
Munsell: core 1: 2.5YR 4/1; core 2: 2.5YR 5/6; ext.:

**90**

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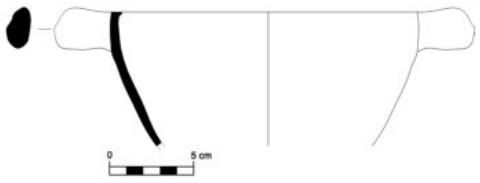


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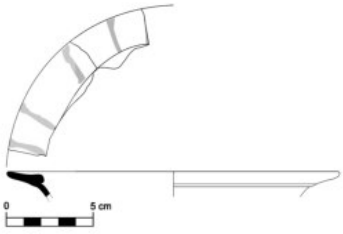


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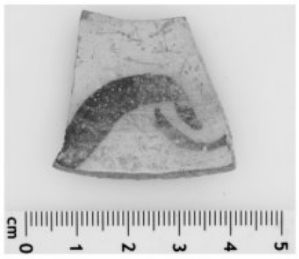


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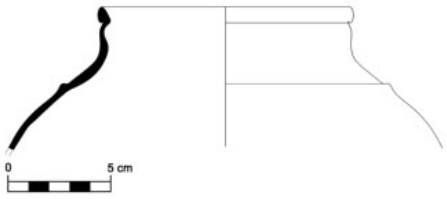


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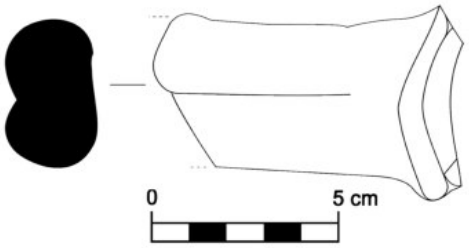


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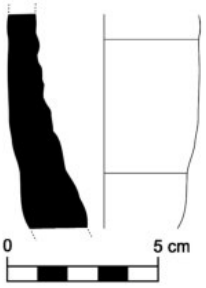


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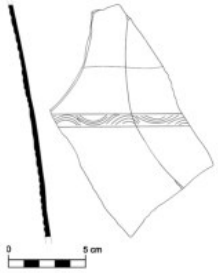


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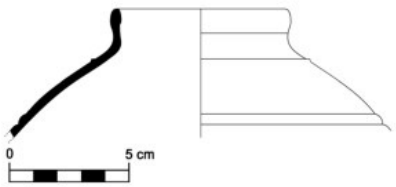


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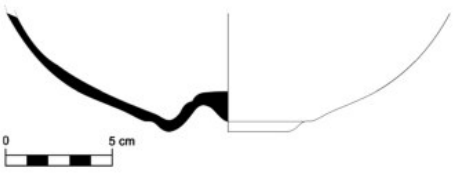


2.5YR 5/6.
Handmade zoomorphic handle; hard fired; small, frequent lime inclusions; deco.: upper ext. surface, straight grooves below the head.
*References*: Scholl (1986), group III-V.
Late Byzantine – Umayyad (Late 6th century – mid 8th century AD).

**Lanterns (SKr)**
*Rims*
53.
J13-Ed-18-67-70
Rim, handle and shoulder, fragmented.
Fig. 53.
Diam. (max): 18; H.: 19.3; L.: 18; T.: 0.4 – 0.8.
Munsell: core: 10YR 7/4; int.: 10YR 7/4; ext.: 2.5YR 7/6.
Handle is round, clear cut circle of terracotta; handmade attachment of handle; shoulder bends inwards; part of the knife-cut opening for the lamp; medium-sized holes have been cut from the ext.; hard fired; wheel made; medium levigation; sporadic, small lime and quarts inclusions; traces of fire around lamp hole; horizontal, carinated lines on neck and shoulder.
*References*: Piazza (1983-1984), fig. 46; Gawlikowski and Musa (1986), no. 33; Uscatescu (1996), fig. 31, fig. 77, 437, fig. 101, 701; Lichtenberger, Raja and Sørensen (forthcoming), no. 59, 61 and 63.
Late Byzantine – Umayyad (5th century – late 7th century AD).

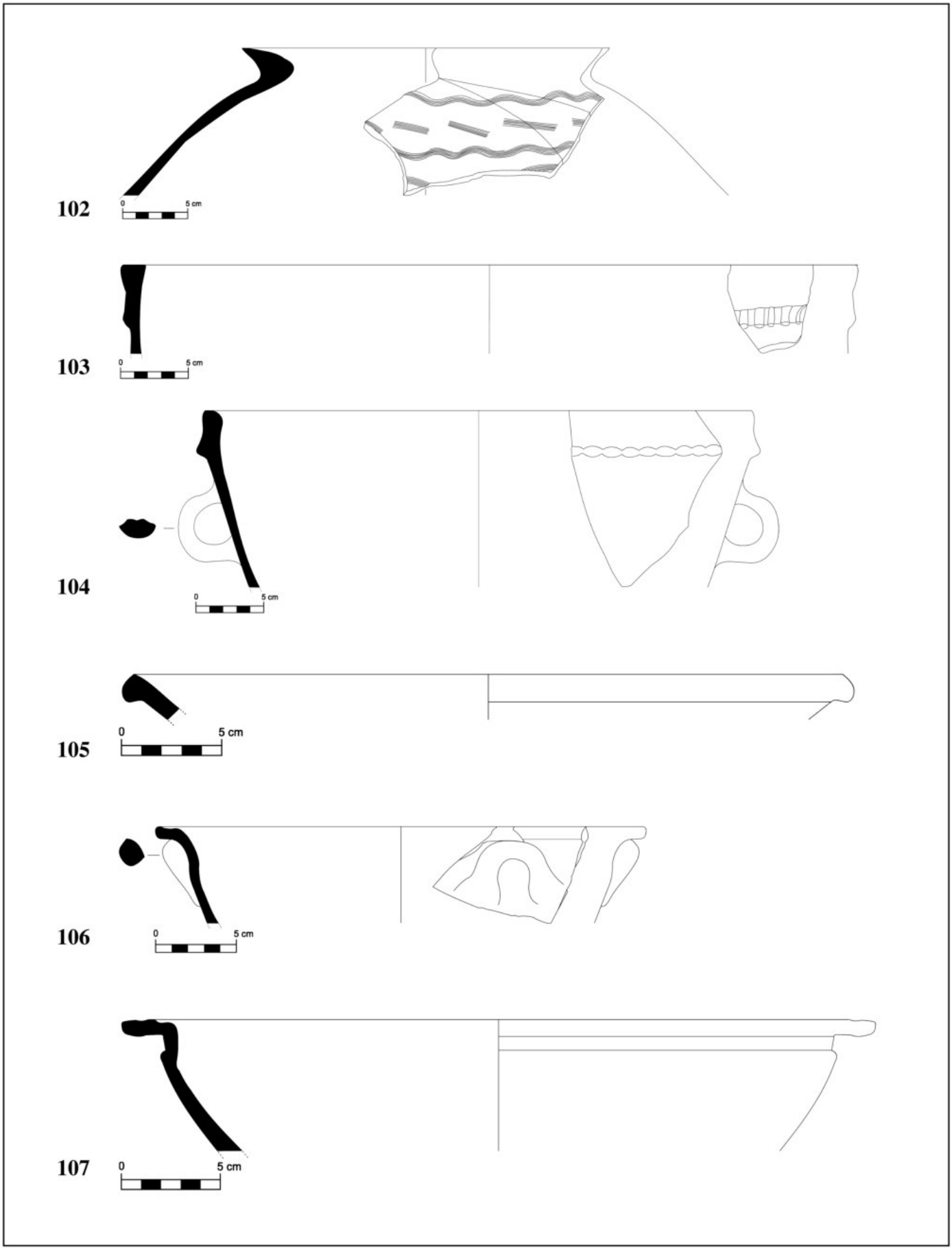
*Base*
54.
J13-Gb-9-5+16
Base, fragmented.
Fig. 54.
Diam. (base): 12; H.: 4.5; L.: 10.1; T.: 0.3 – 0.7.
Munsell: core: 2.5YR 5/8; int.: 2.5YR 6/8; ext.: 2.5YR 6/8.
Base is flat and round; body bends outwards; medium-sized holes have been cut from the ext.; hard fired; wheel made; medium levigation; covered with line int. and ext.; frequent, small to medium lime inclusions.
*References*: Piazza (1983-1984), fig. 46; Gawlikowski and Musa (1986), no. 33; Uscatescu (1996), fig. 31; Lichtenberger, Raja and Sørensen (forthcoming), no. 61 and 63.
Byzantine – Umayyad (5th century – late 7th century AD).

*Body*
55.
J13-Hc-4-8
Shoulder, fragmented.
Fig. 55.
Diam. (shoulder): 15; H.: 2.65; L: 9; T.: 0.4 – 1.
Munsell: core: 7.5YR 5/4; int.: 7.5YR 6/3; ext.: 10YR 7/3.
Fragment of a shoulder; body bends inwards; small holes have been pierced from the ext.; medium fired; wheel made; medium levigation; frequent, small lime, black and quarts inclusions; rim is pointed; deco.: upper ext. surface, deep grooves in the shape of pointed lines, and circles enclosing central pointed lines.
*References*: Uscatescu (1996), fig. 76, 407-409, 411, 413; fig. 77, 436 (in terms of decorated ext. surface); Bonifay (2004), fig. 168, p. 300; Ferrazzoli *et al*. (2010), fig. 3, no. 20-27, fig. 4, no. 29-36; Lichtenberger, Raja and Sørensen (forthcoming), no. 56.
Late Byzantine – Umayyad (6th century – late 7th century AD).

**Table Wares** (PE; SBr)
*Bowls*

*Rims*
56.
J13-Ha-13-11A
Rim, fragmented.
Fig. 56.
Munsell: core: GLEY26/10B; int. and ext.: GLEY17/10Y; 2.5Y 2,5/1; 2.5Y 6/3.
Diam. (rim): 24; H.: 6.1; L.: 10.9; W. (rim): 1.2; T. (max.): 0.5; (min.): 0.3.
Bowl, hard-fired and rather finely levigated clay.
*References*: form: Kraeling (1938), p. 562-563, fig. 41, no. 21; p. 569, fig. 46, no. 31.
Roman (1st century AD).

57.
J13-Ha/a1-13-59
Rim and base, intact profile.
Fig. 57.
Munsell: core: 5YR 4/3; int.: 5YR 5/3; ext.: 5YR 5/2.
Diam. (base): 3.46 (rim): 13; H.: 3.6; L.: 12.1; T. (max.): 0.5; (min.): 0.2.
Bowl, hard-fired and medium levigated clay.
*References*: Lapp (1961), p. 180, J Qumrân II.
Roman (1st century AD).
58.
J13-Ga-12-25
Rim and body, fragmented.
Fig. 58.
Munsell: core: 2.5YR 6/6; ext.: 2.5YR 7/8; slipped int.: 2.5YR 6/8.
Diam. (rim): 22; (base): 19.5; H.: 3.5; L.: 18.5; T. (max.): 0.6; (min.): 0.5.
Bowl/large plate; hard fired, rather coarse clay with some air pockets.
*References*: form: Uscatescu (1996), p. 243, 17, fig. 37, 17; Hayes (1972), ARS Form 181.
Roman (2nd half of 2nd – 1st half of 3rd century AD).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59.
J13-Ga-12-24
Rim, base and body, almost intact.
Fig. 59.
Munsell: core1: 2.5YR 6/8; core2: 2.5YR 6/4; int.: 10R 6/8 + 5/6; ext.: 5YR 7/6, 7/4 + 10R 5/4.
Diam. (rim): 30; (base): 26; H.: 4.6; L.: 30; T. (max.): 1.1; (min.): 0.6.
Bowl/large plate, intact profile, hard fired, medium – finely levigated clay.
*References*: form: Uscatescu (1992), p. 243, fig. 37; Hayes (1972), ARS Form 181.
Roman (2nd half of 2nd – 1st half of 3rd century AD).

60.
J13-Ha/a1-13-57
Rim, fragmented.
Fig. 60.
Munsell: core1: 7.5YR 7/4; core2: 2.5YR 6/8; int.: 5YR 7/6; ext. 5YR 6/4.
Diam. (rim): 26; H.: 4.5; L.: 13.3; T. (max.): 1; (min.): 0.4.
Bowl, hard-fired and medium levigated clay.
*References*: Gawlikowski and Musa (1986), p. 144, fig. 5, no. 4.
Byzantine (5th – 6th century AD).

61.
J13-Ha/a1-14-6
Rim, fragmented.
Fig. 61.
Munsell: core1: 10YR 4/1; core2: 2.5YR 6/8; int.: 2.5YR 6/8; ext.: 2.5YR 6/8+2.5YR 4/2.
Diam. (rim): 20; H.: 3; L.: 6.4; T. (max.): 1.3; (min.): 0.4.
Bowl, hard-fired and medium levigated, well settled clay.
*References*: Gawlikowski and Musa (1986), no. 26, fig. 7.2; resembles: Hayes 1972, LRC Form 3.
Byzantine (2nd half of the 5th century AD).

62.
J13-Hc-3-8
Rim, fragmented.
Fig. 62.
Munsell: core: 10R 6/8; int. and ext. slipped: 10R 5/8.
Diam. (rim): 22; H.: 3.4; L.: 3.4; W.: 1.3; T. (max.): 0.7; (min.): 0.6.
Bowl, flat outwards folded rim; hard-fired and very finely levigated clay.

*Orange Ware*
63.
J13-Ha/Ha1-13-30
Rim, fragmented.
Fig. 63.
Munsell: core: 10R 6/8; int.: 10R 7/6; ext.: 10R 6/6.
Diam.: 28; H.: 3.05; L.: 9; T. min.: 0.4; max.: 0.5.
Bowl with out-folded rim, neck flaring inwards; distinct convex shoulder, steep body shape.
Uscatescu (1996) p. 339, no. 343; Gawlikowski-Musa (1986), no. 26, fig. 7, 2; resembles: Hayes (1972) LRC, Form 3.
Byzantine (5th – 6th century AD).

*Reddish/Red Brown Ware*
64.
J13-Ga-12-35
Rim, fragmented.
Fig. 64.
Munsell: core: 2,5YR 5/4; int.: 2,5YR 6/6; ext.: 2,5YR 4/4.
Diam.: 24; H.: 4.2; L.: 8.6; T. min.: 0.4; max.: 0.6.
Bowl with flattened out turned rim; very distinct shoulder; vertically attached, carinated handle, attached over rim.
*References*: Uscatescu (1996), p. 286, Grupo XVI fig. 5, (figura 16); Negev (1986), p. 98, fig. 821, 822; Gaspar (2009), p. 663, fig 19, no. 29.
Late Roman.

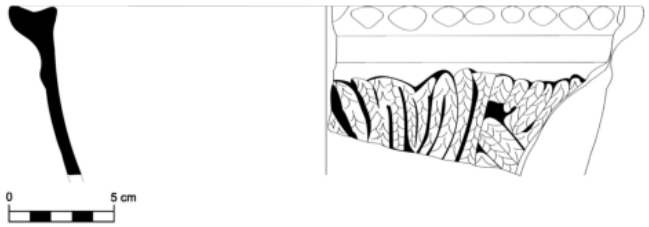
65.
J13-Dab-17-22
Rim, fragmented.
Fig. 65.
Munsell: core: 2.5YR 5/6 and 2.5YR 3/2; int.: 2.5YR 6/8; ext.: 2.5YR 5/6.
Diam.: 18; H.: 4.3; L.: 4.5; T. min.: 0.33; max.: 0.9.
Bowl with high, straightened neck and rounded rim; deco.: incised wavy line at ext.
*References*: Uscatescu (2001), p. 75, no. 1, 2; Uscatescu (1996), p. 303, fig. 33 and p. 338 no. 338 and p. 370 no. 687; Magness (1993), p. 194, fig. 1, 3.
Late Byzantine (late 6th century – 1st half of 7th century AD).

*Bases*
*Reddish/Red Brown Ware*
66.
J13-Ed-18-33
Base, intact profile.
Fig. 66.
Munsell: core: 2.5YR 6/6; int.: 2.5YR 6/8; ext.: 2.5YR 6/8.
Diam.: 10; H.: 4.6; L.: 4.4; T.: min. 0.3; max. 0.5.
Bowl/cup. Omphalos base.
*References*: Uscatescu (1996), p. 338, no. 329.
Date: Byzantine.

*Plate*
*Rim*
67.
J13-Gf-30-36
Rim and 'spout', fragmented.




**108**



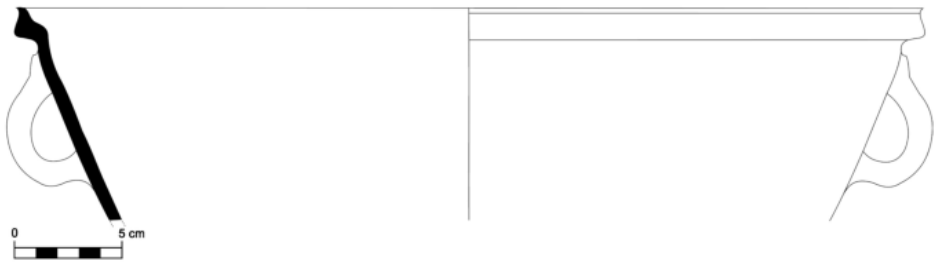

**109**




**110**




**111**




**112**

Fig. 67.
Munsell: core1: 10R 4/1; core2: 10R 5/6; int.: 10R 5/6; ext.: 10R 5/6.
Diam. (rim): 28; H.: 1.7; L.: 6.8; T. max.: 0.7; min.: 0.4.
Plate, hard-fired, medium levigated, well settled clay. A little 'spout' (not wider than a thumb) on rim; the spout is not indicated in the drawing.
*References*: form, without the 'spout': Rasson (1986), fig. 17, 2; Hayes (1972), ARS Form 181.
Roman (2nd half of the 2nd century – 1st half of the 3rd century AD).

*Jars*
*Rim*
*Reddish/Red Brown Ware*
68.
J13-Dab-13-23
Rim, fragmented.
Fig. 68.
Munsell: core: 2.5YR 4/8; int.: 2.5YR 5/8; ext.: 2.5YR 4/6; deco.: White page N/9.
Diam.: 14.6; H.: 9.8; L.: 4.3; T.: 0.6.
Jar with a rounded rim; rim fragment with intact handle attached; vertical set carinated handle, over folded rim. Body fragment preserved at handle; deco.: Three white vertical lines at handle.
*References*: Ball (1986), p. 354, no. 1.
Late Roman – Byzantine.

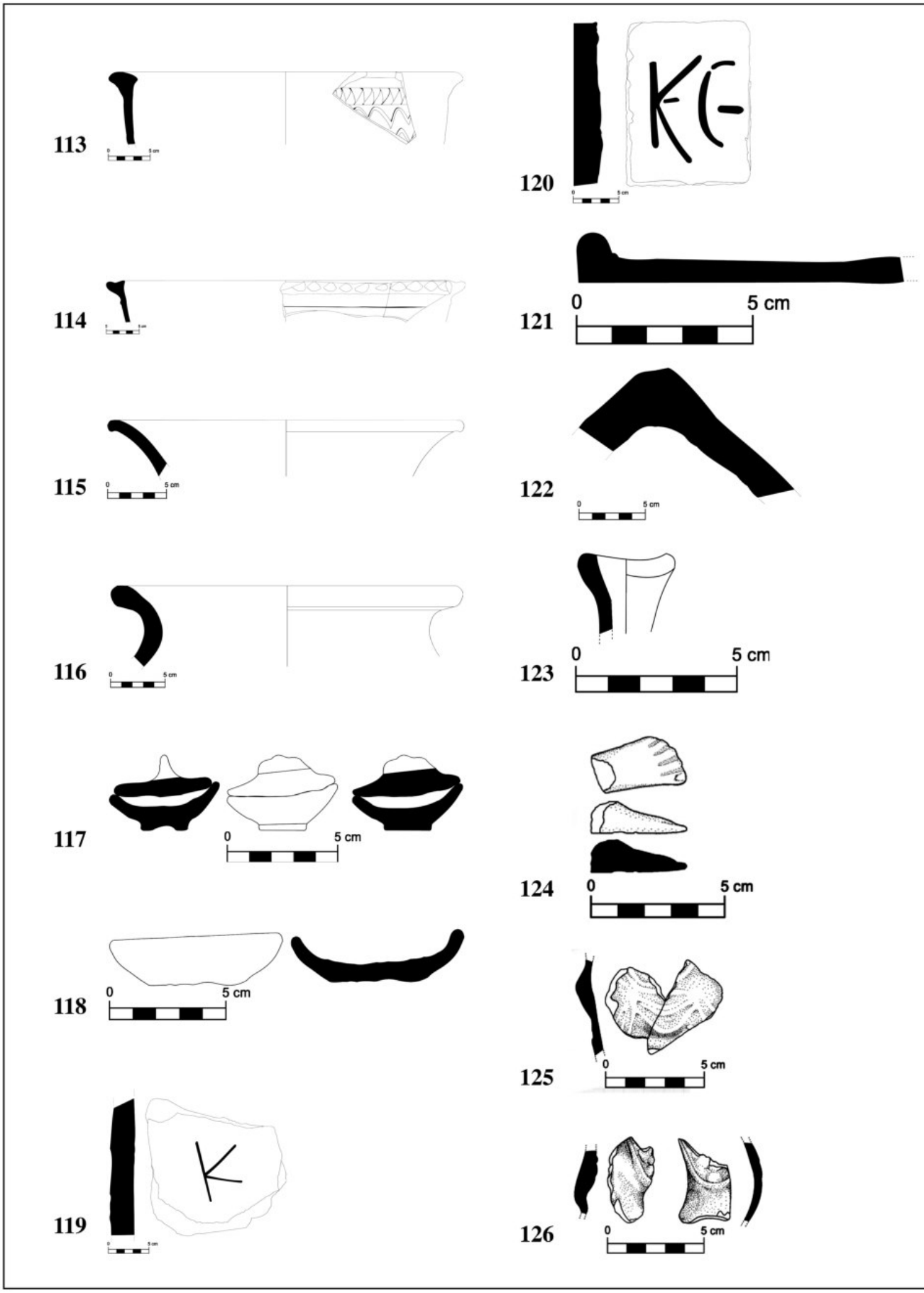
*Body*
69.
J13-Ed-19-23
Fig. 69.
Body, fragmented.
Munsell: core: 5Y 8/1; int.: 10YR 8/2; ext.: 5Y 8/1.
Diam. max: 14; H.: 6.8; T.: max.: 0.65; min.: 0.6.
Five joining pieces of a closed vessel of a cream coloured fabric. Softly fired, few lime and small stone inclusions. Deco.: combed horizontal and wavy lines running around the vessel; probably corresponds to one of the cream wares occurring in the 8th century AD. According to Walmsley: "Ware 7".
*References*: Ware: Whitcomb (2008), p. 490; Walmsley (1995), p. 661.
Abbasid (?).

*Painted Buff Ware*
*Rim*
70.
J13-D-9-8
Fig. 70a-b.
Rim, base and body, fragmented – rim and base do not join.
Munsell: core: 5YR 6/8; int.: 5YR 7/6 and 7.5YR 7/6; ext.: 5YR 7/6 and 5YR 5/8; deco.: 2.5YR 4/4 and 2.5YR 3/4.
Diam. rim: 10, base: 20; H.: rim 2.8, base: 7.5; L.: rim: 5.5, body: 12.2; T.: max: 0.5, min.: 0.2.
Flattened rim, omphalos base, deco.: irregular sprays of dark brown paint on ext. of body and on lip. Rim and body do not join, but may belong to the same vessel – probably a jug or a jar.
*References*: Avissar and Stern (2005), p. 111-112, fig. 46.1-2 (Mamluk); Smith (1973), p. 237-238, pl. 71 no. 479, 480, 928 (Abbasid); McNicoll (1992), p. 194, pl. 125.4 (Fatimid-Mamluk)
Ayyubid – Mamluk.

*Jugs*
*Rims*
71.
J13-Dab-13-7
Rim, fragmented.
Fig. 71.
Munsell: core: 2.5YR 5/8 and 2.5YR 4/1; int.: 2.5YR 5/8 and 2.5YR 4/1 and 2.5YR 4/2; ext.: 2.5YR 5/8 and 2.5YR 4/1 and 2.5YR 4/2.
Diam.: 5.4; H.: 11.4; L.: 10.2; T. min.: 0.3; max.: 0.4.
Jug; rim, neck and handle intact. Rounded inwards folded rim; rim and upper neck flaring outwards. Ledge secondarily attached at upper part of neck and shoulder. Globular body shape. Rocker pattern impressed at upper body/shoulder. Flattened, vertical handle; probably a spouted jug.
*References*: Shape: Pierobon (1978-1980), p. 102, fig. 8 – Je 5071; Canivet (1992), fig. 5, no. 1, 2, 3; deco.: Canivet (1992), fig. 9, no. 2; fig. 5, no. 36; Lichtenberger, Raja, Sørensen (forthcoming) no. 81-82.
Late Byzantine (Late 6th century AD – 1st half of the 7th century AD).

72.
J13-Hc-5-4
Rim, fragmented.
Fig. 72.
Munsell: core: 10YR 5/2; int.: 10YR 5/1; ext.: 10YR 4/1.
Diam.: 5; H.: 5.2; L.: 4.5; T. min.: 0.2; max.: 0.7.
Jug with high funnel shaped neck with flattened out-flaring rim; handle attachment preserved under rim; convex ledge at upper part of neck.
*References*: Ball (1986), p. 356, no. 2; Teichner (2009), p. 984, fig. 6, no. 1.
Late Byzantine (late 6th century AD – 1st half of the 7th century AD).

73.
J13-Ed-18-88
Rim, fragmented.
Fig. 73.
Munsell: core: 2.5YR 6/6; int.: 2.5YR 6/6; ext.: 2.5YR


113
114
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5 cm

6/6.
Diam.: 5; H.: 9.2; L.: 14.4; T. min.: 0.3; max.: 0.5.
Spouted jug; rim, neck and handle intact, high straightened neck; convex ledge at shoulder; flattened out folded rim; ribbed and globular body; vertical carinated handle folded over lip; spout hole and spout attachment preserved on shoulder.
*References*: Canivet (1992), fig. 5, no. 1, 2, 3, fig. 3, no. 24; Lichtenberger, Raja and Sørensen (forthcoming), fig. 83; Uscatescu (1996), fig. 19, group XXIX, no. 5, fig. 80 no. 483.
Byzantine.

74.
J13-Gb-12-65
Rim, fragmented.
Fig. 74.
Munsell: core: 10R 5/2; int.: 2.5YR 7/6; ext.: 2.5YR 8/6.
Diam.: 5; H.: 3.6; L.: 5; T. min.: 0.35; max.: 0.6.
Jug with a high, narrow neck with funnel shaped mouth; out-flaring, rounded rim and convex ledge at upper part of neck. Most likely at spouted jug.
*References*: Piazza (1983-1984), p. 131, fig. H, no. 52; Berlin (1997), plate 49, no. PW 438; Oweiss (1985), p. 4, no. 27.
Byzantine.

*Base*
75.
J13-Ga-12-40
Base, fragmented.
Fig. 75.
Munsell: core: 5YR 7/3; int.: 2.5YR 6/6; ext.: 7.5YR 8/2; paint: 7.5YR 4/3.
Diam. (base): 3.5; H.: 5.2; L.: 7; T. max.: 0.2; min.: 0.25.
Flat base, closed vessel, hard-fired, but rather coarse clay with air pockets; deco.: paint/slip partly covering the ext. surface.
Not datable

*Reddish/Red Brown Ware*
*Rim*
76.
J13-Hc-4-12
Rim, fragmented.
Fig. 76.
Munsell: core: 7.5R 4/1 and 10R 5/6; int.: 7.5R 5/6; ext.: 7.5R 4/6.
Diam.: 5; H.: 2.5; L.: 4.3; T. min.: 0.2; max.: 0.6.
Jug with dual flattened rim, out folded. funnel shaped neck sloping outwards; handle attached at rim and neck, over folding the rim. Square, vertically placed handle, two shallow carinations. Sandwich core.
*References*: Walmsley (2008), p. 132 fig. 18.
Late Roman – Byzantine.

*Green Ware*
77.
J13-Ha/a1-20-4
Fig. 77.
Rim, fragmented.
Diam.: 12; H.: 2.5; L.: 4.1; W.: rim 0.6: T.: max: 0.8, min.: 0.4.
Closed shape, rounded rim, probably a neck jug.
*References*: Ware: resembles: Fuller (2011), http://users.stlcc.edu/mfuller/Area2pottery.html.
Possibly Abbasid.

78.
J13-Gb-12-82A
Fig. 78.
Rim, fragmented.
H.: 5; L.: 5.6; W.: rim: 0.5; T. max: 0.5, min.: 0.3.
Lip and neck slightly outcurving, irregular oval mouth, probably a neck jug.
*References*: Ware: resembles: Fuller (2011), http://users.stlcc.edu/mfuller/Area2pottery.html.
Possibly Abbasid.

*Juglet*
*Rim*
79.
J13-Ed-18-1X (J13-Ed-18-71)
Juglet, intact.
Fig. 79.
Munsell: core: 2.5YR 6/8; int.: 5YR 5/6 and 5YR 4/2; ext.: 5YR 6/6.
Diam.: rim: 3.6; max.: 6.6; H.: 21.8; T. min.: 0.2; max.: 0.4.
Juglet with high, slightly out-flaring neck, ribbed at ext.; flattened rim sloping inwards. Vertically set carinated handle; handle over folded at rim, and attached at shoulder. Cylindrical body shape, very finely ribbed, almost not visible, rounded base.
*References*: Konrad (2001), p. 177, no. 1; Lichtenberger, Raja and Sørensen (forthcoming), fig. 112.
Late Byzantine (end of the 6$^{th}$ century AD – first half of the 7$^{th}$ century AD).

*Bottle*
*Rim*
*Reddish/Red Brown Ware*
80.
J13-Ebd-14-33
Rim, fragmented.
Fig. 80.
Munsell: core: 10R 6/6; int.: 7.5YR 5/4; ext.: 2.5YR 5/4 and 2.5YR 5/1.
Diam.: 2.7; H.: 6.45; L.: 4.7; T. rim: min.: 0.5; max.: 0.6; body: min.: 0.2; max.: 0.35.

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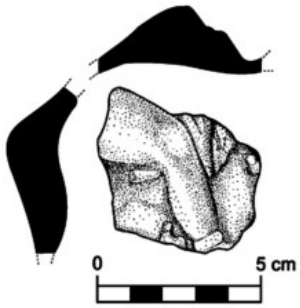


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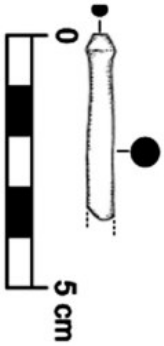


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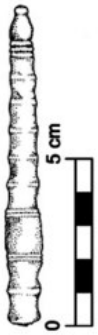


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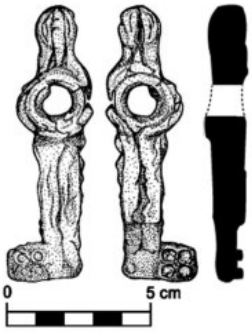


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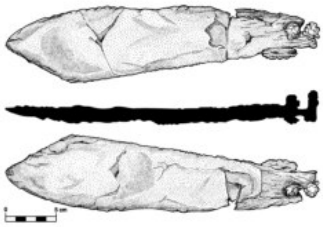

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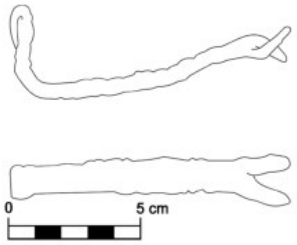


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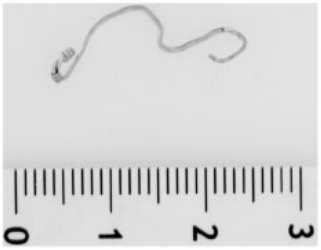


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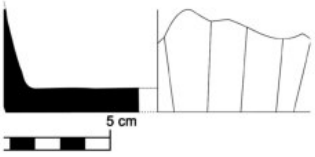


Flask/bottle with rounded out folded rim; ribbed body.
*References*: Uscatescu (1996), p. 348, fig. 78,451.
Late Byzantine.
*Lids*
*Knobs*
*Reddish/Red Brown Ware*
81.
J13-Fa-9-8
Knob, fragmented.
Fig. 81.
Munsell: core: 2.5YR 6/6; deco.: 7.5YR 9/1.
Diam. knob: 1.8; H.: 4.5; L.: 8.4; T.: 0.4.
Rounded raised knob, convex in centre. Dome shaped body. White lines circulating lower ext. part of lid.
*References*: Knob: Uscatescu (1996), p. 311, fig. 41, no. 66; Piazza (1983-1984), p. 103, fig. 1. Je 50 78. Knob and profile: Ball (1986), p. 354, no. 6.
Byzantine.

*Rims*
82.
J13-Ga-12-31
Rim, fragmented.
Fig. 82.
Munsell: core: 2.5YR 6/8; int.: 2.5YR 6/8; ext.: 2.5YR 6/8.
Diam. knob: 4.3; H.: 6; L.: 9.7; T. min.: 0.33; max.: 0.9.
Carinated knob in three levels. Heightened disk shaped lid. Body pierced through at two places. Pierced from the outside before firing; deco.: incised pattern at ext., two leafs. Three horizontal lines circulating knob stem.
*References*: Knob: Uscatescu (1996), p. 346, fig. 76, grupo XVIII, no. 416; p. 310, fig. 40, no. 5; Kenkel (2012), taf. 17.
Byzantine.

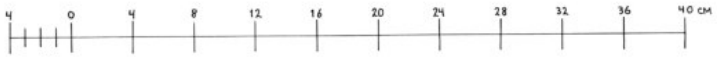
83.
J13-Fh-29-9
Rim, fragmented.
Fig. 83.
Munsell: core: 2.5YR 6/8; int.: 2.5YR 5/4; ext.: 10R 5/6; sec. fired: 2.5YR 3/1 and 2.5YR 1/5.
Diam.: 20; 4.5.: 6; L.: 20; T. min.: 0.4; max.: 0.55.
Casserole lid, dome shaped; Flattened, out-folded rim; traces of fire on interior and exterior surfaces.
*References*: Bonifay (2004), p. 222, no. 2; Uscatescu (1996), fig. 76, 346, no. 408; Gerber (2012), p. 385, fig. 3.61, no. 15.
Late Byzantine.

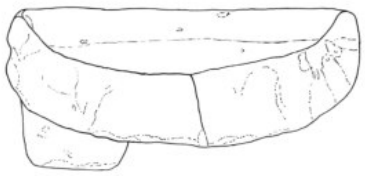
84.
J13-Dab-17-13
Rim, fragmented.
Fig. 84.
Munsell: core: 10R 5/8 and 10R 4/1; int.: 10R 4/1; ext.: 10R 5/4; deco.: 10R 8/3.
Diam.: 16; H.: 3.9; L.: 6.15; T. min.: 0.23; max.: 0.43.
Lid with flattened out turned rim; dome shaped body. Sec. fired at int.; deco.: asymmetric pattern at ext. softly curvy lines.
*References*: Piazza (1983-1984), p. 103, fig. 1. Je 50 78; Canivet (1992), fig. 3, no. 27.

**Cooking Vessels** (PE; SBr)
*Cooking pots*
*Rims*
*Orange Ware*
85.
J13-Gb-12-79
Rim, fragmented.
Fig. 85.
Diam.: 10; H.: 5.9; T.: rim: 0.5; body: min.: 0.2, max.: 0.5.
Munsell: core: 2.5YR 6/6; int.: 2.5YR 6/6; ext.: 2.5YR 6/6.
Cooking pot with a high straightened neck. Rounded rim, slit by a deep ledge under lip. Steep shoulder and indication of a globular body shape. Vertical, pinched handle attached on rim and shoulder. Finger impressions visible at handle.
*References*: Gerber (2012), p. 295, fig. 3.30, no. 20-21; Kenkel (2012), Kt25, tafs. 26 and 63.
Late Roman.

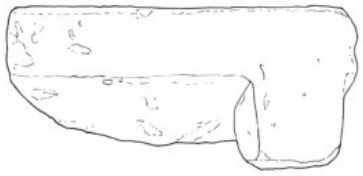
*Reddish/Red Brown Ware*
86.
J13-Fb-40-114
Rim, fragmented.
Fig. 86.
Munsell: core: 2.5YR 5/6 and 2.5YR 4/1; int.: 2.5YR 5/8; ext.: 2.5YR 5/6.
Diam.: 13; H.: 5.2; L.: 7.7; T. min.: 0.15; max.: 0.4.
Cooking pot(?) with out-folded rounded rim; bulge under lip. Convex ledge at shoulder, ribbed at shoulder/body. Sandwich core.
*References*: Kenkel (2012), taf. 41, no. Am 22.1a and Am 22.1b, Canivet (1992), fig. 1, no. 6; Magness (1993), p. 218, fig. 1.
Late Roman/Byzantine.

87.
J13-Fd-40-51
Rim, fragmented.
Fig. 87.
Munsell: core: 2.5YR 5/6; int.: 2.5YR 5/6; ext.: 2.5YR 5/4 and 5YR 5/2 and 10YR 4/1.
Diam.: 12; H.: 8.8; L.:10.6; T. min.: 0.3; max.: 0.6.
Pot with rounded, over folded rim sloping inwards; straight, short neck; ledge at shoulder; ribbed, globular body; vertically placed carinated handle attached at rim and mid body.

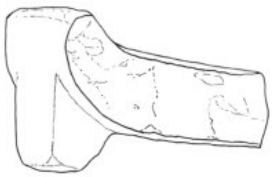


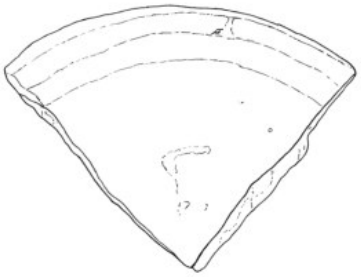
FRONT VIEW



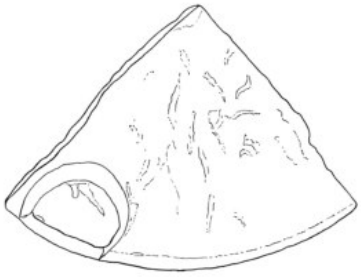
BACK VIEW



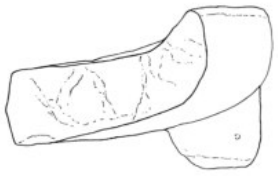
LEFT VIEW



TOP VIEW



BOTTOM VIEW



RIGHT VIEW

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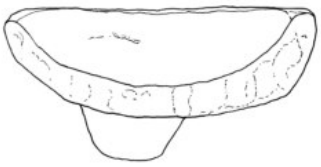

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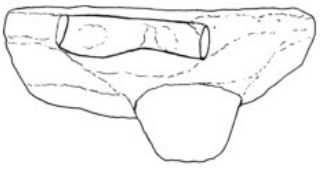
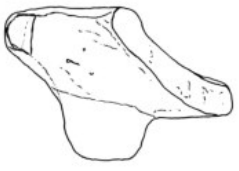


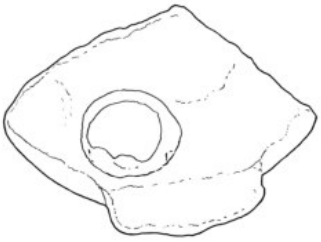
BACK VIEW



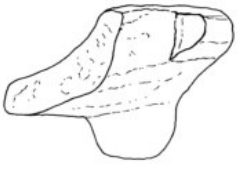
LEFT VIEW



TOP VIEW



BOTTOM VIEW



RIGHT VIEW

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*References*: McNicoll (1992), Pl. 110, no. 1; Canivet (1992), fig. 1, no. 6; Magness (1993), p. 216, fig. 1.
Byzantine.

**Casseroles**

*Rims*

88.
J13-Ec-27-23
Rim and handle, fragmented.
Fig. 88.
Munsell: core: 2.5YR 4/6; int.: 2.5YR 5/4; ext.: between 10R 5/8 and 7.5YR 6/8.
H.: 2.2; L.:2.1; W. (rim): 0.5; T. max.: 0.7; min.: 0.5.
Casserole, hard-fired and medium levigated, mottled surface; Cnidian handle type with formed cleft on top of the handle, following the handle curving, as decoration, as well as a seam on the bottom. The curve itself is narrowing while following the handle form until it›s almost closed by the potter in the middle of the handle.
*References*: Form: Magness (1993), Casserole form 1.
Late Roman – Byzantine.

*Reddish/Red Brown Ware*

89.
J13-Ed-14-16
Rim, fragmented.
Fig. 89.
Munsell: core: 2.5YR 6/8; int.: 2.5YR 6/8; ext.: 2.5YR 6/8.
Diam.: 18; H.: 5.4; L.: 9.2; T. min.: 0.4; max.: 0.5.
Casserole with flattened rim, flaring inwards; horizontally placed, carinated handle, attached under rim. Dome shaped body.
*References*: Uscatescu (1996), p. 286, fig. 16 grupo XVI no. 1B; Magness (1993), p. 212, fig. 11.
Late Roman – Byzantine.

90.
J13-Fd-40-39
Rim, fragmented.
Fig. 90.
Munsell: core: 2.5YR 6/6; int.: 2.5YR 6/6; ext.: 2.5YR 6/6; deco.: 2.5YR 8/1.
Diam.: 28; H.: 3; L.: 11.4; T. min.: 0.4; max.: 0.5.
Casserole with over-folded, rounded rim, lip flattened and flaring outwards. Ledge at int. rim. Horizontally set, carinated handle raised above the rim but attached under the rim. Dome shaped body. Unevenly fired at rim, ext. deco.: wavy lines at rim.
*References*: Uscatescu (1996), p. 344, fig. 74 no. 395; Canivet (1992), fig. 11, no. 9; Lichtenberger, Raja, Sørensen (forthcoming), fig. 92.
Late Roman – Byzantine.

91.
J13-Fd-40-38
Rim, fragmented.
Fig. 91.
Munsell: core: 2.5YR 6/6; int.: 2.5YR 6/6; ext.: 2.5YR 6/6 and 10YR 2/1.
Diam.: 18; H.: 7.8; L.: 14.9; T. min.: 0.4; max.: 0.5.
Casserole with flattened rim, flaring inwards; horizontally placed, carinated handle, attached under rim. Dome shaped body. Sec. fired at ext.
*References*: Hama vol. II (1990), p. 177, no. 609/611.
Late Byzantine (end of the 6$^{th}$ century AD – first half of the 7$^{th}$ century AD).

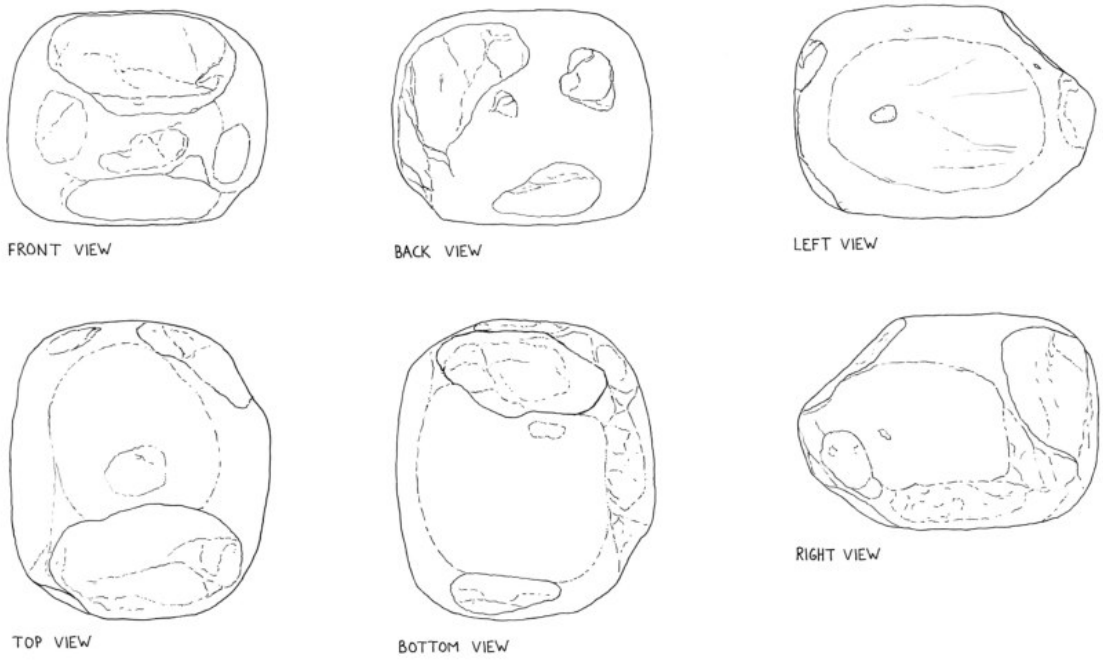
92.
J13-Ed-20-28
Rim, fragmented.
Fig. 92.
Munsell: core: 2.5YR 6/6; int.: 2.5YR 6/6; ext.: 2.5YR 6/6.
Diam.: 28; H.: 6.2; L.: T. min.: 0.4; max.: 0.6.
Casserole with over-folded, rounded rim, lip flattened and flaring outwards; ledge int. on rim. Horizontally placed, carinated handle which is raised above rim but attached under rim; dome shaped body; traces of use over open fire int. and ext. centered at base.
*References*: Profile, not handle Uscatescu (1996), p. 345, fig. 75 grupo XVII no. 400; Lichtenberger, Raja, Sørensen (forthcoming), fig. 94.
Byzantine.

93.
J13-Dab-13-34
Rim, fragmented.
Fig. 93.
Munsell: core: 2.5YR 4/1 and 2.5YR 5/8; int.: 2.5YR 5/8; ext.: 10YR 4/5; deco.: 2.5YR 8/1.
Diam.: 19; H.: 1.4; L.: 10.2; T. min.: 0.3; max.: 0.7.
Casserole. Inwards over folded rim. Rounded lip, flaring outwards. Ledge at int. rim. Dome shaped body; deco.: white vertical lines on rim.
*References*: Uscatescu (1996), p. 344, fig. 74 grupo XVI no. 394; Canivet (1992), fig. 11, no. 10; Seigne (1982-1983), p. 73, no. 5; Lichtenberger, Raja, Sørensen (forthcoming), fig. 92.
Byzantine.

**Storage Vessels** (AHS; AR)

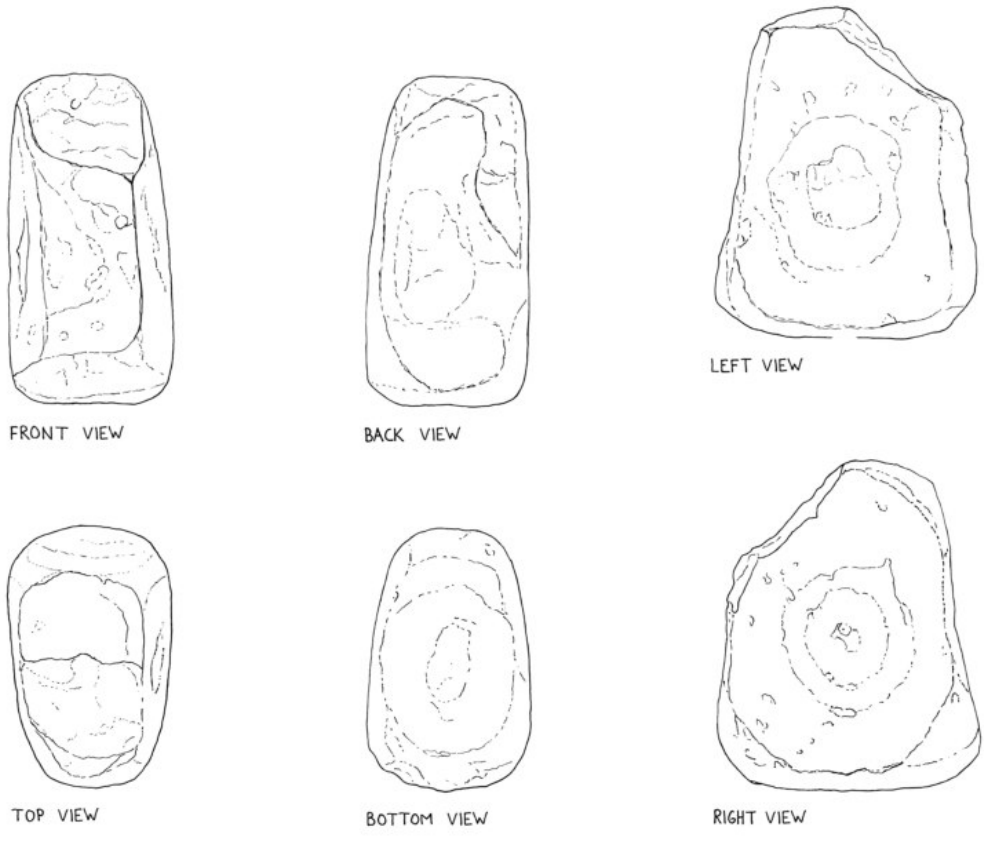
94.
J13-Ed-23-14
Fig. 94.
Body, fragmented.
Munsell: core: 2.5YR 4/1; slip: 7.5YR 8/3; deco.: 10R 4/6.
H.: 1.2; L.: 3.5; T.: max: 0.35; min.: 0.3.
Sherd with thick light coloured slip and painted red deco. int.: two curving lines; According to Smith: “red-on-cream”; Watson: “Ware P”; Gutfeld: “Red Painted Ware”; Walmsley: “Ware 8”.


2 0 2 4 6 8 10 12 14 16 18 20 cm


FRONT VIEW
BACK VIEW
LEFT VIEW
TOP VIEW
BOTTOM VIEW
RIGHT VIEW

**140**


2 0 2 4 6 8 10 12 14 16 18 20 cm


FRONT VIEW
BACK VIEW
LEFT VIEW
TOP VIEW
BOTTOM VIEW
RIGHT VIEW

**141**

*References*: Smith (1973), p. 234, pl. 30 no. 492, pl. 45 no. 488; jar exhibited in the Umayyad show case at the Jerash Museum; Bujard and Joguin (2001), p. 140, fig. 1: 1-6; Watson (1992), p. 244; Gutfeld (2010), p. 110; Walmsley (1995), p. 661.
Umayyad – Abbasid.

**Amphorai/Amphoriskoi** (AR)

*Rim*

95.
J13-Fh-29-11
Fig. 95.
Rim and shoulder, fragmented.
Munsell: core: 2.5YR 5/6; int.: 5YR 5/3; ext.: 5YR 4/2.
Diam. rim: 12; H.: 6.7; L.: 5.9; T. max.: 0.5; T. min.: 0.2.
Outwards folded rim; body horizontally ribbed; moderately elevating shoulder with slightly convex band.
*References*: Brown (1979), p. 23, fig. 1, 17; Uscatescu (1996), p. 259, no. 515 (p. 353, fig. 83.515; group XXXIV).
Byzantine.

*Base*

96.
J13-Gf-29-4
Fig. 96.
Base, fragmented.
Munsell: core: 5YR 6/8; int./ext.: 5YR 7/4.
Diam. base: 2.94; H.: 9.4; L.: 4.9; T. max.: 2.9; T. min.: 0.8.
Oval and rounded flat base and lower part of an amphora; base slightly convex; body steeply rising.
*References*: Gandolfi *et al*. (2010), p. 36. p. 49, fig. 5, 5.
Byzantine ($5^{th}$ – $6^{th}$ century AD).

*Handle*

97.
J13-Ha/Ha1-14-10
Fig. 97.
Handle, fragmented.
Munsell: core1: 10YR 6/1; core2: 2.5YR 6/6; int.: 2.5YR 6/6; ext.: 10YR 7/3.
H.: 3.5; L.: 8.2; W.: 2.8.
Upper part of a double-barreled handle of the Koan type; rather coarsely levigated with few inclusions and air pockets.
*References*: Berlin (1997), pl. 66; Tyers (1996, 2012), http://potsherd.net/atlas/Ware/DR2-4
Late Hellenistic – early Roman ($1^{st}$ century BC – $2^{nd}$ century AD).

*Body*

98.
J13-Dab-13-76
Fig. 98.
Body, fragmented.
Munsell: core and surface: in between 2.5YR 5/6 and 2.5YR 5/8.
Diam. max.: 6.26; H.: 7.0; L.: 5.6; T. max.: 1.7; T. min.: 0.7.
Lower part of an amphora; medium levigated with filled with silver mica. Smith and Day: "Micaceous ware", import.
*References*: Smith and Day (1989), p. 106, fig. 50.5.
Late Roman – Byzantine.

99.
J13-Dab-13-71
Fig. 99.
Body, fragmented.
Munsell: core: 2.5YR 5/8; int.: Gley 1/5N; ext.: 10YR 7/2; paint: White Page 10YR 2/9.
H.: 14.9; L.: 10.6; T.: max: 3.2; min.: 2.5.
Water jar/amphora?; thin walled ribbed ware, hard fired, with small stone grits. Combed decoration in a thin reserved band on the body. White paint covers the surface of the vessel.
Late Umayyad - Abbasid (?).

*Reddish/Red Brown Ware*

100.
J13-Dab-13-54
Rim, fragmented.
Fig. 100.
Munsell: core: 10R 5/8; int.: 10R 5/8; ext.: 10R 6/6.
Diam.: 7; H.: 5.32; L.: 8.35; T. min: 0.35; max: 0.55.
Amphora or jar with straight, short neck with rounded rim; globular body shape. Concave ledge at shoulder.
*References*: Kenkel (2012), taf. 41, no. Am 22.1a & Am 22.1b; Canivet (1992) fig. 1 no. 6.
Late Roman – Byzantine.

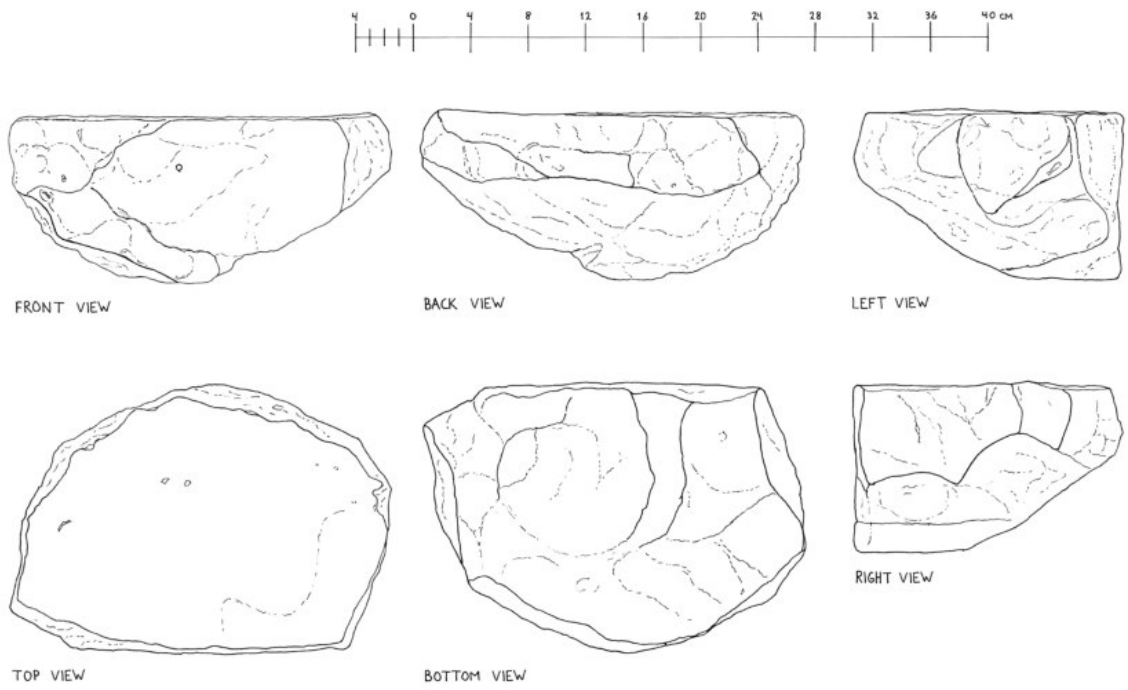
*Grey Ware*

101.
J13-Ed-23-13
Fig. 101.
Base, fragmented.
Munsell: core and surface: GLEY 1 7/N.
Diam. base: 6; H.: 5.5; L.: 9; T.: 0.5.
Hollow-based with moderately elevating body; ribbed surface.
*References*: Rasson and Seigne (1989), p. 142, no. 43 (p. 141, fig. 11,7); Smith (1981), p. 321, fig. 2, 12; Uscatescu (1996), p. 261, no. 599 (p. 362, fig. 599; group XXXVII).
Byzantine.

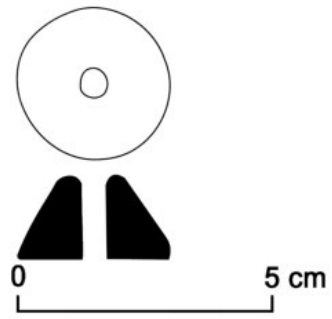
**Pithos** (AR)

*Rim*

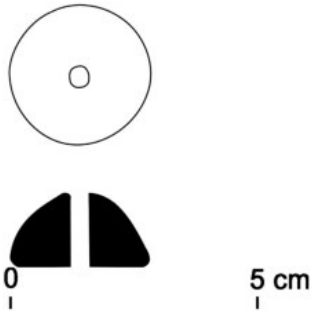
102.
J13-Dab-13-53
Fig. 102.



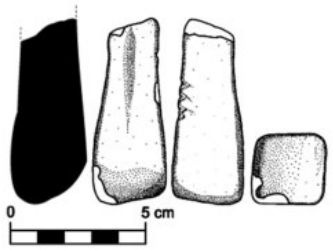

**142**




**143**




**144**




**145**

Rim and body, fragmented.
Munsell: core1: GLEY 1 5/1; core2: 2.5YR 4/8; int.: GLEY 1 5/1; ext.: 10YR 6/2.
Diam. rim: 28; H.: 11.2; L.: 16.1; T. max.: 2.6; T. min.: 0.3.
Pithos rim; sharply outwards bending rim; deco.: two combed horizontal wavy lines and single straps of combed lines in between. Magness: "Holemouth jar".
*References*: Najjar (1989), p. 316, no. 27 (p. 315, fig. 6, 27); Uscatescu (1996), p. 263, no. 651 (p. 367, fig. 97,651; group XLI); Magness (1993), p. 231-234.
Late Byzantine (Uscatescu); Abbasid (Najjar).

**Basins** (AR)
*Rims*
103.
J13-Eac-13-6
Fig. 103.
Rim, fragmented.
Munsell: core: 2.5YR 6/1; int.: 2.5YR 6/1; ext.: 7.5YR 8/1.
Diam. rim: 54; H.: 6.5; L.: 6.1; W.: 1.7; T. max.: 1.2; T. min.: 0.5.
Basin; rim wheel-made, adjunctive body hand-made; below rim band of irregular impressions; very steep rim, on top almost straight.
*References*: Brown (1979), p. 23, fig. 1, 27; Jäggi *et al.* (1997), p. 320, no. 36 (p. 319, fig. 8,36); Uscatescu (1996), p. 260, no. 547 (p. 356, fig. 86,547; group XXXVI).
Late Byzantine.

104.
J13-Ec-27-24
Fig. 104.
Rim and body with attached handle.
Munsell: core1: 5YR 6/1; core2, int., ext.: 2.5YR 7/6.
Diam. rim: 40; H.: 11.8; W.: 1.4; T.: 0.6.
Basin; coarse ware storage vessel; rather steep body; band of impressed fingerprints separating body from rim; steep slightly inwards tending rounded rim; handle attached to the body.
*References*: Rast and Schaub (1974), p. 51, no. 296 (p. 50, fig. 11,296); Uscatescu (1996), p. 260, no. 549 (p. 357, fig. 87,549; group XXXVI).
Late Byzantine.

105.
J13-Ha/a1-13-10
Fig.105.
Rim, fragmented.
Munsell: core: 7.5YR 8/4; slip: White page: 2.5Y 2/9.5.
Diam.: 28; H.:1.7; L.: 2.5; T.: min.: 0.5, max.: 0.8.
Basin; rounded rim, of a cream coloured fabric, hard fired with brown and lime inclusions and covered in a thick whitish slip. Probably correspond to one of the cream wares occurring in the 8$^{th}$ century AD.
*References*: ware: Whitcomb (2008), p. 490.
Possibly Abbasid.

106.
J13-Fa-17-22-23
Rim and handle, fragmented.
Fig. 106.
Munsell: 7.5YR 6/1; int.: 7.5YR; ext.: 5YR 7/6.
Diam. (rim): 30; H.: 5.9, L.: 9.5; T. max.: 0.85; min.: 0.6.
Basin; medium fired and medium levigated clay. Horizontal handles pushed below the rim, three thumb impressions visible. Handle is not in a symmetrical angle to the rim.

*Orange Ware*
107.
J13-Ga-12-44
Rim, fragmented.
Fig. 107.
Munsell: core1: GLEY 8/R; core 2: 2.5YR 6/8; 2.5YR 6/8; 2.5YR 7/6.
Diam. (rim): 38; H.: 6.6, L.:20.2; W.: 3.1; T. (max.): 0.5.
Basin, hard fired and finely levigated clay with some air pockets included.
*References*: form: Clark (1986), fig. 20, no. 17; Uscatescu (1996), no. 372-374, p. 255; fig. 71-72; Pierobon (1986), p. 188, fig. 9, no. 8, 10.
Late Roman – Byzantine (3$^{rd}$ century – 7$^{th}$ century AD).

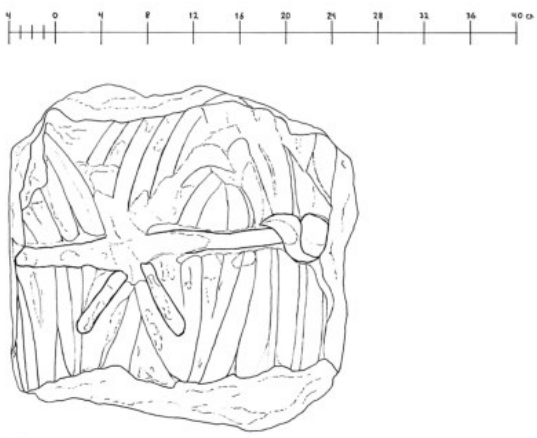
*Grey Ware* [16]
*Rims*
108.
J13-Eac-10-22
Fig. 108.
Rim, fragmented.
Diam. rim: 44; H.: 4.4; L.: 9; W.: 0.9; T. max.: 1; T. min.: 0.5.
Basin; steep body; band of stringed pointed oval shaped dots separating body from rim; outwards curving and rounded rim.
*References*: Uscatescu 1996, p. 255, no. 370 (p. 341, fig. 71,370; group XV).
Late Byzantine.

109.
J13-Ed-14-11+12
Fig. 109.
Rim and base, fragmented.

16. Munsell not indicated here. The colours correspond to the description given of the ware in the 2012 report.

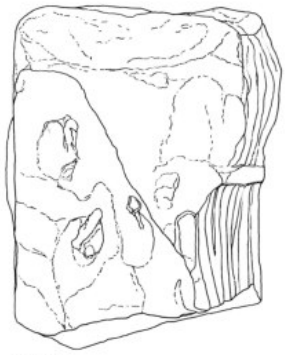


**146a**



**146b** FRONT VIEW





LEFT VIEW



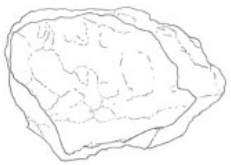
RIGHT VIEW

**146c**





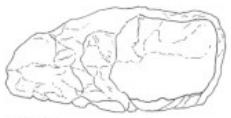
FRONT VIEW



BACK VIEW



LEFT VIEW



TOP VIEW



BOTTOM VIEW



RIGHT VIEW

**147**

Diam. rim: 30; H. rim: 7.9; L. rim: 13.2; W. rim: 2.3; T. max. rim: 0.7; T min. rim: 0.5; H. base: 4.2; L. base: 6.1; T. max. base: 1; T. min. base: 0.7.
Basin; flat base; rather steep body; outwards bending rim; deco.: body decorated with irregular grooves incised by fingers; rim with finger impressions on the outside.
*References*: Rasson and Seigne (1989), p. 144, no. 57 (p. 145, fig. 13,2); deco. body: Uscatescu (1995), fig. 23, 77; Uscatescu (1996), p. 265, no. 728 (p. 375, fig. 105,728; group XXXVI).
Late Byzantine.

110.
J13-Ed-14-13
Fig. 110.
Rim, fragmented.
Diam. rim (inside): 61; H.: 8.6; L.: 12.5; W.: 2.8; T. max.: 1.2; T. min.: 0.5.
Basin; steep body and rim; slightly convex band below rim; deco.: combed wavy lines on body and on top of the rim.
*References*: Kehrberg (1989), p. 94, no. 7 (p. 91, fig. 7); Piccirillo and Russan (1976), p. 68, no. 11; Schaefer (1986), p. 430, fig. 10,1; Watson (1992), fig. 6, no. 43.
Late Byzantine – Umayyad.

111.
J13-Ed-18-5
Fig. 111.
Rim, body and base, almost intact.
Diam. rim: 42. Base: 24; H.: 19.5; T. base: 0.5, body: 0.7, rim: 2.
Basin; complete profile; flat base; rather steep body; slightly stepped and outwards bending rim.
*References*: Ball *et al*. (1986), p. 358, fig. 8; Rasson and Seigne (1989), p. 137, no. 27 (p. 133, fig. 7,7); Uscatescu (1996), p. 260, no. 557 (p. 357, fig. 87,557; group XXXVI).
Byzantine.

112.
J13-Fb-40-113
Fig. 112.
Rim and body with attached handle.
Diam. rim: 42; H.: 9.8; L.: 7.3; W.: 1.1; T. max.: 0.5; T. min.: 0.4.
Basin; rather steep body; S-shaped and rounded rim; handle attached to the body directly below rim.
*References*: Uscatescu (1996), p. 255, no. 361 (p. 340, fig. 70.361; group XV).
Late Byzantine.

113.
J13-Fi-34-3
Fig. 113.
Rim and body, fragmented.
Diam. rim: 42; H.: 8.6; L.: 9.9; W.: 3.4; T. max.: 1.9; T. min.: 0.9.
Basin; steep body; outwards bending rounded rim; deco.: horizontal pointed wavy incised lines on body; directly below rim band of impressed zigzag-shaped pattern.
*References*: Brizzi, Sepio and Baldoni (2010), p. 366, no. 3 (p. 366, fig. 12,3); Uscatescu (1996), p. 265, no. 748 (p. 377, fig. 107.748; group XXXVI).
Late Byzantine – Umayyad.

114.
J13-Dab-13-33
Fig. 114.
Rim, fragmented.
Diam. rim: 54; H.: 6.2; L.: 25.3; W.: 3.1; T.: 0.9.
Basin; steep body with slightly convex band below rim; outfolded rim with ten finger impressions on the ext.
*References*: Najjar (1989), p. 314, no. 13 (p. 313, fig. 5, 13); Schaefer (1986), p. 428, fig. 9, 12.
Umayyad.

**Unpainted handmade Coarse Ware - Ayyubid/ Mamluk**
*Rims*
115.
J13-Gf-33-14
Rim, fragmented.
Fig. 115.
Munsell: core: GLEY 2 4/10BG; int.: 5YR 7/8; ext.: 5YR 7/8.
Diam.: 30; H.: 4.7; L.: 6.1; T. min.: 0.8; max.: 1.2.
Bowl; convex sloping neck rounded out folded rim; surface smoothed.
*References*: Franken (1975) p. 135, fig. 64.
Late Ayyubid – Mamluk (late 12$^{th}$ – 14$^{th}$ century AD).

116.
J13-Ha1-16-15
Rim, fragmented.
Fig. 116.
Munsell: core: 10YR 4/1; int.: 10YR 7/4; ext.: 10YR 7/4.
Diam.: 32; H.: 7.3; L.: 9.7; T. min.: 1.4; max.: 1.9.
Jug; convex sloping neck; rounded, outward sloping rim.
*References*: Tholbecq (1997), p. 168 no. 38; Thuesen (1988), p. 277 no. 10.
Late Ayyubid – Mamluk (late 12$^{th}$ – 14$^{th}$ century AD).

117.
J13-Da-2-1, 2
Incense burner (bowl and lid), intact.
Fig. 117.
Munsell: int.: 5YR 6/6 and 5YR 7/3; ext.: 5YR 6/6 and 5YR 7/3.
Bowl: Diam. rim: 4.9; base: 2; H.: 2; L.: 4.9; T. min.: 0.3;



**148a**



**148b**




**148c**




**149**

max.: 1.
Lid: Diam. rim: 4.9; H.: 1.85; L.: 4.9; T. min.: 0.3; max.: 1.83.
Knob: H.: 1; W.: 2.5; T.: min.: 0.4; max.: 1.2.
Miniature incense burner. Bowl: ring base, outwards sloping body with rounded out folded rim. Lid: dome shaped; knob: flattened and rectangular, secondarily attached. Surface smoothed, but breakable. Very crooked, roughly made. Medium to coarse levigated. Sec. fired at ext.
*References*: McQuitty (1997), p. 226, fig. 21.

118.
J13-Da-2-3, 4, 5
Bowl, intact.
Fig. 118.
Munsell: core: 7.5YR 7/6; int.: 7.5YR 7/6; ext.: 7YR 6/8.
Diam. rim: 7.4; base: 3.8; H.: 2.3; L.: 7.4; T. min.: 0.3; max.: 1.4.
Miniature bowl: flattened base, outwards sloping body with rounded, straightened rim. Surface smoothed, but breakable. Very crooked, roughly made. Medium levigated, air pockets.
*References*: McQuitty (1997), p. 226, fig. 21.

**Brick (AR)**
119.
J13-Ha/Ha1-13-37
Fig. 119.
Brick.
Munsell: core: 10YR 6/2; int./ext.: 10YR 6/2.
H.: 3; L.: 16.7; T. max.: 2.9; T. min.: 2.6.
Flat hand-made brick with incised mark 'K' on one surface; grooves from fingers on bottom.
*References*: Barnes *et al*. (2006), p. 307, fig. 17, 4.
Late Byzantine – early Islamic.

120.
J13-Ebd-19-24
Fig. 120.
Brick.
Munsell: core, int./ext.: 2.5YR 4/6.
H.: 3.3; L.: 17.7; T. max.: 2.6; T. min.: 2.5.
Flat hand-made rectangular brick with incised marks 'KE' on one surface.

**Tile (AR)**
121.
J13-Gf-30-3
Fig. 121.
Tegula.
Munsell: core, int./ext.: GLEY 1 7/N.
H.: 2.8; L.: 18.3; W. rim: 2; T. max.: 1.3; T. min.: 1.1.
Flat hand-made tile; outwards turned rounded rim.
*References*: Clark (1986), p. 317. p. 336, pl. 14.28.
Umayyad.
122.
J13-Ha/Ha1-13-39
Fig. 122.
Hollow tile.
Munsell: core: GLEY 6/10Y; int.: GLEY 5 N; ext.: 10YR 7/2.
H.: 11.1; L.: 27.5; T. max.: 5.3; T. min.: 1.3.

**Miscellanea**
**Unguentarium (PE)**
123.
J13-Ec-13-41
Rim/Spout, fragmented.
Fig. 123.
Munsell: core1: 2.5YR 7/3, core2: 2.5YR 7/1; int.: 2.5YR 4/2; ext.: GLEY2 5/5PB.
Diam. (max.): 2.9, (min.): 1.5; H.: 2.5; L.: 2.9; W.: 0.5; T. (max.): 0.80, (min.): 0.49.
Plain ware unguentarium, hand-made, hard-fired and rather finely levigated clay.
Late Roman.

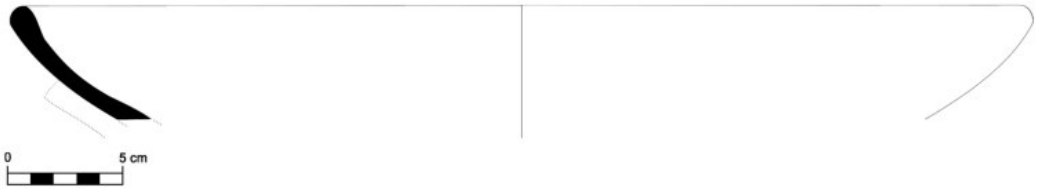
*Terracotta (AR)*
124.
J13-Ga-12-22
Fig. 124.
Figurine, foot.
Munsell: core, int./ext.: 2.5YR 6/6
H.: 1.2; L.: 3.8; T. max.: 1.1; T. min.: 0.3.
Front part of the left foot of an anthropomorphic figurine; flat stand; space between toes slightly incised; big toe shows the nail.
Roman

125.
J13-Gb-9-7 and 15
Fig. 125.
Figurine, breasts.
Munsell: core, int./ext.: 2.5YR 6/6.
H.: 4.7; L.: 5.9; T. max.: 0.8; T. min.: 0.2.
Two joining pieces of a mould-made female draped figurine; two breasts showing the garment's folds running curved between the breasts.
*Roman*

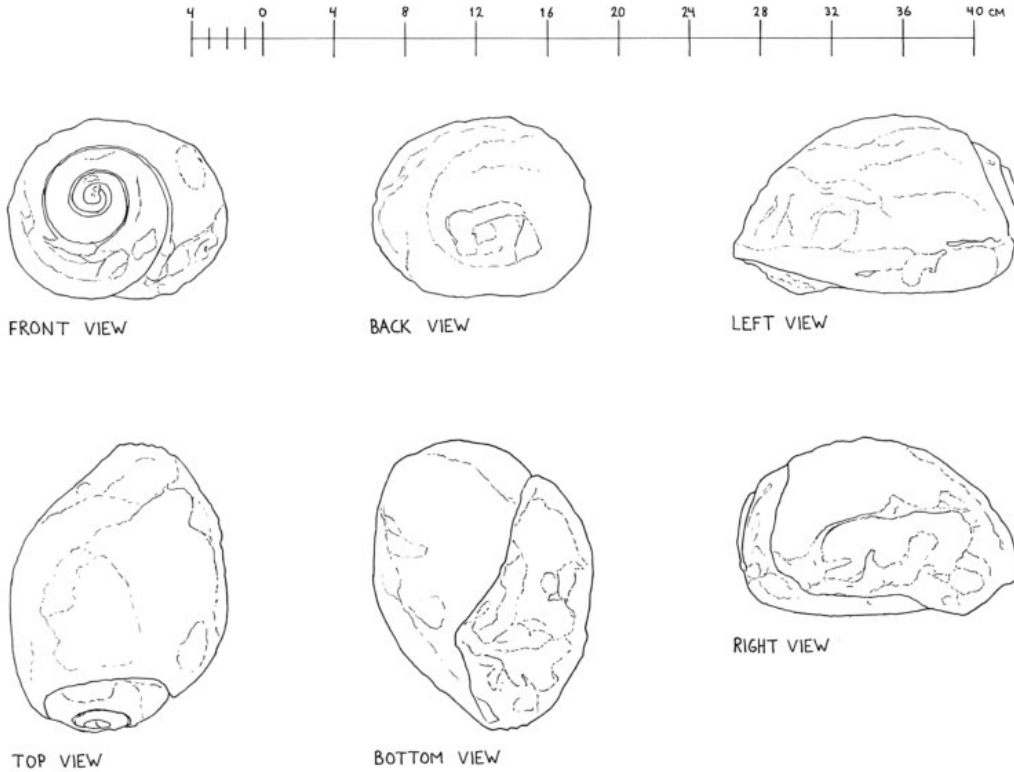
126.
J13-Gb-12-58
Fig. 126.
Figurine, head, fragmented.
Munsell: core/int.: 2.5YR 6/6; ext.: 10R 7/6 and 5YR 8/3.
H.: 4.4; L.: 2.8; T. max.: 0.85; T. min.: 0.3.
Lower part of the face and neck of a mould-made figurine; fold surrounding the face.


10 cm

**150**


0
5 cm

**151**


4 0 4 8 12 16 20 24 28 32 36 40 cm
FRONT VIEW
BACK VIEW
LEFT VIEW
TOP VIEW
BOTTOM VIEW
RIGHT VIEW

**152**

Roman
127.
J13-Gd-28-17
Fig. 127.
Horse-rider figurine, leg of rider and torso of horse, fragmented.
Munsell: core, int./ext.: 2.5YR 7/6.
H.: 4.9; L.: 4.8; W.: 1.8; T. max.: 1.5; T. min.: 0.12.
Leg of a rider turning towards the right, with bracelet around the ankle; part of the saddle and body of horse.
Roman

**Mould (AR)**
128.
J13-Fi-53-17
Fig. 128.
Mould of a mask.
Munsell: core: GLEY 1 5/N; int.: GLEY 1 5/N; ext.: 7.5YR 6/1 and 5YR 3/1.
H.: 7.1; L.: 5.5; W.: 1.8; T. max.: 0.9; T. min.: 0.3.
Left half of a rather flat mould of a chubby-cheeked (extended chins) male face showing chin, slightly opened mouth, part of the nose, one eye and brow and schematic strands of hair; traces of secondary firing on the exterior.
Roman – late Roman.

**Bone utilities (SKr)**
129.
J13-Dab-7-4
Worked bone spindle, almost intact.
Fig. 129.
Diam. (min): 0.4; Diam. (max): 0.6; H.: 3.6.
Worked bone; oblong, rounded shaft; cone-shaped top with central depression.
*References*: Clark *et al*. (1986), pl. XXVI, 1; Lichtenberger, Raja and Sørensen (forthcoming), no. 151.

130.
J13-Ec-27-51
Worked bone spindle, almost intact.
Fig. 130.
Diam. (min): 0.4; Diam. (max): 1.1; H.: 9.5.
Worked bone; oblong, rounded shaft with curving sides; rounded, oval top with a rounded projection; straight ridges around the shaft; depression at the base.
*References*: Riis (1969), fig. 44, nos. 3; Clark *et al*. (1986), pl. XXVI, 1, pl. XXVII, 1; Riis and Buhl (1990), fig. 99, no. 810; Findlater *et al*. (1998), fig. 8, no. 99 (similar).

131.
J13-Ha/Ha1-16-1
Shaft and proximal end of a bone, fragmented.
Fig. 131.
Worked metatarsal from a horse; saw marks; either remains from butchering, or from ornamental craft work.

**Metal objects (PE)**
132.
J13-Dab-19-14+15
Iron key.
Fig. 132.
L.: 2.7; H.: 9.6; H.:2: 1.3; T. (max.): 1.8; (min.): 1.4.
Very corroded iron key. Found in a fire place in situ. Glued together (modern conservation 2013), the key has a long shape, with a ring in the middle and four bumps on the key bit.
*References*: Shape: Crowfoot (1957), p. 446, no. 6, fig. 105; Goldmann (1950), IX, no. 73; bid shape: Waldbaum (1983), no. 392-394, pl. 25; bronze example in: Kol-Yaakov (2000), p. 494, no. 90; pl. IX, no. 3.
Roman – Byzantine.

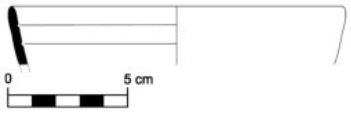
133.
J13-Da-22-1
Iron blade.
Fig. 133.
L.: 30.8; W.: 7.0; diam. (first attachment): 1.2.
Very corroded iron blade of a short knife. Remains of the attachments to hold the handle are still visible. Conservation revealed: the iron oxites fossilized the scabbard in oxidation process, meaning, the rust on the surfaces shapes the scabbard, which seems to have been consisting of leather with yarn embroideries for decoration.
*References*: form: Fisher (2000), fig. 5.1, no. 9.
Possibly Roman – Byzantine.

134.
J13-Fe-21-9
Copper alloy jewellery
Fig. 134.
Ball: H.: 0.9; L.: 0.8. chain L.: 1.6; total L.: 2.6.
Piece of jewelry, in the shape of a small ball hanging on a chain. Well preserved.

135.
J13-Ha/a1-13-4
Unidentifiable bronze tool or clasp.
Fig. 135.
H.: 10.5; T.: ca. 0.3; W.: 0.6.
Corroded and bended object: A clasp or a bronze tool (?).
*References*: Bears slight resemblance to socket keys (Gaitzsch (2005), S2 15-16, p. 204; pl. 4).

136.
J13- Ga-21-11
Gold wire.
Fig. 136.
L.: c. 2 (twisted); T. (max.): 0.1.
The small and thin wire is twisted. It was cleaned from the corrosion of an iron-object from the same context. The

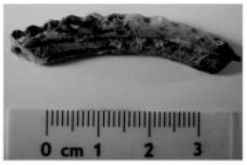
**153**




**154**




**155**

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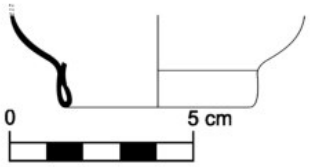


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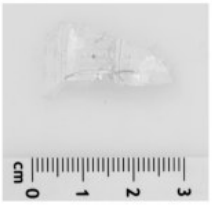
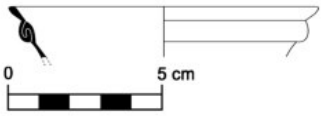



**158**




**159**



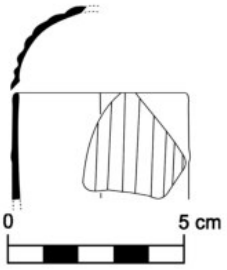

**160**




**161**




**162**

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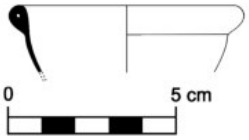


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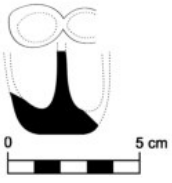


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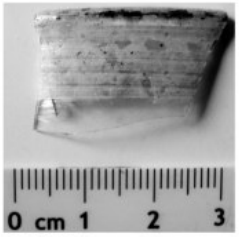
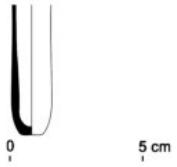



**166**



**167**

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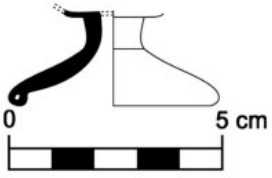


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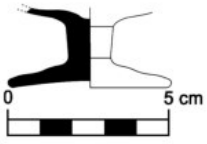


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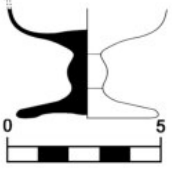


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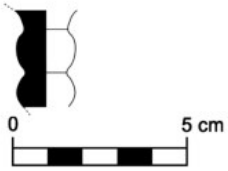


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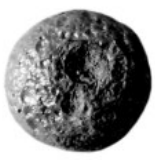

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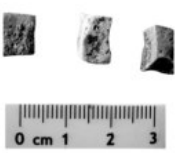


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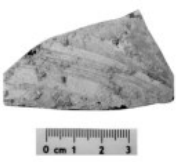


ends of the string are twisted two and three times around the string. Jewellery fragment.

**Stone Utensils (AMB)**

*Vessel*

137.
J13-Ha/a1-13-48
Base fragment of limestone mug.
Fig. 137.
Diam. base: 12; H.: 9; L.: 1.5; T.: 0.7 – 1.
Flat base mug; vertical cut marks.
*References*: Deines (1993); Geva (2010), pl. 5.4.
Early Roman (1st cent. BC – 1st cent. AD).

*Mortars*

138.
J13-Hc-3-1
Basalt mortar, fragmented.
Fig. 138.
H.: 10.8; L.: 18.4; T.: 5.1; W. base: 6.8.
Almost 1/3 of a well preserved mortar, one base completely preserved; slightly covered in lime; the stone is dark grey/black.
*References*: Clark *et al*. (1986), fig. 24; Riis *et al*. (1990), fig. 77, 78; Thuesen (1988), Pl. 51.12

139.
J13-Da-10-32
Basalt bowl, fragmented.
Fig. 139.
Diam.: c. 22; H.: 9.5; L.: 18.4; T.: 1.9–5.8.
Rim of a basalt mortar; rounded foot; smoothened int. and ext. surface; the stone is black/grey.
*References*: Clark *et al*. (1986), fig. 24; Riis *et al*. (1990), fig. 78.

*Grinders*

140.
J13-Dab-13-17
Limestone object, possible grinder, fragmented.
Fig. 140.
H.: 8.3; L.: 9.6.
Rounded to square; smoothed surfaces on all four sides; the stone is white/brown.
*References*: McNicoll *et al*. (1992), plate 73 no. 2.

141.
J13-Ed-23-1
Possible grinder, fragmented.
Fig. 141.
H.: 9.5; L.: 7.5; T.: 3.7–4.8.
Smoothed surfaces; trapezoidal shape with heavily rounded corners; one hollow on both sides; the stone is black/grey.
*References*: McNicoll *et al*. (1992), plate 73 no. 2.

142.
J13-Dab-17-7
Basalt grinding stone.
Fig. 142.
H.: 12; L.: 26.5; T.: 19.
Flattened on one side, rounded on the other; the stone is greyish.
*References*: McNicoll *et al*. (1992), plate 72 no. 4, plate 73 nos. 1 and 6.

*Spindle whorls* (SKr)

143.
J13-Dab-7-1
Fig. 143.
Diam.: 3; H.: 1.6.
Intact cone-shaped spindle whorl with central hole; flat top and base; sandstone, light brown/white.
*References*: Riis (1969), fig. 39, nos. 8; McNicoll *et al*. (1982), plate 132, no. 7; Riis and Buhl (1990), fig. 97, no. 752-765; Lichtenberger, Raja and Sørensen (forthcoming), no. 158 and 159.

144.
J13-Db-19-17
Fig. 144.
Diam.: 2.8; H.: 1.5.
Intact cone-shaped spindle whorl with central hole; flat top and base; Steatite, black with white streaks.
*References*: Riis (1969), fig. 39, nos. 8; McNicoll *et al*. (1982), plate 132, no. 7; Riis and Buhl (1990), fig. 97, no. 752-765; Lichtenberger, Raja and Sørensen (2013, forthcoming), no. 158 and 159.

*Loomweight* (AMB)

145.
J13-Dab-13-61
Loomweight.
Fig. 145.
H.: 6.7; T.: 1.8–2.6.
Smoothened surfaces; deep groove on one side; three grooves in one corner and two in another;
the stone is brown/grey.
*References*: McNicoll *et al*. (1992), plate 79.b.

**Sculpture (AL; RR)**

146.
J13-Da-10-2x
Torso of Artemis Rospigliosi.
Figs.: 146a-c.
Whitish marble, crystalline.
Diam.: 24; H.: 30 (max), H. of drapery: 24; W.: 30; D.: 24.
Female torso almost life-size of an Artemis Rospigliosi type (LIMC, Artemis-Diana, p. 808pp, no. 35a-i). The sculpture was re-used as a building block roughly dressed

**175a**



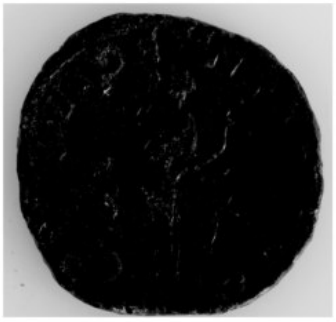
**175b**



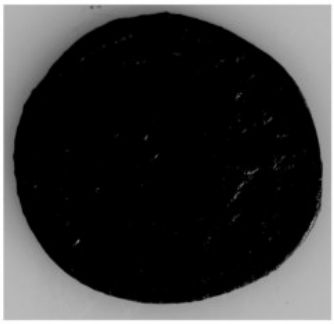
**176a**



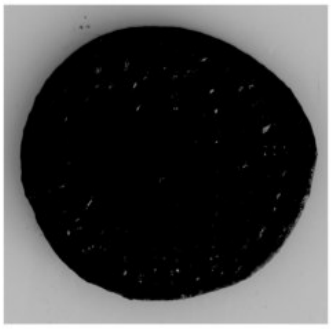
**176b**



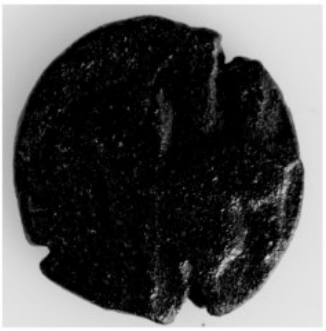
**177a**



**177b**



**178a**



**178b**



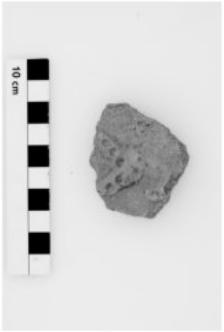
**179a**



**179b**



**180**



in the 'Ionic Building'. It is preserved from below the neck until above the navel. The surface of the front is damaged and the backside is cut vertically to fit secondary use as a building block. The torso is wearing a chiton with a belt knotted with a badly damaged Heracles-knot right under the breasts. On the left side a fold of thick drapery hangs over the belt. Between the breasts a rich asymmetrical but schematized drapery falls towards the knot of the belt. The sculpture is carved in low relief; the folds are highlyschematized. The product most likely stems from a local workshop of the second or third century AD.
The Artemis Rospigliosi, going back to a 2nd century BC type, was a prominent Artemis type in this part of the Roman Near East. Further examples are known from Caesarea Philippi, Gerasa and probably also Pella.
*References*: Friedland (2012), 110-113 no. 15 figs. 50-51; Weber (2002), p. 486, no. C3, taf. 121E; Fischer (1938), p. 269, taf. 54; Weber (2002), p. 483, no. B1, taf. 118A-C; LIMC, Artemis-Diana, p. 808, no. 35a-i.
Roman (2nd or 3rd century AD) after Hellenistic original.

**Architecture** (AMB)
147.
J13-Dbd-8-1
Ionic capital, fragmented.
Fig. 147.
H.: 17.1; L.: 24.5; W.: 9.
Limestone.
Fragment of Ionic capital decorated with egg-and-dart and bead-and-reels; appears partly blackened by fire.
*References*: Kraeling (1938), pl. XLVI.b; Lichtenberger, Raja and Sørensen (forthcoming), cat. no. 166, but with beads in the bead-and-reel ornamentation more closely set, as illustrated in Nassar (2004), Pl. 29, 2.
Roman.

**Plaster – Wall paintings** (AHS)
148.
J13-Da-10-31; Dc-10-16; Db-10-27, Dcd-10-5, Dc-10-16, Da-10-9 – most probably from the same decoration as J13-Db-29-8
Painted plaster, fragmented.
Figs. 148a-c.
Colours: red, yellow, black, blue, and pink.
Painted and unpainted plaster fragments. The decoration seems to have mainly consisted of parallel bands of colours of varying width. The paintings have been constructed on a base of coarse plaster covered by a very finely levigated and thinner layer of plaster. On some of the fragments string impressions used as guidelines for the paint are preserved. The painting technique has not been analysed but the thick layers of paint give the impression of al secco painting.
*References*: Bloch (2011), p. 120-121, Taf. 58-61; Cruikshank Dodd (2004); Ettinghausen (1962); Schlumberger (1986).
Mamluk.
149.
J13-Db-29-8 – most probably from the same decoration as J13-Da-10-31; Dc-10-16; Db-10-27, Dcd-10-5, Dc-10-16, Da-10-9
Fig. 149.
Colours: red, yellow, black, and blue.
Painted and unpainted plaster fragments. The decoration seems to have mainly consisted of parallel bands of colours of varying width. The paintings have been constructed on a base of coarse plaster covered by a very finely levigated and thinner layer of plaster. The painting technique has not been analysed but the thick layers of paint give the impression of al secco painting.
*References*: Bloch (2011), p. 120-121, Taf. 58-61; Cruikshank Dodd (2004); Ettinghausen (1962); Schlumberger (1986).
Mamluk.

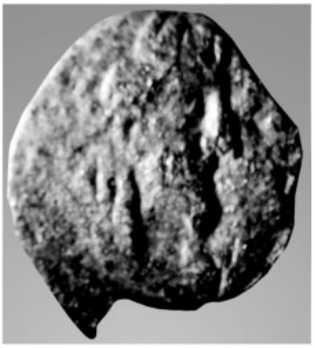
**Wasters and Crucibles** (AHS)
150.
J13-Fh-29-3
Fig. 150.
Wasters.
H.: 4.8; L.: 10.5; W.: 5.9.
Wasters from local pottery production.

151.
J13-Fd-40-5
Fig. 151.
Crusible, rim, fragmented.
Diam.: 44; H.: 6.7; L.: 6.2.
Crusible from local production. Ceramic vessel on ext. clay packing, int. remains of the melted material heated in the vessel.

**Fossil** (AHS)
152.
J13-Db-27-1
Fig. 152.
H.: 10.3; D.: 16.1; W.: 12.3.
Large Steinkern (stone cast) of a gastropod, built into a wall.
Most likely stems from the Paratethys ocean.
Tertiary

**Glass** (HS)
153.
J13-Ec-13-44
Rim fragment of a conical grooved bowl with two horizontal grooves on the interior.
Fig. 153.
Amber, translucent; white weathering and iridescence.
Diam. (rim): 14; H.: 2.45; T.: min: 0.3, max: 0.4.
*References*: Grose (2012), p. 37, no. G 107, fig. 12, pl. 8.

**181a**



**181b**



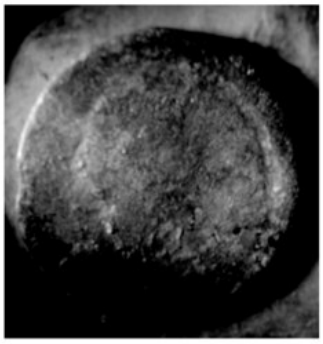
**182a**



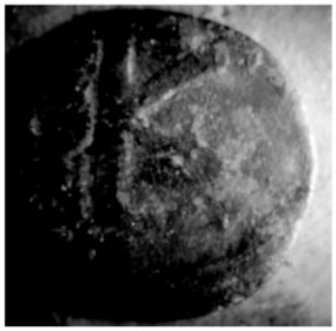
**182b**



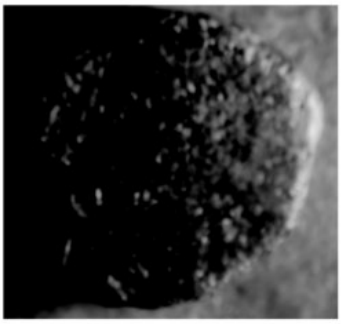
**183a**



**183b**



**184a**



**184b**



**185a**



**185b**



Hellenistic (mid-2nd – mid-1st century BC).

154.
J13-Ha1-13-50
Rim fragment of a hemispherical grooved bowl with two horizontal grooves on the interior.
Fig. 154.
Purple, translucent; weathering and iridescence.
Diam. (rim): 16; H.: 4; T.: min: 0.57, max: 0.66.
*References*: Dussart (1998), p. 51, group AII.11, pl. 1, 8 (late 3rd century BC); Jennings (2004/2005), p. 34, no. 2.5.6, fig. 2.5.6 (60–50 BC); Grose (2012), p. 42, no. G 162, fig. 16, pl. 10; Antonaras (2012), p. 55, no. 18 (c. 150 – 50 BC).
Hellenistic (mid-2nd – mid-1st century BC).

155.
J13-Gb-7-18
Rim fragment of a small bowl with an applied strip-handle, consisting of a thick crimped trail.
Fig. 155.
Light bluish green, transparent; dark weathering and iridescence.
Diam. (rim) 11.
*References*: Meyer (1988), p. 185, fig. 5 G. H; Weinberg (1988), p. 55, no. 118–121, fig. 4-16, pl. 4-7; Arveiller-Dulong – Nenna (2005), p. 190, no. 522. 523 (late 1st – 2nd century AD); Keller (2006), p. 210, type VII.19b, no. 692, pl. 11f (early 2nd century AD); Jennings (2004/2005), p. 73–74, no. 4.5.2, fig. 4.5.2 (4th century AD).
Context date: early Byzantine/Umayyad.
Mid-/late Roman (2nd – 4th century AD).

156.
J13-Gb-12-49
Foot fragment of a deep bowl with a high folded base-ring.
Fig. 156.
Yellowish green, translucent; dark weathering and iridescence.
Diam. (base): 5; H.: 2.5; T. rim: 0.38, body: min: 0.11, max: 0.2.
*References*: Hayes (1975), p. 120, no. 470, fig. 12 (late 3rd – 4th century AD); p. 158, no. 652, fig. 21 (about 3rd century AD); Jennings (2004/2005), p. 190, no. 8.3.6, fig. 8.3.6; Weinberg and Stern (2009), p. 125, no. 213, fig. 15, pl. 20 (mid-3rd century AD).
Mid-/late Roman (3rd – 4th century AD).

157.
J13-Ga-12-18
Wall fragment of a hemispherical bowl, decorated with two sections of engraved lines and long oval facets between them.
Fig. 157.
Colourless, opaque; white weathering and iridescence.
Diam. not definable. H.: 2; T.: min: 0.18, max: 0.30.
*References*: Shepherd (1999), p. 313, no. 12, fig. 11.2 (late 2nd or 3rd century CE); Weinberg and Stern (2009), p. 123, no. 200, fig. 13, pl. 19 (probably mid-3rd century AD); Kakhidze and Shalikadze (2009), p. 77, no. 88, fig. 29 (3rd – 4th century AD).
Mid-/late Roman (3rd – 4th century AD).

158.
J13-Hc-3-3
Rim fragment of a bottle or jug, decorated with a thick horizontal trail below the rim.
Fig. 158.
Pale greenish blue, translucent; dark weathering and iridescence.
Diam. (base) 6; H.: 0.9; T.: min: 0.15, max: 0.38.
*References*: Weinberg (1988), p. 65, no. 217-228, fig. 4-28 (4th century AD); Jennings (2004/2005), p. 113–114, no. 5.27.1–10, fig. 5.27 (second half 4th – 5th century AD); Keller (2006), p. 228, type VII.57b, no. 1855, pl. 20k (4th – early 5th century AD); Schwarzer (2009a), p. 70, no. 12, pl. 1 (3rd – 4th century AD); Antonaras (2012), p. 168 no. 240 (3rd – 4th century AD).
Mid-Roman – early Byzantine (3rd – 5th century AD).

159.
J13-Gb-9-9
Rim fragment of a bowl; below the rim a horizontal rib surrounds the body, formed by a double fold in the glass wall.
Fig. 159.
Pale green; dark weathering and iridescence.
Diam. (rim) 10; H.: 1.66; T.: min: 0.1, max: 0.5.
*References*: Hayes (1975), p. 120, no. 472, fig. 13, pl. 30 (4th century AD); Weinberg (1988), p. 53–54, no. 108–1 , fig. 4-15, pl. 4-7 (second half 4th century AD); Whitehouse (1997), p. 79, no. 103 (4th century AD).
Late Roman (4th century AD).

160.
J13-Gb-3-21
Rim fragment of a bowl with a broad outfolded rim and an in-curving wall.
Fig. 160.
Pale green, transparent.
Diam. (rim) 18; H.: 1.42; T.: min: 0.12, max: 0.49.
*References*: Weinberg (1988), p. 41–44, no. 12–36, fig. 4-3; Whitehouse (1997), p. 70, no. 81 (3rd – 4th century AD); Pollak (2006), p. 155–158, no. 9–18, fig. 127; Antonaras (2012), p. 106, no. 130 (4th century AD).
Late Roman (4th century AD).

161.
J13-Dab-13-42

Rim fragment of a bottle or jug, decorated with a thick trail on the lip and a thinner spiral trail below the lip around the neck; both trails are of the same colour as the body.
Fig. 161.
Pale greenish blue, translucent; white weathering.
Diam. (rim) 6; H.: 1.5; T. rim: 0.36, body: min: 0.1, max: 0.16.
*References*: Oliver (1980), p. 101, no. 159 (4th century AD); Atik (2009), p. 3, fig. 41 (4th – 7th century AD).
Late Roman – early Byzantine (4th – 5th century AD).

162.
J13-Eac-10-11
Body sherd from a mold-blown flask or jug with a vertical ribbed fluting pattern.
Fig. 162.
Pale greenish blue, transparent.
Diam.: 5; H.: 3; T.: min: 0.15, max: 0.22.
*References*: von Saldern (1974), p. 79, nos. 71 (jug). 72 (flask) (3rd – 4th century AD); Hayes (1975), p. 113, no. 428, pl. 27 (first half [?] 4th century AD); Oliver (1980), p. 125, no. 221; 126, no. 222 (5th century AD [?]); Stern (2001), p. 233, no. 119 (probably second half 4th century AD); Arveiller-Dulong and Nenna (2005), p. 427, no. 1193, pl. 108 (second half 4th century AD); Antonaras (2012), p. 98, no. 117 (4th century AD).
Late Roman – early Byzantine (4th – 5th century AD).

163.
J13-Ed-14-8 + J13-Ed-18-75
Four (three + one) rim fragments (belonging together but not joining) probably from a conical goblet.
Fig. 163.
Pale olive green, translucent; white weathering and iridescence, sintered.
Diam. (rim) 7: H.: 2; T.: rim: 0.56, body: 0.11.
*References*: Hayes (1975), p. 104, no. 379, fig. 11 (4th century AD); Meyer (1988), p. 189, fig. 5 T; Stern (2001), p. 310, no. 173 (probably mid-6th – 7th century AD); Lightfoot (2007), p. 93, no. 212 (4th century AD).
Late Roman – early Byzantine (4th – early 7th century AD).

164.
J13-Fd-15-19
Base of a double kohl tube.
Fig. 164.
Yellowish green, translucent; white weathering, pontil mark visible.
Diam.: max : 4 ; H. (preserv.) 3.1 ; T. : min : 0.34, max : 0.95
*References*: Hayes (1975), p. 101, no. 359, pl. 28 (4th century AD); Meyer (1988), p. 194, fig. 7. U; Dussart (1998), p. 173, pl. 57, 16, group BXIII.211 (late 6th century AD); Whitehouse (2001), p. 195, no. 747 (4th – 5th century AD); Israeli (2003), p. 231, no. 291 (4th – 6th century AD); Arveiller-Dulong and Nenna (2005), p. 484, no. 1322 (5th century AD); Antonaras (2012), p. 265, no. 434 (4th century AD).
Late Roman – early Byzantine (4th – early 7th century AD).

165.
J13-Fd-40-1
Rim fragment of a conical cup, decorated with a blue spiral trail on rim and body. Measurements not available.
Fig. 165.
Colourless, transparent; white weathering.
*References*: Shepherd (1999), p. 327, no. 138, fig. 11.7 (2nd – 3rd century AD); Jennings (2004/2005), p. 159, no. 7.2.20, fig. 7.2.20 (first half 6th century AD); Keller (2006), p. 219, type VII.33b, no. 1209, pl. 16l (late 6th century AD); Pollak (2006), p. 174, no. 109, fig. 137; Adam-Veleni (2010), p. 350, no. 376 (5th – 6th century AD).
Late Roman – early Byzantine (mid 4th – early 7th century AD).

166.
J13-Dab-17-11
Foot fragment with folded base-ring, unusually turned inwards; probably from a large plate.
Fig. 166.
Yellowish green, translucent.
Diam. (foot) 28; H.:1.8; T.: base: 0.57, body: min: 0.12, max: 0.38.
*References*: Only two comparable pieces are known, both from Gerasa itself: Meyer (1988), p. 194, fig. 7. I; 198, fig. 8. P.
Early Byzantine (5th/6th century AD).

167.
J13-Fd-40-3
Stemmed hollow foot of a polycandelon lamp.
Fig. 167 .
Light yellow-green, translucent; white weathering, pontil mark visible.
Diam. base: 1; H.: 5.3; T.: min: 0.16, max: 0.39.
*References*: von Saldern (1980), p. 51, no. 280, pl. 23 (Early Byzantine); Oliver (1980), p. 117, no. 202 (5th or 6th century AD); Whitehouse (1997), p. 196, no. 343 (c. 5th century AD); Jennings (2004/2005), p. 142, no. 6.16.2, fig. 6.16.2 (first half 6th century AD); Czurda-Ruth (2007), p. 182, no. 811, pl. 21.
Early Byzantine (5th – 6th century AD).

168.
J13-Ed-18-76
Foot fragment of a goblet with a hollow stem and a conical foot with a tubular folded edge.

Fig. 168.
Pale greenish blue, transparent; white weathering.
Diam. (foot) 5; H.: 2.24; T. base: min: 0.3, max: 0.46, body: 0.12.
*References*: Meyer (1988), p. 199, fig. 8. bb; Whitehouse (1997), p. 105, no. 156 (4th century AD or later); Dussart (1998), p. 116, pl. 27, 38, group BIX.1 (Byzantine); Schwarzer (2009a), p. 72, no. 40, pl. 3; Çakmakçi (2009), p. 62, tab. 2, type A1b.
Early Byzantine (5th – early 7th century AD).

169.
J13-Fa-9-5
Foot fragment of a goblet with a solid foot and a solid short stem.
Fig. 169.
Yellowish green, translucent; pontil mark visible.
Diam. (foot) 5.2; H.: 2.5; T. stem: min: 1.31, max: 1.5; base: min: 0.31, max: 0.52; body: min: 0.16, max: 0.42.
*References*: Meyer (1988), p. 206, fig. 10. Y; Dussart (1998), p. 121, pl. 29, 1, group BIX.2 (first half 8th century AD); Hadad (2005), p. 130, no. 402, pl. 21 (Umayyad); Çakmakçi (2009), p. 63, tab. 5, type B1b.
Early Byzantine – early Umayyad (5th – second half 7th century AD).

170.
J13-Db-13-1X
Fragment of a goblet with a solid foot and a solid stem with one knob.
Fig. 170.
Pale greenish blue, translucent; white weathering, pontil mark visible.
Diam. (foot) 4.6; H.: 3.57; T.: stem: min: 0.86, max: 1.32, body: min: 0.12, max: 0.65.
*References*: Jennings (2004/2005), p. 130, no. 6.3.16, fig. 6.3.16 (late 6th/early 7th century AD); Hadad (2005), p. 130, no. 409, pl. 21 (Umayyad); Schwarzer (2009b), p. 92, no. 34, pl. 2; Çakmakçi (2009), p. 64, tab. 7, type B1d.
Early Byzantine – early Umayyad (5th – second half 7th century AD).

171.
J13-Fa-9-1
Lower part of a solid stemmed lamp, decorated with two knobs.
Fig. 171.
Greenish blue, translucent; white weathering, pontil mark visible.
H. max. 2.8; diam. (knobs): 1.6; stem: min.: 1.18, max.: 1.78.
*References*: Baur (1938), p. 519–521, no. 1–3, fig. 17 (5th or 6th century AD); Meyer (1988), p. 212–213, fig. 13. A. B; Dussart (1998), p. 88, pl. 16, 13–16, group BVI.23 (early 4th – 12th century AD); Jennings (2004/2005), p. 147, no. 6.20.6, fig. 6.20.6 (late 6th century AD); Hadad (2005), p. 132, no. 426, pl. 22 (Umayyad).
Early Byzantine (late 6th century AD) – Umayyad/ Abbasid (8th/9th century AD).

172.
J13-Fc-15-12
Small pearl bead.
Fig. 172.
Blue (?); yellowish weathering.
Diam. (max.) 0.5.
*References*: Spaer (2001), p. 64; Schwarzer (2009a), p. 75, no. 71, pl. 4.
Hellenistic – early Islamic.

173.
J13-Fh-29-2
Three tesserae.
Fig. 173.
Pale blue, translucent.
Dimensions c. 0.8 x 0.9 x 0.6.
*References*: Schwarzer (2009a), p. 75–76, no. 83, pl. 4; James (2010).
Mid-Roman – early Islamic.

174.
J13-Dab-13-39
Fragment of a casted window pane.
Fig. 174.
Yellowish green, translucent; streaks, white weathering.
Dimensions: 6.7 x 5.0; T. c. 0.5 cm.
*References*: Hadad (2005), p. 136, no. 473, pl. 24 (Umayyad); Pollak (2006), p. 187–188, no. 192, fig. 144; Schwarzer (2009a), p. 76, no. 88, pl. 4.
Late Roman – early Islamic.

**Coins**

175.
J13-Da-18-2X
Fig. 175a-b.
AE; Follis.
Constantinople, Iustinianus I.
Wt: 16.02; diam. min: 2.880; diam. max: 3.194; 6h.
Obv.: [DN IVST]INI-ANVS [PP] A[VG]; draped and cuirassed bust of Iustinianus I. facing right, diademed.
Rev.: M – A – CON; large letter M with A for the officina below, CON below baseline.
*References*: Bellinger (1966), p. 78, no. 28a.1–28a.3; Morrisson (1970), p. 75, no. 4/Cp/AE/05; Wroth (1966), p. 29, no. 28.
AD 527–538.

176.
J13-Db-19-10
Fig. 176a-b.

AE, Sestertius.
Wt: 19.50; diam. min: 2.836; diam. max. 2.961; 12h.
Maximinus Thrax, Rome.
Obv.: IMP MAXIMINUS PIVS AVG; draped bust of Maximinus Thrax facing right, laureate.
Rev.: [PR]OVIDE-NTIA AVG – S – C; standing personification of Providentia looking left with cornucopia in her left and lowered right hand, in front of her feet globe.
*References*: BMCRE 6, p. 223, no. 17. p. 230, no. 91–92; RIC 4,2, p. 145, no. 61.
AD 235–236.

177.
J13-Db-17-6
Fig. 177a-b.
AE, Follis.
Wt: 2.87; diam. min.: 1.898; diam. max.: 2.046; 5h.
Thessalonica, Constantine I.
Obv.: CON[STAN-TINVS AVG]; head of Constantine I. facing right, laureate.
Rev.: PROVIDEN-TIAE AVGG – SMTSE; campgate with two turrets, star above, six stone layers, no door.
*References*: RIC 7, p. 518, no. 153; Robertson (1982), p. 198, no. 287–288.
c. AD 326–330.

178.
J13-Ed-8-3
Fig. 178a-b.
AE.
Uncertain Phoenician city.
Wt: 4.33; diam. min: 1.552; diam. max.: 1.626; 12h.
Obv.: Head of Tyche with corona muralis facing right, veiled.
Rev.: [..]PA[…]; galley with prow to the left, above and below traces of an inscription.
1st century BC – 2nd century AD.[17]

179.
J13-Gb-8-3
Fig. 179a-b.
AE.
Wt: 6.59; diam. min.: 2.127; diam. max.: 2.131; 12h.
Philadelphia/Arabia, Elagabalus.
Obv.: [AV KEC]AP AN[TωNINOC]; draped and cuirassed bust of Elagabalus facing right, laureate.
Rev.: [ΦIΛ ΚOIΛ - C]YP; chariot with domed canopy upon four pillars to the right, drawn by four horses, above countermark: lying club with handle.
*References*: Rosenberger (1978), p. 73, no. 47; SNG ANS 6, no. 1398; Spijkerman (1978), p. 256, no. 46.
AD 218–222.

**Addendum** (AHS)
180.
J13_Dbd_24_7
Body, fragmented.
Fig. 180.
Munsell: 5YR 7/6.
H.: 4.5; L.: 5.5; T.: max: 1.2, min.: 1.
Handmade coarse ware fragment with applied "snake" pattern; Hard-fired, rather coarse with some lime inclusions.
*References*: Sala (2011), fig. 7; Fernández-Tresguerres Velasco (2008), 30-31, fig. 7.
Early Bronze Age

**Coins from 2012 Campaign** (SR)
J12-1.
J12-Af-19-17
Fig. 181a-b.
AE.
Wt: 2.23; diam. min.: 1.554; diam. max.: 1.762; 12h.
Petra; Rabbel II.
Obv.: Jugate busts of Rabbel II. with long hair and Gamilath facing right, laureate.
Rev.: Nabatean letters (Rabbel/Gamilath); two cornucopiae crossed and filleted, between them Nabataean letters in two lines, border of dots.
*References*: Bellinger (1938), p. 38, no. 79; BMC Arabia, 13 no. 3–7 (esp. no. 6–7); Meshorer (1975), p. 110–111, no. 163; SNG GB 12,2, no. 3622–3626; SNG Copenhagen 7, no. 132–135; SNG ANS 6, no. 1446–1451.
AD 70–106.

J12-2.
J12-B-2-1226
Fig. 182a-b.
AE, Follis.
Wt: 5.96; diam. min.: 2.046; diam. max. 2.313; 5h.
Constantinople; Anastasius I.
Obv.: DN ANAST[A]-SIVS [PPAVC]; draped and cuirassed bust of Anastasius I. facing right, diademed.
Rev.: M – CO[N]; large letter M with cross above, CO[N] below baseline.
*References*: Bellinger (1966), p. 12–13 no. 16a.1–16a.8; Morrisson (1970), p. 21 no. 1/Cp/AE/11–1/Cp/AE/22.
AD 498–518.

17. The type of the coin is known from several Phoenician mints from the first century BC up to the second century AD. Since the specimen presented here is to badly preserved to give a precise reading of the inscription the exact mint and date must unfortunately remain uncertain.

J12-3.
J12-Bc-27-145
Fig. 183a-b.
AE, Semi-Follis.
Wt: 2.44; diam. min.: 1.956; diam. max.: 2.021; 6h.
Uncertain, Iustinianus I.
Obv.: […]S[…]; draped (and cuirassed?) bust of Iustinianus I. facing right.
Rev.: K; large letter K.
*References*: Bellinger (1966), pp. 188–189, no. 360.1–360.28; Morrisson (1970), p. 122, no. 4/X/AE/04–4/X/AE/06.
AD 527–565.

J12-4.
J12-Bc-42-45
Fig. 184a-b.
AE, Nummion.
Wt: 0.70; diam. min.: 0.819; diam. max.: 0.873.
Obv.: no distinguishable features.
Rev.: monogram in a laurel-wreath.
6th – 7th century AD.

J12-5.
J12-Ca-39-1
Fig. 185a-b.
AE.
Wt: 1.01; diam. min.: 1.302; diam. max.: 1.306; 12h.
Constantinople; Theodosius I.
Obv.: DN THEODO-SIVS PF AVG; draped and cuirassed bust of Theodosius I. facing right, diademed.
Rev.: SALVS REI-PVBLICAE – CONSA; Nike advancing left, right hand carrying a trophy over her right shoulder and dragging a captive with her left, in left field Chrismon.
*References*: RIC 9, p. 234, no. 86(b).
AD 388–392.

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# REPORT ON THE ḤUMAYMA EXCAVATION PROJECT'S 2010 AND 2012 FIELD SEASONS

*M. Barbara Reeves, Craig A. Harvey, Mike Fergusson, Sherry Harden, Lindsay M. Holman, Marla MacKinnon and Andi Shelton*

## Introduction

Ḥumayma, ancient Ḥawara, is the largest Nabataean and Roman period site in the Ḥisma desert of southern Jordan. The Nabataeans, in the first century BC, had founded a town with an impressive water-supply system here on a pre-existing caravan route. Just over a century later, following the creation of *Provincia Arabia*, the Romans chose to build a fort for 500 soldiers at this strategic location. The residents of Ḥumayma's fort and town coexisted for the next three centuries, during which time socio-political conditions in the Roman and Byzantine Near East underwent many changes.

In 2008 a new cycle of excavations was begun at Ḥumayma with the goals of investigating the character and extent of Ḥumayma's Nabataean and Roman period civilian communities and of exploring the nature of the interactions between the site's civilian and military populations. The spatial focus for excavations in the civilian community is immediately south and west of the Roman fort, an area which past research had shown was heavily impacted by the nearby garrison (**Fig.1**; Oleson *et al*. 2008; Reeves 2009; Reeves *et al*. 2009). This area had once formed part of the Nabataean town, but it was damaged and then rebuilt in conjunction with the construction of the Roman fort. Based on Roman parallels, this Roman period civilian community is referred to as the *vicus*. Even though the inhabitants of the *vicus* would have been civilians, its spaces catered to the needs of the soldiers, as shown by both the community shrine (in E125) and the garrison's bathhouse (in E077).

A major goal of the Ḥumayma Excavation Project in 2010 and 2012 was to learn more about the Nabataean to Roman transition at Ḥumayma and about the subsequent phasing of the *vicus* by continuing excavations in two previously opened multi-phase fields (E077 and E128). Another goal was to catalogue all of the ceramic building material found in association with the Roman and Byzantine phases of the garrison's bathhouse (Field E077) and with

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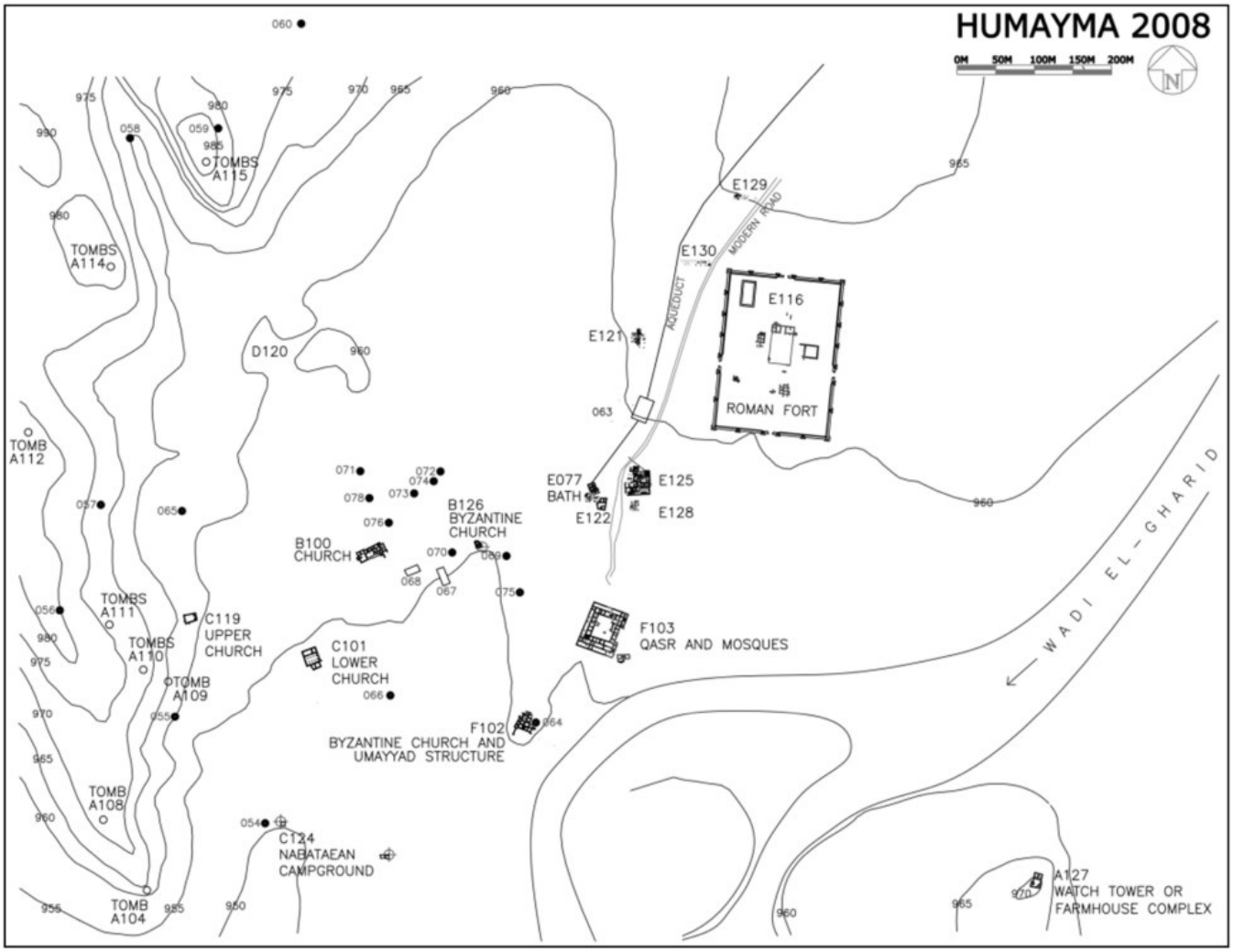
1. The 2010 and 2012 seasons of the Humayma Excavation Project took place from 15 May to 24 June 2010 and 19 May to 2 July 2012. Project funding was provided by the Social Sciences and Humanities Research Council of Canada and the Senate Advisory Research Committee of Queen's University. The project director was Dr. M. Barbara Reeves of Queen's University, Kingston, Ontario, Canada. Craig A. Harvey was Assistant Director in 2012. Area supervisors were Khristine Chua, Barbara Fisher, Craig A. Harvey, Marla MacKinnon, M. Barbara Reeves, Samantha Rice, Brian Seymour and Victoria Wijnbergen. Michael Fergusson and Marla MacKinnon conducted the RTI and Photogrammetry survey. The ceramicists were Andi Shelton in 2010, and Sherry Hardin and Lindsay Holman in 2012. M. Barbara Reeves and Craig A. Harvey processed the ceramic building materials. Brian Seymour supervised the architectural drawings in the field and Devon Skinner (2010) and Chris Mundigler (2012) digitized the plans in Canada. Lisa Bengston was field conservator in 2012. Staff from the ACOR Conservation Cooperative cleaned our coins in 2010 and 2012 and looked for pottery joins in 2010. Jessie George, Craig A. Harvey, Marla MacKinnon and M. Barbara Reeves photographed the finds. Amer Bdour (2010) and Mohammed Donabiat (2012) served as representatives of the Department of Antiquities. The Humayma Excavation Project is accredited by the Archaeological Standards Committee of the American Schools of Oriental Research and licensed by the Department of Antiquities of the Hashemite Kingdom of Jordan. The Project Director is very grateful to Dr Ziad al-Saad, former Director-General, Mr Fares al-Hmoud, former Acting Director-General, and to everyone at the Department of Antiquities, as well as to Drs Barbara Porter and Chris Tuttle, and all the staff at ACOR, for their assistance with the project.

the heated room in the Roman fort (Field E116 Area I Room J), in order to create diagnostic typologies for each class of building material. A final goal of the 2012 field season was to test the use of close-range photographic techniques to document excavated artifacts in the lab. These techniques were also used on *in situ* inscriptions and graffiti found in excavation areas and in the hills to the south-west of the ancient town-site[1].

**Field E077: Nabataean Structures and Bathhouse (M. B. Reeves)**

Field E077 is located approximately halfway between the center of the Nabataean town and the Roman fort **(Fig. 1)**. Its elevation on a slight rise above the floodplain and rain-fed cisterns to its west, but below the civic distribution point of the gravity-fed aqueduct, meant it was probably always dependent on the aqueduct for its water supply (cf. Oleson 2010: 223). Past explorations by the Ḥumayma Excavation Project (Oleson 1990; Reeves *et al*. 2009) had indicated that this field was occupied by a succession of buildings spanning the Nabataean to late Byzantine or early Islamic periods. E077 is thus one of most important areas at Ḥumayma for understanding the Nabataean to Roman transition and the subsequent phasing and character of the civic community (*vicus*) that developed next to the Roman fort.

Excavation in this field dates back to 1989 when J. P. Oleson examined seven freestanding rooms (**Fig.2:** A-G) associated with an ancient bathhouse (Oleson 1990). Oleson's probes within and against the outside walls of this structure suggested that a small Roman




*1. Plan of Ḥumayma with ancient structures marked.*

bathhouse had been built in the second century AD on top of a Nabataean stone structure, and that the bathhouse had grown in size by means of a renovation in the Byzantine period (Oleson 1990: 298). Although these data formed the basis for subsequent analyses of the site's history (e.g. Reeves 1996), new excavations carried out in 2008 revealed that the phasing of the architecture in this field was much more complicated than originally suspected (Reeves *et al*. 2009). In particular, the 2008 excavations showed that there were more ruins associated with the bathhouse than previously suspected and that the bathhouse had actually decreased in size between the Roman and Byzantine period.

The goals for the 2010 and 2012 excavations in this field were to reveal the maximum extent of the bathhouse and to assess the character and construction of E077's remains in each phase. This investigation included the Nabataean structures that preceded the bathhouse's construction, the dump piles and other activity areas associated with the bathhouse's operations and renovations, and subsequent occupational areas postdating the building's abandonment as a bathhouse. The investigation also sought to ascertain how the bathhouse fitted into the plan of the *vicus* by exploring its water supply,




*2. Plan of E077 after 2012 excavations.*

drainage system and any associated roads.

A total of 24 cardinally oriented 6 m x 6 m squares were laid out around all four sides of the freestanding remains excavated in 1989 **(Fig. 2)**. As the bathhouse and preceding Nabataean structures are oriented 20 degrees west of north, some squares were slightly extended in order to abut the walls mapped in 1989. In addition, new probes for dating purposes were excavated in Rooms A, D, E and F, and *in situ* ceramic building materials were collected from Rooms A, D and E. Five of the six squares excavated in 2008 also underwent further excavation in 2010 or 2012.

These 2010 and 2012 excavation seasons have produced a great deal of information about Field E077 which is being analyzed in association with the data from the 1989 excavations, as well as from small probes done in 1996 and 2000. Owing to space restraints, this report will only provide an overview of the current theorizing regarding E077's phasing and discuss some of the more significant discoveries **(Table 1)**.

*Pre-Bathhouse Phases*

The five pre-bathhouse phases correspond to three construction and two destruction phases, all of which pre-dated the second century AD construction of the bathhouse. **(Fig. 3)** shows the identifiable walls associated with the three construction phases. Only traces of these walls survive today as a result of subsequent activity.

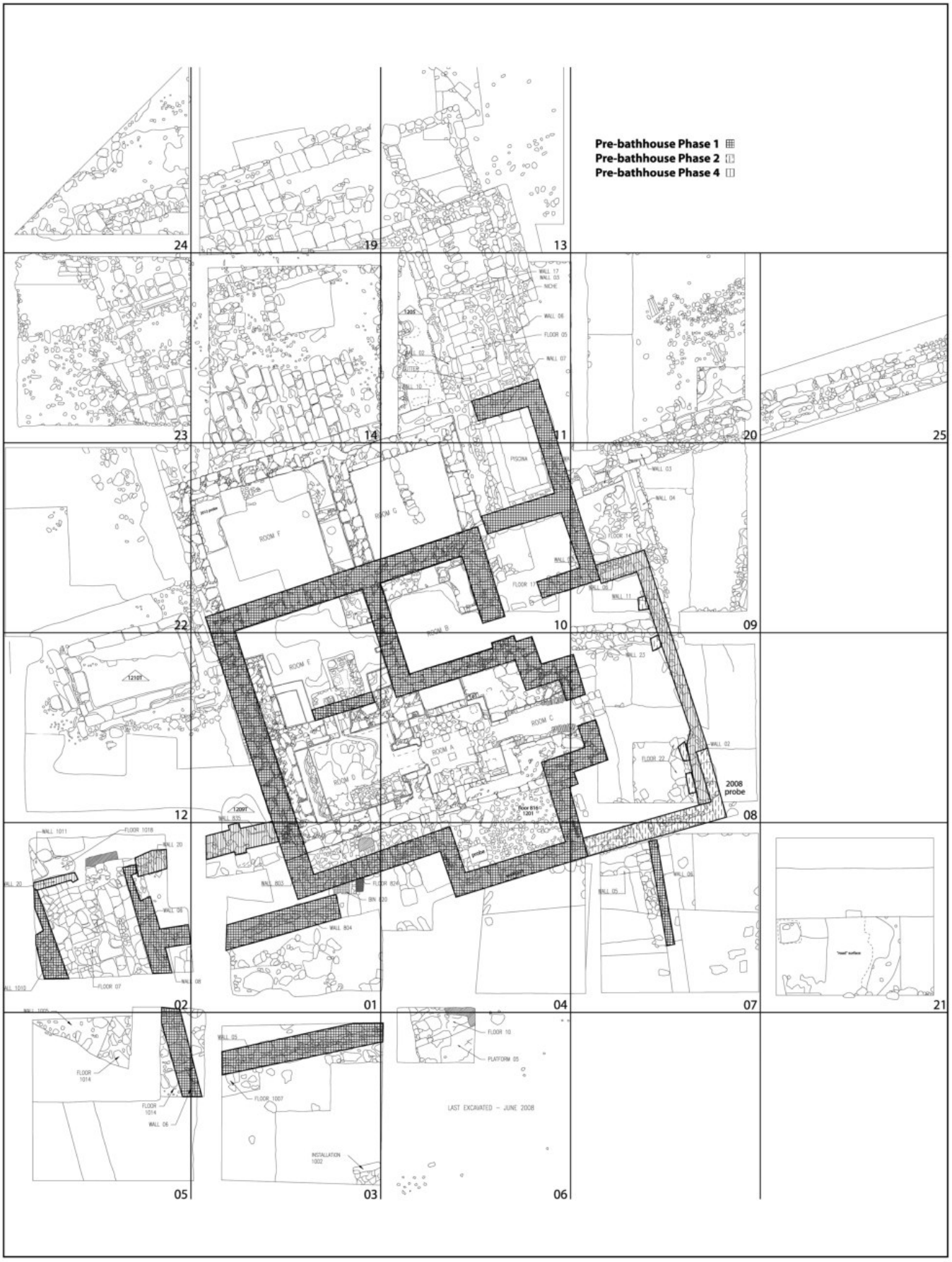
The earliest traces of human activity in E077 date to the first century AD when at least two finely constructed ashlar structures were built at the south end of the field (Pre-Bathhouse Phase 1). Although these structures have been heavily robbed out, traces of them have been found both reused as foundations beneath the southern half of the Roman bathhouse and in abandoned areas around the bathhouse's southern perimeter. The traces that remain reveal carefully constructed sandstone walls, flagstone floors and arched ceilings **(Fig. 4)**. The walls and the cobblestone foundation courses of floors were set in dark grey mortar. The walls had mortared rubble cores and were faced with Nabataean dressed blocks. Interestingly, the exterior faces of walls (with tightly fitting blocks) seem to have been more carefully constructed than the interior faces (where chinking stones were used between blocks) **(Fig. 5)**.

There is not enough left of these structures to determine their original function. Previous suggestions that E077 might have contained a Nabataean bathhouse (Oleson 1990: 296, 2010: 223) are probably not true as no Nabataean phase basins or sandstone *pilae* like those used in the Nabataean bath at Wadi Ramm (Dudley and Reeves 1997) or hypocaust bricks matching those used in the Nabataean bath at Wadi Musa have been found (Reeves and Harvey 2013). The quality and complexity of the construction, as exemplified by a surviving corridor with doorways opening to the east and west **(Fig. 4)** suggests elite structures. It is likely that the construction of these stone structures represents the expansion of the Nabataean town in the first century AD into a previously unoccupied area. This area was above the run-off zone to the west that fed the cisterns associated with the town's earliest occupation. The structures in E077 were likely built following the construction of the Nabataean aqueduct whose water was distributed to the town from a point just north-east of E077. Although no Nabataean period pipeline to E077 has been identified, it is likely that the buildings here received water from ceramic pipelines, as was the case in nearby Field E125 (Oleson *et al*. 2008: 317).

Following the initial construction of buildings, the eastern structure seems to have expanded eastwards as evidenced by an abutting wall in the south-east which bonded with a new northward running wall which had a series of arch springers on its western face (Pre-Bathhouse Phase 2). The prosperity evidenced by both the original construction and this expansion, however, seems to have been cut short by a calamity that damaged the building towards the end of the first century (Pre-Bathhouse Phase 3). Architectural evidence

**Table 1:** Overview of E077 Phasing.

| Phase | Culture; Proposed Date (CE) | Result and Description |
|---|---|---|
| Pre-Bathhouse phase 1 | Nabataean; 1st century | Construction: The earliest structures in E077 consist of at least two finely constructed stone structures built in the southern half of the field. |
| Pre-Bathhouse phase 2 | Nabataean; 1st century | Renovation: The eastern structure expands to the east. |
| Pre-Bathhouse phase 3 | Nabataean; end of 1st or early 2nd century | Destruction: The Nabataean structures and their contents are damaged. |
| Pre-Bathhouse phase 4 | Nabataean or Roman; early 2nd century | Crude construction: Southeastern walls are crudely repaired. A new western wall runs over and through previous Nabataean walls and floors. |
| Pre-Bathhouse phase 5 | Roman; 2nd century | Destruction: Nabataean walls from previous phases are robbed out. The displaced stones are probably reused in the Roman fort or bathhouse. |
| Bathhouse phase 1 | Roman; 2nd century | Construction: A Roman bathhouse is constructed, probably contemporaneously with the fort. The southern rooms incorporate the foundations of Nabataean walls and floors. The northern rooms are built on virgin soil. |
| Bathhouse phase 2 | Roman; 2nd or 3rd century | Minor renovation: Thin walls are built to the north of the latrine in the northeast corner of bathhouse. |
| Bathhouse phase 3 | Roman; 2nd or 3rd century | Major renovation: The Roman bathhouse undergoes elaborate expansion with the addition of the grand entranceway and entrance corridor on the north. The plunge pool on the west, cistern on the east, and the expansion of the fresh water conduit likely also date to this phase. |
| Bathhouse phase 4 | Roman - Byzantine; late 3rd (and possibly early 4th) century | Abandonment: The bathhouse, along with the fort and adjacent *vicus* structures (e.g. E125, E122) were probably abandoned when the Roman garrison withdrew from Humayma in the late 3rd century. |
| Bathhouse phase 5 | Byzantine; early 4th century | Major renovation: A much smaller bathhouse is created by abandoning all rooms except A-E. This renovation is probably related to the reoccupation of the fort by a smaller garrison. |
| Bathhouse phase 6 | Byzantine expansion, 5th century or later | Renovation: The *klinai* in Room F (and probably the room itself) were added. |
| Bathhouse phase 7 | Late Byzantine or Umayyad; 6th century or later | Renovation: The latest datable artifacts associated with renovations to the bathhouse's furnace and wall heating date to the Late Byzantine or possibly Umayyad period. |
| Bathhouse phase 8 | Umayyad? | Abandonment: Although there is no clear evidence for when the bathhouse or the aqueduct that supplied it went out of use, both were likely used into the Umayyad period. |
| Post-Bathhouse | mid-20th century | Construction: Between 1948 and the mid-1960s the ruins in E077 are reused and recycled for a domestic structure. |




*3. E077: Pre-bathhouse phases.*



*4. E077: Corridor from a robbed out Nabataean structure in Square 02. The corner of a later structure extends from the north-west corner.*



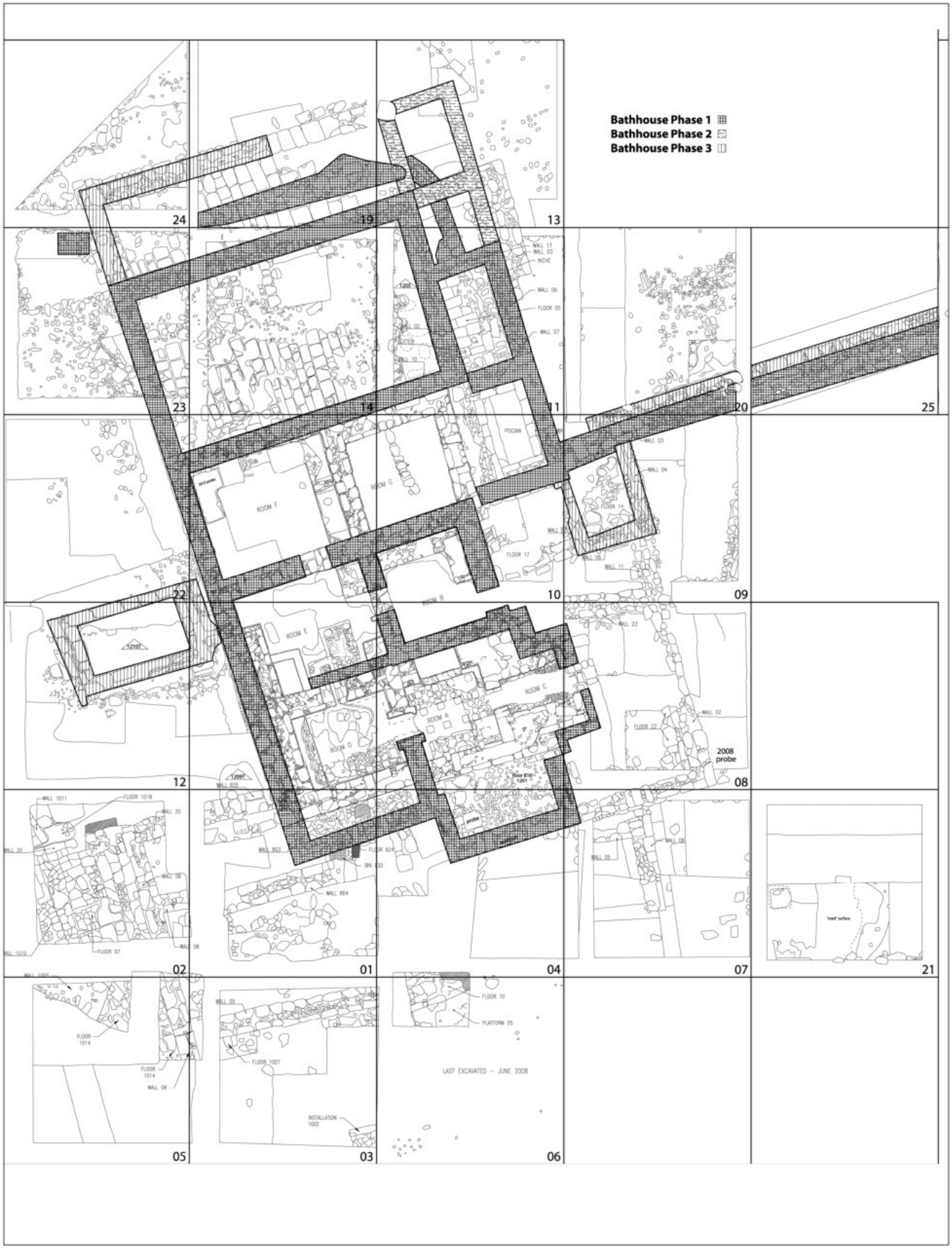
*5. E077: Finely constructed external face of two Nabataean walls in Square 04. The more crudely faced walls behind correspond to a Nabataean internal face (right) and two Byzantine walls (center and left).*

post-dating this calamity (Pre-Bathhouse Phase 4) includes a crude wall built in Squares 01 and 02 with disregard for the previous doors, walls and floors, a crude wall inserted behind the surviving arch springers on the eastern side of the E077, and the construction of the abutting wall in Square 09 which overlays wall collapse. A thick concentration of broken pottery against the external face of the expansion-era wall in Square 08 is hypothesized to constitute the material discarded from the building following the Pre-Bathhouse Phase 3 calamity. As discussed more fully in the ceramicists' report below, the pottery from this dump suggests that it was discarded in the late first or early second century AD. The architectural evidence suggests that the damage to the Nabataean structures at this time was substantial, perhaps resulting from an earthquake. Later still, the original phases of occupation in E077 were brought to an end when all of the preceding architecture was robbed out, often to floor or foundation levels (Pre-Bathhouse Phase 5; **(Fig. 4**). Pottery sherds found in the corridor in Square 02 suggest this robbing occurred in the second century. Since the Roman fort built in the early second century incorporated large numbers of recycled Nabataean blocks, the E077 stones likely ended up there, or in the Roman bathhouse.

*The Large Roman Bathhouse*

After the Nabataean structures in E077 had been robbed out, a large bathhouse was built incorporating the lower courses of surviving Nabataean walls and subfloors as foundations (Bathhouse Phase 1; **Fig. 6**). As a result, the bathhouse is oriented 20 degree west of north, rather than following the cardinal orientation employed in the construction of the Roman fort. Based on its second century construction date, its location near to but outside the main gates of the Roman fort and the large quantities of water and fuel required to operate it, this bathhouse was most likely built for the use of the Roman garrison (cf. Reeves 1996). The date of the bathhouse's construction is not precisely known, but based on parallels to external bathhouses built outside auxiliary forts in the western half of the Roman Empire its first incarnation was probably built contemporarily with the fort. It then expanded during two renovations dating to the second and third centuries before probably being abandoned, along with adjacent structures in E122 and E125, when the garrison withdrew from the fort in the second half of the third century (Oleson *et al*. 1999: 427; Oleson *et al*. 2008: 313).

Although the bathhouse's orientation was determined by the recycled Nabataean foundations, the




*6. E077: Roman bathhouse phases.*

placement of the rooms conformed to Roman guidelines with the heated bathing rooms on the south and west sides of the building and the unheated rooms to the north (Vitruvius X.1). Another important organizational design feature for this bathhouse was the location of the conduit that conveyed fresh water from the town's aqueduct. The conduit's support wall entered the bathhouse in the center of the east side and provided a central axis for the building with unheated rooms located to its north and heated rooms to its south.

Owing to the Byzantine period downsizing of the bathhouse, which resulted in the abandonment of most of the northern rooms, the Roman period organization and features of these northern rooms are relatively well preserved. Notable among the unheated rooms from the first phase of the bathhouse are the *piscina and frigidarium*, the latrine, the drainage channel taking dirty water away, and a large entrance hall / *apodyterium. The piscina* **(Fig.7)** was a small pool with an internal bench on which bathers sat while having cold water poured over them (Nielsen 1990: 154). It was located in the center of the eastern side of the building, right next to the *terminus* of the stone conduit wall conveying the fresh water **(Fig. 8)**. Parallels suggest that the piscina would have been located at the eastern end of a *frigidarium*, which may have extended all the way to the western edge of the bathhouse. Subsequent renovations have obliterated the internal features of the *frigidarium*, except for part of its cobblestone subfloor and a drainage channel right next to the piscina which carried dirty water from the *frigidarium*'s floor through its northern wall to the latrine **(Fig.7)**. This dirty water entered the latrine's underfloor channel in its south-west corner and flushed the latrine while being carried downhill to an exit in its north-west corner. Seats (no longer extant) would have been placed over the channel and a clean water trough, on the flagstone floor just in front of the seats, would have provided water for washing. After leaving the latrine, the dirty water was conducted through a covered stone channel



*7. E077: Latrine (front) and piscina (back).*

running across the north of the bathhouse and beyond its western edge **(Fig. 9)**. The flagstone floor above this channel probably also dates to the bathhouse's original phase, although in that phase it would have been located outside the building. This external flagstone floor must have provided entrance to the north-west corner of the large unroofed hall that probably served as an *apodyterium* (changing room). Although this hall has been heavily disturbed it seems to have been unroofed with a flagstone floor and mortared rubble benches, which are still extant against the west and south walls in its south-west corner **(Fig. 9).** The entrance to the rest of the phase 1 bathhouse would have been through this room. There was likely a separate external entrance into the latrine from the north.

In contrast to the northern rooms, the arrangement of the southern rooms is much less clear at this time, owing to later renovations.

Traces of phase 1 hypocausts have been found beneath Room E and the later cut-off sections to the south of Rooms D and A. The furnace would have been located in the south-east corner of the building (Room C). A probe beneath the plaster floor of Room F indicates that its extant floor was a Byzantine addition (see below), but provided no evidence of Room F's Roman function. Likewise owing to later disturbance, it is not possible to determine how far east the southern portion of the bathhouse extended in its original phase.

After its original construction, the bathhouse was renovated twice more during the second and third centuries. The first renovations were minor (Bathhouse Phase 2). They involved the construction of the thin walls in the north-east corner of the building. This expansion presumably had something to do with regulating access to the latrine. The other renovation phase (Bathhouse Phase 3) was major and would have had a great impact not only on the functionality of the structure, but its prestige. During this phase the building underwent elaborate expansion with the addition of the wide entranceway in the center of the northern side leading to a walled entrance corridor **(Fig. 9)**. By turning right, entrants could access the bathhouse; by turning left, they could access the latrine. Other renovations from this period seem to have pulled more water from the town's aqueduct. The northern extension to the stone conduit wall **(Fig. 8)** was likely built at this time to increase the water supply to the bathhouse and the rectangular cistern in Square 09 was used to store extra water **(Fig. 8)**. Finally, on the west side of the building, a plunge pool **(Fig. 10)** was added to enhance the bathing experience by allowing bathers to fully immerse themselves while viewing the towering vista of Jabal Qalkha to the west.

At its greatest extent, the plan of Ḥumayma's bathhouse bears some striking similarities to the plan of the bathhouse next to the Great Temple in Petra (Joukowsky 2007: 200-10), albeit on less grandiose scale. Both have an entrance corridor leading either to a latrine via an anteroom or to the bathhouse proper via an *apodyterium*. Next, both have a bank of unheated rooms with a large pool on the west and a small immersion pool with internal bench on the east. Beyond the unheated rooms, at the opposite side of the building from the entrance corridor, is a bank of rooms heated by hypocausts. The basic similarities in the plans of Ḥumayma's and Petra's contemporaneous bathhouses make it likely that either the same designer was involved in their construction or that one building was inspired by the other. Indeed, given these similarities, it can now be posited that there might be a buried *palaestra* around Ḥumayma's plunge pool, just like at Petra. However, in spite of these similarities, there are also major differences in the size and luxuriousness of these two buildings. Ḥumayma's bathhouse is approximately half the size (ca 450 $m^2$) of Petra's bathhouse, and lacks the marble surfaces and non-rectangular design embellishments of that structure. These differences probably reflect the different clienteles intended for an auxiliary fort's bathhouse versus a civic bathhouse in the center of a major urban center.

*The Small Byzantine (and Possibly Umayyad) Bathhouse*

In the early Byzantine period, probably early in the fourth century, the bathhouse in E077 underwent a major renovation (Bathhouse Phase 5; **Fig. 11**). The result of this renovation was to create a much smaller bathhouse by abandoning most of the Roman period structure. Undisturbed strata in the abandoned pools and rooms contained ceramics dating up to the third or perhaps fourth century. A probe through the new plaster floor in Room B produced pottery extending possibly to the fourth century, a foundation probe in Room A produced an early Byzantine pottery sherd associated with the renovated hypocaust, and the fill around the abandoned hypocaust in Room E contained ceramics dating from the first to third century. All of this evidence is consistent with a military



*8. E077: Two-phase stone water conduit entering bathhouse with piscina at bottom left and cistern on right.*



*9. E077: Northern rooms of Roman bathhouse from north-east corner.*

bathhouse being abandoned following the departure of Ḥumayma's garrison in the late third century (Bathhouse Phase 4) and then downsized following the arrival of a much smaller garrison in the early fourth century.

The fourth century bathhouse was smaller and required less water and fuel. It consisted of a furnace (Room C), two heated rooms (A and D) and two unheated rooms (B and E). Given the bathhouse's location, it would still have been dependent on piped water from the aqueduct. The northern extension to the water conduit wall **(Fig. 8)** may date to this renovation, instead of an earlier time, if some damage had occurred to the Roman period conduit. The amount of water piped into the building was probably considerably less at this time as the immersion pools had been abandoned and likely replaced by splash pools in Rooms E and A.

There is evidence for (at least) two subsequent renovations to this bathhouse. The first renovation (Bathhouse Phase 6) resulted in the addition of an *apodyterium* (Room F) and a new entrance to the bathhouse on the north. This *apodyterium* contained plastered *klinai* (benches) around its sides constructed of bricks, stones and mortar. Although all but two *klinai* were subsequently robbed out, their former position is still marked by floor plaster. A probe excavated in the north-west corner of the room beneath the location of the robbed out *klinai* produced a Byzantine corpus of finds including an early fifth century coin of Theodosius II (408 - 423), dating the *klinai's* installation to the fifth century or later. As this renovation likely post-dates the occupation of the fort (Oleson 2010: 59), the bathhouse's clientele following this renovation is not clear.

There is also evidence for at least one other renovation of the bathhouse in or after the late Byzantine period (Bathhouse Phase 7). A 1989 probe in Room C's latest floor packing produced late Byzantine ceramics (550 - 640) indicating that the furnace was rebuilt in or after that time (Oleson 1990: 305). This major remodeling of the furnace may relate to a problem in distributing heat throughout the building, evidenced also by a large hole punched into the hypocaust through the southern wall of Room D and then subsequently filled in **(Fig.12)**. The *in situ tubuli* lining the south wall of Room A (i.e. from the last phase of the functioning bathhouse) may also date to this renovation of the heating system **(Fig.13)**. As the best published parallels for these 'Wheel-made Square-vent' *tubuli* come from the Umayyad period bathhouse at *Qasr* al-Hayr East in Syria (Harvey 2013: 81-4), this last renovation may have occurred in the Umayyad period. In support of the theory that Ḥumayma's bathhouse may have been operational into the Umayyad period, it should be noted that the adjacent ruins in Field E122 were converted into an Umayyad house (Oleson *et al*. 1999: 426-27), suggesting that this area of the site still received



*10. E077: Plunge pool on west side of bathhouse.*

water from the aqueduct. The Abbasid family was also resident at Ḥumayma at that time in the *qasr* they built south of the bathhouse. Given that the *qasr* contains no bathhouse and that such facilities are standard in similar Umayyad period elite residences (Reeves 1996), it is likely that the *qasr* residents would have reused the E077 bathhouse. Unfortunately, the ceramic evidence is inconclusive: Umayyad period sherds have been found in E077's highest soil strata and in the disturbed fill from rooms reused in the mid-twentieth century (see below), but not in sealed contexts.

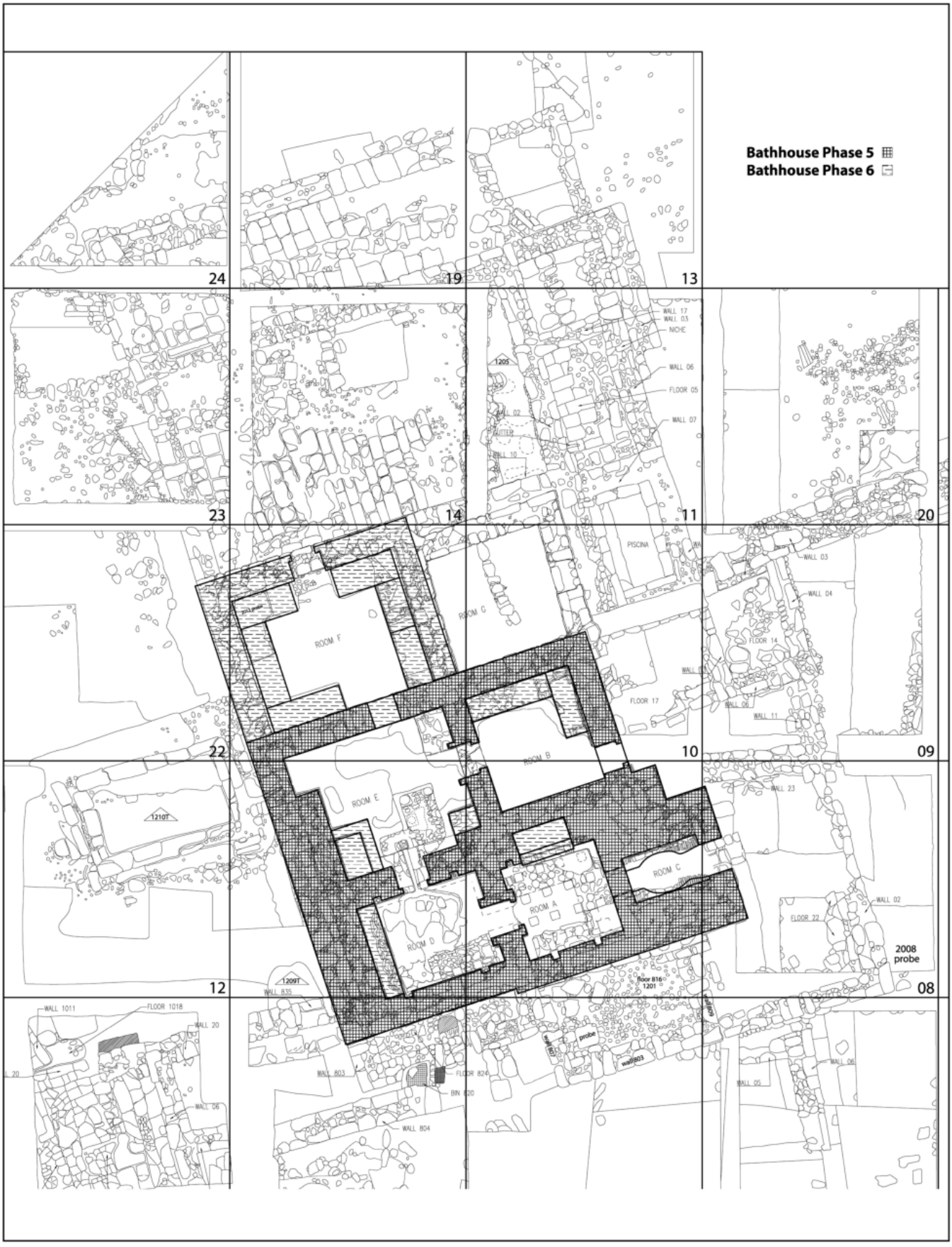
There is no evidence as yet for when the bathhouse went out of use. Theoretically, the bathhouse in E077 could have remained in operation for as long as it had a water supply and, given its location, its only feasible source was piped aqueduct water. It is unfortunate, therefore, that it is not known when Ḥumayma's aqueduct ceased to operate.

*The Mid-Twentieth Century Domestic Structure*

After the abandonment of the bathhouse, the ruins seem to have been left alone until the mid-twentieth century when E077 was reoccupied **(Fig. 14)**. According to the locals, a Moroccan named Abdul Aziz al-`Arabi lived in the ruins of the bathhouse between 1948 and the mid-1960s (Oleson 1990: 294). A 1992 aerial photo taken after Oleson's excavations (Oleson 2010: fig. 4.50) shows that al-`Arabi recycled both wall stones and extant walls to create a circular room on the eastern side of the Byzantine period structure. A 1953 aerial photo, taken during al-`Arabi's occupation, suggests that his structure also incorporated Room B and that he built circular features, perhaps animal pens, over Rooms F and E (Hunrin Aerial Survey, Aerial Photographic Archive for Archaeology in the Middle East, APA 1953/HAS 26.002).

Al-`Arabi was also probably responsible for the construction of Room G. As Oleson (1990: 298) noted in 1989, Room G is a late addition to the structure. Its north and east walls "are less well built than those elsewhere in the Bath, they do not bond with them, and the only door opens outside the building." When excavated, Room G contained a thin central partition wall (shown in the top plan) and a hearth (mentioned in the field notes), but no ancient features as the interior "had been cleared out to the foundation level sometime in the post-classical period" (Oleson 1990: 298). Oleson noted that this room was a late addition, dating either to the last phase of the bathhouse (Oleson 1990: 297-8) or to modern times (Oleson 2010: 225). Given that the north and east walls do not appear in the 1953 aerial photo and that they are located without regard to the bathhouse's wall lines, it seems most likely that this room was built after 1953 as an addition to al-`Arabi's domestic complex.

Additional evidence of al-`Arabi's residence turned up during the 2010 excavation of Squares 09 and 10, where the circular room of his house had been located. Although the curved walls had been removed during the 1995 consolidation of the bathhouse, and although that removal and two subsequent consolidations had greatly impacted this area, excavators were still able to find a floor level and objects dating to the mid-twentieh century. Of particular note is the only modern coin found: a 1949 50 fils coin issued by the Hashemite Kingdom of the Jordan. As 1949 was the first year that Jordan issued its own coinage, this particular coin likely had sentimental value for an immigrant who had settled in Ḥumayma the previous year.




*11. E077: Byzantine (and Umayyad?) bathhouse phases.*



*12. E077: Ancient cleaning or inspection hole punched into Room D hypocaust through Byzantine-phase south wall.*



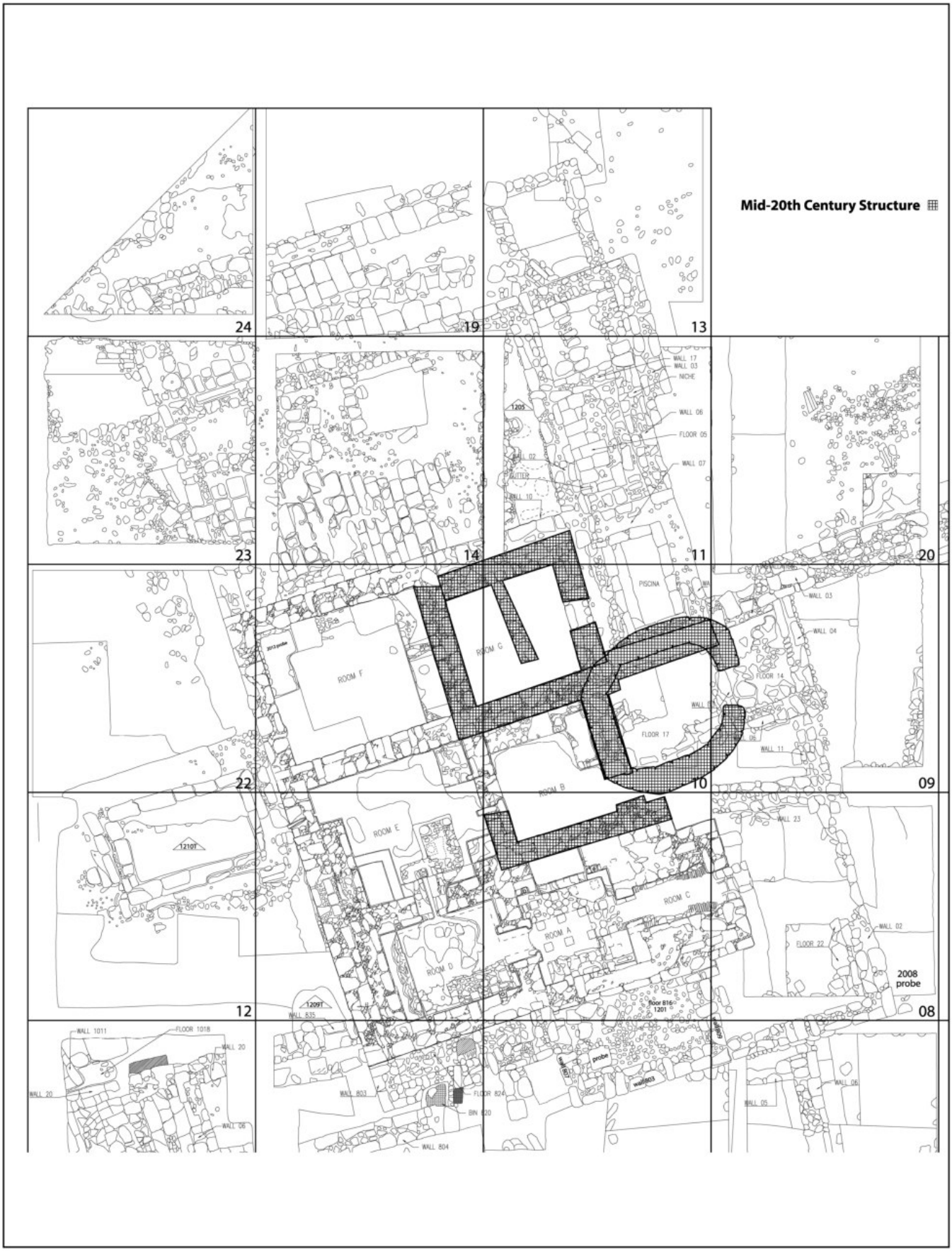
*13. 'Wheel-made Square-vent' tubulus from south wall of E077 Room A.*

*Water Supply, Drainage and Roads*

In addition to providing information about E077's various phases, the 2010 and 2012 excavations also provided valuable information about the local infrastructure associated with the functioning bathhouse. Most importantly, the excavations confirmed the theory that the bathhouse was supplied by the town's aqueduct. As can be seen in the area to the east of the bathhouse on the plan **(Fig. 2)**, fresh water was piped down from the vicinity of the aqueduct-fed pool (no. 063) via a stone conduit. In Squares 15 and 16 this conduit split, with some water being piped directly into the unheated areas of the bathhouse, and another section continuing to the south-west. It is unknown whether this latter conduit continued past the bathhouse into the town (cf. Oleson 2010: 218-19) or whether all or part of it diverted again in order to go directly to the bathhouse's heated rooms. Alterations were later made to the conduit entering the bathhouse's cold rooms, with the northern side having much shallower foundations and probably a later date. The northern alterations may have increased the water supply into the bathhouse as they seem to go with the square cistern at the end of the conduit and with the addition of a plunge pool on the west side of the structure. No internal pipelines survive to show exactly how the clean water moved around the building; however, the location of the Roman period piscina, immersion pool and latrine sponge channel, as well as the Byzantine period splash basins, make it clear where the clean water ended up in the various building phases.

As mentioned above, dirty water displaced from the Roman period piscina fell on the floor of the *frigidarium* and then drained through a small square hole in the wall between the *frigidarium* and the latrine trench. The dirty water then flowed via gravity through the latrine trench, thus cleaning it, and into a covered sewer than ran beneath the floors of adjacent areas. The sewer exited the building to its north-west and was last observed in Square 23. Dirty water from the plunge pool seems to have exited through a pipe in its south-west corner that lead through the wall at floor level. The endpoint of this pipe has not been traced. As already documented by Oleson (1990), dirty water from the Byzantine period splash basins ran across floors and through channels under the doorways until it exited the building in the north-west corner of Room E. Given the presence of the former plunge pool at the apparent end of the gravity flow, it is possible that dirty water was then collected in the pool for agricultural or industrial uses.

Two roads through the site have now also been identified at the edges of E077. No physical remains have been found of the first road, but a road - or at least a path - must have led patrons




*14. E077: Mid-twentieth century domestic occupation.*

to the wide entranceway in the center of the north side of the Roman bathhouse. Traces of another road were found in Square 21 outside the south-east extent of E077's building remains. The discovered section of this hard packed soil surface was at least 3.4 m wide, with a ditch up to 0.8 m wide on its east side. The road and ditch ran between the Roman bathhouse and the Roman house in Field E122 on a bearing of 24 degrees east of north. Cultural remains found on the surface of the road, which included a sandstone tessera coated in mortar that looks identical to the tesserae displaced from the damaged mosaic floors in the commander's residence of the Roman fort (see E116 *Praetorium* Room J below), are consistent with the road being used to at least the third century. A probe through the road revealed an underlying hard natural layer with calcium carbonate concretions that could have served as an earlier surface (cf. Reeves *et al*. 2009: 250).

*Other Structures and Activity Areas*

In addition to the major structures described above, there is evidence of other human activity in E077 dating to various time periods. In the north-west corner of Square 02 the external corner of another stone building was discovered **(Fig.4)**. The corner is constructed of three courses of reused ashlar blocks and chinking stones. As this seemingly well-built structure is on a different orientation (45 degrees west of north) to the Nabataean buildings in E077, is placed in disregard to the Nabataean structures and reuses Nabataean ashlars, it probably dates to the Roman or Byzantine periods, although more excavation is needed to confirm this.

Other Roman or Byzantine walls and activity areas that are difficult to date precisely are located in the northern half of E077 on top of architecture dating to the Roman phases of the bathhouse. For example, near the north-east limit of the building (in Squares 11 and 13) crudely constructed walls were built against the eastern wall and overtop the bottommost courses of the northern wall of the latrine's anteroom. The new eastern wall is on top of a thick concentration of displaced wall plaster fragments **(Fig.9)**. Other evidence of destruction preceding or associated with the crude reworking of the northern rooms of the bathhouse comes from the large unroofed *apodyterium* (Room K) and entrance corridor where the flagstone floors were partially robbed out, including over the sewer **(Fig.9)**. In the north-west corner of the building, a wide wall containing column drums (recycled from an unknown location) was built over the original Roman wall. A lead crucifix was associated this wall **(Fig.15)**. The crude reworking of these possibly damaged northern rooms suggests that they were reused by squatters after they no longer formed part of the bathhouse. This phase may date to the period following the withdrawal of the Roman garrison from Ḥumayma in the late third century when the fort and other parts of the *vicus* (e.g. E125; E122) were abandoned, or it may follow the Byzantine downsizing of the bathhouse.

Other walls and activity areas around the south and south-east perimeter of E077 are also indicative of the field's history but unfortunately are often difficult to date precisely because of subsequent activity in these areas. One particularly interesting category of activity area is that associated with the construction or renovation of the bathhouse. This includes areas where torn out ceramic building materials have been stacked for possible reuse (e.g. in the piscina) or discarded. This category also includes the thick layer of hard sandy white mortar with carbon and lime inclusions that seems to have spilled on the ground outside the south-west corner of the bathhouse during a renovation. Another interesting category of activity area consists of the ash dumps associated with the frequent cleaning out of the bathhouse's hypocausts. Although these dumps contain few artifacts, their stratigraphic placement in the site and the types and condition of ceramic building materials they contain is helping to phase them.



*15. Lead crucifix associated with column drums in post-bathhouse wall, E077 Square 23.*

*E077's Ceramic Building* Materials (M. B. Reeves and C. A. Harvey)

During all excavation seasons at Ḥumayma, samples of ceramic building materials (CBM), including bricks, *tubuli* (flue pipes), water pipes and roof-tiles, were collected. In 2011, M. B. Reeves and C. A. Harvey began the careful analysis of these samples with the goal of creating typologies for each CBM category and using those typologies as dating tools (Reeves and Harvey 2013). In order to further refine this typology, all of the CBM encountered in soil strata during the 2012 excavation was collected.

Before processing, all CBM was carefully dry brushed in order to remove dirt while leaving in place mortar, plaster and soot. The dimensions, weights, fabric details, surface details and archaeological context of each sample were then recorded. This analysis has resulted in the identification in E077 of four major assemblages of bricks and five major assemblages of heating pipes (including both rectangular *tubuli* and cylindrical flue pipes). The archaeological contexts in which these assemblages have been found (especially original versus recycled versus discard contexts) have helped to clarify the very complicated phasing of E077. Particularly informative are the *in situ* bricks from the heated rooms of the bathhouse.

In Room E, *in situ* bricks were collected from both Oleson's 1989 south-eastern probe and from a small western extension to this probe excavated in 2012. The *in situ* bricks observed and sampled from the hypocaust included pedales, square *bessales*, circular *bessales* and small rectangular bricks (Oleson 1990: fig. 1). All were produced in a common type of fabric featuring straw inclusions, leading to the label 'Straw Tempered Fabric Type' **(Fig. 16)**. The hypocaust in Room E was abandoned and sealed in the Byzantine downsizing of the bathhouse. Bricks of this same type have been found *in situ* in other areas of the bathhouse abandoned at same time, i.e. in the south-west corner of Room D-South and under the partition wall between Rooms A and A-South. These straw tempered bricks were clearly used throughout the heated rooms of the Roman bathhouse. No *tubuli* remain *in situ* from the Roman period; however, rectangular slab-made straw tempered *tubuli* recovered from dump contexts are probably contemporary with the straw tempered bricks.

Room A was already heavily disturbed prior to its 1989 excavation owing to both the mid-twentieth century occupation and the destruction of the previously intact hanging floor in 1986 (Oleson 2010: 223). Moreover, since 1989 it had been further disturbed by clandestine digging and the 1995 consolidation of the bathhouse (Oleson *et al*. 1999: 446-7). As a result of these disturbances, it was only possible to collect *in situ* samples of the small rectangular bricks lining the walls, the square *bessales* in the *pilae* and the circular *bessales* lining the subfloor (Oleson 1990: **Fig. 2**). Samples of the *in situ tubuli* from the south wall and from the *pilae*-covering bricks had been collected in 1989 and were also available for study. The small rectangular bricks, square *bessales* and *pilae*-




16. Circular bessalis of 'Straw Tempered Fabric Type'.



17. E077 Room D: in situ CBM along south wall.

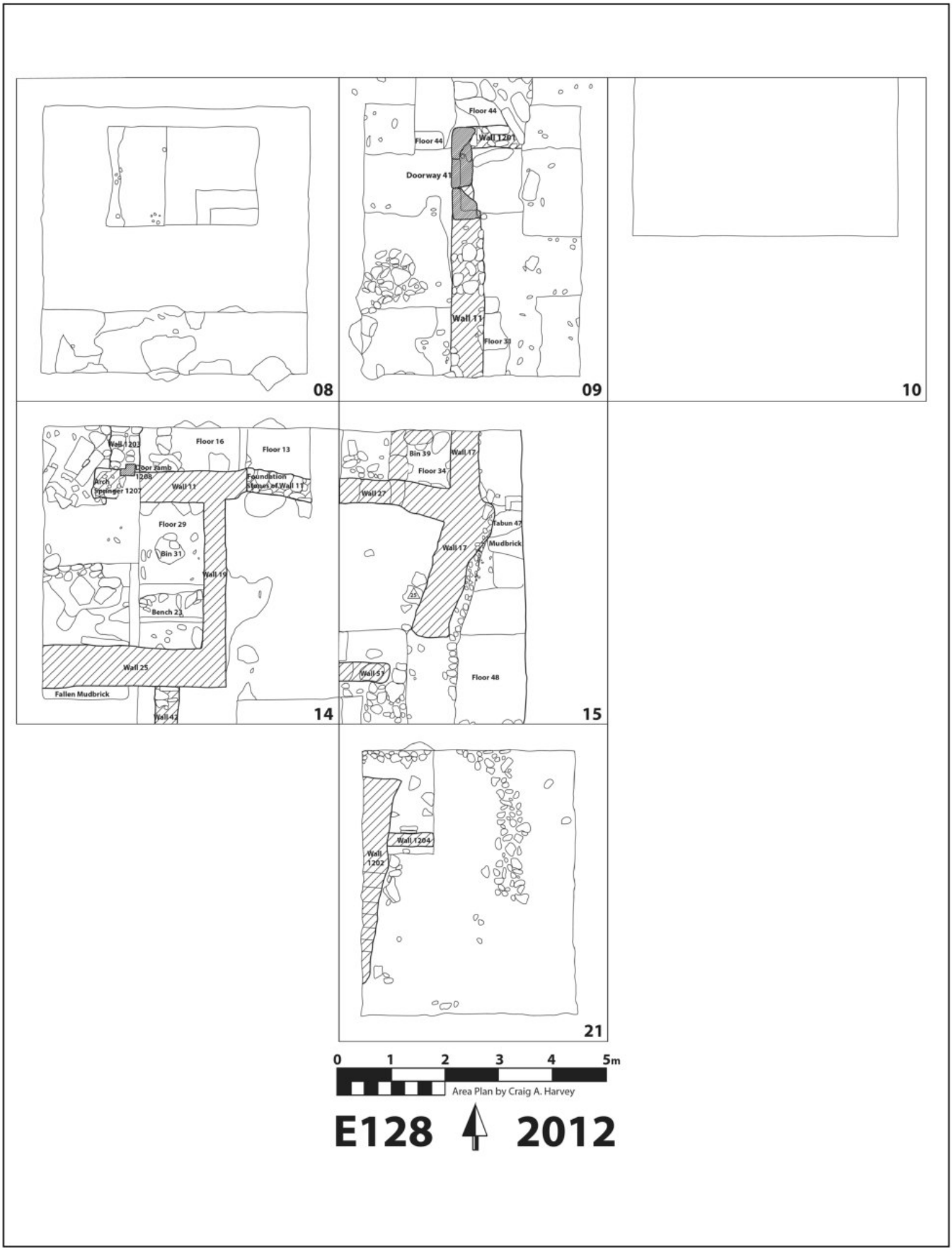
covering bricks are all of the same type (dubbed the 'Smoothed Top / Ovoid Bottom Type') and appear to be in their original use context. In contrast, the circular *bessales* in the subfloor correspond to two different assemblages (the 'Straw Tempered Fabric Type' and the 'Room A Subfloor Type') and bear clear signs of having been recycled from previous hypocausts. Finally, the wheel-made square-vent rectangular *tubuli in situ* in the walls **(Fig. 13)** are not distinctive in terms of fabric; however their form (which is unlike most of the rectangular *tubuli* found at Ḥumayma) resembles published *tubuli* from an Umayyad bathhouse (Harvey 2013: 81-4).

The final room sampled for *in situ* bricks, Room D, had not previously been excavated below the level of its suspended plaster floor. The 2012 probe along the south wall of this room provided the most complete CBM assemblage from any heated room in E077 **(Fig. 17).** This assemblage, corresponding to a renovation of the room dating to the fourth century or later, was extremely heterogeneous. Moreover, residual traces of mortar and soot on some bricks of all types and sizes show that much or all of the CBM used in this room had been recycled from earlier phases of the bathhouse. The most common bricks recovered from this probe were of the 'Smoothed Top / Ovoid Bottom Type' and included square *bessales* (lining the walls), small rectangular bricks (lining the walls and in the *pilae*), *pilae*-covering bricks and fragments of various sizes used as packing for the hanging floor. 'Room A Subfloor Type' circular *bessales* were also found in the packing for the hanging floor. Finally, square *bessales* of a new type, dubbed the 'Thin Non Straw Tempered Fabric Type', were used to cap the *pilae*. No rectangular *tubuli* were used in this room but fragments of cylindrical flue pipes (still undergoing analysis) were found beneath the wall grooves that had once held them.

In addition to the CBM found *in situ*, a vast amount of CBM was found in dump contexts. Particularly noteworthy among the dumped material is the most prevalent type of rectangular *tubuli* from E077, dubbed the 'Wheel-made Wide-depth' type (Harvey 2013: 61-72). These *tubuli* with oval, pointed-oval or tear-shaped vents are similar to those from many other second to fourth century bathhouses in the region (Harvey 2013: 118-19). Their study, and that of Ḥumayma's other CBM, is still ongoing (cf. Reeves and Harvey 2013).

*Field E128: Nabataean and Roman Mudbrick Structure (C. A. Harvey & M. B. Reeves)*

Field E128 is a small mound containing a decayed structure situated in the Nabataean and Roman neighborhood to the south-west of the Roman fort **(Figs. 1 and 18)**. Excavations in 2005 (Oleson *et al*. 2008: 317-18) and 2008 (Reeves *et al*. 2009: 235-41) suggested that the




*18. Plan of E128 after 2012 excavations.*

original walls of the building were constructed from a mixture of materials including Nabataean cut blocks and mudbricks with at least three different fabrics. This eclectic construction suggested that the structure was built using debris recycled from various previously damaged buildings. Based on ceramics, the structure in E128 is hypothesized to have been initially constructed sometime between the third quarter of the first century AD and the middle of the second century AD. At some point in the structure's occupation, an earthquake caused extensive damage and shifted several walls westward. Some time after the early third century the building was abandoned and repeatedly used as a dumpsite up until the sixth century.

In 2012 it was decided to reopen E128 in order to address some questions raised by the previous excavations. In particular, we wished to refine the building's phasing in order to determine whether its construction pre-dated or post-dated the arrival of the Roman garrison in the early second century and what the structure's subsequent phases of occupation were, including when its earthquake damage occurred. We also wished to determine the original function of the building. In this regard, the exposure of a portion of a small room with a wide masonry bench in the central portion of Square 14 in 2008 was intriguing, as this architectural arrangement might be indicative of a structure related to the Roman garrison, such as a Roman brothel (cf. Wallace-Hadrill 1995; McGinn 2004) or temporary quarters for Roman soldiers (cf. Magness 2009: 75). Finally, by renewing excavations in Field E128, we sought to determine more in general about the size and the layout of the buried structure.

In order to address these issues, we began the 2012 season by reopening three squares (Squares 09, 14 and 15) that had been partially excavated in previous seasons, as well as opening new squares immediately to the east (Square 10) and south (Square 21) of the previously excavated area. Unfortunately, however, the goals intended for these squares could not be achieved in 2012 as it became necessary to close down this field after only two weeks and transfer the personnel over to Field E077 in order to complete the excavation of the Roman bathhouse. The premature end to the intended excavations meant that there was not time to determine anything significant from the excavations in Squares 10 and 15; however, important information was gained from the excavations in Squares 09, 14 and 21.

The focus of the 2012 excavations in Square 09 was the removal of three thin mid-square baulks left over from the 2008 excavations (Reeves *et al*. 2009: **Fig. 8**). Although these baulks had contributed important stratigraphic data, it was felt that they were obscuring information about the architecture's phasing. With the removal of these baulks, several hitherto unknown features of the architecture were revealed **(Fig. 19)**. One result was the full exposure of the threshold of Doorway 41. This threshold, made of several cut sandstones, was situated at the northernmost extent of Wall 11 before it turns east and becomes Wall 1201. The door itself would have been about 1 m wide and, judging from the position of the 3 cm high doorjamb and the pivot hole, which measured 7 cm in diameter, the door opened to the east. Further south along Wall 11, the removal of the southernmost mid-square baulk revealed a sharp drop in the extant wall's height. Although earlier excavation had shown that the wall was not preserved to a uniform elevation, the location of the internal baulk had concealed the nature of this change in height. Excavation this season has shown that the southern section of Wall 11, which has a top elevation of 957.75 m comes to a sudden vertical drop in height to a top elevation of 957.30 m that is maintained along its north extent. This 45 cm drop was further defined by several stones that sat on top of the lower section of the wall and leaned against the higher section. These leaning stones suggest that the wall was altered in antiquity, possibly as a result of earthquake or human actions. As a result of these alterations, the northern section of Wall 11 had been dismantled to its foundation level, whereas the southern sections were left

at a higher level. An interesting find from the collapsed baulks in this square was a copper alloy coin issued at Rabbathmoba in 210 / 211 AD (**Fig. 20**; Spijkerman 1978: 272-3 no. 31 pl. 61). Unfortunately, this coin came from a fill layer, and thus was not able to help refine the dating of the structure.

Some of the most interesting discoveries regarding the building's phasing and character came from the north-west corner of Square 14 where an arch springer (Arch Springer 1207), a door jamb (Door Jamb 1208) and a later mudbrick wall (Wall 1203) were all found *in situ* **(Fig. 21)**. Voussoirs that had fallen from an arch that once extended to the west were also found to the north-west of the springer in a position that would have blocked the door associated with the doorjamb. Based on the exposed architecture, we hypothesize that there was originally an arched room in the western portion of Field E128 that could be entered from an external area or courtyard via an inwardly opening door. Later the arch collapsed blocking the interior and the doorway. Later still a northward extending mudbrick wall was built which butted up against the ruins. As the 2012 excavation did not extend below the fallen voussoirs, it is not known when the arch collapsed. It could be related to the major damage that occurred to buildings in Fields E077 and E125 in the first, second or third centuries AD (Oleson *et al*. 2008: 313; Reeves *et al*. 2009: 261).

The existence of the westward and northward extending arched room and a possible new external doorway suggests that the structure in E128 was once much more grandly built and important than previously thought. These discoveries may necessitate new theories on the building's purpose and function, and more excavation will be needed before it is possible to fully understand the architecture and phasing of this ruin. The later mudbrick wall (possibly reflecting squatter occupation) further demonstrates the complicated phasing of the site.

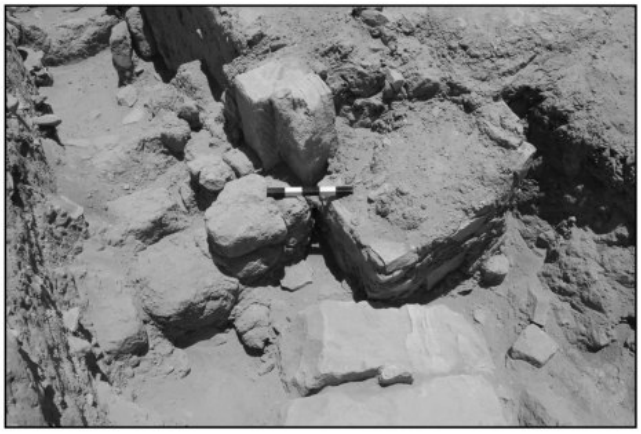
Excavation in the southernmost square (Square 21) confirmed that the structure continued at least 5 m south of the previously excavated area. Moreover, the excavation revealed more evidence of an earthquake that caused considerable damage to the building. As was the case in Square 15, this earthquake seems to have shifted the southern end of the north - south mudbrick wall in Square 21 west of its original cardinal orientation. It is possible that this earthquake is the same one that caused the destruction of the arch in the north-west corner of Square 14. Concerning the date of this earthquake, the 2008 excavations found that artifacts uncovered in association with a tabun and bin postdating the displacement of the wall in Square 15 date to the late second and third century (Reeves *et al*. 2009: 238). These later phase features are possibly contemporary



*19. E128 Square 09 Wall 11.*



*20. Coin from Rabbathmoba found in E128. Obv: Bust of Caracalla with laurel wreath; inscription illegible. Rev. Poseidon standing to left with one foot on prow; dolphin in left hand; shaft [of trident] in right; inscription PABA[---].*



*21. E128 Square 14: arch springer, door jamb, fallen voussoirs and later mudbrick wall.*

with the squatter wall (1203) in Square 14, and with the squatter occupation that followed the destruction of arches and walls in adjacent Field E125 (Oleson *et al*. 2008: 310-14). There is as yet, however, no firm evidence from within Field E128 to date the earthquake which ended the primary occupation of the building in this field.

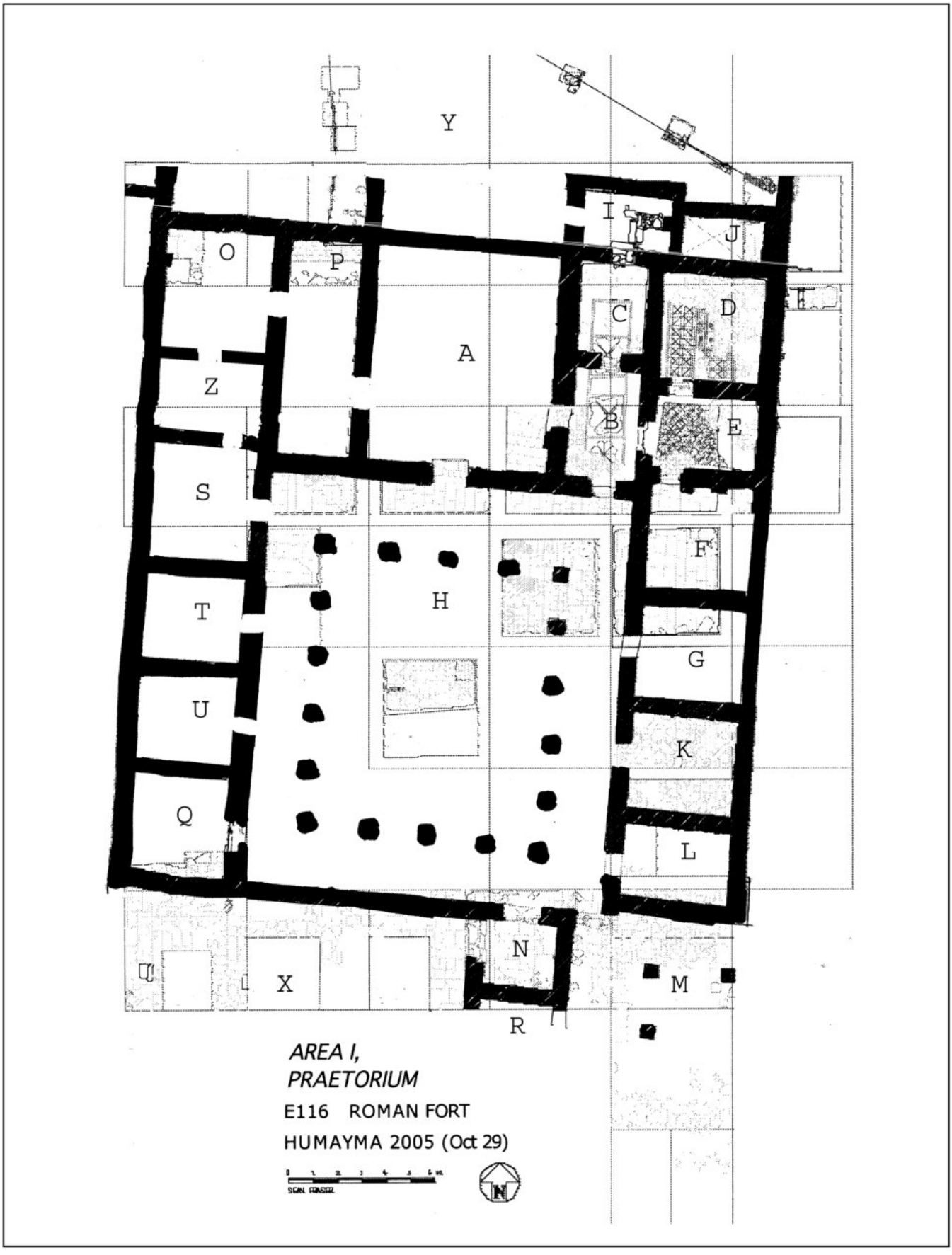
After the abandonment of the structure, the area was used as an ancient dump until the sixth century AD. Excavation in 2008 uncovered numerous artifacts from this dump (Reeves *et al*. 2009: 238-41), which had been sealed by collapsing mudbrick from the surrounding walls. Although excavation was limited in 2012, several more interesting artifacts from this dump were uncovered, including an illegible copper-alloy coin, a bone pin, two sea urchin spines and a great deal of glass, bones and ceramic material. Of particular note is an Eastern Sigillata A (ESA) bowl rim (Hayes form 56), which dates to the second half of the second century AD. Although from a dump context, this sherd is an excellent example of the imported fine ware that was brought to the site.

Although several interesting new discoveries were made in E128 this season, there was not time to achieve the overall goals of the renewed excavations. Further excavation is necessary before this interesting area of the site can finally be understood. Although there are multiple features within E128 that would benefit from further excavation, one of the more interesting ones is the collapsed arch in the north-west corner of Square 14. Renewed excavation around the arch and beneath the voussoirs would help to date both the arch's destruction and the end of a major phase in E128's occupation.

*Field E116 Area I Room J: Heated Room in Fort's Praetorium* (M. B. Reeves)

Ḥumayma's Roman fort was excavated by John P. Oleson between 1993 and 2005 (Oleson 2009; Oleson *et al*. 1995, 1999, 2003, 2008). During the 2004 season, excavations in the extreme north-east corner of Area I (the *praetorium* / commanding officer's house) revealed the presence of a small room, Room J, which had once been heated by a hypocaust **(Fig. 22)**. The access to this room was via Room D, a large room decorated with polychrome mosaic floors and wall frescoes, interpreted as the Roman commander's dining room (Oleson *et al*. 2008: 322). Although only a small probe was excavated within Room J in 2004, enough of the plan and phasing of the room was recovered to hypothesize that the heated room and its stokehole from Room I were part of a northern extension to the *praetorium* (Phase 1b), which postdated the *praetorium*'s early second century construction (Phase 1a), but preceded the partial destruction of the building in the second half of the third century (Phase 2). This destruction was followed by a period of abandonment lasting until early in the reign of Constantine when a smaller garrison reoccupied parts of Ḥumayma's fort (Phase 3). The excavators suggested that Room J was used as a dump after its suspended floor had been dismantled and its door from Room D blocked at the beginning of Phase 3 (Oleson *et al*. 2008: 318-24).

The probe excavated in 2004 had revealed important details about Room J's hypocaust, including the presence of some bricks still *in situ* in the *pilae*, larger brick fragments and ceramic pipe fragments in the room's fill, and recesses in the walls that had once held chimney pipes (Oleson *et al*. 2008: 323-24). The 2004




*22. Plan of E116 Area I (praetorium) at the end of excavations in 2005.*

excavators had also described the ceramic building materials from the probe; however, when comparative study of the site's ceramic building materials began in 2011, it became clear that the descriptions of Room J's materials were not precise enough in regards to form and fabric to allow meaningful comparisons with the materials from the E077 bathhouse. It was, therefore, decided to re-open Room J in order to catalogue all of the ceramic building materials found *in situ* and in the unexcavated fill. Another motivation to reopen this room was to determine its original function. Following the 2004 excavation, the excavators suggested it might have functioned as either a bath or a heated dining room. As the bath interpretation was largely dependent on the presence of waterpipe fragments in the fill, we wished to determine if flue pipe fragments could have been misidentified as waterpipe fragments and to look for any other evidence in support of a bath interpretation. The final motivation to reopen Room J was to see if the materials dumped in this elite structure could provide additional information about conditions during the fort's various phases.

**(Fig.23)** shows Room J following the excavation of the western three-quarters of the room and the removal of the 2004 backfill from the eastern quarter. At subfloor level, the interior dimensions of the room are 3.4 m x 1.7 m. The west, north and east walls were constructed contemporaneously as a bounded unit that abutted the pre-existing south wall. The new room's intended function as a heated room is clearly shown by the brick-arched stokehole through the west wall and the recesses (ca 13 x 8 cm) to hold cylindrical heating pipes in the room's four corners. In contrast to the walls in the E077 bathhouse, the walls of this heated room were much more crudely constructed with rough courses of cobbles, boulders and semi-hewn sandstone blocks set in mud packing. The east and west walls, at 40 cm and 47 cm thick, are also thinner than average walls in either the E077 bathhouse or elsewhere in the *praetorium*. One very strange design feature is the absence of stone courses for the bottom 77 cm of the eastern wall where firm soil (possibly pisé) was used instead **(Fig.24)**. Perhaps the builders did not think that a completely stone built wall was necessary here because Room J's eastern wall ran along the inside of the *praetorium*'s eastern perimeter wall for its full length **(Fig.22)**. Another curious feature of the room is the subfloor composed of tightly fitting sandstone slabs. Such a floor is not as heat resistant as a brick floor and would have been unnecessarily expensive. The date of the floor could not be determined from a foundation probe. It is possible that this floor predates the heated room as the flagstones continued directly under the brick stokehole; the flagstone floor was also considerably lower than the lowest course of stones in the east and south walls **(Figs.24 and 25).** As regards phasing, it is also important to note that Room J's eastern and northern walls were set just within the borders of the Phase 1b northern extension of the *praetorium*. This suggests that Room J belongs to an even later renovation phase of the *praetorium* (Phase 1c?).

Room J's suspended floor was supported by ten *pilae* of circular *bessales* (d = 19.3 - 19.8 cm; th = 5.8 - 6.7 cm) in the center of the room and five *pilae* of small rectangular bricks (23 - 24.5 cm x 11 - 12.5 cm; th = 2.3 - 3.5 cm) along the north wall **(Figs.23 and 26)**. The stacked bricks in these *pilae* were attached together and to the subfloor by a lime-based mortar (in contrast to the mud mortar used in E077's *pilae*). The suspended floor was presumably also supported on the south, but all evidence of how is now lost. Broken square bricks 4.7 - 5.2 cm thick with uncharred central areas preserving the shape of circular *bessales* are probably pedales that topped the circular *pilae* **(Fig.26.3)**. Some of the other large square or rectangular brick fragments (up to 6 cm thick) in the fill probably come from bricks that spanned the space between the individual *pilae*. Numerous large fragments from the room's fill of light grey mortar with embedded bricks and cobbles presumably represents the suspended



*23. Praetorium Room J at the end of the 2012 excavations.*



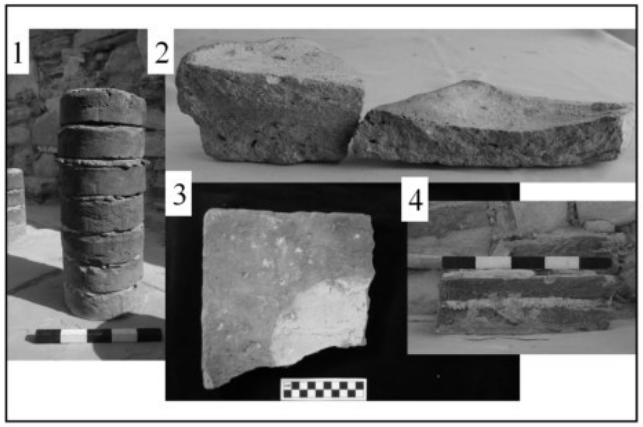
*24. Praetorium Room J's east wall.*

floor's packing, whereas the many fragments of reddish-yellow plaster with crushed pottery inclusions and a smoothed upper face probably represents the suspended floor's upper surface. Although many stone tesserae were found in the room's fill **(Fig.27)**, there are no tesserae imprints in the room's mortar, suggesting that Room J did not have a mosaic floor; instead these tesserae were probably dumped here when the mosaics in adjacent rooms were crudely repaired in Phase 3. Narrow ledges to support the *tubuli* (with some bricks embedded in mortar still attached) were present on the north and west walls 57 - 65 cm above the subfloor **(Fig. 23)**. No *tubuli* were found *in situ* but the material from the fill shows that that they were attached to the walls with a light grey mortar and then covered with white wall plaster that also formed the finished wall surface. Many fragments of ceiling plaster bearing reed imprints suggest this small room had a flat roof (and that the occasional fragments of roof tiles in the fill were dumped from elsewhere).

When excavated, the room contained 1.75 m of fill that was full of artifacts and ecofacts originating both from the destruction of this room and from the room's subsequent use as a dump. After the hypocaust was no longer in use, any *in situ* remains of the suspended floor must have been removed and any easily accessible bricks must have been taken away for other building projects (e.g. blocking the door to Room D **(Fig. 25)**. The recycling of these bricks explains why no intact bricks were found loose in the room's fill and only the lowermost bricks in the *pilae* were left in place. The recycling effort also explains why the room's fill below the removed suspended floor was so churned up that fragments of ceiling plaster were found within 10 cm of the hypocaust's subfloor. In spite of the churned up nature of the room's fill, three main concentrations of artifacts and ecofacts were identifiable. The first layer (Loci 1208 - 1210), extending from the top of hypocaust's subfloor to 1.21 m above it, contained over a thousand fragments of flue pipes and more than 300 fragments of broken bricks, in addition to a great deal of mortar and plaster, representing most of what was left after the hypocaust was destroyed and robbed out. The second layer (Loci 1203 - 1208) overlaps the first but extends



*25. Praetorium Room J's south wall. Note the 19 cm thick layer of compacted sand located between the lowest course of wall stones and the top of the flagstone subfloor.*

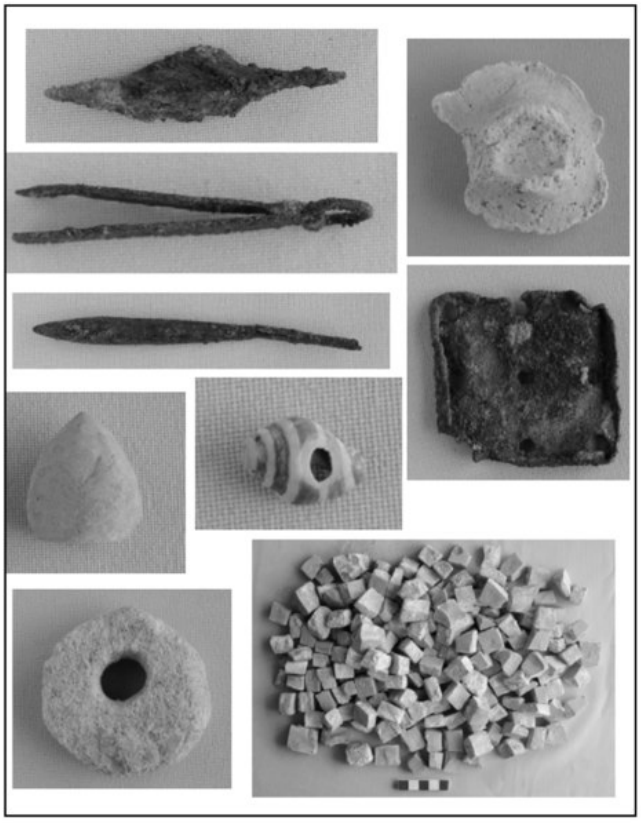



*26. Brick assemblage from praetorium Room J: (1) pila of circular bessales; (2) fabric and surface parallels between circular bessalis and small rectangular brick; (3) pedalis pila cap retaining uncharred shape of circular bessalis; (4) pila of small rectangular bricks.*

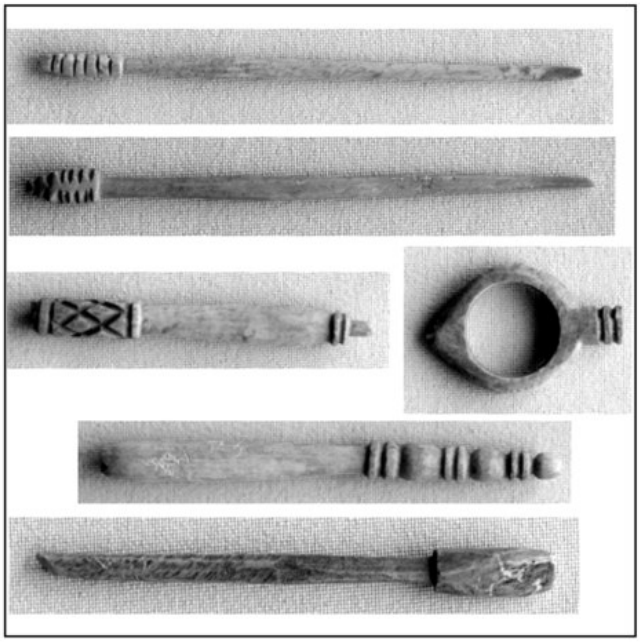
above it. This layer, which begins 51 cm over the subfloor and extends up for 80 cm, is notable for its high concentration of finds, many of which were unusual objects more in keeping with the elite inhabitants of the *praetorium* than with Roman soldiers in general **(Figs. 27, 28 and 35)**. Of particular interest are 4,539 *ceramic vessel* sherds reflecting both regional and long distance trade (see below), high quality glass vessel sherds, a Latin graffito scratched into wall plaster, some copper alloy cosmetic items, a high concentration of mammal, fish and bird bones, some rare seashells (that seem to have been used for adornment) and many worked bone artifacts. Finally, the highest layer (Loci 1201 - 1202), beginning 1.38 m above the subfloor and extending 47 cm to the surface contained almost no material from the hypocaust, produced no registered artifacts, and contained considerably less pottery and glass sherds, bone fragments and artifacts of any type than the second layer. It is hypothesized that this layer formed after the major dumping from the *praetorium* had been completed.

During excavation, all fragments of bricks and *tubuli* recovered from the fill were studied, along with samples of the *in situ* bricks. Significantly, the small rectangular bricks, circular *bessales*, pedales and larger bricks shared the same fabric, surface treatment and a white build-up on their surfaces that is mostly likely efflorescence **(Fig. 26**; **Table 2**)[2]. This uniformity suggests that all of the bricks used to construct this hypocaust were made at the same production facility. Moreover the patterns of soot and mortar on the bricks suggest they were used for the first (and only) time in this hypocaust. The heating pipes (both rectangular *tubuli* and cylindrical flue pipes **(Fig. 29)** also constitute homogenous corpuses in original use. This CBM assemblage (dubbed the '*Praetorium* Room J Type') also differs from those found in the E077 bathhouse. In terms of phasing, the bricks and heating pipes from this room are therefore very important because they constitute an assemblage of ceramic building materials imported to Ḥumayma's garrison during a renovation to the fort. Also informative was what was missing from the ceramic building material in the room's fill. The absence of any complete bricks in the fill suggests that, as was common practice, intact bricks had been recycled for new building projects. (It is not clear why some *pilae* bricks were left but perhaps they were not easily accessible.) Also

2. The white surface of the bricks has not yet been tested, but x-ray diffraction on the core of one brick revealed Albite (NaAlSi3O8), a sodium end member which is consistent with the efflorescence theory (Dominique Dupuis, personal communication, 2014).



*27. Artifacts from praetorium Room J (clockwise from upper left): H12.0314.02: three-bladed iron arrowhead, 4.5cm long. H12.0314.03: vessel stopper molded from chalky off-white plaster, max. th = 2.35cm; outside d = 4.9cm, plug d = 2.6cm. H12.0315.09: square artifact (4.5cm x 4.4cm) with a raised lip and three rows of three evenly spaced holes (d = 0.25cm) made from a sheet of copper alloy (th = 0.1cm). H12.0328.01: 206 variously coloured sandstone mosaic tesserae fragments with white mortar adhering to all sides except the upper surface. H12.0315.06: six-sided flat disk with central hole created from a wall plaster fragment, 4.0-4.2cm wide; h = 1.2-1.3cm; hole d = 1.0-1.2cm. H12.0319.03: conical sandstone game piece or miniature betyl, 1.9cm high; 0.1-1.7cm wide; ovoid base is 1.3cm long x 1.1cm wide. H12.0314.05: complete Engina mendicaria shell with a hole for suspension drilled through the external surface after it had been filed down, 1.1cm long; 0.7cm wide. H12.0314.06: copper alloy tool (6.9cm long) with a shallow lanceolate scoop head (4.7cm long x 0.5cm wide) and a circular (broken) shaft (d = 0.2cm). H12.0314.01: copper alloy tweezers, 4.7cm long; 0.6cm wide.*



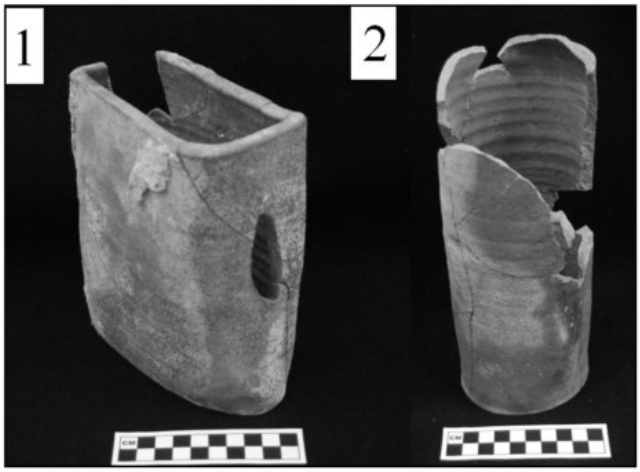
*28. Bone artifacts from praetorium Room J (top to bottom): H12.0315.01: 9.4cm long; shaft th = 0.2-0.3cm. H12.0315.02, 9.1cm long; max. shaft d = 0.3cm. H12.0315.07: 6.0cm long; shaft d = 0.5-0.65cm. H12.0315.04: 3.7cm long; shaft th = 0.65cm. H12.0315.03: 8.1cm long; shaft th = 0.45-0.7cm. H12.0310.01: 6.9cm long; shaft th = 3.0cm.*

extremely rare in the fill were cylindrical pipe fragments that were free of heat damage. As cylindrical flue and waterpipes often share the same form (Harvey 2013: 19), it seems likely that the 'waterpipe' fragments identified by the 2004 excavators were actually fragments of the cylindrical flue pipes that once ran up the recesses in the room's corners.

The paucity of waterpipe fragments, in conjunction with the lack of any basins or similar features in Room J make it likely that this room, next to a *triclinium*, was a heated dining room rather than a bathing room. As outlined by the Roman architect Vitruvius, a Roman house should have specific triclinia for the spring, summer, autumn and winter seasons (De Arch. VI.4). The original *triclinium* in Ḥumayma's *praetorium*, in the north-east corner of the building (Room D), presumably had windows to the north and east that made it appropriate for spring, summer and autumn dining. However, the building originally lacked a winter dining room, which according to Vitruvius should have windows to the west so as to be lit and heated by the afternoon sun. For the architects at Ḥumayma, a difficulty in building a sufficiently heated winter *triclinium* would have been the hills immediately west of the site which block the afternoon sun. It is therefore likely that Room J, with its hypocaust, was added next to the original *triclinium* in

order to serve as a heated winter dining room that was not completely dependent on the sun's rays. As this was an addition, rather than part of the original design, it is likely that the inspiration came from heated triclinia in other *praetoria* (e.g. South Shields [Hodgson 1993: 133]) or possibly from heated dining and reception rooms in other elite houses (e.g. Dharih [al-Muheisen & Piraud-Fournet 2013: 841-42]; Bignor [Rudling 1997: 16]).

Finally, it must be noted that the finds from the layers of dump excavated from within this room in 2012 are necessitating a rethinking of the room's phasing. All three layers from the 2012 dump contained pottery forms that extend into the fourth century (see *Ceramic vessel overview below*). This makes it possible that the room was damaged and its hypocaust dismantled in the mid fourth century (possibly after the 363 earthquake), rather than in the early fourth century (Phase 3) as previously hypothesized. It is hoped that the phasing will become clearer once all of the analyses of the finds from this room have been completed. The dating of the hypocaust's dismantlement would also be clarified if the charred bricks removed from this room could be located in a recycled context.




*29. Reconstructed rectangular tubuli and cylindrical flue pipes from praetorium Room J.*

**RTI and Photogrammetry** (M. Fergusson, M. MacKinnon and M. B. Reeves)

Two types of close-range photographic techniques were used during the 2012 excavation season to improve the reading, analysis and interpretation of inscriptions, petroglyphs and artifacts in and around the site of Ḥumayma. The photographic techniques used were Reflectance Transformation Imaging (RTI) and photogrammetry.

The RTI image capture process creates a 2D digital image with imbedded 3D data. This capture process requires a relatively inexpensive kit that includes a DSLR camera, tripod, a powerful strobe and the placement of two black spheres in the frame of the image to model the light location in 3D space **(Fig. 30)**. Between sixty and eighty photographs are captured of a subject, each lit from a different angle in a hemisphere surrounding the object and each from the same distance. While this process is simple in a studio setting, its use in the field is sometimes hindered by logistical problems such as inaccessibility. The type of 3D data created by an RTI is surface normal information. Surface normal data is used to map the 3D surface of the subject and allows for dynamic re-lighting in an RTI viewer. This gives one the ability to quickly capture images in the field and to manipulate the RTI data later, allowing a viewer to discern shallow relief with raking light from 360 degrees.

The photogrammetry technique for close-range imaging is a form of stereo photogrammetric imaging that can either use multiple strips of overlapping photos or two or more convergent images to create dense 3D models. These kinds of projects are ideal for imaging small-scale inscriptions and petroglyphs on relatively flat surfaces, such as those found in and around Ḥumayma. They are especially useful for imaging subjects that are inaccessible for RTI. Convergent pair photogrammetry is useful for inscriptions that are inaccessible for close-range strip photogrammetry projects. A number of different lenses are used to capture these images, including wide angle lenses for large subjects, telephoto lenses for distant subjects and macro lenses to capture a high level of detail. The ADAMTech Mine Mapping Suite,

**Table 2:** Characteristics of 'Praetorium Room J Bricks and Flue Pipes' (M. B. Reeves and C.A. Harvey).

| Type | Dimensions and weight | Feel, color and grain | Fabric inclusions and voids | Surfaces | Other notable features |
|---|---|---|---|---|---|
| Small rectangular bricks (Fig. 26.4) | Length: 23.3-24.5cm<br><br>Width: 11.0-12.5cm<br><br>Thickness: 2.3-3.5cm<br><br>Weight: 1255-1285g | Feel: hard sandy<br><br>Colors: light red (10YR 6/6; 10R 6/6; 2.5YR 6/8), red (2.5YR 5.6; 10.5 YR 4/6; 10R 4/6; 10R 5/6; 10R 5/8) or weak red (7.5R 5/4) fabric; some have dark surface (bluish grey: gley2 5/5 Pb; greenish grey (gley 2 6/1)<br><br>Grain: brick's grain parallel to faces and sometimes goes up at sides | Well sorted or poorly sorted fine to very coarse sub-rounded and sub-angular clear and multi-colored quartz sand; some very small to small white flecks; some very small pebbles; some very small to medium voids | Top face: concave or flat with an even surface that is smooth to the touch; smoothed lengthwise (or in one case widthwise) by tool or fingers; finished by smoothing along one short side<br><br>Bottom face: flat, slightly concave or convex with an even surface that is rough to the touch; some ovoid voids<br><br>Sides: flat with an even surface that is smooth to the touch | * Thin white build-up on most faces and sides (including over dark surfaces), but not on breaks<br>* Likely form-made given flat, even and smooth sides and thin outwardly raised edge along bottom of some bricks which possibly resulted from clay squishing out of the form |
| Circular *bessales* (Fig. 26.1) | Diameter: 19.3-19.8cm<br><br>Thickness: 5.8-6.7cm<br><br>Weight: 3140-3315g | Feel: hard sandy<br><br>Colors : red (7.5R 5/6; 10R 5/6; 10YR 5/8) fabric and surface<br><br>Grain: brick's grain parallel to faces | Poorly, moderately or well sorted fine to coarse sub-rounded clear quartz sand with some small white inclusions; very many small to medium voids | Top face: slightly concave or flat with an even or uneven surface that is smooth to the touch; evidence of smoothing by hand or tool.<br><br>Bottom face: slightly concave or flat with an even or uneven surface that is rough to the touch; evidence of smoothing by hand or tool.<br><br>Side: convex with an even surface that is smooth to the touch; top and / or bottom edge trimmed with knife on an angle. | * White build-up on surfaces<br>* Likely form-made: vertical and encircling imprints on brick's side possibly from mold or production process |
| *Pedales* (Fig. 26.3)<br><br>Caveat: all samples were fragments so some bricks larger than *pedales* may have been mistaken for *pedales* | Theoretical length / width: *ca* 29.6cm (1 Roman foot)<br><br>Maximum preserved length / width: 25.0cm<br><br>Thickness: 4.4-6.2cm at edge; 3.5-4.1cm near center<br><br>Weight: unknown (none complete) | Feel: hard sandy<br><br>Colors: pinkish grey (7.5YR 7/2), red (10R 5.8) or yellow (10YR 7/6) fabric; one has brown (10YR 5.3) surface<br><br>Grain: brick's grain parallel to faces and goes up at sides | Poorly sorted or well sorted medium to very coarse sub-rounded and sub-angular clear and multi-colored quartz sand; some small white flecks; occasional black flecks; some very small pebbles; some very coarse angular sand; some to many very small to medium voids; a few large voids | Top face: concave or slightly concave with an even or uneven surface that is smooth to the touch; smoothed in one lengthwise direction by tool leaving fine linear marks or fingers; smoothed last along one edge<br><br>Bottom face: flat with an even surface that is rough to the touch; occasional to many straw imprints; some small ovoid voids<br><br>Sides: flat with an even surface that is smooth to the touch | * Thin white build-up on faces and sides<br>* Likely form-made given flat, even and smooth sides<br>* Some fragments with a charred face have an uncharred central area preserving part of the shape of a circular *bessalis* |
| Rectangular *tubuli* (Fig. 29.1) | Length:<br>17.4-18.3cm<br><br>Width:<br>15.5-16.5cm<br><br>Depth:<br>8.0-10.0cm<br><br>Wall Thickness:<br>0.4-0.8cm | Feel: Coarse, sandy<br><br>Colors:<br>Reddish yellow (5YR 6/6), red (2.5YR 5/8) or reddish brown (2.5YR 4/3) fabric; most have light brownish grey (10YR 6/2) or dark grey (5YR 4/1) surface; some have a dark grey (5YR 4/1) core | Well sorted medium sub-rounded clear quartz sand, with some course to very coarse sand and some small white flecks; some small voids | Inside surface: all examples have wheel marks, suggesting they were wheel-made; heavy soot-staining and soot build-up<br><br>Outside surface: some examples have faint wheel marks; some surfaces have soot-staining; many examples have mortar adhering | * Thin white build-up on most surfaces<br>* One end is ovular, while other is rectangular in shape<br>* Oval, pointed-oval, and tear-shaped vents were cut into both short sides |
| Cylindrical flue pipes (Fig. 29.2) | Length:<br>26.8cm<br><br>Diameter of Middle:<br>9.3cm<br><br>Diameter of male end:<br>6.0cm<br><br>Diameter of female end:<br>8.4-9.4cm | Feel: Coarse, sandy<br><br>Colors:<br>Reddish brown (5YR 5/4) and red (2.5 YR 5/6) fabric; dark grey (5YR 4/1) surface | Well sorted, medium, sub-rounded, clear quartz sand; some coarse sand; some white flecks; occasional very small voids | Inside surface: wheel marks; heavy soot-staining and soot build-up<br><br>Outside surface: faint wheel marks; some surfaces have soot-staining; other surfaces have mortar adhering | * Thin white build-up on some exteriors<br>* All have a wide groove followed by a thick ledge on the interior of the female end just inside from the rim, which was likely designed to grip the mortar that sealed the joint between two adjoining pipes<br>* Exact parallels of this form were used as water pipes |

a photogrammetry software package originally designed for the mining industry in Perth, Australia, was then used to construct the models. These models are accurate to within 1/10 of a pixel which, when using a macro lens, can be accurate to the level of microns.

All of these techniques were employed over the course of the 2012 excavation season on ten previously noted inscriptions and graffiti in and around the site of Ḥumayma and on seven artifacts excavated this season. Of particular interest were the results obtained for the heavily eroded inscription on a statue base excavated in the principia of the Roman fort in 1996 (Oleson *et al*. 1999: 417; Oleson *et al*. 2002: 110-12). When publishing the inscription, Oleson, Reeves and Fisher (2002: 111) noted that "very little is certain about the text of the inscription, despite autopsy during a variety of lighting conditions, and manipulation of digital images." The lack of success of traditional methods suggested this statue base would ideally be a good test case for RTI in the field. In reality, however, the fact that the inscription had remained *in situ* and exposed to the elements for 16 years cast doubt on whether the RTI technique would reveal any details that were not discernable to the original interpreters.

*Previous Reading*

Oleson *et al*. (2002:111) interpreted the inscription as follows.

The inscription originally consisted of two lines of tall (H ca. 0.05 m), narrow letters, occupying approximately the central 0.45 m of the longer (south) side of the block. Traces of letters, and possibly of a recessed cutting to allow correction or damnatio memoriae can be traced over 0.34 m of the first line, but nothing is legible. Traces of letters can be seen over 0.43 m of the second line, but only 0.28 m of the middle portion could be deciphered with even partial confidence, yielding approximately 13 letters. The proportions and spacing of the lettering resemble those of the Greek alphabet used on a dedicatory inscription to Trajan at Petra dating to 114, and the Latin alphabet of the nearby, contemporary inscription of C. Claudius Severus. The NT of line 2 appear to be ligatured.

1. (illegible)
2. ṚṚẠẸṢẸṆ͡ṬẸṂḶẸḠẠṬ (end?) or
   ṚṚẠẸṢẸṆ͡ṬẸṂẸṚẠṬ (end?)

*New Reading*

To create a RTI model of this inscription, 62 high resolution digital images, taken under a variety of lighting conditions (e.g. **Figs. 31 and**



*30. Capturing Reflectance Transformation Imaging data on an inscription carved near Ḥumayma's dam.*




*31. Two of 62 images of the principia statue base's inscription taken for Reflectance Transformation Imaging.*

**32**), were merged and examined on the computer (e.g. **Fig. 33**). This model revealed several new significant details and clarified the uncertain letters from the original reading allowing us to propose a new reading for this inscription.

1. ]ṾḄ[---]C̣X̣Ḥ[---]ROṢ (end?)
2. ]Ṛ ṾI PRAESENTEMPRAṬ (end?)
3. ]ỊR[

The first significant finding was that the inscription seems to consist of three lines, instead of the two originally proposed. Although most of the third line has eroded away, an "R" is clearly visible at the end of the first quarter of this line **(Figs. 31 and 32)**. Just before the "R" there seems to be a letter with vertical line, possibly an "I".

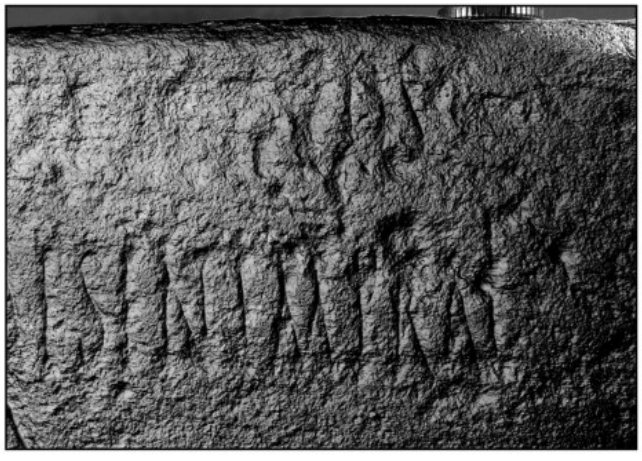
Another significant discovery is that the end of the second line reads neither "PRAESENTEMLEGAT" nor "PRAESENTEMERAT" as proposed previously, but probably "PRAESENTEMPRAT" **(Figs. 31, 32 and 33)**. (Although the "T" at the end could alternatively be a taller vertical line, possibly with a diagonal bar at the top rising to the right.) In addition, some of the letters earlier in the line can now be read. Immediately before "PRAESENTEM" are two letters followed by a central dot indicating a word division **(Figs. 31 and 32).** The first of these letters is possibly a "V", although the reading is uncertain as the letter has been damaged at the top by a square-sided punch. (The sides of the punch mark are eroded in the 2012 photos but clear in Oleson *et al*. 2002: tafel IV no. 3.) The second letter seems to be an "I". Before these two letters is a word ending in an "R" (or possibly an "X"), followed by another central dot.

In the first line, which was illegible previously, several letters are now visible enough to allow interpretations. There seems to be a "V" followed by a "B" (or short "0") at the end of the first quarter of the line (Figs. 31.1, 31.2 and 32.1), and possibly a "CX" followed by an "H" (or "M") just after the crack (Figs. 32.1 and 32.2). Most importantly, the line seems to end with "ROS" (or possibly "ROX") **(Fig. 33)**.

One of the reasons that it is difficult to read some of the surviving letters is that the face of the statue base containing the inscription is covered with pockmarks, some of which are directly over letters (see Figs. 31.2 and 32.2 [and Oleson *et al*. 2002: tafel IV no. 3]). The pockmarks were probably deliberately punched into the sandstone to key the plaster of a later (non-extant) painted inscription. Similar punch marks were found between layers of wall plaster in Ḥumayma's fort **(Fig. 34)** and the altar from Ḥumayma's shrine had both pockmarks and traces of a thick layer of whitewash on its carved surface (Oleson *et al*. 2002: 113). Moreover, other statue bases from Ḥumayma's principia, which lack carved inscriptions, are thought to




*32. Two more images of the principia statue base's inscription taken for Reflectance Transformation Imaging.*



*33. Computer composite screenshot detailing the end of Lines 1 and 2 in the principia statue base's inscription.*

have had painted inscriptions (Oleson *et al*. 2003: 41). In the case of this statue base, which occupied a prime position in the principia courtyard, a new inscription would mean that its honorand was changed during the course of the fort's occupation. Finally, as regards damage to the inscription, it is possible that horizontal erasure in the first line just before the ROS might be deliberate scratching; however, as the grain of the stone goes in the same direction, this might alternatively simply be natural erosion **(Fig. 31.1)**.

Although large parts of the inscription still remain illegible, the new reading will make it easier for scholars to comment on the inscription's overall message. Moreover by revealing new letters and contextual details (such as the punch marks) and clarifying some previously misread letters, the RTI technique has demonstrated its usefulness even on an extremely weathered sandstone inscription.

**Ceramic Vessel Overview from the 2010 and 2012 Seasons** (Holman, L.M. Hardin, S. and Shelton, A. )

*General Observations*

Approximately 54,000 sherds were recovered during the 2010 and 2012 excavation seasons. These ceramics represent types produced between the first century BC and the early ninth century AD. The earliest and latest dated sherds represent a small percentage of the corpus. Thus, the majority of the ceramics date from the first to fifth centuries AD. Owing to the site's long history, most contexts excavated are mixed. One notable exception is the Square 08 pottery dump from Field E077, which contained primarily Nabataean pottery of the first centuries BC and AD. To date, no evidence of local ceramic production has been found (Oleson *et al*. 2008: 337). The major suppliers of ceramic materials for Ḥumayma are Petra and Ayla (modern ʻAqaba); however during the Late Roman period (106 - 324 AD), imported amphorae also reached the site in significant quantities (see below).

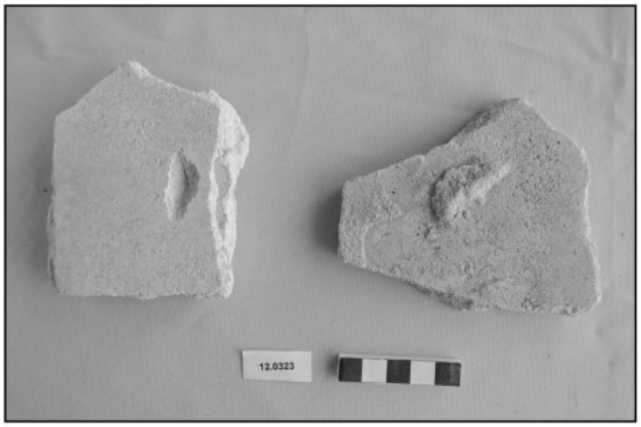
*Coarse Wares*

Coarse ware pottery represents the largest portion of the ceramics recovered from both seasons. The majority of coarse ware pottery was imported from Petra and Ayla, with Petra being the predominant supplier. Only a handful of sherds have been identified as imported from regions other than Petra and Ayla. Five fragments recovered during the 2010 season appear to have been imported from the Karak plateau. Also, a few sherds (still undergoing analysis) were possibly manufactured in the Negev. A single sherd of Pompeian Red Ware, produced during the first century AD, was also identified among the 2010 material. A wide variety of coarse ware forms reached the site. The most common forms are open bowls, jugs, jars, closed cups and cooking vessels. In general, only sherds of vessels were recovered, although a complete cooking pot **(Fig.35.1)** and a nearly complete hemispherical bowl with holes purposefully punched out for straining **(Fig. 35.2)** were recovered from a dump in the *praetorium* of the Roman fort (Field E116 Area I Room J).

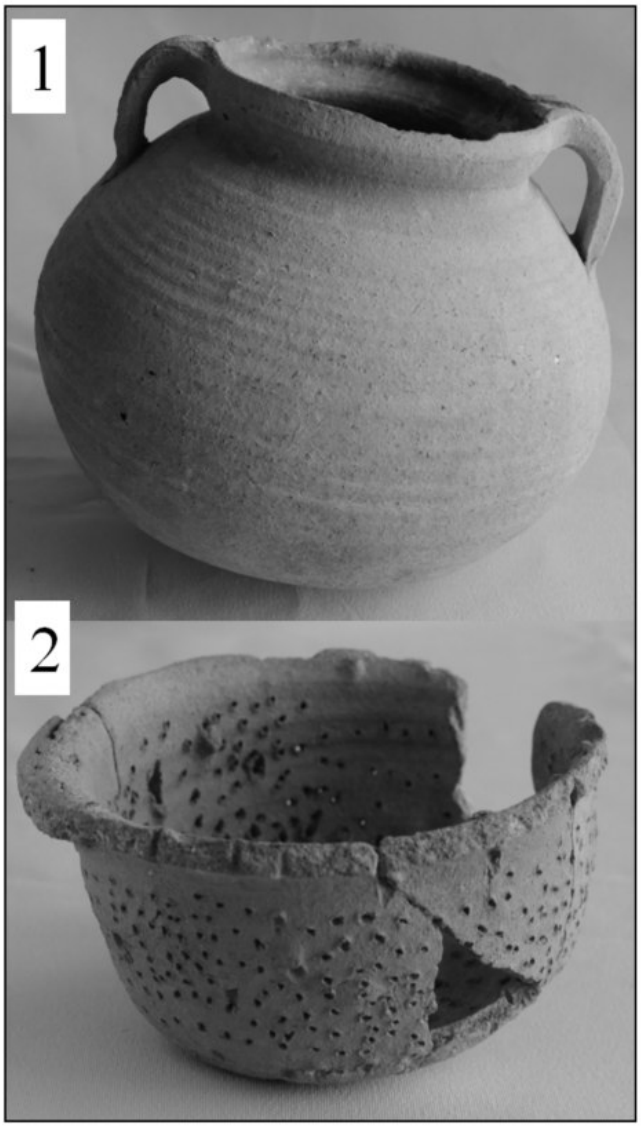
*Fine Wares*

The majority of fine wares recovered are Nabataean painted and unpainted fine wares produced at Petra. The painted fine wares date from the late first century BC to the third century AD. Schmid's Dekorphase 3 (early first to early second centuries AD) dominates the assemblage. Carinated bowls represent the most common unpainted Nabataean fine ware form. Hemispherical bowls and beaded rim cups represent other common Nabataean fine ware forms recovered.

Small quantities of fine wares produced outside Arabia reached the site, most of which were too fragmentary to classify as a specific type. The most common Early Roman imported fine ware recovered during the 2010 and 2012 seasons was Eastern Sigillata A (ESA). There were two classifiable sherds: one base of Hayes Form 28 (E128), manufactured from the last quarter of




*34. Top of an old layer of wall plaster punched (left) to key the underside of a new layer (right).*




*35. Ceramic vessels from dump in E116 Area I Room J: (1) Cooking pot (H12.0322.01); red fabric (10 R 5/18); exterior buff slip (10 YR 7/3); h = 13.0cm; (2) Strainer (H12.0314.04); light red fabric (2.5 YR 6/6); height = 6.1cm.*

the first century BC to the first quarter of the first century AD (Hayes 1985: 27), and one rim of Hayes Form 56 (E128), produced during the early second century AD (Hayes 1985: 39). All ten of the ESA sherds recovered during the 2012 season were from the *vicus* (E077 and E128). Of the Late Roman and Early Byzantine period sherds recovered, a small quantity of Red Slip ware sherds were identified, including 11 fragments of African Red Slip (ARS). Three ARS sherds were recovered from the Roman fort (E116); the remaining sherds were found in E077.

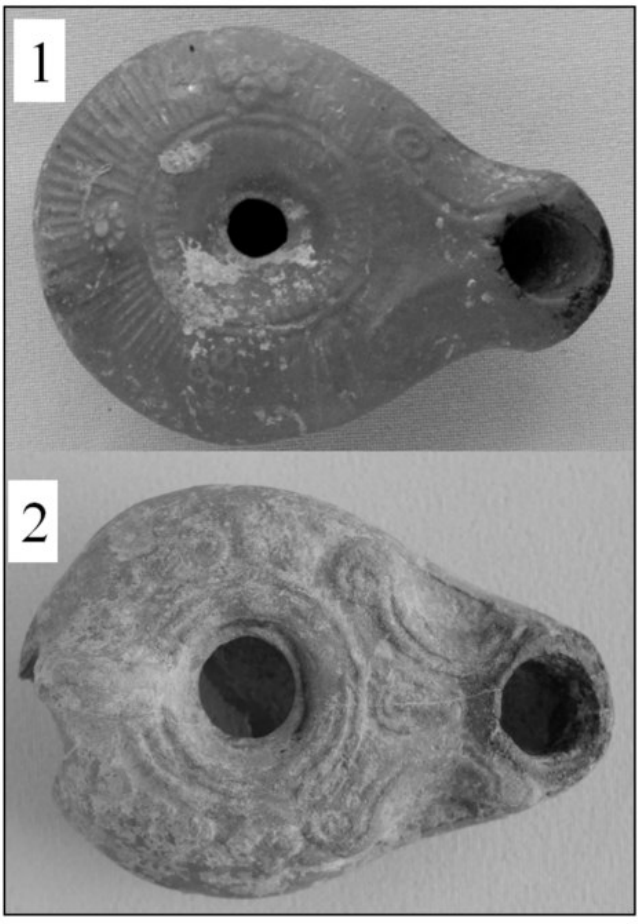
*Amphorae*

The majority of imported amphorae identified date from the second to fourth centuries AD. Class 47 is the most frequently identified imported amphora from both seasons, based on the quantity of sherds (219). This vessel is thought to be a wine amphora produced in the Aegean during the late second to fourth centuries AD (Peacock and Williams 1986: 193-95). Class 47 amphorae were recovered from E128 and E116, but most sherds were found in E077. Class 45, found in E116 (19 sherds) and E077 (two sherds), was the second most commonly identified imported amphorae. The form appears in the late first century AD and was produced until the late sixth century AD (Peacock and Williams 1986: 188-90). Several fragments of amphorae produced in Egypt (Class 52) and Gaza (Class 48) were identified (Peacock and Williams 1986: 196-97, 204-5). These Class 48 and 52 amphorae were probably used to ship wine.

*Lamps*

Few identifiable lamps were recovered during the 2010 and 2012 seasons. Those lamps which could be classified date from the first to fourth centuries AD. Several Nabataean Rosette Lamps (Negev type 1a) of the first century AD were recovered, including one complete lamp and one fragment from E077's Square 08 pottery dump (Negev 1986: 134; **Fig. 36.1**). A complete Late

Roman ovoid lamp, manufactured between 280 and 320 AD, with volute decoration between the spout and the fill hole, and groupings of rosettes around the fill hole was recovered from the fill beneath the plaster *klinai* in Room F of the E077 bathhouse (Grawehr 2006: typentafel 2: fig. K.3; **Fig.36.2**). Several Late Roman lamps were recovered from E116 Area I Room J. From the middle layer of the dump in Room J, a spout fragment and a disk fragment have been identified as Grawehr's type J.2 round lamp dated to 180 / 210 - 260 (2006: typentafel 2). A semi-complete lamp disk, also from this layer, was identified as Grawehr's type J.2. Finally, the latest dated lamp from the 2010 and 2012 seasons was a very charred complete lamp top, again from the middle layer of the dump of E116 Area I Room J. It most closely resembled Grawehr's type J.3 variation b dating from 225 - 300 (2006: typentafel 2).




*36. (1) Nabataean Rosette Lamp (H10.0245.01) from the E077 Square 08 dump; fabric is light red (10 R 6/6) to very pale brown (10 YR 8/3); red slip (2.5 YR 5/8) covering the top; h = 2.8cm; (2) Ceramic ovoid lamp with charring around the nozzle (H12.0065.01) in fill beneath kline in E077 Room F; red fabric (10 R 5/8); h = 2.1cm.*

*E077 Square 08 Dump and E116 Praetorium Room J Dumps*

During the 2013 study season, the diagnostic sherds from two pottery dumps, one in E077 Square 08 and the other from E116 Room J in the *praetorium*, were analyzed. The dump from Square 08 is a unique assemblage from Ḥumayma. It is a homogenous corpus of Nabataean wares from Petra and Aila that is thought to have a closing date of the late first or early second century AD. On the other hand, the dump excavated from Room J in the *praetorium* shows the breadth of wares and vessels that reached the site during the second to fourth centuries AD. Specifically, the dump in E116 Room J illustrates the manufacturing centers that supplied the army and commander stationed at Ḥumayma.

*E077 Square 08 Dump*

The dense concentration of ceramics designated as the E077 Square 08 Dump was found during the excavation of a foundation probe against the outside face of the E077's eastern perimeter wall **(Fig. 2)**. Given the many phases of occupation in E077, it was especially remarkable that the pottery dumped here seems to represent a homogeneous Nabataean assemblage containing material dated from the late first century BC to the late first century or early second century AD. The corpus is comprised of Nabataean coarse and fine wares from Petra and Aqaba. 3,864 sherds were retained from the portion of the pottery dump within the 2010 probe; unexcavated portions of the dump were also observed to extend to the north, east and south of the probe's location. In 2011, Na'if Zaban of the ACOR conservation cooperative sorted the retained sherds into vessel types and looked for joins. During the 2013 study season, a database was created to document the different

types of vessel amongst the assemblage. The fragments that were joined were counted as a single sherd. Thus, the total sherds recorded in the database equaled 3,545. The percentages provided for the wares are based on the initial reading of the 3,864 sherds in 2010. Percentages of the vessel forms discussed in the report will be based on the 3,545 sherds recorded during the 2013 study season.

Over 99 percent of the recovered corpus is Petra coarse and fine wares. No fine wares or amphorae produced outside of the Kingdom of Nabataea were identified. The only other regional ceramics recovered were Aila coarse and fine wares, which represent less than one percent of the corpus. The majority of the corpus is Petra fine table-wares (32.8 percent) and Petra coarse cooking wares (39.2 percent). Coarse serving and storage vessels also comprised a significant portion of the corpus (20.9 percent). Open bowls represented nearly 25 percent of the corpus, with Nabataean Painted Fine Ware representing slightly over four percent and Petra fine ware carinated bowls comprising 12.4 percent. Diagnostic sherds of jug, juglet and jar forms, which were most likely utilized for serving and storing food stuffs, represent approximately six percent of the corpus. Petra fine and coarse ware cups compose one percent of the ceramics recovered. Petra ware cooking pots (7.9 percent) and cooking bowls (0.8 percent) also represent a significant portion of diagnostic sherds. This suggests that the contents of the dump were from a domestic context, presumably a kitchen or storeroom.

The earliest dated ceramics from the corpus are Petra coarse ware cooking pots of the first century BC (nine sherds or 0.26 percent) with rims that are flanged and flattened (Gerber 2001a: 360, fig. 1.11). However, the remaining fine and coarse ware pottery recovered, such as carinated bowls, are forms common during the first century AD. All of the Nabataean Painted Fine Ware identified were Schmid's Dekorphase 3b manufactured from 70 / 80 - 100 AD (Schmid 1996: 207, abb. 701). The exclusivity of Dekorphase 3b, as well as the presence of second century AD Petra coarse ware cooking bowls (Gerber 2001a: 360 fig. 1.23) and Petra cooking pots with grooved rims that form a protrusion (Gerber 2001a: 360 fig. 1.20-21) suggest that the *terminus post quem* for the deposition of the pottery was the late first or early second century AD. However, the small quantities of these later cooking vessel types (0.54 percent of the corpus) could suggest that the material was dumped prior to or around the time of Trajan's annexation of Arabia in 106 AD. The absence of pottery produced outside the borders of the Nabataean Kingdom may also indicate that this homogeneous corpus represents pre-annexation material. Limited quantities of early imported fine wares, such as ESA, do reach the site, yet none were found in the E077 Square 08 assemblage. The importation of amphorae to the site does not begin in significant quantity until after the fort was established in the early second century AD. The rarity of an abrupt *terminus* for ceramics at Ḥumayma may suggest that a catastrophic destruction, possibly an earthquake, caused the vessels to be broken and subsequently discarded in the late first and early second century AD (cf. Stucky *et al*. 1995: 303; Kolb and Stucky 1993: 417).

**Praetorium Room J Dump**

The corpus from Room J of the *praetorium* (Area I) in Field E116, which was excavated during the 2012 season, is comprised of ceramic material dating from the first to fourth centuries AD. 4,859 sherds were recovered. As noted by the excavators above, once the hypocaust in *praetorium* Room J was dismantled, the interior of the room appears to have been used as a dump. The three soil layers previously noted by the excavators contained three distinct assemblages of ceramics. All three layers contained material produced from the first to fourth centuries AD.

The lowest (non overlapping) layer of the dump (Loci 1209 - 1210) yielded the smallest quantity of sherds. As noted by the excavators, this layer was formed when the hypocaust bricks

were robbed out for reuse in other buildings at the site. The ceramics date primarily to the first to third centuries AD; however, some vessels have production periods that extend into the mid-fourth century AD. Of the 135 sherds collected, only four were manufactured outside of the Province of Arabia. One sherd was identified as a Class 47 amphora; the three other amphora sherds have not yet been identified. The Nabataean Fine Wares included the most commonly identified forms at Ḥumayma. There were three carinated bowls, two hemispherical bowls and one notched rim bowl (Schmid 1996: 189 abb. 663-667). Only one Nabataean Painted Fine Ware sherd was collected. This was identified as Schmid's Dekorphase 3c, manufactured during from the early to mid second century AD (Schmid 1996: 209 abb. 702-704). The cooking wares revealed the widest variety of forms. Two cooking pots manufactured from the late first to third centuries AD with rims that are squared and overhang the exterior were recovered (Gerber 2001a: 360 fig. 1.18; Lindner *et al.* 2007: 246 fig. 10). Two triangular rim cooking pots were also identified (Gerber 2001b: 11 fig. 2.A-G). A Late Roman casserole form that was in use from the second century into the mid-fourth century AD at Petra was also recovered from Locus 1210 (Gerber and Fellmann Brogli 1995: 652 fig. 5.10). A cooking lid that typically accompanies this casserole form was found in Locus 1209 (Gerber and Fellmann Brogli 1995: 652 fig. 5.7-8). The three remaining diagnostic cooking sherds were of a cooking pot form with a rounded rim and offset neck dated to the second and third centuries AD (Gerber 2001b: 11 fig. 2.E).

As noted by the excavators, the middle layer (Loci 1203 - 1208) had a much higher concentration of sherds than the layers above or below it. This assemblage is the largest in terms of total sherds recovered (4,539 sherds) and yielded the widest variety of imported and locally manufactured vessel forms. It is also a thoroughly mixed layer, including ceramics commonly manufactured from the first to mid-fourth centuries AD.

Among the amphorae sherds recovered, Class 45 (nine sherds) and Class 47 (eight sherds) were identified. There were also 39 sherds identified as Gaza ware jars or amphorae, 36 fragments of which were from the same locus and are likely to be from the same vessel.

As regards fine wares, the only fragments (three sherds) of ARS ware recovered from *praetorium* Room J were found in this deposit, including one rim sherd of Hayes' Form 50A, produced from 230 / 240 to 325 AD (Hayes 1972: 62-73). All of Schmid's Dekorphases from 2c to 4, which were manufactured from the beginning of the first to the beginning of the fourth centuries AD, were identified (Schmid 1996: 205, 207, 209 abb. 698-706). The only two unguentaria sherds from Room J were recovered from this layer. The common bowl forms, carinated (seven sherds) and hemispherical (three sherds), were represented in this assemblage. Nabataean Fine Ware cups with beaded rims and globular bodies (40 rim sherds) were recovered (Erickson-Gini 2010: 119 25). Eleven fragments of a cup type with a globular body, an offset neck and a bevelled rim were identified (Schmid 2000: abb. 263, 301-302). The middle layer also yielded several ovoid lamps (discussed above) dating from the late second to early fourth centuries AD.

As was the case for fine wares, the middle layer also yielded a variety of cooking vessel forms. One complete cooking pot with a short neck and simple rounded rim is comparable to the cooking pot from az-Zanṭūr that was found in the destruction layer from the earthquake of 363 AD (Gerber and Fellmann Brogli 1995: 655 fig. 10; Fig. 35.1). Casseroles (27 sherds) with vertical sidewalls and two horizontal loop handles produced from the second to fourth centuries were recovered (Fellmann Brogli 1996: 257 abb. 773-774). Examples of cooking lids (seven sherds) were also recovered. The cooking pots manufactured in the second and third centuries, which were also found in the lowest layer, were the most common cooking pots found in the middle layer, with 24 sherds of

the form with a squared, overhanging rim and 31 sherds of the vessel with a rounded rim and offset neck identified. The remaining cooking vessels were of common types, including triangular rim cooking pots (three sherds) and the cooking pot form with a slight groove on the rim (11 sherds), a form that was manufactured from the late first to fourth centuries AD (Fellmann Brogli 1996: 244 abb. 734-735).

The coarse wares found in the middle layer were unique to this room. Several fragments of a hemispherical bowl with holes punched out, presumably for straining, were recovered **(Fig. 35.2)**. Late Roman jar and jug forms found at az-Zanṭūr well into the fourth century AD were identified, including two sherds of a globular jar with a groove under a folded rim (Fellmann Brogli 1996: 251-251 abb. 760-761) and one example of a cylindrical jug with a grooved neck (Fellmann Brogli 1996: 266 824-825). Finally, a coarse ware version (11 sherds) of the Nabataean Fine Ware cup with a bevelled rim and offset neck was found, sometimes with traces of charring on the outside, suggesting that it may have been used for cooking.

In the uppermost layer of the dump (Loci 1201 - 1202), 185 sherds were processed. Only 12 of the 185 sherds were imported from outside the Province of Arabia. As in the middle layer, Class 45 (ten sherds) and Class 47 (one sherd) amphorae were identified. Of the diagnostic Nabataean fine and coarse ware sherds processed, several common forms were identified, including two sherds of Nabataean Fine Ware carinated bowls. No Nabataean Painted Fine Ware sherds were recovered from this layer. Among the cooking vessel forms identified there were two triangular rim cooking pots, one grooved rim cooking pot (Gerber 2001a: 360 fig. 1:20-21; Fellman Brogli 1996: 242 abb.730) and one cooking pot with a slight groove on the rim, similar to the form from the middle layer. Whereas the amphorae and the cooking pots have production periods that extend to the mid-fourth century AD, the fine wares are residual sherds of the first century AD.

**Conclusions and Future Plans** (Reeves, M. B.)

The 2010 and 2012 excavations have contributed a great deal of data about the Nabataean, Roman and Byzantine period structures that existed in the vicinity of the Roman and Byzantine fort. Most importantly, Field E077, which contains several phases of Nabataean structures, a Roman, Byzantine and perhaps Umayyad bathhouse, and a mid-twentieth century domestic structure has now been fully excavated and its finds are undergoing analysis. In addition to the analysis of traditional finds, the Ḥumayma Excavation Project has been conducting an analysis of the ceramic building materials from this field and other areas at Ḥumayma since 2011. The resulting typologies are clarifying the phasing of Ḥumayma's structures. The ceramic building material assemblage from the heated room in the *praetorium* of the Roman fort is particularly interesting as it is distinct from the assemblages in the bathhouse and indicates a different phase in the importation of these artifacts to Ḥumayma. In addition, the excavation of the only heated room in the Roman commander's house, which was undertaken primarily to retrieve ceramic building materials, has contributed new information relating to the function and phasing of this special room in an elite Roman domestic structure. Finally, although the buried mudbrick structure in Field E128 has only been partially excavated, these limited excavations have contributed new information about the design of this mudbrick structure and the extent of the Roman civilian community (*vicus*).

After several years of excavation in the *vicus* adjacent to the Roman fort, there is now enough data to begin the final analysis of this area. Our plan is to spend the next few years focusing on the final analyses of the architecture, finds and stratigraphy from the previously excavated fields in order to prepare a volume on the Nabataean town and Roman *vicus* to be published in Ḥumayma Final Report series. In the meantime, limited fieldwork will likely be undertaken to answer questions generated during the final report preparation.

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# PETRA DECUMANUS MAXIMUS SURVEY 2008

*Steven E. Sidebotham, Ross I. Thomas, Mary A. Sidebotham and Jean-Louis Rivard*

## Introduction

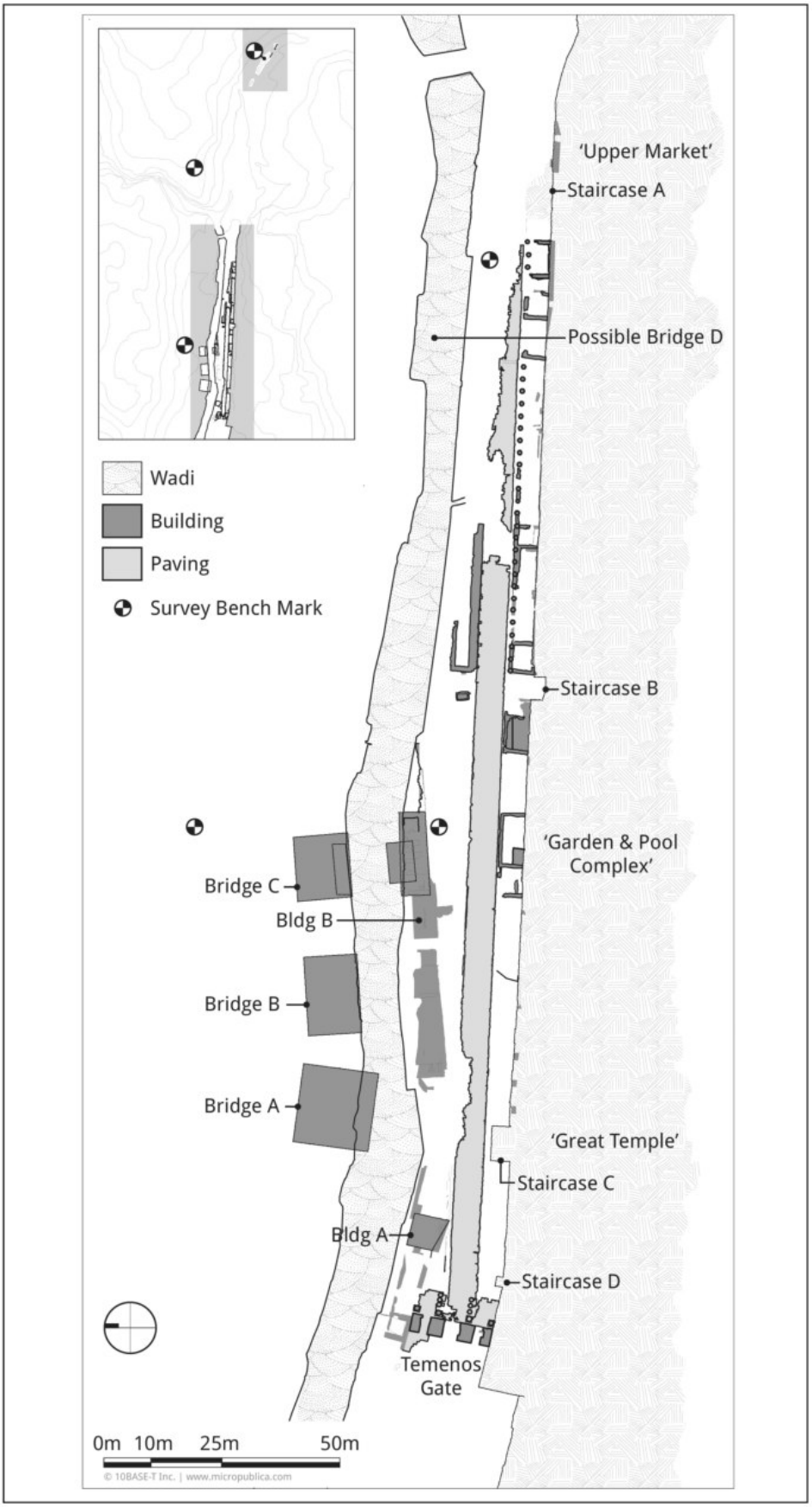
In late June - July 2008 a three-person team under the aegis of the University of Delaware (USA) conducted a three-week, site-intensive survey at Petra of the paved and partially colonnaded street / *decumanus maximus* (hereafter referred to as the *decumanus maximus*) and some of the adjacent features. The team included Steven E. Sidebotham (USA), Ross I. Thomas (UK) and Mary A. Sidebotham (USA). Jean-Louis Rivard (Canada) augmented the plans and drawings somewhat based on additional survey work he and Sidebotham undertook at Petra in May - June 2013[1].

The objective of the Delaware survey was to draw a detailed plan of *decumanus maximus* **(Fig. 1)**, the city's primary east - west artery, in order to understand better its dimensions, orientation, date(s) of construction, areas of repair, periods of use and relationship to adjacent buildings. Earlier excavators and scholars presented three major chronological / use phases of this thoroughfare and some of its immediate environs (Parr 1970; Fiema 1998; Kanellopoulos 2001: 11-22). These are: (1) period of unpaved street or streets and environs prior to the extant paved one; (2) paved street and environs of the early Roman period; (3) late Roman modifications and uses of the paved street and environs. Excavations by D. Graf in the area (Graf *et al*. 2005, 2007, forthcoming; Graf 2013a, 2013b) since Z. Fiema's project in 1997 (Fiema 1998) taken together with the results of our survey necessitate some modification / clarification of the chronologies proposed by earlier scholars. In general, however, our survey confirmed the relative chronology of the street vis-à-vis adjacent structures proposed by earlier investigators. This data, when used in conjunction with information provided by the excavations of Graf (and others in the future) should allow scholars to establish a more secure phasing for the structures adjacent to the street, any earlier manifestations of the street and the extant street itself.

## The Survey

The survey used a Leica TC-300 total station[2] to produce a detailed and accurate local map of the *decumanus maximus* and its immediate environs. In order to place the Delaware survey within the context of ongoing and previous work conducted in the area, the project located and tied in the main survey point created by our team with those of Peter Parr (in his trench 3 on the southern side of the *decumanus maximus*), David Graf (in his trench HPP2007-9 on the southern side of the *decumanus maximus*), three ACOR survey points used by Kanellopoulos and Akasheh to prepare their 2001 map of the

1. Dr. and Mrs. J. A. Seeger, Mr. W. Whelan, Prof. S. E. Sidebotham, Ms. M. A. Sidebotham and the Department of History, University of Delaware provided funding for the project in 2008. The return visit in 2013 was courtesy of Prof. D. F. Graf, University of Miami, Coral Gables, Florida (USA) as part of his survey of the adjacent area.
2. Loaned by the University of Southampton (UK), as were survey and graphics software LISCAD, CAD, Corel Draw and Leica Survey Office that were used to generate the survey maps, plans and drawings produced by R. I. Thomas. Subsequently, Jean-Louis Rivard added some additional survey details from the 2013 season and modified the style of the drawings. The Brown University (USA) team loaned a tripod for use with the total station.




*1. Plan of decumanus maximus and environs produced by University of Delaware Petra Street Survey project (2008). Surveyed by S.E. Sidebotham, R.I. Thomas and M.A. Sidebotham. Drawn by R.I. Thomas, edited and redrawn by J.-L. Rivard (2013).*

street **(Fig. 2)** and a survey point generated by Brown University above and behind (south of) the ‘ Great Temple’. The Delaware team also measured these with a hand-held GPS receiver to place the local survey grid in real-world coordinates[3].

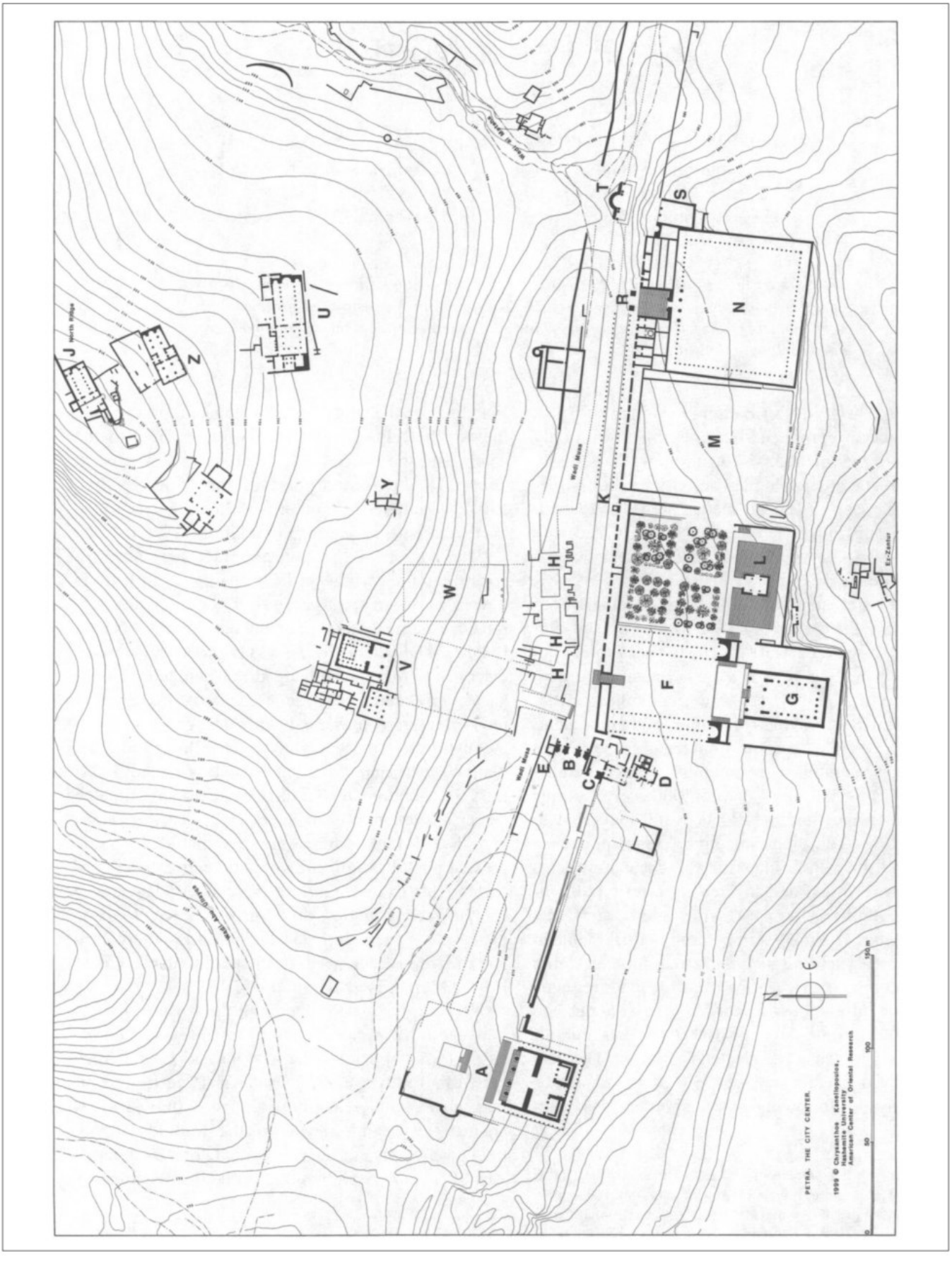
To conduct the survey the Delaware project employed local labor and tools to remove concretions and wind-blown sand obscuring the street[4]. The sandy layer was especially dense towards the eastern end of the *decumanus maximus*, but clearing and cleaning took place along the entire length of the thoroughfare and in some of the adjacent structures. A heavy layer of dense concretion covered portions of the street towards its eastern end and no amount of cleaning could remove this deposit. There is additional discussion of this concretion presented below.

While ACOR / Kanellopoulos / Akasheh (Kanellopoulos and Akasheh 2001: 6; cf. Murray and Ellis 1940) published an excellent initial / overall plan of the *decumanus maximus* and its environs **(Fig. 2)**, it does not provide, nor was that its intention, the great detail produced by the Delaware survey which is needed for more detailed analysis and interpretation. It does not depict some of the structures adjacent to the street with as much precision as our plan, nor could it given that Graf’s excavations took place only after the ACOR survey. The Delaware survey drew a definitive map of the street pavers, stone by stone, and recorded in plan, in as much detail as time allowed, the structures adjacent to the street. The street pavers are made of a local mulluscan limestone (J. A. Harrell pers. comm.) /Ma’in fossiliferous stone (Kanellopoulos 2001: 21; Rababeh 2005: 39); the extant curbing stones lining the *decumanus maximus* are made of much less stout local red sandstone, the most common building material found at Petra (cf. Rababeh 2005: 37, 39).

The length of the primary area surveyed during the 2008 season was 569.94 m east - west; more than 25,100 survey points were recorded. The Delaware survey documented a total of 5,095 paving stones and fragments in the *decumanus maximus* itself. Other pavers, clearly not part of the street, but associated with the gate at the western end of the *decumanus maximus*, are not included in this count. In addition, more paving stones survive, but these are covered by an extremely hard rubble and mud concretion (noted above) washed and deposited onto the street towards its eastern end by a *seyl* (flash flood) from the *wadi* lying just to the north. A local *bedouin* reported that this episode of flooding occurred in summer 1998, but the survey could not independently confirm this date. The concretion remaining on the street covers an area of 25.20 x 5.82 m (or 140.664 $m^2$); the survey could not estimate how many additional street pavers this concretion covered. Hand picks were only partially efficacious in removing this overburden. At one point the survey employed a front-end loader on loan from the Department of Antiquities to try to loosen some of this concretion, but with very limited success as extreme care had to be exercised to avoid any damage to the street itself and areas immediately adjacent to it. Other areas of missing flagstones towards the eastern end of the extant

3. Main Delaware survey point (from which three other subsidiary points were also taken): 30°19.45.3’ N 35°26.35.3’ E. Peter Parr’s datum point in his trench 3 (south side of street): 30°19.45.4’ N 35°26.34.1’ E. David Graf’s trench HPP2007-9 datum point (south side of street): 30°19.44.8’ N 35°26.35.0’ E. ACOR survey point (no 3) [south-south-east of Qasr al-Bint]: 30°19.40.5’ N 35°26.26.0’ E. ACOR survey point 12 (“12” in red / orange paint; “6-7-77” carved into concrete when wet) (south of street above ‘Great Temple’): 30°19.39.3’ N 35°26.31.4’ E. ACOR survey point 13 (“13” in concrete) (north of street above nymphaeum): 30°19.45.8’N 35°26.45.3’ E. Brown University survey point (south and above ‘Great Temple’): 30°19.39.5’ N 35°26.30.8’ E. Unlike the total station survey, the GPS coordinates taken by our survey are, unfortunately, no more accurate than to within a few meters. Should they wish to do so, future scholars may relocate these points with minimal effort to incorporate our local survey into real-world coordinates more precisely.

4. Picks, shovels, trowels, wheelbarrows and brushes were borrowed from the University of Brussels (Belgium) equipment stored at Petra.




*2. Plan of central Petra by Kanellopoulos and Akasheh (2001): 6.*



*3. View of decumanus maximus from gate looking east. Photo by S.E. Sidebotham.*

*decumanus maximus* may be the result of flood damage Kirkbride observed during her work in the area (Kirkbride 1960: 117; throughout she refers incorrectly to the extant paved east - west street as a "*cardo maximus*").

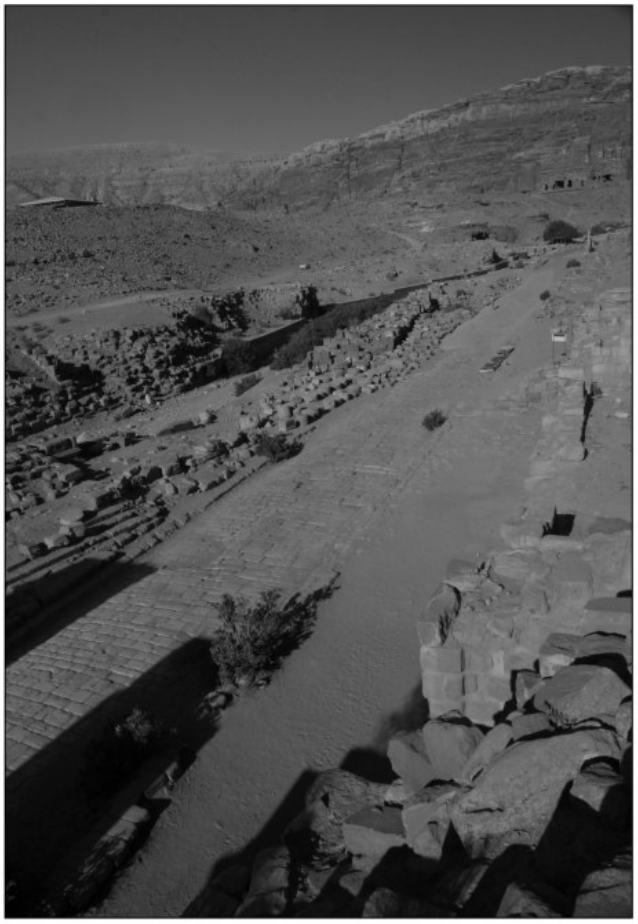
Lying above at least one and perhaps several gravel surfaced predecessors (Kirkbride 1960: 121; Parr 1970: 369; Fiema 1998: 397, 416; Graf *et al*. 2005: 419, 427-428, 432) and beneath a very late dirt road (Kirkbride 1960: 117), the *decumanus maximus* at Petra in its current manifestation from the easternmost extant paving stones just north of staircase A to the eastern face of the gate / arch at the western end of the street is 234 m long (cf. Kanellopoulos 2001: 14 who records a length of 233.40 m) and an average of 5.94 m wide **(Figs. 3 and 4)**. In some areas the street is 6.04 - 6.34 m wide.

The survey also recorded the general location, orientation and outlines of another street east of the *decumanus maximus* **(Fig. 1** inset at top left and **Fig. 29**). The latter had clearly been recorded (though in what detail remains uncertain) previously as the identification of two survey points marked in green paint at two locations along the northern edge of this road indicate (cf. Kirkbride 1960: 121). The easternmost of these green-painted survey markers was indistinct, but appeared to read: "X 218", while the second farther west along this road segment read "X 233". Stones in this street were, on average, significantly smaller than those used to pave the *decumanus maximus*, but appear to be of a similar material: a durable, light-colored limestone. The Delaware survey had insufficient time to clean adequately and record this more easterly thoroughfare. Instead, we documented only the visible outlines of this street, but not the individual paving stones; a thorough cleaning would reveal many more. Our survey recorded an area of this street of 69.30 m x 4.77 m.

**The Decumanus Maximus at Petra and Parallels**

The width dimensions of the *decumanus maximus* at Petra are similar to those of some streets in Alexandria, Egypt (van Tilburg 2007: 29-30) and the main streets in Priene, Asia Minor (van Tilburg 2007: 29-30, cf. 31). The *decumanus maximus* at Hippos-Sussita is 4.2 m wide (Segal *et al*. 2005: 9). Thus, the Petra *decumanus maximus* is about as wide as those in some urban areas of the eastern Roman Empire (van Tilburg 2007: 27-31) and wider than in others (van Tilburg 2007: 30-31).

The Romans referred to this type of thoroughfare topped with cut paving stones, common within cities throughout the empire,



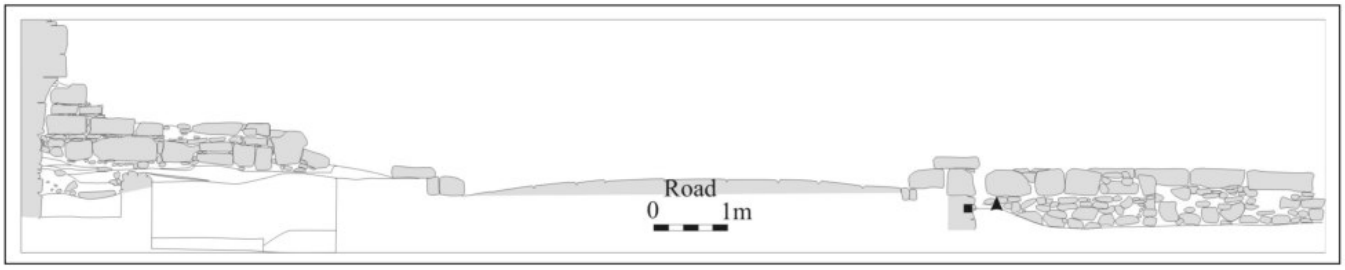
*4. View of the decumanus maximus looking east northeast. Photo by S.E. Sidebotham.*

as a *via silice strata* (van Tilburg 2007: 15, note 139); variants included the *via munita and lapide quadrato strata* (Smith and Cornish 1898: 668). Colonnaded streets were common features in many Roman-era cities in the Levant (MacDonald 1986: 43; Fiema 1998: 395); those of Alexandria, Egypt (van Tilburg 2007: 30), Ephesus (Scherrer 2001: 64-65 fig. 3-9 no 83; 72, fig. 3-13) Antioch-on-the-Orontes (Downey 1963: 82-83, 90, 99, 203; Liebeschuetz 1972: 56), Caesarea Maritima (Holum *et al*. 1988: 175-176), Apamea (MacDonald 1986: 44, 45 fig. 40), Gerasa (Browning 1982: 133-147; MacDonald 1986: 38 fig. 35), Tyre (Jidejian 1969: photo p. 84, 160, figs 67-68), Bosra (Ball 2007: 89-90 & fig. 5), Phillipopolis (Ball 2007: 101 & fig. 8) and Palmyra (MacDonald 1986: 45 fig. 39; van Tilburg 2007: 30; Ball 2007: 120-122 & fig. 36) are especially noteworthy examples.

**Details of Construction and Phasing**

Typical of many roads and city streets throughout the Roman world, the Petra *decumanus maximus* crowns to a high point along the central east - west axis and slopes down towards the edges with curb stones lining the northern and southern boundaries of the thoroughfare **(Fig. 5)**. Calculating the average / median of the height difference between the crown of the street and the northern and southern edges is difficult as the points taken by our survey are not in perfect alignment, but are instead where the pavers fall. We present here the height differences at various points along the street: easting 1894.5 (by the gate) is 19 cm; easting 1950 is 25 cm; easting 2000 is 21 cm; easting 2050 is 13 cm; easting 2100 is 13 cm. From this small sample the average elevation differences between the highest point of the street at its center crown and the edges (inside the sandstone curbing) is 18.2 cm. This crowning technique, found on many paved roads throughout the empire, prevented water from pooling on road surfaces. Of course, in most desert areas, this would not have been a major concern much of the time. This type of street construction is, however, difficult for camels to negotiate as it is quite slippery (Sidebotham pers. obs.; Kirkbride 1960: 117, 121-122), suggesting that camel caravans did not normally enter this part of the city or that those who built the street were not familiar with the limitations of that beast of burden. If the latter is the case, then this must certainly point to engineers and builders who were not originally from this part of the Roman world. In addition, the street slopes 4.26 m throughout its length from a high in the east down to a low point in the west (at the gate).

The sizes of paving stones in the street vary significantly in different areas that may relate to phasing and function. The paving slabs measure from 0.001106 $m^2$ (smallest) to 0.762425 $m^2$ (largest), with the mean average being 0.211154 $m^2$ (with 68% standard deviation falling between 0.112301 $m^2$ and 0.310006 $m^2$). The median average is 0.198501 $m^2$ (mid value) and




*5. Cross section of decumanus maximus showing crowning of the street. Surveyed by S.E. Sidebotham, R.I. Thomas and M.A. Sidebotham. Drawn by R.I. Thomas.*

mode average is 0.224949 $m^2$ (most frequent). Pavers used to construct the *decumanus maximus* average 0.208 $m^2$ (standard deviation 0.303 - 0.113 $m^2$), with a minimum of 0.001 $m^2$ and maximum of 0.762 $m^2$. However, pavers associated with the gate at the western end of the *decumanus maximus* average 0.298 $m^2$, (standard deviation 0.450 - 0.146 $m^2$), with a minimum of 0.003 $m^2$ and maximum of 0.745 $m^2$. Thus, the paving stones associated with the gate have higher standard deviations (i.e. are less regular) and are nearly 50% or *ca* 10 $cm^2$ larger than those comprising the *decumanus maximus*.

In order to illustrate graphically patterns of construction represented by different paver sizes, each street paver is color coded by size on the plans presented here. Those highlighted in solid black are unusually large (greater than 1 standard deviation of the mean average noted above), while those coded in white are unusually small (smaller than 1 standard deviation of the mean average noted above). Those in gray are within 1 standard deviation of the average size and represent the majority of the paving stones comprising the *decumanus maximus*[5].

In addition to recording in detail the *decumanus maximus* and its environs immediately north (up to the *wadi* bed) and south (up to the northernmost extant east - west retaining wall running approximately parallel to the street), the survey documented the western side of the gate / arch and as many of the paving stones inside the gate / arch as possible (cf. **Figs. 6 and 24**). There were also large slabs west of the gate and on the eastern side of the northern and southern gate openings. The eastern side of the middle (main) opening of the gate has relatively small slabs that seem to have been designed to be part of the *decumanus maximus* itself; these were probably reworked / recycled from some previous use. There are also large slabs in front of one set of steps (staircase D) **(Figs. 1 and 7)** leading to the so-called 'Great Temple', which are similar in size and general appearance to those in the immediate vicinity of the gate. Excavators of the 'Great Temple' posit a construction date of first century BC with Nabataean renovations in the first century AD, possibly as late as the very early second (Joukowsky 2003: 220-221; Joukowsky 2007: 22, fig. 1.18). The latest published on the chronology of the 'Great Temple' notes an earthquake early in the second century AD, which then resulted in repairs to the propylaeum (including staircases C and D leading up to the area?) (Figs. 1 -7) in the mid second century (Joukowsky 2007: 22, fig. 1.18)[6]. If this is the case, then those areas of the temple complex abutting the street would most certainly have postdated the *decumanus* by a few decades. The excavators of the 'Great Temple' believe that that edifice originally aligned with a street that predated, but had a similar orientation to, the extant *decumanus maximus*. Unfortunately, the staircases (C and D) in their current manifestation that now lead up to the temple area from the *decumanus maximus* are part of

5. One standard deviation either side of the mean average accounts for 68% of the sample. This is a common statistical tool to identify outliers within any given statistical sample.

6. Earthquake damage in Aqaba supports a date of early second century AD for this event (Thomas *et al*. 2007: 63).

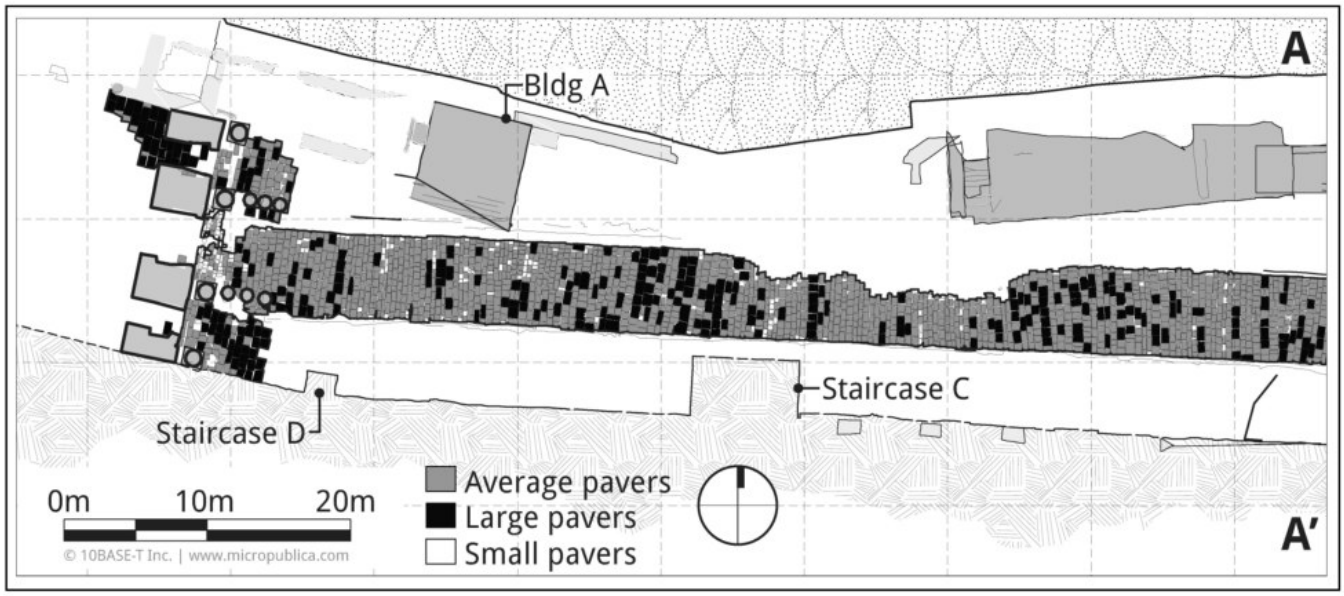


*6. Paving associated with the northern-most opening of the gate looking west. Scale = 120 cm. Photo by S.E. Sidebotham.*

a modern reconstruction making their ancient chronological relationship to the *decumanus maximus* impossible to ascertain. Aside from the staircases (C and D) leading to the 'Great Temple' from the south and their immediate environs, all the other evidence may suggest an approximately contemporary construction date for the slabs adjacent to the gate and the gate itself. If so, then this indicates that these features postdate the construction of the extant *decumanus maximus*. There may have been some additional modification of staircases C and D after the *decumanus maximus* was built and after the posited earthquake of the early second century AD, but we cannot be certain given the current state of the modern reconstructed remains in this area.

Graf's excavations documented that the larger slabs associated with the gate to its west were built over Nabataean structures and a street, but that those larger pavers west of the gate dated likely to no earlier than the last quarter of the first century AD (Graf *et al*. 2005: 431). We believe these larger slabs / paving stones around the gate to be somewhat later, certainly postdating the *decumanus maximus* itself. Other indications that the extant *decumanus maximus* east of the gate is likely a later manifestation of some earlier street can be seen in the alignment of buildings A and B and the structure / wall between buildings A and B on the northern side of the *decumanus maximus* towards its western end, just east of the gate **(Figs. 1, 4, 7 - 9 and 11)**. All these structures are at noticeable, but dissimilar angles to the course of the extant *decumanus maximus*. Bridge A has a NNE - SSW orientation similar to building A, while bridges B and C have orientations similar to the wall / installation between buildings A (but not building A itself) and B, and also building B, *viz*. NNW - SSE. These orientations, none of which are parallel to the extant *decumanus maximus*, suggest not one, but at least two different street alignments prior to that now visible, at least at the thoroughfare's western end (cf. Kanellopoulos and Akasheh 2001: 6). Since the extant evidence points to an Augustan construction date for the Temple of the Winged Lions and, by association, bridge A and building A and those must have aligned with some pre-*decumanus maximus*, likely unpaved street, we must assume that the orientation of bridges B - C and associated building B and wall between buildings A (but not building A itself) and B were built at a different time and aligned with yet another pre-paved *decumanus maximus*-era thoroughfare. We cannot be sure, however, whether these latter structures predate or postdate the Temple of the Winged Lions and associated building A and bridge A.

On the basis of these measurements and observations, the following conclusions can be made. The plan of that portion of the street marked 'section A' **(Fig. 7)** is the westernmost zone measured by the survey. Here the Petra *decumanus maximus* terminated at a main gate




*7. Plan of western end of decumanus maximus. Note location of Building A. Surveyed by S.E. Sidebotham, R.I. Thomas and M.A. Sidebotham. Drawn by R.I. Thomas, edited and redrawn by J.-L. Rivard.*

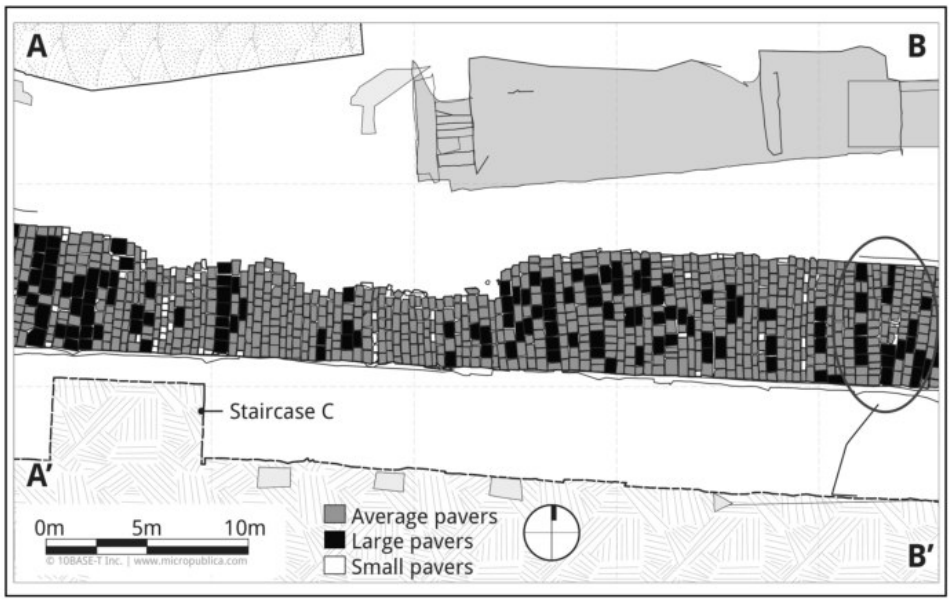
comprising three arches; west of the gate the area widened into a broad plaza **(Fig. 30)** with a *temenos* area beyond (cf. MacDonald 1986: 33) in which was located Qasr al-Bint, a temple likely dedicated to the principal Nabataean deity Dushara (Healey 2001: 41-42; Graf 2006: 449). This religious structure seems to date, in its earliest phase, to sometime in the first century BC with subsequent renovations / additions (Graf 2006: 446-447; Renel *et al*. 2012: 39, 51).

Several areas of the *decumanus maximus*, especially towards its western end ('section A'), have sunk substantially **(Fig. 10)** suggesting the presence of subterranean channels or canals. These likely carried water from the higher ground south of the street to debouche into the *wadi* to the north (cf. Graf *et al*. 2005: 420, 421 and fig. 5). The presence of oleander bushes along the street (especially on the southern side) may be another indicator of the presence of subterranean water channels and the water that still accumulates in them during occasional rains.

At the very eastern edge of "area A - B" / western edge of "area B - C", three rows of blocks on the southern side of the street become five to six rows on the northern side of the street just opposite (circled on **Figs. 9 and 11 - 12**). This clever sleight of hand by the builders suggests an alteration of the street's original orientation in a more south-westerly direction. This may indicate that the original intention of the builders was for the orientation of the *decumanus maximus* to lie in a more north-westerly direction than its current manifestation. This modification also directed the road more towards the steps of the 'Great Temple', likely constructed before the *decumanus maximus*, but with possible modifications to staircases C and D after the appearance of the *decumanus maximus*. This change of direction of the *decumanus maximus* seems to have taken place immediately before the construction of the gate in its current manifestation or when those altering the orientation of the street became aware that a gate would soon be added. This would have taken place at some point in the early Roman period (along with the large pavers). There are concentrations of large stones within this street segment, probably owing to a rebuild / repair (see 'section A' above). This apparent realignment of the *decumanus maximus* by the builders, if it was intended to lead to Qasr al-Bint, suggests at that point in time a more holistic approach to city planning than had been the case previously. Clearly, later and larger paving stones were



*8. Western end of decumanus maximus with Building A in middle foreground (looking northeast). Photo by S.E. Sidebotham.*




*9. Plan of section A-B of decumanus maximus. Surveyed by S.E. Sidebotham, R.I. Thomas and M.A. Sidebotham. Drawn by R.I. Thomas, edited and redrawn by J.-L. Rivard.*

then placed to form a plaza west of the gate and between the gateand Qasral-Bint **(Fig. 30).**

That part of the plan depicting 'section C - D' **(Fig. 13)** is a fairly even and intact stretch of road with pavers consisting of a mix of sizes, but no concentrations of specific sizes within the area; the majority of pavers are average in their dimensions. This area may comprise part of the earliest extant section of the *decumanus maximus*. If our interpretation is correct, then the street sections east and west (i.e. sections B - C and D - E respectively) of 'section C - D' were built later. Of note towards the eastern end of 'section C - D' is a paving stone measuring 75.5 cm x 43.0 cm marked with a cross or 'X' measuring 15.5 cm x 15.5 cm carved in the center of the slab **(Fig. 14)**. The relatively unworn condition taken together with exactly the same lengths of each bar of the cross may indicate a relatively modern date for its carving. While the precise function of this cross remains uncertain, it may have served as either an ancient or modern survey point. In the immediate area of this cross the paving stones are generally larger. There



*10. Collapsed southern portion of decumanus maximus towards its western end (looking south): scale=60 cm. Photo by S.E. Sidebotham.*

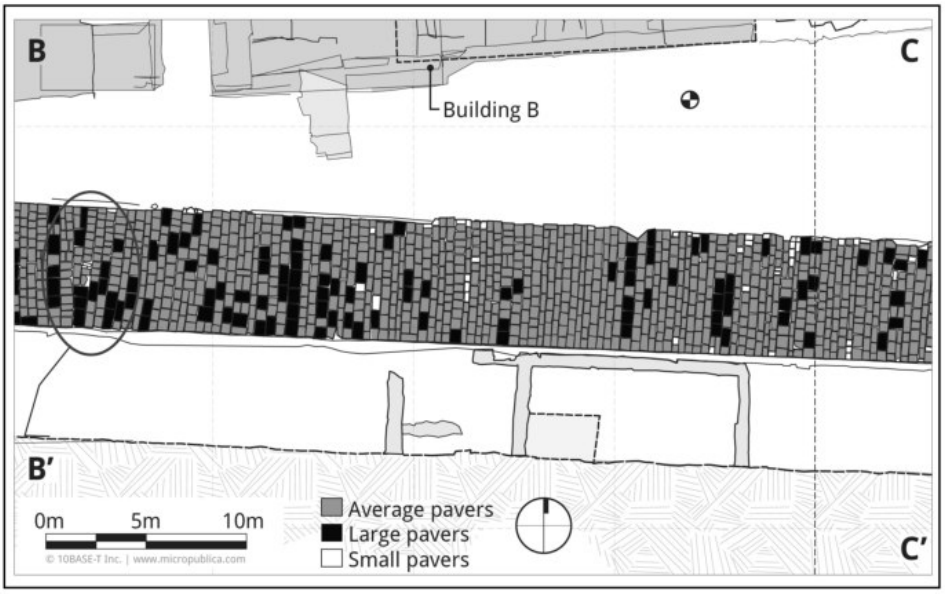
are repairs, odd-shaped smaller 'filler' stones, including what appears to be a recycled stone door pivot, and a number of other stones, likely reworked and / or recycled **(Fig. 15)**, south of the slab containing the cross. Here we posit that a large staircase (B) **(Fig. 13)** originally debouched and intersected with the *decumanus maximus*, the southern edge of which was later blocked by red sandstone curbstones at this location.

The plan of 'section D - E' **(Fig. 16)** shows a straight length of the street, but one that clearly sustained damage and partial destruction from *seyul* overflowing from the *wadi* situated to the north. The overburden resulting from this flooding was described above. The plan of 'section E' **(Fig. 17)** the easternmost end of the extant *decumanus maximus* - depicts a straight portion of road, but like 'section D - E' one that has been damaged and partially destroyed by one or more *seyul*, and perhaps by some human activities.

From the extant evidence, which should be tested by additional excavations along the southern side of the *decumanus maximus* more towards its eastern end (east of Graf's excavations), we can make the following tentative observations. It appears that there was at least one and perhaps more Nabataean streets, of which little survives (Kirkbride 1960: 121; Parr 1970: 369; Fiema 1998: 397, 416; Graf *et al*. 2005: 419, 427-428, 432; Hoffmann 2013: 102-3). This was followed by construction of the Roman thoroughfare which one sees today. Numismatic evidence from excavations conducted late in the twentieth century suggested a *terminus post quem* for this Roman street of the late first or early second century AD, likely during the reign of Trajan (98-117) (summarized by Fiema 1998: 397); its construction sometime after the Roman annexation of the Kingdom of Nabataea as *Provincia Arabia* in 106 AD is most likely.

**The Decumanus Maximus and Adjacent Structures**

Parr's excavations (Parr 1970) and Graf's in 2004 (Graf *et al*. 2005), 2005 (Graf *et al*. 2007) and 2007 (Graf 2013a, 2013b; Graf *et al*. forthcoming) placed trenches on both the eastern and western sides of the gate. Those west of the gate and on the southern side of the *decumanus maximus* towards its western end (east of the gate) and in its central portion provided evidence of earlier occupation. Parr suggested that remains he excavated farther west along the street were Hellenistic / Nabataean "dwellings" (Kanellopoulos 2001: 11, citing Parr 1970). Coins and pottery pointed to activity in this area (prior to the extant street) by at least as early as the third and second centuries BC and perhaps earlier (beneath Qasr al-Bint: possibly the fourth century BC: Renel *et al*. 2012: 45, 49 [figure 8], 50, 51; Renel and Mouton 2013: 72-5; Hoffmann 2013: 102-3; Mouton and Schmid 2013; elsewhere in the city center Graf *et al*. 2005: 436; Graf 2013a: 38, 40-46; Graf 2013b: 29-34). Whether this early occupation was domestic, religious or commercial / industrial could not, however, be conclusively determined. Occupation into at least the fourth century AD is evident from Graf's excavations (Graf *et al*. 2005: 426; in general see Fiema 2012: 31-32). Other testimony for later activity in this area of the city are remnants of tower-like features flanking the northern and southern sides of the gate / arch. One or both of these may belong to a late Roman / Byzantine phase of fortification.




*11. Plan of section B-C of decumanus maximus. Surveyed by S.E. Sidebotham, R.I. Thomas and M.A. Sidebotham. Drawn by R.I. Thomas, edited and redrawn by J.-L. Rivard.*

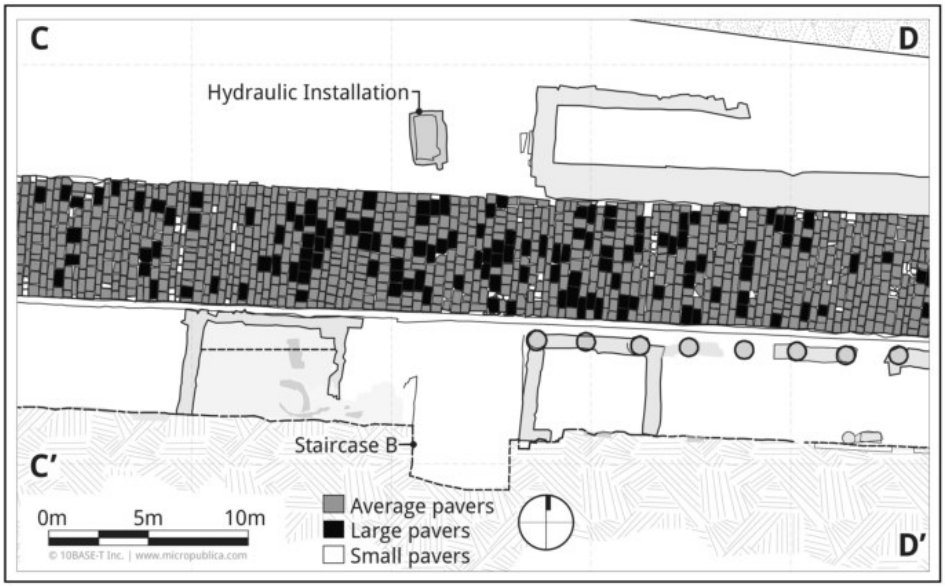


*12. Section B-C of decumanus maximus looking south. Photo by S.E. Sidebotham.*

Thus, the latest activity along and adjacent to the *decumanus maximus* in antiquity appears to have been commercial or domestic as well as military or, perhaps, all three.

Rooms, blocked doorways and window-like features in the main 'portico' wall (cf. Bedal 2001: 24, fig. 1; Kanellopoulos 2001: 10, fig. 1) **(Figs. 18 and 19)** that runs roughly parallel to and south of the extant street suggest that earlier rooms and structures lay inside and behind that wall, making use of it as the front, northernmost facade of those establishments. Kirkbride believed that at least some of these blocked features dated to the time of the construction of the *decumanus maximus* (her "*cardo*"; Kirkbride 1960: 118). Graf's excavations and the appearance of column drums and bases recycled into clearly later rooms (likely shops or taverns: cf. Fiema 1998: 396) on the southern side of the street towards the eastern end (e.g. **Fig. 20**) suggest that these rooms, approximately 30 in total (Kanellopoulos 2001: 11), had been blocked sometime in late antiquity, perhaps earlier, and that rooms (later shops?) were then built farther north extending onto what had originally been the sidewalk adjacent to the southern side of the *decumanus maximus*. This extension of rooms from the northern face of the retaining wall onto what had been the sidewalk south of the street's curbing stones and colonnade effectively covered the sidewalk (cf. Kanellopoulos 2001) and eliminated the colonnade if, indeed, there had ever been one along these portions of the street.

At least 11 rooms (possibly shops) can be identified along the southern side of the *decumanus maximus*. In their present manifestation most, if not all, are likely late Roman / Byzantine in origin, though limited excavations by Graf in 2007 indicate activity in some areas beneath these late Roman rooms that dates to Hellenistic times (Graf *et al*. forthcoming; Graf 2013a: 38, 40-46, 2013b: 29-34). Walls of these late Roman / Byzantine structures located up and down the street clearly make use of much recycled architectural material including column drums, bases and ashlars (cf. **Fig. 20**). The survey recorded 26 doors piercing the northernmost (and likely latest) retaining



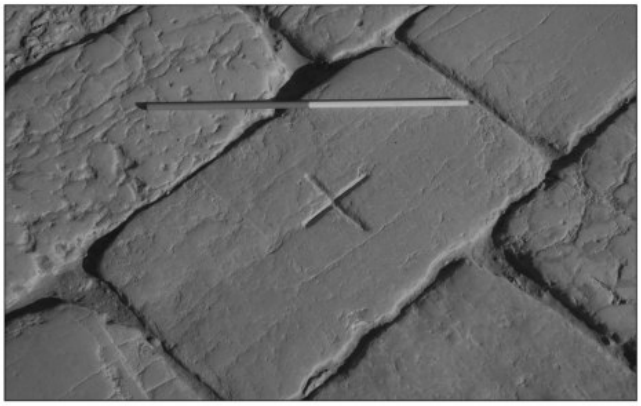

*13. Plan of section C-D of decumanus maximus. Surveyed by S.E. Sidebotham, R.I. Thomas and M.A. Sidebotham. Drawn by R.I. Thomas, edited and redrawn by J.-L. Rivard.*

wall, which runs approximately parallel to and south of the *decumanus maximus*. A number of these portals had been blocked (e.g. **Fig. 18**) or partially blocked in some later phase of activity along the street. The survey could not determine precisely when these blockages were put in place, though Kirkbride (1960: 118) believed them to be contemporary with the construction of the street. In addition, there are four window- / niche- / alcove-like features (e.g. **Fig. 19**) in the central southern portion of that retaining wall in the area of Graf's trenches 1, 3 and 8 - 9. These may have adjoined storage rooms behind and to the south of the rooms now exposed adjacent to the southern side of the *decumanus maximus* (e.g. **Fig. 21**).

There is little evidence for the use of permanent roofing materials (e.g. terracotta roof tiles. etc.) in the structures abutting the street on its southern side in late antiquity. Instead, in some instances at least, we posit the appearance and use of awnings made of textile, woven wool or goat hair, or animal hide / leather above and in front of shops or other structures located in this area, especially in its central and western portions. These awnings might have been held in place by poles with their ends slotted into movable stone bases to anchor them. The identification of one approximately square / rectilinear shaped stone with a round hole in the center and two circular disc shaped stones, one with a round hole and the other with a rectilinear shaped hole (pierced all the way through each disc) found in the central and western areas of the street may be the only extant evidence for the existence of these putative late antique awnings **(Fig. 22).** Graf recorded similar holed stones in his 2004 excavations (Graf *et al*. 2005: 426, 427, fig. 17)[7]. The documentation of at least one other of these anchors for awnings in a likely Nabataean context (Graf *et al*. 2005: 425, fig. 15 and 426) may indicate that awnings were used in earlier times as well, but perhaps on a more limited scale. These presumptive awning pole anchors may have been recycled from architectural elements / column drums. The earthquake of 19 May 363 AD damaged or destroyed some, if not all, of the structures adjacent to the street (Fiema 1998: 398)[8]. The survey could not determine, however, whether the supposed awnings would

7. We are not certain, but it is possible that the putative awning anchor stones documented by Graf 2005: 426, 427 (fig. 17) may have been removed from his trench and might be the same ones we photographed from the surface of the site in the general vicinity of his earlier trench.

8. See Thomas *et al*. 2007, 66 on the frequency and magnitude of earthquakes, including that of AD 363 and less well-known events from the historical sources that are, nevertheless, attested archaeologically.



*14. Cross (possible ancient surveyor's mark?) carved on a paver on the decumanus maximus in "Section C-D." Scale = 60 cm. Photo by S.E. Sidebotham.*



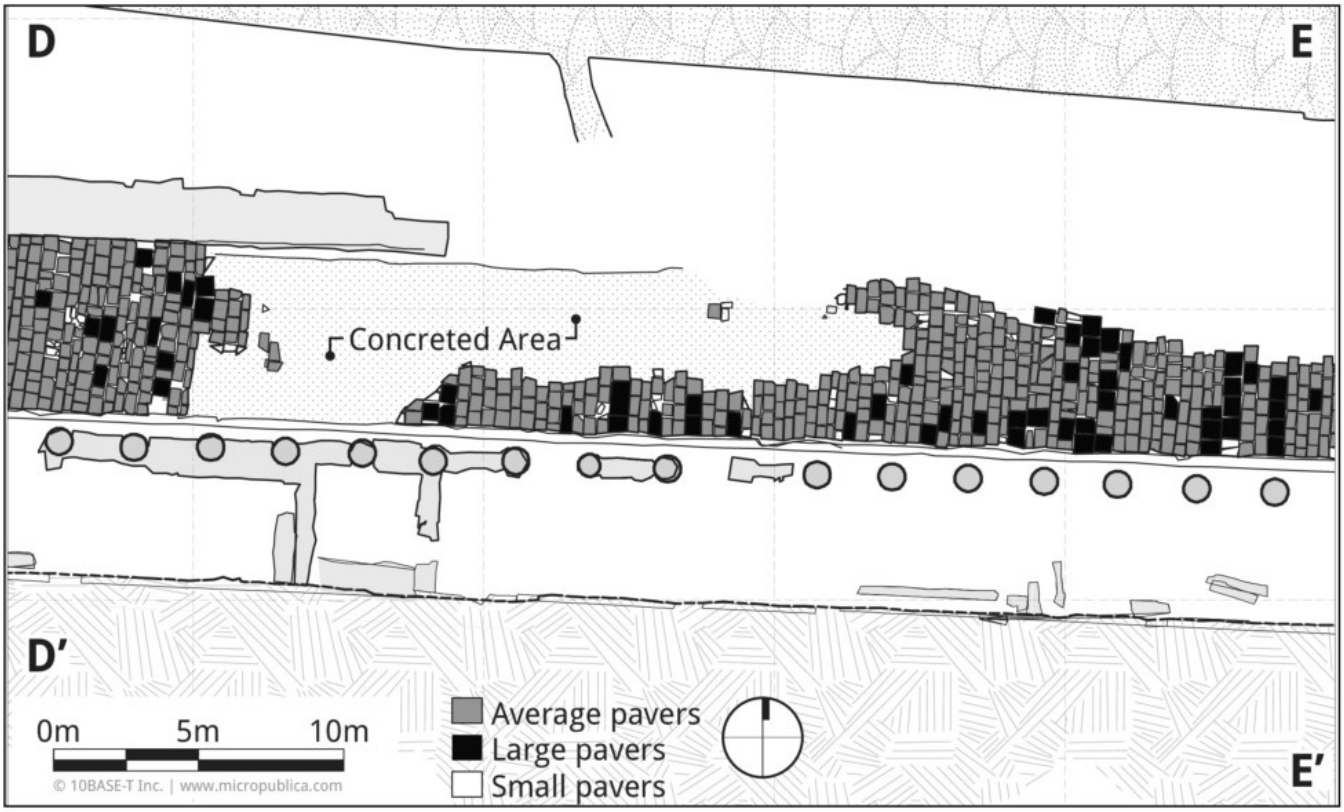
*15. Recycled (pivot stone and other stones in a secondary context) and filler cobble-sized and smaller stones in the middle of the decumanus maximus adjacent to lower (northern) end of missing Staircase B (looking south): scale=60 cm. Photo by S.E. Sidebotham.*

have been deployed after the earthquake in lieu of any substantive rebuilding of the damaged / destroyed structures or had been used prior to that event. Given the sketchy evidence from Graf's excavations (noted above) it appears likely that awnings were used on an *ad hoc* basis in adjacent structures throughout the history of the street.

The sandstone curbing appears not to have been contemporary with the original paved street, but seems to have been added at some later date **(Figs. 23 and 24)**. Towards the western end of the *decumanus maximus*, those curbstones do not sit atop the extant northern edge of street paving, but are offset and form, instead, the southern edge of the larger slabs associated with the gate itself **(Fig. 24)**. It was with these larger pavers that the tripartite gate was clearly contemporary and it was in this period when the gate and larger pavers were installed that the curbing stones appear to have been placed. Thus, the extant red sandstone curbstones seem to have been added at about the same time that the gate and the large slabs associated with it were built, *viz*. sometime after the initial construction of the *decumanus maximus*. The reddish sandstone curbstones may have been quarried specifically for the use in which we now find them. However, they may have been recycled from some earlier structure(s) (perhaps portions of one or more staircases or other edifices) from elsewhere on site. Sample measurements of randomly selected steps in staircase A **(Figs. 1 and 25)**[9], were compared with those of curbstones measured along different sections of the *decumanus maximus*[10]. While some of the curbing stones might have been recycled from now missing (and presumably robbed) staircase B (*ca* 5.50 m wide) **(Figs. 1 and 13)**, which originally led to the upper level south of and above the street, comparison of stones from extant staircase A (assuming that stones comprising staircase B had similar dimensions as staircase A) with randomly selected curbstones in the street does not invariably support this hypothesis. Lengths and thicknesses of both sets of stones (steps in staircase A and curbstones) suggest that an approximately similar set of dimensions was applied to the quarrying of both, but the thicknesses of the curbstones

9. Measurements taken at the extreme eastern end of the street on its southern side provided the following dimensions: (1) 1.25 m x 0.39 m x 0.12 m; (2) 1.10 - 1.11 m x 0.39 - 0.40 m x 0.15 - 0.16 m; (3) 0.99 m x 0.41 m x 0.13 m; (4) 0.97 m x 0.40 - 0.41 m x 0.09 - 0.10 m; (5) 0.94 m x 0.37 m x 0.14 m; (6) 0.93 m x 0.37 - 0.38 m x 0.14 m.

10. Measurements taken of the curbstones had the following dimensions. Southern side of street near the arch: (1) 0.79 m x 0.46 m x 0.18 m; (2) 0.78 m x 0.45 m x 0.20 m; (3) 0.67 m x 0.35 m x 0.14 m. Northern side of street mid section: (1) 0.80 m x 0.43 - 0.44 m x 0.20 m; (2) 0.69 m x 0.40 m x 0.20 m. Southern side of street slightly west of mid-section: (1) 0.90 m x 0.45 m x 0.18 m; (2) 0.75 m x 0.36 - 37 m x 0.23 - 0.24 m; (3) 0.67 m x 0.45 m x 0.19 - 0.20 m; (4) 0.64 m x 0.35 m x 0.19 m.




*16. Plan of section D-E of decumanus maximus. Surveyed by S.E. Sidebotham, R.I. Thomas and M.A. Sidebotham. Drawn by R.I. Thomas, edited and redrawn by J.-L. Rivard.*




*17. Plan of section E of decumanus maximus. Surveyed by S.E. Sidebotham, R.I. Thomas and M.A. Sidebotham. Drawn by R.I. Thomas, edited and redrawn by J.-L. Rivard.*



*18. Blocked doorway (survey no. 17) on the southern side of decumanus maximus: scale=60 cm. Photo by S.E. Sidebotham.*



*19. Blocked window/niche/alcove-like feature (survey no. 3) on the southern side of decumanus maximus (looking south): scale=60 cm. Photo by S.E. Sidebotham.*

are generally greater than those of the steps in staircase A, which would preclude it as their original provenance as would the fact that no stones are missing from staircase A in its current manifestation. Of course, since the steps of staircase B are missing, we have no way of ascertaining whether the stones comprising it might have been generally thicker than those in staircase A. If so, then it is possible that at least some of the curbstones may have come from the dismantling of staircase B. In the final analysis, however, the question of the recycling of at least some of the extant curbstones of the street from steps now missing from staircase B remains unanswered.

Thus, it appears, at its western end at least, that the paved *decumanus maximus* predates, though by how much is unclear, the gate, its associated larger paving stones and the curbstones lining both sides of the *decumanus maximus* itself. The similarity in size, appearance and materials of the paving stones around the gate and those lying between the gate and Qasr al-Bint suggests that both were laid down at the same time, i.e. after construction of the decumanus. Qasr al-Bint itself, however, seems aligned with the *decumanus maximus*, though the former certainly predates the street. It seems that the paved plaza, the gate and those pavers immediately abutting the gate were built after Qasr al-Bint and the *decumanus maximus*. The relative chronology of Qasr al-Bint appears to be:

Phase I: Simple installations preceding construction of Qasr al-Bint (4$^{th}$ - 3$^{rd}$ centuries BC)

Phase II: Architecture predating Qasr al-Bint (3$^{rd}$ - 1$^{st}$ centuries BC)

Phase III: Qasr al-Bint (mid 1$^{st}$ century BC - levelled for cultic complex currently visible [see Renel and Mouton 2013: 72-75])

Thus, the general relative chronology of this area of Petra appears to be: (1) original construction of Qasr al-Bint and its related *temenos*; (2) construction of the decumanus; (3) construction of the gate and the pavers of the plaza between it and Qasr al-Bint. As noted above, staircases C and D leading to the 'Great Temple' may also have been modified at this time (i.e. after construction of the *decumanus maximus*), though their current modern reconstruction precludes any definitive conclusions. Complicating more precise dating



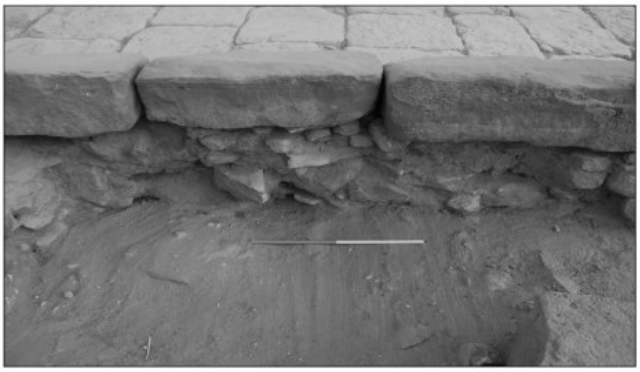
*20. Late Roman/Byzantine shop wall made of recycled architectural elements on the southern side of decumanus maximus: scale=60 cm. Photo by S.E. Sidebotham.*



*22. Worked stone discs possibly used as moveable anchors for poles to support awnings: scale=50 cm.*



*21. Possible storage room connected by door (survey no. 26) to the southern side of the decumanus maximus: scale=120 cm. Photo by S.E. Sidebotham.*



*23. Northern side of decumanus maximus: street foundation, paving stones and curbing (looking south). Scale = 60 cm. Photo by S.E. Sidebotham.*

are, most certainly, various subsequent repairs and reconstructions of these major features that may have taken place over an undetermined period of time during the ancient occupation of this portion of the city.

If the *decumanus maximus* itself were to be extended along its current alignment towards the west, it would terminate approximately in the center of the main eastern wall of Qasr al-Bint. Yet, the extant three-arched *temenos* gate does not align with the street's orientation / extension to Qasr al-Bint. This suggests that the gate and the street lying to the east (the *decumanus maximus*) were not configured as a single project. Indeed, the paving beneath the gate on its western side and north of the street on its eastern side is not only different in appearance - as noted above with stones generally larger than the pavers of the decumanus - but was clearly laid down at a different time from the street pavers (and as is also evident from the location of curbstones at the northern side of the street at its extreme western end [visible in **Fig. 24**]). Careful cleaning and examination of all these paving stones by our survey and the results of Graf's excavations conducted adjacent to the gate in 2004 suggest that the time differential between the laying down of the pavers in the area west of the gate, the construction of the gate itself and the creation of the paved *decumanus maximus* was minimal. Undoubtedly different construction crews were responsible for each of these features and their completion dates may have varied by as little as a few weeks, a few months or by as much as several years, perhaps decades. Clearly, however, in their latest manifestation all these features were designed to be seen as a single, though not seamlessly executed, organic feature



*24. Realigned curbstones at western end of decumanus maximus adjacent to gate/arch (looking west): scale=60 cm. Photo by S.E. Sidebotham.*

of Petra's city center by sometime in the first half of the second century AD. In addition, the column base moldings from Graf's excavations west of the gate vary in appearance from the other three types found east of the gate. These variations suggest that different architects and masons worked in the areas west and east of the gate, which may provide further evidence for different phases / dates of work in this part of Petra. Alternatively, these differences in the styles of column base moldings may only reflect the activities of different work crews who may well have labored simultaneously. Finally, that the columns currently visible immediately east of the gate seem to have been placed there in about 1960 and from locations unknown may not allow us, of course, to draw any conclusions about relative dating based on the shape of their moldings alone when compared to those west of the gate.

Some of the column elements found along the colonnaded street are variations of the Attic column base (with upper and lower torus, scotia between and fillets) **(Fig. 26).** The Attic type became the most popular column base used by Roman architects (Anderson and Spiers 1907: 195-205, 322; Adam 1990: 84, 92, 98)[11]. This base form appears in a range of contexts, from the early colonnaded street of Antioch dated to *ca* 170 BC (Anderson and Spiers 1907: 195-205) and Hadrian's retreat in Tivoli (second century AD). The Attic base appears within Petra as part of a mixed order; it exists in both freestanding columns and also in engaged columns / pilasters appearing on the carved façades of its famous rock-cut tombs, such as ed-Deir (Wilson Jones 2000: 111-112). It is likely, however, that many of the freestanding bases at Petra represent architectural phases that post-date the Roman annexation of 106 AD (Ward-Perkins 1981: 328-9; Rababeh 2005: 126-134).

Though Kanellopoulos (2001: 11) asserts that there were originally 72 columns, 36 along each side of the street, the Delaware survey found no such evidence. In late antiquity, by which time shops or other facilities encroached onto areas of what had previously been the walkway south of and parallel to the street, the columns, if they had existed here initially, had been removed. There is no extant evidence that the entire length of the street examined by the survey had a colonnade in late antiquity. Possibly only its eastern end possessed columns by that time; the ones currently visible on the southern side of the *decumanus maximus* at its eastern end were re-erected in 1960 (Fiema 1998: 396). Columns re-erected in modern times (also in or about 1960) at the western end of the street near the *temenos*

11. This type of base was popular beginning with its development as part of the Ionic order. Found in architecture from the late fifth century BC, such as that on the front (eastern) porch of the Erechtheion on the Acropolis in Athens, the Attic column base continued to be used in the Corinthian order from the late second century BC and the Roman Composite order from the first century AD.



*25. Staircase A at eastern end and on southern side of decumanus maximus (looking east). Photo by S.E. Sidebotham.*

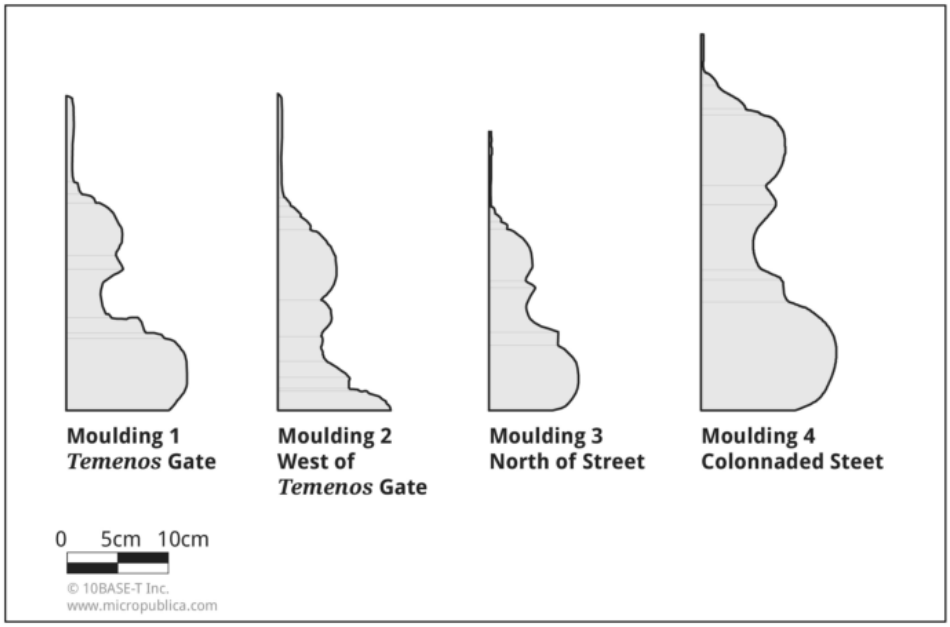
gate may or may not have originally been part of the street colonnade. They may have been recycled here from other locations remote from the street itself, a hypothesis with which Kanellopoulos (2001: 9, 11) seems to agree.

At least three bridges of varying dimensions spanned Wādī Musa north of and roughly parallel to the *decumanus maximus* itself towards the central part and western end of the street **(Fig. 1)**. There may have been one or more bridges farther east; all would have facilitated communication between areas north of the *wadi* (e.g. the Temple of the Winged Lions, the later church etc.) with the southern side, i.e. where the *decumanus maximus* is now and points uphill and to the south including the 'Great Temple' (Kanellopoulos and Akasheh 2001: 6), the pool / garden (Bedal 2001) etc. The Delaware survey plotted the general outlines of three of these bridges, but could not determine with certainty when they were erected in relation to the decumanus. It is evident, however, that bridge A was associated with and probably erected at the same time as the Temple of the Winged Lions, *viz*. sometime during the last quarter of the first century BC up to 27 AD with continued use until the earthquake of 363 AD (Hammond 1996: 7). The director of the Temple of the Winged Lions Cultural Resources Management Initiative, Dr . C. A. Tuttle, reports that his team is currently "re-examining the evidence and assessing the original proposed chronological phasing" of this key edifice (C. A. Tuttle pers. comm.). In addition to the remnants of the bridges, the project also plotted a hydraulic feature north of the street **(Figs. 27 and 28).**

**Conclusions**

It is clear that the extant manifestation of the *decumanus maximus* at Petra is a composite of several different phases of use and repair. While its general date of 'Roman' must be accepted, it is uncertain how many earlier Nabataean versions of the street may have existed, what these earlier versions looked like or how orientations of the *decumanus maximus* may have changed with the addition of new buildings along its periphery (cf. Seigne 1999). The *decumanus maximus* may represent, along with the reconstruction of a variety of other structures in Petra at that time, a significant change in the use of space in the center of Petra that saw the reorganization of the format and use of funeral complexes, tribal gathering places, and sanctuaries and houses following the Roman annexation in AD 106 (Schmid 2103: 265-266). The western end of the *decumanus maximus* has a number of construction / use phases. The arch / gate in its current manifestation is not aligned with the extant pavers of the decumanus, but sits slightly off-center and askew to the north-west **(Figs. 1 and 7).** This indicates that the present arch / gate was not designed in tandem with the extant decumanus, but postdates it, a conclusion that Kirkbride (1960: 120-121) supports. This does not preclude the existence of an earlier arch / gate in this area, which may well have been modified by and / or incorporated into this later edifice (also Graf *et al*. 2005: 427, 432). The extant arch / gate postdates the larger pavers **(Figs. 6 - 7, 24)** (cf. Graf *et al*. 2005: 431-432), though both these larger pavers and the arch likely belong to the same construction phase. These larger pavers continue west into the area between the arch / gate and Qasr al-Bint and form the open plaza **(Fig. 30)**.

Street pavers of substantially smaller sizes immediately east of the gate's central opening




*26. Sections of Attic style column bases from the gate area. Drawn by R.I. Thomas, edited and redrawn by J.-L. Rivard.*

and the various recycled stones (including the pivot block) opposite staircase B **(Fig. 15)** point to repairs / alterations. The likely change in orientation of the *decumanus maximus* seen towards its western end where curbstones have been moved to align with larger and later pavers associated with the arch / gate on its eastern face **(Fig. 24)** and, possibly, the variant designs of some of the column bases found near the gate all point to different orientations of the *decumanus maximus*. The angles of the entrances of buildings A and B and of the wall that lies between these two edifices lying on the northern side of the *decumanus maximus* towards its western end **(Figs. 1 and 7 - 8)** likely point to different orientations of thoroughfares that predate the extant paved street. On the western end of the plan representing 'section B - C' the road clearly changed direction from its original projected course **(Figs. 9 and 11 - 12)**, and headed more towards the south-west, *viz*. more aligned with Qasr al-Bint which lies west of the gate. These structures and other architectural and exposed archaeological evidence should, along with additional excavations, provide some future project with the information necessary to phase more definitively activities under and along the *decumanus maximus* and determine the number, appearance and orientation of any streets in the area predating that thoroughfare.

Three extant staircases, and the robbed remains of a fourth, debouche onto the *decumanus maximus* from its southern side **(Fig. 1).** Two (reconstructed, at least in part, in modern times) descend from the 'Great Temple' (C and D) and one (A) (just east of the easternmost extant end of the *decumanus maximus*) from the Trajan-era 'market'. There is a fourth now robbed staircase (B). Extant walls perpendicular to and piercing the main east - west retaining wall of the high ground behind the street suggest that this staircase B connected the main street with the 'pool complex / lower market' or 'middle market'. Alternatively, staircase B may have led to both. In any case, curbstones adjacent to the street and the lower portions of this 'staircase' are clearly different from other curbstones in the vicinity, in that they have more roughly cut faces. The street pavers in this location are also recycled (pivot stones / other stones in a secondary context), with smaller filler cobble-sized and smaller stones **(Fig. 15)**. In the middle of the street, where these 'repairs' appear and opposite where staircase B would have met the *decumanus maximus*, is the cross carved into a paver described above (in 'section C - D') **(Fig. 14).** It is in remarkable condition, placed as it is at the crown of the thoroughfare. The survey



*27. Hydraulic feature north of decumanus maximus (looking east). Scale = 60 cm. Photo by S.E. Sidebotham.*



*28. Hydraulic structure north of decumanus maximus (looking northwest). Scale = 60 cm. Photo by S.E. Sidebotham.*



*29. View of street east of the decumanus maximus (looking west). See Figure 1 (inset at top left). Photo by S.E. Sidebotham.*

could not determine whether this cross was modern or ancient; if the latter, it could possibly represent an ancient surveyor's point.

Farther east, opposite the extant colonnade, the entire curb structure and northern part of the street are missing, undoubtedly washed away by



*30. Area between gate and Qasr al-Bint looking west. Photo by S.E. Sidebotham.*

periodic *seyul* that have overflowed the banks of the *wadi* over time. Further evidence of this water- and sediment-borne damage may be apparent on the surviving curbstones bordering the southern side of the street on its eastern end. Here, significant segments of the softer red sandstone curbstones have been damaged, perhaps by water washing up against and past them **(Fig. 31)**. Kirkbride believed that the eastern end of the *decumanus maximus* had been built first and the western end later, arguing that the sizes of the paving stones suggest a reduction in funds available for construction (Kirkbride 1960: 120-121). While we would, in general, agree with her chronological conclusions, her belief that differences in sizes of pavers reflect funding issues is less convincing.

There is little evidence that the entire street was colonnaded at least in late antiquity. All the extant evidence suggests that perhaps only the eastern end had a colonnade up to the juncture of putative staircase B joining the 'lower / middle markets' to the street near the cross, a presumed ancient or modern surveyor's point ('section C - D') **(Figs. 13 and 14).** This may be additional evidence for some redesign / reorientation of the street at its central and western end and its varying appearances from approximately this point along the street to the gate / arch at the western end.

Thus, we posit the following general chronology for those areas near the *decumanus*



*31. Damaged curbstones on southern side of decumanus maximus at its eastern end (looking south). Scale = 60 cm. Photo by S.E. Sidebotham.*

*maximus* and for that street itself for which we have some evidence:

*Phase I: Pre-paved decumanus maximus period*

Sub-phase Ia

4th - 2nd century BC activity (domestic / commercial / industrial?) adjacent to the street at least in its central and western portions on its southern side; likely unpaved street/s in this area oriented approximately east - west; earliest pre-Qasr al-Bint construction activities.

Sub-phase Ib

1st century BC / 1st century AD activities: likely an unpaved street; Temple of the Winged Lions and associated bridge A and building A; the 'Great Temple'; the extant southern portico wall and some rooms piercing its façade; possibly staircases A - D.

Sub-phase Ic

Building B and wall between buildings A (but not building A itself) and B at the western end - central portion / northern side of the extant *decumanus maximus* and bridges B - C. Not certain if sub-phase Ic might predate sub-phase Ib.

*Phase II: Extant decumanus maximus*

Sub-phase IIa

Construction of the extant *decumanus maximus* early in the 2nd century AD.

Sub-phase IIb

Addition of red sandstone curbstones; remodeling of staircases A - D to accommodate the paved street; construction of the gate at the western end of the *decumanus maximus* and associated large pavers around the gate, between the gate and Qasr al-Bint and below staircases C - D leading to the 'Great Temple'. Some of this activity may have been due to the putative earthquake of the early 2nd century AD.

*Phase III*

Middle - late Roman period (3rd - 4th centuries AD and later, including earthquake of 363 AD) removal of some of the columns of the *decumanus maximus* at its central and western ends; creation of shops and other installations encroaching onto the southern side of the street (i.e. north of the portico wall and south of the street's southernmost curbstones); more extensive use of putative awnings; construction of later 'Byzantine' towers adjacent to extant gate at western end of *decumanus maximus*.

At this time we cannot place putative bridge D or the hydraulic feature north of the *decumanus maximus* into the chronology presented here.

*Plans for future work and thanks*

Funding and permit allowing, the University of Delaware would like to extend its survey in the future to include the following: detailed drawing of a plan of the area between the gate / arch at the western end of the *decumanus maximus* and Qasr al-Bint, and detailed drawing of a plan of the street situated east of the *decumanus maximus*.

We would like to thank the Department of Antiquities of the Hashemite Kingdom of Jordan and its director general, the late Dr Fawwaz al-Khraysheh, for kindly granting us a permit to conduct our work in 2008. A special thanks must go to our inspector Mr Ahmad Juma' al-Shami. Ahmad was instrumental in so many ways in smoothing the way for our project's ultimate success. Prof. David F. Graf read a version of this manuscript and provided very useful comments and bibliography. Dr Chris A. Tuttle also provided bibliography and his latest views on the dates for the Temple of the Winged Lions

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# PRELIMINARY REPORT ON THE TEMPLE OF THE WINGED LIONS CULTURAL RESOURCE MANAGEMENT INITIATIVE (2009 - 2013)

*Christopher A. Tuttle, Glenn J. Corbett and M. Elena Ronza*

The Temple of the Winged Lions (TWL) is a majestic Nabataean temple built on a promontory above the north bank of Wadi Musa, overlooking the city center of Petra **(Fig. 1)**. Although the presence of a monumental structure in this spot was recognized as early as the end of the 19th century, it was not until the 1970s that the nature of the building was identified. The temple and several areas abutting it were the focus of a long-term excavation project directed by the late Philip C. Hammond (1924 - 2008) during the years 1974 to 2005, *viz*. the American Expedition to Petra (AEP) (Hammond 1996). During the early years of the AEP project, the temple's cella was cleared, leading to the discovery of the unique 'winged lions' capitals (from columns around the central cultic podium) that gave the building the moniker still used today. Other data recovered from the excavations led to the identification of the temple as likely having been dedicated to the primary Nabataean goddess al-Lat / al-'Uzza, and also possibly as a place where the imported Hellenistic Isis cult was celebrated.

Owing to a variety of factors, including



*1. Aerial view of the Temple of the Winged Lions, Petra, Jordan. (Photo C. A. Tuttle).*

limited funding, the TWL was unfortunately never thoroughly conserved or restored during the life of the AEP project. A few conservation interventions were undertaken by the AEP, but these were generally limited to essential stabilization needs. The only significant conservation / restoration effort was undertaken in 1988 by the Department of Antiquities and involved the west wall of the temple cella which was at risk of completely collapsing. The rest of the building and its precinct, however, have remained without any conservation interventions for nearly 40 years. As a result, the structural elements have suffered severe deterioration from wind, water and use-related erosion, solar radiation exposure, rising damp and salt efflorescence, geological action and vandalism. By 2009, the overall state of the TWL had become dire and it was clear that without a major and concerted initiative to address the many and complex issues plaguing the precinct, the long-term survival of the temple was not assured.

In order to save this important part of Petra's story, the Temple of the Winged Lions Cultural Resource Management (TWLCRM) initiative was launched in 2009 as a co-operative project involving the American Center of Oriental Research (ACOR), the Department of Antiquities of Jordan (DoA) and the Petra Archaeological Park (PAP) (for a thorough introduction to the project and its goals, see Tuttle 2013a). The initiative was developed with the intent of accomplishing a number of important goals: (1) to stabilize, conserve and protect the monumental temple and its precinct, (2) to rehabilitate the surrounding landscape that had been adversely affected by the original excavation project, (3) to develop and implement a comprehensive presentation strategy for the temple and its environs, (4) to (re-)publish all of the data derived from both the original excavation and the new project, (5) to help develop guidelines and manuals for different aspects of cultural resource management (CRM) work in the PAP and (6) to help build local capacity for undertaking CRM efforts as a means of increasing the likelihood that current and future work will become sustainable.

The need to achieve such diverse goals has required the TWLCRM to evolve, since its inception, into an innovative project for Petra - one which employs a holistic, grassroots model that encompasses a number of sub-components, *viz*. assessment, documentation, landscape rehabilitation, conservation, restoration, presentation, archives and publication. The key unifying factor that integrates these sub-components is an emphasis on a social engagement approach (see below) which directly involves members of Petra's local communities in nearly all aspects of the work, including photography, drawing, artifact processing, data classification and database entry. This is intended to foster the development of different types of capacity within these communities and provide an accessible venue for their unique, innate contributions to such projects. The capacity-building includes training in a variety of job skills, developing consciousness about the different 'outstanding universal values' that make Petra a World Heritage Site, fostering a sense of 'ownership' of both the monuments themselves and the work undertaken on them, and perhaps most importantly, creating a dialogue-based ethos that permits a beneficial educational exchange between the foreign and local members of the team.

Funding for the TWLCRM initiative, initially provided by a small grant from the Global Heritage Fund, increased substantially in 2011 when the project was awarded a US Ambassador's Fund for Cultural Preservation (AFCP) Large Grant totaling $600,000 over four years. Other funding for the project is provided by ACOR from a USAID endowment for cultural heritage work in Jordan, while work by the TWL conservation team has been made possible in part through the gracious sponsorship of Royal Jordanian Airlines, which donated nine round-trip flights for the international conservation specialists in 2013. In-kind logistical support has been provided by both the DoA and PAP, and in 2012 and 2013 Engineer Asma Shaltough, head of conservation at the DoA, was project co-director.

**Archives**

One of the first major goals of the TWLCRM initiative was to gain access to the original AEP excavation archives. Fortunately, this effort had the strong support of the late Fawwaz al-Khraysheh, then DoA Director-General, who contacted Philip Hammond's widow, Lin Hammond, to inquire about the possibility of gaining access to the archive. She graciously arranged to have returned to Jordan the entire AEP archive. It arrived at ACOR in January 2010, where it is now being stored and gradually catalogued and digitized on a year-round basis. In addition, the archival team has been working to digitally 'ink' many of the scanned materials for use in future publications, particularly the thousands of excavation and pottery drawings. Ultimately, the scanned AEP archive materials will be incorporated into a searchable digital database that will directly support the analysis and publication work of the TWLCRM.

**Documentation**

Much of the work conducted by the TWLCRM between 2009 and 2013 has focused on the initiative's documentation sub-component. The current state of all the standing architecture in the TWL area has been recorded by photographs, and work has begun to correlate these images with corresponding data from the AEP archives. Drawings to record the different types of damage evident on the temple itself using a standard classification system have also been completed. All of the standing architecture in the temple proper has now been drawn and classified into a new categorization scheme. An 'archaeology of masonry' study of the architectural construction phasing for some of the ancillary areas around the precinct has also been initiated. In addition, the documentation team has worked to systematically record, catalogue and consolidate the extensive range of stone construction materials found in the lapidaries, ashlar dumps and rubble piles that are part of the enormous 'impact zone' extending outward from the excavated area of the TWL (see below).

Other documentation work has focused on developing a comprehensive overview of the entire TWLCRM site. This has included an intensive total station survey, conducted by DoA surveyor Qutaiba Dasouqi, of the TWL precinct and the project's broader impact zone, as well as of the area of the ascending propylaeum (grand entryway) that originally provided access to the temple from the wadi below. Dasouqi's survey has allowed the project to relocate and re-establish the original AEP excavation grid and also geo-reference the final AEP top plan. In addition, the project co-operated with a team from the University of California, San Diego (directed by Thomas E. Levy) and the DoA to obtain complete aerial coverage of the TWLCRM work zone using a specially-designed helium balloon. The result of both efforts has been a complete geo-referenced site plan that uses the composite aerial photograph as the background for the project's various work zones **(Fig. 2)**. Additional aerial photography was also obtained with the assistance of Ivan LaBianca who used an unmanned aerial vehicle (UAV) to take low-altitude photographs of the site.

**Landscape Rehabilitation**

One of the major problems faced by the TWLCRM is the massive impact zone left by the original AEP project on the landscape surrounding the excavated temple areas. This zone radiates outward from the temple for ±150 - 200 meters in all directions and consists of numerous lapidaries, ashlar dumps, rubble piles and soil dumps. This impact zone adversely affects a number of Petra's 'outstanding universal values' as a World Heritage Site, especially the aesthetic, environmental / ecological, didactic and scientific. A major CRM innovation that this project has introduced into Petra is the concept of 'landscape rehabilitation'. This sub-component is experimenting with developing ways to mitigate some of the impacts that are found in this zone. The goals are to enhance the overall final presentation strategy for the TWL, to remove impediments that presently




*2. Site plan of TWLCRM work zones outlined on a composite aerial photograph taken of the site in November 2012. (Aerial image courtesy of the University of California, San Diego - California Institute of Telecommunications and Information Technology [Calit2], Levantine Archaeology Laboratory and Cyber-Archaeology Laboratory; the Temple of the Winged Lions Cultural Resource Management Initiative (TWLCRM) of the American Center of Oriental Research (ACOR); the Department of Antiquities of Jordan).*

complicate or impede additional scientific research in adjacent areas and, most importantly, to try to understand better the long-term impact of archaeology on the natural landscape.

The most visible work that can be seen on the site today is related to this sub-component **(Fig. 3)**. In June 2012, the TWLCRM team began to remove systematically the soil, rubble and ashlar dumps from the landscape. The soil dumps were re-excavated and the soils sifted. All recovered material culture was collected, sorted and processed for study by trained local team members. The clean soil, pebbles and cobbles were all separated and stored separately for recycled use in subsequent efforts on the site. Some of the clean soils were immediately used for the temporary backfilling of areas within the TWL to create protective surfaces on which the team could work without causing new damage. Removal of the site's major rubble piles and ashlar dumps has proceeded in a similar way. The ashlars were first moved from the dumps to a temporary work area. Each stone was examined there, to determine if there were any special features, and was then assessed for suitability for possible re-use. All ashlars were measured



*3. TWLCRM local team members sifting the soils re-excavated from the original AEP project dumps. (Photo M. E. Ronza).*

and inventoried; the different types of tool marks that may have been evident were recorded using a standardized system. Those ashlars not selected for retention were then moved into old AEP excavation trenches and reburied.

Since 2012 when the landscape rehabilitation sub-component began in earnest, significant results have been achieved. Three major soil dumps have been removed from the landscape and recycled; work on removing the largest soil Dump 4 as well as other smaller dumps has also begun. The removal and sifting of soil Dump 1 alone yielded nearly 2.5 metric tons of ceramic fragments (amounting to more than 500,000 sherds, all of which were examined by TWLCRM ceramologist Tali Erickson-Gini). Stone Piles 2, 3 and 4 (totaling some 3,500 ashlars) have all been fully removed from the landscape; these were carefully sorted by stone type and the materials relocated and organized. All of the architectural elements in the Lapidaries (1 - 7) have been sorted, cataloged and redocumented; many of these excavated elements were relocated to temporary areas to await permanent storage through reburial in backfilled areas; the architectural elements that will remain visible are currently all being consolidated into the existing footprint of a single area (Lapidary 1).

A number of subsidiary projects related to the landscape rehabilitation sub-component have also been undertaken. In 2012 the site was gridded and a baseline survey of vegetation cover was conducted; a comparison site elsewhere in Petra that has a similar slope and aspect, but without archaeological disturbance, was also surveyed. These sites will be monitored seasonally during the coming years so that changes can be noted and documented. An experiment was also begun on the site in which six raised planting beds were constructed and filled with different types of soils from the TWLCRM work zone. These beds will be observed throughout the project in order to see what may or may not grow naturally. All of these data will eventually contribute toward the final presentation and management strategy for the site.

**Conservation**

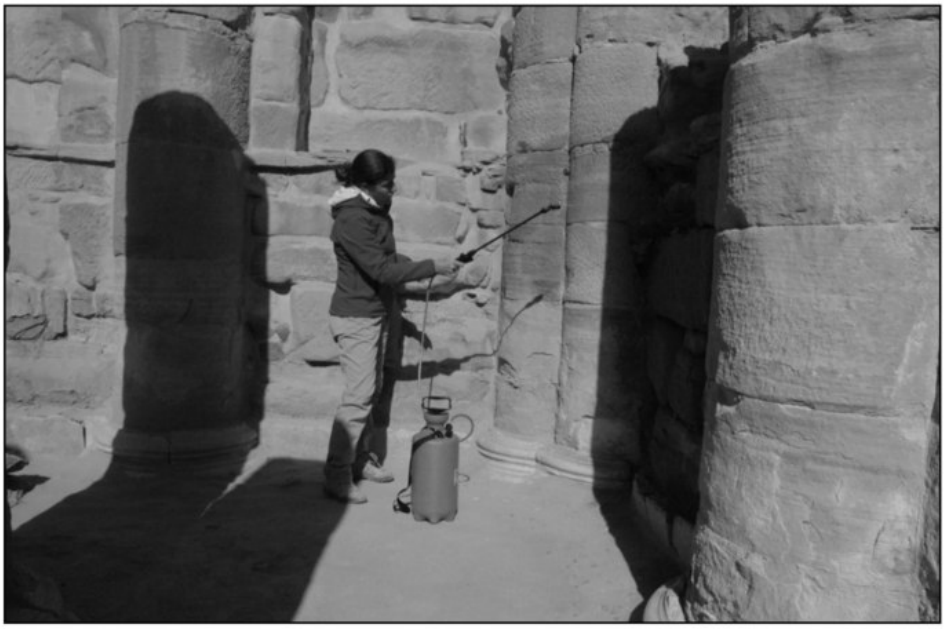
The first round of conservation work on the TWL began in spring 2013 after nearly three years of preparation that involved thoroughly studying the current condition of the architecture and the forms of degradation present, analyzing the different types of building materials (e.g. mortars, grades of sandstone etc.), and

determining the correct types of consolidation products as well as mortar ingredients and mixtures to be employed for the different circumstances found inside the TWL precinct after testing. All interventions were planned on the basis of internationally accepted best practice and the specific contexts of the construction materials and techniques employed at Petra.

Work on implementing the necessary stabilizing interventions began in March 2013 with a team of international and local conservators and conservation technicians led by lead conservator Christina Danielli. The focus of this first two-month campaign was the interior face of the north wall of the temple *cella*; this wall was determined by Danielli and the rest of the TWLCRM team to be a priority owing to its advanced state of degradation. During a nine-week period, the conservation team cleaned the wall of the detritus that had accumulated since the original 1970s excavation, removed salts, stabilized flaking and scaling stone surfaces, sealed cracks, conserved a few *in situ* examples of original plasters and treated all surfaces with consolidants **(Fig. 4)**. They also applied hydraulic mortar to the wall in order to: (1) prevent water from percolating between the ashlars, (2) increase the wall's overall stability and (3) reduce salt-efflorescence (with the mortar acting as an absorption layer). Finishing mortar was then emplaced and roughly textured in order to help integrate the new work aesthetically into the existent building. Some additional cleaning and consolidation work was also undertaken on columns still standing in the temple *cella*. Conservation work on the temple complex will continue in 2014 and 2015.

**Presentation Strategy**

In 2013, the TWLCRM initiative also began working on the final presentation strategy for the site. The TWLCRM team met in the autumn of 2012 to decide on the minimal extent of restoration *(anastylosis)* that would be needed to meet all of the presentation strategy goals, such as the structural needs of the building as well as the educational / didactic, aesthetic and environmental impacts. The decision was made to restore a small cluster of five of the original first-storey columns in the *cella* to an accurate approximation of their original heights with the appropriate capitals. Two columns from the west colonnade were selected to be crowned with original Nabataean-Corinthian capitals, while three columns at the north-west corner of the cultic podium would be restored and crowned with a combination of original and replica 'winged lions' capitals.



*4. A member of the TWLCRM conservation team treats the north wall of the temple's cella with a consolidant solution.*

The TWLCRM restoration and documentation teams then developed a unique plan to test the restoration proposal. The columns and capitals would first be built using lightweight materials at one-to-one scale and then be placed in their original locations to see if the end product would in fact meet all of the goals. The teams, along with local trainees, then spent the next few months making all of the life-sized column elements out of lightweight materials. The drums were cast in plaster using molds; they were also made hollow to reduce their weight (*ca* 60 kgs each versus 350+ kgs for the original stone). The capitals were constructed using layered sheets of polystyrene; the details were then carved in polystyrene and affixed to the blank capitals. The drums and capitals were finally painted and textured with realistic patinas.

The extant portions of the original columns inside the temple *cella* were prepared so that they would not be in any way damaged by the installation of the 'faux' columns on top of them. The two original west colonnade columns are also leaning severely, so this problem had to be solved so that the lightweight replicas would stand true in order to present like the originals. The solution was to build wooden supporting frames around the columns where needed and install wooden platforms on top of all the columns that would buffer the points of contact and bear the weight. This innovative, experimental archaeology effort was unveiled at a public event held on site in May 2013 **(Fig. 5)**. The entire TWLCRM team (and invited guests) were able to see with their own eyes one of the final products that would ultimately result from all of their efforts on the project.

**Social Engagement**

The central sub-component of the TWLCRM is the initiative's use of a social engagement model that aims to involve members of Petra's local communities in as many aspects of the project as possible. The ultimate goal is to lay grassroots, local foundations for a sustainable preservation ethos in Petra that functions at both the cognitive and practical levels.

The TWLCRM's first step was to inaugurate an egalitarian system for hiring local team members for work and training. A system was designed in which everyone's name is registered on a roster, which is organized by town, tribe and family unit. This allows the project to apportion the opportunities available in each field equally; this system is further augmented through a dialogue between the TWLCRM and local communities who help prioritize people who have immediate or special need. The initiative also introduced a tiered pay scale that



*5. TWLCRM team members place the 'faux restoration' columns in order to test the project's final presentation strategy. (Photo Q. Tweissi).*

provides local team members with opportunities for advancement based on the acquisition of new skills, demonstrated commitment to the project and increased CRM awareness, as well as other factors. The project also hired women for a range of different fieldwork tasks and training, for the first time in many cases.

A few statistics will demonstrate the impact within the local communities of the social engagement model used by the TWLCRM. During the first 18 months of fieldwork, the TWLCRM created more than 500 employment and training opportunities that were fulfilled by some 260 individuals. Women represented 59% of these individuals; youths (under the age of 30) represented about 75%; a full 100% of participants derive from communities defined in Jordan as known poverty centers.

One of the most exciting social engagement elements has been the creation of an informal women's sandbag co-operative within the surrounding towns **(Fig. 6)**. The TWLCRM needs about 12,000 sandbags - which are not readily available in Jordan. Rather than import sandbags at great expense, the initiative decided instead to make them locally. Recycled burlap (jute) rice bags were purchased and then provided to local women, many of whom are divorced or widowed with children, who hand modified them to the form required for the project. The modified bags were then filled on site (using clean soil from the sifted dumps) and sewn closed. The filled bags were used for buttressing architecture, controlling foot-traffic and other stabilization efforts. The TWLCRM hopes to make this sandbag co-operative sustainable through opening up this service to other projects in Jordan.

In addition to providing training and employment opportunities, the TWLCRM has also sought to play a more positive, constructive role within the lives of its team members and the broader local community. This has included: (1) the staffing and opening in March 2013 of a childcare center in the village of Umm Sayhoun (in co-operation with the local Social Development Center) that provides daycare services for local women, including those working on the project, (2) a 'Children's Day' at the site in April 2013 that gave the children of local team members the chance to interact with the site and experience the different types of work done by their parents and (3) a day-long program in October 2013 that introduced the site and its various sub-components to young girls participating in the Petra National Trust's Youth Education Program. The TWLCRM team has also benefited from the use of social



*6. TWLCRM team member Khatima Ruwei Jdeilat sews a sandbag closed on site. (Photo Q. Tweissi).*

media to enhance and promote its social engagement strategy. In May 2013 the project launched a Facebook page (www.facebook.com/TWLCRM) that tells the story of the Temple of the Winged Lions monument in Petra and the history of work that has been done at the site from 1973 to the present. Many of the local team members are now on Facebook and have learned to engage with the project in different ways through this social media venue. Finally, project founding director and former ACOR associate director Christopher Tuttle wrote two introductory articles on the project for the *ACOR Newsletter* (Tuttle 2012; 2013b) and also gave a public lecture at ACOR in April 2013 entitled "A Holistic Approach to Preserving Petra - Introducing the Temple of the Winged Lions Cultural Resource Management (TWLCRM) Initiative".

**Future Directions**

The TWLCRM Initiative will enter its final phases in 2014 and 2015, with an emphasis on concluding the project's landscape rehabilitation sub-component and conserving, stabilizing and backfilling many of the exposed areas from the earlier AEP excavations that are at risk. In addition, the plan is to implement the final presentation strategy, starting with the erection of the five columns and capitals in the temple's cella, followed ultimately by the creation of a walkway, platform and signage that will guide visitors safely around the site. All this will continue to be accomplished through the active engagement and ongoing capacity-building of Petra's local communities. Analysis and publication of both the original AEP archives and the new TWLCRM data will continue in 2016 and beyond.

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# Ancient Burials At The Hippodrome of Gerasa / Jarash[1]

*Ina Kehrberg and Antoni A. Ostrasz (1929 - 1996)*

This article is about the archaeological contexts of burials uncovered during our excavations of the Jarash hippodrome and periphery between 1984 and 1996 (Ostrasz 1989, 1991, 1993, 1994; Kehrberg and Ostrasz 1997; Kehrberg 1989, 2001, 2007, 2009). Our systematic excavations of the entire circus were a vital element in the careful removal of tumble and exposure of extant remains, in their subsequent archaeological and architectural study for restoration, and in gaining an understanding of the building's history of occupation and that of its people. The interred, doubly entombed by the earthquake tumbles, were an integral part of the archaeological study of the site. Documentation and as yet unpublished research findings, like our unfinished manuscript on the mass burials in W2 and W3 (*infra*) were made available to osteoarchaeologists who came to examine the skeletal remains for their own research projects (see e.g. Hendrix 1995). However, some publications have misinformed by failing to acknowledge our project or publications (Sandias 2011). It therefore seems timely to fill the gaps and present a concise account of the archaeological data pertaining to and surrounding the burials at the hippodrome.

## Introduction

We have already mentioned in previous publications that the hippodrome site began in the Late Hellenistic - Early Roman period as a quarry and cemetery of hypogean tombs (e.g. Ostrasz 1989; Kehrberg and Ostrasz 1997; Kehrberg 2004, 2011). The necropolis **(Fig. 1:1)** and quarry were closed permanently when Hadrian visited Gerasa and instigated his master plan to upgrade Gerasa's township that had grown from the 2nd century BC Seleucid foundations of *Antioch-on-the-Chrysorhoas.* New cadastral zones were drawn up to embellish the prosperous but still relatively modest provincial town. Ambitious building projects were to bring about Hadrian's vision of Roman Gerasa, indeed encompassing most of what we know and still see today. Knowing of Hadrian's ambitions in the arts, work may have begun under his direct tutelage during his stay in 129 / 130 AD, certainly shortly after (Kehrberg 2011). The building programme included the city wall and expanding secular and religious precincts on previous cemetery grounds in the southern and northern areas and beyond the city gates (Kehrberg and Manley 2001, 2002). The hippodrome site was probably the most important extramural zone as it comprised the Roman road approaching Gerasa from Philadelphia: it was here that Hadrian's Arch was built, followed shortly after by the hippodrome or Roman circus by about the middle of the 2nd century[2]. Trenches of the closed quarry and sealed hypogean tombs formed some of

1. Excavations were a permanent part of the Jerash Hippodrome Restoration Project 1984-1996, sponsored by the Dept of Antiquities of Jordan (DoA) and directed by architect Antoni Ostrasz; Ina Kehrberg was the ceramics/small finds specialist archaeologist of the project.

2. The actual time it took to build the circus remains hypothetical but we know that construction began in the first half of the 2nd century and that chariot racing took place there well before the end of that same century (Ostrasz 1989a, 1989b, 1991; Kehrberg 1989; Kehrberg and Ostrasz 1997).

the foundations for the new Roman edifices, as evidenced in particular at the hippodrome **(Fig. 1:2-3)**[3].

Except for being part of the south-east *cavea and carceres* foundation, these earliest rock-cut tombs at the hippodrome site do not concern the circus as such, its builders or subsequent occupants. I will leave these burials aside in particular since I have already discussed aspects of this early cemetery in a wider study of Late Hellenistic Gerasa and its cultural origin (Kehrberg 2004, 2006). We will instead introduce the burials pertaining to the later occupancies of the circus structure and periphery. Photographic documentation is poor as we lacked an appropriate camera at the time of excavations, but this did not impede our methodical work. Like other contexts, if not more so owing to their delicate nature, the burials were carefully excavated and recorded in *situ*. The excavations of the mass graves in chambers W2 and W3 (*infra*) took over two years, from 1991 to 1993, partly because of the large, compact mass of bone that had been crushed by earthquake tumbles of the vaults and *scalaria*, but also because the fragile skeletons of well over 200 bodies could only be excavated during the dry season (Ostrasz 1993, 1994; Kehrberg and Ostrasz 1997). The skeletal remains were kept in their separate lots according to excavated loci in order to correlate them with the excavation sequence and other finds from the same loci or lots **(see Fig. 15:1)**. They were subsequently examined in storage by osteoarchaeologists (e.g. Hendrix 1995 and *supra*)[4].

## The Burials

The plans at **(Fig. 1)** map the south-west necropolis and late Hellenistic - Roman hypogean tombs excavated at the hippodrome site that belong to the pre-130 AD phase prior to the circus. Plan 2 and Section 3 show the west - east section of the aforementioned *cavea* foundation trench in chamber E45 that was founded on quarry cuts and a hypogean tomb. While the schematic plans at **(Fig. 2)** provide an overview of the excavation history of the hippodrome, the hippodrome ground plan at **(Fig. 3:2)** marks the locations of burials belonging to secondary occupancies or the industrial phase of the circus building and periphery (Kehrberg and Ostrasz 1997).

The burials, or rather the graves and their contents - deliberate offerings or part of the ground into which the graves were placed - are presented in chronological order approximating the dates of interment. These simple burials were placed in the *cavea* chambers of the hippodrome or were buried in the grounds outside it, but never in the arena. Most of the graves in the chambers were superimposed by debris of later occupancies, usually workshop dumps that at times contaminated the upper layer covering the tomb, a situation exacerbated by earthquake tumbles. This, as well as the practice of digging a pit and covering the burial with the dug-up dirt, made precise dating of burials without grave goods more difficult.

However, one can safely posit that the simple graves belong to the second or industrial phase of occupancy at the hippodrome encompassing the later 3rd to the late 6th / early 7th centuries, or Late Roman to Late Byzantine periods, excepting the two mass graves of the mid-7th century plague victims interred there after an interval of abandonment (*infra*).

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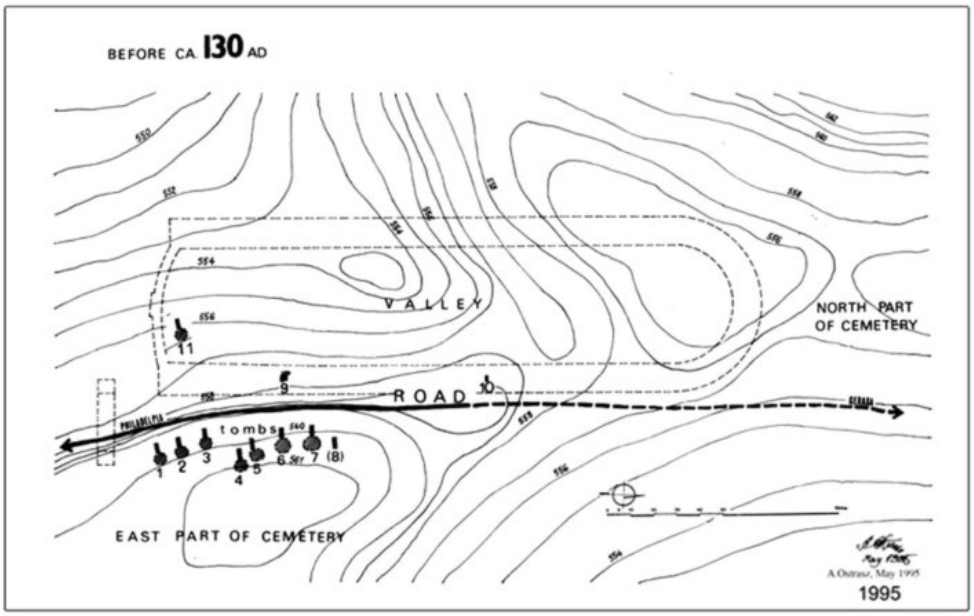
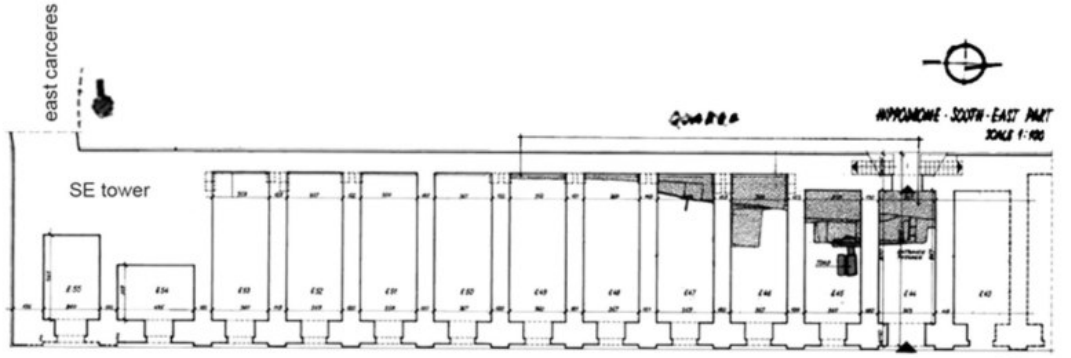
3. See figures in Ostrasz 1989, 1991; re. a Late Hellenistic - Early Roman round 'temple tomb' at the hippodrome site see Abu Dalu 1995, Seigne and Morin 1995 and Kehrberg 2004.

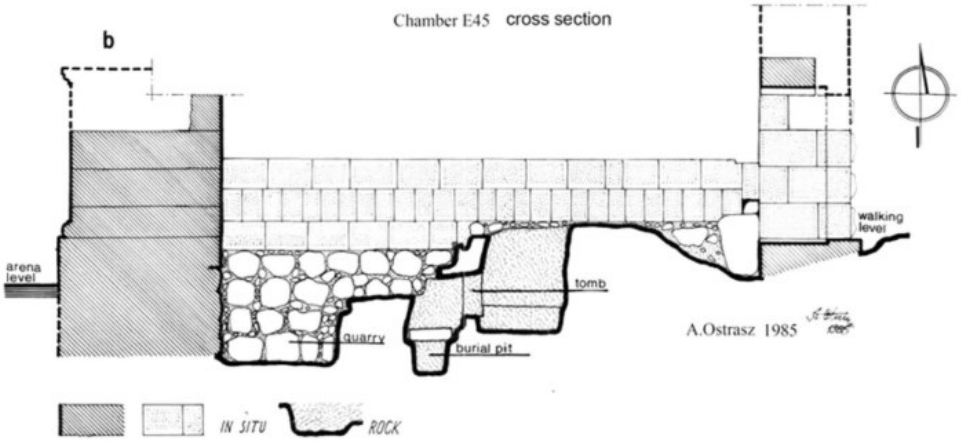
4. Mark Kehrberg-Ostrasz assisted in the excavation of the skeletal remains in chambers W2 and W3; he helped with finds sorting and restrung the beads according to clusters found with the bodies, see Fig. 18 (Ostrasz 1994; Kehrberg and Ostrasz 1997). For the estimated number of skeletons see Hendrix 1995. Scanned sketch plans at **Figs. 15 and 16** are not to scale but plot accurately the find spots and layers in W2 and W3. I have retained Antoni's measurements and descriptions to show his attention to detail in the field. The same comments apply to his sketches of the other excavations of burials at **Figs. 6 and 8.** The sketch plans (labels) accompanied the finds and bones from each context, layer and / or locus.




1. A.Ostrasz: site plan before the construction of the hippodrome marking hypogean tombs (1995)

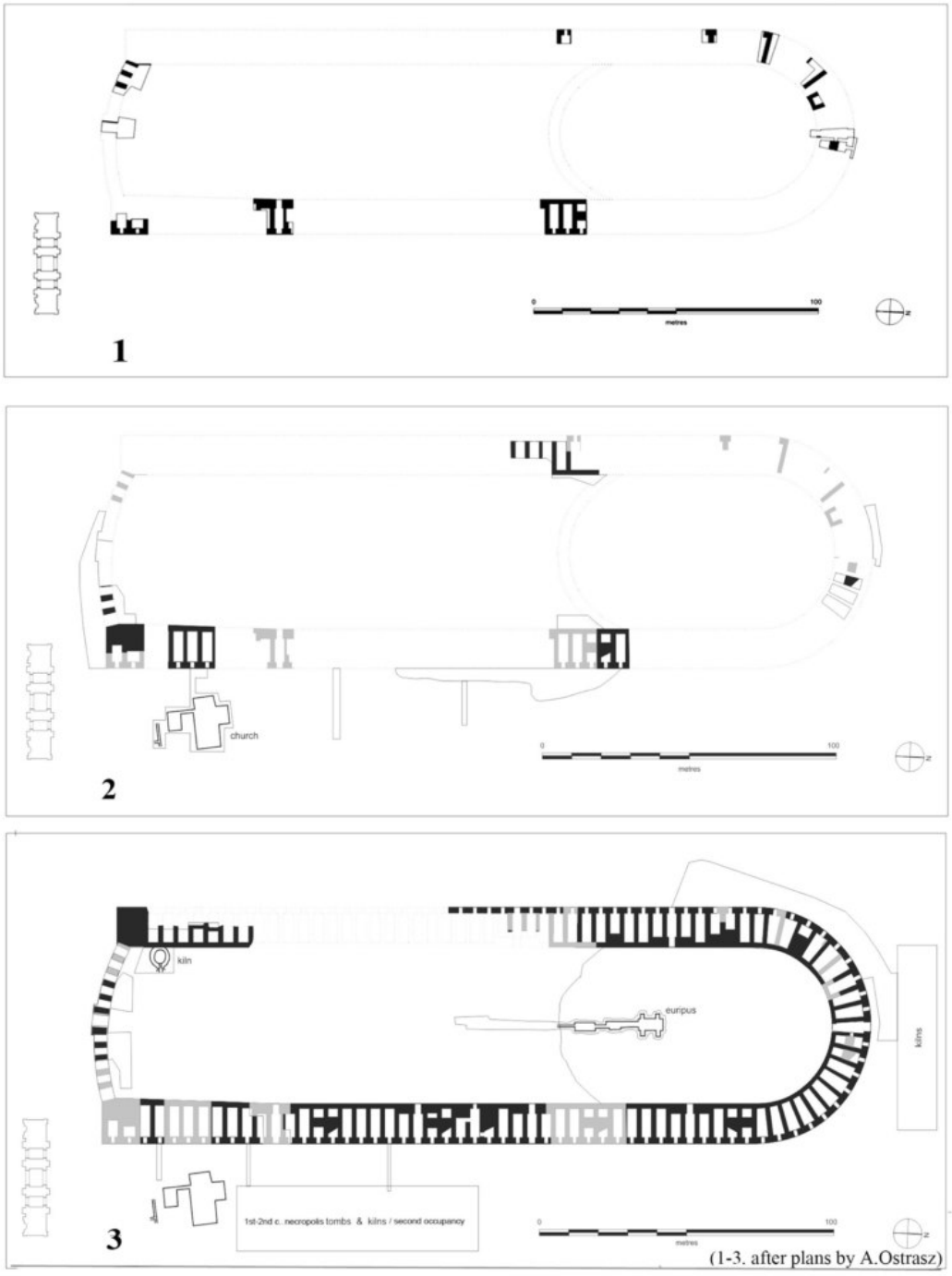



2. A.Ostrasz: East Cavea chambers E55-E43:foundations with quarry and tombs (1985)




3. Hypogean tomb in chamber E45, foundation level of the east cavea (A.Ostrasz 1985)

*1. The site before and during construction of the hippodrome.*




(1-3. after plans by A.Ostrasz)

Histograph of exploration of the hippodrome and surrounding area: **1.** 1931 and 1933 trenches, E.B. Mueller (in Kraeling 1938); **2.** 1982 and 1983 trenches, Polish Team M. Gawlikowski, A.Ostrasz, T.Scholl and A. Musa (JAP I); **3.** 1984-1996 complete recording and excavation of tumbled remains and continuous total excavation to the foundations of the circus with annexed outer buildings and outlying structures, including the tombs of necropolis phase and post-hippdrome occupancies, restorations and preservation, A.Ostrasz and I.Kehrberg (Consultant for Computer imaging A.Wilson, ACL, Univ. of Sydney)

*2. Excavations at the hippodrome until 1996.*

As stated above, the main purpose of this article is to provide *in situ* archaeological evidence for dating the interments: this is best done by illustrating loci and representative finds **(Figs. 1 - 25)** with a concise account of deposits pertaining to and / or immediately surrounding each burial context[5].

**Sequence of Burials**

*Burials inside cavea chambers*

Chamber E29 HCh88. E29.2
Infant burials below threshold of door in transverse wall between chambers E29 and E30.
Chamber W8 HCh96. W8.2-3
Burial: body buried in dirt floor of chamber.
Chamber W1 HCh91.W1. Gr. 2
Grave 2 burial.
Chamber W2 HCh91-93.W2.2
Mass grave of mid-7th century plague victims.
Chamber W3 HCh92-93.W3.2
Mass grave of mid-7th century plague victims.
Query Chamber E46 HCh85.E46.3b
Cremation burial in jar; reburial of disturbed burial?

*Burials in front of east cavea*

HCh91.E18/19. Gr.1, in front of
Grave 1: burials (adult and one infant) in front of chamber E18/19 (periphery of east *cavea*) - four Late Roman glass *unguentaria*.
HCh92.E12. Gr., in front of
Grave: single burial in front of chamber E12.

*Burials inside cavea chambers*

1- HCh88. E29.2 **(Figs. 5 - 7 and 24)**

Infant burials below threshold of doorway in transverse wall between chambers E29 and E30.

Description of Context Deposits **(Fig. 6:1-9)**

The pottery assemblages from loci shown in sketches nos 1 - 9 **(Fig. 6)** are part of burials A and B and surrounding find spots. The forms belong to the Late Roman or later 3rd - 4th century, of which some examples are illustrated at **(Fig. 7)**. Typical of this period is the hippo lamp fragment (**Fig. 7:4;** cf. Kehrberg 2011b: 143) from a large deposit of this Late Roman lamp-type. Like the lamp fragments, the pottery shown at **(Fig. 7)** belongs to an accumulative waste dump of the workshop in chamber E29, of which the Tyche appliqué no. 3 is an exceptional piece that once adorned a closed jar (see the negative ribbing). Here is not the place to discuss the forms, but merely to point out the conformity of the wares pertaining to the later 3rd and 4th centuries produced at the hippodrome workshops. The bronze bell fits comfortably within that time span; it is one of two examples excavated at the circus. To judge from the quantity or depth of accumulation of waste deposits as well as typological hallmarks, the infants (burials A and B) had been interred early during the production of the pottery workshop; the pottery and lamp fragments associated with and covering the actual burials below the slabs of the thresholds belong to the later 3rd - early 4th century rather than to the mid- to late 4th century when the pottery workshop ceased operating. This is borne out by the successive waste deposits below the tumbled remains of the vault, sealing the chamber's final waste deposit layers that contained a number of coins preliminarily dated by Bowsher to the 4th century **(Fig. 24: 9-11)**[6].

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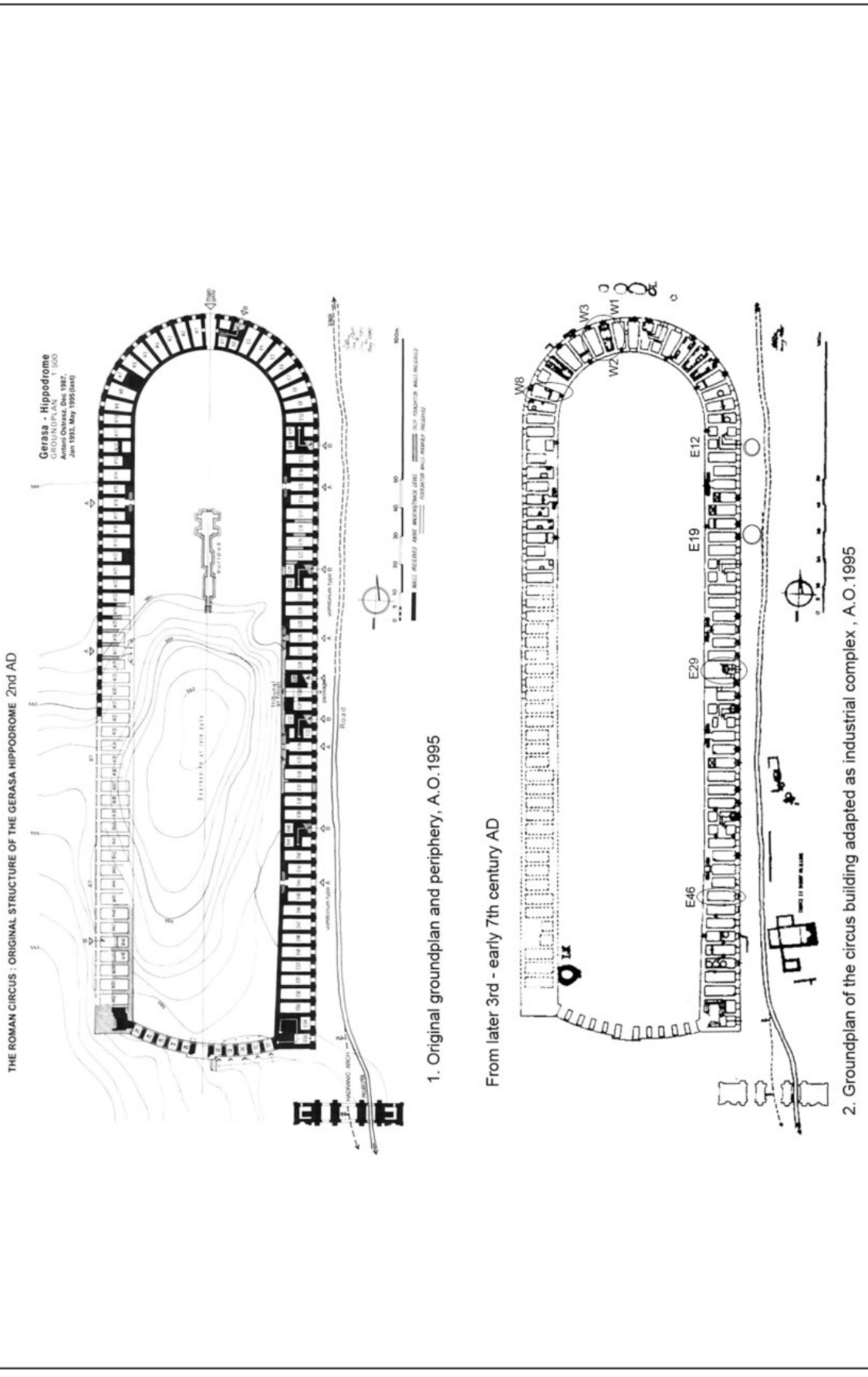
5. A detailed report of the excavations is given in Volume I of the final publications of the 1984 - 1996 hippodrome project by A. A. Ostrasz; the pottery and other finds are presented by I. Kehrberg in Volume II (White - Levy Program for Archaeological Publications, Harvard University; in prep.). This article will not discuss issues and opinions related to cultural periods surrounding the burials at the hippodrome or the artefacts that have in part been published by me and which will be examined in full in the final publications

6. Christian Augé and Julian Bowsher will publish their readings of the coins from the 1984 - 1996 excavations in our final hippodrome publications. Preliminary identification was done during Antoni's lifetime, being recorded by Augé and Bowsher on the coin catalogue cards (see Plates 4a-b), and subsequently listed for each chamber by Antoni. In this context of dating sequences of events or stratified layers, it is interesting to note that both coins from the tumbled remains of the vault and scalaria in E29 date to the first half of the 2nd century, the construction period of the hippodrome, sandwiching the secondary Late Roman and Byzantine occupancies in the chamber neatly between its foundation and construction of the earlier part in the 2nd century.




*3. Ground plans of the Roman and Byzantine hippodrome.*

It is important to note that there were linkages between separate loci or deposits in the form of pottery fragment joins. This shows that the E29 workshop did not produce frequently, nor over a long period of time. Among the homogeneous assemblages from the deposits, it is interesting to note only one intrusive Late Byzantine bowl fragment (similar to the type shown at **(Fig. 20:13-15)**, suggesting a possible date for the earthquake damage at E29 of the 6th century as evidenced at other parts of the hippodrome and other monuments of Jarash, albeit not as devastating as the subsequent destructions by the 650 and 749/50 earthquakes (*infra*).

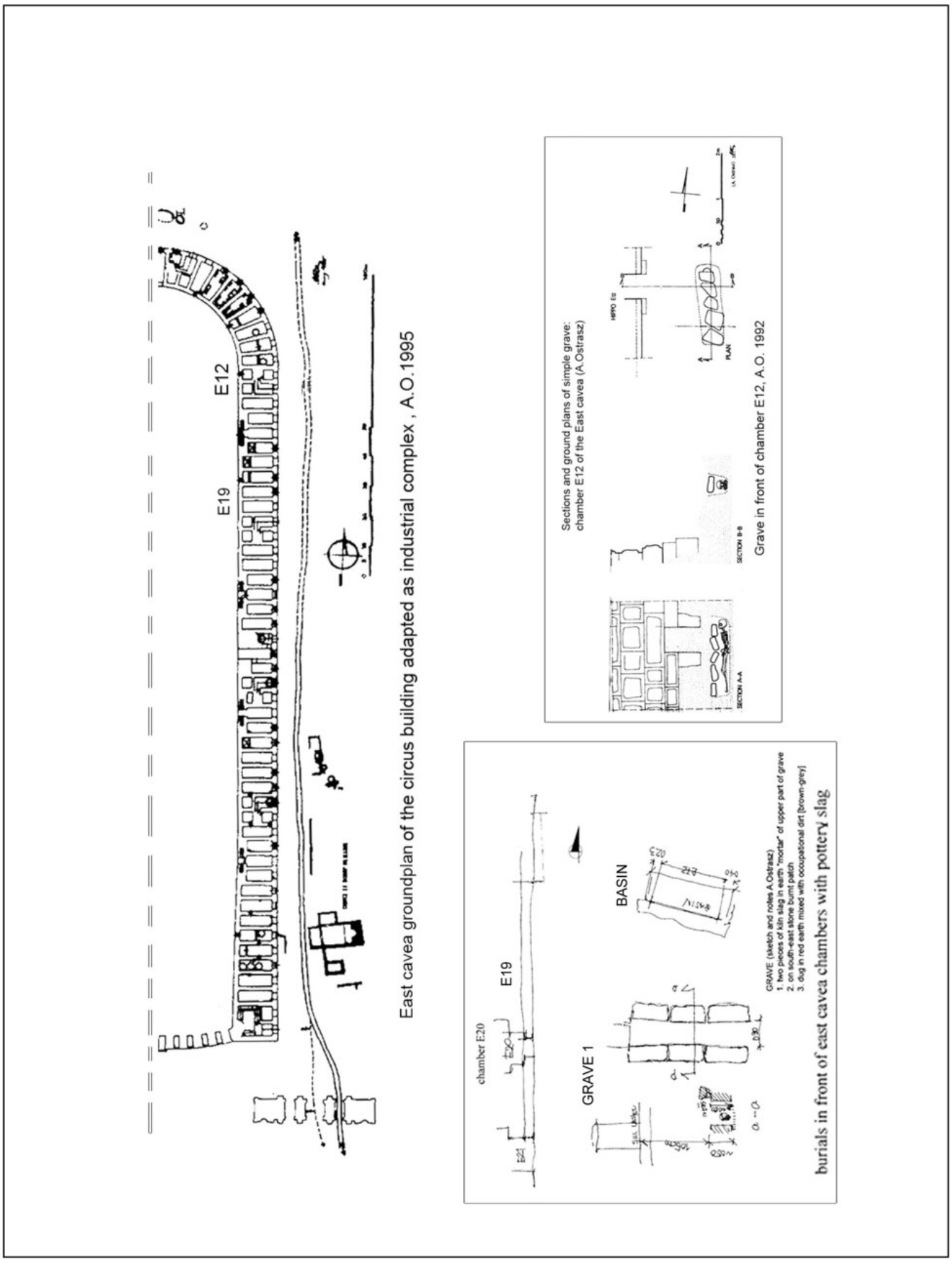
2-HCh96. W8.2-3 **(Figs. 7 and 24)**

A coin from the grave fill **(Fig. 24:6)** places the burial in W8 in the Early Byzantine period; this date or period is corroborated by two coins from the surrounding deposits **(Fig. 24:7-8)** of the same type, that have been preliminarily dated to the 4th or begining of the 5th century by Bowsher. The pottery from loci sketched *in situ* **(see Fig. 8)**, that were part of as well as surrounding the burial context, support an end-of-4th to (possibly) an early 5th century date. Plates 6 and 6a show the homogeneous wares and types produced at the hippodrome workshops from the Late Roman to Early Byzantine periods. This precludes a Late Byzantine date for the burials, even though that type of coinage is found throughout 5th and even 6th century deposits. It seems highly unlikely that coin no. 6 could be intrusive and slipped into the grave as a result of earthquake. It is both too light and could only have been carried there embedded in soil and with other deposits. The stratification is straightforward in that it is obvious the grave was dug into the original dirt floor inside the chamber. This is further evidenced by the few sherds in the soil that directly covered the grave **(Fig. 11:3)**; the dirt was part of the deposit that was excavated for the grave. The sherds date to the Roman period, or construction of the circus in the first half of the 2nd century. This 'inverse' chronology or stratification was also found in two other graves in chamber E46 and W1 (*infra* and **Fig. 13**). Last, but not least, the glass vessel at **(Fig. 10:5)** corroborates an Early Byzantine date for the middle part of the secondary occupation.

The photos at **(Fig. 9)** illustrate the carefully prepared inhumation, in which the pit grave was lined with stones. It is clear from its position along the intrusive wall shown in sketches at **Fig. 8,** as well as from waste deposits accumulated above, that the body would have belonged to an earlier generation of occupants, possibly associated with the early 5th century workshop.

3-HCh85. E46.3b **(Figs. 1, 3:2 and 13)**

The following burial deposit found in east *cavea* chamber E46 may be best understood when looking at its context, which is part of the aforementioned quarry-cum-hypogean tombs foundation trench at the south-east *cavea (supra)*. It appears that we are dealing with a Roman cremation burial, at any rate pre-130 AD **(Fig. 1:1)**, which was disturbed and reburied by Byzantine occupants. The reason for this proposition is that the pottery with the charred remains dates to both the Roman and the Byzantine period. One might posit that the cremated remains were in a Roman jar and that the fragmentary remains of the jar and bones were reinterred in a Byzantine-period storage jar, which was sealed with gypsum available at the site from previous tanneries (Kehrberg 2007). The storage jar is difficult to date precisely within the Byzantine period and the secondary interment could have occurred any time during the 5th and / or 6th century. Workshops are attested in that part of the *cavea* from the Early Byzantine period onwards (Ostrasz 1989, 1991; Kehrberg 2009). That it cannot have been a Byzantine burial is demonstrated by the cremation; while cremation could occur in the pre-Christian Roman period there were none at Byzantine Jarash. Nor could the reburial have occurred after the Byzantine period, as it was covered by dense layers of pottery dumps pertaining to Late Byzantine hippodrome workshops (Kehrberg and Ostrasz 1997) and




*4. Post-chariot racing occupancies: burials at the hippodrome.*

to their tumbled remains. The stratigraphic sequence suggests instead that it had occurred before the end of the Byzantine period.

4-HCh91. W1.Grave 2 **(Figs. 3:2 and 13)**

There is not much artefactual evidence with which to date the grave in chamber W1, but it is clear from the context that the burial did not predate the abovementioned tombs and instead belonged to the Late Byzantine period. Indeed, the deceased may have belonged to the last generation of occupants at the hippodrome, being interred shortly before all workshops and the entire building complex were abandoned towards or at the end of the Byzantine period. If the few pottery sherds associated with the burial context hint at a scenario similar to that at chamber W8, the context at W1 is more defined and, indeed, minimalist. The Late Byzantine Jerash bowl fragment and Late Hellenistic and Early Roman lamp fragments provide termini post and ante *quem* for the building of the circus. The lamp fragments found covering the grave belong to the construction fill of the hippodrome, dug up from the foundation or original 'floor level' of the chamber into which the grave was cut. The Jarash bowl fragment epitomises the final flourishing phase of the hippodrome pottery workshop productions[7] and could indeed be one of the many examples of Jerash bowl productions found in the workshop pottery dumps in W2 and W3 (*infra*).

5-HCh91-93. W2 and W3.2: mass grave **(Figs. 13 - 25)**

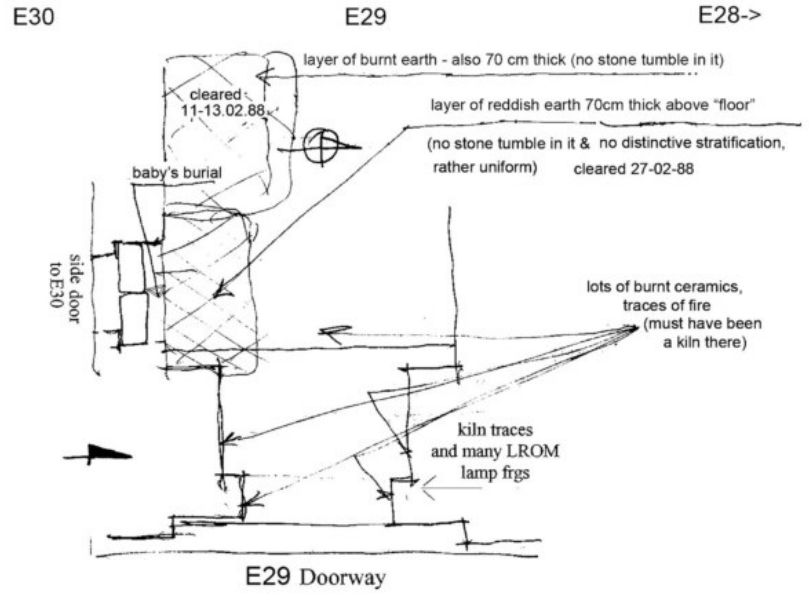
The mass burials in chambers W2 and W3 have already been published, in the first instance by us (Ostrasz 1993; Kehrberg and Ostrasz 1994, 1997) and subsequently by various authors on osteological studies of the skeletal remains, the main reason for this article (*supra*).

Therefore, it suffices to summarise the archaeological evidence for dating the mass graves and to consider the most likely cause of death. The rich archaeological data retrieved from our excavations of chambers W2 and W3 in fact provide a comprehensive sequence for the building of the circus and occupancies occurring at the hippodrome. The latter began with workshops dating to the last decades of the Late Roman period, the earliest evidence for occupancy in both chambers.

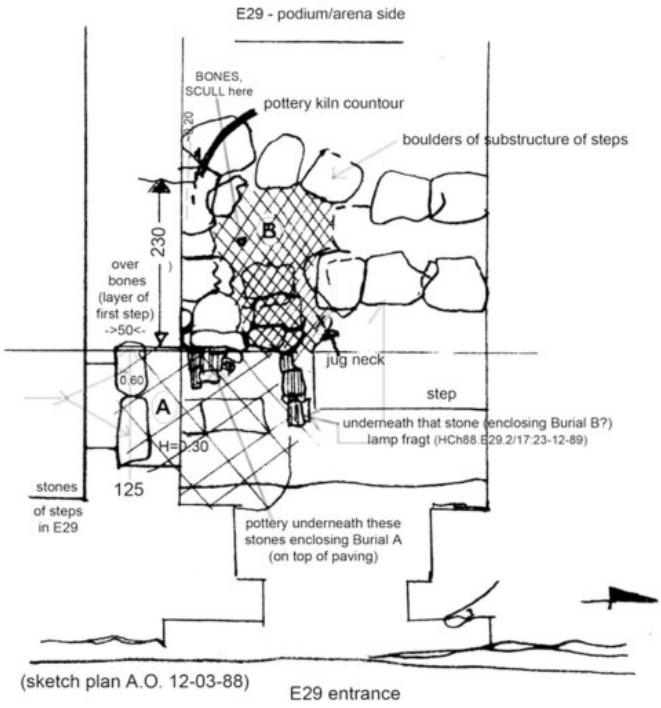
In chamber W3, the occupancy is attested to by a misfired pottery dump found directly on top of the constructional fill within the foundation wall. In chamber W2 it is attested to by a group of large vessels placed along the walls of the south part of the chamber **(Figs. 16:2 and 16:7)** that were found partly filled with a dried lime-like substance (gypsum). The vats or vessels were set on top of the construction fill in rows, with the space between the east, south and west rows being filled with dirt. The top of this fill was the walking surface at half the height of the vessels. This dirt contained mostly sherds of the 1st century BC/AD, with a handful of Late Roman sherds in the uppermost layer; two coins in mint condition of Constantine I in the upper layer point to the first decades of the 4th century as the date for the placement of the vessels in the chamber.

These workshop installations in W2, a Late Roman tannery (Kehrberg 2007), were covered with a compact layer of misfired and unfired Late Byzantine pottery (Kehrberg and Ostrasz 1994: 546-7)**.( Figs. 19-23)** amply illustrate the rich finds in both chambers and are representative of the prolific output of the Late Byzantine potters. Previous publications (esp. Kehrberg 2009) detail productions at the Late Byzantine workshops of the hippodrome; some of the unfired ceramics are shown here for the first time **(Fig. 22)**. As mentioned earlier, this article is not about ceramics *per se* (fn. 6), but to inform about the excavation and find contexts.

7. Barring sporadic reoccupations or squatting from the end of the 7th or early 8th century onwards, almost a century after abandonment (Kehrberg and Ostrasz 1997; Kehrberg 2009 and 2016) when memory of the mass graves may have waned.

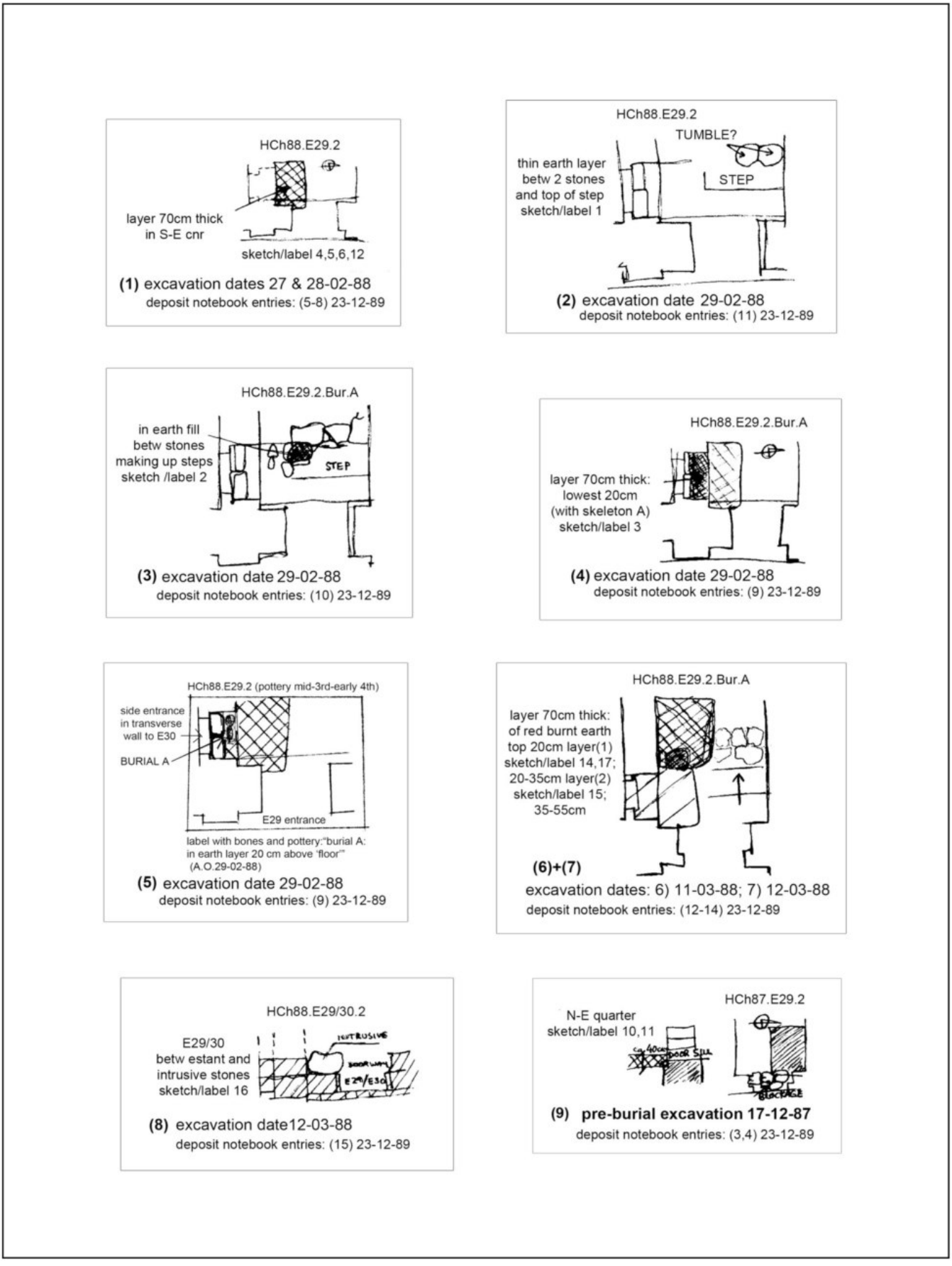



**(1)** general plan of excavations in east cavea chamber E29 from 11-13 and 27. 02.1988

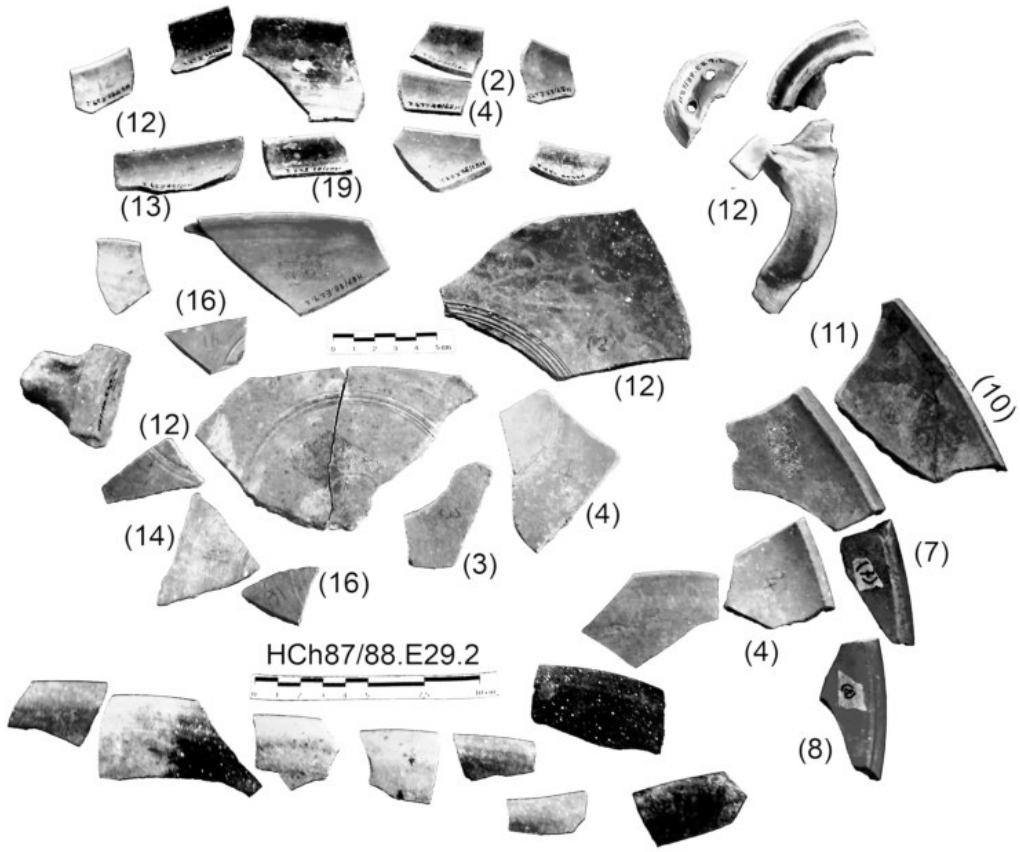



**(2)** detail sketch of loci:burials in chamber E29; E29/30:excavated 12-03-1988

*5. Plans of kiln remains and intramural burials in E29 (A.O. 1988).*




*6. Sketch plans of pre-burial and burial loci: HCh87/88. E29.2 (A.O. 1987/88).*



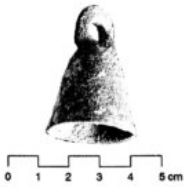

**1** examples of joins from separate deposits (x), see Fig 6



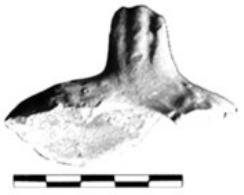

**2** HCh88.E29.2 (Fig. 6:1, data entries 5-8: thick layer above "floor" and burial): cooking pot JH917




**3** HCh88.E29.2. (14): applique head of Tyche JH646, cf Fig 6: 6,7

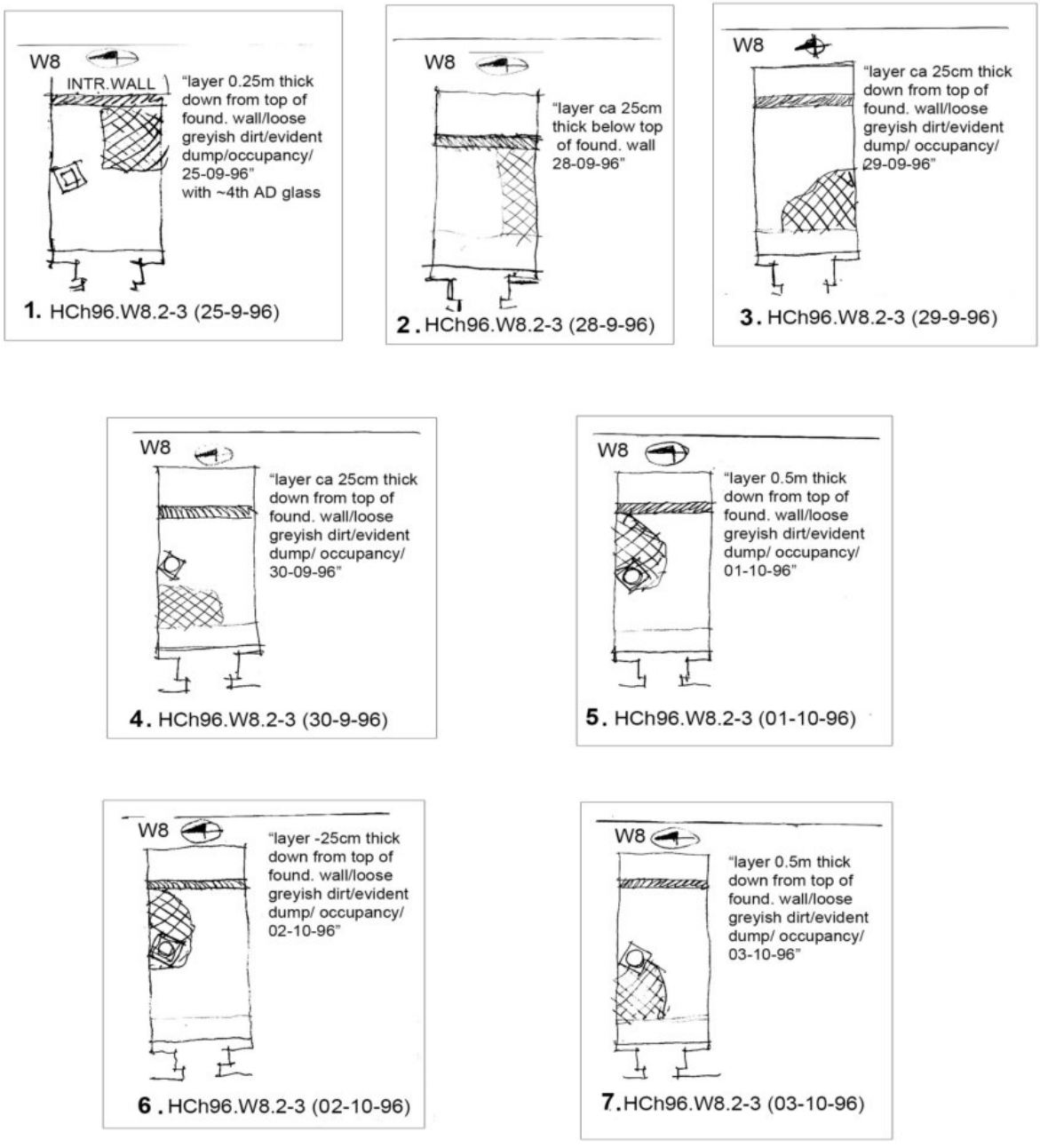



**5** HCh88.E29.2.see Fig. 6:1(8) data entry: bronze bell JH12



**4** HCh87.E29.2.JH90: 'HIPPO Lamp', cf.Kehrberg 2011b:143,145;Fig.2:32c,

*7. Pottery and bronze bell from various deposits above and with burials E29.2.*




*8. Sketch plans made in situ during excavations in W8 (A.O. 1996).*

Section 1 at **(Fig. 15** illustrates the lower cross-section in chamber W2 and the layers or 'lots' of excavated deposits, in particular noting coin finds associated with the workshop. Sketch 2 is a schematic section along the chamber providing a realistic rendition of the tumble within the chamber that we excavated carefully.

Photos at **(Fig. 14)** provide a glimpse of the difficulty of excavating the skeletal remains in both chambers W2 and W3. The photos speak for themselves; top plans at Plate 8 show some detail of single find spots. Each context (level, locus or lot) was documented by Antoni during excavation in the field. Apart from being routine recording, this documentation proved vital in reconstructing the finds directly associated with some of the skeletal remains, actually individual victims of the plague. It seems there were no accoutrements of the type one would expect in normal burials, which can be explained by the nature of the mass graves. We noted in 1994: "The corpses appear to have been dumped in the chamber (on top of the ceramic dump) with no regard to any burial custom. One can assume that this was done in a hurry. The corpses were hardly covered with any soil. This manner of disposal is common in times of plague." (Kehrberg and Ostrasz 1994: 549). The modest jewellery bespeaks of simple individuals **(Figs. 15:3, 17 and 18);** the beads, while not restrung in a precise pattern, do however belong together and can be associated with single individuals, as can the bronze and iron finger rings and bracelets. Of particular importance is one coin found with beads among the crushed bones of one individual, viz. a gold tremissis of either Constans II (641 - 685) or Constantine IV (668 - 685) as identified by Augé. To reiterate what we stated in 1994, the coin provides a *terminus post quem* for both the burials and the earthquake that caused the collapse of the vaulted chamber sketched at **(Fig. 15:2)**.

Whilst at the very beginning of the excavation of chamber W2, we initially considered that the entombed individuals may have been victims of a late earthquake (Ostrasz 1993: 499), further excavation and the discoveries of the same scenario in chamber W3 confirmed that the burials were mid-7$^{th}$ century plague victims (e.g. Conrad 1986), corroborated by the coins associated with individuals; there were several dating to Late Antiquity, contemporary with the gold coin. Indeed, the chronological gap between the top layers of the pottery dumps in both chambers overlaid by the burials and the coins associated with the dead provide solid evidence for the victims being those of the 7$^{th}$- rather than the 6$^{th}$-century plague. According to Augé, the gold tremissis is most probably attributable to Constans II, thereby fitting the mid-7$^{th}$ century plague. The two intact glass vessels from W3 **(Fig.10: 6)**, protected from being crushed by a column drum under which they had been placed, also date to the late 6$^{th}$ - 7$^{th}$ century, all of which accords with archaeological data from the other cavea chambers which places the closure of workshops and abandonment of the entire building or site no later than the beginning of the 7$^{th}$ century (Kehrberg 2009). The gold coin, especially, seems to indicate what we had suggested in 1994, that the burials were done speedily to avoid contamination and that bodies were obviously barely touched, let alone searched, and were buried as they were found. The abandoned building was an appropriate site outside the walled city. The earthquake, most likely in 650 AD, sealed the graves; as mentioned above the tumbled vault and *scalaria* contained pottery as well as coins dating the construction of the circus. In this sense the two chambers represent the entire history of the building and site from beginning to end.

*East Cavea Periphery*

6-H91. Gr.1 **(Figs. 3 - 4 and 10)**

Context Description

"Hippo / area east of east outer wall / in front of E18/19 / grave south of 'stela' structure / in fill of grave together with skeletons / 7-09-1991" (A.O.; labels with skeletal remains; pottery sherds and glass).

Deposit

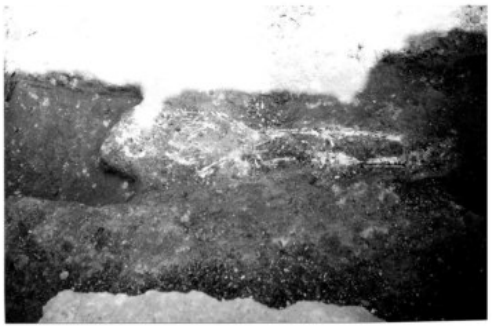


intrusive wall (A.Ostrasz 1996)



















*9. HCh96.W83b. Burials in west cavea chamber W8 (A.O. 1996).*



1 H91.Gr.1 JH1638



2 H91.Gr.1 JH1639

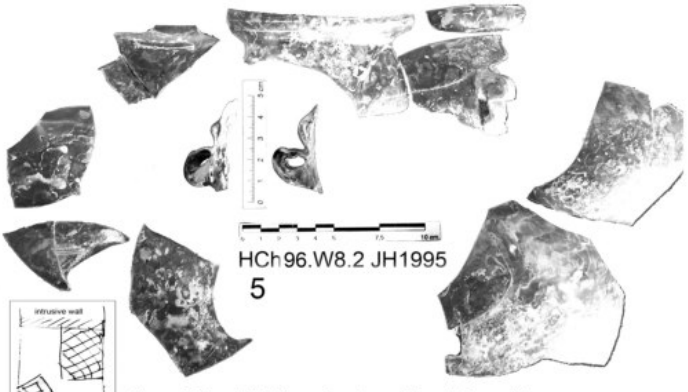


3 H91.Gr.1 JH1640



4 H91.Gr.1. JH1641

1-4: H91. Grave 1 in front of E19

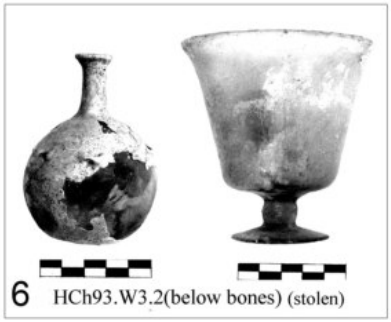


HCh 96.W8.2 JH1995

5

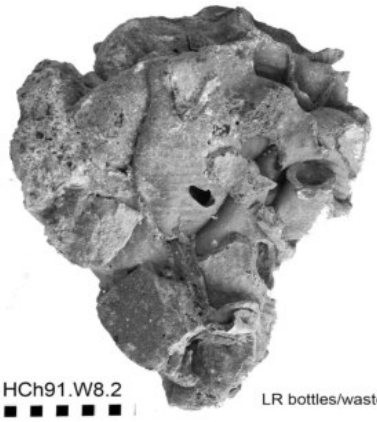


"layer 0.25cm thick/down from top of foundation wall/ loose greyish dirt/evident dump/occupation/ 25-9-96"(A.O.) pottery dump later 3rd-4th c.AD



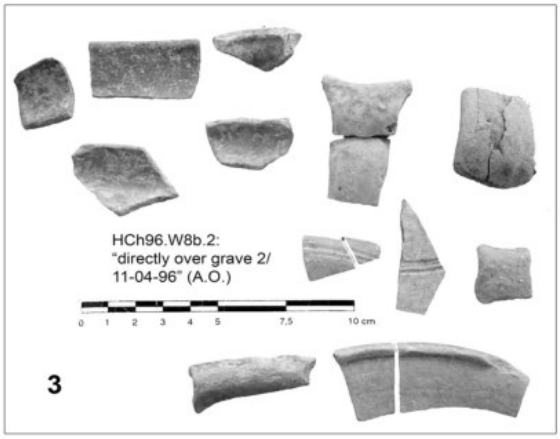
6 HCh93.W3.2(below bones) (stolen)

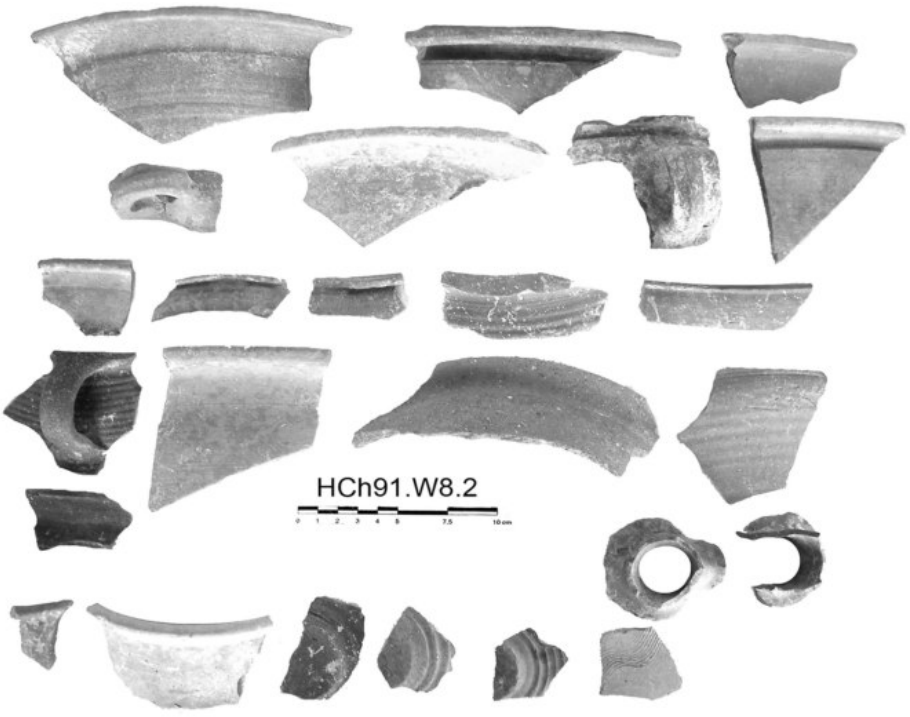
*10. Glass vessels associated with and in burial contexts.*



**1** HCh91.W8.2 LR bottles/waster

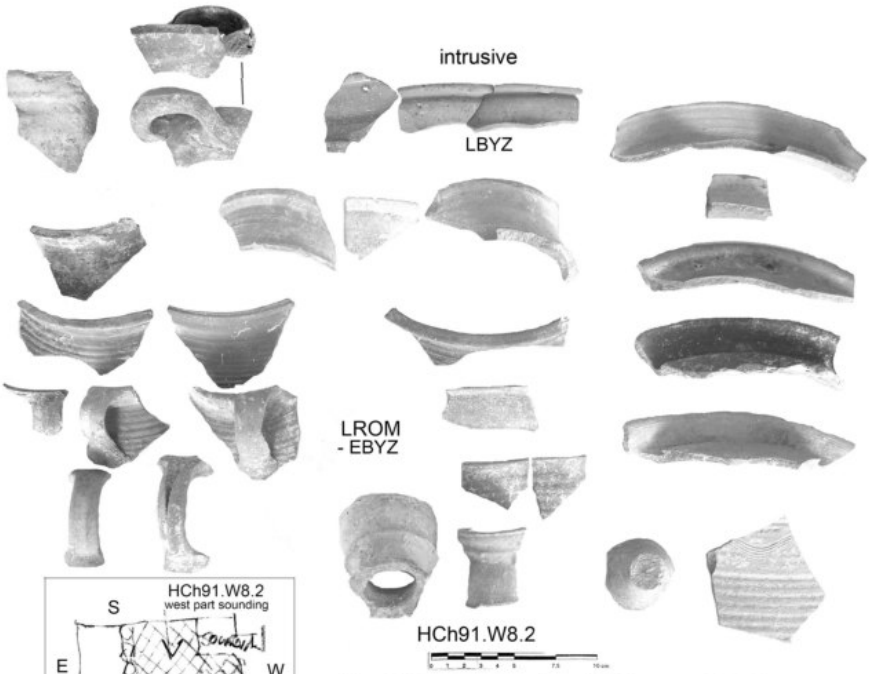
"Hippo/W8/south-west corner/layer ca 0.5m thick corresponding to 4th doorway stone below arch (together with 'beautiful' waster/ 17-3-91" (A.O.). Deposit notebook entry: (2)6-9-91 together with LR (late 3rd-4th) pottery parallel to E2.2 (I.K.)



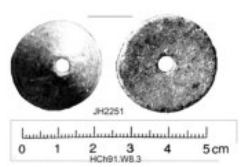




**2** "Hippo/W8/south-west corner/layer ca 05m thick corresponding to 4th doorway stone below doorway arch (together with beautiful waster)/17-03-91" (A.O.) Deposit notebook entry (2)6-9-91: LROM-EBYZ

*11. Roman, Late Roman - Early Byzantine pottery in west cavea chamber W8.*




**1** "W8/west part/in red earth fill, layer ca 0.2-0.25cm above 'floor'/on top of greyish dump fill/28-20/6/1991" (A.O) Deposit notebook entry (5) 6-9-91

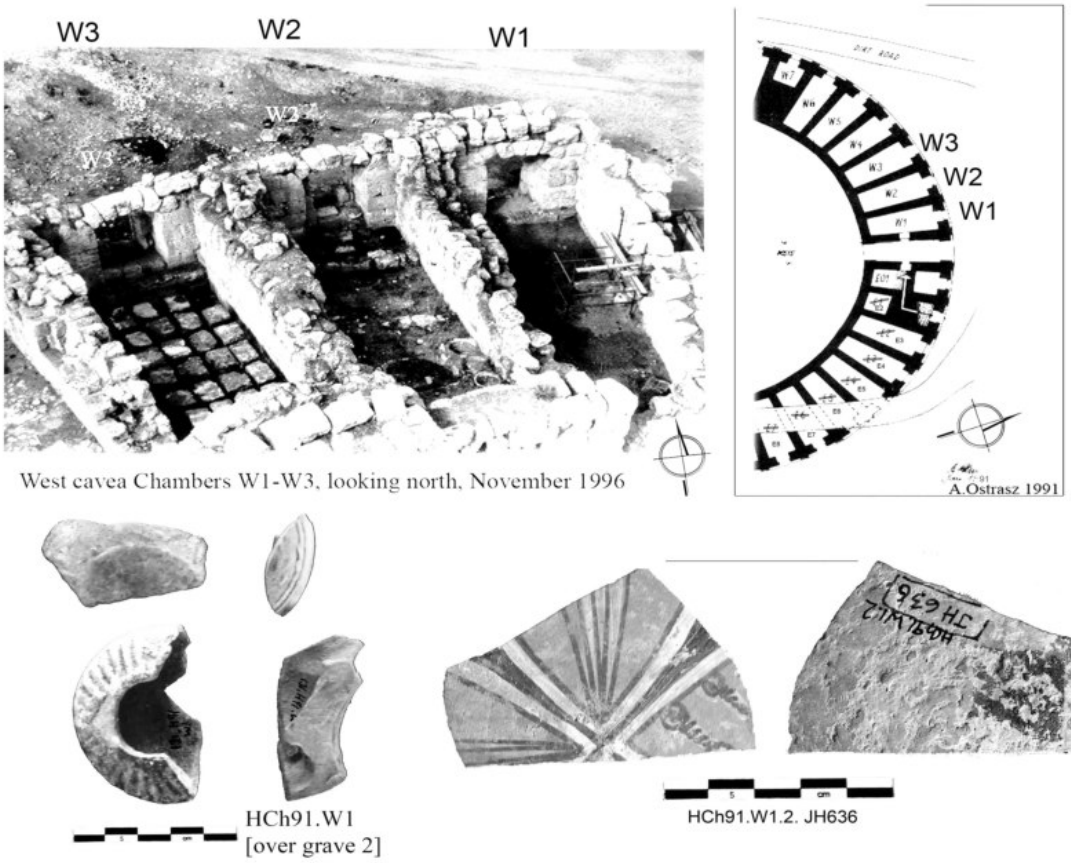



HCh91.W8.3.
"Hippo/W8/south-west corner/ layer ca 0.6m thick below 'floor' level together with pottery dump of same level,locus & date/ 18-03-91" (A.O.)
Deposit notebook entry (3) 6-9-91: deposit LROM-EBYZ

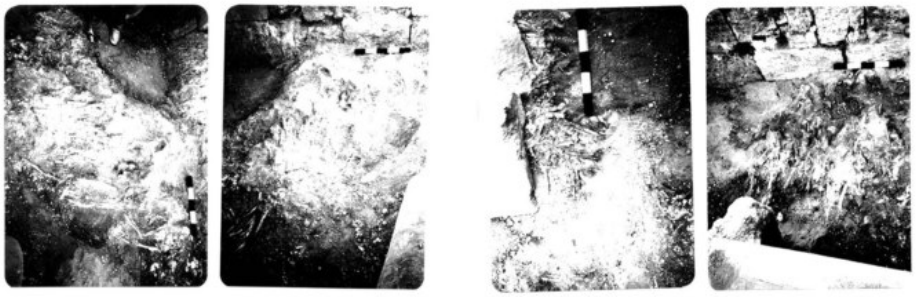



**2** HCh91.W8.3."Hippo/W8/south-west corner/ from 'floor' level down to ca 0.6m/ 18-03-1991" (A.O.). Deposit notebook entry (3) 6-9-91.

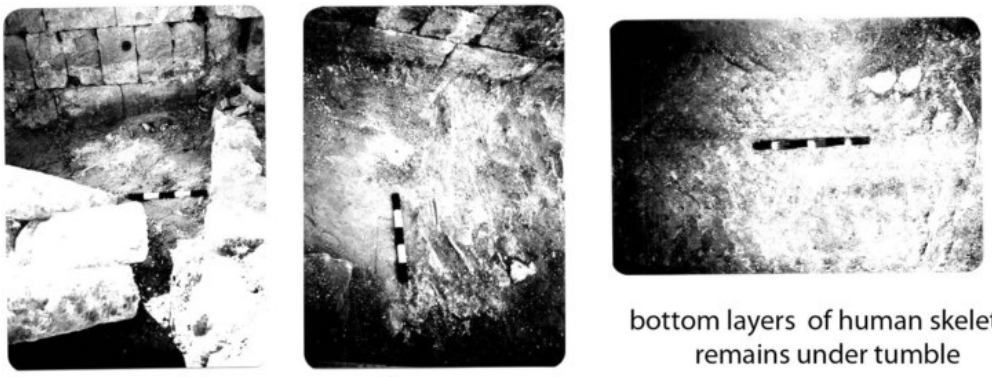
*12. Roman, Late Roman - Early Byzantine pottery in west cavea chamber W8.*




*13. Cremation burial in chamber E46 (reburial [?]); burial in chamber W1.*



mid- layers of human skeletal remains under tumble

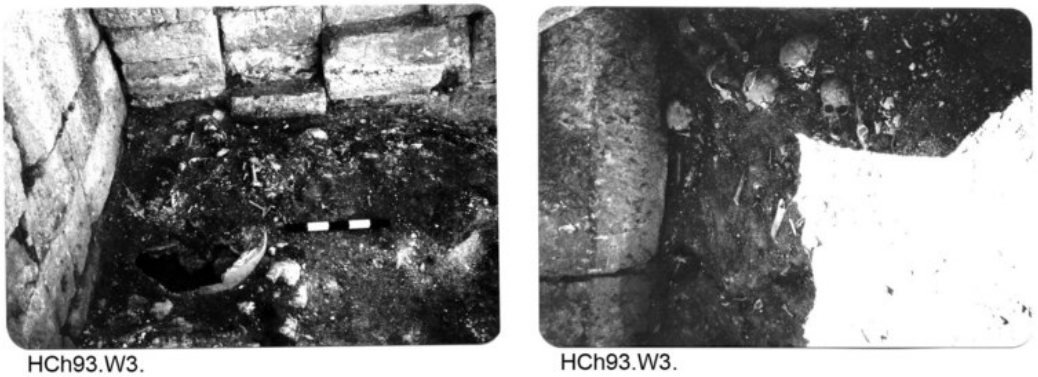


bottom layers of human skeletal remains under tumble



installations in chamber W2 :
after excavation /removal of layers of
tumble, skeletal remains and pottery dump

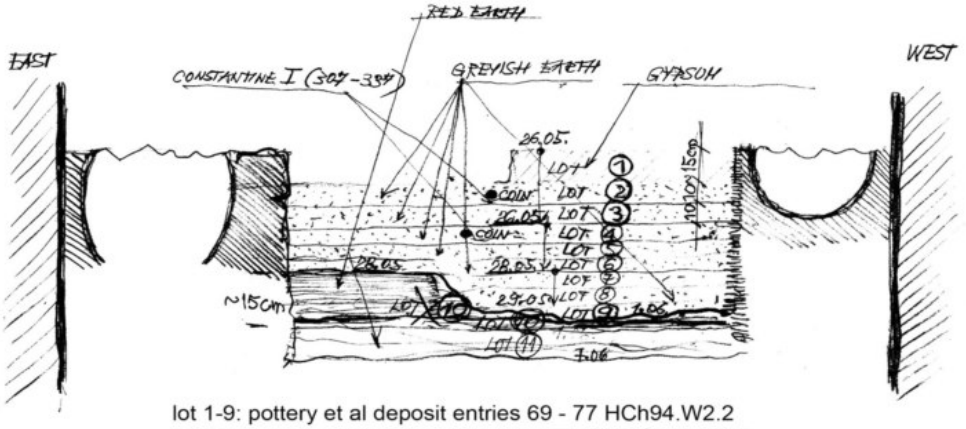
HCh92,93.W2



HCh93.W3.

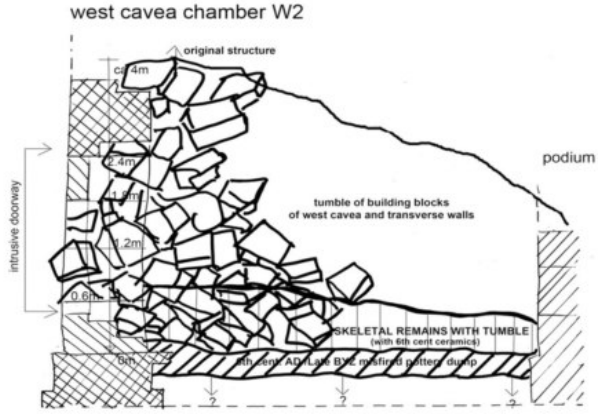
HCh93.W3.

*14. West cavea chambers W2, W3: mass graves of mid-7th century plague victims (A.O. 1992/93).*

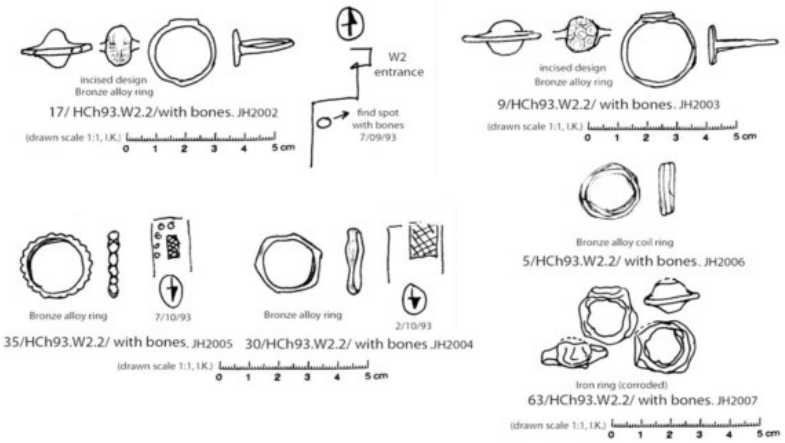



lot 1-9: pottery et al deposit entries 69 - 77 HCh94.W2.2
lot 10-11: pottery et al deposit entries 78, 79 HCh94.W2.3

**1** Hippodrome, west cavea chamber W2: workshop: sounding between vats (A.A.Ostrasz 26-05-1994: sketch not to scale)

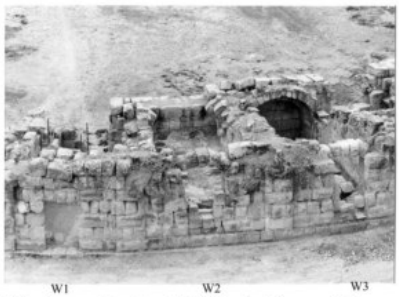



**2** Sketch by A.A. Ostrasz: N-S section of W2 with intrusive doorway to workshop: earthquake tumble and levels of reoccupancies.




**3** Jewellery found with human skeletal remains in chamber W2 (Pl.9)

*15. Sketch sections of chamber W2 (A.O. 1994), and metal rings.*



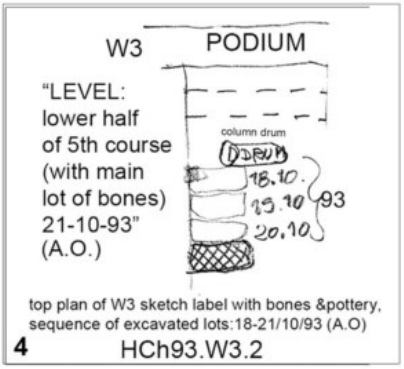

**1** West cavea chambers W1-W3: view from north to south overlooking the outer periphery and inner arena (photo A. Ostrasz 1995)




**2** West cavea chamber W2 after excavation with deep sounding near sunken vats; looking south.
(in W 3: tumbled seat stones arranged for restoration)
(photo A.Ostrasz 1995)

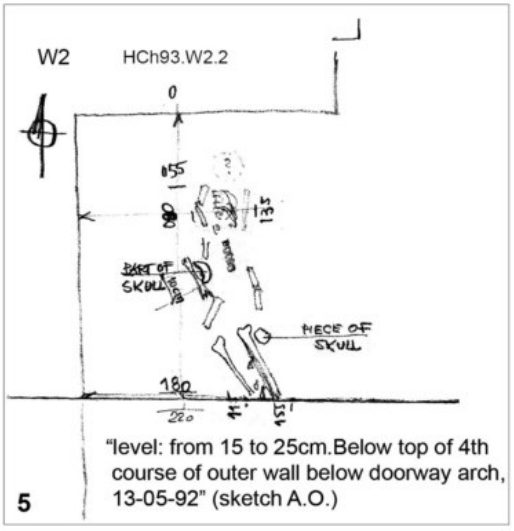


**3** Original entrance to chamber W2 and intrusive secondary workshop door (photo I.K. 2006)

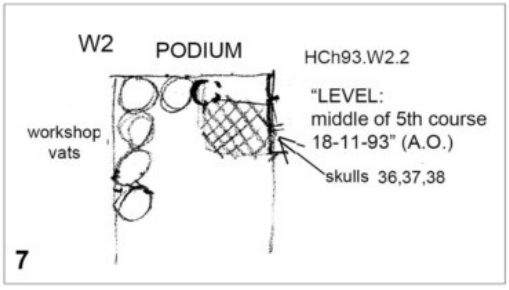



top plan of W3 sketch label with bones &pottery, sequence of excavated lots:18-21/10/93 (A.O)

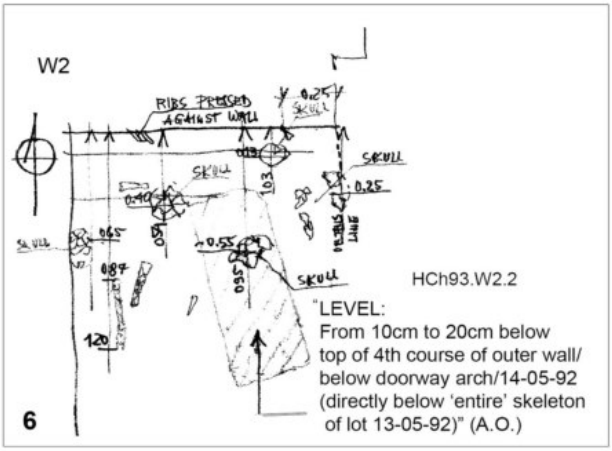
**4** HCh93.W3.2




**5** "level: from 15 to 25cm.Below top of 4th course of outer wall below doorway arch, 13-05-92" (sketch A.O.)

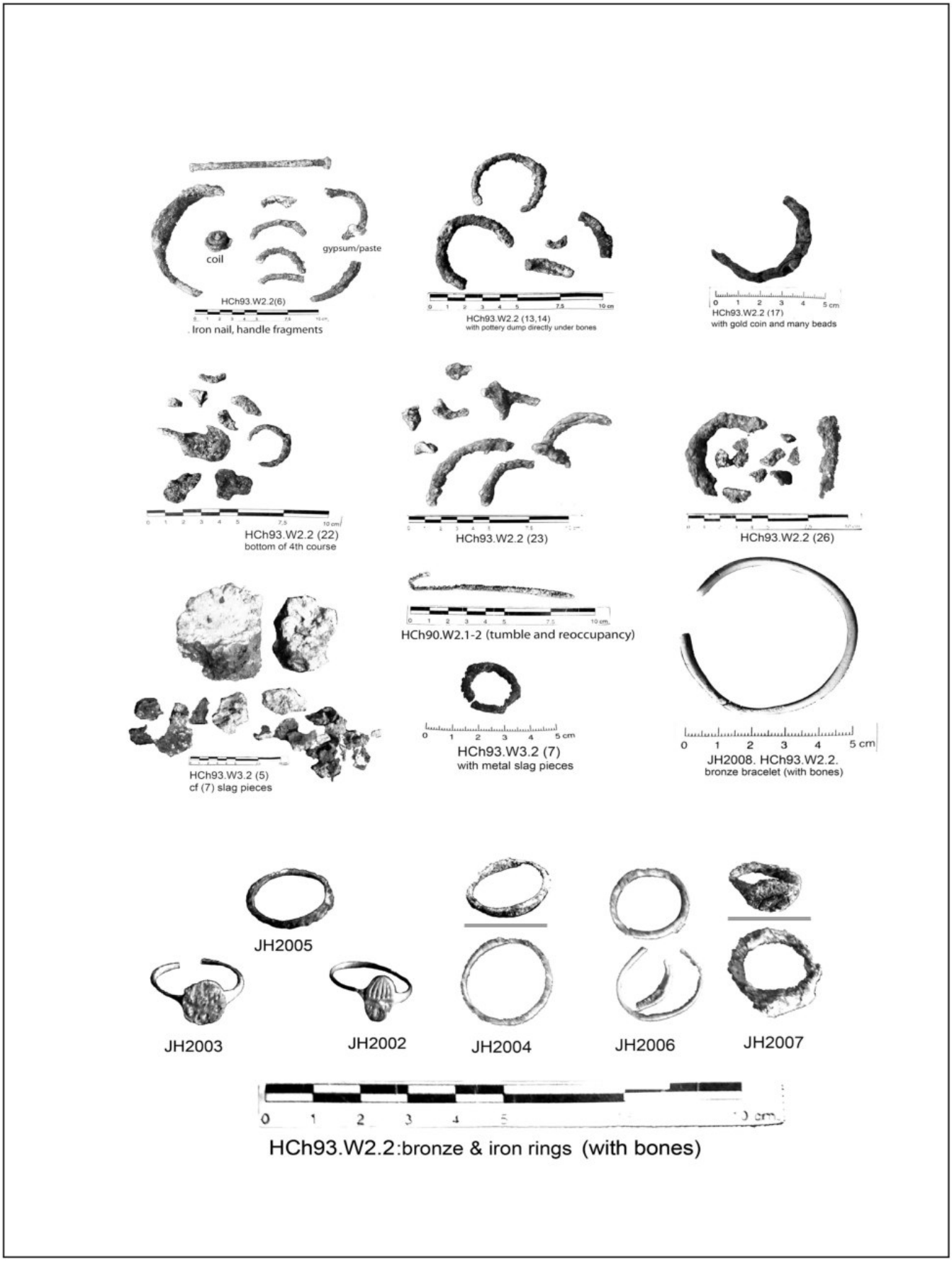



**7**

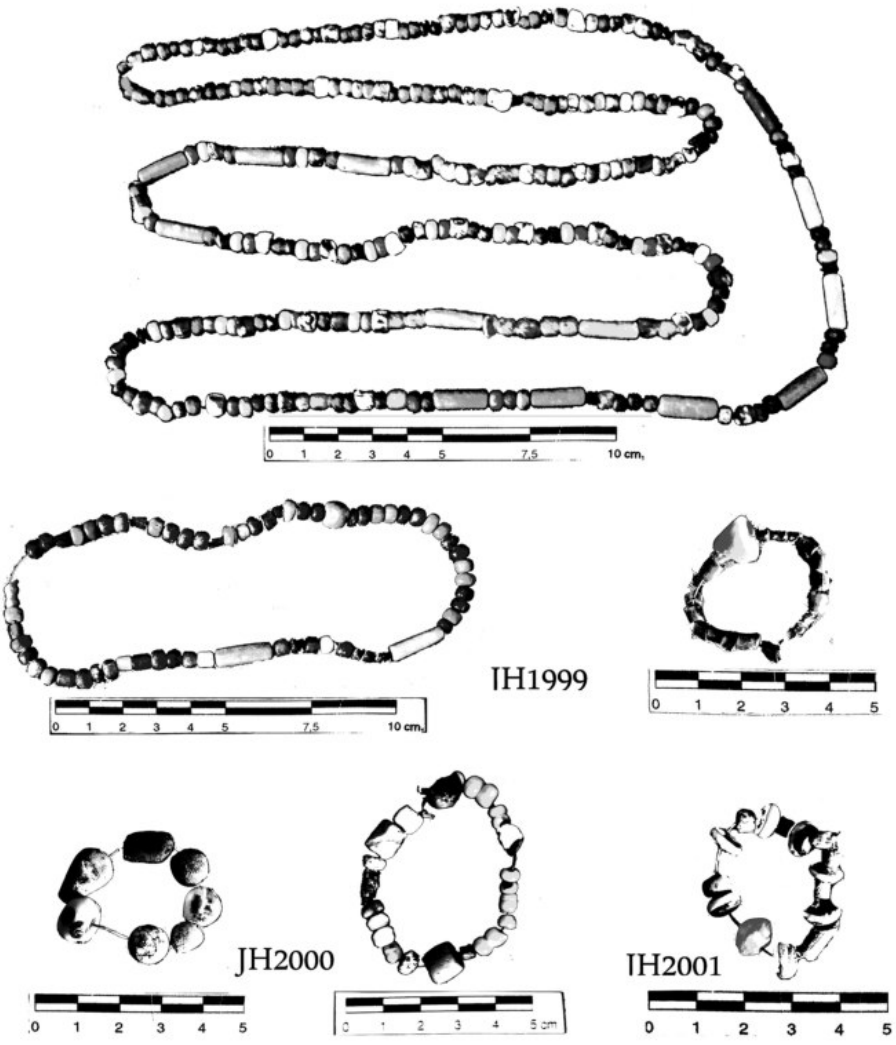



**6**

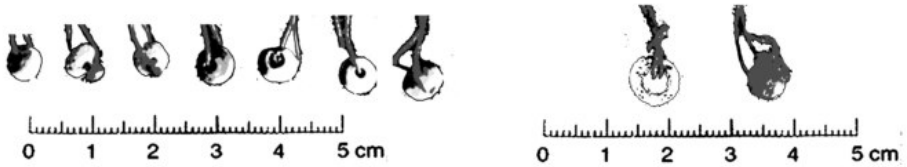
*16. (1-3) Post-excavation: cavea chambers W2, W3; (4-7) in situ plans during excavations (A.O. 1992/93).*




*17. W2 and W3: 'chambers of the dead': metal jewellery of mid-7th century plague victims.*




HCh93. W2.2 (with mass burial and coin) (beads clusters restrung by M.K-O)

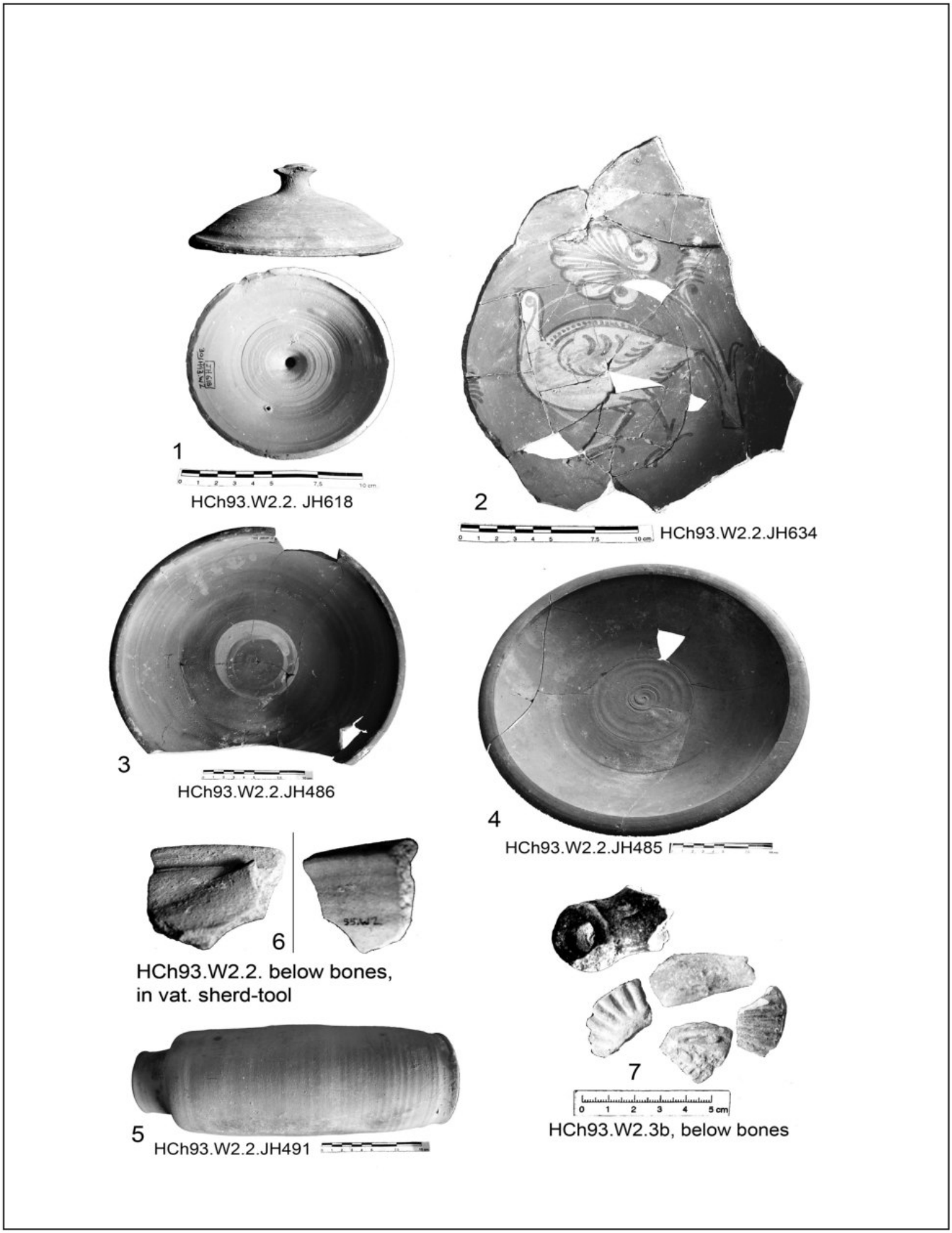



HCh93. W2.2 (with mass burial and iron frgt) JH2226

HCh93.W3.2. JH2243

18. Jewellery with human skeletal remains in west *cavea* chambers W2 and W3

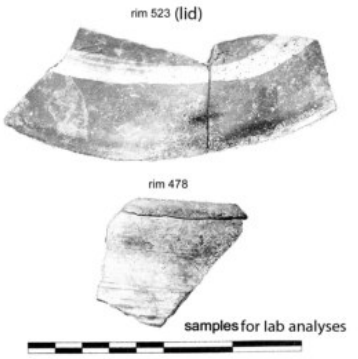
*18. Glass bead jewellery with skeletal remains in chambers W2 and W3.*




*19. Three periods in chamber W2: (1-5) second industrial occupancy: pottery dumps; (6) first secondary occupancy of tanners; (7) pottery from foundation level.*




13-15. HCh93.W2.2 with unfired pottery



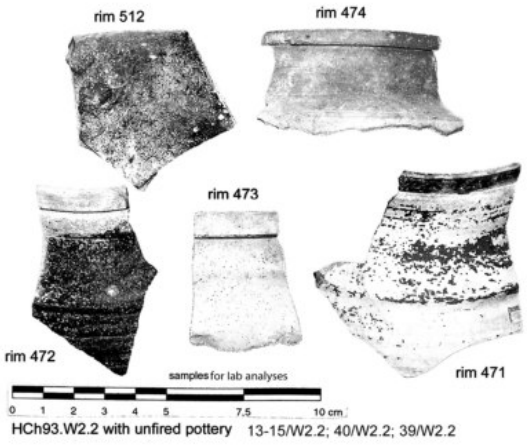

18,20. HCh93.W2.2 with unfired pottery




20.HCh.W2.2 with unfired pottery



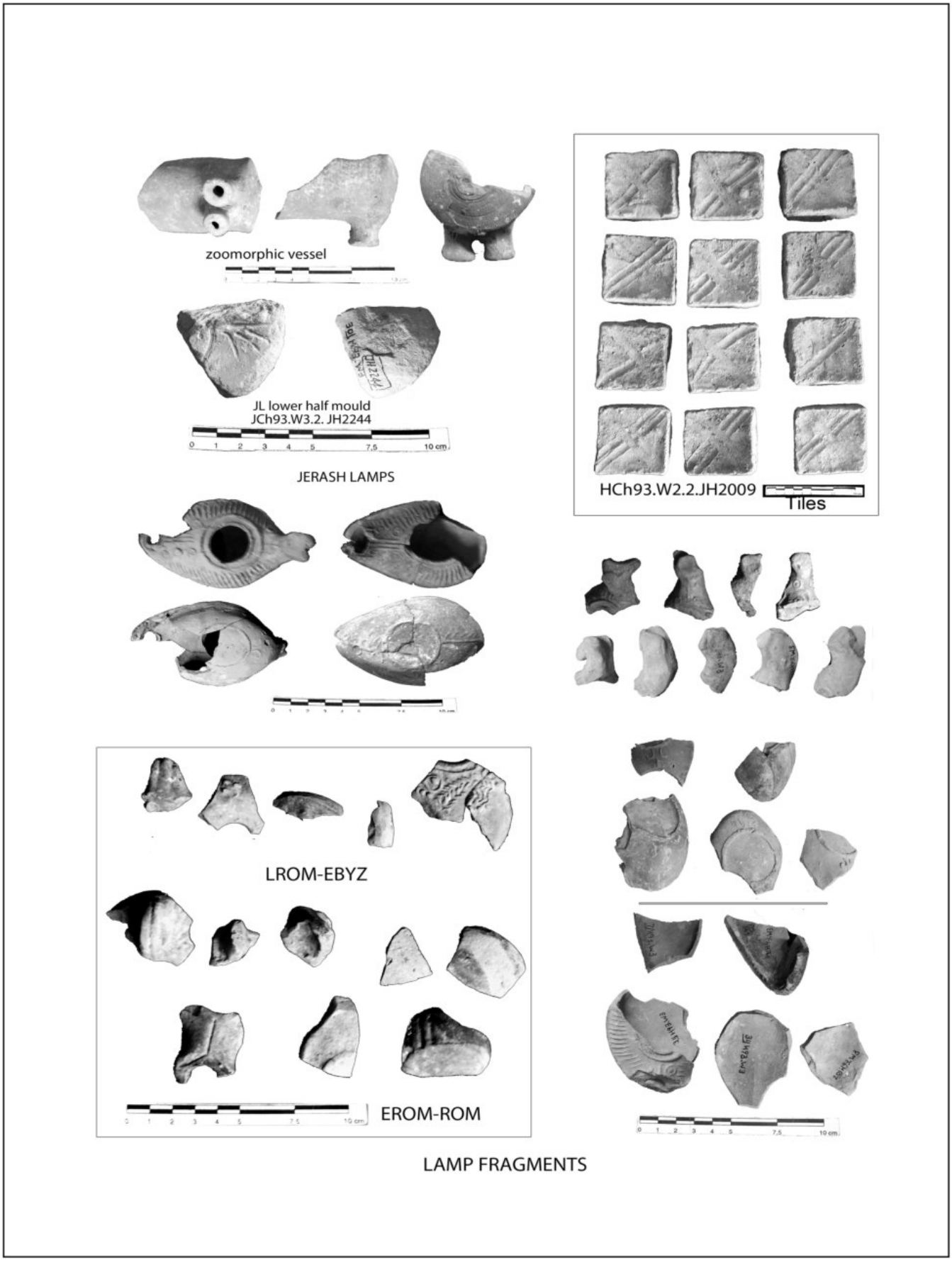
13-15. HCh93.W2.2 with unfired pottery



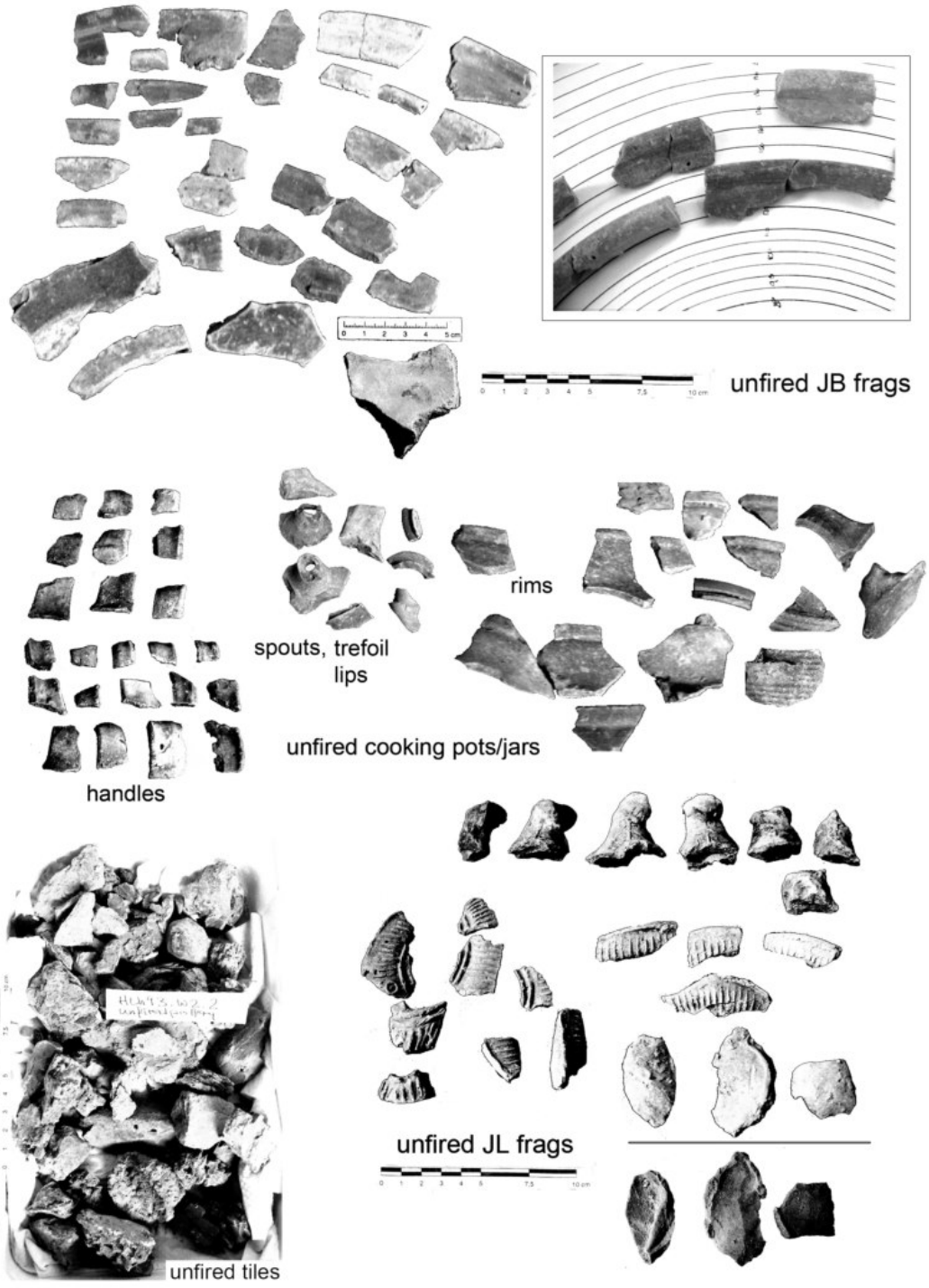

HCh93.W2.2 with unfired pottery 13-15/W2.2; 40/W2.2; 39/W2.2

20. HCh93.W2.2. pottery dump below bones, with unfired LBYZ pottery

*20. HCh93.W2.2: pottery dump below bones, with unfired Late Byzantine pottery.*




*21. HCh93.W3.2: mould-made and other ceramic objects found with bones below tumble.*




*22. Unfired pottery (Jerash bowls; Jerash lamps; jars; tiles) under skeletal remains in chamber W2.*



LROM-EBYZ & LBYZ

HCh93.W3.2, with bones, below tumble : POTTERY



Jarash Hippodrome 1992-1993, west cavea chamber W2
(below skeletal remains)



Jarash Hippodrome 1992-1993, west cavea chamber W2 (stolen )
(below skeletal remains)

HCh93.W2.2 below bones

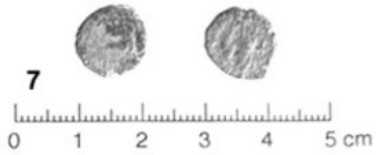


Jarash Hippodrome 1992-1993, west cavea chambers [W2 and] W3
(below skeletal remains)

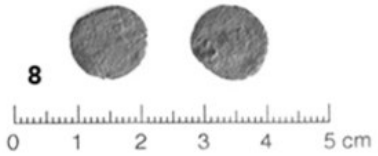
*23. Misfired ceramics and other fragments from chambers W2 and W3, with and below bones.*



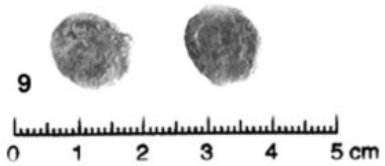

HCh96.W8b.3(b)" fill of grave/1(2/04/96)" (A.O.)



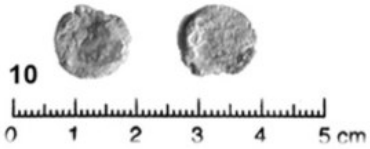

HCh91.W8.2. " W8/ 'floor level'/ 26-03-91" (A.O.)
coin cat no JH1433: "prob...Antioch,..period 383-395..." (J.B.)




HCh91.W8.2. "W8/middle of chamber/ 'floor level'/ 27-03-91" (A.O.)
coin cat no JH1434: " (?) late 4th - beg. of 5th cent? " (J.B.)




HCh87.E29.2. "E29/ east half of chamber directly above layer of earth fill
(ca 0.8m above 'floor; level)/under tumble (rather in tumble)/ cf glass and lamp frag
of same locus and excvn date/ 7-12-87" (A.O.)- see sketch plan Fig.7:9
coin cat no JH1340: " (?) prob middle-2nd half of 4th cent," (J.B.)




HCh87. E29.2 "E29/ east half of chamber directly above layer of earth fill
(ca 0.8m above 'floor' level)/under tumble (rather than in tumble)/ cf glass and lamp frag
of same locus and excvn date/ 7-12-87" (A.O.)
coin cat no JH1341: "(?) late 4th cent. ?" (J.B.)




HCh87.E29.2 "E29/east half of chamber/directly above layer of earth fill
(ca 0.8m above 'floor' level)/under tumble (rather than in tumble)/
(compare glass & lamp frag of same locus & excvn date/7-12-87" (A.O.)
coin cat no. JH1032: " ('follis')..ImpCo[nstantine I..] roughly 312-320.." (J.B.)

*24. Coins in hippodrome chambers with burials in W8 and E29.*




1

0 1 2 3 4 5 cm

HCh94.W2.2. "trench across chamber, lot (4): see ceramics/ 6-05-94" (A.O.)
Coin cat no.108, JH992: "AE , diam 20mm; obv. IMP Constantinus PF AVG..." (J.B.)




2

0 1 2 3 4 5 cm

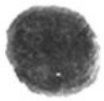
HCh94.W2.2. "trench across chamber, lot (2): see ceramics/ 6-05-94" (A.O.)
Coin cat no.109, JH993: obv.IMP Constantinus PF AVG; diam 20mm..." (J.B.)



3

0 1 2 3 4 5 cm

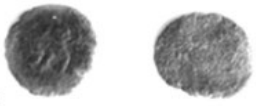
HCh93.W2.2 "W2/ N-E part -->/ level of 5th course (over flagging)/ under skeletal remains/ stm 2/ 9-09-93" (A.O.)
coin cat no JH1411: " ca 11mm diam/ illegible/ T.O. something on rev. ca 4th?" (J.B.)



4

0 1 2 3 4 5 cm

HCh93.W3.2. "W3/ layer of lower half of 5th course below arch of doorway with disintegrated bones/ --> verte/ 3-11-93" (A.O.)
coin cat no. JH1424: " 13mm diam, obv. diad bust, rev illegible, 3rd quarter 4th cent." (J.B.)



5

0 1 2 3 4 5 cm

HCh93.W3.2 "W3/north part -->verte/ level of middle of 5th course below arch of doorway/ together with skeletal remains/ stm 2/ 20-11-93" (A.O.)
coin cat no JH1426: "15mm diam/ obv illegible, rev stg emp with captive...ca 364-75 AD" (J.B.)

*25. Coins in hippodrome chambers with burials in W2 and W3.*

"Few Late Roman (3rd - 4th) pottery sherds and four Late Roman glass unguentaria: 3 intact and one complete, fragments." (I.K.).

This grave contained an adult and a young child, carefully interred with clearly distinctive burial gifts of four small glass *unguentaria* or phials **(Fig. 10:1-4)**. The glassware and shapes date to the Late Roman period, corroborated by pottery fragments found within the fill of the burial. As in the other graves, the individuals were seemingly cared for, evidenced by the careful construction of a simple pit or shaft grave lined with stone slabs. The location **(Fig. 4)** and date suggest that the dead belonged, as previously, to a family of the potters working and living at the hippodrome, possibly associated with one of the east cavea workshops nearby. The location of each burial plot is clearly deliberate and may indicate some commercial zoning pertaining to workshop units, which may in turn signify bought or rented 'rights' of specific terrain occupied by each workshop and family, and possible extensions: in other words no random squatting and thus burial grounds. It will be interesting to pursue this inquiry at other sites, but for now it suffices to state that the family of the dead belonged to Late Roman potters. The glass phials, a relatively costly import, are evidence of sufficient if modest earnings within the family. Glass was rare at Gerasa, especially before the boom of church-building in the 5th and 6th centuries which introduced glass window panes, glass lamps (candelabra) and vessels for the churches and chapels, and tesserae, together with itinerant glass workers evidenced by in situ finds at the hippodrome and other parts of Byzantine Jarash (Kehrberg 1986).

It is conceivable that the single burial in front of east *cavea* chamber E12 **(Fig. 4)** belongs here. Without distinctive pottery or other finds one cannot date the interment other than by its context, which places it within the secondary or industrial phase of the hippodrome, i.e. belonging to a family of potters. One may posit, however, since the manner of construction of the grave and its location is the same as the burial in front of E19, that it may be roughly contemporary and that the inhumation occurred before the church was built around 570 AD **(see plan Fig. 3:2)**. In all, the scenario fits the earlier industrial phase or Late Roman - Early Byzantine pottery workshops[8].

To end this concise account of the secondary burials at the hippodrome, it is hoped that it provides sufficient information pertaining to the burials to allow for a better comprehension of the published osteological studies. The purpose here is to show the archaeological evidence placing the burials into socio-historical contexts. The final hippodrome publications will discuss and present in full data shown at **(Figs. 1 – 25)**.

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**Abbreviations**

*ADAJ* Annual of the Department of Antiquities of Jordan

*AJA* American Journal of Archaeology

*JAP I, JAP II* Jerash Archaeological Project Vol. I, 1981-1983 (DoA, 1986, Amman); Vol. II, 1984-1987 (DoA / SYRIA 66, 1989)

*SHAJ* Studies in the History and Archaeology of Jordan. DoA. Amman.

*WLC* 2011 S. Mithen & E. Black (eds.), Water, Life and Civilisation: Climate, Environment and Society in the Jordan Valley, Cambridge University Press, 2011.

8. There were no Late Roman - Early Byzantine tannery workshops operating along the east cavea; the tanneries clustered in the northern east - west or curved end and west chambers of the cavea, close to a lime kiln complex (Fig. 3:2) in front of the north main gate to the arena.

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# LANDSCAPES OF THE DEAD (FOLLOW THE POTS PROJECT): MAPPING, SURVEY AND SITE MONITORING AT FĪFĀ JORDAN - 2013 SEASON

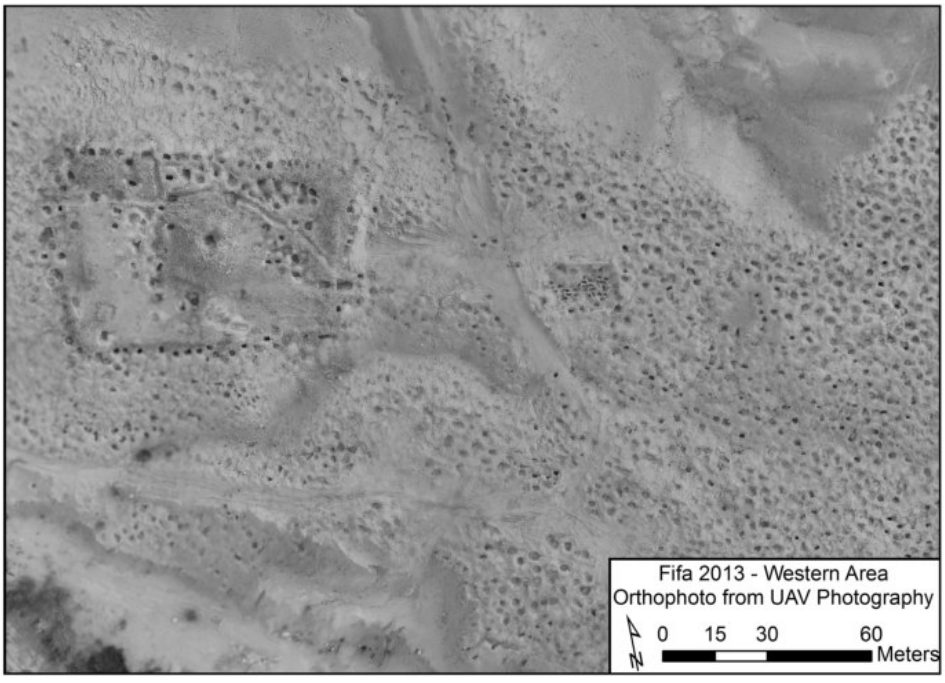
*Morag M. Kersel and Austin C. Hill (with contributions by Meredith S. Chesson, Walter Rast and R. Thomas Schaub)*

## Introduction

The primary objective of the 2013 field season of the *Landscapes of the Dead Research Project at Fīfā* was to assess (through aerial photography and a pedestrian survey) the Early Bronze Age (3,500 - 2,000 BC) archaeological landscape at Fīfā in order to understand better both the ancient and modern uses of a mortuary site. During the process of formal recording in 2011, we recognized and documented ongoing threats to the site in the form of systematic looting to supply artifacts to the antiquities market. As part of a future comparative analysis of other Early Bronze Age cemeteries (Bāb adh Dhrā‘, Jericho and Naqa‘), the 2013 season focused on providing a base line for looting at the site. By thoroughly documenting the site using Unmanned Aerial Vehicles (UAVs) we produced a composite 3D image of the site **(see Fig. 1)**, which we will use as a comparison in future seasons to assess cultural and natural transformations in the landscape. This was the first of a planned five-season project of site monitoring of this looted landscape. In addition to mapping and recording the site, we are interested in assessing potential cultural heritage protection strategies for safeguarding the past. Through aerial photography and pedestrian survey the change over time of this archaeological landscape was assessed. The main research goals of the *Landscapes of the Dead Project are:* (1) To obtain quantitative data on the scale and intensity of looting at Fīfā using innovative aerial photography, and (2) To continue recording and mapping the looted landscape of Fīfā.

## Background

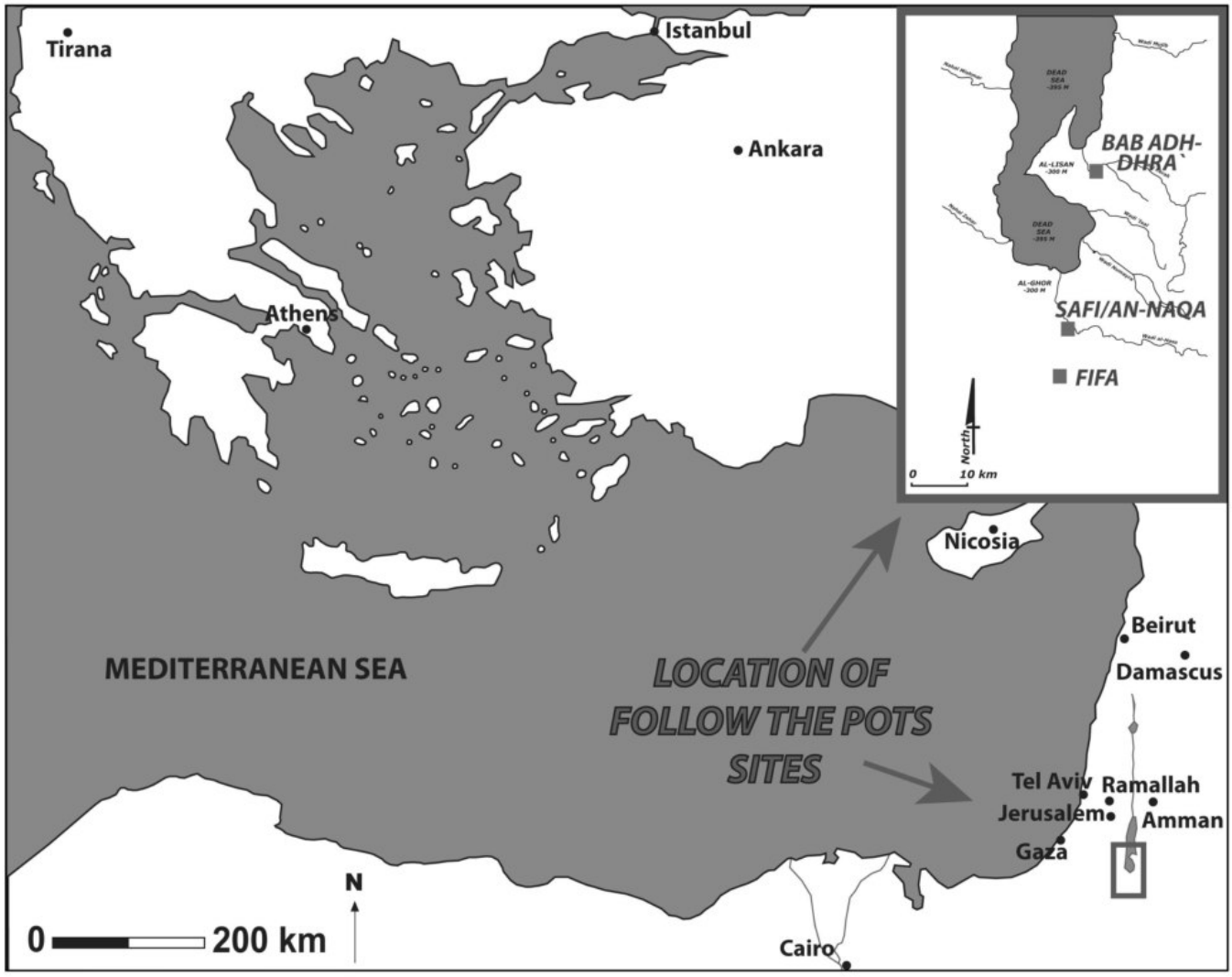
Located approximately 30 kilometers south of the southern shore of the Dead Sea, the




*1. 3D ortho photograph of the western area of Fīfā, 2013.*

cemetery is situated to the north of Wādī Fīfā on a low east - west ridge overlooking Ghawr Fīfā to the west **(see Fig. 2)**. Also west of the site is the modern town of Fīfā. At the western base of the cemetery promontory is a modern cemetery. Early evidence for the site comes from Frank, who in 1932 referred to an Early Bronze (EB) scatter at Fīfā (Frank 1934). During his survey of Transjordan in 1936, Nelson Glueck also mentioned the site (Glueck 1937). As part of *their Survey of the Southeastern Plain of the Dead Sea in* 1973 Walter Rast and R. Thomas Schaub (1974) recorded Early Bronze Age, Iron II, Roman and later Islamic period pottery at the site. During this survey Rast and Schaub noted similarities in setting with the Early Bronze Age town site and cemetery at Bāb adh Dhrā‘, which led them to suggest that Fīfā was one of a series of Early Bronze Age settlements along the south-east Dead Sea plain. They reported looting at the site and disturbances of the associated material culture from the tombs at this cemetery. This is the earliest mention we have of archaeological site destruction at Fīfā.

Subsequent visits by Rast and Schaub and identifications by *the Southern Ghors and Northeast ‘Arabah Archaeological Survey* (MacDonald *et al.* 1992) raised doubts about the presence of an EB walled settlement at the site. Based on the distribution and concentration of Iron Age pottery, MacDonald and colleagues (1992) redesignated the walled structure as Iron II, which they named Site 75. The EB cemetery was named Site 76; Neolithic and Chalcolithic




*2. Map of the Follow the Pots field sites.*

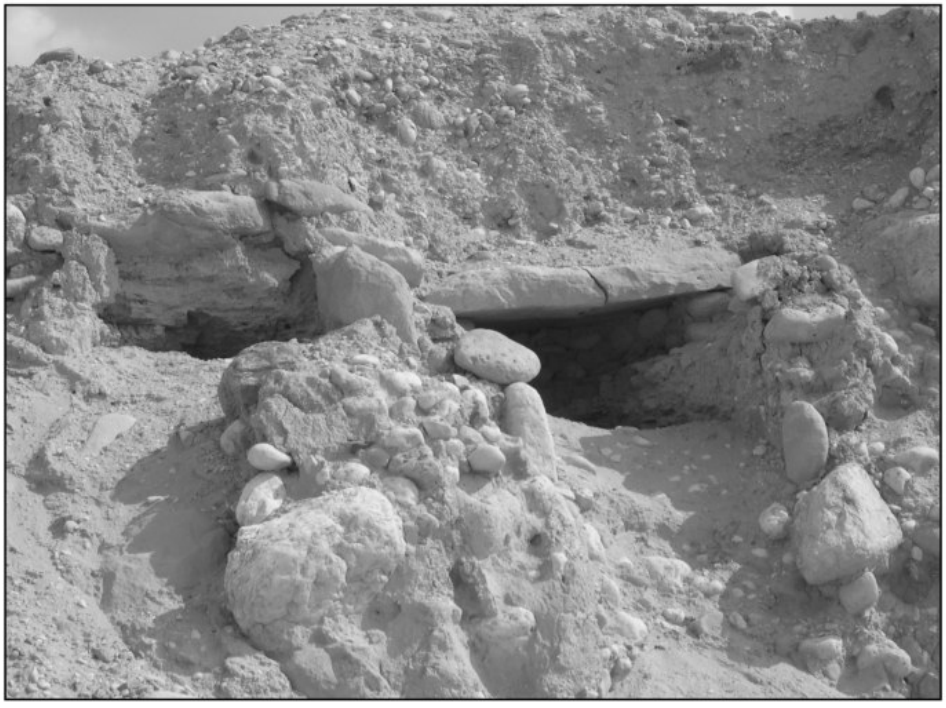
ceramics were noted in the area and looting of the site was confirmed (MacDonald *et al*. 1992).

The results of the MacDonald survey were instrumental in arriving at goals for the 1989 - 1990 systematic archaeological excavations carried out at Fīfā by Rast and Schaub. The first objective of the three-week season was to explore and determine the extent of the cemetery. Rast and Schaub thought that data recovered from Fīfā, taken in consideration with those from Bāb adh Dhrā‘, would contribute to ongoing discussions surrounding the transition from the Chalcolithic to Early Bronze Age. A second goal was to determine the occupational history of the walled area - conclusively dating the area to the Early Bronze or Iron Age.

In three trenches Rast and Schaub exposed eighteen tombs, excavating eleven. All of the tombs were burials in stone-lined cists with slab roof coverings **(see Fig. 3)**. Typically apsidal, the average size of the tombs is 1.66 m, about 70 - 80 cm in width and about 1 m deep. Based on a survey of the looted tombs, in our 2011 season we determined that there were three different types of tombs: slab-lined **(see Fig. 4)**, boulder-lined **(see Fig. 5)** and slab- and *wadi* cobble-lined **(see Fig. 6)**, confirming some of the findings of Rast and Schaub in 1990. Between one and six individuals (combination of subadults and adults) were interred in each of the excavated tombs. Rast and Schaub (1990) estimated a density of six tombs in a 50 sq. m area. If this estimate is consistent across the site, Fīfā may rival Bāb adh Dhrā‘ in cemetery size. Fīfā, however, is unique in that it contains only EB I. As an element of the *Landscapes of the Dead* project, we are interested in determining the extent of the site through pedestrian and aerial survey.

In response to reports of increased looting and destruction at the site, Dr Mohammed Najjar excavated an area of 20 m x 10 m (approx. 177.5 sq. m) in 2001 on behalf of the Department of Antiquities, uncovering 50 graves.

In the 2011 season of the *Follow the Pots Research Project* (FTP) (co-directed by Morag M. Kersel and Meredith S. Chesson) the team (Morag M. Kersel, Isabelle Ruben and Hugh Barnes) surveyed and mapped the extent of the cemetery using a handheld GPS unit and a total station. Data from previous excavations and visits to the site, in combination with aerial photographs, indicate that there are thousands of looters' pits at the site, many of which have destroyed stone-lined cist tombs containing secondary burials, ceramic and stone vessels, shell bracelets, stone mace heads and beads.



*3. Cross-section of a cobble-lined cist tomb with slab covering.*



*4. Slab-lined cist tomb, Fīfā.*



*5. Boulder-lined cist tomb, Fīfā.*

In 2011 the site resembled a moonscape, with looters' trenches extending across rolling hills as far as the eye could see. The ground is covered with spoil heaps of dirt, human skeletal remains and broken artifacts. Such a scale of destruction makes total documentation of all looters' pits impossible, but we addressed the salient question posed by Webb and Frankel (2009), which challenges conventional archaeological investigations by asking: Is a cemetery that has been robbed and pillaged for generations worthy of systematic research? Ground-truthing of the looted Early Bronze Age IA cemetery at Fīfā in 2011 demonstrated that looted cemeteries are crucial to a holistic methodical investigation of an archaeological landscape. These aspects have been discussed in publication (see Kersel and Chesson 2013a; Kersel and Chesson 2013b). In December of 2013 we launched an Arabic / English website *(www.followthepotsproject.org)* in order to disseminate the results of our research more effectively.



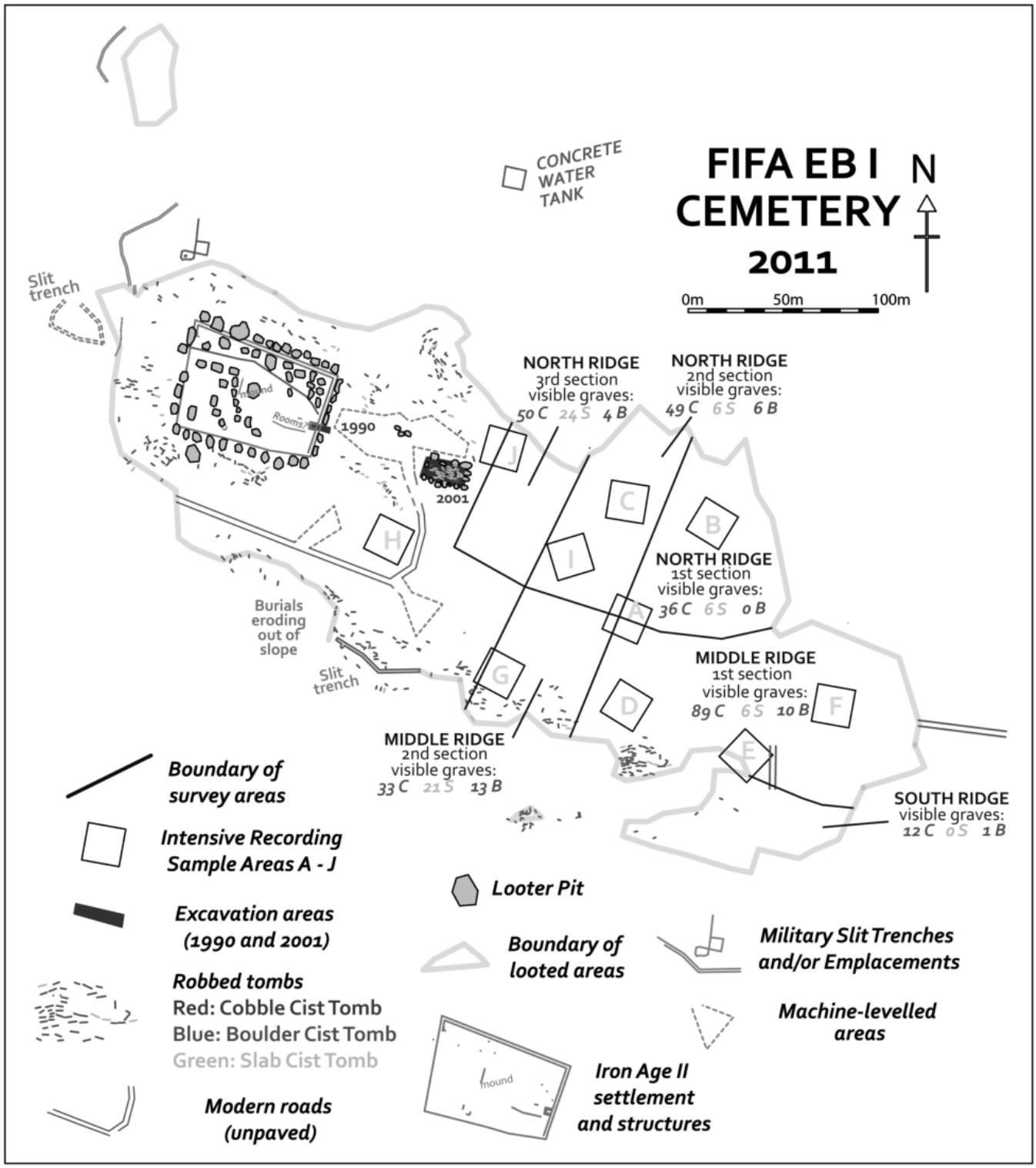
*6. Cobble-lined cist tomb, Fīfā.*

**Field Work Strategy (Methods)**

Two components of fieldwork at Fīfā were undertaken in January - February 2011. The first included intensive surface mapping, documenting the extent of the cemetery using a GPS and total station to record the terrain. The second involved a sampling strategy of recording looters' pits and visible tombs. Although not part of the original scope of the project, this second aspect tested the recent proposal of Contreras and Brodie (2010) to use Google Earth to record looting. Contreras and Brodie (2010: 109) assert, "There is no guarantee that all of the looting pits penetrated burial chambers, though it seems most likely that pitted areas do represent looted tombs". In ground-truthing the cemetery, FTP investigated the assumption that every pit equals a successfully looted tomb. As a result FTP recorded and quantified evidence of archaeological site looting in a systematic fashion, providing a more accurate account of the destruction of this ancient landscape. The results indicated that, in fact, every hole does **not** equal a tomb. This demonstrates that Google Earth may be useful, but ground-truthing is required for an accurate assessment. The initial mapping of the site indicates an estimated area of 64,000 sq. m for the cemetery **(see Fig. 7)**. Our mapping recorded over 800 graves in the looted landscape, although thousands more exist, yet to be looted or excavated. In the examination of back dirt piles from looting we were able to determine that there were different looting episodes. This background information and map allowed us to formulate the methodology and goals for the five-year (2013-2018) *Landscapes of the Dead Project.*

**Methodology for the Landscapes of the Dead Project, 2013**

*Aerial photography.* The primary element of this field project is the use of aerial photography as a method of site assessment and monitoring. The advantages of gaining a good aerial view of the ground are well established and appreciated by archaeologists; a high viewpoint permits a better appreciation of fine details and their spatial relationships within the wider site context. Rather than relying on satellite images or Google Earth for aerial images of Fīfā, which provide insufficient resolution for identifying site details, multiple images of the site were taken using a remote controlled plane. Aerial photography from UAVs is one low-cost, inclusive, environmentally friendly alternative to more expensive satellite imagery and




*7. Comprehensive plan of Fīfā, 2011.*

traditional aerial photography (Verhoeven 2009). *Site recording.* This research builds on and expands the 2011 preliminary survey of the site, which embarked on a more intensive recording of the individual graves by taking two measurements when possible, one at each end of the grave in order to show its orientation (see Fig. 7 - map of the site). During this season we took a series of images of the tombs exposed during the 2001 systematic excavations of M. Najjar and the Department of Antiquities in order to create 3D models of the tomb types. This work enhances

the existing database of tomb types, established during the 2011 Follow the Pots survey season.

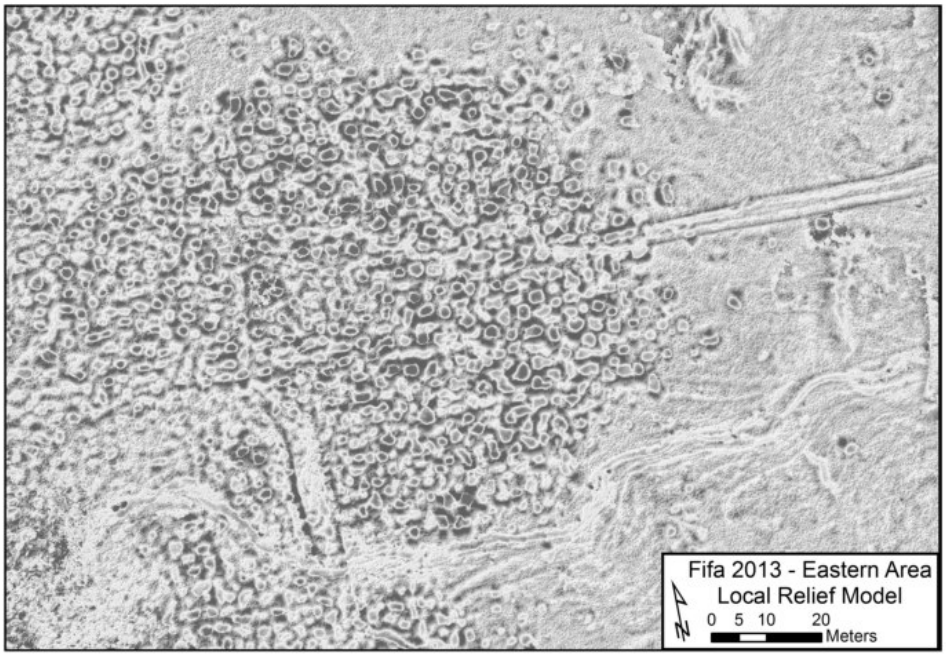
**Preliminary Results**

A small fixed wing UAV provided a platform for stable, low elevation aerial photography, making it possible to both document looting and destruction at Fīfā as well as generate spatial data for digital mapping **(Fig. 8)**. Aerial survey at the site utilized novel photogrammetric image post-processing to produce high-resolution digital elevation models (DEMs) of the site. A chronological assessment of looting at Fīfā will assist the identification of new looter's pits and determinations of whether any of the looter's holes had been revisited, whether or not the looting was recent (indicated by fresh earth) and whether there is a discernible difference in looting episodes. The continued mapping and ground-truthing of the landscape during the 2013 season supported our conclusion that looters are revisiting earlier looter's holes and that there is ongoing, recent looting. This season of aerial site monitoring was the first of a five-year plan to revisit the site at the same time each year to investigate change over time, using high resolution, spatially accurate 3D models, and to assist the Jordanian Department of Antiquities' assessment of anti-looting campaigns and outreach programs.

**Incidents of Looting**

During our second day on the site (15 June 2013), in the early morning, we placed plastic plates at 50 m intervals (using a handheld GPS) to be used in georectifying the images in order to create 3D plans and a comprehensive base map of the area. At approximately 10:00am we headed in to Ghawr aṣ-Ṣāfī to get cement and rebar in order to establish a datum for future research. As we gathered our equipment and prepared to leave the site we noticed a couple of men on the far eastern edge of the site; one waved and said good morning. We started back toward the car and as we left we noticed something unusual on the south-eastern edge of the main wadi: flying, loose dirt. The two men were digging a tomb. We decided to leave our equipment and assess the situation. They appeared to be 're-excavating' an old looter's pit and had recovered three vessels (two Ṣāfī cups; one juglet) **(see Fig. 9)**. The looters were using a large pick, a shovel, a long metal pry bar for leverage and two screwdrivers to excavate. We asked if we could take some images; they said yes. They asked us if we were also digging and if we wanted to buy a pot.

Our DoA representative, Jehad Darweesh,




*8. Local relief model of the eastern area of Fīfā, 2013.*



*9. Confiscated looted vessels, Fīfā 2013.*

called the local police who came to arrest the two looters. Jehad Darweesh confiscated the pots, which will be used as evidence in the courts. Later we documented and recorded the looted area. After a comprehensive pedestrian survey of the site, we concluded that looters in the area are revisiting tombs that have been previously looted. They are using a technique where rather than finding a tomb and digging from the top down, they are digging from the side at the bottom of an already looted tomb. The close proximity of tombs (sharing walls; abutting each other [as demonstrated by the Najjar / DoA excavations in 2001]) results in the successful acquisition of pots in this manner - digging from one tomb into an adjacent one. This method requires less work than excavating from the top down, especially when adjacent tombs are covered by previous spoil heaps that would need to be moved first.

**Concluding Remarks and Future Work**

UAV-based aerial photography is a low-cost, inclusive, environmentally friendly alternative to more expensive satellite imagery. A remote controlled plane, which allows for stable, low elevation aerial photographs, is an efficient tool for recording looting and site destruction at Fīfā. It is clear from the ongoing looting that site guards are required to keep the looters at bay. If Jehad Darweesh had not been working with us in the field, the looting incident on 15 June 2013 would have gone unreported. Additional funds from the DoA would be very helpful in assisting local inspectors to monitor looting at the various sites under their jurisdiction. Looting is harmful to our understanding of the past and we should all be assisting in the monitoring and recording of looted landscapes.

The myriad consequences of the illegal excavation at Fīfā on the interpretation of changing mortuary practices and social differentiation may never be known and valuable data has been and continues to be lost, distorting our understanding of Early Bronze Age burial customs. Damage caused by looting places severe limitations on attempts to describe the orientation and original condition of the tomb chambers accurately and document the extent of the cemetery site, creating *lacunae* in the archaeological record. This project will make a significant contribution to our understanding

of the genesis of complex societies during the Early Bronze Age period of the southern Levant, while assessing the efficacy of aerial photography as a means of monitoring archaeological site destruction.

**Acknowledgements**

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# ROMAN ANTIQUITIES FROM AL-QUNAYYAH, JORDAN

*Romel Gharib, Julien Aliquot and Thomas M. Weber-Karyotakis*

## 1. The Ancient Site of al-Qunayyah (Romel Gharib)

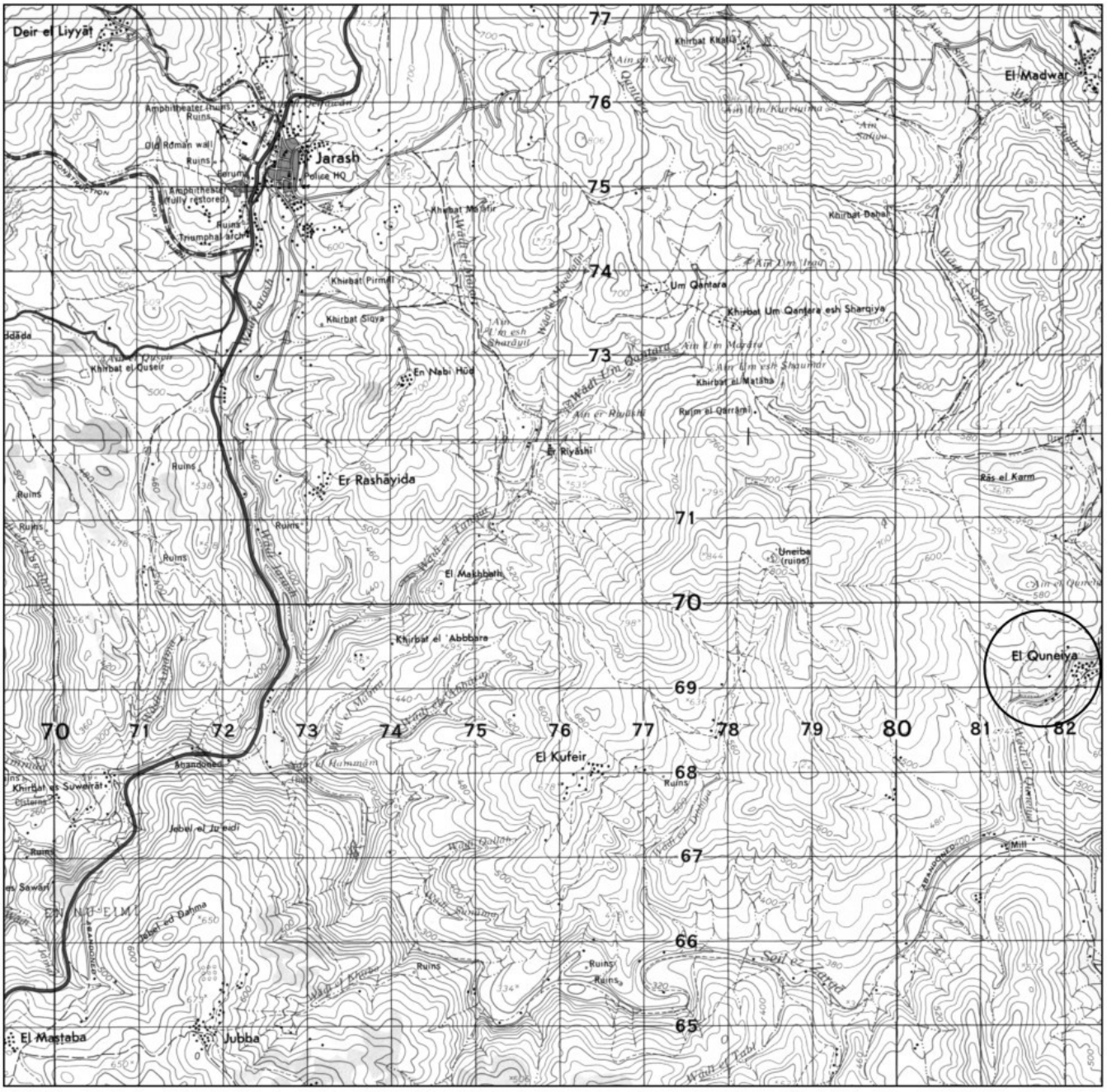
Al-Qunayyah (32.222116° N; 35.993929° E; alt. 490 m) is located in the communal district of Hashimiyya al-Jadida (Zarqa governorate). As the crow flies, it is some 10 km south-east of Jarash, the ancient city of Gerasa of the Decapolis, about 20 km north-west of Zarqā' and 30 km north of Amman, ancient Philadelphia **(Fig. 1)**. The modern village nestles on both banks of Wādī Qunayyah, which runs from north to south until it enters a bend of the Zarqā river. The once-perennial flow of the river is today supplemented by the outlets of the Samra water plant. Only few kilometers to the east, the landscape quickly changes into the semi-arid fringes of the steppe and the desert.

The ancient name of the site is unknown. Up to the present day, geological and climatic conditions have allowed relative prosperous agriculture through irrigation, which helps to explain the modern Arabic name of the village (Ar. "small canals"). Along the banks of Wadi Qunayyah, dissolution of the limestone has formed karst caves that were used as dwellings, cellars and tombs in antiquity. A number of ancient buildings and their foundation layers are visible on the eroded ground surface. Some of the older buildings in the village, dating back to the late 19th and 20th centuries, make use of solid limestone ashlars which might, on the basis of their appearance and workmanship, be Roman. This applies especially to the remnants of the aquaduct and tower of a ruined late Ottoman water mill, which are still to be seen at a ford crossing the Qunayeh brook **(Fig. 2)** where today the modern asphalt main road passes from its southern to northern banks.

In 2007, two Roman stone monuments were found in the village within a kilometre of each other. They represent different types of porous limestones of local origin. They are both of great interest for the history of the site: one of them is a funerary stele which displays figural representations of human busts; the other is a votive altar inscribed in Greek that was dedicated by several priests in the late 3rd century AD. The votive altar was lying in the olive orchard and garden of a private owner, close to the Ottoman mill. The funerary stele was found ca 800 m further south on the slope of the east bank, in the neighbourhood of a modern farm. No surface traces are visible that might shed further light on the ancient architectural context of these two finds. Both monuments were removed from al-Qunayeh by the Zarqa office of the Department of Antiquities, to be protected and exhibited to the public in the newly restored Ottoman Qaṣr Shabīb.

## 2. A Funerary Stele with Superimposed Busts (Thomas M. Weber-Karyotakis)

This monument **(Fig. 3a-d)** consists of white limestone with yellow stains. It is covered in an extensive transparent ochre patina. The porous stone material, which includes a few fossils, seemingly erodes by flaking. The block, almost cuboid in shape, had a thin fissure in its lower rear part; this part broke off while workmen were moving it for photography.



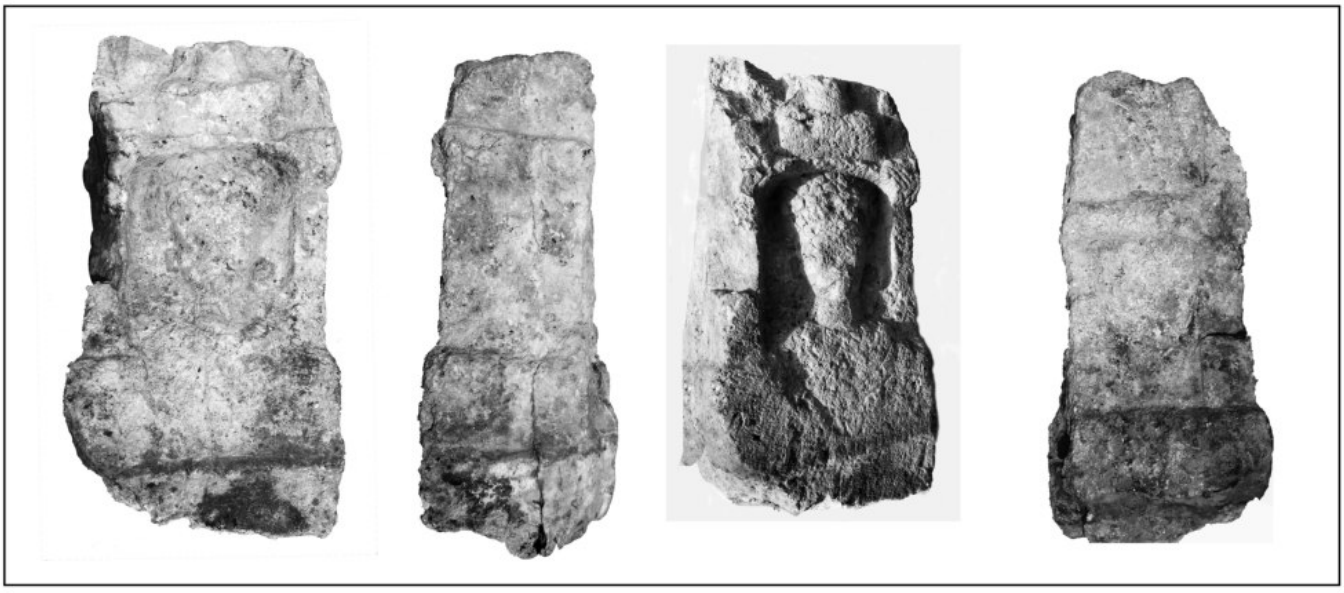

*1. Jarash, the Zarqa river and al-Qunayyah (1:50,000 topographic maps of Jordan [Jarash and Suwaylih sheets, nos 3154 I-II, 2nd edition, 1961]).*

The monument was sculpted on its frontal and lateral sides; the rear displays only the rough dressing of quarry extraction. Faint traces of a pointed and a fine claw chisel are visible on the lateral sides. The dimensions of the block are 99 (h) x 44 (w) x 36 (d) cm.

The frontal view of the block displays two superimposed frontal human busts in an architectural framing that is broken at its upper and lower edges. The upper bust survives only up to the neck; the head, including the pillar framing as well as the entablature and assumed pediment of the naiskos frame, are missing. This damage occurred in antiquity as the patina runs over the breaks. The preserved parts are much worn, by erosion rather than through deliberate damage or iconoclasm. The details of the busts and architectural frame are likely to have been emphasized in antiquity by color paint of which no trace remains. It is quite possible that the subjects



*2. Remnants of a late Ottoman water mill at al-Qunayyah (photo Romel Gharib).*

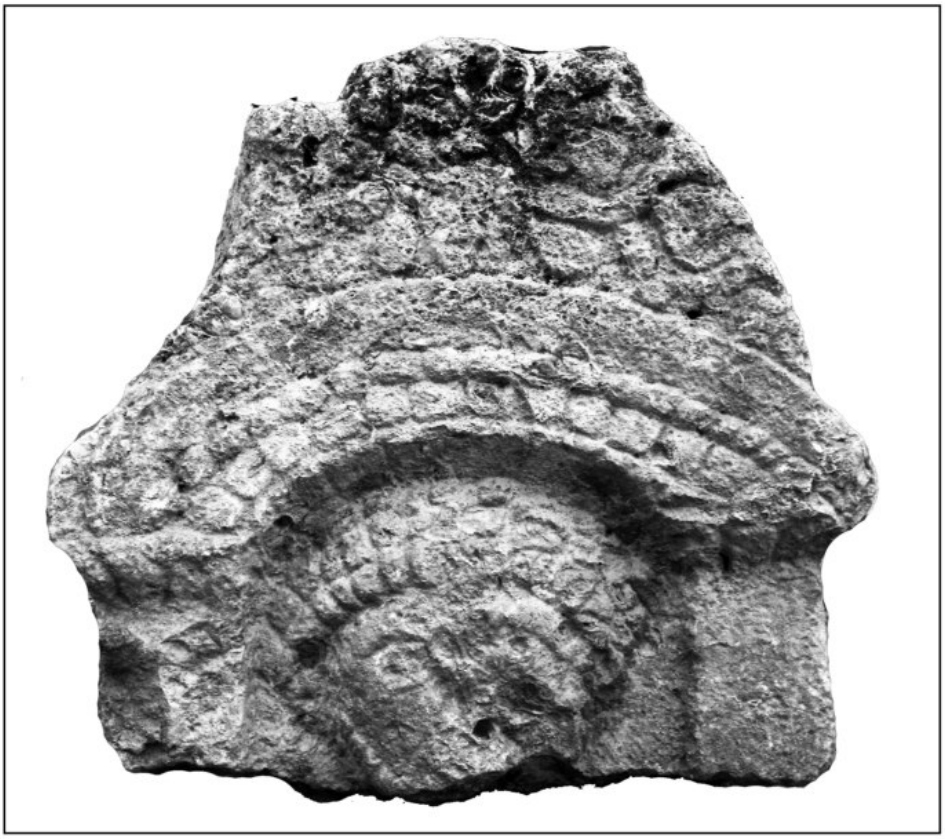


*3a-d. Roman stele with superimposed busts from al-Qunayyah, now in the garden of* Qaṣr *Shabīb, Zarqa (photos Thomas M. Weber).*

were named in a painted inscription under the lower bust, but if so this has entirely vanished.

Of the upper bust, only the vague contours of the shoulders, chest and solid neck survive. At its lower edge, it terminates in a straight line. No trace of clothing folds can be seen, which might indicate that the bust represents a male with a naked chest. This must however remain an assumption, as the surface is much weathered. A fragment of a somewhat similar stele, allegedly from Ḥayyan al-Mushrif and presently on display at the entrance gate of the Mafraq office of the Department of Antiquities **(Fig. 4)**, gives a suggestion of how the upper termination of the epitaph might have looked[1]. The Hayyan al-Mushrif fragment appears so congruent in style to the Qunayyah stele that both seem likely to have been produced in the same workshop at the same time. The lower bust of the Qunayyah stele is, however, placed in a niche crowned by a flat, segmented, curved arch and framed by smooth pillars terminating

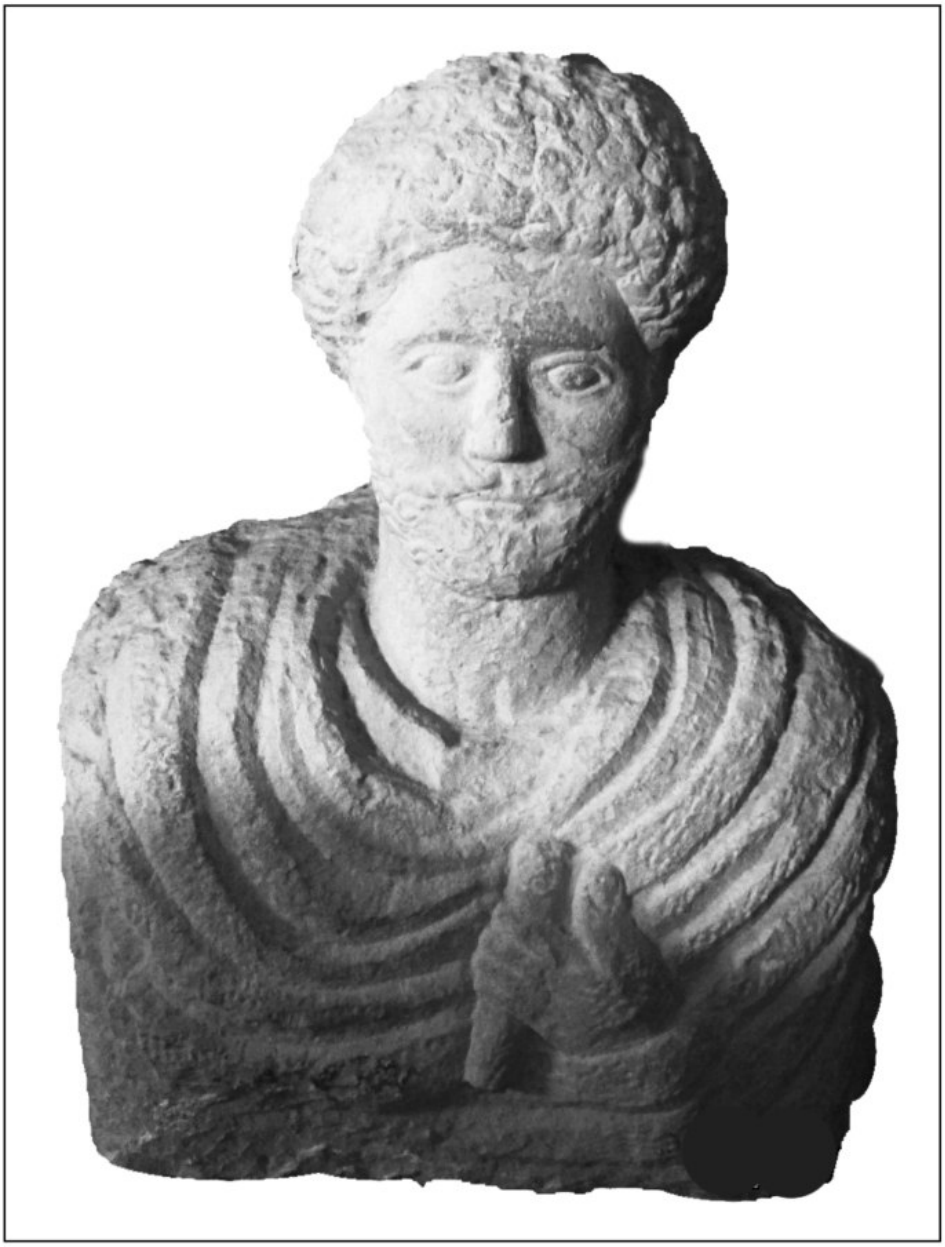
1. Thanks to Mr Sulayman al-Sirhan, DoA Mafraq, for information on this monument.



*4. Fragment of a limestone Roman funerary stele (upper part of a naiskos with head of a frontal bust [bearded male with wreath]) from* Ḥayyan *al-Mushrif, now at the entrance of the Department of Antiquities Mafraq office (photo Thomas M. Weber).*

in bulky capitals. Two oblique incised lines at the right pilaster capital point to a more precise modeling delineated by the original painting, probably in Corinthian acanthus style. This bust fragment is similar to the upper one, but terminates in a hanging curve at its lower edge. The folded texture of a garment, most likely a cloak, is depicted by curved, incised lines. The oval head sits on a broad, conical neck. The outline of the face with its rounded chin gets broader towards the temples, while the top of the head is delineated by the segmented arch of the niche. Hair consists of short, irregular locks. The forehead is covered by a diadem or wreath with a rounded gem in its centre. The facial features have entirely vanished, but ear lobes or earrings are indicated on both sides by circular incisions.

Representations of frontal busts are well known in the funerary art of the region **(Figs. 5 - 6)**, especially in the Decapolis cities of Gadara (Weber 2002: 414-417, pl. 47-81), Abila (Weber 2002: 466-481, pl. 99-116) and Scythopolis, but also at Samaria (Skupińska-Løvset 1983; 1999: 262-264) and in Lebanon (Gatier 2005). The common feature of all these busts is that they are carved in the round from locally available stone. Reliefs on steles, sarcophagi and lintels are rare, as are as full sized statues. Very few busts bear personal names incised on the base. Funerary busts in Jordan and Palestine do however display some regionalism, being concentrated at some urban centers and in their respective territories. The custom of placing busts in tombs was clearly not practiced at Capitolias (Bayt Rās) and Adraha (Dar'a) (Fournet and Weber 2010: 189, Fig. 17), while only a few specimens are known from Gerasa (Jarash) and Philadelphia (Amman). An example of an early 2nd-century AD stele, chiseled in basalt relief,and showing the deceased soldier as a half-figure **(Fig. 6)**, comes from Gadara (Weber 2002: 446, PL 101, pl. 60 D [cf. also 481, A 74, pl. 116 D-F for a female bust from Abila, with a tabula ansata below for the subject's name in painted letters]). As well as these regional groups in the Levantine hinterland, funerary reliefs occur in great numbers and in different local styles in the Hauran (Sartre-Fauriat 2001, I: 243-279; Weber



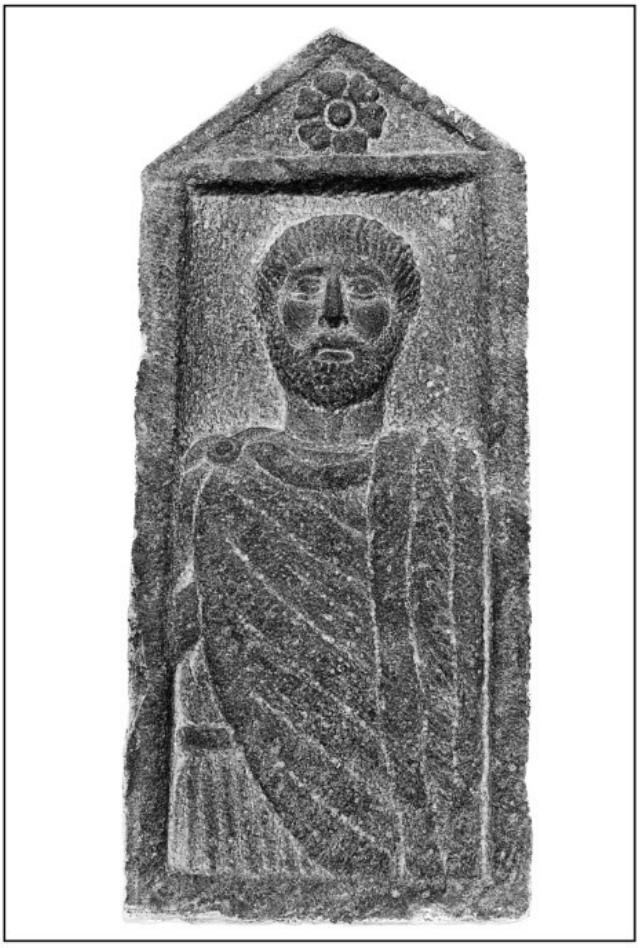
*5. Limestone funerary bust of a bearded man, probably from Umm Qays (ancient Gadara): Rihani collection, Amman (photo Thomas M. Weber).*

and al-Mohammed 2006: 40, nos 19-20, pl. 14 B-C; 50, no 37, pl. 28; 118, no 103, pl. 80 D; Weber 2015: 582), in the Palmyra oasis (Weber 2015: 583; cf. Kropp and Raja 2014: 393-408), in the cities along the Euphrates (Parlasca 1982: 14-16), and in south-western and north-eastern Arabia beyond the frontier of the Roman Empire.

Neither archaeological context nor epigraphic data shed light on the chronology of the Decapolitan busts, with the result that they can only be dated on the basis of details such as hairstyle and clothing. The origins of this kind of monument may be sought in late republican Roman Italy, where funerary bust galleries, sometimes superimposed on registers **(Figs. 7 - 8)**, were popular amongst freedmen *(liberti)* (Zanker 1975). To sum up, both the Qunayyah and Ḥayyan al-Mushrif monuments testify to a provincial group of tombstones on the north-western edge of the Jordanian steppe in the second half of the 2nd century AD. This group was strongly influenced by Roman funerary art and the Hellenised iconographic conventions of the neighbouring Decapolis communities.

### 3. A Greek Dedication on a Votive Alta (Julien Aliquot)

The second stone monument from al-Qunayyah



*6. Basalt tombstone with a half-figure representation of a soldier, probably from Umm Qays (ancient Gadara): Bisharat collection, Amman (photo Thomas M. Weber).*

is an inscribed votive altar 91 cm in height, 51 cm in width and 41 cm in depth **(Fig. 9)**. It is possible that its upper part was recut. The shaft measurements are 34 cm in height, 37 cm in width and 34 cm in depth. The monument is made of hard, brownish limestone that includes some natural pebbles, sometimes of large size. The surface has other natural impurities of fossil character caused by the geology of the rock. It is also entirely covered with a dark yellow-brown patina, quite dense for the most part, and is battered or worn in places, making some letters difficult to read. The front face of the entablature was partially covered in baked earth or an encrustation that was mechanically removed by Jordanian specialists on 11 May 2015. On the upper surface of the block there was a deep oval hole carved into the stone, presumably for the insertion of a cultic object.

The block has a protruding upper section with an alternating *torus* - *trochilus* profile. At the base, it terminates in a high, slightly protruding pedestal with a similar but inverted molding. The cubic shaft of the block is set slightly back from the entablature and plinth. The plinth is damaged at the lower right-hand edge of its front face. The rear part of the block has been roughly smoothed but is otherwise unworked.

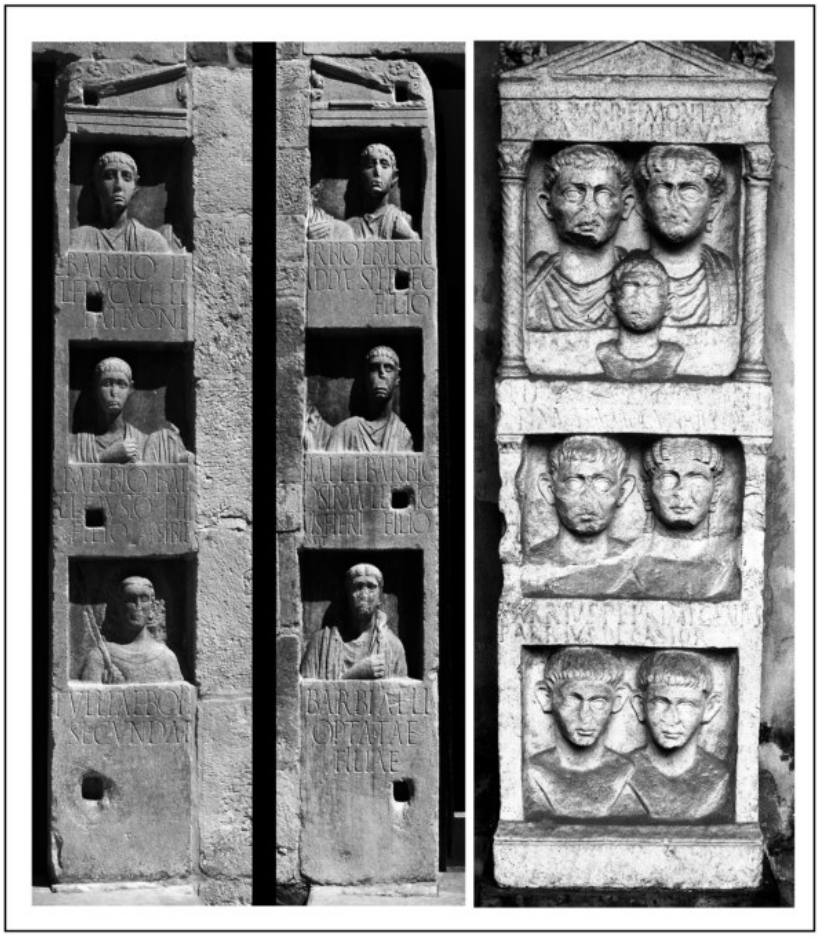
The three parts of the front face bear a Greek dedication in nine lines. The inscription is engraved in rounded letters, 3.5 to 6 cm high, and the writing is shallow and sloppy. The cruciform *upsilon* in line 2 is remarkable, as is the rounded shape of the *gamma* in line 4 and the straight short serifs on all *iotas*.

[- - -]ΜΕ[- - -]
Αὔκτου
καὶ Χαλ-
4 δης γυ-
νεκὸς
ἱερεῖς
ἀνεθήκ[αν]
8 [ἔ]τ(ους) ζλτ΄, Ὑπ[ερ]-
[β]ερ[εταίου].

Line 1 is badly damaged to the left and right; the upper parts of the letters that are still visible are missing: maybe two triangular letters or a M before ΜΕ and perhaps ΙΑ or ΓΑ after. At lines 4 - 5, γυνεκός is for γυναικός.

Translation: "... of Auktos and Chalde his wife, the priests dedicated (this altar) in the year 337, in the month of Hyperberetaios."

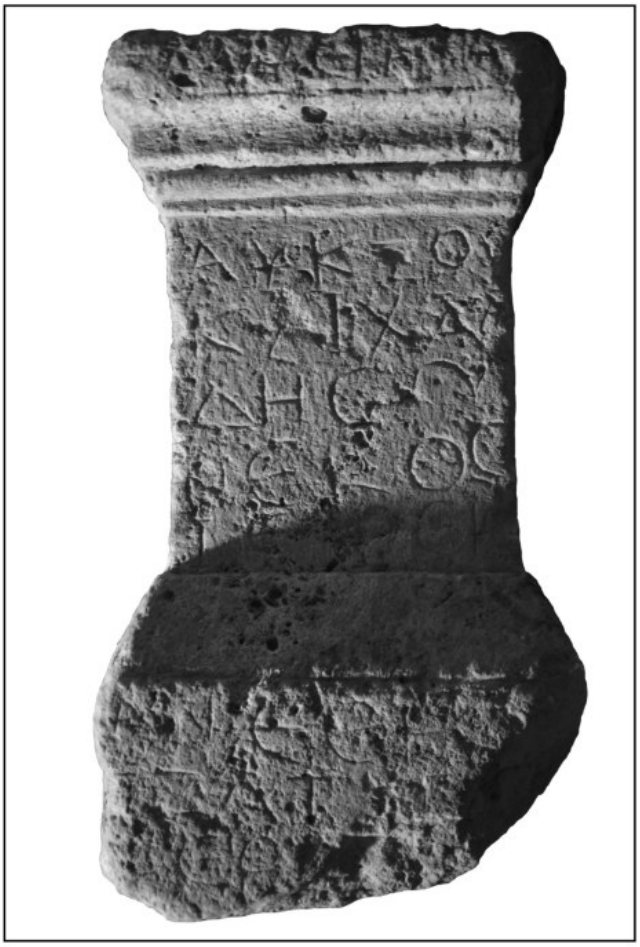
The donors were probably priests from a rural sanctuary at al-Qunayyah or in the surrounding area. Apparently they dedicated the altar on behalf of a married couple. The name of the husband Auktos is a Greek transliteration of the Latin *cognomen* Auctus. By contrast, the name of his wife is Semitic in spite of its Greek aspect



*7. 8 Fragments of a late Republican Roman funerary stele with superimposed busts, late 1st century BC; probably from the necropolis of Tergestum, reused in the central gate of the mediaeval cathedral of San Giusto, Trieste, eastern Veneto, Italy (photo Thomas M. Weber). Tombstone of a group of Roman freedmen, 1st century AD: Museo Archeologico Nazionale, Ravenna (photo Thomas M. Weber).*

(reminding of the Chaldaea, i.e. Babylonia). It has already been identified with the same spelling in a Greek epitaph from Qrayya in the Syrian Hauran (Waddington 1870: 471, no 1967: Χαλδη Σεουήρου). It is related to the more common spelling Αλδη and to a series of Semitic names derived from the root ḫld (Arabic ḫld, cf. masc. Khalid; fem. Khalida). It may be translated as: "One who remains young". For onomastic parallels in different Semitic languages (Nabataean; Palmyrene Aramaic; Safaitic; Arabic) see Wuthnow (1930: 17 and 119), Harding (1971: 225-226), Sartre (1985: 173) and Negev (1991: 29).

The era of *Provincia Arabia,* beginning on 22 March 106 AD and used, for instance, in the territory of Bostra, cannot be used to convert the date of the dedication to the Julian calendar. The result would be much too late (September / October 442 AD). The era adopted at al-Qunayeh was thus necessarily the Pompeian era with a 63 BC epoch, as in the neighbouring cities of Gerasa (Jarash) and Philadelphia (Amman). According to this chronology, the month of Hyperberetaios in the year 337 occurs in autumn 274 AD. This fits well with both the rather late script of the inscription and the pagan flavour of its dedication. The use of the Pompeian era and the location of al-Qunayyah north of the Zarqa river, closer to Gerasa than to Philadelphia, suggest that the site belonged to the civic territory of Gerasa in the Roman period.



*9. Inscribed votive altar from al-Qunayeh, now in the garden of* Qaṣr *Shabīb, Zarqa (photo Julien Aliquot).*

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# MADABA PLAINS PROJECT: EXCAVATIONS AT TALL AL-'UMAYRI, 2012

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*Kent V. Bramlett, La Sierra University (Chief Archaeologist)*

## Introduction

A fifteenth season of excavation by the Madaba Plains Project at Tall AL-'Umayri occurred between 4 July and 8 August 2012. It was sponsored by La Sierra University in consortium with Andrews University School of Architecture (Michigan, USA), Canadian University College (Alberta, Canada), Pacific Union College (California, USA), Mount Royal University (Alberta, Canada) and Walla Walla University (Washington State, USA). Full reports have already been published for the first five seasons (first season [1984]: Geraty *et al.* (eds.) 1989; second season [1987]: Herr *et al.* (eds.) 1991; third season [1989]: Herr *et al.* (eds.) 1997; fourth season [1992]: Herr *et al.* (eds.) 2000; fifth season [1994]: Herr *et al.* (eds.) 2002). The sixth (1996 - 1998) is in press and the seventh (2000) is ready for submission for publication. Preliminary reports have also been published (first season [1984]: Geraty 1985; Geraty *et al.* 1986, 1987; second season [1987]: Geraty et al. 1988, 1989, 1990; third season [1989]: Younker *et al.* 1990; Herr *et al.* 1991; LaBianca *et al.* 1995; fourth season [1992]: Younker *et al.* 1993; Herr *et al.* 1994; fifth season [1994]: Younker *et al.* 1996; Herr *et al.* 1996; sixth season [1996]: Younker *et al.* 1997; Herr *et al.* 1997; seventh season [1998]: Herr *et al.* 1999, 2000; eighth season [2000]: Herr, Clark and Trenchard 2001, 2002; ninth season [2002]: Herr and Clark 2003, 2004; tenth season [2004]: Herr and Clark 2005a, 2005b; eleventh season [2006]: Herr and Clark 2008a, 2008b; twelfth season [2008]: Herr and Clark 2010, 2013; thirteenth season [2010]: Clark and Bramlett 2011, 2012a, 2012b; fourteenth season [2011]: to be published with the current report. For a summary report of the first 12 seasons (1984 - 2008) see Herr and Clark 2009, Clark 2011 and Herr 2011 in Clark et al. 2011.

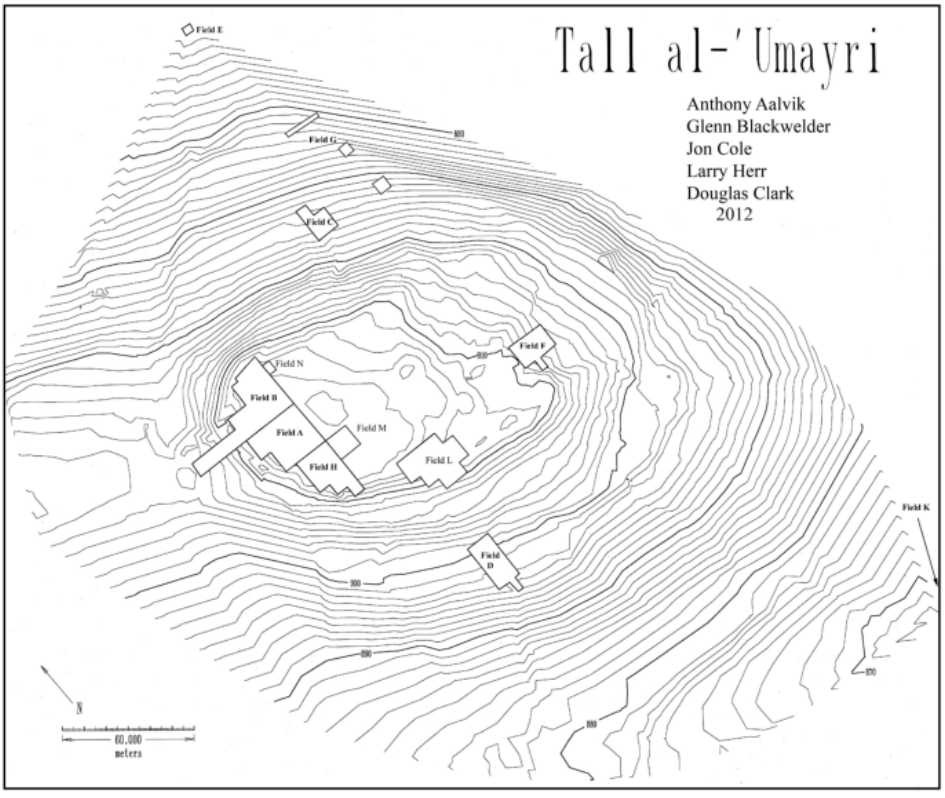
In the 2012 season, a team of 14 Jordanians and 37 foreigners participated in the fieldwork and camp activities of the interdisciplinary project at AL-'Umayri, located 12 km south of Amman's Seventh Circle on the Queen Alia Airport Highway, at the turnoff for Amman National Park. A much smaller team was fielded in 2011:



*1. Aerial view of western `Umayri.*

four Jordanians and nine foreigners. **(Fig. 1)**.

In the first season (1984) four fields of excavation were opened (Fields A, B, C and D) **(Fig. 2)**. During the second season (1987) three of the four were expanded (Fields A, B and D), one was completed to bedrock (Field C) and two new fields were opened (Fields E and F). In the third season (1989) one field expanded (Field A), three fields reopened old squares and expanded slightly (Fields B, D and F), another reduced excavation from two squares to one (Field E) and a new field was opened on the northern slope as a series of three soundings (Field G). In the fourth season (1992) three fields deepened previously opened squares (Fields A, D and F), one deepened existing squares while expanding by one square (Field B) and two fields were discontinued (Fields E and G). During the fifth season (1994) one field deepened (Field A), another expanded and deepened (Field B) and one was added (Field H). In the sixth season (1996) three fields expanded (Fields A, B and H). The tomb excavations on the south-eastern slopes of the *tell*, already begun under the hinterland survey in 1994, became part of the 'Umayri *tell* excavations as Field K. During the seventh season (1998) two fields deepened their squares (Fields A and B), two expanded (Fields H and K) and a new field was opened on the southern edge of the site (Field L). In the eighth season (2000) we deepened three fields (Fields A, B and H) and expanded and deepened in two fields (Fields K and L). During the ninth season (2002) Field A was not worked, while Field B expanded to the north and continued in two other squares; Field H was limited to the large plastered and cobbled courtyard near the northern extent of the field (next to Field A); in Field L we exposed more of the Hellenistic structure by opening two new squares and reopening one other. During the tenth season (2004) Field A deepened squares begun during the 1980s; Field B deepened three earlier squares and expanded to the north to intersect the northern edge of the site; Field H deepened earlier squares in its northern part; Field L deepened three previous squares and opened one new square. During the eleventh season (2006) Field A concentrated on removing balks and small areas between walls to deepen the western part of the field to Late Iron

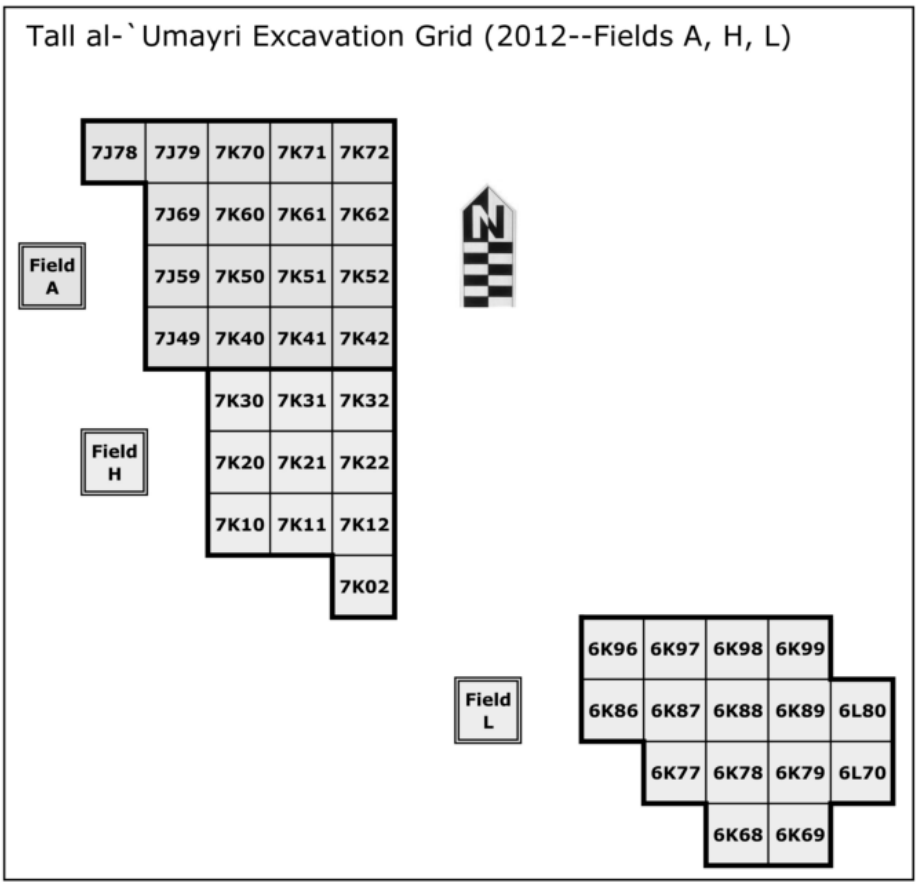



*2. Topographic map of the tell.*

I levels; one square was opened at the south-west corner of the field to examine a possible gateway. In Field B excavation concentrated on uncovering the floors of the northern extent of the remarkably preserved LB building. Excavation in Field H concentrated on bringing the southern part of the open-air sanctuary down to Late Iron I levels. Field L, on the southern edge of the site, expanded to the east and north with three new squares.

The 2008 season saw Field A expose the third LB / Iron I building in the southern part of the field by going deeper in most squares. Field B completed the excavation of the LB building and added a square to the east with a new field designation, Field N. Field H went deeper in four squares, exposing the top of the LB / Iron I levels and locating the bottom of the southern portion of the perimeter wall. Field L went lower in three squares and added two more squares to the west. Additionally, a new field was opened, Field M, east of Field H as part of our overall goal of connecting Fields H and L. This season also saw the introduction of high-resolution GPS for the location of fields, squares and architecture. It forced a slight change of orientation to align all our squares with true north and we chose to locate squares on primary grid lines, causing some squares to be smaller in their east - west measurements.

The thirteenth field season (2010) continued work in four fields (Fields A, H, L and M) (for 2012 see **Fig. 3**). Field A extended the exposure of LB / Iron I domestic structures, clearing the third building and uncovering the major portion of a fourth. The clearance of the Late Iron I sacred precinct in Field H brought the team to domestic structures post-dating the Early Iron I buildings in Field A, but preceding the precinct. Field L cleared Hellenistic remains in several balks, clarifying in the process the function of an Iron II oil press, and exposing the tops of several Iron II walls. Field M cleared Late Iron II paved plaza levels surrounding what appear to




*3. `Umayri grid of Fields A, H and L.*

be domestic buildings.

In 2011, the small team focused on Field H (continued clearance of post-Early Iron I debris in order to expose the remaining components of Early Iron Age Building M) and Field L (removal of all Hellenistic architecture in order to expose Iron Age remains).

After 14 seasons, the team felt a good deal of confidence in talking about final stratum numbers for the site. We think, reasonably, that no new significant settlements will be discovered beyond those we have already found, even if, as happened in 2012, we have isolated an important sub-phase in the Early Iron I Period. We thus include a stratigraphic chart **(Fig. 4)**.

**Field A: Western Acropolis** (Stephanie Brown, University of California, Berkeley)

Field A is located on the western acropolis of Tall AL-'Umayri and has been excavated in twelve previous seasons (1984, 1987, 1989, 1992, 1994 1996, 1998, 2000, 2004, 2006, 2008 and 2010). Seasons 1984 - 1996 focused on the Late Iron II / Persian period of occupation in the eastern part of the field. Here a large Ammonite administrative complex was identified and excavated. Seasons 1998 - 2012 focused on the Iron I occupation in the western part of the field where excavators explored the relationship between the Early Iron I (1,200 - 1,100 BC) architecture and its subsequent destruction in the north-western area of Field A and in the south-western area of Field B. This architecture includes Field B's Building B, 'Umayri's well-known 'four-room house' (Clark, 2000: 57-100). The 2008 season attempted to bring most of Building C in Field A into phase with the 'four-room house' in Field B, but by the end of the 2008 season this goal was only partially achieved. During the 2010 season Building C was fully exposed. Additionally, the western portion of a fourth Early Iron I building, Building D, was brought into phase with Buildings B, A and C. Finally, a fifth Early Iron I building, Building E, was posited.

During the 2012 excavations at Tall al-'Umayri five squares were excavated in Field A: 7J68, 7J69, 7J78, 7K50 and 7K60. The primary objective of the 2012 season was to expose Building D. All five of the buildings in this Early Iron I village were found beneath a massive destruction layer that consisted of mudbrick, ash, clay, plaster and fallen stones, in places up to 2 m in depth.

During the Iron IIB period a house was constructed directly on top of the destruction of Building D. This house was the so-called 'pillared house', so named because of a curvilinear courtyard on the western end of the house that had two standing stone pillars in its middle, or simply the 'Iron IIB house'. The 2012 season saw the removal of this building, thus exposing more of Building D.

Below are stratigraphic descriptions of the 2012 field phases:

*Field Phase 13 (LB / Early Iron I)*

Phase 13 was rediscovered at Tall al-'Umayri during the 2012 excavation season, the evidence suggesting an occupation of Buildings C and D that predated Field Phase 12. The evidence suggests that Building D had two major occupation surfaces, similar to those found in Building C.

The reinterpretation of the surfaces in Building D during the 2012 season was based on the existence of the two surfaces in Building C as well as on two features, now associated with Phase 12, from Building D, viz. a huge lower grindstone found in 2010 and a north - south curtain wall which abutted the building's southern wall. Because the grindstone was situated above 0.2 m of brown clay material, it was assumed that the grindstone fell down from an upper storey. However, the position of the grindstone appears to be intentional. The curtain wall was positioned *ca* 0.1 m off the surface. Both of these features sat directly atop locus 7J69:075, clearly a distinct surface rather than collapsed roof debris.

In previous seasons, Phase 13 was associated

**Tall al-`Umayri**

**Comprehensive Strata Chart**
**(1984-2012)**

Stratum 22 (Chalcolithic Period) – 4500-3300 BC
Hiatus
Stratum 21 (Early Bronze Age IB) – 3200-3000 BC
Stratum 20 (Early Bronze Age II) – 3000-2600 BC
Stratum 19 (Early Bronze Age III) – 2600-2300 BC
Stratum 18 (Early Bronze Age IV) – 2300-2250 BC
Stratum 17 (Early Bronze Age IV) – 2250-2200 BC
Hiatus
Stratum 16 (Middle Bronze Age IIC) – 1650-1600 BC
Stratum 15 (Middle Bronze Age IIC) – 1600-1550 BC
Hiatus
Stratum 14 (Late Bronze Age II) – 1350-1230 BC
Stratum 13 (Late Bronze IIB/Early Iron I) – 1230-1200 BC
Stratum 12B (Late Bronze IIB/Early Iron I) – 1200-1150 BC
Stratum 12A (Late Bronze IIB/Early Iron I) – 1200-1150 BC
Hiatus
Stratum 11 (Iron IB) – 1100-1050 BC
Stratum 10 (Iron IB) – 1050-1000 BC
Stratum 9 (Iron IIA) – 1000-850 BC
Stratum 8 (Iron IIA) – 850-600 BC
Stratum 7 (Late Iron II/Persian – 600-550 BC
Stratum 6 (Late Iron II/Persian) – 550-500 BC
Stratum 5 (Persian) – 500-400 BC
Hiatus
Stratum 4 (Hellenistic) – 200-50 BC
Stratum 3 (Early Roman) – 50 BC - AD 135
Hiatus
Stratum 2 (Byzantine) – AD 350-650
Stratum 1 (Islamic) – AD 650-present

*4. `Umayri strata chart.*

with an Early Iron I earthquake that damaged the Middle Bronze Age rampart, excavated in Field B, which protected the site. This rampart was repaired and expanded during Early Iron I (Clark 2002: 55-56). However, until now there has been no architecture to associate with Phase 13. The existence of two distinct surfaces in Buildings C and D separated by clay-based earth, which appears to be collapsed unfired mudbrick, suggests that the Phase 13 occupation at Tall al-'Umayri was brought to an end by the Early Iron I earthquake which was discovered over the Middle Bronze Age rampart.

Buildings A, B and C all had well-preserved 'casemate' rooms against the western perimeter wall. Though a complete dividing wall has not yet been uncovered in Building D, in Square 7J69 there might be the remnants of such a wall, which would have created a casemate room in Building D. However, more excavation of the Phase 12 surface will be necessary in order to confirm the existence of this wall.

*Field Phase 12 (LB / Early Iron I)*

The phasing for the squares excavated in Phase 12 of Building D was clearly identified in previous seasons when its relationship to Buildings A and B in Field B as well as to Building C in Field A was determined. Phase 12 of Buildings A, B, C, D and E was discovered beneath a massive destruction layer that was dated to the Early Iron I period. Exposing Building D down to its Phase 12 surface was the main objective of the 2012 season **(Fig. 5)**.

Four squares were excavated as part of Building D in Phase 12, exposing three known exterior walls: northern, western and southern. The space seems to have been sub-divided by one north - south curtain wall.

A fill layer separated the later Iron IIB architecture from Phase 12 material. Below the fill loci was a thick layer of burnt mudbrick, ranging in thickness from 2 m in the western part of the building to *ca* 0.9 m in the east**(Fig. 6)**.

Several objects were found in the upper layers of the destruction in Building D, including three mortars, three pestles, five upper millstones, two lower grindstones, three ceramic spindle whorls, one ceramic stopper, a bone bead, a bronze point, a carnelian lotus-seed pendant and two ceramic scarab seal impressions, one of which was a seal of Thutmose I (*ca* 1,506 - 1,493 BC). The bronze point lends credence to the possibility, demonstrated elsewhere at `Umayri, that the Phase 12 destruction was caused by a violent attack on the site. The remaining objects seem to confirm Building D as a domestic dwelling.

In the north-western corner of Room D1 (the western room of Building D) was a stone platform **(Fig. 7)**. This was similar to the one found in Building C, though the stones are



5. Field A, Building D.



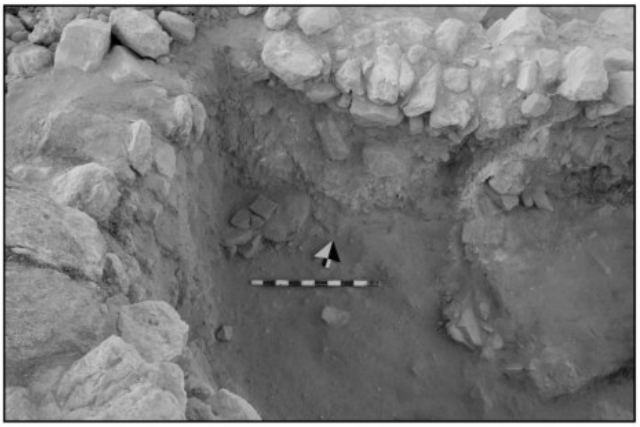
6. Field A, mudbrick debris.

slightly smaller. The platform's use might have extended into Phase 13, but because a Phase 13 surface has not been confirmed this cannot be a certainty.

In Room D2 four small curtain walls were also exposed, all of which were made of unhewn limestone and were constructed in boulder-and-chink masonry style. These walls were preserved only one or two courses high and one or two rows wide, and appeared to divide the space in unique ways, including creating space possibly for a raised platform and providing a dividing wall unusual in its orientation.

A few objects were found on or just above the surface in Building D: a ceramic scarab seal impression, a small burned limestone mortar, a basalt upper grindstone and a complete ceramic saucer lamp **(Fig. 8)**. The small number of artifacts may suggest, as in Building B, that most activities occurred in the upper storey or on the roof of the house.

A small amount of excavation was carried out in Building E (called Building F in the 2008 report [Herr and Clark 2010]). Building E is the fifth house in the Early Iron I village that ran along the inside of the western perimeter wall. Like Buildings A, B, C and D, this building was oriented to the east from the western perimeter wall and occupied the narrow space between Building D and the perimeter wall once the latter turned to the east. The existence of the two surfaces might indicate that, like Buildings C and D, Building E also had a Phase 13 and a Phase 12 surface. Many domestic objects found previously confirm the domestic use of this building, including grinding stones, storage jars,



*7. Field A, stone platform.*




*8. Field A, saucer lamp.*

a basalt bowl and two Iron I 'pilgrim flasks'

Throughout Building D there was an ash layer, part of the destruction debris, immediately above the use surface. The same seems to be true in Building E. In this ash layer three objects were found: an upper milling stone, a partially incomplete pithos and a nearly complete bronze spear point**(Fig. 9)**, likely providing evidence that the Iron I destruction was caused by an attack on the site.

As stated above, the primary goal of the 2012 season was to expose the Early Iron I Building D. By the end of the 2012 season, Building D was shown to be preserved in both of its phases. The exposure of Building D and analysis of its associated artifacts suggest that it functioned similarly to Building C. Although the use surfaces of Building D are almost a meter below those of Building C, the two buildings appear to have coexisted in both Phases 12 and 13, sharing a common wall. The lower level of the surface in Building D, the *ca* 2 m of mudbrick debris and the plaster ceiling collapse all suggest that Building D had a second storey. Building C, however, does not have this kind of evidence and therefore may have only supported a single storey. The objects found in Building D suggest that the house served as a domestic dwelling, similar to Building C.

*Field Phase 8B (Iron II)*

Because the stratigraphy of Field A's Iron IIB building appeared to suggest a lack of integrity between its two major rooms, as had been proposed previously, and because of a desire to access the eastern portions of Phase 12 Building D, it was decided to clarify the stratigraphy and remove the western room of the building. The discovery of a crucial foundation trench provided concrete evidence that what was thought to be one Iron IIB building was actually constructed in two different phases instead of one.

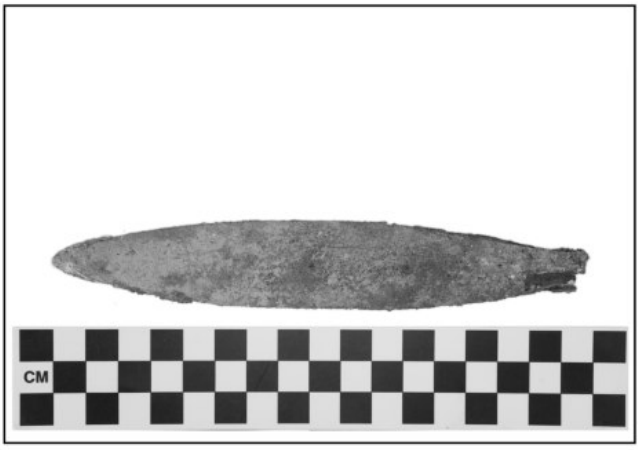
*Field Phase 8A (Iron II)*

The presence of a wall and a surface that sealed against it, which were later cut by a foundation trench, indicated another phase to the Phase 8 Iron IIB building. A later wall was constructed which was originally assigned to Phase 8B. This foundation trench clearly confirms that the Iron IIB house was constructed in two distinct phases.

**Field H: South-Western Acropolis** (Monique Vincent, University of Chicago, assisted by Nicole Oakden, University of Calgary)

This report covers results from the 2011 and 2012 seasons. The 2011 season was a short, specialized season focused primarily on Field H and excavation south of Wall 4. The 2012 season was a full-scale season of excavation and included work in nearly the entirety of the field.

The goals for excavation in 2011 included investigation along the southern face of Wall 7K10:004 (= 7K11:004 = 7K12:004)**(Fig. 10).**




*9. Field A, spear point.*



*10. Field H, Wall 4.*

Wall 4 borders the southern edge of the field and the *tell*; work here was designed to better understand Wall 4's construction and activities along the south-western edge of the *tell*. Wall 4, one of the last substantial architectural features remaining in the open areas of excavation in Field H, was also used in the Late Iron I / Early Iron II open air courtyard sanctuary, previously excavated and now mostly removed from the field. Our 2011 investigation south of Wall 4 indicated that architectural activity expanded south of this large bordering wall in the Iron II and Persian periods, using the southern face of Wall 4 to form rooms. Excavating along the length of the southern face of Wall 4 also provided a better understanding of the wall's foundation, its phases of construction and the earliest associated occupational phases.

Following work in 2012 we now know that Wall 4 had at least three phases, extending from the Early Iron I to Persian periods. A second goal involved bringing the last areas of the nine central squares down to the Early Iron I phase, which is dominated by a large domestic structure, Building M **(Fig. 11)**. Excavations in 1996, 2000 and 2006 reached the building's peripheral rooms, and work in 2008 and 2010 revealed the central rooms of the building. The excavated material confirmed Building M's domestic nature and completed the picture of the structure and its use.

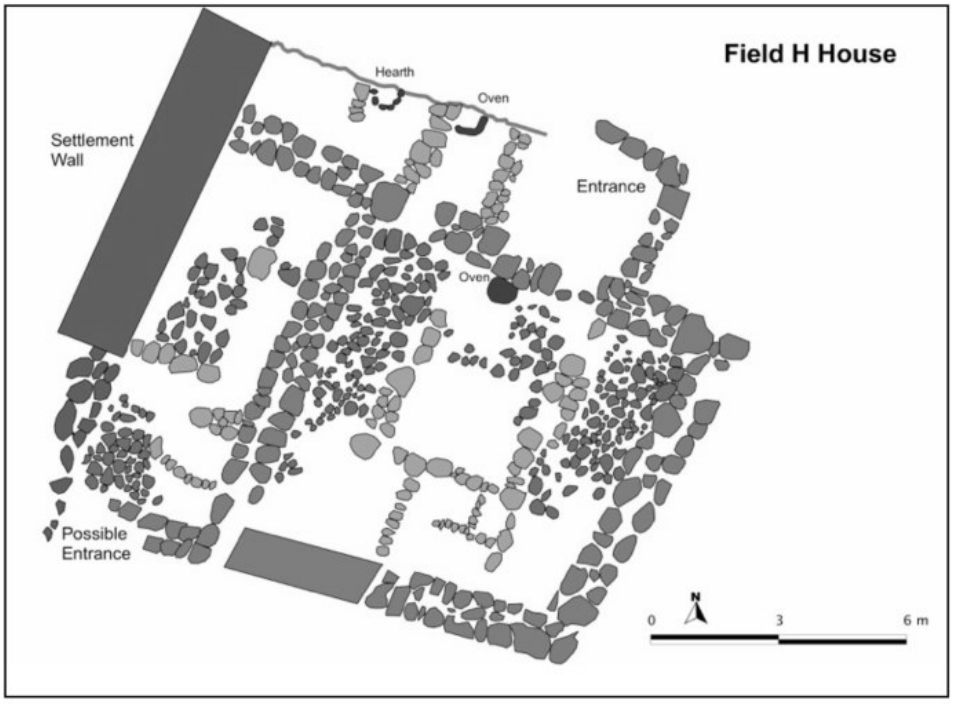
A third goal of 2012 was to excavate several strategically placed probes to date the walls of the domestic structure and establish the stratigraphy of the Early Iron Age in relation to other fields at 'Umayri, especially Fields A and B.

*Field Phase 14: Late Bronze / Early Iron I*

Elsewhere on the *tell*, this phase is represented in Fields A and B where a series of houses was excavated underneath a thick destruction layer. This season was the first time the same phase was identified with confidence in Field H after the excavation of four probes placed against walls inside the Phase 12 domestic structure. All of the walls of Building M were constructed during Phase 12, with Phase 13 and Phase 14 walls identified directly beneath them. A thick mudbrick destruction layer sealed against these walls. It would appear from the destruction debris that structures from the same LB / Early Iron I settlement extended as far south as Field H and suffered the same devastating destruction.

*Field Phase 13: Early Iron I (Iron IA)*

This is a new phase for Field H, identified with certainty in several probes in Squares 7K21 and 7K22, and tentatively in the 7K20 and 7K30 probes. The phase is very shallow and appears to have been constructed directly on top of the destruction debris from Phase 14. The pottery is more closely related to Early Iron I Phase 12 than to Phase 14; the rim and collar from a pithos in Phase 12 fill layer 7K22:078 date to roughly the middle of the Iron I period.




*11.Field H Building M Drawing.*

*Field Phase 12: Early Iron I (Iron IA)*

Excavation during the 2012 season uncovered several important elements of Building M, including two possible entrances (in Rooms 5 and 11) and the southern room of the structure (Room 4). The entire building - outer and inner walls, and surfaces - was constructed as a comprehensive whole at the beginning of this phase**(Fig. 12)**, directly atop the earlier occupational debris of Phase 13.

Once the large, well-built, typically two-row and multiple-course outer walls were constructed, a series of small, poorly built, typically single-row inner walls were built to divide the building into smaller areas. Most of these walls have been described previously, but they are all excellent examples of partitioning walls. The central area of Building M, composed of long Rooms 1, 2 and 3, and broad Room 4, constitutes a typical four-room house plan bounded by substantial walls and divided by single-row walls. The northern and western rooms provide additional space flanking this central area, utilizing the perimeter wall and large wall as additional external walls.

When the building was constructed it contained mostly beaten-earth surfaces, though cobbles were soon laid down in Rooms 2, 3, 9, 10 and 11. The cobble surfaces contain large and somewhat uneven rounded stones, dipping severely in places (Rooms 9 and 11). The beaten-earth surfaces in Rooms 1, 6 and 7 had heavy ashy build-up from the close proximity of ovens and hearths.

Starting with the central rooms and moving out, the rooms are described briefly in the following few paragraphs. The only new information about Room 1, the central long room, revealed thick layers of ashy build-up into which was laid the foundation stones of an oven. Further excavation in Room 2 showed that the cobble floor thins out and disappears in the south, where the surface instead consists of a beaten-earth surface with fragments of plaster.

In Room 3, more cobbles were found in the south with considerable surviving plaster. The space was divided from Room 4 by a single-row, five-course wall and was the only access route to Room 4, which itself was divided by flimsy, small, single-row, multiple-course walls. Room 4 must then have served as storage for agricultural goods or animal by-products.

In the northern series of rooms, Room 5 has proven to be the main, northern entrance to

Building M boasting a threshold to the building. The 2012 season produced no new information on Rooms 6, 7 or 8.

In the western series of rooms, Room 9 had been excavated previously, with a cobble surface preserved fragmentarily in the north section of the room. This room was heavily disturbed by later building activity, but an eastern balk preserved the original occupational and post-occupational debris. In Room 10, cobble flooring served as the main surface; however, surface build-up may also have served as a later use surface.

Room 11 was also entirely previously excavated but, with the removal of the east balk, the access point between Rooms 11 and 10 became clear between Walls 18 and 8. The possible southern entrance between Wall 17 and the perimeter wall would have served as an ideal livestock entrance, leading into the three cobble-floored Rooms 11, 10 and 9, which could have easily held small livestock. A back entrance would have facilitated the dumping of excess rubbish outside the building.

Building M seems best interpreted as a large domestic structure where several activities took place. Grinding stones were common. In conjunction with two ovens, a hearth and extremely frequent cooking pots suggested that food preparation was a major activity in the building. The heavy ash layers in the rooms with ovens / hearth attest to their frequent use. Spindle whorls were also common artifacts and several tuff pendant seals were found in Building M with hatching or dot patterns, indicating a concern for personal identification, transactions or perhaps ritual use (London 2011). Other artifacts included shells, carnelian and stone beads, one bronze ring, a restorable lamp and a hematite weight.

Stratigraphic and ceramic information locates this phase somewhere in the Early Iron I period. It succeeds the LB / Early Iron I transitional phase and precedes the Late Iron I phases. The cooking pots, the main diagnostic pottery type found throughout Building M, indicated a slightly later date in Early Iron I than the LB / Early Iron I period, but earlier than the Late Iron I period.

*Field Phase 11: Late Iron I*

This phase began with construction on top of the thick mudbrick debris from Phase 12. Most of Building M was covered by this mudbrick debris, though some walls were visible and reused. It is in this phase that Wall 4 was widened one row to the north, laying a series of stones along the top of the mudbrick debris against the north face of the wall. This widening of Wall 4 then allowed additional courses to be added.

*Field Phases 10B, 10A and 9*

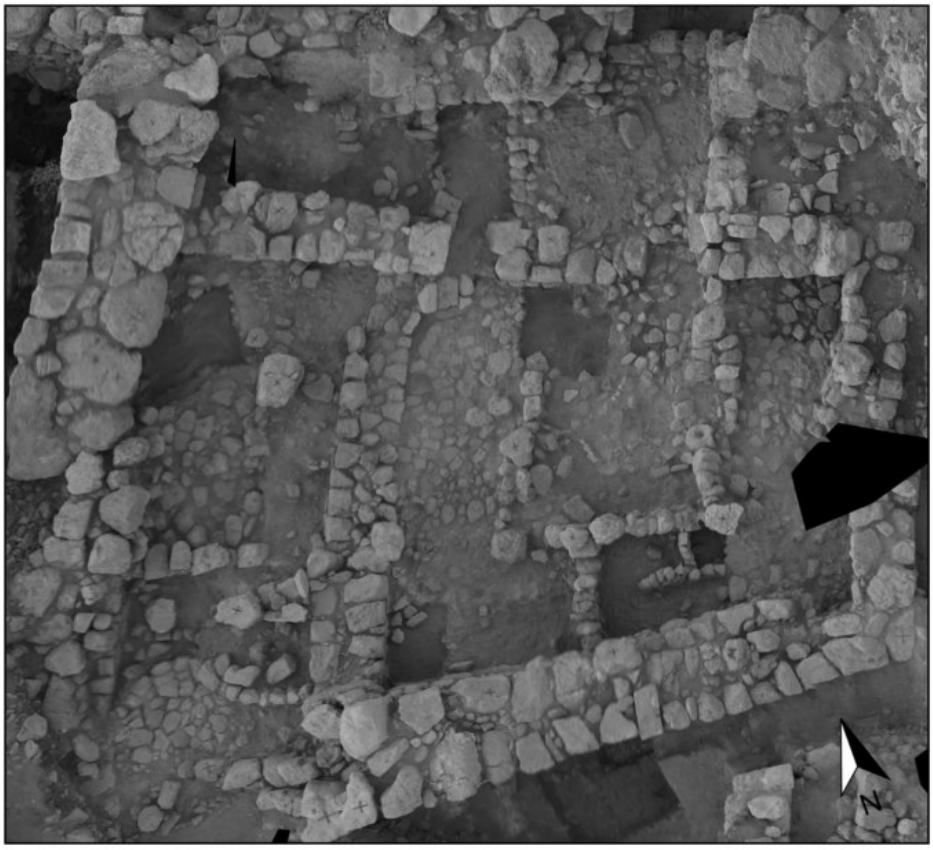
Connecting the phases south of Wall 4 **(Fig. 13)** with those north of the wall was difficult at best, but for this and the following two phases attempts have been made on the basis of connections under the later eastern expansion of Wall 4 (currently assigned to Phase 6), pottery readings and elevations. During this phase, the open-air courtyard structure still dominated the northern half of the field. On the southern face of Wall 4, a rocky tumble of earth was about the same level as a fill layer associated with a stone feature, tentatively interpreted as a stone bench.

A stone feature of similar orientation and construction was excavated to the north in the actual courtyard in 2002 (7K22:035 [see Cormack 2002 Season, FP9 discussion]) and was interpreted as the foundation for an awning or stage. I suggest these stone features might also have served as benches for the presentation of the types of cultic objects also found in the courtyard that season.

Evidence from south of Wall 4 indicated the first activity since the construction of Building M in Phase 12. With much of the pottery providing Iron II or later readings, it would appear that during the Late Iron I phase (Phases 10 and 9) of the open-air courtyard structure there was little or no preserved activity south of Wall 4. The Phase 8 construction indicates a desire to expand the courtyard activities south with a similar stone feature and surfaces.

*Field Phase 7: Late Iron II*

Much of our work in this phase focused on old loci in 7K10's east balk, though removal of




*12. Field H, Building M.*

threshold 7K11:021 and work in 7K11's east balk allowed for some new excavation. Cobble surface 7K11:028 served as the primary surface for this phase, covering over a foundation trench and its fill.

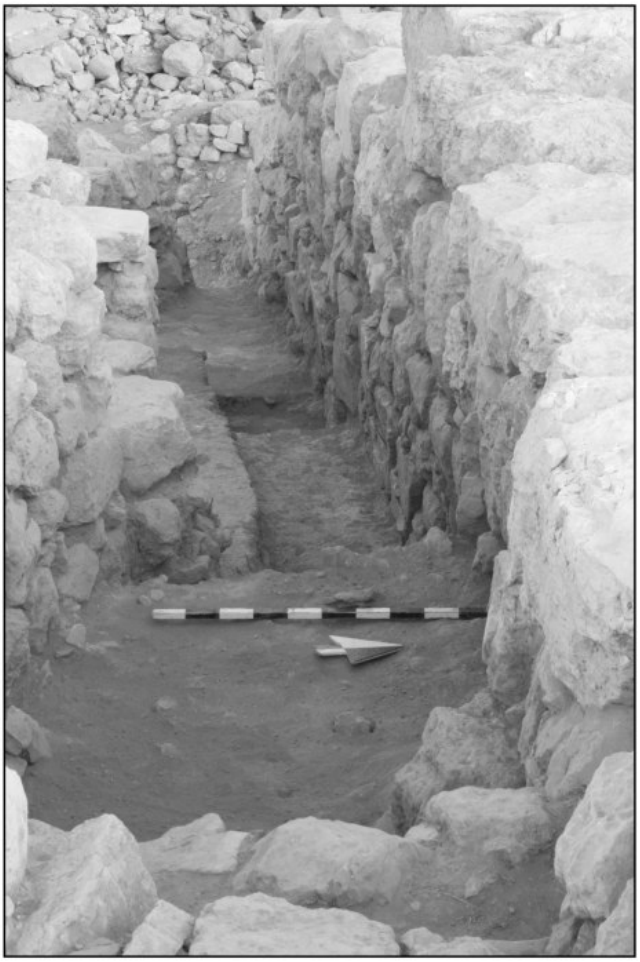
*Field Phase 6: Late Iron II / Persian*

As previously described (Berge and Willis MPP 6: FP6 discussion), during this field phase the inhabitants constructed two rooms against the south face of Wall 4, including the architectural elements of north - south Wall 7K11:006 and threshold 7K11:021, and exposure surface 7K11:025 in the eastern room. Surface 25 was a fill layer of compacted mudbrick debris, the flat-lying pottery on top of it identifying it as a use surface. Similarly two additional layers functioned in the same way in the room.

*Field Phases 5 - 2*

Work in the north and east balks of Square 7K10 exposed topsoil and subsoil. Especially in the north balk, which had a dramatic slope and height difference of nearly 2 m between its western and eastern ends, the material in earth layers 1 and 2 consisted mostly of debris washed down the side of the *tell* and windblown layers. In the western end of the north balk a small terrace wall was excavated.

The original construction of two-row, multiple-course Wall 4 can now be confidently dated to Phase 12 in the Early Iron I period, built as an integral part of the construction of Building M. In the succeeding phase, Phase 13, Wall 4 was widened a row to the north, the new large boulders being placed on top of the post-occupational debris from Phase 12. In Phase 7, the Late Iron II period, Wall 4 was extended to the east to meet Wall 7K12:005. During the Late Iron II / Persian period, Wall 4 was rebuilt with two courses of massive boulders, some spanning the entire width of the wall. Because the *tell* slopes downward in a south-western direction where Wall 4 is located, Wall 4 was built following the slope, so phasing is not level across the wall. These various phases of Wall



*13. Field H, Wall 4 south side.*

4 indicate a long continuity of use of a single architectural feature in Field H throughout the entire Iron Age, rebuilt to suit the needs of succeeding occupants. During the next season of excavation a primary goal will be to remove all later phasing from Wall 4, including the Late Iron I widening and the last of the later courses. This will help us to better understand how it connects with Wall 7K10:017 in the west and help locate the surface in Building M's Room 4.

South of Wall 4 there was little activity until the Iron II period (Phase 8), when the first signs of architectural construction appeared in the form of a stone bench and associated surfaces. Succeeding phases continued this expansion southward, adding a series of walls to form rooms along the face of Wall 4 and down over the southern edge of the *tell*. Whether or not these rooms were integral to the Iron II courtyard complex and, later, the Persian period complex is unclear as access routes during the later periods were blocked by the formidable Wall 4. Perhaps access was gained from further to the east where the *tell* remains unexcavated. Future excavations should return to this southern edge of the *tell* to clarify the extent of occupation and access pathways in the later periods.

Excavating the last of the post-occupational debris from Building M and re-exposing features excavated and then buried in the western rooms brought the entirety of this domestic structure into view. Building M was a large rectangular structure with two major inner dividing walls and many smaller dividing walls. The pillars that stand at intersections in the house must have helped to support the roof; the two western pillars, pillars 18 and 19, were particularly large and well-built. Other large stones that would have served as pillar bases are in the central rooms of the building. No signs of a second storey were excavated from Building M; the extra rooms north and west must have been sufficient for additional living-space needs. Understanding Building M in stratigraphic relation to the rest of the *tell* was made possible through the probes. Discovering the transitional Late Bronze / Early Iron I stratum in Field H has clarified that Building M belongs to an Early or Mid-Iron I stratum not previously found at 'Umayri. Further studies of Building M will significantly contribute to our understanding of reoccupation at the *tell* following the massive destruction of the transitional period settlement.

**Field L: Southern Acropolis** (Carrie Elaine Duncan, University of Missouri - Columbia)

Field L was opened on the southern edge of Tall al-'Umayri's acropolis in the 1998 excavation season. The initial purpose of the field was to explore the various architectural features visible in the transition from the top of the *tell* to the southern slope. Excavators posited a continuation in Field L of the Early Bronze Age remains found in Field D, located lower on the southern side of the *tell*. Additionally, ground penetrating radar surveys conducted in the early

1990s indicated the possibility that Field L was the location of the city's main gate, which has yet to be found after 28 years of excavation. Ensuing seasons of excavation have identified significant architectural and material culture remains from the Iron I, Late Iron II / Persian and Hellenistic periods, corresponding to site-wide Strata 12, 7 and 4 respectively.

Over the past several seasons, Field L concentrated on exposure and documentation of a Hellenistic farmstead and associated occupation phases. Various probes and soundings conducted during these seasons indicated that earlier phases of occupation dating to the Iron II and Iron I periods were present. Beginning in the 2010 season, the decision was made to begin removal of Hellenistic architecture (the associated occupational surfaces of which had long since been excavated) in order to better expose the underlying Iron Age remains. This process continued during a small, targeted season in 2011, during which several of the Hellenistic-period walls were removed by David and Amanda Hopkins.

Work in Field L during the 2012 season focused on clarifying the phases of occupation and dates of previously exposed architectural remains in anticipation of the possible need to adjust our research design owing to issues involving land ownership at 'Umayri (see below). Specific objectives for this season were: (1) to determine the date of the large east - west wall that runs across the breadth of the field (6K88:014 = 6K89:010 = 6L80:023) by excavating probes on the north and south sides of the wall, and (2) to investigate the relationship of this wall to a north - south line of monumental stones to the north (6K88:024 = 6K98:019) by excavating the corner of their conjunction as well as the west side of the north - south wall. These tactics were sufficient to accomplish the stated objectives. The foundation course of the large east - west wall dated to the Iron I period, while the upper extant courses constituted an Iron II rebuilding along the earlier wall line. This rebuilt wall was contemporary with the construction of the monumental north - south wall and together formed the southern and western walls, respectively, of an Iron II period room.

*Field Phase 7 (Stratum 12: Iron I)*

One of the primary goals of the 2012 season was to confirm the date of the large east - west wall running through Squares 6K88, 6K89 and 6L80. A probe conducted in the 2008 season against the south side of the wall in Square 6K89 had indicated an Iron I date for the wall. The size of the wall stones is somewhat surprising for the Iron I, given the smaller scale of construction characteristic of this period at 'Umayri. Probes conducted on both the north and south sides of the wall provided a qualified confirmation of the 2008 findings. Sealing against the lowest course of the south side of the wall in Square 6K88, earth and surface loci yielded Iron I pottery. These findings appear to confirm the 2008 findings. A probe conducted on the north side of the wall in Square 6K89 also yielded Iron I pottery against the lowest course and beneath the foundation level of the wall. The situation of the wall was complicated, however, by additional findings elsewhere in Square 6K89, which are discussed below. These findings indicate that, although the lowest course of the east - west wall dates to the Iron I period, the courses above date to a later phase and constitute a rebuilding of the wall using the Iron I stones as a foundation course.

Iron I material was also found in Square 6K98, though not in association with any architectural remains or discernible occupation surfaces. Pottery from several earth loci dates almost exclusively to the Iron I period; although these remains cannot offer much insight into the nature of Iron I occupation, they do indicate that the Iron I period is represented more broadly in Field L than just Wall 6K88:014.

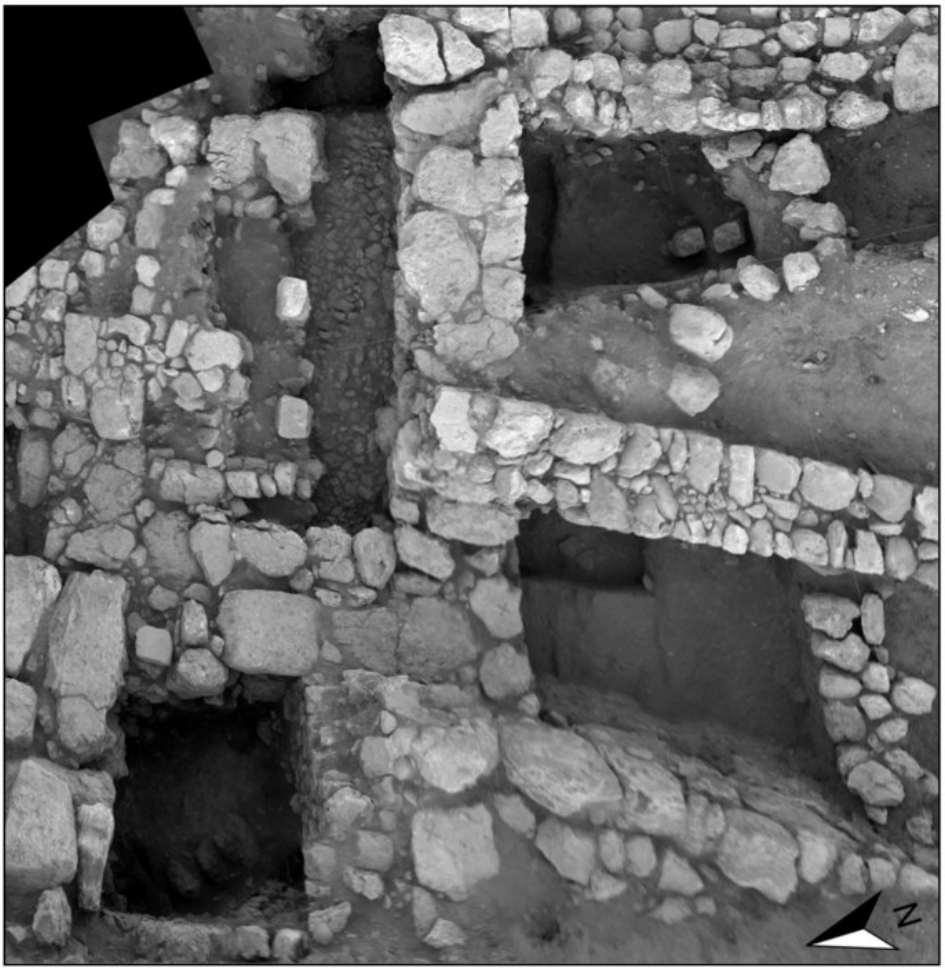
*Field Phase 6 (Stratum 7: Late Iron II / Persian)*

The most interesting and significant discoveries made in Field L during the 2012 season belong to Phases 6 and 5. An Iron II room emerged from a probe, measuring *ca* 4 x 6 m, bounded

by Walls 6K89:010 and 6K88:014 on the south, Walls 6K88:024 and 6K98:019 on the west, Walls 6K98:027 and 6K99:029 on the north, and Wall 6K89:021 on the east; it was paved with cobble surfaces and contained two free-standing pillars **(Fig. 14)**.

This room is presumed to belong to a larger structure, although the dimensions and layout of that structure are currently unknown. Doorways were located in the south-east and north-west corners. Additional rooms might be expected to the east.

The size of the stones used, particularly in Wall 6K98:019 (= 6K88:024), suggests a structure of monumental size and / or defensive purpose. Discerning the purpose of the pillared room is not aided by any *in situ* pieces of material culture. It appears that the room was thoroughly cleared prior to its subsequent re-use; no objects remain on the floor surface to suggest whether a domestic, administrative, military or any other function was likely. One suggestive aspect of the Iron II structure in Field L is the size of the stones used. The only comparably sized stones found thus far at 'Umaryi form part of the Iron II refortification of the city wall at the confluence of Fields A and H. The possibility presents itself that Field L's monumental Iron II construction is 'Umayri's long-sought city gate. The large stacked stones that appear just at the north-west corner of the excavation area in 6K98 could feasibly be a pier, and similar monumental stacked stones are visible approximately 3 m to the west in Square 6K97. Comparison with the Iron II gate at Khirbat AL-Mudayna demonstrates a similar width for the street between piers (Chadwick *et al.* 2000). In this reconstruction, the pillared room would form an admittedly unusual gate chamber, with additional chambers presumably located to the




*14. Field L, pillared room [upper left] and basement room [lower left].*

north and west. This hypothesis is intriguing, if highly speculative, and will require a substantial amount of additional excavation to demonstrate conclusively.

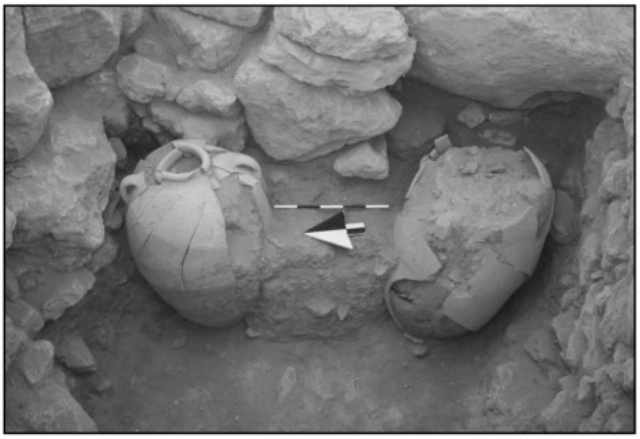
*Field Phase 5 (Stratum 7: Late Iron II / Persian)*

Excavation of material related to Phase 5 in the 2012 season has offered an interesting opportunity to rethink the phasing of Field L more generally. In past seasons, two phases have been assigned to the Late Iron II / Persian period, with the immediate phases before and after corresponding to the Iron I and Hellenistic periods respectively. Exposure of the Iron II pillared room and consequent dating of the upper courses of 6K89:010 to that period, as well as additional indications of a more purely Persian occupation in Field L, discussed below, suggest another possible understanding of Field L's phasing. Rather than seeing two Late Iron II / Persian phases, perhaps the first of these phases (Phase 6) should tend towards the earlier side of this designation and be considered Late Iron II, or even Iron IIB, while the later phase (Phase 5) might constitute a true Persian period occupation as has been argued for other sites on the Mādabā plains such as Jalūl (Younker 2009). Alternatively, it is possible that additional field phases should be added to accommodate the 2012 Iron II and Persian finds. The current phasing is retained in this report for the sake of simplicity and in order to link finds from the current season to those of previous seasons.

The pillared room constructed in the Iron II period and preserved in Squares 6K88 and 6K89 saw renovation and reoccupation in Phase 5. The dimensions of the room were slightly diminished in this phase of occupation in comparison with the earlier room. Threshold 50 was laid at the west side of Wall 21. The material on the east side of the threshold did not reveal any structure, again leaving open the question of where this doorway, the only point of access to the room in this phase, might have led.

The Phase 5 use of the area west of Wall 6K98:019 is the most stratigraphically interesting feature in Field L this season and is the impetus for suggesting a true Persian phase for Field L in general and for the later occupation of the pillared room structure specifically. As noted above, the doorway which had previously made the area west of Wall 19 accessible from the north-west corner of the pillared room was blocked during the Phase 5 occupation. In addition, it appears that Phase 6 cobble surface 6K98:036 was removed during the later occupation, with the later occupation occurring on the stratigraphically lower sub-cobble bedding surface preserved in the north-west corner and on the eastern side. Two large pithoi were sunk into the surface along this eastern edge of the room **(Fig. 15)**. The addition of south and west walls turned the area into a *ca* 2 x 2 m storage basement. The resulting room is characterized as a basement because of the lack of a doorway providing access to the room.

The two pithoi were set side-by-side along the eastern edge of the room, bounded by Wall 6K98:019 at the same elevation and thus, presumably, at the same time. Strikingly, the northern pithos, a rather closed form, is generally characterized as a Hellenistic form, while the southern pithos, a holemouth variety, is usually associated with the Late Iron II / Persian period. The pottery from pit installation fills, associated with the northern and southern pithoi, yields an identical read of Late Iron II / Persian. The use of a jar otherwise considered characteristically Hellenistic suggests the early use of a late form together with the late use of an otherwise earlier form, and that both might meet in the middle during the Persian period. The contemporaneous use of pottery otherwise designated as Late Iron II / Persian with a purportedly Hellenistic form suggests that the Persian part of this designation merits heavier emphasis, or even sole usage, in Field L contexts. A similar case extends to a complete lamp found in the fill just above the south pithos. While the closed form immediately suggests a Hellenistic date, a lamp fragment of similar construction was found elsewhere at 'Umayri in what was characterized



*15. Field L, two pithoi.*

as a solidly Late Iron II / Persian context (Herr 1989: . 19.17:14). Together, these finds indicate an overlap of Iron II and Hellenistic forms that most logically occurred in the Persian period. The contents of each pithos still await analysis, but the northern jar (Hellenistic) contained the skulls of five blind mole rats that clearly became trapped after attempting to consume what they found.

*Field Phase 4 (Stratum 4: Hellenistic)*

The earlier Hellenistic material in Field L consists primarily of fill layers representing a deliberate leveling of earlier occupation levels in preparation for construction of the Hellenistic farmstead. Several walls are included in Phase 4 not because they were still in use as walls during this phase, but because much of the Phase 4 Hellenistic fill layers seal up against them. The extant tops of these walls appear to be at the approximate level to which the Hellenistic builders were trying to build up the ground level. These walls are thus being used as guidelines for the Hellenistic construction's preliminary leveling phase.

*Field Phase 3 (Stratum 4: Hellenistic)*

No new loci associated with Phase 3 were identified in 2012, but four walls associated with the Hellenistic farmstead were removed to expose the underlying Iron Age architecture.

The research strategy for the 2012 season at 'Umayri was designed with the possibility of this being the last season of excavation owing to land-ownership issues (see below). Primary attention focused on answering outstanding questions regarding the dates and phases of visible architecture and occupation. This season's work provides definitive conclusions regarding the date and phasing of the Field L's large east - west wall and its associated megalithic walls. The foundation course of the east - west wall dates to the Iron I period, either as part of an unexpectedly large building or as part of the city's defensive system. Additional courses were built upon the Iron I foundation, along with associated walls to the north, using megalithic stones in the Iron II period. This resulted in the pillared room and other, unexcavated, parts of the structure in the immediate vicinity. The Iron II structure enjoyed subsequent renovation and re-use, perhaps in the Persian period. A more nuanced understanding of the Iron II to Persian periods in Field L is an unexpected bonus to a successful season.

Field L would benefit from moving north and west to identify further and uncover the minimally understood megalithic Iron II structure. The intriguing possibility of having at last found the site's city gate increases the already high desirability of continuing excavation in Field L and at 'Umayri.

**`Umayri Survey Site 84** (David and Amanda Hopkins, Wesley Theological Seminary)

Among the MPP `Umayri survey sites, Site 84, south of `Umayri on land owned by the Bisharat family, was discovered in the 1989 survey and excavated during the 1994 season by David Hopkins. Its function as a Late Iron II / Persian farmstead, ostensibly connected to `Umayri, was quickly established on the basis of its architectural plan and the remains found, as well as on the agricultural context of the fields and installations surrounding it.

Excavators focused their efforts in 2012 exclusively on clarifying the nature and function of a large rock-cut feature previously identified as a wine cellar, located 20 m from the 10 x 10 m

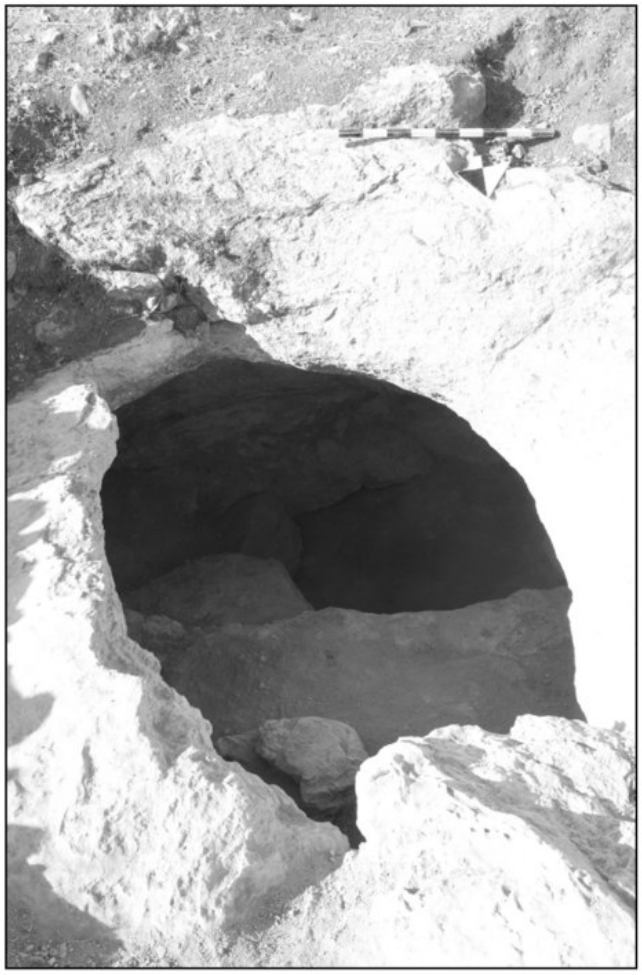
farmstead. The initial survey revealed cisterns, terraced walls, grape pressing installations with cup holes, quarrying marks and water reservoirs. The primary purpose of Site 84 was to produce wine.

Excavators again revisited Site 84 during the 2012 season, with the purpose of clarifying the use of this rock-hewn feature and to recover any material remains that might exist within the installation. The rock-hewn feature consisted of a curvilinear opening measuring 1.5 m by 2.4 m; this quickly expanded into a rounded dome measuring 5.24 m by 4.4 m **(Fig. 16)**.

While the full extent of the cavity has yet to be cleared, excavators made initial observations about its construction and use. In the southern area of the cave, excavators noted evidence of chiseling and found the remnants of plaster, measuring 1.5 m by 0.4 m. They also encountered soil of varying consistencies and types, including a large amount of nari and a large pebble pocket.

Features included a channel and chiseled reworking of solution cavities. The pottery, whilst rare, was consistent with Late Iron II- / Persian-period use.

Previous surveyors identified this opening as a cellar that would provide a secure storage facility and an ideal environment for the fermentation of wine. They were led to this hypothesis by the large irregular opening that is uncommon for cisterns. Excavation results from the 2012 season challenge this hypothesis. Evidence of chisel work and plaster on the walls and ceiling of the cave indicate that it was probably used as a cistern. The chiseling of natural solution features into what can best be described as channels running into the underground space support this new interpretation. A more definitive view of the rock-hewn cave will not occur until excavators return and continue to clean this feature.



*16. Survey Site 84, cistern opening.*

**Field K: Dolmen(s)**

Although there was no new excavation in Field K in 2012 (see earlier reports), the dolmen and what now appears, in a composite tripod-boom photo, to be an adjacent dolmen foundation**(Fig. 17)** were cleaned by Ela Dubis for purposes of more detailed photographic and laser recording formats (see below). This discovery also motivated a week-long sub-surface mapping project in the summer of 2013, developed in collaboration with Dr Bilal al-Khrisat of Hashemite University.

**Technology**

Tall al-`Umayri is currently the subject of negotiations connected to land-ownership issues. This has left the future of long-term excavations at the site in something of a state of flux, even if there is some promise of a resolution in favor of the cultural heritage preserved at the site.

This situation, which became apparent only weeks prior to the start of the 2012 season, forced a rapid restructuring of the project's strategic goals and research plan for the season. Among



*17.Field K Dolmen and Dolmen.*

the resulting outcomes came a commitment to record digitally every possible architectural feature on the site using every available digital technology for any contingency should the *tell* become inaccessible for research in the future.

Thus, the season saw the continued, even intensified, use of iPads and iPods for digital data-harvesting and of the tripod-mounted photo boom for composite geo-referenced photographic records from above. Additionally, the team used a stereo gigapan system to record a series of 28 3D digital spheres taken inside and outside of `Umayri's architecture. In addition, in conjunction with the Department of Antiquities, the team employed LiDAR technology to document, again in 3D and to a resolution of a few millimeters, most of the important structures at the site, should any of them need reconstruction in the future.

**Restoration and Preservation**

Following excavation in 2012, all newly exposed architecture was consolidated and conserved, as happens at the end of each excavation season. This action has resulted in the complete preservation of almost all extant architecture at the site, making research easier for archaeologists and visualization of the remains more meaningful for visitors.

The greater threat to the survival of cultural heritage at `Umayri is a dispute between landowners and the government (referenced above), which may leave all exposed surfaces and architecture vulnerable and which could force an end to excavation. All parties are of good will and are searching for a solution that respects both the cultural heritage of Jordan represented at the site and the rights of those who have invested in the land.

**Plans for 2014**

The project is planning a full excavation season during the summer of 2014, from 25 June to 30 July. Work will occur in Field K, in search of additional dolmen burial chambers that were at least potentially identified in the brief sub-surface mapping survey in 2013. There will also be a step trench down the southern slop of the site between Fields L / H and D, and perhaps excavation along the top of the southern slopes in connection with observable defensive structures on the edge of the acropolis. Our move to the southern slopes, while important in its own right, has been motivated by the land-ownership dispute which, we hope only for the short term, will keep us from the acropolis.

**Acknowledgements**
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# EXCAVATIONS IN AREA III ON TALL ZAR‘Ā

*Ursula Rothe, Andrea Zerbini, Frauke Kenkel*

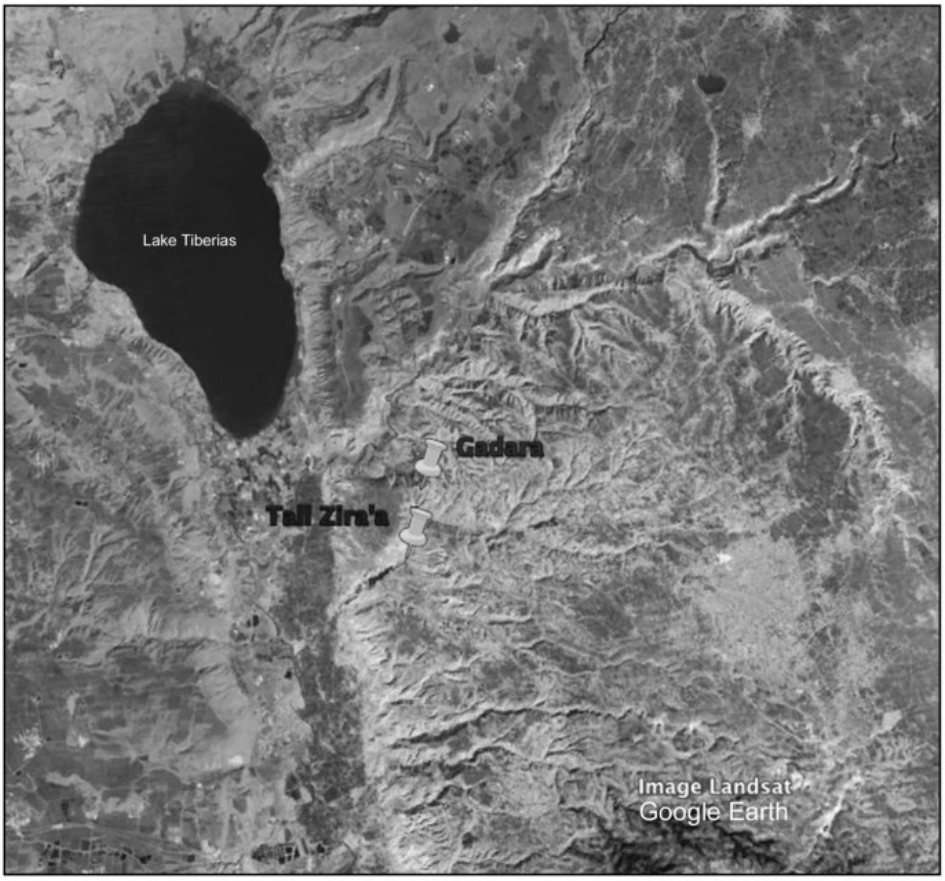
**Tall Zar‘ā and the ‘Gadara Region Project’ (F. Kenkel)**

The campaign of the “Gadara Region Project” in 2014 took place between the 29th of April and the 29th of May in Umm Qays. The “Gadara Region Project” was initiated by the Biblical Archaeological Institute in Wuppertal, Germany, with its director Dieter Vieweger in 2001. The focus of the first two years was to conduct a survey on Tall Zar‘ā to find the most promising areas on the plateau to excavate. Excavations have been taking place since 2003. Due to the fact that the “Gadara Region Project” was going to continue for at least 20 years, the Biblical Archaeological Institute Wuppertal started a close cooperation with the German Protestant Institute of Archaeology in Amman in 2004 and its director at that time, Jutta Häser. Since 2006, the German Protestant Institute of Archaeology in Jerusalem has also been involved. Dieter Vieweger and Jutta Häser are the directors of the “Gadara Region Project” until today (Vieweger – Häser 2013: 4). Tall Zar‘ā is the main excavation site of the “Gadara Region Project” that is joined by a hinterland survey, the Wādī al-ʿArab Survey, which was conducted between 2009 and 2012 by Katja Soennecken and Patrick Leiverkus. From 2012 until probably 2017 no major excavations have been and will be undertaken, because the main aim of the project at this time is to publish everything that has been uncovered since its beginnings.

The main focus of the 2014 campaign, directed by Dieter Vieweger and Jutta Häser was with the publication of the results of the past excavations on Tall Zar‘ā. In addition, geophysical investigations and archaeometric measurements of various metal and glass finds from the excavations were carried out by Robert Lehmann and Marie Schulze (Leibniz University Hannover) and Linda Whittaker led the first archaeobotanical research on samples from the site. In Area III on top of the tell (Byzantine and Mamluk period), Ursula Rothe and Frauke Kenkel opened and excavated a test trench in the first two weeks of the campaign in the context of a CBRL-funded pilot project to clarify questions concerning the extension and chronology of the building to aid in the planning of a larger project in the Area.

Furthermore, various groups of finds have been worked through, such as the stone tools, metal and glass from the classical periods as well as the Bronze and Iron Age pottery. Stefanie Hoss undertook analyses of the Hellenistic to Umayyad glass from the tell within a project funded by the German Research Foundation (DFG). Susan Schütz worked on the stratigraphy of the Roman Tall Zar‘ā as part of her PhD thesis, while Katja Soennecken dealt with the transition period from the Bronze to the Iron Age in her PhD thesis.

Tall Zar‘ā is located in the Wādī al-ʿArab, only 4.5 km southwest of Gadara (modern Umm Qays) **(Fig. 1).** This wadi is connected to the Jordan Valley and therefore the Mediterranean coast with the East Jordanian Highland. In the Bronze and Iron Age periods it was part of a prominent trade route between Egypt and Syria and Mesopotamia (Vieweger – Häser 2013: 5). The tell itself rises 22-40 m above ground level, depending on the surroundings in the wadi; its




*1. Map of the north-western part of Jordan with the sites Tall Zarʿā and Gadara marked (by Google earth).*

highest point is situated 17 m below sea level and it has a diameter of 240 m at its bottom and 160 m on the plateau **(Fig. 2).** In addition to its important strategic position at the entrance to the Wādī al-ʿArab, this site has an artesian spring that provided the plateau with fresh water until 2011. The excavations cover an uninterrupted sequence from the Early Bronze Age to the Islamic period – the last documented settlement was in 1885 by Schumacher (Vieweger – Häser 2008: 375-395). Altogether three different Areas (I-III) have been excavated since the beginning of the project **(Fig. 3)**. Excavation Area I is located on the northwestern slope of Tall Zarʿā. By the end of the season in 2011, 1750m$^2$ had been excavated, which equals 70 squares measuring 5 m by 5 m. A sequence from the Early Bronze Age until the Umayyad period has been revealed in this area (Häser – Vieweger 2012: 251-267). Excavations in Area II, which is situated on the northern edge of the tell, started in 2006 and continued until 2011. The strata, which date from the Late Hellenistic to the Umayyad period, have been revealed across 1500m$^2$. Area II is the second highest and most protected area of the tell plateau. Only Area III in the south of the plateau is situated higher, and measures more than 600 m$^2$ in size. Work in that area began in 2007 with a survey, measurements and test trenches. First excavations were undertaken in 2008. In 2014 only a few squares were opened to answer questions about the size and chronology of the huge excavated building structure in that area.

From the pottery and architectural remains as well as due to correlation with historical events, it could be concluded that the settlement on Tall Zarʿā was modified several times between the Early Bronze Age and the Islamic period (Vieweger – Häser 2013: 16-41). Some house structures can be connected with the Early Bronze Age period. Within the transition period of the Early Bronze Age to the Middle Bronze Age period only a few storage pits and hearths as well as some walls were found (Vieweger – Häser 2013: 16-19). In The Middle Bronze Age



*2. Aerial picture of Tall Zar'ā with all three excavation areas visible (photo: APAAME_20111002_DLK-0759).*

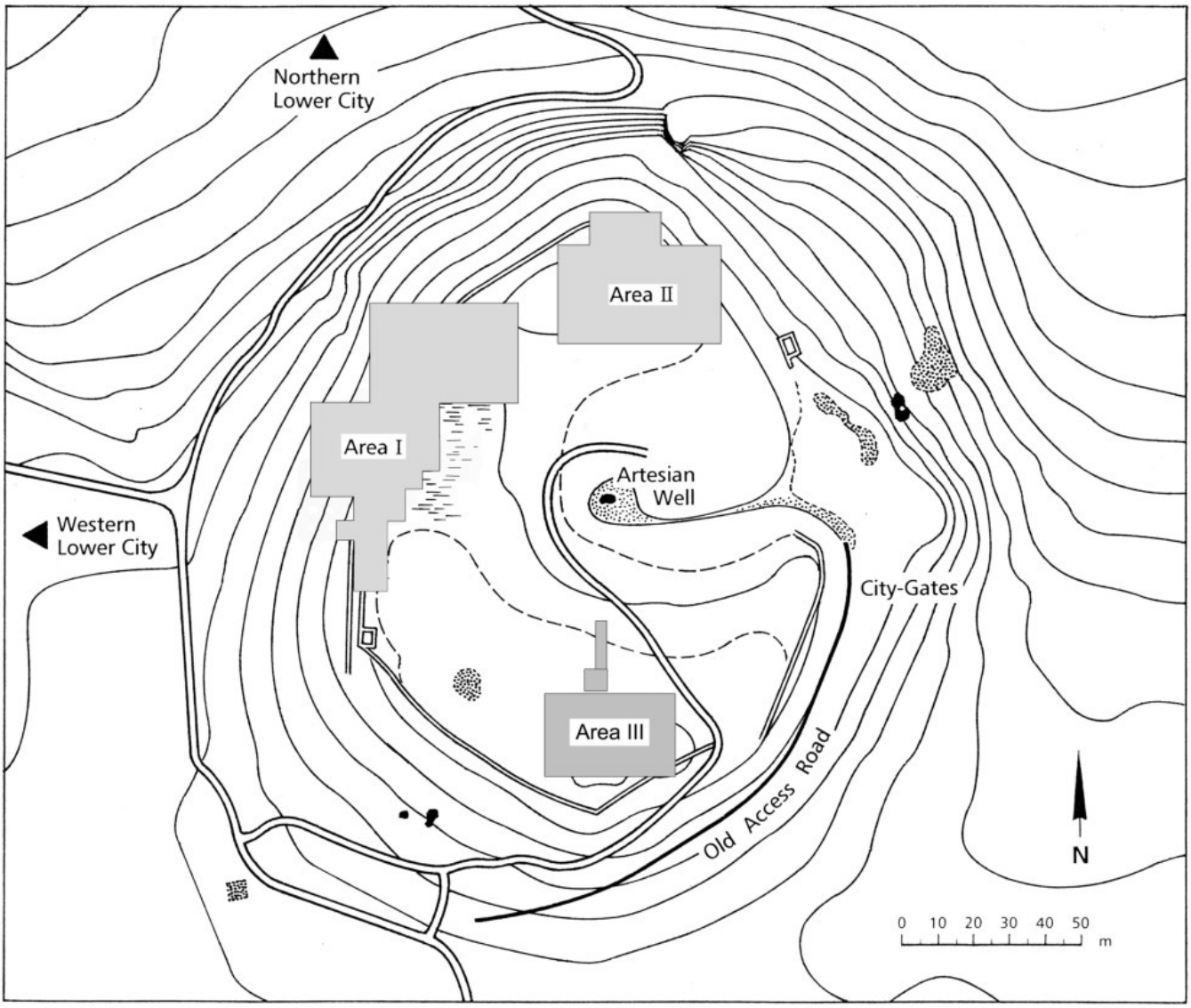
houses and workshops were excavated in Area I. After a landslide in the Late Bronze Age, the settlement became a big city, with a city wall, temples, houses and workshops (Vieweger – Häser 2013: 20-25). The Late Bronze Age city was destroyed in around 1200 BC but resettled in the Iron Age period (Häser – Vieweger 2012: 258-260). In the Iron Age II period it became more consolidated and the architectural remains give the impression of a bigger settlement again, more city-like than in the period before (Vieweger – Häser 2013: 30). At the end of the 8th century BC, this settlement lost its urban character again and only some houses remained on the plateau (Vieweger – Häser 2013: 32).

In the Early Hellenistic period, Tall Zar'ā was most likely a fortified checkpoint at one of the smaller access roads to Gadara. In the Late Hellenistic and Early Roman period, this was expanded into a civilian settlement with a large building complex that was found mainly in Area II so far. Probably in the 2nd century AD the settlement was scaled back to a track marshal. Most likely at the beginning of the 4th century AD a uniformly-designed settlement was built on top of the whole plateau, which became an important agricultural centre, after numerous extensions and conversions, with its main building in today's Area III (Kenkel 2012: 308-324). The settlement on the tell prospered in the Byzantine and Umayyad period. In later Islamic periods some areas were still in use but on a smaller scale.

## The 2014 Area III Excavations (Figs. 4-9) (U. Rothe)

*Introduction:*

Excavation work conducted by the German Protestant Institute of Archaeology and the Biblical Archaeological Institute in Summer 2008 in Area III, in the southern part of the tell plateau on Tall Zar'ā, uncovered a series of building remains dating to the late Byzantine, Umayyad, Mamluk and Ottoman eras (Vieweger-Häser 2008). The original Byzantine




*3. Map of Tall Zar'ā with level curves and the three excavation areas including the extension in area III of 2014 to the north (photo: BAI/DEI).*

building consisted of a large courtyard with a gate entrance on the western side and a series of ca. 5 m x 5 m rooms around the northern, southern and eastern sides (Häser 2013). The mosaic paving surface of the courtyard was discovered on the final day of excavations and had seemed to be of plain grey/white tesserae. As there was no time to excavate it properly, it was reburied to protect it for the future. Although 500 $m^2$ of the structure were opened up in 2008, the excavation failed to find the edge of it in any direction except to the south, where the slope of the tell formed a topographical limit. It was clear that the structure had been modified and reused in the Umayyad period, and the ruins of these earlier structures provided the basis and materials for later, smaller buildings of the Mamluk and Ottoman periods.

It was not clear from the excavated remains what the original Byzantine structure had been. A largely intact oil press in the eastern part of the excavated area indicated agricultural activities, and extensive contemporaneous structures in Area II in the north of the tell plateau (Häser –Vieweger 2012) had since suggested the tell was home to a considerable settlement in the Byzantine era, with workshops, storage areas and further agricultural activity. Finds of thousands of both large and very small tesserae on the surface in Area III pointed to the structure

there playing a central role in the complex. In light of this, two possibilities were mooted: 1. that the site had been a large rural estate, or 2. that it had been a monastery.

In Spring 2014 (4th-18th May), Ursula Rothe of the Open University (UK) restarted the project in Area III, and, in collaboration with Frauke Kenkel from the German Protestant Institute of Archaeology in Amman and funded by the Council for British Research in the Levant, conducted a small pilot excavation to the north of the previously excavated area. The objective was to determine the dimensions of the complex, and any further information as to its identity, so as to provide the basic information needed in order to plan a larger project aimed at uncovering the whole structure in Area III.

*The Tall Zar'ā Mosaic*

While the main purpose of the Spring 2014 season was to gain further information about the complex, upon arrival at the site the excavators discovered that the area of mosaic floor in the previous trenches that had been reburied in 2008 had been dug open and damaged, and also that what had seemed to be plain tesserae emerged now, after having been exposed to the elements, as having different colours and displaying an inscription in ancient Greek. It was decided that the first priority should be to look after this very precious mosaic, which is the only inscription so far retrieved from Tall Zar'ā, and one of only few inscriptions from the region in general. First, the mosaic was excavated and exposed by carefully scratching away the very hard layer of lime that had concealed the detail in the first place. It was then measured and photographed from various angles, and tesserae lying in the vicinity that originally belonged to the mosaic were collected in the hope that some of the lacunae could be restored. It was felt that due to the damage that had already been done, it would be preferable for the mosaic to be salvaged and taken to a safe place, and this was also the opinion of the Department of Antiquities, who sent Amjad Bataineh from the regional Department headquarters in Irbid to assess the situation. The mosaic was expertly lifted by members of the Department of Antiquities on the 18th May 2014 and taken away for restoration. Further details as to the wording of the mosaic and its implications can be found in the next section.

*The Test Trench*

A test trench 15 m long (with a balk after 10 m) was dug from the northern edge of the previously excavated area. It was L-shaped to accommodate the corner of a previously excavated structure to the south. The test trench ran over three squares in the general Tall Zar'ā grid, from south to north: Y 125, Z 125 and AA 125. A succession of layers and structures were uncovered which will be summarised in the following.

Roman or Byzantine: Below the main Byzantine-period structures in trench Y 125 that correspond to the structure with the inscription mosaic further to the south, a wall was discovered. It is at a slightly different angle to the structures above, and appears to belong to an earlier building. It was covered by a layer of backfill.

Byzantine: This occupation layer was also only attested in trench Y 125. In this layer, a room is formed by a wall in the north and one in the south. There is a doorway in the northern wall. A stone toward the outside of the doorway at the bottom (western side) has a hole worked into it – presumably for a door. A hard mortar floor to the south of the southern wall and a hard mud floor with cobblestones to the north of it within the room belong to this phase, as do several subsequent hard loam floor layers. In one of these, four coins were found, dating it to some time in the 4th or 5th century AD. This structure is then apparently destroyed: The hard mortar floor is filled with a backfill layer, a wooden construction above the room to the north of the southern wall burns down and creates an ash and charcoal layer with an intact burnt beam. This may have been earthquake damage: seismic events are known in the area

for AD 363, 419, 447, 551, 580 and 631/632, 659/660 (Amiran *et al*. 1994).

*Byzantine-Umayyad (until 749 AD):* This layer corresponds to the main Byzantine-period structures (which now turn out to be a monastery: see discussion of mosaic below) in the earlier excavation and is found across the three squares of the test trench. In Y 125, the previous southern and northern walls continue to be used. The doorway in the northern wall receives a step up to a new floor level which is paved using plain white mosaic stones roughly 2.5cm$^3$ (similar to those in the courtyard of the old excavation and common in monasteries in this region in the Byzantine period: Hirschfeld 1992, 65f.). This floor is at the same height as the partially intact mosaic floor with inscription in the earlier excavation (dated in the inscription to AD 709). In Z 125, outside the doorway in the northern wall and stepping down circa 30 cm is an open space with a hard loam surface that houses some kind of (agricultural?) installation **(Fig. 4)**. Behind that to the north is a further small building evidenced in two walls and a doorway with carved stones. The room is paved with flat stones and sealed with very hard loam **(Fig. 5)**. Further to the north in AA 125, the paved floor from Z 125 continues. At some stage immediately following this phase, a new floor was added on top of the existing paving and floor. The most important find in this trench was a large wall, circa 75 cm wide, constructed using two rows of dressed header and stretcher stones, and the intervening space filled using large field stones **(Fig. 6)**. It appears to be a boundary wall for the complex (perhaps the edge of the core monastery precinct). The ground to the north of it is in any case very different to anything found further south in any of the trenches, consisting of dark brown/red earth peppered with small stones and suggesting it lay 'outside' the complex to the south.

The condition in which these structures were found points to them being destroyed in a single, catastrophic event and that this event was probably seismic. In Y 125, the mosaic floor was uncovered in a completely destroyed state. The stones were still inside the original mortar but entirely dislodged. We were unable to find even the smallest remaining section intact. Burnt beams also suggest a wooden roof



*5. The walls, carved doorway and paved floor of the Byzantine era in Z 125 (photo: BAI/DEI).*




*4. The Byzantine-era agricultural(?) installation in Z 125 (photo: BAI/DEI).*



*6. The Byzantine 'boundary wall' in AA 125, looking south (photo: BAI/DEI).*

that burnt and collapsed. The other squares also revealed a layer of collapsed debris within the confines of the 'boundary wall', but not outside it. It seems likely that the destruction is connected with the major earthquake (or series of earthquakes: Ambraseys 2005) that befell the region in around AD 749, resulting in large loss of life and widespread destruction in nearby Tiberias, Gadara, Pella, Jerash and Skythopolis (Tsafrir and Foerster 1989; Marco *et al.* 2003).

*Abbasid-(Mamluk)*

Some time appears to have passed before reoccupation, as the whole area becomes covered in a layer of backfill and soil. The buildings are, however, reoccupied: In the main building in Y 125, the doorway in the northern wall is now completely walled in to a new floor level made of hard loam **(Fig. 7)**. A new layer of walling is built on top, represented by an upright worked stone. A step is added within the room to the west of the doorway (leading out of the trench). A new wall is added to the west. The southern wall is no longer in use, and a tabun oven is built in the eastern part of the room **(Fig. 8)**. Later, this floor receives a new layer and a new tabun, and the older tabun receives a small surrounding wall. In the north, the 'boundary wall' is still in use, and forms the northern edge of a structure with a new wall going out at a right angle from it. The doorway with carved stone frame in Z 125 is walled up. A single row of large field stones is laid between the SW corner of this wall to the doorway of the main building in Y 125. The former agricultural installation may still be in use. 'Outside' the 'boundary wall' to the north a rubbish pit is dug containing a great deal of sherds of Late Byzantine-Early Umayyad cooking and storage vessels ('bag jars'). Several occupation layers can be found across the whole site within these structures that contain pottery dating to the Umayyad, Abbasid and Mamluk periods, suggesting low-intensity occupation over a long period of time.

*Mamluk1*: The preceding structures are destroyed or fall into disuse and the entire area is covered in a layer of debris and backfill. On top of them, entirely new structures are built that bear no or little relation to the older ones and date to the Mamluk period. In Y 125, a wall runs through the centre of the trench, where there seems to have been some kind of doorway. Another runs perpendicular to this. Within this and to either side of the wall is a cobbled area which peters off into a floor/occupation layer to the south. In the north, the tabun ovens have been filled in and a new floor of hard, white loam has been installed. The cobbled area partially covers this. At some stage the doorway was blocked **(Fig. 9)**. In the north of the area in square AA 125, two new walls are built on top of the Byzantine 'boundary wall', using this partially as a foundation base. Together with further new




*7. The doorway to the room in Y 125 walled in to a new level in the Abbasid(-Mamluk) period (photo: BAI/DEI).*




*8. Abbasid(-Mamluk)-era tabun oven in Y 125 (photo: BAI/DEI).*



*9. The walling-in of the doorway in Y 125 dating to the Mamluk period (photo: BAI/DEI).*

walls to the north they form a series of small rooms. In the intervening area in square Z 125, no new structures are built but there is a clear occupation layer containing a hearth.

*Mamluk2*: Sometime in the later Mamluk period the former structures fall into disuse and are rebuilt haphazardly: several new walls are built at various stages using the older ones for support, and a series of occupation layers suggest small-scale occupation.

**Area III: Some Comments on the Imported Pottery – (Fig. 10: 1-13)** (F. Kenkel)

The pottery examples discussed here were chosen to show the imported wares during the Late Byzantine–Early Islamic period. They are accompanied by some oil lamps that are easily distinguishable and datable. These examples are therefore very important for the stratigraphy of Area III.

Beside the chosen examples, the pottery material of Area III contains a lot of Byzantine-Umayyad amphorae, some Byzantine-Early Islamic basins of a coarse and chaff tempered fabric, as well as lots of Byzantine-Islamic cooking vessels. But the main category is jars, jugs and bowls from the Mamluk period, mainly from the 15th century AD. Some lids and huge storage vessels, 12 tiles, some plates and sieves, one cup and one fragment of an Ottoman pipe accompany these main categories. So far, only the examples from the so-called classical periods have been evaluated further. Especially the pottery of the Islamic period still needs further research.

The material presented below consists of three examples of African Red Slip Ware (**Fig. 11: 1-3**), five examples of Late Roman C Ware **(Fig. 10: 4-8**) and five oil lamps (fragmentary and complete, **Fig. 10: 9-13**).

African Red Slip Ware (ARSW) is one of the leading fine wares in most of the parts of the Mediterranean world for several centuries (Hayes 1972: 13). The clay is rather coarse and has a colour range from orange-red to brick-red. The slip is a refined version of the body clay and of good quality but without the glossiness of that on terra sigillata (Hayes 1972: 14). Within the pottery assemblage of Tall Zarʿā, this group is rather scarce. The three examples from Area III and only one example from Area II are all the instances that could be found so far. But this picture is also well known from other sites in northern Jordan. ARSW is mainly to be found in North Africa, Greece and the western Mediterranean. In the eastern Mediterranean, Late Roman C Ware (LRCW) is the leading import ware, especially during the 4th–7th centuries AD (Kenkel 2012: 90-91). The 22 examples of LRCW from Area III and the far higher amount of this group from the other two areas on the tell support this picture. Like in the material from Areas I and II, Hayes Form 3 is the most common one in Area III (Kenkel 2012: 91). No Cypriot Red Slip Ware (CRWS) has been found so far in Area III, although it was found in the other areas. But like ARSW, CRSW is not very common in this region of the eastern Mediterranean.

Only two of the five oil lamps could be dated more precisely due to their conservation status. These two examples belong to the group of so-called "Jerash lamps" that were produced mainly in the north of Jordan (Hirschfeld 1997: 325; Kenkel 2012: 295). They can be dated from the end of the 6th to the beginning of the 7th century AD but were in use until the mid 9th

**Table 1:** Imported pottery and oil lamps – Tall Zar'ā, Area III (table: F. Kenkel).

| No | Type | Inv.No. | Square | Context | stratum | Fabric group | Date |
|---|---|---|---|---|---|---|---|
| 1 | bowl | TZ 300092-013 | V 125 | 30159 | 00 | ARS | mid-late 5th-6th cent. AD |
| 2 | bowl | TZ 300013-001 | X 126 | 30020 | 00 | ARS | 550 – 625 AD |
| 3 | bowl | TZ 300011-003 | V 123 | 30024 | 00 | ARS | 550 – 625 AD |
| 4 | bowl | TZ 300011-004 | V 123 | 30024 | 00 | LRC | 6th cent. AD |
| 5 | bowl | TZ 300013-002 | X 126 | 30024 | 00 | LRC | 6th cent. AD |
| 6 | bowl | TZ 300089-002 | U 123 | 30134 | 05 | LRC | late 6th–early 7th cent. AD |
| 7 | bowl | TZ 300041-001 | X 125 | 30084 | 00 | LRC | late 6th–early 7th cent. AD |
| 8 | bowl | TZ 300029-006 | W 125 | 30030 | 00 | LRC | late 6th–early 7th cent. AD |
| 9 | Oil lamp | TZ 300198-009 | Y 125 | 30354 | 02 | Is Bu2Br | late Byzantine–Umayyad |
| 10 | oil lamp | TZ 300104-015 | W 125 | 30118 | 05 | Is Grey | late Byzantine–Umayyad |
| 11 | oil lamp | TZ 300026-026 | V 123 | 30024 | 00 | Cl Red2Br | late 3rd–early 4th cent. AD |
| 12 | oil lamp | TZ 300033-009 | X 128 | 30035 | 00 | Cl Bu2Br-f | late 3rd–early 4th cent. AD |
| 13 | oil lamp | TZ 300020-021 | X 128 | 30035 | 00 | Cl Red-bu2br core | 1st–3rd cent. AD |

century AD (Kenkel 2012: 296).

The material presented here can be dated mainly within the end of the 6th to the beginning of the 7th century AD, with three exceptions that are the fragments of oil lamps dated to the Roman period. There are some Eastern Sigillata A fragments that – together with the lamp fragments – hint to an earlier occupation phase in Area III, but the major part of the material clearly dates to the late Byzantine–Early Islamic period. However, the majority of the material – not presented here – is glazed ware and especially painted vessels of the Mamluk period, mainly from the 13th–15th century AD.

## Imported Pottery and Oil Lamps from Tall Zar'ā – Area III (Fig.10: 1-13)

### African Red Slip Ware

*Type:* Bowl
*Rim Form:* Rather deep bowl with plain rim and overhanging rounded downturned flange.
*Figure References:* Tl. A, Fig. 1
*Est. D. (max):* 17 cm
*Parallel*: Mid-late 5th–6th century AD: Hayes 1972, Fig. 26, Form 91, 92
*Note:* A broad flange characterizes the earlier examples of this type with a heavy lip at a sharp angle. The example shown has a broad but more rounded flange.

*Type:* Bowl
*Rim Form:* Large bowl with sloping wall turning into a thickened and knobbed rim.
*Figure References:* Tl. A, Fig. 2
*Est. D. (max):* 30 cm
*Parallel:* 550-625 AD: Hayes 1972, Fig. 30, Form 104, C23
*Note*: –

*Type:* Bowl
*Rim Form:* Large bowl with sloping wall turning into a thickened and knobbed rim.
*Figure References:* Tl. A, Fig. 3
*Est. D. (max):* 40 cm
*Parallel:* 550-625 AD: Hayes 1972, Fig. 30, Form 104, C23
*Note:* –

### Late Roman C Ware

*Type:* Bowl
*Rim Form:* Rim with concave outside and flat underside that can appear quite broad and has a small ridge at the junction to the wall. This bowl type normally appears with a ringfoot base.
Figure References: Tl. A, Fig. 4
*Est. D. (max):* 20 cm
*Parallel:* 6th century AD: Kenkel 2012, Pl. 13, LRCW3.9
*Note:* This type is one of the most common

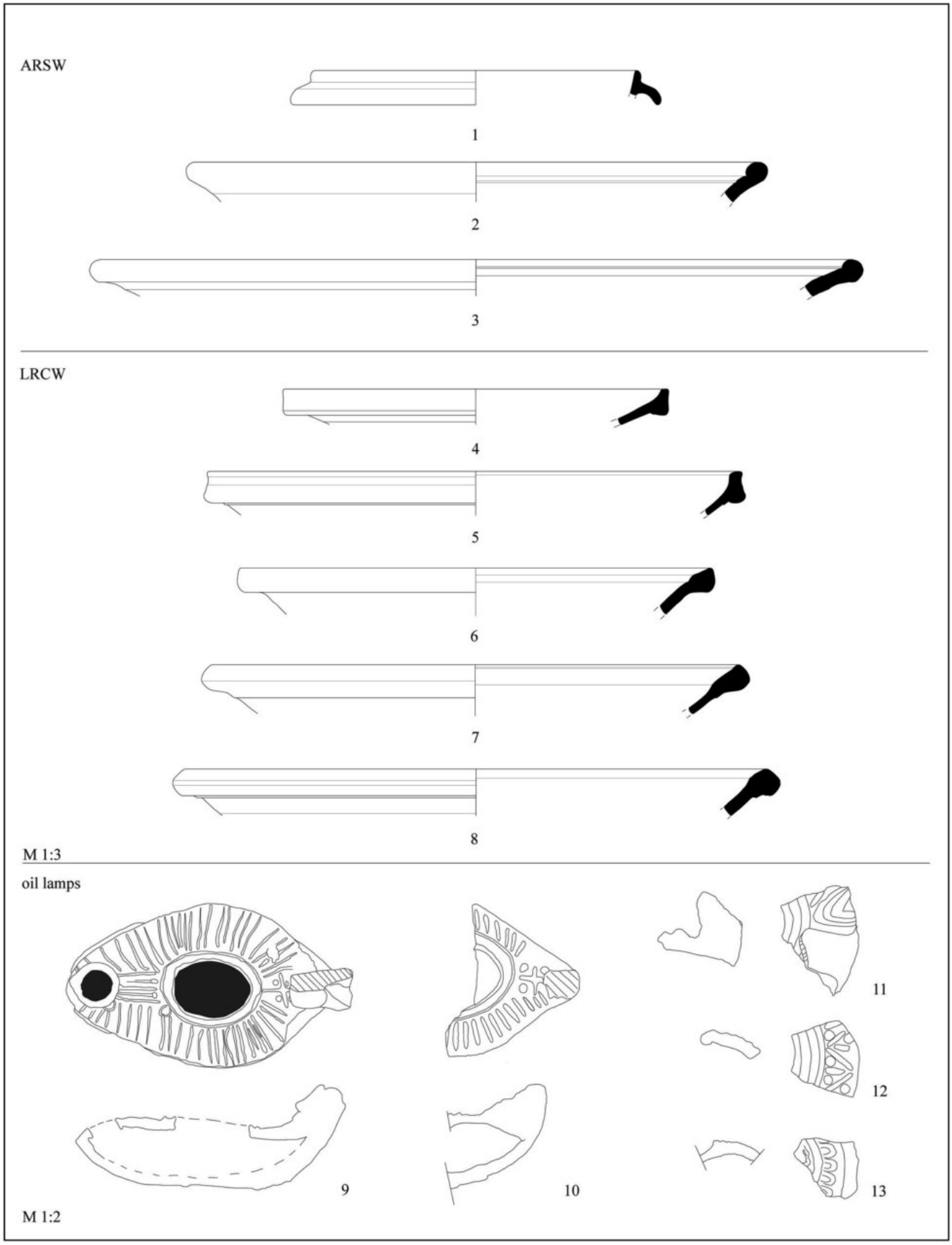



*Fig.10: 1-13 Imported pottery and oil lamps – Tall Zar'ā, Area III (drawings: F. Kenkel).*

forms within the excavation on Tall Zar'ā and belongs to Hayes type 3F.

*Type:* Bowl
*Rim Form:* Rim with concave outside and flat underside that can appear quite broad and has a small ridge at the junction to the wall. This bowl type normally appears with a ringfoot base.
*Figure References:* Tl. A, Fig. 5
*Est. D. (max):* 28 cm
*Parallel:* 6th century AD: Hayes 1972, Fig. 69, Form 3, F23; Kenkel 2012, Tl. 13, LRCW3.6
*Note:* This type is one of the most common forms within the excavation on Tall Zar'ā and belongs to Hayes type 3F.

*Type:* Bowl
*Rim Form:* Bowl with heavy rim and squarish profile.
*Figure References:* Tl. A, Fig. 6
*Est. D. (max):* 25 cm
*Parallel:* Late 6th–early 7th century AD: Hayes 1972, Fig. 71, Form 10 A, 11-12
*Note:* –

*Type:* Bowl
*Rim Form:* Bowl with heavy rim and squarish profile.
*Figure References:* Tl. A, Fig. 7
*Est. D. (max):* 28 cm
*Parallel:* Early-mid 7th century AD: Hayes 1972, Fig. 71, Form 10 C, 14
*Note:* –

*Type:* Bowl
*Rim Form:* Bowl with heavy rim and squarish profile.
*Figure References:* Tl. A, Fig. 8
*Est. D. (max)*: 31
*Parallel:* Late 6th–early 7th century AD: Hayes 1972, Fig. 71, Form 10 A, 2
*Note:* –

**Oil Lamps**
*Type:* Oil lamp
*Form:* So called "Jerash-lamp"
*Figure References:* Tl. A, Fig. 9
*Est. D. (max):* –
*Parallel:* Late Byzantine–Umayyad: Kenkel 2012, Pl. 53, La90
*Note:* This type of lamp was produced mainly in northern Jordan, most probably in Jerash (Hirschfeld 1997: 325). The handle was usually a handmade zoomorphic one.

*Type:* Oil lamp
*Form:* Fragment of so called "Jerash-lamp"
*Figure References:* Tl. A, Fig. 10
*Est. D. (max):* –
*Parallel:* Late Byzantine–Umayyad: Kenkel 2012, Pl. 53, La90
*Note:* This type of lamp was produced mainly in northern Jordan, most probably in Jerash (Hirschfeld 1997: 325). The handle was usually a handmade zoomorphic one.

*Type:* Oil lamp
*Form:* Fragment of mould-made lamp
*Figure References:* Tl. A, Fig. 11
*Est. D. (max):* –
*Parallel:* Late 3rd–early 4th century AD: Kenkel 2012, Pl. 58, La70-La75
*Note:* It is difficult to date small fragments like this , but because of the fabric and the estimated shape it is most probably from the Roman–early Byzantine period.

*Type:* Oil lamp
*Form:* Fragment of mould-made lamp with a bow-shaped nozzle
*Figure References:* Tl. A, Fig. 12
*Est. D. (max):* –
*Parallel:* Late 3rd–early 4th century AD: Kenkel 2012, Pl. 57, La69
*Note:* Could also be a fragment of a so-called "Galilean lamp" from the 5th-6th century AD, but it is hard to judge because of the fragmentary piece.

*Type:* Oil lamp
*Form:* Fragment of mould-made lamp with a concave discus and a short, rounded nozzle

*Figure References:* Pl. A, Fig. 13
*Est. D. (max):* –
*Parallel:* 1st–3rd century AD: Kenkel 2012, Pl. 56, La58
*Note:* Based on the decoration, this fragment is dated to the Roman period.The Area III Inscription (A. Zerbini) **(Fig. 11)**

The Area III Inscription (A. Zerbini) **(Fig. 11)**

During the 2014 campaign at Tall Zar'ā, an inscription was found in the excavations of Area III (Fig. 10). The text is set in a partially preserved mosaic medallion, the original diameter of which must have been ca. 160 cm. The inscribed field measured ca. 140 cm in diameter, while the frame, made up of concentric circles of black, red (two rows) and again black tesserae was at least 10-12 cm in width. The medallion was removed before the end of the excavation season and re-assembled at the mosaic storage site of Tabarbour (Amman). Restoration work has been carried out by Mohammad al-Shiyab and Ziad Aziz of the Department of Antiquities of Jordan. Height of letters: 5.5-12 cm.

[Two more lines?] | [- - -][.]α|[- - -ca. 6 - - -] [...]ιο[- - -c. 6- - -] τοῦ| [....]νου δευτεραρί|ου κὲ λυποῦ μοναχ||οῦ ἐ(ν) μινεί Ἰου|νίου χιβ' χ(ρόνων) | ἰνδ(ικτιῶνος) ζ'

The *alpha* is written throughout using the cursive form with open top. This is rare in inscriptions, but attested from the sixth cenutry onwards (e.g. Mouterde & Poidebard 1945: 209 (Hierapolis, AD 542-8), Canova 1954 n.222 l. 3 (Kerak, 6th c.), CIIP 1548 (Caesarea, 3rd-6th c.), 2470 (Gaza, AD 540)); l. 2, the *tau* could also be a *gamma*; the *upsilon* is written in the cursive form (Jordanian comparanda: Canova 1954 n. 242 ('Ayyun, AD 620/1), I.Gerasa 73 (Jerash, late-3rd c.)); l. 3, ]νου probably Ἰωάννου should be read (suggestion by J.Niehoff);l. 4, κὲ for καὶ; λυποῦ μοναχοῦ for λοιπῶν μοναχῶν, with the common omega – omicron replacement; *upsilon* for OI is also attested (e.g. IGLS XIII/2 9773-4; 9572); l. 5, μινεί for μηνί; *trema* on the iota of Ἰουνίου; l. 6, χ(ρόνων) is an unusual abbreviated form; much more frequent are χρ(όνων) and ἐν χρ(όνοις).



*11. The mosaic inscription found on Tall Zar'ā (photo: K. Takeshi).*

"(the work was carried out under?)… (and) Ioan]nes (?), the deuterarios, and all the other monks in the month of June, year 612 in the time of the 7th indiction (AD 709)"

This inscription must have commemorated the completion of construction or mosaicking works carried out in this building. Despite its fragmentary state, it reveals a number of elements of great historical significance, which we will now proceed to briefly outline (a fuller discussion may be found in *Zerbini et al.* First, the inscription serves as confirmation of the presence of a monastic establishment in the vicinity or, more likely, on the site of Tall Zar'ā – an aspect adumbrated by the material evidence discussed above. This is demonstrated by the reference to monks and, more importantly, to a member of the monastic hierarchy, the deuterarios. As the name clearly specifies, the deuterarios acted as the 'second' or deputy to the monastery's superior (*the hegoumen or archimandrites*). The term is attested in the acts of church councils and hagiographies from the 5th to the 8th century (*among others, see Athan*., doct. Ant. 18 (PG 28 col. 581A); Cyril Scyth., v.Euthym. 48 (ed. Schwartz p.70, 13); ACO III (p.157.18)). References to deuterarioi are much rarer to come by in the epigraphic record. A survey of the epigraphic evidence for Palestine and Arabia conducted by Meimaris (1986: 250) yielded two occurrences (from Skythopolis and St Catherine's monastery in Sinai). Other inscriptions mentioning *deuterarioi* come from Thasos and, possibly, Pylai in Bithynia (see resp. BE 1987 n.452 and 1994 n. 754, with reservations). It is to be expected that, as in the inscription from Skythopolis (Fitzgerald 1939: 16), the name of the hegoumen would have preceded that of his deputy in the Tall Zirāʿa inscription.

Second, the date of the inscription is of particular interest. It contains the denomination of the month in the Julian calendar (June), the civilian year according to the era in use at Tall Zar'ā (612) and the indictional date (7th). This latter was a fiscal reckoning: indictional cycles of 15 years were introduced under Constantine, with the beginning of the first cycle being reckoned in AD 312 (*Chron. Pasc. 522.14-5*). At the time of the Tall Zar'ā inscription, the beginning of the indictional year had long been established at 1 September (Grumel 1958: 193-202). When used together with other dating systems reckoned by eras, the exact beginnings of which are unknown, indictional dates can help clarify them by confirming or denying any of the available alternatives. This is the case with the Tall Zar'ā inscription. Located only a few kilometres south of Gadara, on the south bank of the Wadi al-'Arab, the site has been long assumed to have been part of the territory of this city.[1] Gadara, as inscriptions and coins have shown, used a 'Pompeian era' with its beginning set in the autumn of 64 BC (Meimaris 1992: 79-81). If Tall Zar'ā had been part of the territory of Gadara, the civilian year 612 would correspond to AD 548/9. Yet, June 549 fell within the 12th, not the 7th indiction. Unless a scribal error in either the civilian or the indictional date is factored in, we must assume that another era was in use at Tall Zar'ā. That the latter was the case is strongly suggested also by the order of the numerals in the civilian date of the Tall Zar'ā inscription: while dates by Pompeian eras almost always employ a reversed order of numerals (units, tens and hundreds in succession), the year 612 is written here in its ordinary sequence.

The epigraphic and numismatic evidence has shown that another two eras were in use locally: the era of the provincia Arabia, beginning on 22nd March 106 and in use at Bostra, but also at Adraa *(Dera'a*) and as far south as Husn (south

1. The valley of the wadi al-'Arab is generally assumed to have fallen in the territory of the city of Gadara (e.g. Vieweger and Häser 2005: 1; Hoffmann 1999: 226). This, however, is based on no direct evidence. In what is by far the most detailed attempt at reconstructing the extent of the chora of Gadara, Weber (2002: 31) left the question of the southern limits of the city's territory open

of Irbid) and Kh. Daraya (ca. 17 km south-west of Irbid); and the era of Capitolias, with its beginning disputed to have been set in either AD 96/7, under Nerva, or AD 97/98 under Trajan.

The synchronism between a civilian and an indictional date in the Tall Zar'ā inscription allows us to reach a definitive solution as regards this issue. The era of the provincia Arabia may be immediately rejected: by that reckoning, June of the year 612 would correspond to June 717 falling in the latter part of a 15th indiction (running from 1st September 716 to 31st August 717). On the other hand, the date of the Tall Zar'ā inscription fits perfectly well with a reckoning by the era of Capitolias as starting in AD 96/7. June of the 612th year could have only been June 709, which indeed matches with a 7th indiction running from 1st September 708 to 31st August 709.

I will return elsewhere to the implications of this conclusion for Capitolias, its era and its territory. As far as Tall Zar'ā is concerned, the date may well suggest that the site belonged to the territory of Capitolias.[2] The latter must have therefore been far bigger than previously assumed, with the Wadi al-'Arab presumably functioning as a northern natural border between this and the territories of Gadara and Abila. Moreover, the date of this inscription proves the existence of a functioning monastic community in what was by then the Umayyad jund al-Urdun. While dedications of churches and inscriptions attesting to restorations in the early to mid-eighth century have become numerous in Transjordan over the last 25 years (Di Segni 2006/7), the Tall Zar'ā inscription is among the latest to clearly stem from a monastic environment.

Finally, the inscription attests to the survival into the early Islamic period of yet another local era, that of Capitolias. This joins the Pompeian era of Gadara, which last appears in an inscription from Hammath Gader dated to AD 662 (Di Segni 1997: 237-40 n.54); the Pompeian era of Philadelphia which appears in a church at Qweismeh dated AD 718/9 (Piccirillo 1984); and the provincial era of Arabia, which is attested in inscriptions as late as the early Abbasid period (e.g. an unpublished funerary inscription from the vicinity of Charakmoaba/ al-Kerak dated to AD 829).

**Discussion** (U. Rothe)

The two original objectives of the 2014 expedition to Tall Zar'ā were met in the findings of the test trench. We gained a better understanding of the size and spread of the Byzantine complex in this area when we discovered the large wall in square AA 125 that appears to form the northern boundary of the central complex. We also gained a better idea of the various stages involved in this building phase within the complex and of later phases built on top. Having dug to a level approx. 0.5 metres below the level of the intact mosaic in the adjacent square and having discovered an earlier wall at a different angle, it appears that there are no major earlier building phases of the Byzantine complex as we know it, although there are earlier, substantial

2. Unless we follow Di Segni (2006/7: 121) in thinking that, from the sixth century onwards, "city eras … shook free of the city boundaries". In other words, Di Segni argues that local city eras spread across the limits of their territories. While this theory is corroborated by abundant evidence from Palaestina III (and especially as regards the era of Gaza), the case remains to be verified for Palaestina II and Arabia. For the latter, Di Segni's argument that Kh. al-Daraya lay in the territory of Gerasa, despite using the era of the provincia Arabia in a mosaic inscription dated (probably) to AD 624 is doubtful. Di Segni holds that the position of this village 'in respect to Kh. al Maqatiya', which employed a Pompeian era (as a mosaic inscription dated to AD 482/3 confirms) makes it unlikely that Daraya belonged to the diocese of Bostra. And yet, there is no reason to believe that this was not the case: Kh. al-Maqatiya, which likely lay in Gerasene territory, is located ca. 14 km to the NW of Gerasa: Kh. al-Daraya is another 11 km to the NE of this village, or ca. 18.5 km to the N of Gerasa. Moreover, the village of Sa'ad, located only 11 km to the NE of Gerasa, employed the era of the provincia Arabia and mentioned a Ioannes, zygostates (a 'public weighter') of Bostra, as one of the benefactors of the church (see BE 1997 n.663), adding weight to the theory that the territory of Bostra could have extended this far to the south.

structures below. The broken mosaic floor in Y 125 was a sobering discovery, making as it does the prospect of finding intact mosaics here even more unlikely. In this context it is very fortunate that the mosaic medallion in the earlier trench was preserved at all: perhaps the additional reinforcement provided by the layer of hard lime applied over it at a later stage helped in this respect.

Owing to the significance of the mosaic inscription, however, the expedition also revealed a great deal more than expected. It is now clear that the large Byzantine-period complex on the tell was a monastery. It is possible that it is the *cenobium* mentioned in Cyril of Skythopolis' *Life of Saba*s as having been founded by Sabas (Vita Sabae 34) at the place where he retired to a cave 'by the river called Gadaron' (παρὰ τὸν λεγόμενον ποταμὸν Γαδάρων: 33 (ed. Schwartz 118.30-31)).[3] If the Tall Zar'ā monastery is indeed this one, it is interesting to note its possible early history according to Cyril of Skythopolis: the basis of the monastery was a cave, which calls to mind those along the valley edge of the natural stone platform upon which Tall Zar'ā evolved (although there are caves in the Yarmouk valley that are arguably more appropriate for this use). The date of the cave episode appears to be some time in the first decade of the 6th century. After Sabas receives an increasing number of visitors at the cave, he builds a cell (κελλίον: 34 (ed. Schwartz 120.5)) and several brethren settle down there. Once it becomes too overcrowded, Sabas retreats, and sometime later, one Eumathius inherits one of the cells and builds up a community at the site, making the place into a cenobium (κοινόβιον: 34 (120.9)).

Without more explicit evidence, we cannot be sure that the monastery on Tall Zar'ā is the one referred to in Cyril of Skythopolis, but the form and date of the structures so far discovered would fit with a foundation date in the 6th century and appear to belong to a large, *cenobium-style* monastery. The rows of rooms 5 x 5 m found in both Area II and Area III, the workshops in Area II and the agricultural installations in Area III all correspond to common features of Byzantine monasteries (see, e.g., Mampsis and *other in Negev cenobia in Figueras* 1995). Of great importance is, in any case, the fact that the Tall Zar'ā monastery was still in use and was even subjected to new building works several generations into Umayyad rule, as evidenced in the date of the mosaic.

Future work in Area III of Tall Zar'ā promises to be fruitful, and is likely to prioritise revealing the central monastic structure in its entirety. In this context, it will also be important to clarify both the extent and nature of earlier buildings immediately below, and further details as to the destruction of the site and its reuse in the early Islamic period.

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3. There are only two rivers that are near Gadara that Cyril can be referring to here: the Yarmouk to the north or the Wadi al-'Arab to the south, in which Tall Zar'ā is located. Three factors make the latter a more likely candidate: first, Greek texts usually refer to the Yarmouk by its Greek name: Hieromykes; second, the Yarmouk is a much longer river that rises 70 km to the east of Gadara and as such is unlikely to have been referred to using a name connected specifically to the city at its westernmost point; third, Sabas is described as having been visited in his cave by 'people from Skythopolis and Gadara' (34 (119.16)): the Wadi al-'Arab lies between these two cities, whilst the Yarmouk to the north is in the opposite direction to Skythopolis from Gadara.

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# MACHAERUS PROJECT: PRELIMINARY REPORT ON THE COLUMN ANASTYLOSES IN THE DORIC ROYAL COURTYARD AND IONIC BATHHOUSE OF THE FORTIFIED HERODIAN PALACE AT THE DEAD SEA

*Győző Vörös*

## Introduction

Since 2009, the Hungarian Academy of Arts in collaboration with the Jordanian Department of Antiquities has been conducting architectural surveys and archaeological excavations at Machaerus (modern Mukawir), on the hilltop citadel of the Herodian royal castle, overlooking the Dead Sea in the Hashemite Kingdom of Jordan.

The archaeological site is a pilgrimage destination for Christians and Muslims alike, as it is the site of the imprisonment and martyrdom of Prophet Yahya ibn Zakariyya (Saint John the Baptist), according to the generally accepted authority of Flavius Josephus *(Antiquitates Judaicae* XVIII 5, 2), official historian of several Roman emperors in the first century.

On the basis of our scientific submission dated September 2013, the director general of the Department of Antiquities, Professor Monther Jamhawi, agreed to clear the archaeological site of previously erected (1993), unauthentic and misleading monuments in the royal courtyard, and authorized the author to re-erect two of the original palace columns.

We carried out this task in March - April 2014; the following members of the archaeological mission were present: Dr. Győző Vörös (archaeologist; architect; director), Tamás Dobrosi (architect), Tamás Dósa Papp (architect; photographer), Ueli Bellwald (conservator), Khader Apsi (crane man) and Dylan Karges (archaeological graphic artist). The representative of the Department of Antiquities was Abdullah al-Bwareed.

## Discovery of the Herodian Columns and *in Situ* Reconstruction of the Herodian Column Bases

In 2009, when the Hungarian mission started its fieldwork at Machaerus, we produced a substantial architectural catalogue of unpublished carved stones found on the unguarded site **(Figs. 1 and 2)**. Among the building elements, we identified 51 Herodian column drums and bases, as well as one Doric and six Ionic capitals. These were published in the Machaerus I monograph (Vörös 2013: 294–317), along with a plan for an architectural anastylosis project involving one Doric and one Ionic column.

Anastylosis of the two Herodian columns required sophisticated scientific preparation and detective work, both theoretical and practical. Our original intent did not change: we wanted to present the surviving ruins of the archaeological monument in an attractive, but unquestionably authentic, manner and to preserve them for future generations. Aiming at maximum authenticity, our aim was to re-erect complete columns in the very locations where two column bases had been found *in situ* by the Franciscan Mission in 1979 and 1980 respectively (Corbo 1979 and 1980).

With the valuable graphic and photographic excavation archives of the Studium Biblicum Franciscanum to hand, our first task was to identify the two column bases amongst the other Herodian architectural elements as they had been removed from their original locations by vandals. In the meantime, although the stylobate of the Doric column base remained nearly intact, the upper surface of the crepidoma for the Ionic



*1. This dramatic photograph from the Jerusalem archive of the Studium Biblicum Franciscanum was taken during the second Franciscan mission (directed by Fr Michele Piccirillo) in 1992. Following complete excavation of the Herodian cistern, we can see many architectural elements in its base, waiting to be recovered. View from south-west.*



*2. The Hungarian mission inherited this architectural collection in the form of an undocumented, unpublished and unguarded open-air storage area on the archaeological site of Machaerus, as visible in this 2010 photograph.*

column base had to be reinforced as it had degraded over the past 35 years. For earthquake-proofing, the two column bases were anchored with similar stainless steel *empolia* (plugs) to those we used as links between the column joints.

The day of the re-erection of the two column bases, 30 March 2014, was a fine celebration, as it was the first step in the complete anastylosis of the two Machaerus Herodian columns and the only phase of work that could be scheduled for a specific day. Their Royal Highnesses, Prince Hassan bin Talal and his wife Princess Sarvath al-Hassan represented the Hashemite royal family. Professor Monther Jamhawi, director general of the Department of Antiquities, and HE Dr Béla Jungbert, Hungarian Ambassador to Jordan, were also present, along with members of the Machaerus research project and the Department of Antiquities. All of us were under the protection of Jordanian security officers and royal guards. It was a memorable day in the Dead Sea sunshine that demonstrated the great support of the royal family and Jordanian government for the Archaeological Research Unit of the Hungarian Academy of Arts at Machaerus **(Fig. 3)**.



*3. The re-erected Ionic column base on the reinforced crepidoma in the apodyterium hall of the former Herodian royal bathhouse at Machaerus. HRH Princess Sarvath al-Hassan stands in the center of this official photograph. On her right (in scarf) stands HRH Prince Hassan bin Talal, chairman of the Royal Scientific Society; on her left stands Professor Monther Jamhawi, director general of the Department of Antiquities of Jordan.*

Prior to this, the Department of Antiquities had approved, on the basis of our carefully prepared scientific proposal, the removal of previously erected modern columns from the archaeological site. These misleading 1993 representations had altered the ancient character of the Machaerus hilltop for 21 years **(Fig. 4)**. They had partly been erected in places where no columns had stood in antiquity, thereby neglecting both the archaeological documentation of the first Franciscan excavations and current trends in monument presentation. Specifically, the 1993 reconstruction of the royal peristyle courtyard of Machaerus had a number of flaws: (1) it imitated Ionic style, instead of the archaeologically demonstrable Doric style; (2) the arrangement of columns in the peristyle of the courtyard was 10 x 8, instead of the archaeologically demonstrable 8 x 8; (3) most importantly, the presentation falsified a partial column anastylosis, in which original column bases and capitals were used with modern columns, giving the impression of an Ionic royal peristyle courtyard at Machaerus with four surviving *in situ* column bases and professional anastylosis restoration. It was misleading for visitors and failed to take the archaeological evidence into account. This presentation was actually never completed and received serious criticism internationally. Whilst it was standing, it not only eroded the authenticity of the archaeological site of Machaerus, but also gave a bad name to Jordanian archaeology.

Our proposal for a new presentation of the monument was clear: the site of Machaerus, as the historical place where John the Baptist was imprisoned and beheaded, is so precious for Christian and Muslim pilgrims and visitors that its presentation had to be absolutely reliable and authentic. We published our proposal for a new presentation of the monument in *Machaerus I* (Vörös 2013: 364–377, *The Architectural Plans of the New Monument-Presentation for the Pilgrims and Visitors*). The first step in the execution of this plan was necessarily the removal of the erroneous modern columns, followed afterwards by the re-erection of two complete, genuine Herodian columns that



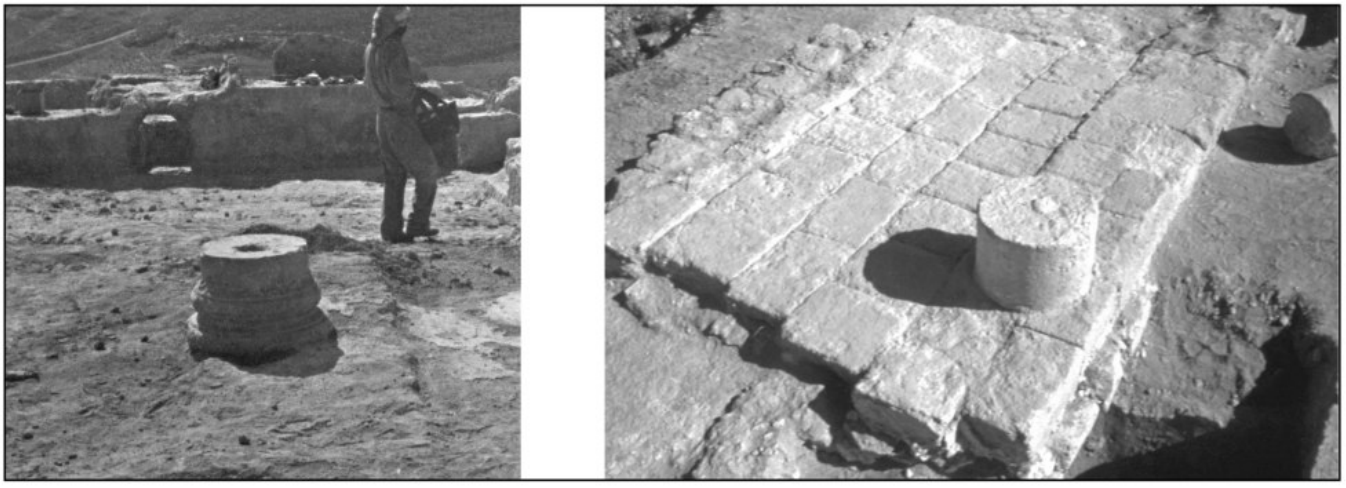
*4. The problematic 1993 presentation of Machaerus, with modern columns in the background and the original Herodian architectural elements left in the foreground.*

we had been able to piece together from the original architectural elements and had already published theoretically (Vörös 2013: 294–317, *The Theoretical Anastylosis of the Doric and Ionic Columns*). The decision to proceed with a new presentation of Machaerus, according to the Jordanian *Law of Antiquities*, required the authority of an appointed director general of the Department of Antiquities. However, as a result of political turmoil in the Middle East, there was - unprecedentedly - no appointed director general between June 2011 and August 2013.

One of the first decisions of Professor Monther Jamhawi, on his appointment as director general, was to approve our proposal in September 2013. With this we were able to start work on the new presentation of the monument. Since 2009, when the Hungarian mission started its work, the Department of Antiquities has provided two fundamental aspects of support free of charge: (1) it funded the entire payroll of the Mukawir workmen and (2) the project was able to use all archaeological equipment of the Madaba Archaeological Museum. In addition, the director general offered us the proven and time-tested crane of the Jarash Archaeological Park and, most importantly, its driver Khader Apsi. He started work with this crane at Jarash a good twenty years ago and has subsequently used it for the re-erection of dozens of ancient columns. The representative of the Department of Antiquities to our Machaerus project has been Abdullah al-Bwareed from the beginning. He is not simply an excellent colleague but, together with Khader, became our very good friend as well.

**The Two Complete Column Anastyloses**

After the publication of our theoretical column anastylosis plans (Vörös 2013: 294–317), three new and important developments occurred. The first was the discovery of a previously unknown Machaerus excavation archive in the *Studium Biblicum Franciscanum* in Jerusalem, which is referenced in the second volume of the Machaerus final reports (Vörös 2015: 264–271). Amongst these photographs were several new images of the first Italian - Franciscan mission excavations, which allowed for definitive identification of both the exact locations and actual bases of the Doric and Ionic columns found in situ in 1979 and 1980 respectively **(Figs. 5 and 6)**. The final identification of the Doric column base led to a modification in the sequence of the drums between the base and capital. The second development derived from physical analyses of the drums. Some of them were too fragile, fragmented or had cracks in the stone that rendered them unusable for an earthquake-proof anastylosis. We had to find alternate drums for these architectural elements on the basis of matching measurements. The third

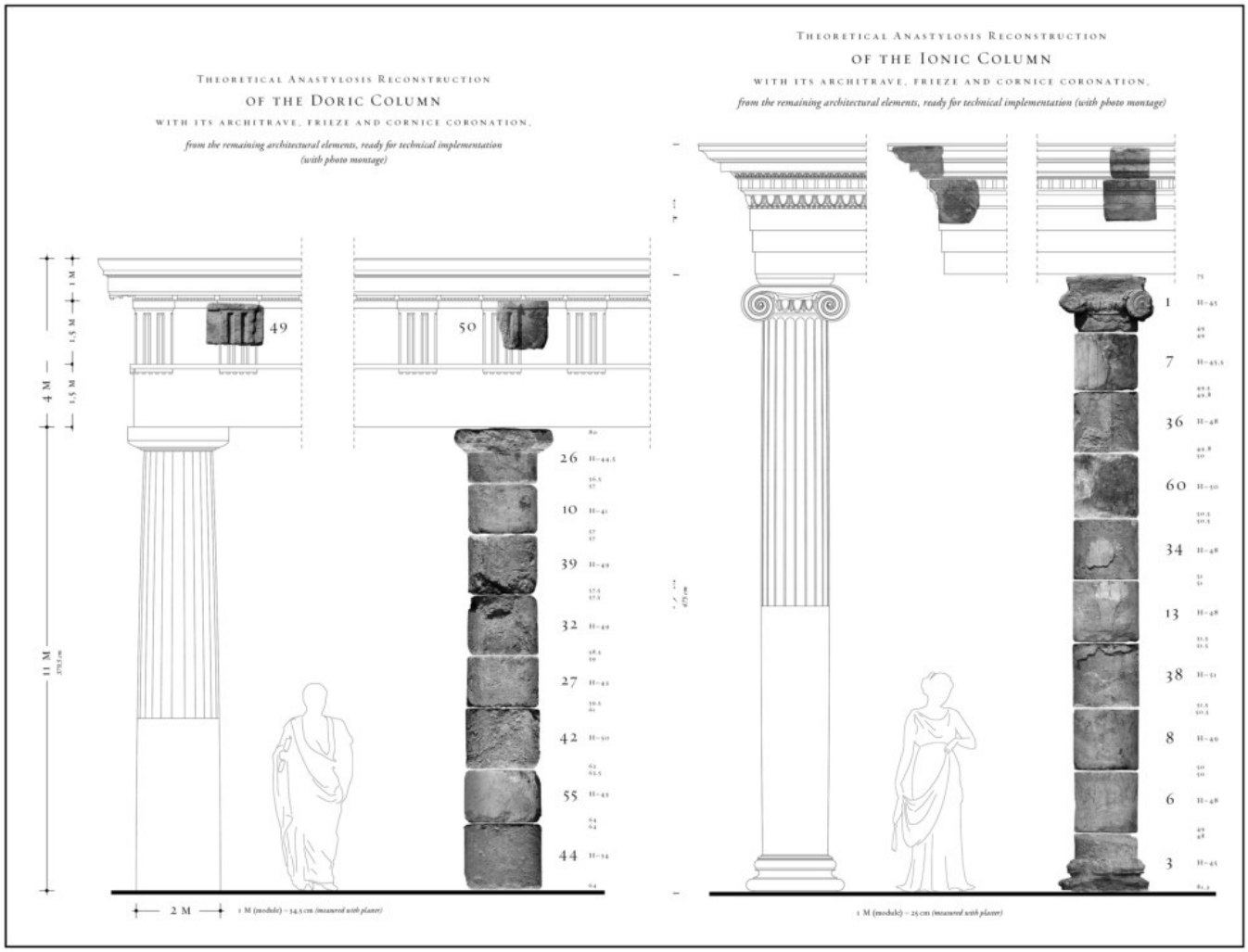


*5 and 6. The original 1979 and 1980 photographs of the two in situ Herodian column bases. The photographs are from the archive of the pontifical Studium Biblicum Franciscanum in Jerusalem.*

reason for coming up with a different sequence of drums in the technical implementation was linked to the nature of the cone-shaped Doric and 'pregnant'-shaped Ionic entases and the requirements of their canonic heights based on both column-base module radii and style. The Doric column was given its original *in situ* base (No 44, with the result that we had to leave out No 45), with No 39 being inserted into the original sequence as the last-but-one drum before the capital. This gave a slightly greater height (379.5 cm instead of 368.5 cm) and module (34.5 cm instead of 33.5 cm). According to the early Roman architectural canon, Doric columns had to have a height equivalent to 11 modules.

This new module did not however fit the two-module base (the actual diameter was only 64 cm rather than the 'requisite' 69 cm), leading us to the theoretical conclusion that the ancient Herodian architects at Machaerus measured the bases of the columns together with their plaster coating, as was normal at Pompeii or Herculaneum. This supposition led us to the dramatic discovery of the diastyle and systyle intercolumniation of the peristyle courtyard. All the other architectural measurements of the royal courtyard conformed to multiplications of 34.5 cm, the so-called *pygme*-module, which will be discussed later **(Fig. 7)**.

Even though we based our theoretical reconstruction of the Ionic column on the original *in situ* base, when it came to the Ionic entasis of the shaft we faced a new challenge. After thorough cleaning of the column base we realised that its diameter was not 51.5 cm, but only 48 cm. A yet greater surprise came when the




*7 and 8. Final computer reconstructions of the Ionic and Doric columns of the Herodian royal palace of Machaerus, before their re-erection on the archaeological site.*

capital was separated from the modern shaft; its diameter was not 44 cm, but 49 cm. At the same time, most of the drums had larger diameters than the base and the capital. We quickly realised that we were dealing with a vertically cigar-shaped entasis of the Ionic columns, in which the ancient builders used plaster to give the appearance of monolithic white marble columns that were usually wider in the middle for strength and stability. Although in practice we were able to use the originally selected base and capital of the Ionic column, as a result of the different measurements and physical states of the various architectural elements, of the eight column drums we were only able to use Nos 7 and 8, and those at different places in the sequence. This resulted in a lower height for the Ionic column of 475 cm (instead of the anticipated 513 cm), but this fitted perfectly with the new module (25 cm instead of 27 cm) measured in antiquity with the plaster, as in the Doric column. According to the early Roman architectural canon, Asia Minor-type Ionic columns were supposed to have a height equivalent to 19 modules **(Fig. 8)**.

Detailed examination of the ancient square holes for *empolia* in the column drums chosen for the anastylosis revealed that although they were positioned in the center of the bed joint, their dimensions did not match. This was because the drums chosen for the anastylosis originally came from different columns. The *empolium* holes were therefore positioned to centre the drums in different vertical successions. The only solution was to widen and deepen the indentations in some of the drums by a few millimeters. This was done with traditional tools, *viz*. mallet and claw chisel. As noted above, our modern *empolia* and their movable rods were manufactured from high quality stainless steel.

In conjunction with the widening of the *empolium* holes, conservation work was carried out on the stucco decoration of the Ionic capital and the surviving Roman-style fluted plaster decoration on the drums. Once the empolium holes on the bedding surfaces of the Doric and Ionic column drums had – where necessary – been widened, the individual elements were ready for reassembly, with any missing sections being restored in limestone mortar. The base and drums of the Ionic column did not need any restoration, although the capital did. However, in the case of the Doric column, the capital and five drums had to be restored in order to ensure safe set-up (excluding the all important base and lowest drum, which were complete) **(Fig. 9)**.

In order to guarantee perfect alignment of the drum perimeters and sufficient stability whilst waiting for the limestone mortar to set, it was necessary to manufacture moulds from 3 mm steel sheet. For easy handling during restoration



*9. Final sequence of the bases, drums and capitals of the two Herodian columns before anastylosis.*

and to ensure a tight seal between the moulds and drums, clamps were welded to the edges of the cylindrical steel sheets to allow them to be fastened together using brackets. To prevent sticking of the limestone mortar, the surfaces of the steel sheets were treated with talcum powder before being attached to the drums. To restore the drums, stone mortar was mixed with aggregate and epoxy resin as a bonding agent. The mix was as follows: epoxy resin 10 %; special minerals to ensure epoxy resin penetration of the aggregate 20%; limestone sand 70 %. For a better aesthetic appearance, the restored surfaces of the Doric column drums were treated with a bush hammer.

As the limestone blocks along the inner edge of the south-eastern angle of the crepidoma had almost completely eroded away, they had to be replaced with two well-preserved blocks of the same dimensions. In the meantime, holes were drilled into the column bases, drums and capitals to allow rods to be inserted into the *empolia* for increased stability and earthquake-proofing. This was done in stages using drills of increasing diameter, starting with 8 mm, then 15 mm, 25 mm and finally 30 mm. *Empolium* holes were also chiseled into the stylobate of the Doric column and the reinforced crepidoma of the Ionic column, followed by the drilling of holes for the rods. Next, the *empolia* and rods were fixed into the holes using the same lime mortar used in the consolidation of the crepidoma masonry. Before the bases were anchored in their final locations, the surfaces of the stylobate (for the Doric column) and the crepidoma (for the Ionic column) were leveled with a thin layer of lime mortar in order to assure stable positioning of the bases on the eroded surface, without any possibility of wobbling.

Wide crane belts were used to lift, position and place the column drums in order to avoid damage to the restored elements. Furthermore, these belts allowed for the precise control of each movement during set-up of the drums, minimising the chance of injury to staff **(Fig. 10)**. One of the main concerns during the set-up of the upper half of the Ionic column was



*10. Ueli Bellwald and Tamás Dobrosi position the Doric capital, while the author (right) discusses the lifting with Khader Apsi.*



*11. The complete Ionic column after its re-erection.*

the positioning of the individual drums so as to respect the alignment of the Roman-style flutes in the stucco decoration **(Fig. 11)**.

After the two Herodian columns had been re-erected, an entire day was devoted to filling the joints between the column drums with lime mortar. The joints were filled almost to the surface of the drums in order to avoid any unsightly gaps. After the lime had carbonized and the mortar hardened, the joints were meticulously cleaned with water and all visible shrinkage cracks were filled **(Fig. 12)**.

**Architectural and Historical Interpretations**

The royal courtyard at Machaerus, with an apsidal throne-niche on its axis, was undoubtedly the most important architectural space within this Herodian fortress on the east shore of the Dead Sea. The tragic birthday party of the newly remarried Tetrarch Herod Antipas was celebrated with royal princesses Herodias and Salome in this courtyard. Many people were invited, even from Galilee, the northern part of the tetrarchy: "An opportunity came on Herod's birthday when he gave a banquet for the nobles of his court, for his army officers and for the leading figures in Galilee" (*Mark* 6, 21). It is not simply the largest architectural space in the fortified palace of Machaerus, but the only space in which the Tetrarch was able to receive a large gathering of official guests. The royal courtyard of Machaerus was likely the very place where, according to Josephus, Antipas sentenced John the Baptist to death. Machaerus was the Golgotha of the Baptist; Jesus compared his future death with that of John the Baptist in the following statement: "they did not recognise him but treated him as they pleased: and the Son of man will suffer similarly at their hands. The disciples understood that he was speaking of John the Baptist" (*Matthew* 17, 12-13).

The archaeological remains of the Jerusalem *praetorium*, where Jesus was condemned to death by Pontius Pilate, are probably lost. However, at Machaerus we have one of the closest architectural and archaeological parallels to its courtyard in the former palace of King Herod. On the *gabbatha* ('elevation') of the Machaerus palace, even the Herodian *lithostrotos* ('stone pavement') survived *in situ* in the royal courtyard. After detailed architectural and archaeological studies in the field, we were able to reconstruct the original Doric architectural space that was designed in the classical early Roman canon with the Greek module of 34.5 cm.

The architects of King Herod the Great established his fortified palace at Machaerus in ca 30 BC, on the ruins of the Hasmonean fortress of the Jerusalem high-priest king



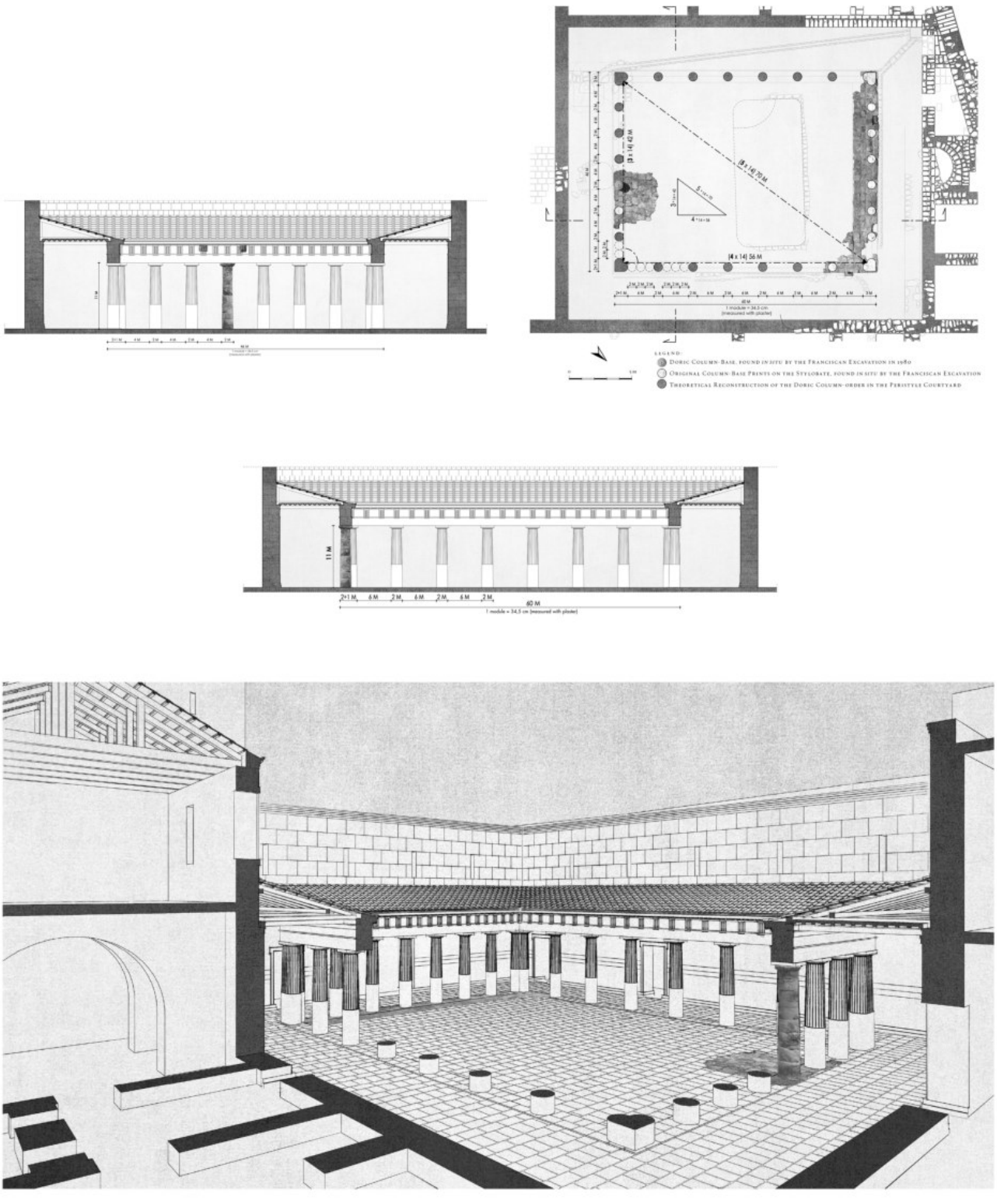
*12. The two re-erected Herodian columns of Machaerus with the Dead Sea in the background.*

Alexander Jannaeus. The heart and center of the hilltop castle became the royal courtyard. Its alignment was completed on the mountain-top summit using the Pythagorean ratio of a 3 : 4 : 5 triangle. Using the same so-called *pygme*-unit, that is the Greek forearm module (34.5 cm or 13.6 in [called pygmaioi, from *pygmê* or the length of the forearm; this is much smaller than a cubit, being only the length from the elbow to the wrist-joint]), they designed not only the courtyard, but also the colonnade of the Doric tetrastyle portico (one column-base radius = one module). The intercolumniation on the short side was two (systyle) column diameters, and on the long side three (diastyle) column diameters. The contemporary Vitruvius, chief architect of Emperor Augustus, warned that when columns are placed three column-diameters apart or more, stone architraves break (Vitruvius, *De architectura* III 3.4). As no architrave stones survived on the archaeological site of Machaerus, most probably the Herodian builders used Lebanese cedar instead. The surviving Doric column drums came from from a number of similar columns, not just from one column. In the Doric peristyle courtyard, there were originally 24 similar columns (plus four heart-shaped ones at the corners), of which the imprint of eleven columns survived on the stylobate **(Fig. 13a-d)**.

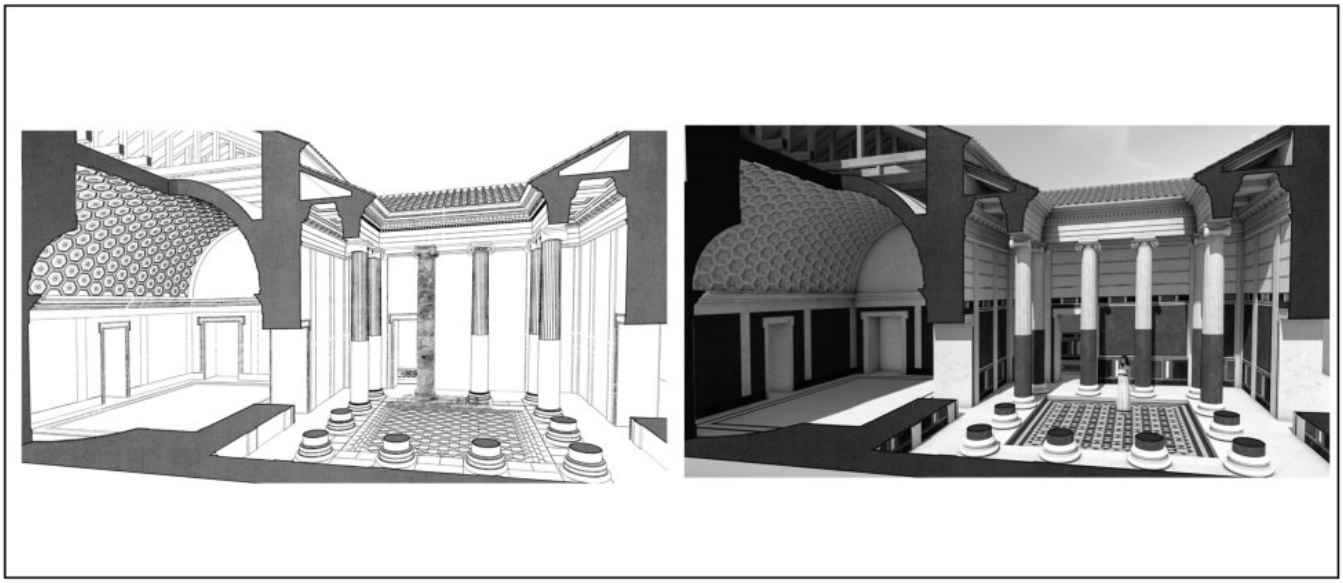
Although the Herodian royal bathhouse was Ionic in style, the courtyard was Doric. This was confirmed not only by the presence of in *situ* column bases, but also by archaeological artifacts that came to light during the excavation of these two locations in the royal castle. Inside the original *apodyterium* hall of the bathhouse there were probably 12 similar Ionic columns on the crepidoma (with much smaller diameters than the Doric drums) **(Fig. 14a-b)**. Nevertheless, we were only able to reconstruct one complete Ionic and one complete Doric column from the surviving architectural elements.

The completed re-erection of the two columns conforms to international conventions of monument anastylosis and presentation, as we used (1) exclusively original architectural elements, (2) re-erected the columns in their original places and (3) ensured that reconstructed columns retained their original appearance. Their heights fit the classical early Roman architectural canons, *viz*. the Doric column is 11 modules or 380 cm, while the Ionic column is 19 modules or 475 cm. The Doric column is even a perfect fit with the classical 11-module standard of the Greek pygme unit of the courtyard, using the same module both horizontally and vertically. Both re-erected columns were originally decorated with plaster, giving them the appearance of white marble monoliths, as in Alexandria or Rome.

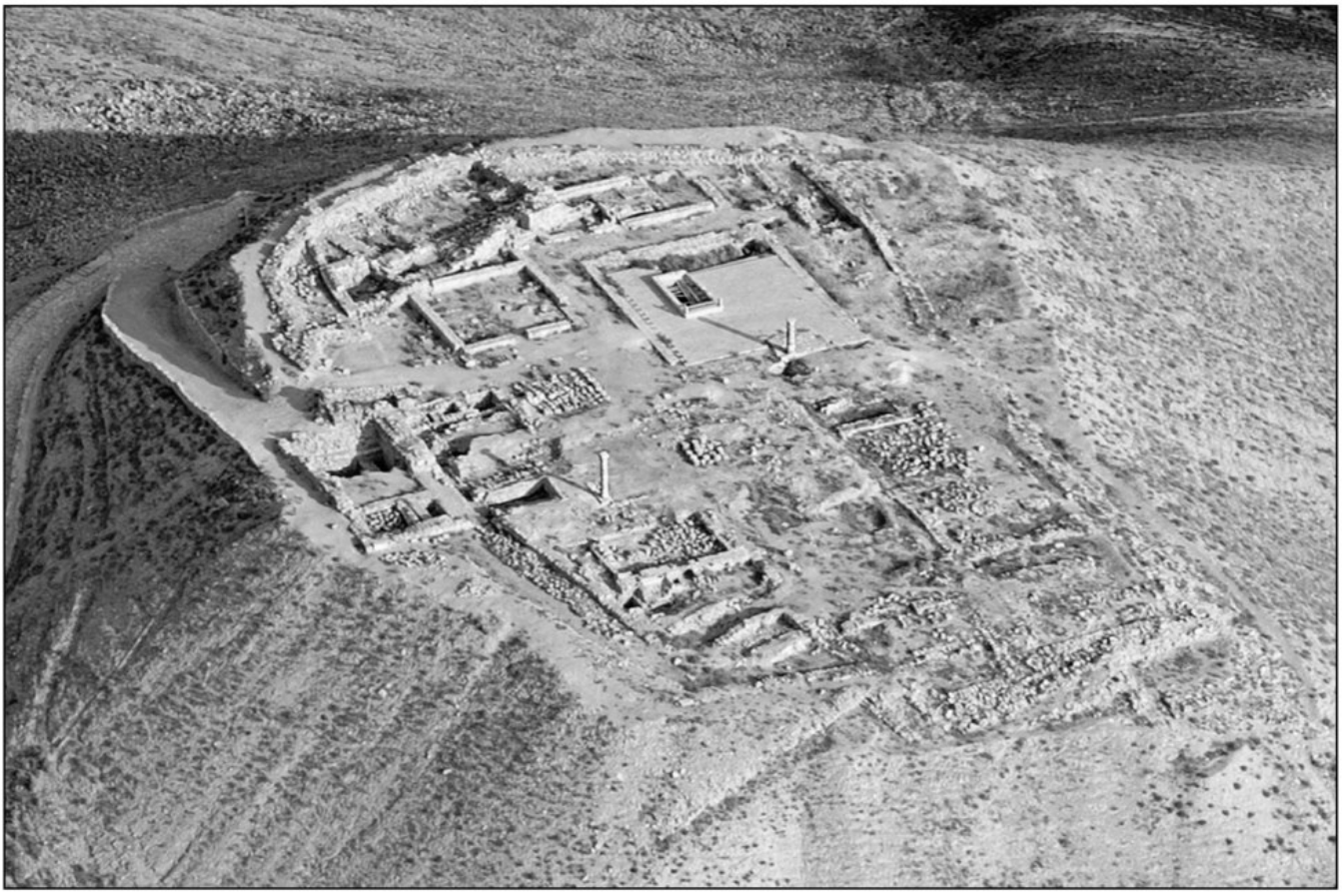
Machaerus, always an important location in the Gospels, has long inspired the imaginations of Bible, Gospel and religious / history book illustrators. In 2014, when opera fans celebrated the 150th anniversary of the birth of Richard Strauss, we were able to propose historically accurate sets designs instead of the imaginary *Salome* set designs used in the opera houses of the world. The latter were based on the text of Oscar Wilde, who described Machaerus from his artistic imagination. As a result of our archaeological excavations and architectural reconstructions, the historical place and its architectural spaces have been revealed, thereby elucidating hitherto blurred scenes from the Gospels. Within the walls of this castle, four figures from the Gospels once lived: King Herod the Great, his son Tetrarch Herod Antipas with his second wife Princess Herodias, and their daughter Princess Salome from the previous marriage of her mother. Today, we do not simply visit the archaeological monument **(Fig. 15)**, but also - in virtual terms - the architectural space of the Calvary of Saint John the Baptist **(Figs. 16 and 17)**.




*13a-b. Architectural (a) cross section and (c) longitudinal section drawings, together with (b) plan of the reconstructed Herodian royal courtyard at Machaerus. The architectural reconstruction (d) is not an imaginary illustration of the royal courtyard. As can be seen through photomontage of the original architectural elements in the illustrations, the details are all based on archaeological evidence. During the excavations of the lower city of Machaerus, several additional architectural fragments and column elements came to light that will be incorporated into the next phase of monument presentation.*



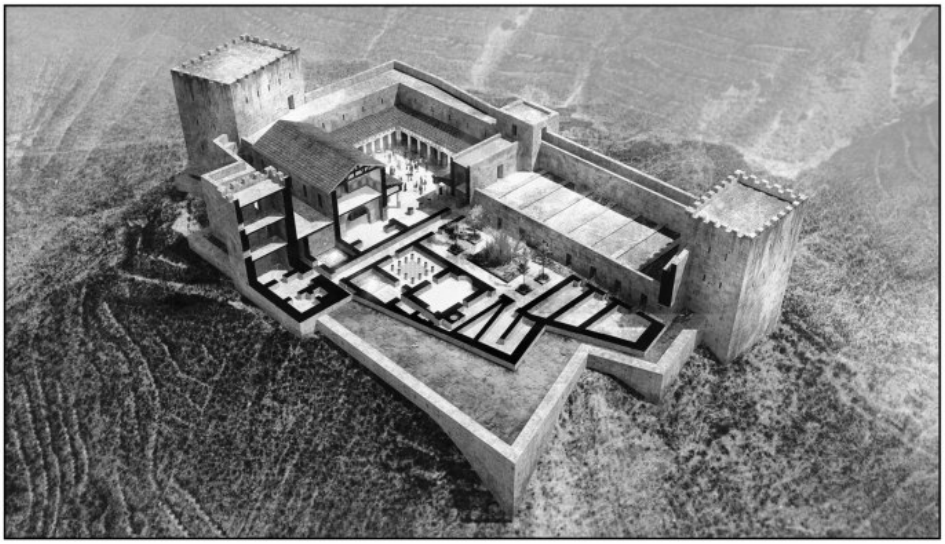
*14a-b. Completed Ionic column anastylosis with tentative architectural visualization; the colors are based on archaeological evidence. An artistic vision of the Machaerus bathhouse can be seen in a cutaway architectural reconstruction, viewed from the north-east.*



*15. Ruins of the hilltop castle from the south (APAAME_20141013_RHB-0073), together with the re-erected original Herodian columns.*



*16. 3D architectural model incorporating the preserved colors of the royal Herodian courtyard and an authentic reconstruction of the actual lithostrotos pavement.*



*17. Cutaway birds-eye view of the Machaerus royal palace of King Herod and Tetrarch Herod from the south, visualized with implied ancient colors.*

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# PETRA NORTH RIDGE PROJECT: THE 2014 SEASON

*S. Thomas Parker and Megan A. Perry*

## Introduction

This preliminary report summarizes results from the second season of renewed work on the Petra North Ridge conducted between 29 June and 2 August 2014, under a permit from the Department of Antiquities.

## Personnel

Senior staff included S. Thomas Parker (co-director and ceramicist) and Megan A. Perry (co-director and bioarchaeologist), Carrie Duncan, Jessica Walker and Russell Gentry (area supervisors), Geoffrey Hedges (assistant archaeobotanist), Anna Hendrick (architect), Jonathan Daniel Lowrey (faunal analyst), Susanne Grieve Rawson (conservator), Heidi Rosenwinkel (small finds registrar), Anna Osterholtz (assistant osteologist), Pamela Koulianos and Sarah Wenner (assistant ceramicists), John Rucker (geologist and camp manager) and Firyal Issa (departmental representative). Trench supervisors were Cassandra Brigham, Margaret Eno, Eva Falls, Alex Garcia-Putnam, Ashley Jones, Jordan Karlis, Kelsey Roepe, Carlos Santiago, Nicole Smith, Sophie Tews and Alex Zarley, and their assistants included Laurel Appleton, Courtney Canipe and Kathryn Parker. Students included Heather Beals, Heather Bostic, Helicia Chiang, William (Tyler) Ellis, Amie Goerlich, Emily Greene, Edward Kritikos, Jana Lanier, Kako Lavendier, Katie Keck, Christopher Mansfield, Amy Morse, Lindsey Nolan, Jonathan Parker, Marie Rogers, Anthony Scialabba, Diana Simpson, Mary Skaggs and Mansi Trivedi. Dakhilallah Qublan served as foreman of about twenty local workers.

## Project Goals

Despite the extent of prior archaeological research within Petra, surprisingly little is known about the city's ancient inhabitants, especially the non-elite population. The Petra North Ridge Project seeks to address this gap by excavating Nabataean (primarily 1st century AD) tombs and Nabatatean, Late Roman and Byzantine (1st - 6th centuries) domestic structures along the North Ridge. The project is examining Petra's population through several avenues of research:

1. The health and quality of life of the Nabataeans during the city's 1st century AD florescence is being explored through analysis of human skeletal material within the tombs.

2. The 1st century AD tombs also contain significant evidence regarding Nabataean mortuary practices, filling in the picture presented by analysis of the monumental tombs within the city.

3. Many structures, some apparently domestic in nature and dating as early as the 1st century AD, are scattered among and in some cases overlie these Nabataean tombs. Excavation of Nabataean, Late Roman and Byzantine domestic structures will broaden our understanding of these periods of Petra, especially the more poorly known later periods.

4. The project is excavating several segments of the city wall to understand its construction and chronology. Petra's city wall appears on site plans from the beginning of the 20th century. However, despite its obvious importance in understanding the history and organic growth of the city, the city wall (variously dated from the Nabataean to Byzantine periods) was undated.

The North Ridge thus contains a skeletal,

architectural and material cultural sample that can address research questions related to Petra's history from the Nabataean to Byzantine periods. The evidence will be interpreted in light of the Petra papyri, offering a rare opportunity to correlate material cultural evidence with documentary evidence from the same sector of the same site. Therefore, this project will combine disparate kinds of evidence (ancient texts, material culture and skeletal evidence) to allow insight into the economic, cultural and social life of Petra's people as well as their connections with other populations.

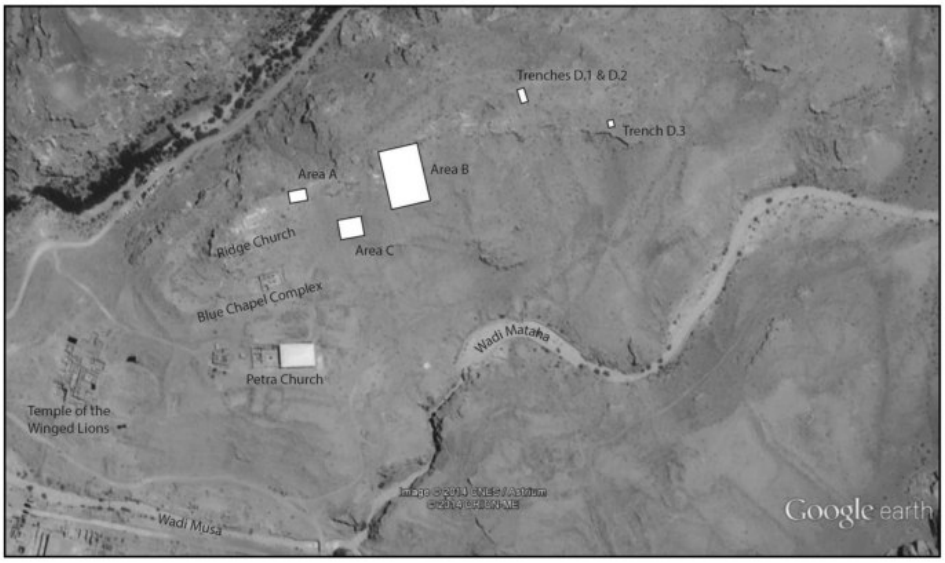
A key component of this project is to minimize excavation-related landscape impact owing to Petra's role as Jordan's largest tourist attraction and status as a UNESCO World Heritage Site. This includes: (1) completely filling tomb shafts upon completion of excavation to protect their interior and prevent accidents; (2) backfilling excavation trenches to preserve exposed architecture until full-scale conservation and presentation of the site at the end of the project, and (3) setting up a cooperative effort with the Temple of the Winged Lions Cultural Resource Management (TWLCRM) project to utilize our sifted sand for backfilling and filling sand bags.

**Previous Research**

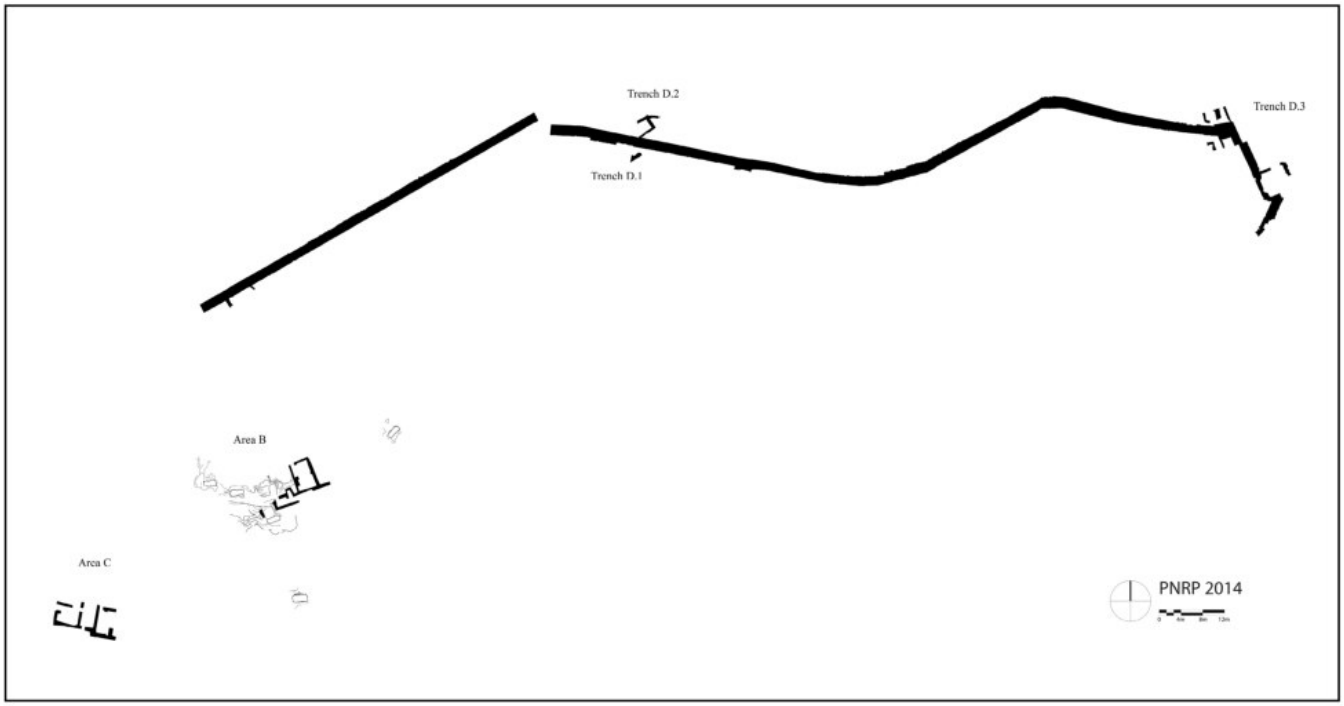
Petra's North Ridge lies just north of the main east - west street extending through the center of the city **(Figs. 1 and 2)**. Previous archaeological projects on the North Ridge focused nearly entirely on monumental structures, such as the Temple of the Winged Lions and several churches (for a brief summary of prior work, see Parker and Perry 2013). However, the ridge is covered by dozens of rock-cut shaft tombs and wall lines suggesting the presence of many other structures, including a portion of Petra's city wall **(Fig. 1)**. These tombs and other surface features, such as ancient walls, were documented through a GIS project, which recorded 51 recently robbed tombs and other structures within a *ca* 6 km$^2$ area, confirming that the North Ridge contains a large cemetery apparently dating to the Nabataean period (Perry 2006). Renewed excavation commenced in 2012 (Parker and Perry 2013, 2014).

In 2012, three 1$^{st}$ century AD tombs (B.4; B.5; B.6) were excavated, revealing artifactual and human skeletal evidence of mortuary practices during Petra's urban fluorescence. The skeletal remains document the lives of about 36 non-elite residents of Petra, which are being explored through paleopathology and isotopic study. The North Ridge thus contains a large skeletal and mortuary material cultural sample to address research questions related to the Nabataeans.

In addition, in 2012 the project also explored two domestic complexes on the North Ridge which yielded valuable data on domestic life




*1.Google Earth image showing location of excavations in 2012 and 2014.*




*2.Plan of 2012 and 2014 trenches with city wall.*

in Petra's more enigmatic Late Roman and Byzantine periods, of which we have little archaeological evidence apart from the three churches excavated on the ridge. In Area A, four trenches (A.1; A.2; A.3; A.4) were opened along the southern face of the northern city wall to explore the function of these structures and their stratigraphic relationship to the city wall. It is clear from ceramic evidence that the structures were initially occupied in the 1st century AD and ended with construction of the city wall, which cut through and / or was built over the earlier domestic structures. Evidence from the city wall's foundations suggests construction in the early 2nd century AD, contrasting with some previous descriptions of the wall as 'Byzantine'.

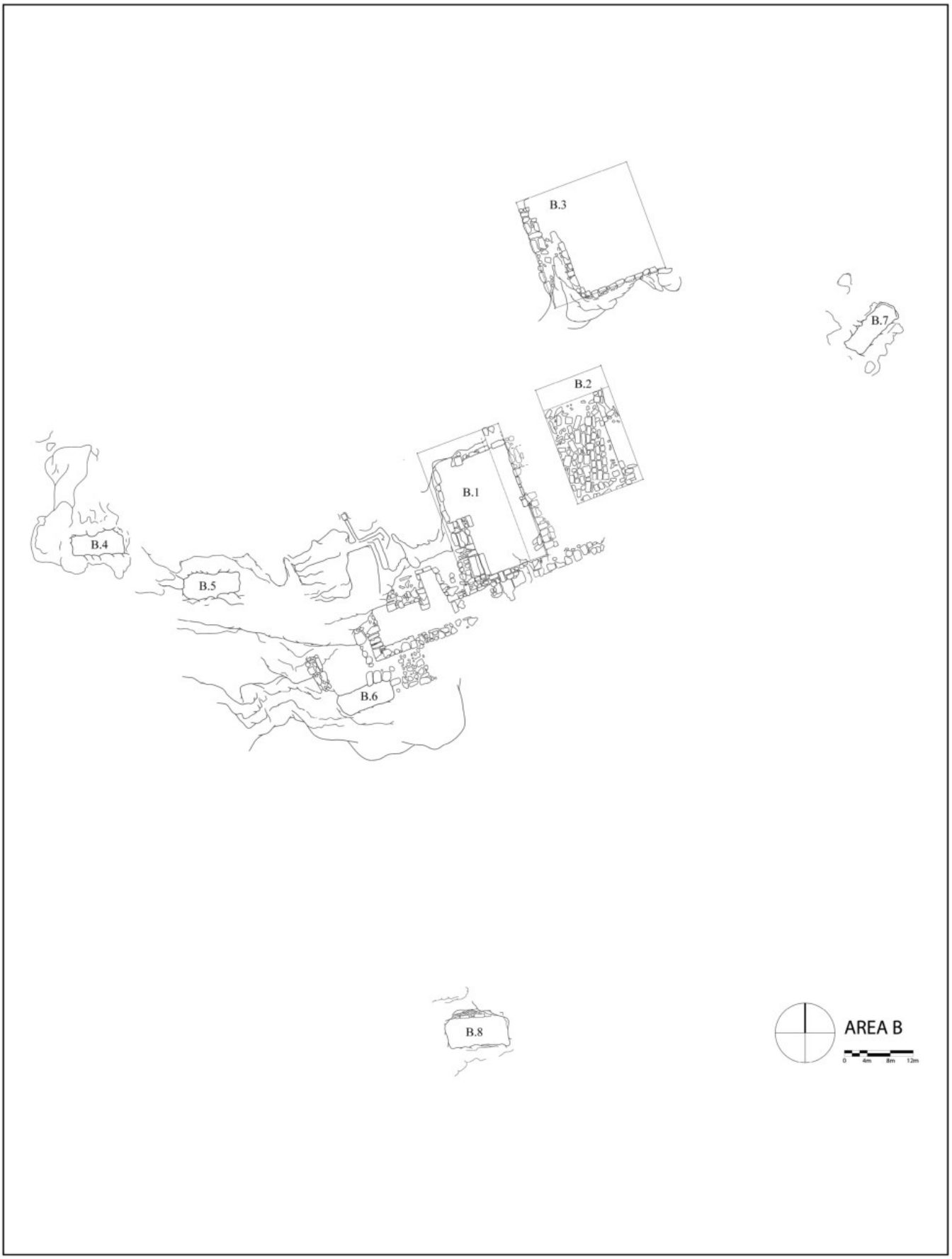
Excavation of domestic structures in three trenches in Area B (B.1; B.2; B.3) revealed a slightly later sequence of occupation than Area A, beginning in the 2nd century AD (perhaps contemporary with or shortly after construction of the city wall) and ending in the 4th century with collapse of the walls, likely as a result of the 363 earthquake. Domestic occupation in Area B thus apparently began only after the disuse of the area as a cemetery.

**Results From the 2014 Season**

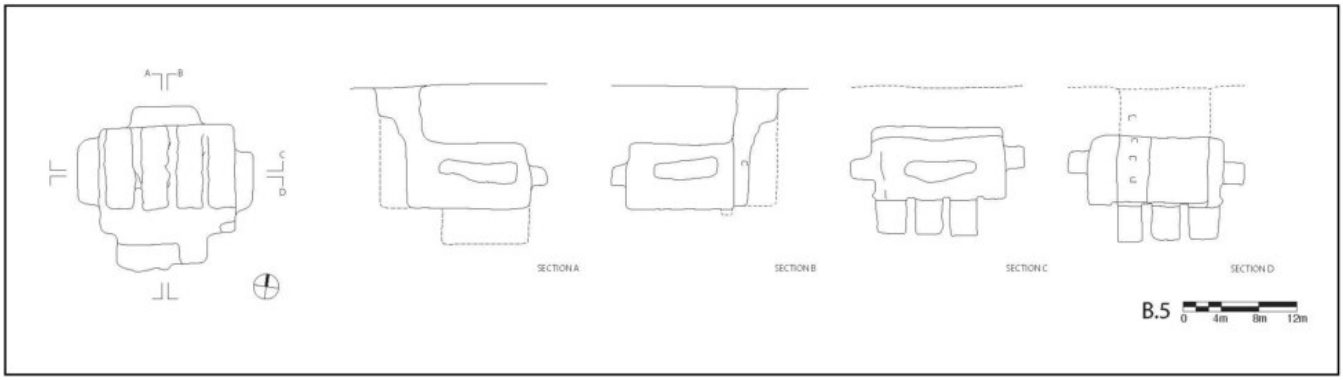
*Area B*

In 2014, excavation in the domestic complex continued only in Trench B.1 while we continued excavation of two tombs not completed in 2012: B.5 and B.6. Two additional shaft chamber tombs, B.7 and B.8, were also selected for excavation. Both of the latter tombs showed the usual signs of recent disturbance, although it was not extensive. The tombs were carved into a bedrock outcrop on the uppermost reaches of the North Ridge **(Fig. 3)**. We sieved a sample (10 % to 20 %) of the naturally deposited tomb fill largely devoid of artifacts, but sieved 100 % of tomb fill associated with the lower levels of the chambers and floor shafts.

Tomb B.5 consists of a shaft measuring 2.4 m x 0.7 m which drops 3.1 m below the surface bedrock and opens into a chamber (3.54 m x 2.80 m; **Fig. 4**). The chamber contains three wall niches, two of which contained human burials, and four rectangular shafts cut into the floor, one of which was unfinished **(Fig. 5)**. In 2014 we excavated the two remaining westernmost floor shafts and completed clearance of this tomb. Unfortunately, despite our efforts to secure the




*3.Plan of Area B showing the domestic complex (B.1 - 3) and excavated tombs (B.4 - 8).*




*4. Plan and elevations of Tomb B.5.*



*5. Floor shaft graves in tomb B.5.*

tomb, the floor shaft second from the west (Locus 10) had been looted during the offseason. Upon clearing and sieving the looted fill we recovered human skeletal material of at least 10 individuals and artifacts. The final floor shaft grave was almost completely full of disarticulated or semi-articulated human bone, with few artifacts. There were at least 38 individuals in this shaft, suggesting that it was an ossuary for burials removed from other receptacles post-decomposition.

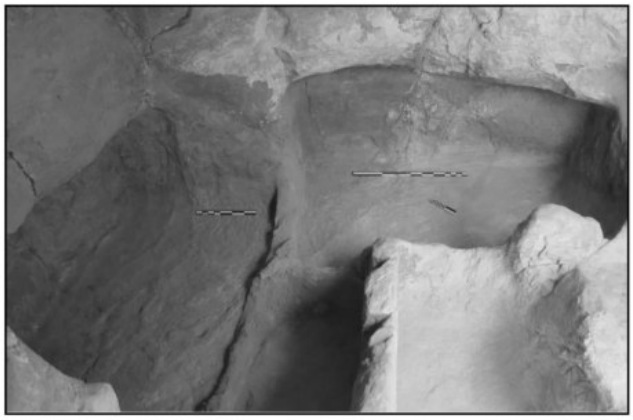
We also continued excavation of Tomb B.6, which consists of a 2.70 m deep shaft measuring 3.10 m x 0.80 m, a larger 2.27 m x 3.10 m chamber to the north of the shaft, and a smaller 0.85 m x 2.75 m floor shaft south of the tomb shaft. Two or perhaps three libation receptacles were carved into the bedrock east of the tomb opening. The tomb had been excavated in 2012 down to the tops of four rectangular floor shaft graves. Another possible *loculus*, blocked by unstable bedrock that extends to the east of the chamber near the shaft, was left unexcavated owing to the instability of the bedrock. A smaller chamber to the south contains a deep floor shaft grave. During the offseason, minor looting occurred at the western edge of the floor shaft. A minimum number of 24 individuals were interred in this tomb between the 1st century BC and 1st century AD. The southern shaft contained successive layers of disarticulated articulated remains until *ca* 0.5 m below the top of the shaft. At that point we discovered three mostly articulated skeletons, one above the other **(Fig. 6)**. No other skeletal material was found under the articulated skeletons and the only associated artifact was a partially intact *unguentarium* in the soil layer below the articulated burials.

The center of Tomb B.6 contained two narrow rectangular shaft graves **(Fig. 7)**. Both floor shafts had commingled skeletal material and artifacts, likely as a result of looting in antiquity, but the one adjacent to the entrance shaft had an articulated skeleton within the remains of a wooden coffin decorated with copper alloy 'studs' **(Fig. 8)**. A complete 1st century BC *unguentarium* was found near the head of this individual. Capstones likely associated with these two shaft graves were found scattered within the chamber. The northern and eastern sides of the chamber had large, shallow basins that also contained commingled skeletal material. It appears that disturbance within this tomb was due to looting in antiquity, although active use of the tombs extends from the 1st century BC to the 1st century AD.

Tomb B.7 lies east of B.5, almost directly south of the Area B domestic structures excavated



6. One of the articulated skeletons in the southern shaft of Tomb B.6.



7. The eastern (locus 15) and northern (locus 16) side chambers in Tomb B.6 along with two central floor shaft graves (loci 18 and 19).



8. Articulated skeleton with coffin remains, copper coffin decorations and unguentarium in Tomb B.6.



9. Tomb B.7 at the end of excavation.

in 2012. This tomb contained two capstones remaining *in situ*. The narrow shaft (0.75 m x 2.10 m) opens into a rather small chamber measuring 2.75 m north - south x 4.10 m east - west. The tomb was completely filled with primarily naturally deposited sediments, the lowest of which (postdating use of the tomb) dates to the late 1st to early 2nd centuries AD based on ceramic evidence. The chamber itself contains five narrow rectangular floor shaft graves, all of which contained the skeletal remains of approximately 15 individuals **(Fig. 9)**. In addition, the eastern side of the tomb was joined with a neighboring (as yet unexcavated) chamber tomb via a window and a door cut into the bedrock. It is not clear if this was due to an accidental misjudgment of the space between the two tombs or was a purposeful connection. We will excavate the adjoining tomb in the 2016 season.

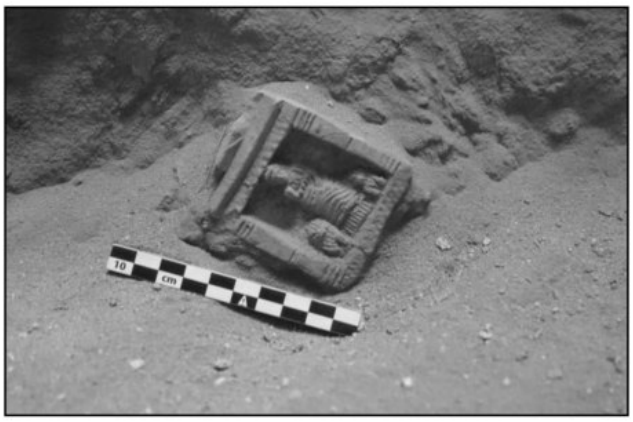
The burial deposits in all floor shafts in Tomb B.7 were disturbed in antiquity, resulting in significant comingling of the human remains. In addition, two of the shaft graves contained undisturbed single, primary burials at the bottom. In both cases, the skulls were not found articulated with the rest of the skeleton, which

may attest to the level of disturbance in these tombs. The bodies were interred in a supine position with arms alongside their bodies. The burial at the bottom of shaft grave locus 29 was interred along with two artifacts, a stylized small stone bas relief depicting Cybele (?) flanked by two lions **(Fig. 10)**, and a bone spindle whorl. In addition, a miniature limestone altar was associated this burial along with 21 worked sheep / goat astragali. Other interesting finds within the Tomb B.7 floor shaft graves include the remains of at least three dogs, wood and nails from coffins, and numerous ceramics from the 2nd - 1st centuries BC to the late 1st - early 2nd centuries AD, indicating the period of use of the tomb.

Tomb B.8 lies mid-slope along the southern face of the North Ridge, just below Tomb B.6 and east of the domestic complexes in Area C. This initially seemed like a typical Nabataean rock-cut chamber tomb (3.40 m north - south x 5.0 m east - west) entered through a shaft measuring 1.5 m x 3 m. While the shaft was a bit wider than B.4, B.5, B.6 or B.7, no other differences were noted until the discovery of a large stone masonry wall separating the chamber from the shaft **(Fig. 11)**. The chamber apparently was constructed initially for use as a tomb, indicated by three possibly unfinished floor shafts (loci 14 and 15) within the chamber. Locus 14 was only 0.46 m deep with a finished floor and contained notches along the top for the placement of capstones. Locus 15 on the other hand was obviously unfinished at 0.03 m deep. The third floor shaft in the western side of the tomb was left unexcavated as the tomb ceiling appeared unstable, which ended the excavation for reasons of safety.

It is not clear whether or not Tomb B.8 was actually used as a tomb, for no diagnostic pre-2nd century artifacts or human skeletal remains were recovered from the earliest deposits. At some point, likely in the Late Roman or Early Byzantine period, the masonry wall was constructed, sealing off part of the entrance, and the interior of the tomb was modified, possibly for domestic purposes. A large stone was placed within the chamber (visible in upper right of **Fig. 11**) and a column drum and base were set up near the entrance, possibly serving as a chair and table **(Fig. 12)**. Little occupational debris was found within the chamber itself, which eventually was filled with naturally deposited soil. The shaft, on the other hand, contained a significant corpus of 3rd to 5th century AD artifacts, our only evidence of post-363 occupation so far recovered in this phase of the North Ridge excavations. While the tomb shaft likely served as a refuse dump during this period, it does indicate that the North Ridge witnessed some occupation during the Early Byzantine period.

The B.1 - 3 structures exposed in 2012 formed portions of a domestic complex dating from




*10. Bas-relief votive of Cybele (?) from Tomb B.7.*



*11. Inside of Tomb B.8 showing enclosure wall (on left) and unfinished floor shaft grave (above lower meter stick). Note unexcavated deposits at the far end.*



*12. Reuse of small column drum and base in Tomb B.8.*



*13. The blocked doorway in the east wall of trench B.1 that once connected the room in B.1 with the room in B.2; view to east.*

the Late Roman period (2nd / 3rd centuries) and apparently destroyed in the earthquake of 363. There appeared to be no later occupation in this area. In 2014 excavation continued only in Trench B.1 in order to remove its eastern balk and to look for a doorway through the common wall between the room in B.1and that in B.2 to the east. Excavation revealed a clear blockage of a previously existing doorway connecting the two rooms near the northern end of the common wall **(Fig. 13)**. This wall also incorporates a projecting pier opposite another pier on the west wall discovered in 2012. These piers supported an east - west arch that once spanned the room. A drain at the base of the eastern wall of B.1 permitted water to flow from the B.2 room, through the wall, down into a channel in the bedrock and out the front door of the B.1 room.

*Area C*

The success in Area B in 2012 in investigating non-elite residential structures led to the decision to explore more of the neighborhood in 2014. The ultimate goal for excavation in Area C is to expose the entire horizontal layout of a single, non-elite domestic structure, and, in so doing, contribute to the limited knowledge of Petra's non-elite population as well as domestic architecture in Nabataea generally and Petra specifically. To this end, an area with visible wall lines south-west of Area B was selected for excavation. Three trenches (C.1 - 3) were laid out side-by-side with the goal of exposing an entire domestic unit **(Fig. 2)**. The westernmost trench, C.1, extended 4.25 m east of a visible west wall line and 5 m north of the shared southern wall. A 1.25 m balk was left on the east side of this trench to preserve a stratigraphic record of excavation. Immediately east was trench C.2, again stretching 5 m north of the shared southern wall and 3.5 m east of the edge of trench C.1. The east - west extent of C.2 was chosen so as to catch the visible north - south walls on either side at the edges of the trench to expose a full vertical profile of each. A 1 m balk was left on the west side of the trench to preserve a stratigraphic record of excavation, with the intention of removing it after recording. Just east of C.2 was trench C.3, again extending 5 m north of the shared southern wall line and 3.5 m east of trench C.2, with a similar aim of catching an apparent north - south wall line emerging at the south-east corner. A 1 m balk was left between C.2 and C.3 to preserve a record of the latter's stratigraphy. Trenches C.2 and C.3 were extended an additional 1.5 m to the south once it was realized that the southern wall in these trenches was offset from that initially seen at ground level and upon which the trench layouts were based, allowing for the inclusion of this more southern wall line within the parameters of these trenches. Two weeks into the season, an additional trench (C.4) was laid out north of C.3, extending 2.5 m north of C.3's north balk and 4 m west of the eastern edge shared by trenches C.3 and C.4. The aim of Trench C.4 was to catch

the northern extensions of the north - south wall lines that seemed to emerge from C.3 and C.2. However, C.4 was closed fairly soon because of needs elsewhere on site.

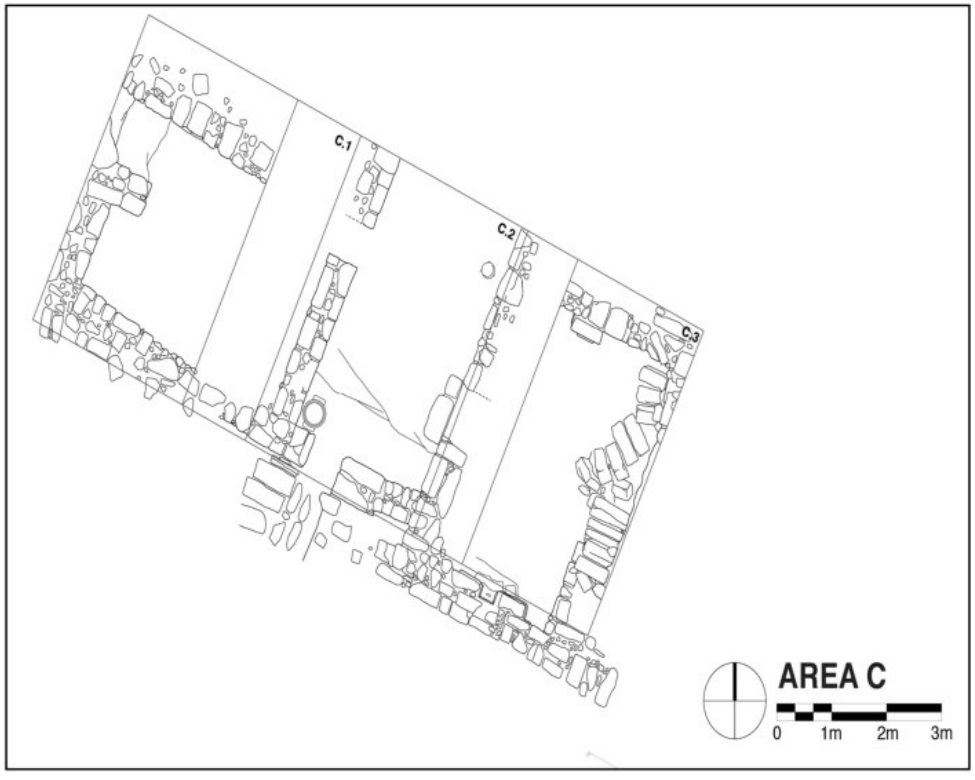
Excavation of the Area C structure revealed Early Roman / Nabataean remains in two of the three completely excavated trenches, suggesting that at least some, if not all, of the Area C domestic complex was initially constructed in the Early Roman / Nabataean period and was subsequently remodeled during a Late Roman reoccupation of the structure. The complex went out of use after suffering significant damage, presumably in the 363 earthquake. Subsequent collapse and abandonment debris filled the rooms of the complex to modern ground level.

Trenches C.1 - 3 were laid out on the hypothesis of a shared southern wall from which a series of north - south walls stretched to the north, resulting in the excavation of three adjacent rooms in separate trenches that were all part of the same complex **(Fig. 14)**. This hypothesis was proven in C.1, where the south wall, visible at ground level, abutted the room's west wall, forming the south-west corner of the room. This



*15. The west wall of room in Trench C.1, with its central prier (in the middle of the photo). Note the masonry built against bedrock to the south (left of the pier) and bedrock alone to the north (right of the pier). View to west.*

west wall incorporates bedrock rising upslope to the north and thus reducing the number of stones in each course as the bedrock rises towards the north **(Fig. 15)**. This west wall is bonded with a pier, after which it gives way entirely to bedrock to the north. The north-west corner of the room is formed by its north wall abutting the bedrock extension of the west wall. The east wall of C.1's room is visible only in trench C.2, where its top and eastern face are exposed, as is the




*14. Plan of Area C.*




*16. The Knife, lamp and articulated fish skeleton found near the cooking installation in C.1.*

doorway giving access to the room. Presumably, a pier abutting the west face of this east wall corresponding to that projecting from the west wall is currently obscured by C.1's east balk. The overall dimensions of the room are *ca* 4 m east - west x 3 m north - south. Some walls in C.1 preserved plaster along portions of their faces.

Trench C.1 contained the most evidence for occupation in the complex and forms the basis upon which construction of the entire domestic structure is dated to the Early Roman / Nabataean period. Just above bedrock was a beaten earth floor that appears patchily across the room, particularly in areas where the bedrock is uneven or dips. An unusual assemblage, consisting of a wooden-handled knife, an oil lamp and an articulated fish skeleton, was found lying on this floor in the northern portion of the room adjacent to a cooking installation **(Fig. 16)**. This surface also preserved a re-constructible bowl, which accords with late Early Roman / Nabataean use of this floor in the 1st century AD. Also associated with the initial use of the room is a tannur or oven on the southern face of the north wall. This was composed of a flat piece of limestone as its base, two unhewn boulders to brace the exterior edges and several ceramic tiles to form an open space above the flat stone base. The exterior was packed with mud mortar and broken sherds and the entire installation was plastered in place against the north wall.

The area enclosed within Trench C.2 appears




*17. The doorway connecting the courtyard in Trench C.2 with the room in Trench C.3 (view to east).*

to be either a shared courtyard giving access to rooms on either side, or an alleyway between separate dwellings with doorways giving access to both adjacent rooms in C.1 and C.3 **(Fig. 17)**. The main entrance to the domestic complex was apparently located at the southern end of C.2. The northern extent of the C.2 courtyard was not determined in 2014, but must lie north of the current trench parameters.

Although evidence for Early Roman / Nabataean occupation in C.2 was not as extensive as in C.1, a few small pockets of pure Early Roman / Nabataean remains were found at the lowest levels overlying bedrock.

There is evidence to suggest that the Late Roman period saw modifications to the Early Roman / Nabataean complex, followed by a period of occupation lasting as long as 200 years before a major collapse effectively destroyed

the building. In Trench C.1, the Early Roman / Nabataean occupation level was covered by *ca* 0.20 m of leveling fill below *ca* 0.20 m of Late Roman occupation horizon. Both fill loci contained material dating to the Late Roman period, but locus 15 was characterized as a leveling fill based on its relative sterility compared to locus 12. The cooking installation possibly continued to function during this phase.

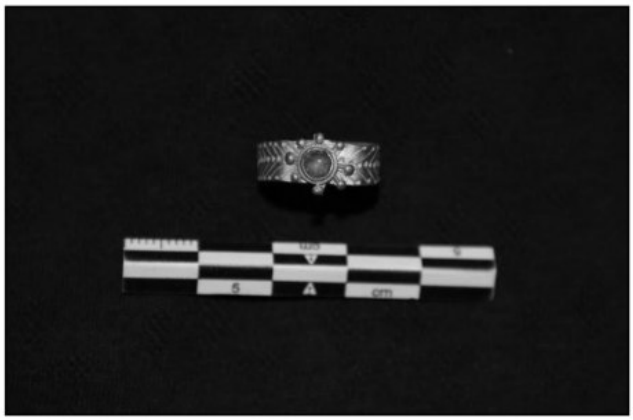
Trench C.2 exhibits extensive remodeling and occupation levels in the Late Roman period. Most significantly, the complex entrance appears to have been modified, with the addition of a wall abutting the east wall to create a doorway in the south. Because of the higher bedrock in the north of the trench, the Late Roman occupation horizon in this sector is less extensive than the Late Roman occupation layers in the southern end of the trench. Nonetheless, numerous diagnostic Late Roman sherds were found in this northern sector. A locus in the southern part of the trench exhibited similar ceramics, plus a few Early Byzantine sherds. In the south-east corner of the trench was a fire installation enclosed by a stone semi-circle; faunal remains suggest household-level butchery and consumption of animals, primarily sheep and goat.

Trench C.3 contained no clear Early Roman / Nabataean occupation but rather Late Roman artifacts at its lowest levels. Nevertheless, some of its architectural features appear secondary to original construction and have thus been phased to the Late Roman period on account of the long period of use of this room. Construction of a plastered niche in the south wall is tentatively assigned to the Late Roman phase, although it should be noted that there is no conclusive evidence tying the construction of this installation to either the Early Roman / Nabataean or Late Roman phases of the room. A niche, apparently a cupboard, extends west from the plastered pier **(Fig. 18)**. The cupboard includes ceramic tiles plastered into the sides as shelves. A lower shelf remains *in situ*, while another tile could very well have been dislodged from the upper portion, where a slot for another shelf is clearly visible. While the construction date of the cupboard cannot be ascertained, it was clearly used right up until the destruction of the room, based on the presence of a 4th century cooking pot found nearby which had apparently fallen from one of the shelves in the final destruction.

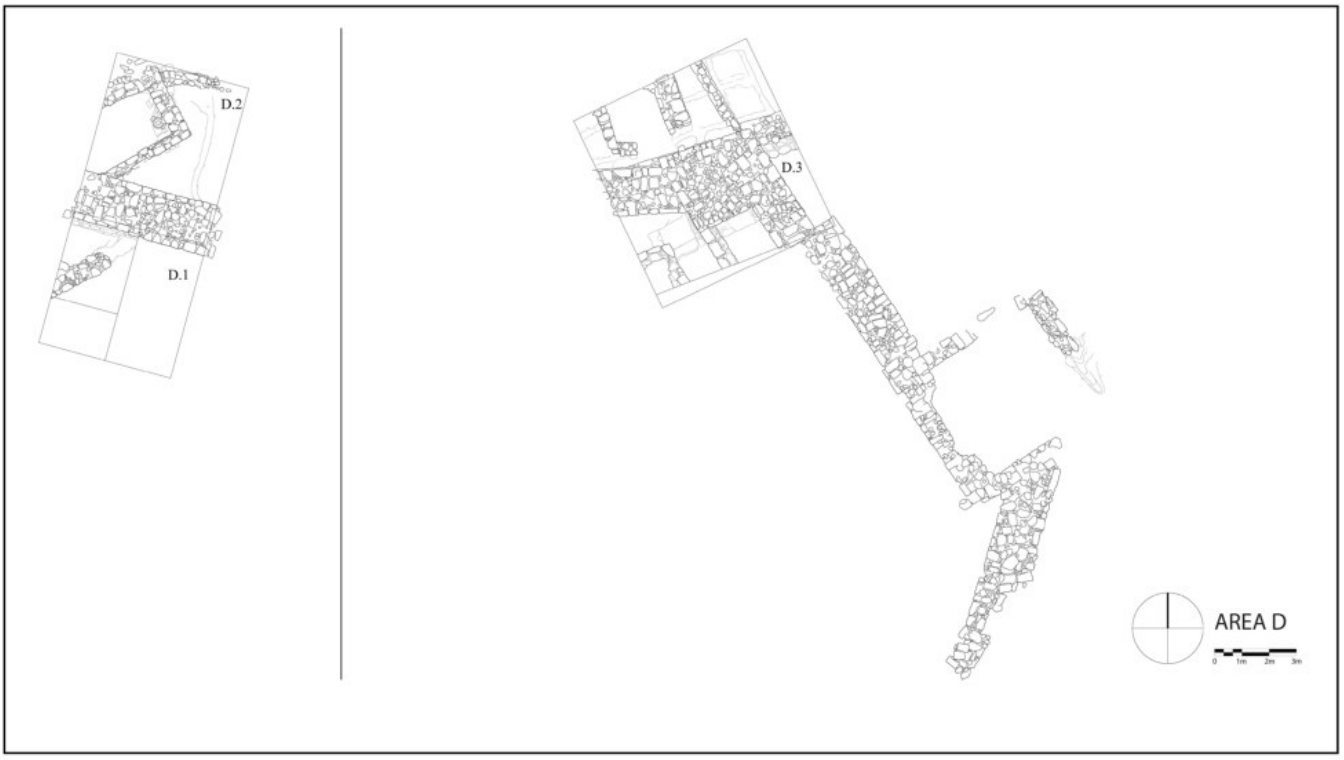
Although it appears likely that the Area C domestic complex was built in the Early Roman / Nabataean period, its most extensive use was in the Late Roman period, beginning perhaps in the 2nd century and extending, at least in some sectors, into the 4th century. Immediately below the final tumble layer, all trenches exhibited a layer of apparent abandonment accumulation, although the depth and character of this phase varied from trench to trench. One surprising find from this context was a gold ring with an




*18. Cupboard in south wall of room in Trench C.3. The lowest horizontal shelf is still in situ. To the left of the cupboard is the plastered pier (arch springer). View to south.*



*19. Gold ring with garnet inlay from under tumble layer in Trench C.2.*




*20. Plans of Area D: Trenches D.1 and D.2 (earlier structures cut by city wall) and trench D.3 (north-east corner of Petra's city wall).*

inset garnet stone encircled with decorative granulation and with an incised pattern around the band **(Fig. 19)**. It is regrettable that this find derived from an abandonment context rather than an occupation layer, but there is no doubt of its context.

An area-wide deposit of dense architectural collapse debris suggests that, like the domestic structure excavated in Area B in 2012, the complex in Area C was destroyed in an earthquake, likely the well-documented seismic event of 363. The balk stratigraphy in trenches C.1, C.2 and C.3 indicates that the massive amount of tumble encountered in Area C trenches is likely the result of two discrete collapse phenomena. In most trenches, this initial level of tumble contained a combination of cut architectural blocks and semi-hewn and unhewn boulders of both sandstone and limestone. Unlike the primary collapse phenomenon described above, some or most of the stone tumble excavated in these later loci likely came from structures and bedrock collapse upslope from Area C itself, in addition to the continued collapse of whatever standing architecture had remained in the Area C complex after the initial collapse.

*Area D*

This area contains three excavation trenches laid out along the city wall of the North Ridge. In 2012 a segment of the wall in Area A was dated by excavation to the early second century AD. From there, the city wall continues eastwards towards Conway's Tower. A detailed plan was completed of the entire length of the city wall from Area A to the wall's north-east corner. This revealed an apparent gap in the city wall, suggesting a possible gateway at this location **(Fig. 2)**. Trenches D.1 and D.2 were laid out along the south and north sides (respectively) of the city wall, roughly midway along the ridge between Area A and Conway's Tower. Further east of Trenches D.1 and D.2, the city wall splits in a Y-shape, one segment continuing north-east towards Conway's Tower and another segment turning south-west, following the crest of the north ridge and thus enclosing a smaller area of the city. This southerly wall continues roughly 75 m along the crest of the ridge before cornering sharply at nearly 90 degrees and continuing

southwards into Wadi Mataha. The city wall is clearly visible as it continues for some distance south of this wadi. Trench D.3 was laid out at the north-east corner, so as to expose both the interior and exterior faces of both the east -west and north - south wall segments. One hypothesis was that this southern wall was a later Byzantine modification to Petra's defensive system, enclosing a smaller area of the city and corresponding to the widely accepted view of a significantly smaller Petra in the Byzantine period.

Trench D.1 contained virtually no discernible architectural features before excavation **(Fig. 20)**. It was selected for excavation based on the possibility that the archaeological features comprising the room in D.2 (see below) continued underneath the city wall and represented a phase of occupation prior to the early second century, cut by the construction of the defensive structure (as with the 1st century AD domestic structures of Area A). D.1 was bisected to create a 5 m x 2.5 m excavation area extending 5 m from the southern face of the city wall, in hopes of quickly discerning if this trench would be archaeologically profitable. Excavation exposed an earlier Nabataean wall overlying bedrock but apparently cut by the later city wall **(Fig. 21)**.

Trench D.2 measured 6 m north - south x 5 m east - west, encompassing the city wall dividing D.1 and D.2 and extending 5 m north from the wall face, leaving a roughly 5 m x 5 m excavation area north of the city wall. The surface tumble suggested the presence of a possible projecting tower. This hypothesis was quickly disproven when the tumble around the edges of D.2 did not form walls. The main feature of D.2, apart from the city wall itself, was an Early Roman / Nabataean structure, later cut and partially dismantled by the construction of the city wall **(Fig. 22)**. In the surviving north-west corner of this earlier structure was a complete basalt millstone still *in situ*. A water channel was cut into bedrock just east of the earlier structure. In addition, three child burials were found in the north-east corner of the trench, possibly dating to the Early Byzantine period.



*21. Trench D.1: Wall of an earlier Nabataean (domestic?) structure in foreground was cut by construction of the later city wall (behind meter stick). Both walls were founded on bedrock View to north.*



*22. Trench D.2: Nabataean domestic structure founded on bedrock with basalt grinder in situ. The south-west corner of the structure was removed by the builders of the city wall, visible in the upper part of the photo. View to south-east.*

Trench D.3 was laid out originally as a 7 m x 7.5 m trench in order to encompass the city wall's north-east corner and provide dating evidence for this structure's relationship to the city wall segments excavated in Area A and D.1-2. The trench provided evidence that the city wall in this corner appeared to be a continuation of the early second century city wall, built over and cutting through earlier Early Roman / Nabataean structures with later Roman and Byzantine walls abutting the north and east faces **(Fig. 20)**. The city wall builders seem to have incorporated some earlier (Nabataean?) masonry structure as the base of the north-east corner, perhaps serving as a kind of corner tower **(Fig. 23)**. There was



*23. The north-east corner of the Petra city wall in Trench D.3. The northern segment of the city wall (foreground, under meter stick) abuts an earlier Nabataean structure (under the photo board). The eastern city wall (visible to the right of photo) extends from the earlier Nabataean structure. View to east.*

extraordinary preservation of the masonry in this trench, with most walls founded on bedrock. The bedrock sloped dramatically from north to south. The interior or west face of the eastern city wall, for example, survived to some 15 courses and still stands nearly 4 m in height. The latest pottery against the foundations of the city wall and associated structures was Late Roman from the early 2nd century. In other words, this segment of the city wall does not appear to be Byzantine in date, as originally hypothesized. There was some evidence of Early Byzantine occupation north of the city wall, but nothing later.

**Historical Conclusions**

The 2014 season yielded much more evidence of the Nabataean cemetery on the North Ridge, which seems to have been in use primarily in 1st century AD. It is notable that at least several domestic structures, such as the complexes in Areas A, C and D, were also in use in this period. The cemetery seems to have gone out of use at around the turn of the 2nd century, about the same time as the construction of the city wall. The dating evidence currently available does not permit any closer dating, i.e. whether the city wall was erected by the Nabataeans just prior to the Roman annexation of AD 106 in a last desperate attempt to defend their capital or was constructed soon afterwards by the Romans themselves. In either case, the city was now under Roman law which typically forbade interment of the dead within the city boundaries. This might explain the abandonment of the cemetery about this time. The domestic complex revealed in Areas B and C continued to flourish through the 2nd and 3rd centuries, and well into the 4th century, until a catastrophic destruction, likely explained by the 363 earthquake. There appears to have been little subsequent occupation of any of these areas in the later Byzantine period, despite the well-documented complex of churches not far to the west on the ridge.

**Post-Excavation Conservation / Protection Measures**

This project is acutely aware of the need for protection and conservation of Jordan's cultural heritage, particularly the structures and features within the heavily-trafficked site of Petra. To that end, we backfilled completed excavation trenches 50 - 100 % full (B.1, D.1 and D.2) to preserve the structures that they revealed, with the future goal of consolidation of the structures and appropriate signage once enough of the complexes have been excavated to be meaningful to visitors. Tombs B.5, B.6, B.7 and B.8 were completely backfilled using their own soil dumps, removing these features from the site. We left the well-dressed architectural stones arranged near Area B for future study by the project's historical architect. Excavation trenches to see continued exploration in 2016 (C.1, C.2, C.3, C.4 and D.3) were only backfilled 10 - 25 %, enough to secure the walls and balks for the offseason. Dumps associated with these excavation areas will be used for backfilling after the 2016 season.

**Acknowledgements**

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# KHIRBAT ‘ATARUZ 2011 - 2012: A PRELIMINARY REPORT ON THE PERIMETER OF THE TEMPLE COMPLEX

*Chang-Ho Ji and Robert D. Bates*

## Introduction

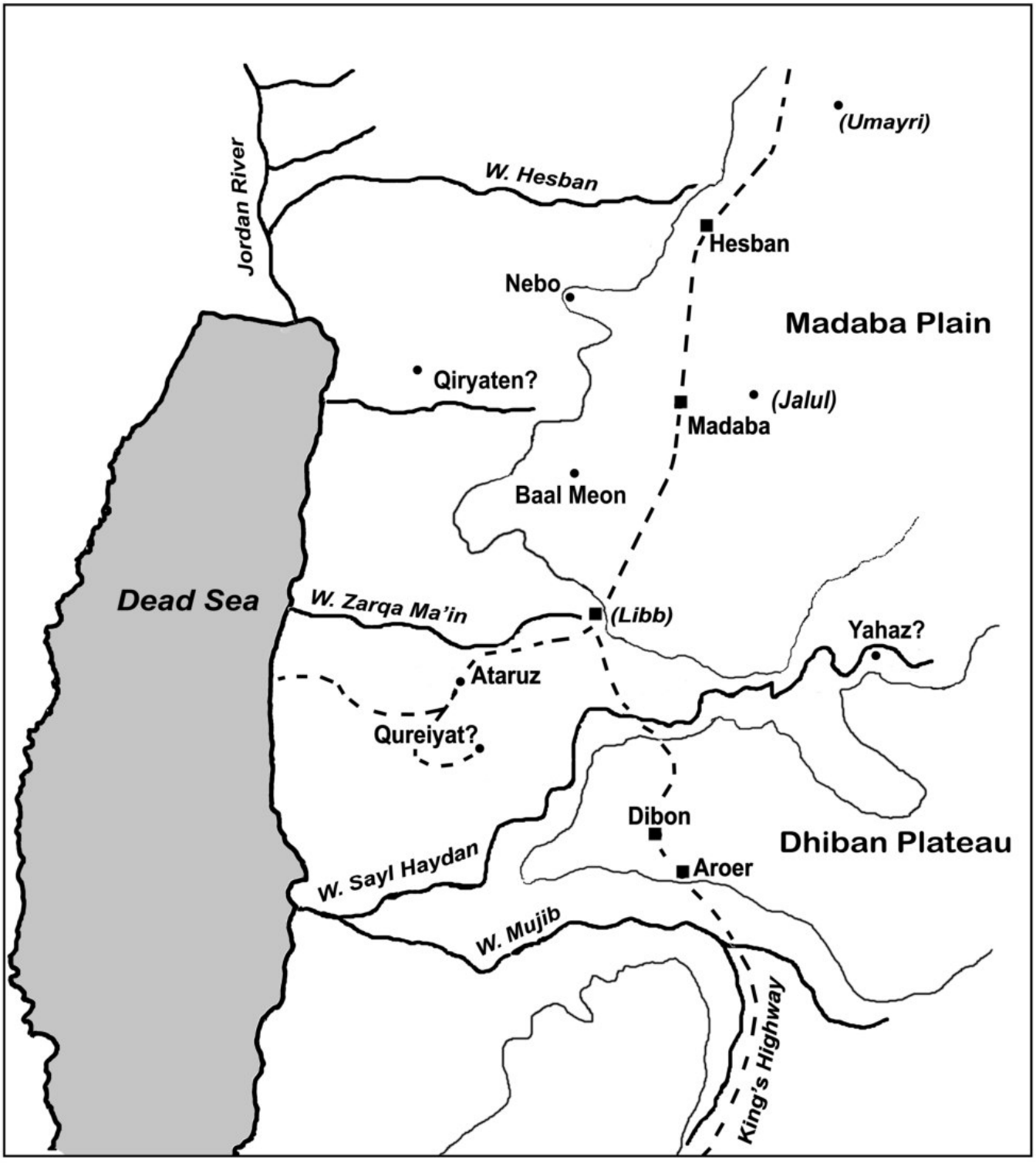
Khirbat ‘Ataruz is located 24 km south of the town of Madaba, 10 km west of the village of Libb, and 3 km east of the ancient site of Machaerus between Wādī Zarqa to the north and Wādī Sayl Haydan to the south (31° 34'31"N / 35° 40' 03"E) **(Fig. 1)**. During the Iron Age it was a fortified town situated on an important crossroad overlooking the Dead Sea. The ancient roads that led from the Dead Sea, Wādī Sayl Haydan and the town of Madaba met at this important cultic site. Excavations were carried out during the summer of 2011 and 2012, under the direction of Chang-Ho Ji of La Sierra University, with the help of a small group of students, volunteers and 18 Jordanian workers from the Beni Hamida region of Jordan **(Fig. 2)**.

## History of Exploration and Excavations

Nelson Glueck was the first western explorer to document the region surrounding Khirbat ‘Ataruz when he visited Jordan in 1937. He concluded from the numerous Iron Age I-II sherds that the site was initially occupied during the Iron Age but later abandoned until its reoccupation during the Late Hellenistic period. In addition, small quantities of Late Hellenistic to Middle Islamic sherds suggested limited occupations during these periods. A later survey conducted by Schottroff found a number of other Iron Age settlements sites in the Jabal Hamidah region (Glueck 1939: 135). In 1983, H. Nieman visited Khirbat ‘Ataruz and found an abundance of Iron Age pottery and a figurine fragment that he believed was made sometime during the 11th - 9th centuries BC (Niemann 1985).

In the summer of 1998, Chang-Ho Ji and Lawrence T. Geraty surveyed Khirbat ‘Ataruz as part of the Dhiban Plateau Survey Project. They also found Iron Age sherds but the western and south-western portions of the site were now underneath a modern cemetery for use by the village of Jabal Hamida **(Fig. 3)** and was therefore unsuitable for excavation. However, the eastern side of the *tell* had several visible wall lines and other ruins standing proud of ground level. A dry moat was observed on the north and south sides and several limestone caves were also discovered.

The first six seasons of excavation at Khibat ‘Ataruz (2000 / 2001, 2004, 2006, 2008 and 2010) exposed many architectural and material remains (Ji 2011, 2012) **(Fig. 4)**. In 2000 / 2001 excavations were carried out in the area of the *acropolis* near to the eastern edge of the modern cemetery. Two squares were opened and an Iron Age temple with many cultic vessels was found. Among the discoveries were fragments of two possible model shrines, sea shells, a pedestal bowl, a lamp and a bronze object with Egyptianising *uraeas* and cobras. Subsequent excavations revealed a temple, 4.1 m x 11 m, oriented east toward the rising sun, with doorways that opened into adjacent rooms and a main doorway that opened into the central courtyard **(Fig. 4)**. The southern room contained a hearth and a platform / altar, and the northern room, with three entrances, may have served as a storage area. Additional buildings on the northern side contained two raised, bed-like platforms and stairs to another possible altar. The eastern doorway of the main temple building opens directly on to a large courtyard where there are several altars and another building.




*1. Map of the region surrounding Khirbat 'Ataruz showing towns mentioned in the Mesha Inscription.*

Four altars face an enclosure wall on the east and a large altar on the north side has a step. Abutting the eastern wall of the temple, next to the doorway, is a four-tiered stepped structure, the purpose of which remains unknown.

**Occupation and Abandonment**

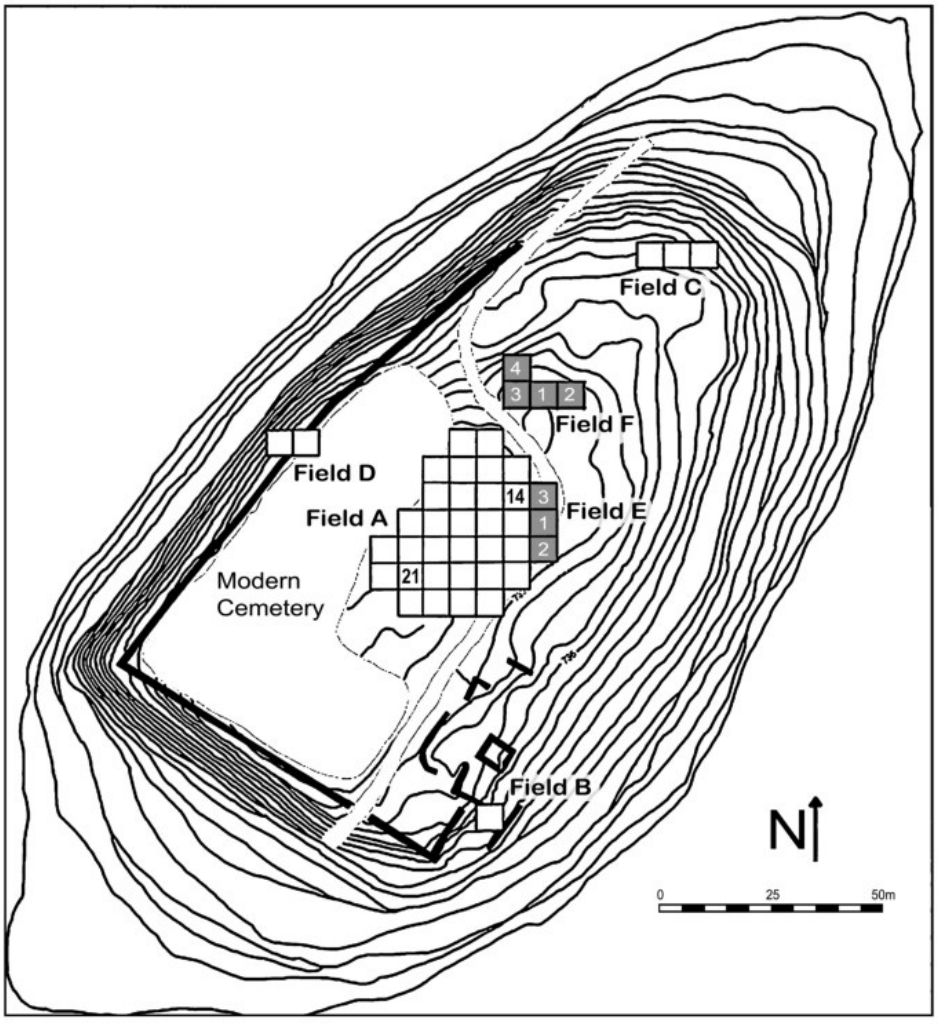
There appear to be at least three phases of cultic activity dating from the early Iron IIA to the early Iron IIB periods, that is, the late 10th to the early 8th centuries BC (see **Fig. 5a and 5d** for



*2. Co-authors Chang-Ho Ji, La Sierra University and Robert Bates, Institute of Archaeology, Andrews University, discussing excavations.*

examples of pottery).[1] At that time, the site was a major cultic centre, probably built and maintained by a national, or at least regional, political entity. The temple complex was well laid out, centrally located and built on the highest point of the site. In the main sanctuary next to the offering table, a standing stone represented the principle deity. Further excavations suggest that a bull motif was also used to symbolize this god. The cultic objects found near the alter and in other parts of the temple complex reflect the same types of cultic material found at Tell Megiddo and Tell Dan, west of the Jordan River (Ji 2012).

During the Iron IIB to Iron IIC periods, Khirbat 'Ataruz was rebuilt and reused. Remains of




*3. Topographical map of Khirbat 'Ataruz showing the excavated squares and Fields E and F.*

1.There has been much debate as to the chronology of the Iron II period in the southern Levant, which is beyond the immediate scope of the present paper. In this report, we tentatively date Iron IIA to the late 10th to late 9th centuries (ca 950 - 830 BC), Iron IIB to the late 9th to 8th centuries BC (ca 830 - 700 BC), and the Iron IIC to the 7th century BC (ca 700 - 600 BC).

kitchens, storage facilities, and water channels suggest that the area was primarily adapted for domestic purposes. However, the eastern side of the earlier Iron IIA courtyard, and its nearby buildings, continued to be used for cultic purposes. By the end of the Iron IIC period, the site was abandoned. No further evidence for domestic or cultic activity is recorded at the site until the early Hellenistic period when the site was rebuilt.

The Hellenistic occupants of the *tell* reused the earlier Iron II structures and added two long walls inside the 'hearth' and 'double platform rooms' **(Fig. 4)**. Also, several walls and rooms in the south-western part of Field A were built during the Late Hellenistic and Early Roman periods (ca 200 BC - AD 100). In addition, excavations in Field C along the north side of Khirbat 'Ataruz revealed Late Hellenistic / Early Roman structures, including a bath installation with plastered steps and walls. The abundance of sherds from storage jars suggests that the Hellenistic and Early Roman settlements took advantage of a rich agricultural hinterland. At the time, Khirbat 'Ataruz was most likely engaged in the cultivation of cereals, and oil or wine production. By the end of the 1st century AD a decline in agricultural prosperity, together with increased political turmoil in the region, contributed to the site's abandonment.

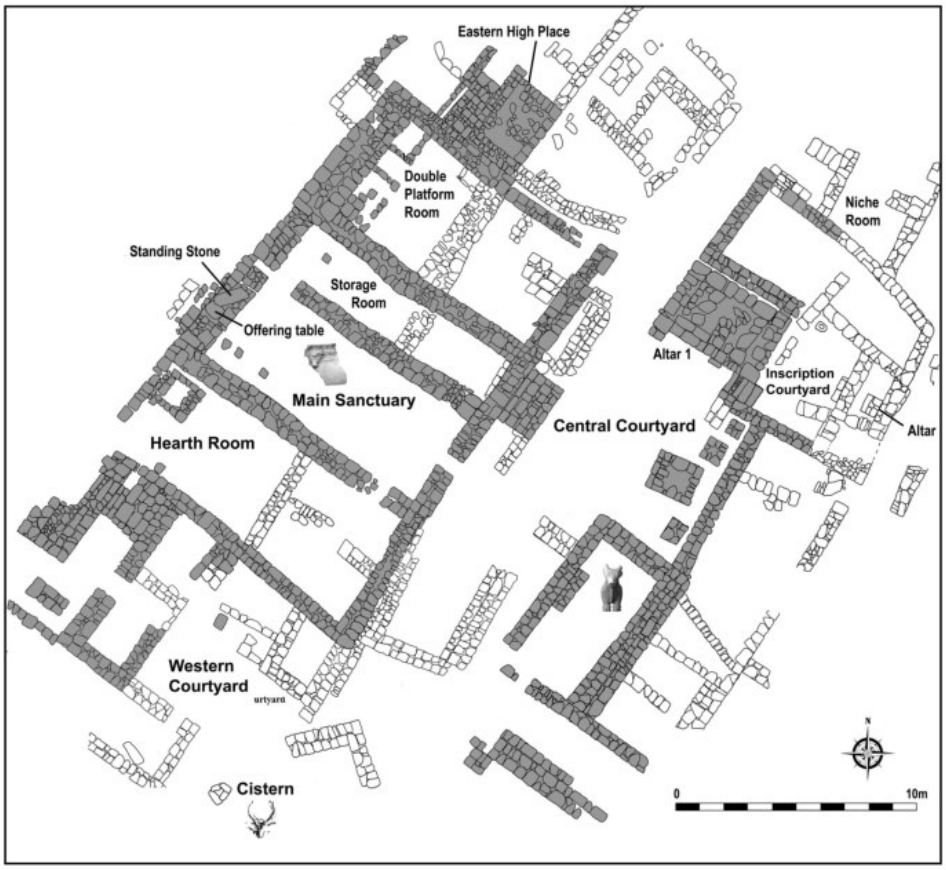
Khirbat 'Ataruz remained unoccupied for nearly 800 years before it was resettled in the Middle Islamic period (ca 1000 - 1400 AD). Residents re-established 'Ataruz as a medium-sized village but the exact size and plan of the settlement is difficult to determine. Although there are a number of walls associated with this period, many of the domestic rooms and buildings reused earlier walls rather than erecting new ones. Indeed, much of the building stone used in the construction of the early to mid-Iron IIA temple complex was dismantled during the Middle Islamic period. This practice was particularly extensive in the area to the north of the acropolis. Nevertheless 'Ataruz was a populous and thriving village during the Middle Islamic period.

**Excavation Aims**

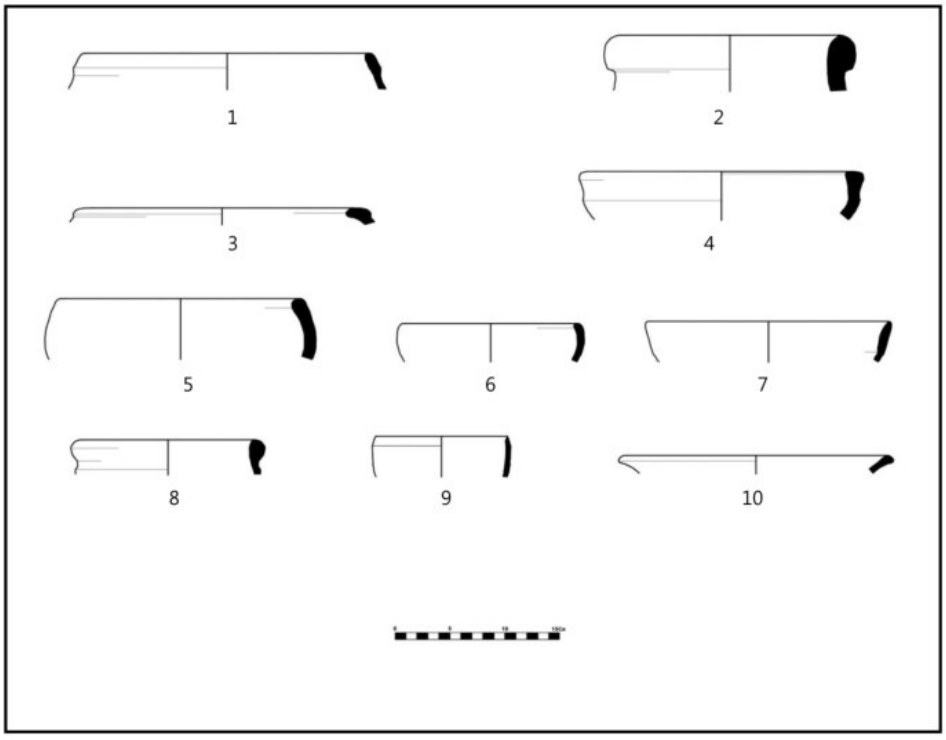
There were four main aims of the 2011 and 2012 seasons. First, since the acropolis had revealed numerous cultic buildings it was necessary to continue exploring the western (Field A) and eastern (Field E) boundaries of the temple complex. **(Fig. 3)** On the eastern side, excavations focused on a small room where a large grinding stone had been found in association with Iron II pottery. Thus an aim of the 2011 and 2012 seasons was to continue excavation in the small room in order to find the edge of the temple complex and determine the size and function of the small room. Another room uncovered in 2010, on the eastern side of the temple complex, revealed an altar platform with an offering step. At the base of the step (IE03) were several cultic objects including a pillar with an inscription.

A second aim of the 2011 season was to determine the exact context of these cultic objects, as well as the size and function of the step altar or platform (IE01-2; **Fig. 4**). This made it necessary to explore the northern extent of the temple complex where some Middle Islamic buildings incorporated earlier structures of the Iron Age temple complex. Questions remained as to whether this marked the end of the temple complex or whether these buildings were reused and modified in later periods. Several additional wall outlines were visible on the surface near the northern edge of the tell before it begins to slope down in a series of terraces. To address these issues, a new field (Field F) was opened under the direction of Robert Bates **(see Figs. 2 and 3)**.

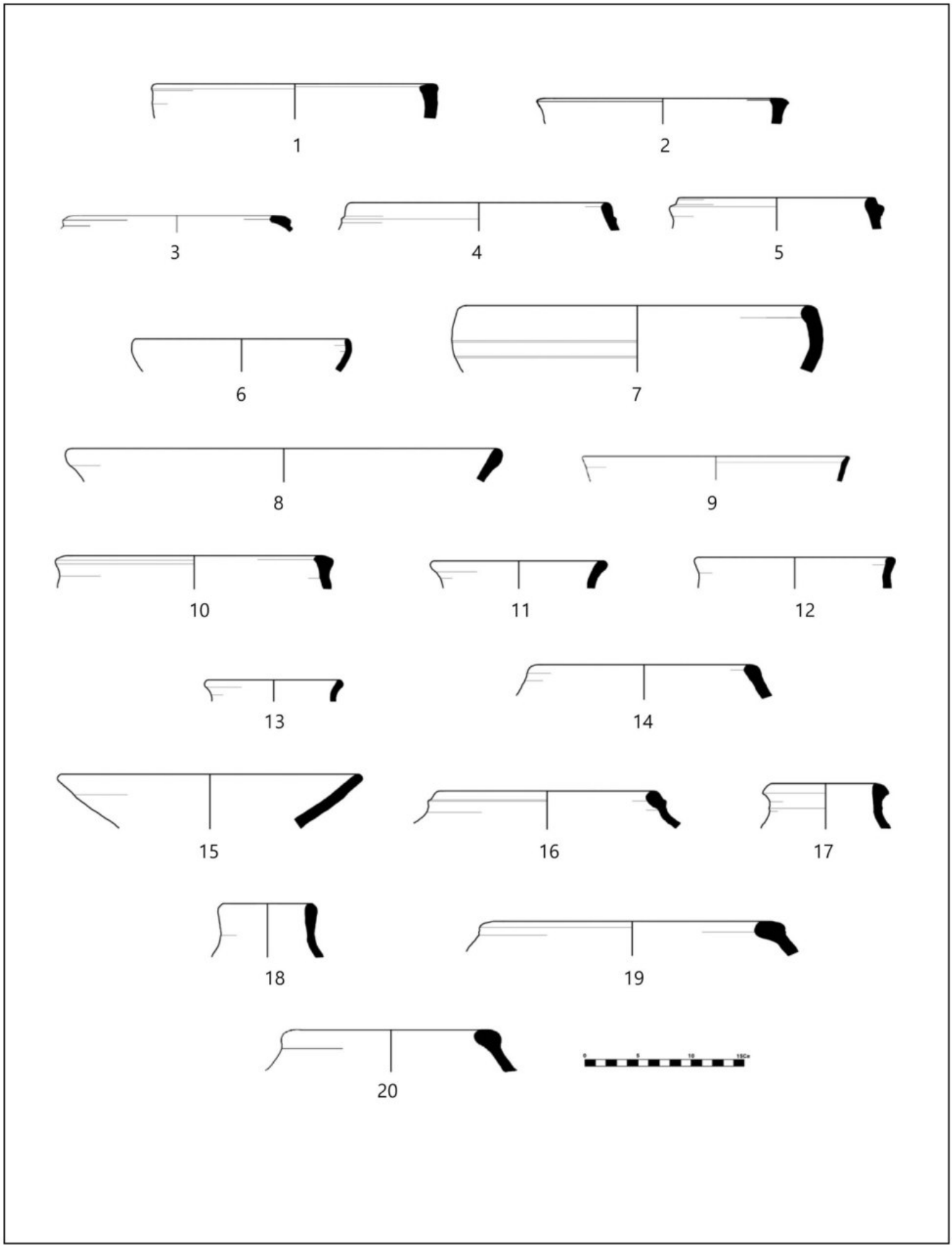
A third aim of the 2011 and 2012 seasons was to explore the cistern that was found on the south-west side of the temple complex in the western courtyard of Field A **(Fig. 4)**. Although the cistern had been identified previously it had not been fully explored by the research team. Debris from the surface had been pushed into the opening and had collected on the floor. Some of the stones were part of the original building material used in the temple complex. Very little water was visible from the opening. The



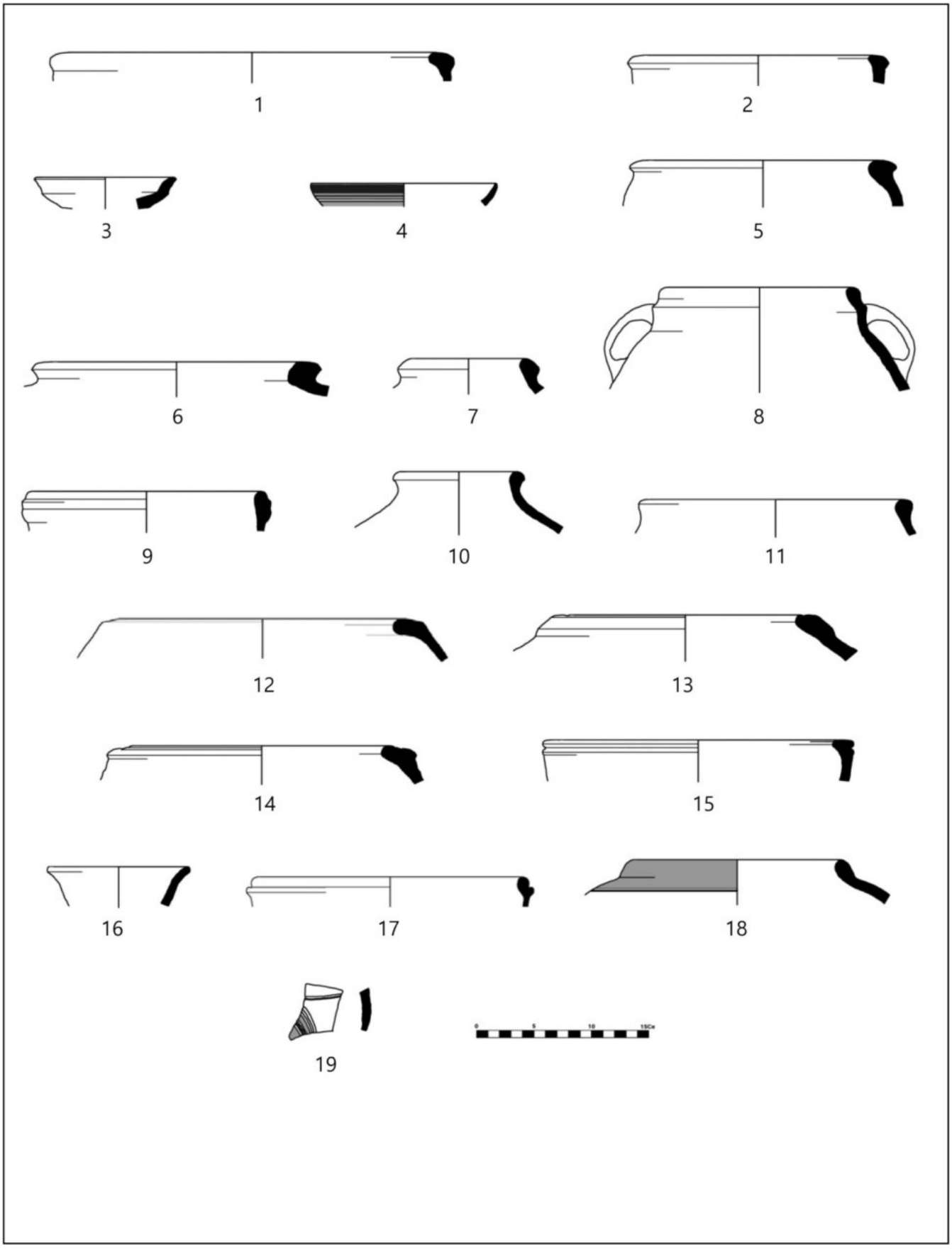

*4. Temple complex map with artefacts showing a bull motif and their relative locations.*




*5a. Selected Iron II pottery from the 'Ataruz temple (Temple Phase I).*




*5b. Selected Iron II pottery from the Ataruz temple (Temple Phase II).*




*5c. Selected Iron II pottery from the Ataruz temple (Temple Phase III and Post-Temple Period).*

| Vessel/Type* | Origin** | Surface Color | Slip & Painted Decoration*** |
|---|---|---|---|
| 5A.1 Cooking pot | A1.33 | gray (10R 6/6) | no slip |
| 5A.2 Storage Jar | A1.33 | light reddish brown (5YR 6/4) | no slip |
| 5A.3 Storage jar | A1.33 | reddish yellow (5YR 6/6) | pink (EI; 5YR 7/4) |
| 5A.4 Bowl | A1.27 | pink (7.5YR 7/4) | very pale brown (EI; 10YR 7/3) |
| 5A.5 Bowl | A1.23 | reddish brown (2.5YR 5/4) | yellowish brown (E; 2.5Y 6/3) |
| 5A.6 Bowl | A1.27 | light red (2.5YR 7/8) | very pale brown (EI; 10YR 8/2) |
| 5A.7 Bowl | A4.12 | light red (2.5YR 7/8) | pink (EI; 5YR 7/4) |
| 5A.8 Storage jar | A1.27 | reddish brown (2.5YR 5/4) | pink (EI; 7.5YR 8/3) |
| 5A.9 Bowl | A1.27 | light red (10R 6/6) | pale red (EI; 10R 7/4) |
| 5A.10 Bowl/plate | A1.23 | light gray (10YR 7/2) | reddish brown (I; 2.5YR 5/4) |
| 5B.1 Bowl | A1.24 | reddish yellow (7.5YR 6/6) | no slip |
| 5B.2 Bowl | A1.23 | pink (7.5YR 7/4) | very pale brown (EI; 10YR 7/3) |
| 5B.3 Krater | A1.23 | reddish yellow (7.5YR 6/6) | no slip |
| 5B.4 Cooking pot | A1.31 | weak red (10R 5/4) | no slip |
| 5B.5 Cooking pot | A1.23 | strong brown (7.5YR 4/6) | no slip |
| 5B.6 Bowl | A1.23 | light gray (5Y 7/2) | no slip |
| 5B.7 Bowl | A1.23 | very pale brown (10YR 7/3) | no slip |
| 5B.8 Bowl | A1.23 | light gray (10YR 7/2) | no slip |
| 5B.9 Bowl | A1.23 | light red (2.5YR 7/8) | no slip |
| 5B.10 Krater | A1.23 | reddish yellow (5YR 7/6) | very pale brown (E; 10YR 7/3) |
| 5B.11 Bowl | A4.9 | light gray (10YR 7/2) | no slip |
| 5B.12 Bowl | A4.9 | light gray (10YR 7/2) | no slip |
| 5B.13 Jug | A8.15 | light gray (10YR 7/2) | no slip |
| 5B.14 Krater | A8.12 | reddish yellow (7.5YR 6/6) | pink (EI; 7.5YR 7/4) |
| 5B.15 Bowl | A12.15 | very pale brown (10YR 7/4) | no slip |
| 5B.16 Cooking pot | A12.24 | reddish brown (2.5YR 5/4) | no sip |
| 5B.17 Storage jar | A12.24 | pink (5YR 7/4) | pale yellow (E; 5Y 8/2) |
| 5B.18 Storage Jar | A15.22 | very pale brown (10YR 7/4) | no slip |
| 5B.19 Storage Jar | A15.27 | pale yellow (2.5Y 8/2) | no sip |
| 5B.20 Krater | A15.22 | gray (10YR 6/1) | very pale brown (E; 10YR 7/4) |
| 5C.1 Krater | A7.11 | pink (7.5YR7/4) | pale yellow (E; 2.5Y8/2) |
| 5C.2 Krater | A7.11 | very pale brown (10R 7/4) | no slip |
| 5C.3 Bowl | A7.11 | reddish yellow (5YR 6/6) | very pale brown (E; 10YR 8/2) |
| 5C.4 Bowl | A7.11 | red (10R 5/8) | reddish painted decoration (E) |
| 5C.5 Krater | A7.11 | very pale brown (10YR 8/3) | no slip |
| 5C.6 Storage Jar | A7.11 | very pale brown (10YR 8/2) | pale yellow (E; 2.5Y 8/2) |
| 5C.7 Storage Jar | A14,12 | very pale brown (10YR 8/3) | pale yellow (E; 2.5Y 8/2) |
| 5C.8 Cooking Pot | A14.11 | yellowish red (7.5YR 4/2) | no slip |
| 5C.9 Cooking Pot | A14.11 | yellowish red (5YR 5/6) | no slip |
| 5C.10 Storage Jar | A14.18 | very dark red (2.5YR 2.5/2) | light reddish brown (E; 5YR 6/4) |
| 5C.11 Krater | A14.12 | red (2.5YR 5/6) | no slip |
| 5C.12 Storage Jar | A14.11 | strong brown (7.5YR 5/6) | pink (E; 7.5YR 7/3) |
| 5C.13 Storage Jar | A14.12 | very pale brown (10YR 8/3) | pale yellow (E; 2.5Y 8/2) |
| 5C.14 Storage Jar | A14.12 | pink (7.5YR 8/4) | pale yellow (2.5Y 8/2) |
| 5C.15 Bowl | A14.12 | light red (2.5YR 6/6) | no slip |
| 5C.16 Bowl | A14.12 | light red (2.5YR 6/6) | pink (E; 7.5 YR 8/4) |
| 5C.17 Cooking Pot | A14.12 | pink (7.5YR 7/4) | no slip |
| 5C.18 Storage Jar | A14.11 | pink (7.5YR 8/3) | light reddish paint (E) |
| 5C.19. Bowl | A14.12 | reddish yellow (5YR 6/6) | reddish and gray paint (E) |

Note. *Figure Number; **Field, Square, and Locus; ***E: external; I: internal.

*5d. Pottery description from the 'Ataruz temple illustrated in FIG. 5a-c.*

purpose of this excavation was to determine the size and approximate age of the construction of the cistern and evaluate whether debris from the surface that had fallen into the cistern had any archaeological significance.

The fourth aim was to create an accurate map of the temple complex and determine the spatial relationship of the many outlying walls on the acropolis. Khirbat 'Ataruz is a large site where most of the excavation has focused on the acropolis, thus, the extent and nature of the outer limits of the site have not been fully investigated. Creating an accurate map using the Promark 3 GPS unit would provide a framework for exploring the relationship of the emerging buildings to the temple complex and allow for the creation of additional fields.

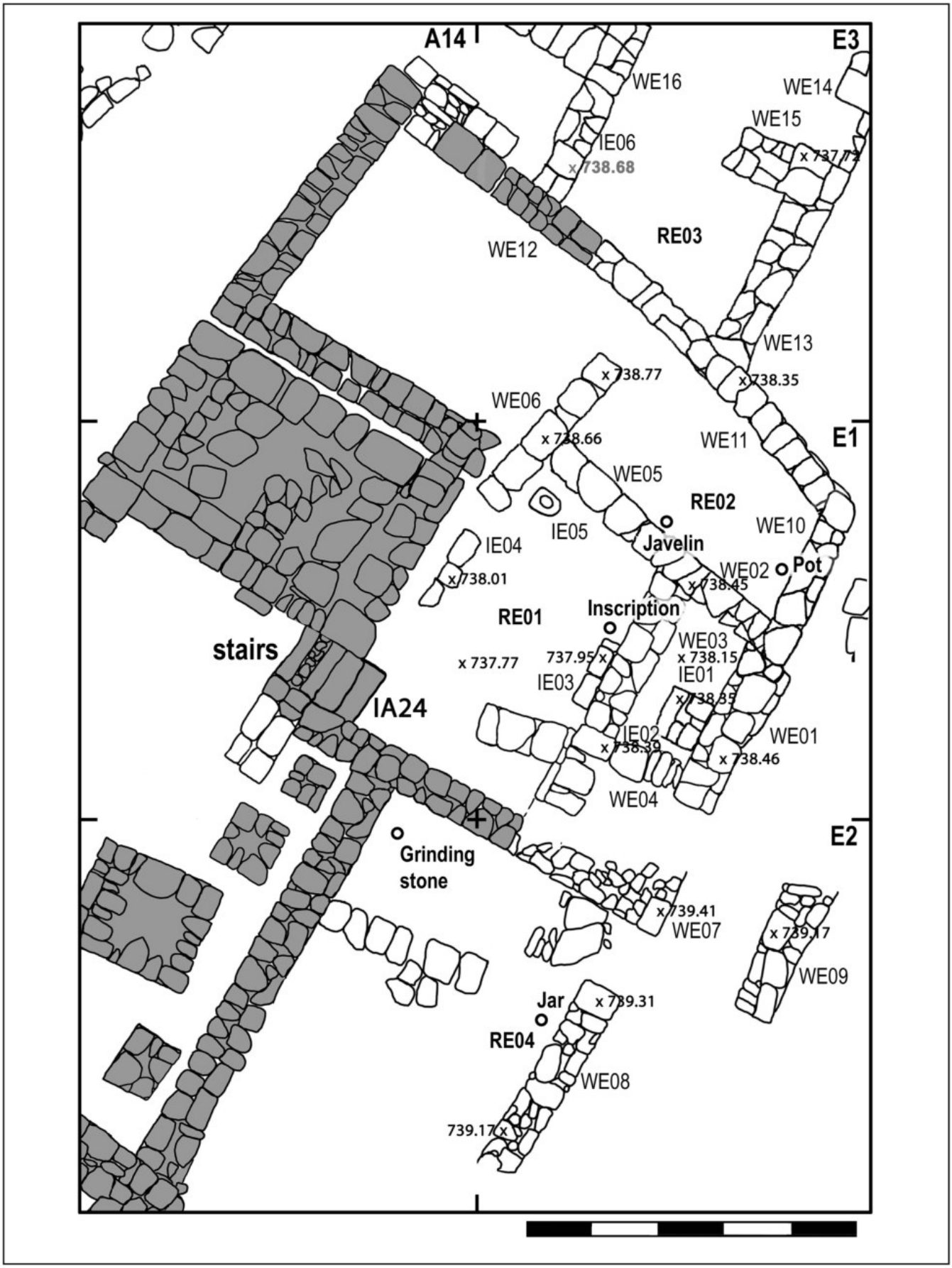
**Field E: The Eastern Edge of the Temple Complex**

On the eastern side of the temple complex is a low platform with a small altar on top, which was discovered in 2010 and measures 0.70 m x 0.70 m (IE01-2). At the base of the platform, a stone step (IE03) was found with two small stone columns on either side. The first column had an inscription on one side that dated to the late 9th to early 8th centuries BC. The second stone column had a square shaped *abacus* incorporated into it with a shallow depression that might have been used to burn incense or hold torch-fire inside. The purpose of the 2011 / 2012 excavations was to determine the relationship between the platform and step and the nearby walls.

In 2011, three 6 m x 6 m trenches were opened to explore the eastern extent of the temple complex (Field E) and parts of the temple compound **(Fig. 6)**. Excavations revealed an Iron IIA - Iron IIB courtyard (RE01) and a raised rectangular platform (WE01-04) that was built for cultic activities. On the south side a three-step staircase (IA24) was discovered that connected the subsidiary courtyard with the main central courtyard near the main sanctuary **(Fig. 4)**. The staircase was the entrance for the courtyard when the platform altar was first built. Priests from the Iron IIA period probably approached the platform from the central courtyard facing the rising sun. Later in the Iron IIB period, this entrance was blocked off in order to put a square fireplace or furnace in the corner. In addition, most of the staircase was covered with soil and incorporated into the earth-beaten floor. On the floor of the courtyard three large irregularly shaped flat stones (IE04) were found near the western wall directly in front of the platform and were probably used as offering tables. The floor, fireplace, and offering stones were all contemporary with the stone columns found in 2010. By the late 9th century BC the area was transformed into a partially enclosed courtyard (the so-called inscription column courtyard, RE01, ca 4 m x 5 m) surrounded on four sides by the platform and three walls and was probably entered through a narrow alley from the south-east **(Figs. 4, 6 and 7)**. This courtyard was reused later in the late Hellenistic period.

The 2012 season concentrated on the architectural details located on the north and south side of the platform. Questions still remained regarding the broader architectural context of the inscription column courtyard (RE01) and its overall plan. While excavating Square E3, four walls of a rectangular room (niche room RE03, 3 m x 6 m; WE11-13, 15-16) were discovered on the north side of the inscription column courtyard **(see Figs. 4 and 8)**. At the centre of the room was an arched niche (IE06) built into the western wall approximately 0.45 m x 0.60 m with a depth of 0.20 m.

A second, adjacent room (RE02, 2 m x 4 m) was found in Square A14 and in the north-eastern corner of Square E1. This room was divided in two by an east / west wall (WE06, **Fig. 9**), which was connected by a door (1 m wide). Excavation showed that this room, like the niche room (RE03), was originally built in the Iron IIA period and then later reused in the Late Hellenistic period, as a small lamp of Hellenistic date was found **(Fig. 10)**. In this area, four earth-beaten floors dating to the Iron IIA - Iron IIB periods were also found. The earliest floor was made during the mid-Iron IIA period when the main sanctuary and its central courtyard were at peak usage. The wall (WE02,



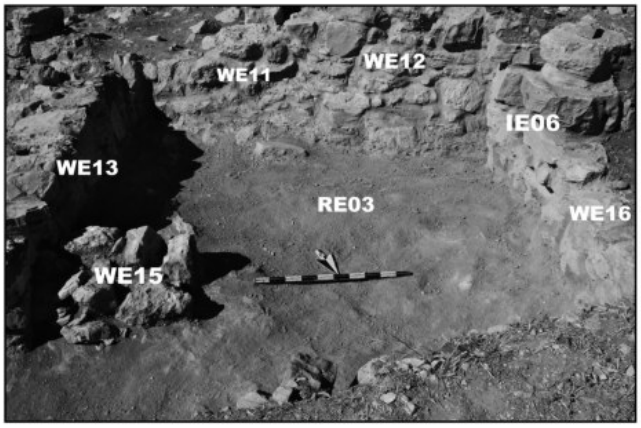

*6. Field E diagram on the eastern side of the temple complex.*

**Fig. 6**; WA43 [Ji 2011: **Fig. 4**]) associated with this Iron IIA floor was built in two courses with chink stones. Its stones were medium sized, relatively well dressed, and laid with much care. A later floor was added in the early Iron IIB period, where an iron javelin **(Fig. 11)** and complete cooking pot **(Fig. 12a-b)** were found in situ next to walls WE05 and WE02 respectively **(Fig. 6)**. During this later phase, a different construction technique seems to have been adopted. The walls consisted of one row of large-sized boulders (e.g., WE05-06 and WE11). These two early walls were reused in the mid to late Iron IIB periods when residents also laid two earth-beaten floors above the earlier ones. During the 2007 season the project identified a Late Hellenistic floor in the area, which was similar to the Late Hellenistic earth-beaten floor found in the rooms in Square A21 (Ji 2011).

On the south side of the inscription column courtyard (RE01) Square E2 was also opened in 2011 **(Fig. 13)**. The purpose of excavating this square was to determine the eastern extent of the temple complex and the southern extent of the inscription column courtyard. In addition, a small room (ca 1.5 m x 2.5 m) with a large grinding stone adjacent to Square E2 was excavated in 2007. Three walls made of chink and boulder construction were discovered. In the north-west corner, the southern edge (WE07) of the inscription column courtyard turned toward the north to form the back side of the altar platform. A second wall (WE08) and doorway running in a north / south direction were connected with the southern edge of the courtyard and altar platform. Several broken vessels of the Iron II period were found, including a cup / jar **(Fig. 14a)** and a juglet **(Fig. 14b)** near the doorway in room RE04. Two large stones lay on the floor next to the doorway but were not excavated. A third wall (WE09) on the north-east corner of the square may connect to a wall in Square E3.



*7. Bongjae Kim investigates and excavates the alley to the south of the cultic platform in Square E1.*




*8. Facing south the niche room (RE03) in E3.*

**Field F: The Northern Edge of the Temple Complex, 2012 Excavations**

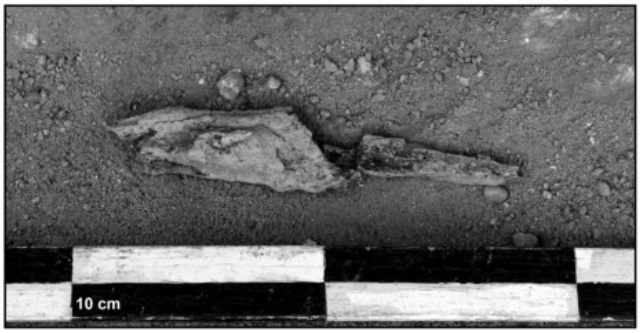
The 2012 season at Khirbat 'Ataruz included the opening of a new field (Field F) on the north side of the temple complex where the acropolis ends and the hill begins to slope downward in a series of possible terraces **(Fig. 3)**. In this area, the tops of several walls were visible above the surface and their close proximity to the north side of the temple area suggested that these structures might mark the northern extent of the temple complex. Like many of the other buildings on the acropolis, it was thought that these buildings might be associated with some type of cultic practice. Alternatively, these buildings could be related to domestic dwellings, industries or defensive structures. Therefore, the main purpose of opening Field F was to examine the edge of the temple acropolis and determine its northern extent, as well as to look for a possible entrance that may have led into the complex. In addition, since there are several walls in the area that could represent fortifications, or possibly




*9. Wall WE06. Facing east. Wall WE06, compartment wall that dividing room RE02. Note the wall has at least two phases.*




*10. Hellenistic lamp with scrolled design found in E3.*




*11. In situ bronze spear point found in E1.*

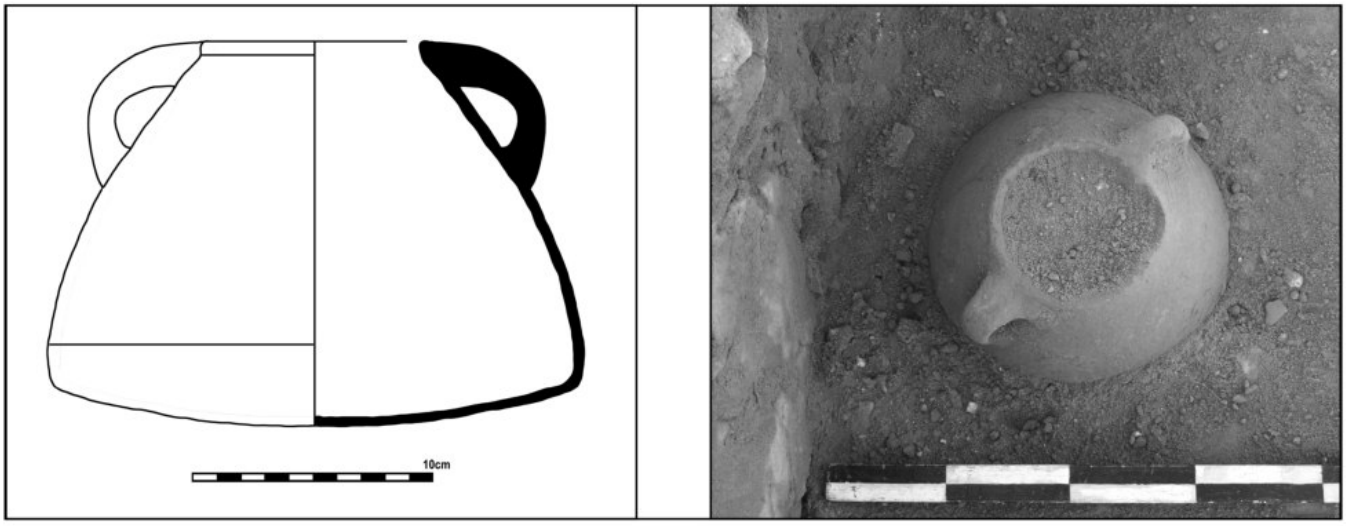
other outlying domestic buildings, a secondary purpose for opening this field was to examine these buildings and their relationship to the temple acropolis.

Four squares (F1 - F4) were opened in Field F; three at the edge of the terrace (F1 - F3) and one (F4) straddling the edge and the northern downslope **(Fig. 3)**. The initial probes in F1 - F2 did not reveal any architecture and consisted of topsoil and stone rubble. These squares were closed and will be reopened at a later time. However, F3 - F4 revealed visible wall lines running in a north / south direction and were intersected by an east / west wall line.

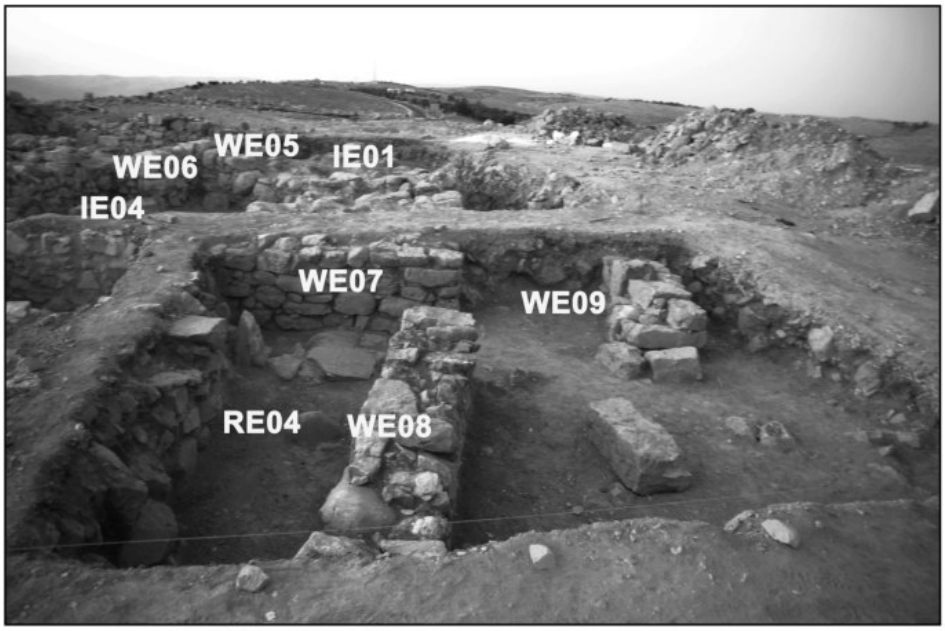
Excavation in Square F3 revealed two north / south walls and three east / west walls **(Fig. 15)**. A central wall (WF05) continues north / south into Square F4, dividing the square into two rooms (RF01-02). On the east side, RF01 is approximately 2 m x 4 m and consists of four walls WF01-04. Wall WF02 does not extend the full length of the room and may have been truncated by a doorway on the eastern side. Iron IIB pottery was found near the walls and on the floor associated with the walls.

A careful examination of the walls in room RF01 revealed several possible phases **(Fig. 16a-d)**. The earliest phase (WF01b-04b) consisted of large rounded unworked boulders 0.5 m - 0.6 m x 0.4 m - 0.5 m **(see Fig. 16e-h)** with small chink stones. Although the stones in wall WF04 were laid out evenly to form a low wall, the stones in walls WF01 - WF03 do not appear to have been laid flat. Some of the stones from walls WF02 - WF03 were found inclined at odd angles between 25-27 degrees while stones in WF01 were uneven. A slight gap was found between the larger stones with the debris that filled the gaps. This would suggest that originally the stones were stacked on top of each other in a wall or possibly a pillar structure that may have fallen over in antiquity.

After a period of abandonment, new stones were used to fill in the gaps, uneven surfaces were levelled and the wall reshaped. At this time, the half wall mentioned above (WF02, **Fig. 16b**



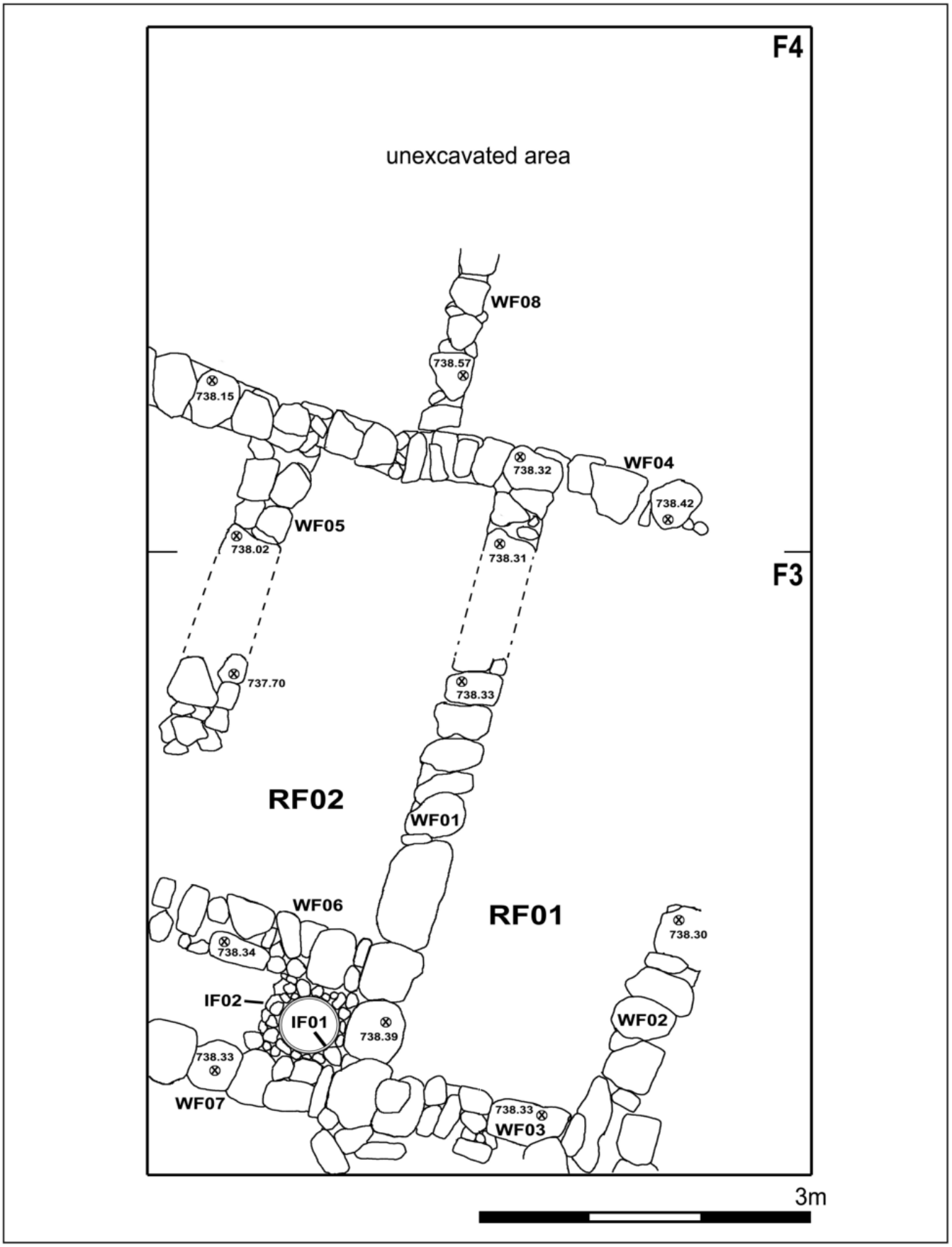

*12a. E1 cooking pot diagram, b. In situ cooking pot found in E1.*




*13. Facing east. Walls WE07-09 and room RE04 in E2.*



*14a. Cup found in situ near doorway in E2, b. Broken juglet found in E2 near doorway.*

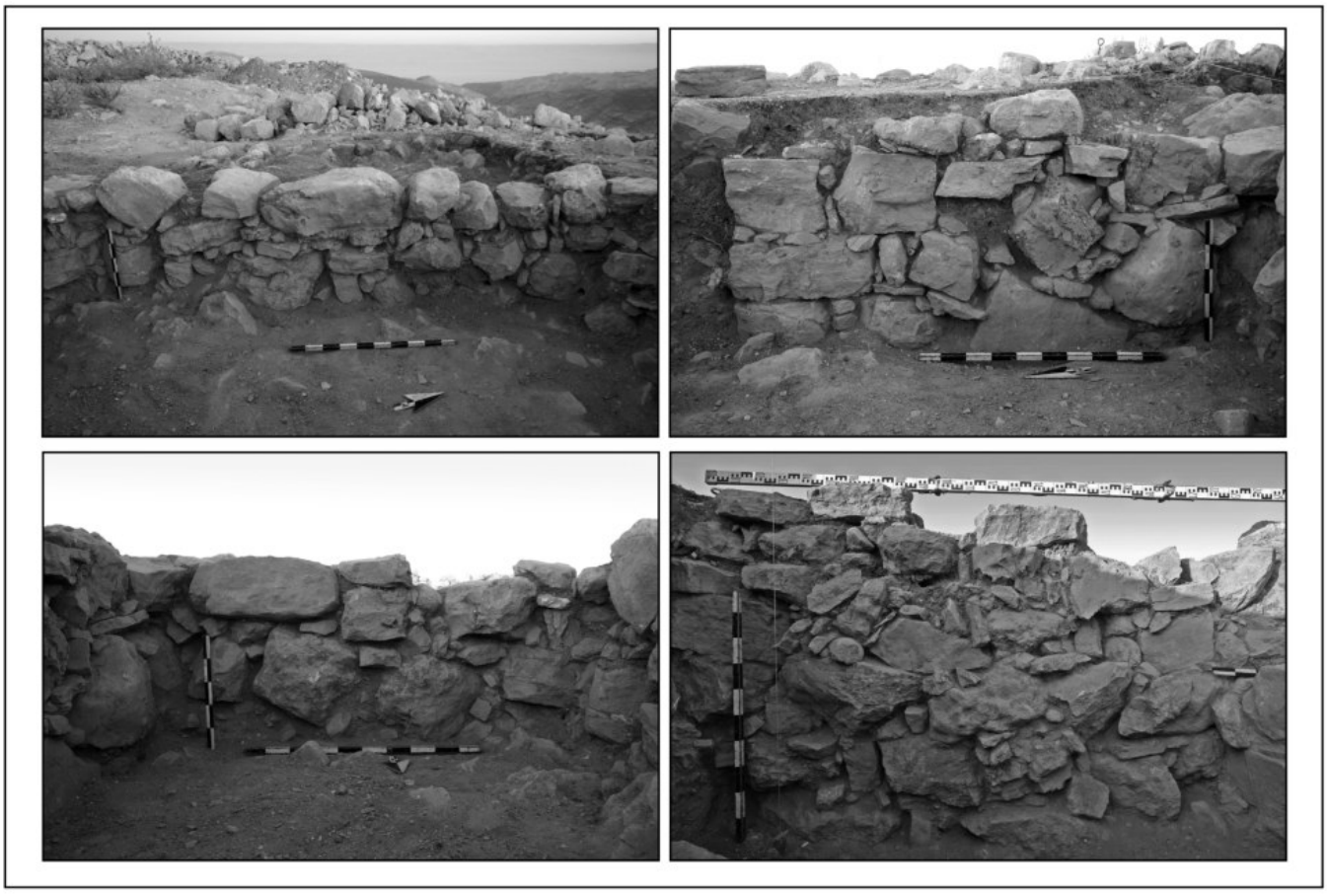



*15. Field F diagram on the north side of the temple complex.*

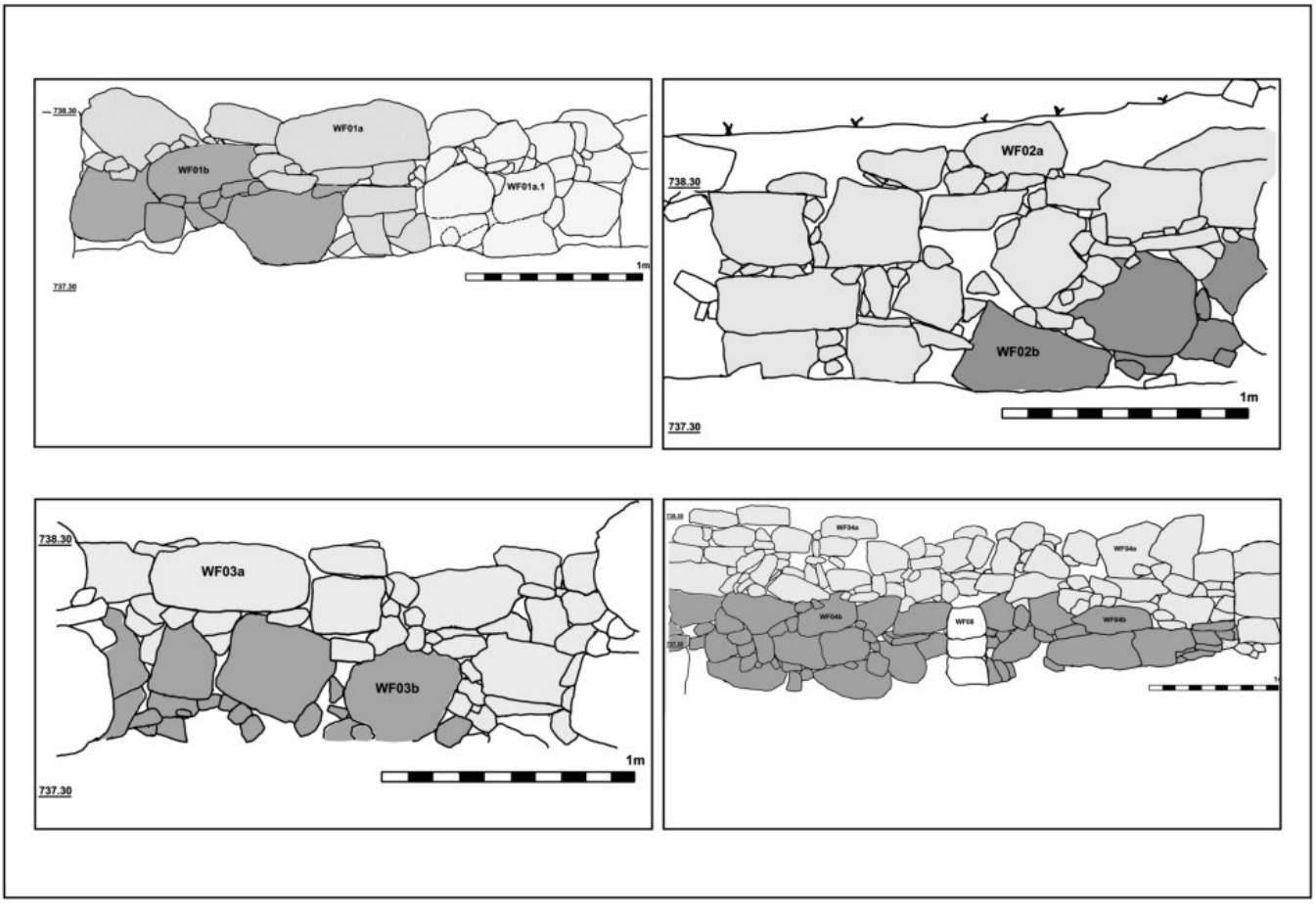
**and 16f**) was rebuilt using smaller square and rectangular shaped stones approximately 0.15 m -0.25 m x 0.20 m - 0.30 m on top of the rubble of the earlier phase (WF01b - WF04b). These stones were probably worked or chosen for their square shape. A second similar half wall (WF01) was also built on top of the fallen debris of WF01b. In this phase, both walls WF01 and WF02 were approximately 2.5 m - 3.0 m long and ran parallel to each other with squared-off edges that formed an opening or niche not unlike a gate structure. In a later sub-phase the gap between the end of wall WF01 and WF04 was filled in with additional stones sealing off room RF01 from room RF02. This sub-phase (RF01a.1) was probably contemporary with the jar installation discussed below (IF01).

The dimensions of room RF02 are uncertain as the western portion of the room may lie in another square. Room RF02 probably measures 2 m x 4 m and consists of three complete walls (WF01, WF04 and WF06) and one partial wall (WF05). It also appears that wall WF05, on the western side, does not extend southward for the full length of the room but it seems to be the same length as wall WF02 in room RF01 **(Figs. 15, 16a and 16e)**. This may indicate an entrance to the room. Although the south wall of room RF01 bonds to the central wall (WF01), the south wall of WF05 does not. Instead, it abuts the central wall and may belong to a later building phase. Finally, the length of room RF02 is shorter than room RF01 because an additional wall (RF06) was added to form the northern wall of an enclosure **(see Figs. 15 and 17)**.

The most interesting discovery was found in room RF02 **(Fig. 16)**. Wall WF07 was found abutting wall WF01, parallel to wall WF06. This construction formed a very small room, approximately 1 m wide, which extended into the western balk. Pottery found sealed against this enclosure included a small lamp and suggests



*16a. Facing west. Wall WF01 in room RF01, b. Facing east, face of wall WF02 in room RF01, c. South face of wall. WF03 in room RF01, d. North face of wall WF04 in room RF01 and.*

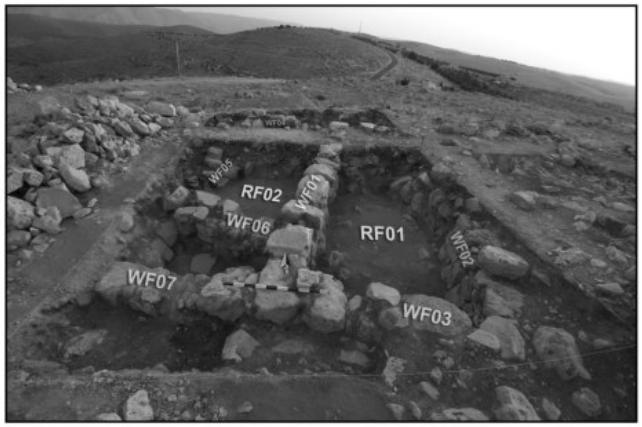



*16e. Diagram of the west face of wall WF01 in room RF01 showing phases WF01a and b and subphase WF01a.1., f. Diagram of the east face of wall WF02 in room RF01 showing phases WF02a and b., g. Diagram of the south face of wall WF03 in room RF01 showing phases WF03a and b., h. Diagram of the north face of wall WF04 in room RF01 and RF02 showing phases WF04a and b and wall WF08.*

that it was made sometime during the mid-8th century BC **(Fig. 19)**. An area next to wall WF01 was outlined with small stones to form a stone lined pit (IF02) in which a large Iron II collared-rim storage jar (IF01, **see Figs. 15 and 20)** was placed. The bottom of the jar was buried into the ground and soil was backfilled to keep the jar upright. Additional stones were added around the jar to a height of approximately 0.5 m. Soil and stones were backfilled to a level just below the jar handles. When the jar was initially discovered, the portion of the jar above the handles was missing.

The bottom of the jar was filled with approximately 10 cm of compacted soil. On top of this soil the upper shoulders of the jar and one third of the rim were found surrounding a stone **(Fig. 21)**. Soil filled the space and a flat stone was placed horizontally, directly above the sherds, creating a separate space below. Additional stones were stacked vertically on top of the edges of the horizontal stone, creating a lining for the jar, with two courses of stones on the western side and one large stone on the southern side **(Fig. 22)**. The remaining two thirds of the rim and other body sherds were found in the soil fill. The sherds were not resting directly on the stones. Another stone was placed horizontally above this area, creating another separate space below it. This top stone was covered with soil up to the edges of the broken jar. Everything was sealed and undisturbed when the jar was discovered and there were no seeds, objects or unrelated additional material found within it.

Finally, in Square F4 another wall (WF08) running north / south was found abutting wall WF04 **(see Fig. 15)**. Three courses were



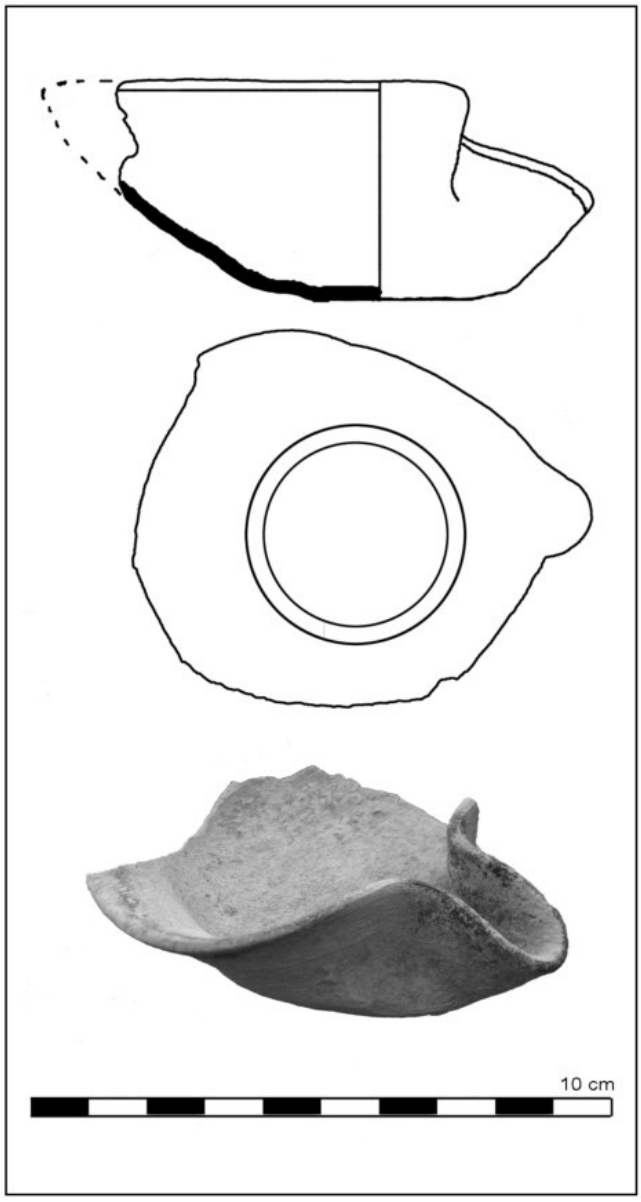

*17. Facing north. Final photo of Square F3 showing rooms RE01 and RE02.*



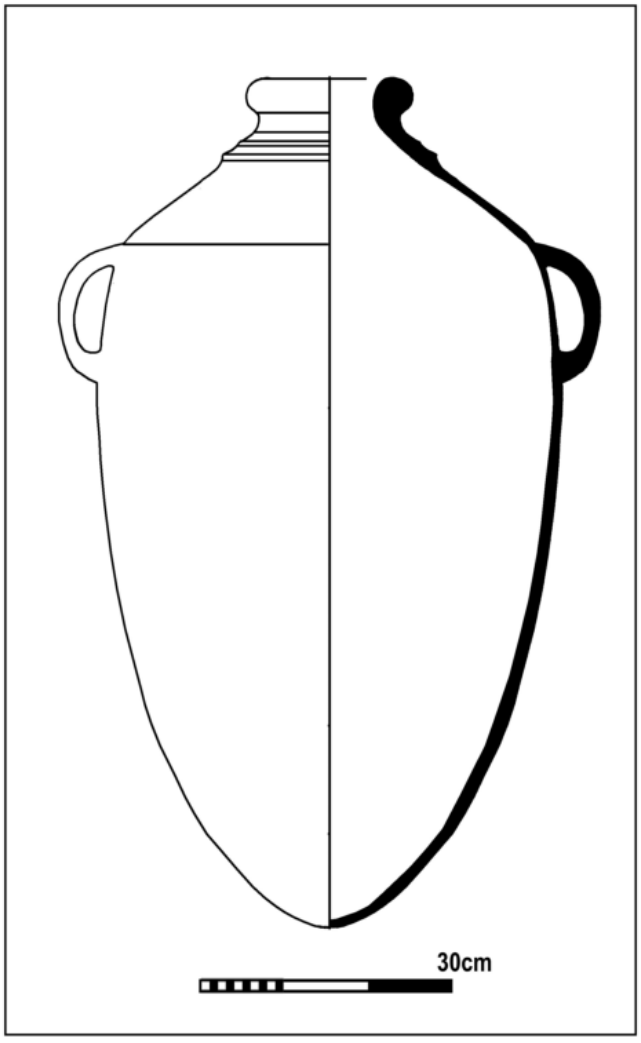
*18. Christine Chitwood discovers a nearly complete Iron IIB storage jar in Square F3.*

excavated and a possible compacted earthen floor was found sealed against this wall **(Figs. 23, 24 and 25)**. It is uncertain whether this wall belongs to the same phase as rooms RF01 and RF02. It may represent an earlier building phase or possibly a lower terrace of buildings sharing a common wall. Further excavation in adjacent squares should reveal the nature of this wall.

Although it is too early to determine the phasing and the function of the rooms that have been recently discovered in Field F, it appears that the jar installation (IF01 - IF02) was created some time during the Iron Age IIB period. The low collar on the jar and the lamp that were found the laying against it suggest that the room was occupied between the mid to late 8th century BC **(see Figs. 19 and 20)**. These rooms were probably used for domestic purposes, either for storage or possibly for food preparation. However, since rooms RF01 and RF02 do not share a common doorway and could not be accessed on the main floor in the later phase, they must represent separate buildings **(see Figs. 15 and 17)**. The entrances to each room must be found in adjacent squares and these two rooms may have had entirely different functions. Further excavation to the east and west should help clarify the purpose of these two buildings. In future seasons, we plan to continue excavating to floor level in Square F3, expand Square F4 to its north balk, re-open Square F2 and possibly open squares west of




*19. Iron IIB lamp found in the fill next to the Iron IIB storage jar in Square F3.*




*20. Diagram of Iron IIB storage jar found in Square F3. The jar was restored at ACOR and now resides in the Madaba Museum holdings.*

Square F3 - F4 and north of Square F2.

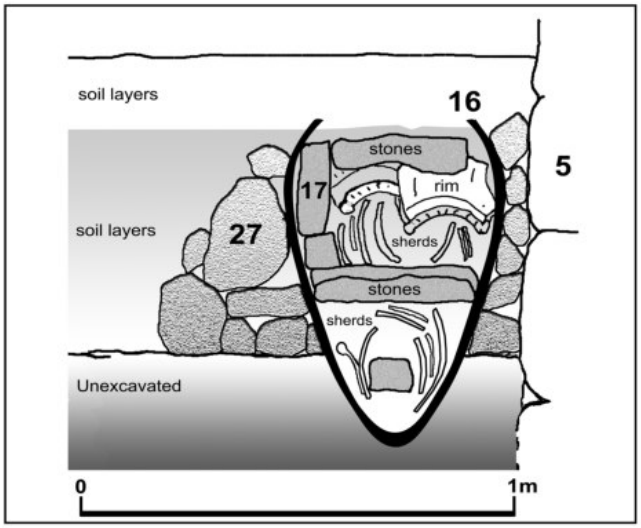
**Field A: Cistern**

On the south side of the temple complex near the western courtyard a cistern was dug in antiquity **(see Fig. 4)**. According to the residents of the area the cistern has been used for generations. The local tribe watered its flocks from the cistern and used the water for cooking. Until recent years, the Jordanian workers at the site would drop a pail down into the cistern to fetch water for tea until they found a snake in the bucket. One of the workers described how his father had plastered the walls sometime in the late 1950s so that it could hold more water. They also said that in recent years there had been less water in the cistern and subsequently the cistern has been sealed in order to allow further study and prevent any accidents.

Exploration of the cistern during the 2011 - 2012 seasons revealed that the opening of the cistern is roughly square in shape, approximately 1 m wide with a shaft that descends approximately 3.5 m into an oval-shaped cistern chamber **(Figs. 26 and 27)**. The chamber measures approximately 5 m x 6 m with a ceiling height of approximately 3.5 m.[2] The walls of the chamber are covered with a recent layer of cement plaster over ancient plaster confirming the local story. The floor of the chamber is covered with debris that forms a mound just below the entrance. Among the debris was a large stone approximately 0.4 m x 0.4 m x 1.2 m that was hollowed out on one side to a depth of 1.5 cm - 2.0 cm in a convex shape. The stone resembles a feeding trough, but it was too dangerous to examine it closely or to remove it from the cistern for further study. The cistern chamber was filled with approximately 0.2 m - 0.3 m of water, of which the origin is currently unknown. Evidence from the walls would suggest that the cistern has held as much as 1.5 m - 2.5 m of water during the winter months.

The most remarkable discovery was made in the entrance shaft of the cistern at the end of the 2011 season. Approximately 3 m down from the opening and just above the point where the cistern chamber opens up, a bull figure was found on the wall of the shaft **(Fig. 28)**. The bull figure measures approximately 0.5 m x 0.6 m with a brownish patina covering the wall **(Fig. 29)**. A circular-shaped *depression ca* 10 cm - 15 cm in diameter rests between the horns on the top of the head and another similar depression is below the right ear. A third example may be below the left ear as well. Each depression seems to be part of the natural stone but further study is needed to evaluate whether tools were used to

2. Since a detailed documentation of this cistern and its installations are planned for a separate future article, only a brief presentation of the cistern is provided here.




*21. Diagram of the contents found in the Iron IIB storage jar and the installation stones supporting the jar. The rim and body sherds were found inside the jar.*



*22. Stone lining of the Iron IIB storage jar from Square F3.*




*23. Facing west. Final photo of Square F4 showing the north wall of rooms RE01-02 that was found in Square F3 and wall WF08 on the north side.*

carve their shapes. The circular shape above the horns resembles a solar disk found in Egyptian drawings of the Apis bull or even the goddess Hathor. The shape of the face is nearly identical to those on the bull storage jar from the main sanctuary room (Ji 2012: Tf 44b-45). It is also reminiscent of the bull figurine that was found in the Central Courtyard in the 2010 season (**see Fig**. 4; Ji 2012: Tf 46).

In addition, while we were staring up at the bull we noticed that sunlight from the opening at the top of the cistern shone directly on to the face of the bull at 12:00 pm on June 23, 2011 coinciding with the summer solstice. Within minutes the light was gone. Although the cistern may have been used for centuries, based on the patina and the similarities between the cistern bull and other bull figurines found at the site, it appears that the early inhabitants of Khirbet 'Ataruz used the natural rock and possibly plaster to form an image of a bull on the side of the cistern wall for cultic purposes. Further study is needed to evaluate its iconography and patina.

During the 2012 season workmen began to clear away some of the larger stones on the cistern floor **(Fig. 30)**. The aim was to remove the debris and excavate the inside of the cistern in the hope of finding the bottom and possibly its water source. Some progress was made but it will likely take several seasons to clear out the remaining debris. In addition, precise measurements were taken and an artist, Stefanie Elkins, was brought in to create a finished drawing of the bull figure, which will appear in a future publication **(Figs. 31 and 32)**.

## GPS Mapping

Most of the excavation squares at Khirbat 'Ataruz were created from a central point using 'dead reckoning' and a compass. Many excavations have found that using this method can cause 'grid drift.' As squares are added, the farther the new squares are away from the original point of origin the greater the chance that the new squares will begin to drift away from the central line of reckoning where the squares started. Even small errors as little as 5 cm -

10 cm can over a distance of 100 m misalign future squares by as much as 10 degrees. In addition, sometimes these errors are drawn into the grid or topographical map and in subsequent seasons the errors are repeated until they become published. These mistakes make it difficult to create 3D renderings, architectural models and topographical maps that include known architecture. In order to prevent this problem, squares for the 2008 season at Khirbat 'Ataruz were laid out using a Promark 3 GPS base station and rover along the Palestinian grid with the help of Matthew Vincent. That season additional squares were added on the south side of the temple complex.

In 2012, the Promark 3 GPS base station and rover was employed to accurately map out the walls of the temple complex and other walls on the site. The base station was set up on the edge of the modern cemetery and elevation points were taken along the tops of the walls. The Promark 3 recorded each individual point and a topographical map was generated of the main excavation area including the elevation of each point **(Fig. 33)**. This GPS map was used as an overlay to create a new architectural drawing of the temple complex with pre-existing drawings of the site **(see Fig. 4)**. As predicted some grid drift had taken place on the eastern edge of the complex, however, this slight deviation was corrected and the new drawings reflect the most accurate representation of the temple complex of the Iron Age. In addition, a walking survey was done along the tops of walls outside of the excavation area. GPS points were measured and photos were taken of prominent walls along the perimeter of the site **(Figs. 33 and 34)**. Finally, a basic 3D model was created using the GPS points and the new architectural drawings. Using Google Sketchup, the walls of the site were added to a Google Earth map of the area to give an aerial view of the temple complex within its geographic context.




*24. Facing south. Final photo of Square F4 showing walls WF04 and WF08 in the foreground and additional walls in Square F3.*



*25. Facing east. Wall WF08 abuts wall WF04.*



*26. Abelardo Rivas entering the Iron Age cistern in 2012.*

**Female Figurine**

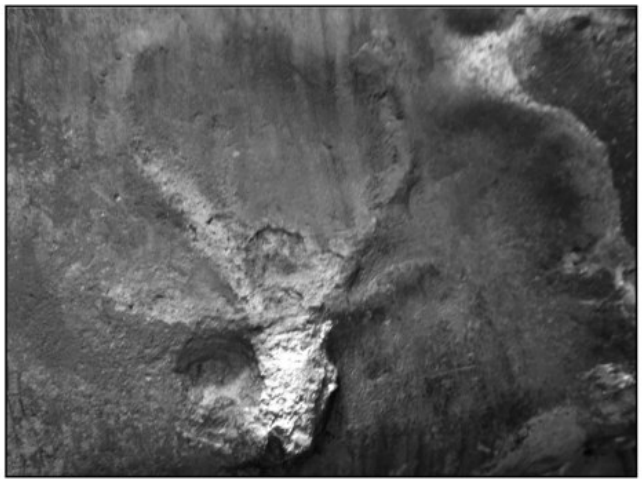
While taking measurements and shooting photographs of the walls along the perimeter, a small broken fragment of a female torso was found (Object



27. Looking up toward the opening of the cistern. Note the large stones that form the entrance.



28. Chang-Ho Ji discovering the bull carved on the wall of the cistern in 2011.



29. The bull carved and possibly plastered onto the wall of the cistern. Note the horns curve inward and the circular depressions between the horns and below the right ear.

no. ATZ 12-014). The figurine measures 4 cm x 5.5 cm **(Fig. 35)**. The head is missing and the lower half is broken off just below the abdomen but the arms, hands, belly and a partial breast are clearly visible. There is no evidence of any clothing *(i.e. naked goddess figurine)* and the abdomen appears to be distended showing a prominent girth that may represent a sign of fertility and / or pregnancy (Lewis 2005). The arms are bent and the hands appear to be clutching a flat disk to her chest, which may be a loaf of bread or possibly a musical instrument[3]. At least three fingers are visible and there may be striations along the arms, possibly outlining some type of jewelry. The back is slightly convex with no distinguishing features like many mold-made figurines. The manufacture is typical of Iron Age IIB figurines with a buff or slightly reddish-coloured exterior and a grey core. The top shows signs of weathering and the greenish colour on the edges suggest that the object was exposed long enough for some type of vegetation to cause a slight discoloration. The bottom was also broken off, but it does not show the same signs of weathering found on the top. Since the figurine was found near the modern cemetery it may have been exposed during a recent burial.

Similar figurines are found throughout Transjordan including one from Tall Hisban[4]. In particular, the 'Ataruz figurine bears a striking resemblance to one that was found at Tall Jalul[5]. Both female figurines have bent arms clutching the chest and a distended

3.For a discussion on female terracotta plaque figurines clutching flat bread or a musical instrument see Keel and Uehlinger 1998:164-167; Sugimoto 2008: 67-87.

4. Object 2826 in Ray 2001: 108, Pl. 5.9.

5. Object J0784 in Gane, Younker and Ray 2010: 189 and Pl. 6.



*30. Jerry Chase assisting the workers clearing the inside of the cistern of debris.*

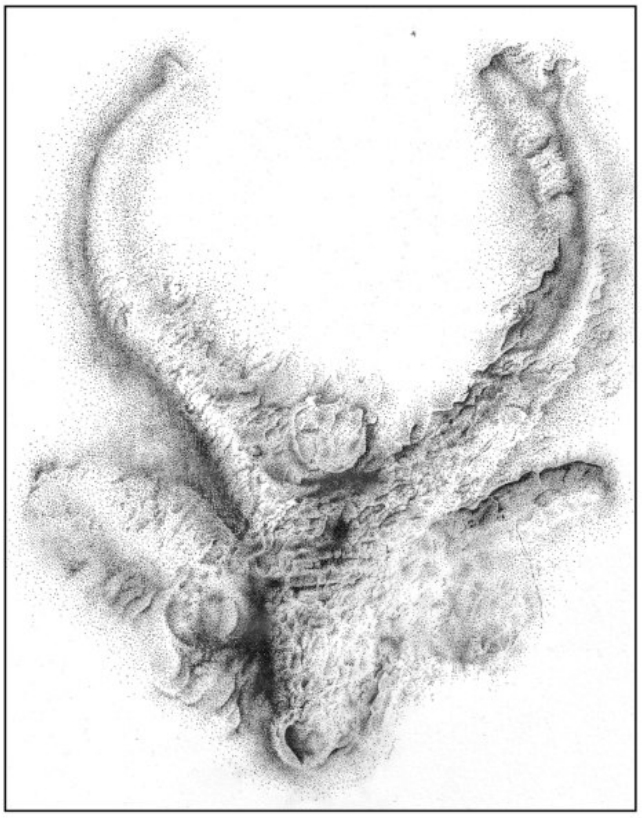


*31. Stefanie Elkins preparing the drawing of the bull in the cistern, and other artifacts.*

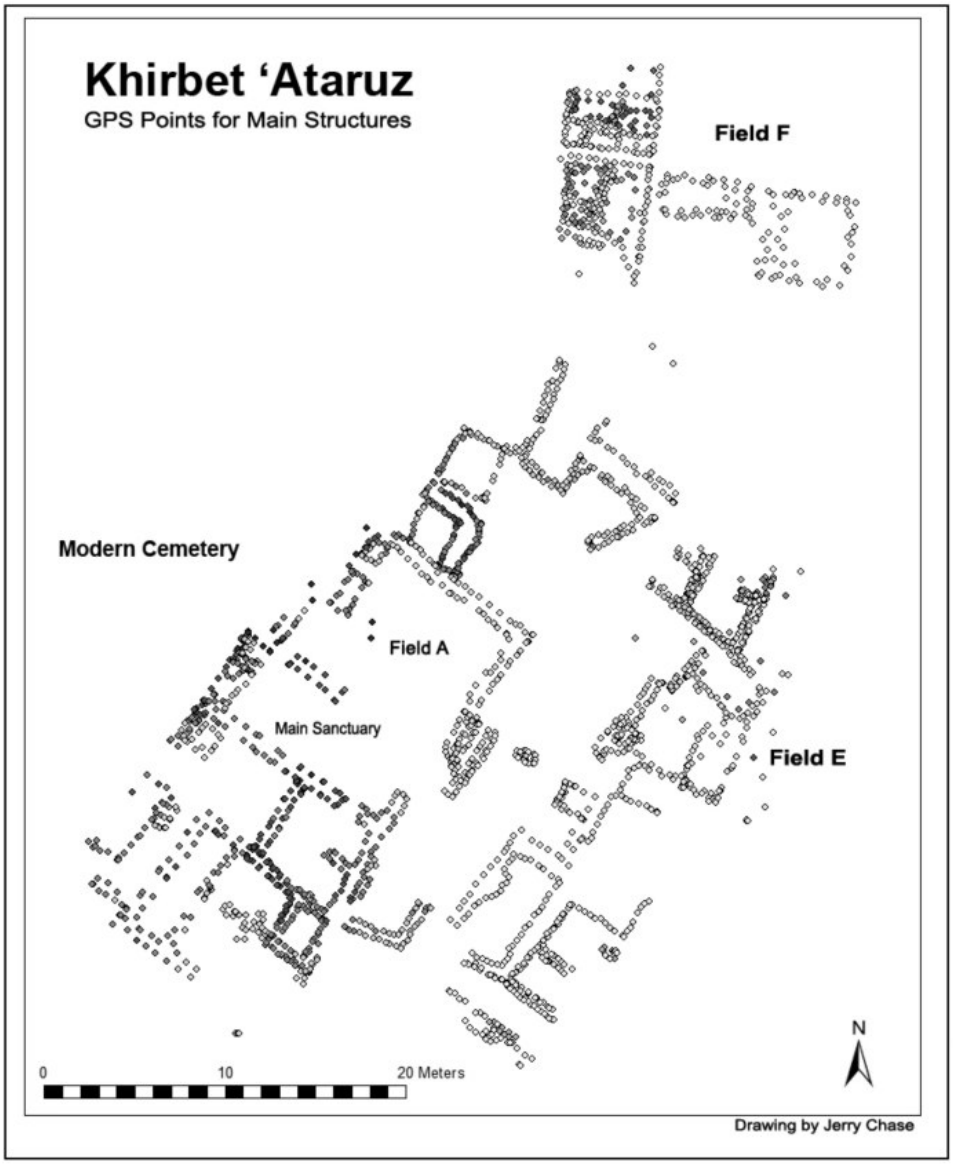
abdomen. Although there are some differences, these similarities suggest that the lower half of the ‘Ataruz female figurine may have had shaft-style legs and no prominent feet. Moreover, this figurine appears to be holding a round flat disk. Finally, the Jalul figurine and others like it are generally found in a domestic context. The discovery of the ‘Ataruz female figurine suggests that a domestic cult involving female figures was present at Khribet ‘Ataruz in addition to the cultic activities taking place in the main temple complex. Indeed, this discovery may point to where some Iron Age domestic buildings might be found. In addition, the present female terracotta molded figurine is significant because it is the only female figurine that has been found to date in the Khirbat ‘Ataruz excavations. All other figures found in and around the temple complex have been male including the model shrine figures as well as other small figurines. Even the animals appear to be male including the various bull figures and the lion figure (Ji 2012: 211-212 and Taf. 460).

**Conclusions and Future Excavation Goals**

The excavations at Khirbet ‘Ataruz continue to uncover Iron Age II remains. The 2011 - 2012 excavations in Fields E and F along the northern and eastern outskirts of the ‘Ataruz



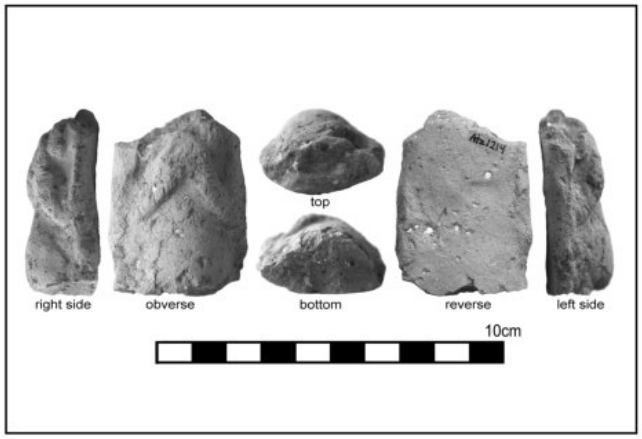
*32. Drawing of the bull in the cistern by Stefanie Elkins.*




*33. Map created from the GPS points taken in Jerry Chase's survery. The points show where the major walls stand and were used to adjust the architectual drawings. Note Fields A, E and F are indicated.*



*34. Facing south. Perimeter wall on the western slope of the tell.*




*35. Small female votive figurine with distended abdomen and two hands clutching a flat disk.*

temple compound have uncovered important buildings and cultic installations. In particular, the discoveries from Fields A and E established a date for the inscription column, its relationship to the altar, and the nature and chronology of the inscription column courtyard. Ceramics from this courtyard and its associated platform point to the Iron IIA period for their construction and continuous use into the Iron IIB period. The rooms on the north side of the inscription column courtyard also appear to have originated in the Iron IIA-IIB periods but they were later used during the Hellenistic period. In addition, the buildings in Field F confirm that the temple complex continued to be expanded during the Iron IIB period, even though the purposes of these buildings require further excavation.

Future excavations will include continued exploration of the temple complex in Fields A, E, and F, a thorough examination of the cistern, and an evaluation of the southern fortifications.

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We would also like to thank the volunteers and staff members who participated in the 2011 - 2012 excavations at Khirbat ʻAtaruz. The 2011 team consisted of Director / Field Supervisor Chang-Ho Ji and Square Supervisor Robert Bates and Bongjae Kim. The 2012 team included: Director / Field Supervisor Chang-Ho Ji, Field Supervisor Robert Bates, Square Supervisors Christine Chitwood and Abelardo Rivas, Artist/Photographer Stefanie Elkins-Bates, and GPS Surveyor/volunteer Jerry Chase.

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# THE 2013 SEASON OF THE ‘AYN GHARANDAL ARCHAEOLOGICAL PROJECT

*Erin Darby and Robert Darby*

## Overview

The site of ‘Ayn Gharandal lies *ca* 70 km north of the Gulf of Aqaba, *ca* 40 km south-west of Petra and *ca* 200 m west of the mouth of Wadi Gharandal on the eastern edge of Wadi Arabah. The ruins rest alongside the modern paved road running east from the nearby Dead Sea highway. The presence of an artesian spring in the mouth of the *wadi* presumably served as the reason for human occupation at the site. ‘Ayn Gharandal and its surroundings were visited by many of the early twentieth century explorers to the region (Frank 1934: 231-32; Glueck 1935: 39-40). Alois Musil was the first to record the ruins of a Roman *castellum* at ‘Ayn Gharandal in 1902 (Musil 1907: 193-97). T. E. Lawrence also passed through ‘Ayn Gharandal in 1914 as part of the Palestine (Wilderness of Zin) Survey (Woolley and Lawrence 1915: 14-15). ‘Ayn Gharandal has been included in regional surveys in recent years (Raikes 1985: 101; King *et al*. 1989: 207; Smith *et al*. 1997: 59-60; Henry *et al*. 2001: 1-19; Gibson 2007) and pottery collected from the surface in these surveys (King *et al*. 1989: 212-13; Smith et al. 1997: 59-60) suggests the site was occupied from the Nabataean to Roman / Byzantine periods.

It has sometimes been claimed that the name Gharandal is derived from *Arieldela* listed in the *Notitia Dignitatum* (Or. 34.44) as the location of the *Cohors II Galatarum* (Musil 1907: 195, n. 20). The name also appears in the Beer Sheva Edicts as *Ariddela* (frag. V, line 5), though this may, in fact, refer to a different site altogether. Alan Walmsley has argued that Gharandal near Tafila is a more likely candidate for *Ariddela* (Walmsley 1998: 433-41). Until the 2013 season, a total lack of any evidence from ‘Ayn Gharandal confirming its identification left the ancient name of the place and the unit garrisoned there a matter of scholarly speculation.

The fort and bathhouse at ‘Ayn Gharandal parallel other Late Roman sites in the region in both design and geographic location, controlling the scarce water resources along an important north - south trade route through Wadi Arabah.

The construction of the road and the numerous military installations along it, including Bersabee, Chermela, Thamara (‘En Hazeva), Zoara and Arieldela (Gharandal), are attributed in the *Onomasticon* of Eusebius to the transfer of the *Legio X Fretensis* from Jerusalem to Aila at the beginning of the fourth century BC (*On*. 11, 42, 50, 118, 129; Erickson-Gini 2007: 91; Millar 1996: 188). In a broader historical context, the Roman military presence at ‘Ayn Gharandal during Late Antiquity appears directly related to the reorganization and redeployment of the legions of *Arabia* and *Palaestina* to the eastern frontier under Diocletian and the Tetrarchs in *ca* 300 BC (Parker 2006: 541-62; Erickson-Gini 2007: 98; Kennedy and Falahat 2009: 150-69).

## Research Agenda and Summary of Previous Work

The ‘Ayn Gharandal Archaeological Project (AGAP) seeks to contribute to our understanding of Jordan’s rich and diverse cultural heritage through documentation and publication of the archaeological materials and site of ‘Ayn Gharandal in Wadi Arabah. The long term project goals are to: investigate the occupational

history, of the site from the Nabataean to Early Islamic periods through systematic archaeological excavations and study seasons; map and record its architectural remains using state-of-the-art technology, including both GPS and GIS, for inclusion in the MEGA-Jordan database; collect, analyze and publish the material culture recovered at the site; preserve and protect the site and its ruins for future generations.

From the data collected during an initial survey in 2009 (Darby, Darby and Shelton 2010; Darby and Darby 2010), five specific squares from three quadrants were selected for the initial season of excavations in 2010. Three are associated with the remains of the *castellum* (A:6/4; A:3/7; C:1/7), while two lie in the ruins of the bath complex (D:6/12; D:6/13). Work in the area of the bath revealed the *caldarium*, *tepidarium*, part of the *frigidarium* and a latrine, as well as numerous graffiti adorning the walls of the bathhouse and in the surrounding debris (Darby and Darby 2012). In 2011, excavation continued in three squares in the fort (A:6/4; A:3/7; C:1/7), which yielded a wide variety of material cultural remains, including rooms along the north, west and south walls of the fort and a painted inscription currently under analysis at the American Center of Oriental Research in Amman. The inscription includes a narrative about the Roman army and a list of names, including those of Nabataean descent. Excavation of a small probe (B:2/1) along the fort's east curtain wall revealed the location of the fort's gate (Darby and Darby 2012)[1].

**The 2013 Season**

The primary goals of the 2013 'Ayn Gharandal Archaeological Project were as follows:

- Expand the 5 x 5 m probes excavated in 2011 along the north and west curtain walls of the fort;
- Expand the two 1 x 1 m probes excavated in 2011 along the east curtain wall of the fort;
- Excavate a new 5 x 5 m probe on the site's eastern ridge;
- Collect, record, conserve and publish all excavated materials on behalf of the Jordanian Department of Antiquities;
- Continue our architectural and topographical mapping of the site, including the use of ground penetrating radar;
- Preserve the remains at the site by backfilling all of the excavated areas at the conclusion of our work;
- Continue developing a long-term conservation /preservation plan for the site, as well as its potential as a tourist destination in relation to the ongoing development of Wadi Arabah and the Red - Dead canal project;
- Prepare the results of the project for publication in *ADAJ* and other academic journals.

**Personnel**

Field staff for the 2013 season included Dr Robert Darby (University of Tennessee) and Dr Erin Darby (University of Tennessee), the project co-directors, and Fawwaz Ishakat (Hashemite University), the surveyor. The field director for the fort was Dr Carrie Duncan (University of Missouri - Columbia) and she directed excavation in square B:2-1/1-1. Craig Harvey (University of Victoria) was the square supervisor for A:6-5/4-3 in the fort. Russell Gentry (North Carolina State University) oversaw excavation in A:4-3/7-6 in the fort. Jessica Walker (University of Pittsburgh) directed excavations on the eastern ridge in square D:20/59. Other field workers included 16 *bedouin* as well as 12 students from the University of Tennessee, three students from the University of Missouri - Columbia, two

1. The AGAP would like to thank the following institutions and persons for their continued support: the Department of Antiquities of Jordan, the American Center of Oriental Research, the ACOR Conservation Cooperative, the American Schools of Oriental Research, the University of Tennessee, the University of Missouri - Columbia, Dr Barbara Porter (Director of ACOR), Dr Christopher Tuttle (Associate Director of ACOR), Dr S. Thomas Parker (North Carolina State University), Dr John Oleson (University of Victoria), Fatma Marii (Jordan Museum), Brittany Dolph of the Cotsen Institute, and Jihad Haroun, Rula Qussous, Ahmed Lash and Khalil Hamdan of the Department of Antiquities of Jordan.

students from North Carolina State University and three volunteers from North America.

Dr Erin Darby directed the archaeological lab in Aqaba and registered the artifacts, Tiffany Key and Pamela Koulianos (North Carolina State University) performed the field readings for the ceramic materials, Cassandra Brigham (Carleton College) assisted with GPS and geoarchaeological analysis, and Anna Hendrick (North Carolina State University) completed the pottery, artifact and architectural drawings. In addition, Dr Nathan Elkins (Baylor University) analyzed the coins from the 2011 season, Dr Austin Hill (Smithsonian Institute) analyzed the faunal remains and conducted a low-flying aerial photographic survey of the site, and Dr Tina Niemi (University of Missouri - Kansas City) conducted ground penetrating radar and geoarchaeological analysis. Following the field season, material culture from the 2013 season underwent conservation at the American Center of Oriental Research in Amman. Conservators included Dr Fatma Marii (Jordan Museum), Naif Zaban (American Center of Oriental Research Conservation Cooperative) and Brittany Dolph ('Ayn Gharandal / ACOR conservation intern from the UCLA / Getty program in archaeological and ethnographic conservation).

**Methods and Objectives**

Three squares from the Late Roman fort (A:6-5/4-3; A:4-3/7-6; B:2-1/1-1) and one square from the eastern ridge (D:20/59) were the focus of the 2013 season. The three squares in the fort are associated with the remains of a ca 40 x 40 m Roman *quadriburgium*. These areas were chosen based upon the understanding of the squares from the 2011 excavation season, their potential for revealing important information about the construction, use and function of the architecture contained within each square, and the nature and depths of the stratigraphic deposits at the site. The square on the eastern ridge was chosen based on two criteria: preservation against consistent looting observed since 2010 and the possibility of occupation levels that predate the fort's period of occupation.

**Preliminary Stratigraphic Report**

*Square B:2-1/1-1*

Square B:2-1/1-1 was opened in the 2013 season to explore the main gate of the fort. Probes conducted by Robert Darby along the east curtain wall during the 2011 season revealed the location of the gate; the 2013 excavation area expanded upon this discovery by laying out a 5 m (east - west) x 10 m (north - south) excavation area. The area is bounded by the east curtain wall along its west side and spans the entryway of the gate where it cuts the curtain wall. The square was excavated under the direction of Carrie Duncan (University of Missouri) with the assistance of Emily Sussman (North Carolina State University), five students / volunteers, and *bedouin* workers. The primary goal for this excavation area was to ascertain the manner of the gate's construction, use and collapse.

Excavation of B:2-1/1-1 immediately revealed inhumations outside of the fort's east curtain wall. As with the other burials recorded in 2010 and 2011 (Darby and Darby 2012), the bodies were located in shallow cist graves and were facing south suggesting burial sometime during the Islamic period. Below the level of the secondary graves, excavation produced a layer of collapse containing both building stones from the fort's gate, as well as the remains from the fort's mudbrick superstructure. In addition to large wall stones, the layer of collapse included the gate's arch, fallen almost directly forward from the entrance **(Fig. 1)**.

Above the collapsed arch a large limestone block, *ca* 0.9 m x 0.65 m x 0.25 m in size and 343 kg in weight, was found lying face-down in the sand. After excavating all of the collapsed mudbrick and arch stones, the block was raised. It was inscribed with a dedication to Diocletian and the Tetrarchs, securely dating the foundation of the fort to the end of the third or beginning of the fourth century BC. The inscription also provided the name of the Roman governor in the province and the name of the garrison: the *Cohors II Galatarum* (see below).



*1. Gate collapse with arch and inscription stones in Square B:2-1/1-l, looking west. Courtesy of the 'Ayn Gharandal Archaeological Project.*

Underneath this collapse layer, excavation revealed a layer of sand. This pattern seems to indicate that the fort was abandoned prior to the collapse of its gate and superstructure. Only under the sand layer did excavation detect significant occupational debris. In fact, the occupation horizon was associated, not with the primary phase of gate construction, but with a secondary construction phase consisting of two stone walls narrowing the mouth of the gate, a secondary threshold stone in the remaining opening and an earthen ramp that led from the higher elevation in the gate to the lower ground outside the fort to its east. This phase produced a number of whole vessels dating to the fourth century BC. Underlying this secondary construction phase is the primary threshold of the fort. Further excavation of this area will be undertaken in the 2015 field season **(Fig. 2)**.

**Special Find: the 'Ayn Gharandal Inscription**

The foundation inscription was preserved in exceptional condition. Because it fell face-down in the sand, not only was the majority of the text legible, but much of the red paint was still adhering to the stone. The inscription is set within a carved frame, or tabula ansata, also containing decorative reliefs of palm branches and a circular boss. It lists the names of the two augusti and two *caesares* to whom the inscription is dedicated: Diocletian, Maximian, Galerius and Constantius I. Thus, the monumental inscription not only provides a date for the foundation of the fort at 'Ayn Gharandal during the reign of the Tetrarchy (293 - 305 BC), but also provides a *terminus post quem* for all subsequent occupation at the site.

In addition, the inscription confirms the site's name in antiquity. It has been claimed that the modern Arabic name 'Gharandal' derives from *Arieldela*, listed in the *Notitia Dignitatum* (*Or*. 34.44) as the location of the *Cohors II Galatarum*, a Roman auxiliary infantry unit. The 'Ayn Gharandal inscription indicates that the site was the location of the *Cohors II Galatarum,* confirming its ancient name, *Arieldela*. The inscription also includes the name, Priscus, the regional governor of *Syria Palaestina* at the time of the fort's foundation. Finally, the inscription includes *a damnatio memoriae*, erasing the name of Maximian. The name of the province was also erased, presumably owing to the changes in provincial structure subsequent to Diocletian.

The 'Ayn Gharandal inscription is one of the most important sources of data for the build-up of Rome's defenses in Late Antiquity, along with inscribed milestones and a small number of other building inscriptions. In fact, only four epigraphic examples from the entirety of the



*2.Fort gate with secondary walls and threshold in Square B:2-1/1-1, looking west. Courtesy of the 'Ayn Gharandal Archaeological Project.*

Roman provinces of *Arabia* and *Syria Palaestina* can be associated with the construction of aTetrarchic-era fortification. These include building inscriptions from the *castella* at Dayr al-Kahf (305 / 306 BC; fragmentary, now lost), Qasr Bshir (293 - 305 BC; *in situ* above gate), Ghadian / Yotvata (ancient Costia / Osia 293 - 305 BC; found lying in front of gate, now in the Israel Museum) and the legionary camp at Udhruh (ancient Adrou 293 - 303 BC; found lying in front of gate, now broken).

Unlike comparable inscriptions at Ghadian / Yotvata and Udhruh, which were not found during stratigraphic excavation, the 'Ayn Gharandal inscription was preserved *in situ* among gate collapse. The significance of the archaeological context should not be underestimated, particularly for dating the fort's foundation. Preliminary analysis of the site's coins and ceramics indicate that the majority of datable materials from the occupation horizon come from the middle of the fourth century or the fourth century more broadly, rather than the end of the third - beginning of the fourth century as might be expected with a Diocletianic foundation. Moreover, beyond the inscription stone, excavation has yielded few datable materials from the fort's initial construction phase, especially given the elusive nature of the fort's foundation trenches and the absence of datable materials beneath the lowest floors and stone wall socles.

To date, the only other evidence for a Tetrarchic foundation remains the date of the mudbrick collapse near the top of the excavation trenches; preliminary analysis dates these loci to the late third - early fourth centuries BC even though they overlie compressed sand that dates to slightly later in the fourth century. In sum, with the exception of the mudbrick collapse layers, which remain susceptible to post-occupational processes, only the inscription stone found through stratigraphic excavation above the collapsed arch provides definitive evidence for the foundation period and historical context.

Not only is it rare for an inscription to survive antiquity, it is fortunate that the inscription was not disturbed in the modern period. The documented history of looting and construction damage at 'Ayn Gharandal (Darby, Darby and Shelton 2010; Darby and Darby 2013) demonstrates the important role excavation plays in preserving cultural heritage. Owing to the efforts of AGAP, the American Center of Oriental Research and the Jordanian Department of Antiquities, the inscription can

now be analyzed in both its architectural and archaeological contexts and displayed for future generations.

*Square A:4-3/7-6*

Square A:4-3/7-6 was an expansion of previous work in A:3/7 and A:4/7. In 2010, Carrie Duncan excavated A:3/7 along the western curtain wall. Progress was slowed by the presence of a burial and, after the removal of this burial, work resumed in 2011 under the direction of Abigail Turner. At that time A:3/7 was excavated to bedrock, revealing the internal face of the west curtain wall and collapsed painted plaster with dedicatory *dipinti*. Additionally, a small portion of A:4/7, just to the north of A:3/7, was excavated to remove a burial that was located in both squares.

For the 2013 season, square A:4-3/7-6 combined A:3/7 and A:4/7 and was expanded to the east to include A:3/6 and A:4/6, thereby totaling 10 x 10 m. Thus, excavating A:4-3/7-6 included both the removal of backfill from A:3/7 as well as new excavations in the other three quadrants of the square. With the identification of the fort's gate in the center of the eastern wall, and the recovery of official documentation set inside a tabula ansata painted on plaster recovered from A:3/7, it is almost certain that the facilities in A:4-3/7-6 constituted the principia of the fort; the definition and excavation of this room was the primary objective of the work in A:4-3/7-6.

The team of excavators included the trench supervisor, Russell Gentry (North Carolina State University) and assistant trench supervisor, Hilarie Zombek (University of Tennessee), as well as five other field school students and a staff *of four bedouin* with additional support as needed.

As in the other squares of the fort, once the top layer of wind-blown sand was removed, excavation produced thick layers of mudbrick collapse as well as secondary cist graves, particularly in the northern half of the square. Of the *ca* 14 separate burials from this trench in the 2013 season (physical analyses are ongoing), at least 12 were located in the northern half. Burials from the square included both children and adults and produced a small number of material culture remains, including fragments of burial shrouds, a shell and a bronze ring. As a result, excavation proceeded very slowly in the north of A:4-3/7-6. This half of the square was closed after the third week of the season to finalize the burials visible at that time and to prevent the likely possibility of opening new, deeper burials with little time remaining to excavate them properly.

In the southern half of the square, excavation confirmed the contours of a large room bordered by the curtain wall in the west, two mudbrick partition walls on the north and south, and a stone wall demarcating the courtyard to the east. As in the other fort squares, a layer of sand was underlying the mudbrick collapse. In the process of excavating the compressed sand, a conglomeration of stones and fallen plaster became visible, though, in contrast with the 2011 season, none of the plaster contained any trace of painted *dipinti*. The stones proved to be the remains of two large piers that had collapsed across the room in antiquity **(Fig. 3)**. The piers very likely supported a raised ceiling. In addition, the east wall separating the room from the fort's central courtyard included large stones similar to those used in the fort's gate. When taken in combination with the plaster *dipinti* from 2011, these unique architectural features seem to further reinforce the hypothesis that this room served as the fort's *principia*.

Given the number of burials and the extensive stone collapse, excavation did not reach bedrock in A:4-3/7-6 during the 2013 season. While the north half of the square will remain closed until future seasons, the southern room will be finalized during a short excavation season in 2014.

*Square A: 6-5/4-3*

Square A: 6-5/4-3 is located on the fort's northern curtain wall. It was laid out with a north - south orientation and measures 10 m x 10 m. Square A: 6-5/4-3 is an amalgamation of four squares: A:6/4, A:6/3, A:5/4 and A:5/3.



*3. Principia of the fort, along the west curtain wall, with the remains of two large piers in Square A:4-3/7-6. Courtesy of the 'Ayn Gharandal Archaeological Project.*

The 2013 season marks the third time this area has been opened for excavation. In 2010, limited excavation was carried out in Square A:6/4 by Byron McCane (Wofford College). This excavation did not reach occupation levels but did identify a mudbrick partition wall and located an arch collapse. In 2011, excavation under the supervision of Craig Harvey clarified the south face of the curtain wall and reached occupation in two adjacent rooms. The 2011 season also shed more light on the internal architecture of the rooms, which had an ashlar arch each. Additionally, the artefacts from the occupations levels suggested that these rooms had a domestic function.

In order to gain further insight into the layout and function of these rooms, it was decided to return to this area and expand the square to the east and south. It was hoped that this expanded square (A:6-5/4-3) would be able to catch another partition wall to the east and the southern cross wall, thereby providing the full dimensions of these rooms. Other goals for the 2013 season were to gain a better understanding about domestic life within the fort, to clarify exactly how these rooms were used, and to provide clues on when and for how long the fort was occupied. The square was excavated under the direction of Craig Harvey (University of Victoria), with the assistance of Jordan Karlis (North Carolina State University), six students / volunteers, and *bedouin* workers.

Excavation in all three rooms yielded mudbrick collapse underneath the surface layers of wind-blown sand. In the center room, an ash layer and two walls were exposed underneath the mudbrick collapse, though no datable materials were associated with these loci. In the western and eastern rooms the mudbrick layers continued even deeper and overlaid a firm sand layer. The same firm sand layer was detected below the secondary walls in the middle room as well. Only underneath the sand layers did the main occupation debris appear. In the eastern room this included a *tabun* and an associated beaten earth floor. It is currently hypothesized that this *tabun* and floor represent a secondary construction phase during the fourth century BC and may be coterminous with the secondary construction phase observed in the fort's gate **(Fig. 4)**.

Beneath the *tabun* in the eastern room was a circular feature containing two fill layers. This feature and two partially-preserved floors in the eastern and middle rooms seem to belong to the same phase, possibly the primary construction phase of the fort. The cobble floor was uncovered in the south of the eastern room and the flagstone floor was uncovered




*4. Secondary tabun in room along north curtain wall of fort in Square A:6-5/4-3. Courtesy of the 'Ayn Gharandal Archaeological Project.*

in the northern part of the middle room. A brown soil layer with limestone flecks and rich material cultural remains was observed filling the circular feature and overlying these floor surfaces. Preliminary ceramic analysis dates these brown soil layers to the fourth century BC.

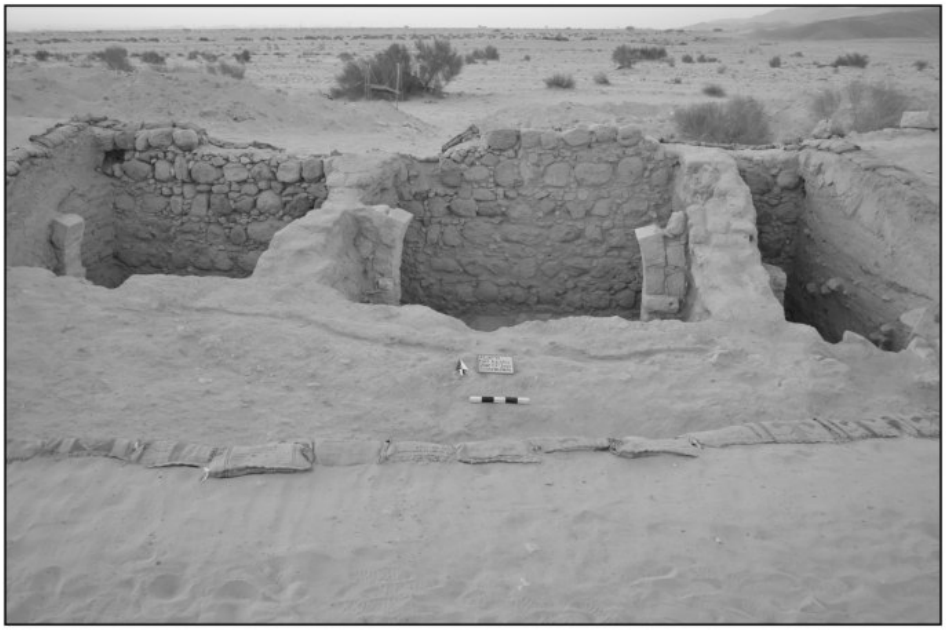
Although a portion of the western room had already been excavated in 2011, excavation in 2013 revealed another feature. Underlying the brown soil with lime that appears in all three rooms, excavation uncovered the remains of a basin filled with similar brown soil. This feature was detected at the lowest elevation in A:6-5/4-3 and preliminary ceramic analysis dates the fill inside to the late third - early fourth century BC. If this is correct, the basin fill would be the earliest locus uncovered in 2013. Alternately, if the brown soil inside the basin is joined with brown soil locus above, then the date would be raised to the middle of the fourth century; thus the date of the basin's fill must remain in doubt.

Excavation of these three rooms also proves that the arches observed in 2010 and 2011 appear to extend across the fort's northern curtain wall. Thus far, no other rooms along the west or south curtain walls have produced similar arches. It is currently presumed that the arches supported a second story along the north wall **(Fig. 5)**. As in previous seasons, the rooms along the north curtain wall also produced the best evidence for domestic activity including cooking installations, domestic pottery and animal bones. These rooms also yielded a great number of coins and a bronze make-up applicator.

*Square D:20/59*

Excavation within square D:20/59 on the east ridge overlooking the main site was initially undertaken in an effort to document and conserve a possible monumental tomb structure. A ceramic surface collection in 2011 observed a partially exposed cist cut, the remains of stone walls and the presence of scattered human remains uncovered by looting. In response, excavations in 2013 aimed to understand the structure's function and record the data from the remaining intact portions of the feature. A single 5 m x 5 m square (D:20/59) captured portions of all the visible architectural features of interest for initial conservation efforts within the area designated as the 'East Ridge' (previously referred to as Area D1 in Darby and Darby 2012). Excavations were directed by Jessica Walker (University of Pittsburgh), with the assistance of Daniel Tallent (University of Missouri - Columbia), two students / volunteers, and *bedouin* workers.

Continued and extensive disturbance was evident at the surface by the presence of



*5. Rooms with arches along the north curtain wall of the fort in Square A:6-5/4-3. Courtesy of the 'Ayn Gharandal Archaeological Project.*

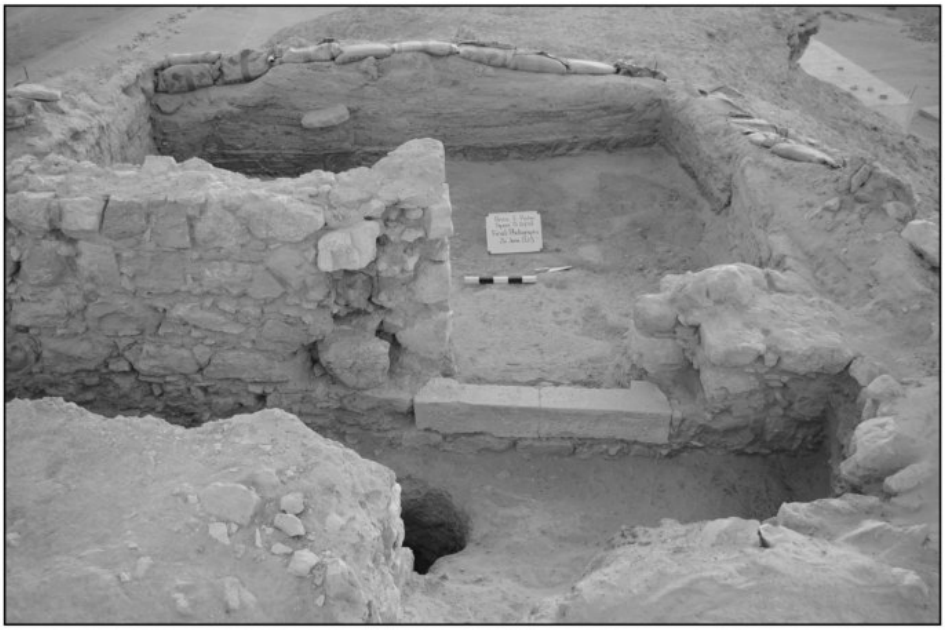
looting trenches exposing portions of walls, a cut stone threshold and a stone door post. All evidence of disturbance was documented with photographs prior to excavation. As in other areas of the site, the east ridge contained inhumations. Two intact burials, three disturbed burials and isolated human remains were uncovered in several disturbed areas, providing evidence for an Islamic period use.

Excavation revealed the interior spaces of two rooms which may or may not belong to the same structure. The data available to interpret the function of these rooms was limited by the extensive looting and continual modification of the area. Neither appears to be a tomb (as was originally hypothesized). The area may have served as a watch tower. While the view to the north is relatively poor, the position atop the ridge affords favorable views to the west and south-west overlooking Wadi 'Arabah and east toward the spring. Additional walls appear to have extended to the west, although, given the extensive looting and mixed ceramic material, this must remain conjectural. Based on the excavated data, it could not be determined whether this was an indoor or outdoor space. It is possible that the rooms on the east ridge were utilized prior to construction of the fort, possibly during the life of the fort, and / or following abandonment of the fort. They were certainly used throughout the modern period **(Fig. 6)**.

**Summary Assessment For Future Excavation**

Having accomplished the 2013 'Ayn Gharandal Archaeological Project field goals, AGAP is now in a considerably better position to pursue excavation in upcoming seasons. In the fort, the 2013 season broadened the excavation areas and, in so doing, reached bedrock in two full rooms and part of a third room along the north curtain wall. These rooms produced a large amount of material cultural remains, including evidence for secondary construction phases. The project also succeeded in excavating the collapse of the fort's gate and retrieving the monumental foundation inscription *in situ*. Furthermore, the 2013 season clarified the architectural features of the presumed *principia*, along the west curtain wall, including all four of the room's walls, and retrieved evidence of monumental construction in the room's east wall and the remains of large piers that would have supported a raised ceiling.

Excavation in 2013 also generated a large amount of information about the site's multiple secondary burials. AGAP uncovered burials from all areas of the fort, particularly along the western curtain wall, and on the eastern ridge. The orientation of the human remains in 2013



*6. Remains of rooms on the eastern ridge in Square D:20/59. Courtesy of the 'Ayn Gharandal Archaeological Project.*

and previous seasons indicate the individuals were probably Muslim. The elevation of the cists *ca* 1m below the modern surface and the absence of any modern memory of a cemetery by the local bedouin population suggest the bodies may have been interred during the Islamic period. Thorough excavation of the burials has produced an array of cloth and charcoal for C14 analysis, which might help confirm the period to which these individuals belong.

On the eastern ridge, AGAP retrieved the remaining data from the structure overlooking the *wadi*, despite its looted state. Excavation revealed that, contrary to early hypotheses, this structure was not a Nabataean tomb, though it may have served some purpose, perhaps as a watch tower. Owing to extensive modern disturbances and mixed pottery, the date of these rooms must remain in question. At best, surface sherds collected in 2011 from this area contained the earliest material uncovered at 'Ayn Gharandal as well as a number of examples of Nabataean fine ware (Darby and Darby forthcoming). Based on the surface collection, it remains possible that the rooms predated the fort, but looting has all but eradicated any such evidence from excavated contexts. At the same time, tooling marks on the cut stones offer little chronological assistance and resemble hammer dressed stones used in the secondary phase of the gate and at other Late Roman sites in the region.

Excavation in 2013 has also confirmed some aspects of the AGAP preliminary phasing in the fort. Based on preliminary ceramic readings in 2011, it was hypothesized that the earliest occupation dates to the end of the third century or the beginning of the fourth century BC. Some loci from the 2013 season seem to confirm this hypothesis. Most significantly, the newly uncovered inscription indicates that the fort was founded at that time, as part of the Diocletianic military build-up in the region.

In addition, the 2013 field season has provided greater clarity about secondary construction phases in the fort, at least in the gate and in one room along the northern curtain wall. Pottery from these loci suggest that both construction phases date roughly to the fourth century BC, with a greater preponderance of pottery and coins dating to the end of occupation. It is not yet clear whether the secondary construction phases were limited in scope to the fort's northern wall and the modified gate. It is possible that excavation areas in 2011 along the fort's southern wall were simply too small to detect secondary phasing. Still, there is no comparable evidence for secondary phases in the presumed *principia*, even though excavation

reached as low as *ca* 0.7m above the floor of the room. Ultimately, only further excavation will rule out secondary phases in that area.

Finally, the 2013 field season has produced new questions about the end of occupation at the site. The season provided the first secure evidence for earthquake damage at 'Ayn Gharandal. Large-scale collapse in the gate and along the northern and western walls suggests one cataclysmic destruction event; the 363 BC earthquake would be a logical explanation, though the ceramic evidence for dating is still preliminary.

That having been said, the earthquake appears to post-date the end of occupation. Stratigraphy in all areas of the fort during 2011 and 2013 suggest the fort was abandoned before any earthquake damage, as indicated by the layers of compressed sand separating the collapsed mudbrick above the sand from the occupation debris below. The sand layers, which largely date to the mid- to late fourth century, suggest the fort stood abandoned prior to the mudbrick collapse brought about by the presumed seismic event. This suggests the 363 earthquake (if that is the correct date) may not account for the end of occupation at the site. Rather, the end of occupation must be attributed to other, yet undetermined, factors.

It is possible that environmental factors may have played a role in the fort's abandonment. The data from nearby Wadi Faynan have indicated the presence of possible environmental shifts taking place between Nabataean and Roman occupation, including a pattern of 'humanly induced desertification' (Barker 2000, 2002). Niemi and Smith (1999) have also hypothesized that a climate shift affected Wadi 'Arabah preceding and following the Roman period. Although these hypotheses are preliminary, they suggest the possibility that natural climate change, land-management strategies or a combination thereof were at least partially responsible for the end of occupation in the fourth century.

It is thus also possible that the secondary construction modifications in the 'Ayn Gharandal gate occurred in response to negative anthropogenic effects or changing environmental conditions, as an attempt to protect the fort from sand accumulation or changing run-off patterns from Wadi Gharandal. Likewise, it is possible that environmental changes played a role in the fort's abandonment. Whatever its cause, the stratigraphy uncovered in the fort during the 2013 season has opened up new questions for further research that will figure prominently in future AGAP seasons.

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# GREEK INSCRIPTIONS IN THE JORDAN MUSEUM

*Pierre-Louis Gatier, Nabil Bader, Julien Aliquot, Maurice Sartre and Jean-Baptiste Yon*

Recently built in the new downtown area of Ras al-Ayn in Amman, the Jordan Museum houses a selection of Greek inscriptions discovered at different sites, from Gadara in the north to Petra in the south. Some of these texts are well known to specialists. Others are unpublished. The aim of this article is to present researchers and visitors to the museum with a collection that reflects the wealth of Jordanian epigraphical heritage. Our work is also a contribution to the Greek and Latin Inscriptions in Jordan programme (*Inscriptions de la Jordanie*), which has received renewed accreditation with the DoA and is part of the IGLS project (*Inscriptions Grecques et Latines de la Syrie*, 'Syrie' being understood here in its ancient meaning of 'Near East ' http://www.hisoma.mom.fr/recherche-et-activites/inscriptions-grecques-et).

Our team studied the inscribed objects in the museum in 2013 and 2015. The inscriptions are presented in geographical order, from north to south. Each of them is described, transcribed, translated and illustrated by one or several photos. Short comments detail their historical and archaeological context.

## 1. Building Inscription, 3rd century AD (After 212 AD)

Jordan Museum, inv. UQ 360; formerly in the museum of Umm Qays. From Umm Qays, ancient Gadara; reused in a wall near the 'podium building' (Weber 2002: 332-334, no BD 10). Marble base bearing traces of the lower part of an animal statuette; on the lateral sides, two mortices with remains of a metallic tenon. Dim.: 21 x 38 x 25 cm. Height of the block with the statue: 36 cm. Height of letters: 2 - 3 cm **(Fig. 1)**.

Bibliography: Weber 2002: 286-287, no IS 14 (P.-L. Gatier, *AE* 2002, no 1548; *SEG* 52, no 1622).Cf. P.-L. Gatier, *Bull. ép*. 2003, no 585.

Ἀγαθῇ Τύχῃ ·
Αὐρ(ήλιος) Διόφαντος Γα[ι]-
ανοῦ ἀστυνομή-
σας ἐποίησεν νυμ-
φέον σὺν ἀγάλματι
μαρμαρίνῳ ἐξ ἰ-
δίων τῇ πατρίδι.

Translation: "Good Fortune, Aurelius Diophantos, son of Gaianos, being *astynomos*, made the nymphaeum with the marble statue at his own expense for the fatherland."

The inscription reminds the reader of the offering of a monumental fountain by a rich magistrate. The building was partially cleared north of the Gadara decumanus near the market basilica (Weber 2002: 145, no BD 11).

The donator, Aurelius Diophantos, was a Roman citizen. His father, Gaianos, had a common Latin



*1. Building inscription from Umm Qays, ancient Gadara, 3rd century AD (after 212 AD).*

name, derived from the *praenomen* Gaius. If he was not a Roman citizen himself, he was at least Romanised. The *nomen* Aurelius implies a date in the 3rd century AD (after 212 AD).

*Astynomoi* were civic officials responsible for the repair and maintenance of buildings and roads. They were in charge of tasks such as boundary disputes, waste collection, house-planning or street repairs. There are few other examples in the Near East: three in Bostra (Sartre 1982, nos 9008-9009, 9028) and one in Gerasa (*AE* 2008, no 1564 = *SEG* 58, no 1772). The latter is very similar to Diophantos' offering, since it is a dedication of a statue of the god Dionysos intended for a fountain.

## 2. Mosaic Dedication from al-Husn Church, 535 AD

Jordan Museum, inv. IR 36. From al-Husn (1995), south of Irbid. Rectangular panel; inscription in a tabula ansata designed with red, brown and black *tesselae*. Black letters on white background; red cross at the beginning, small *omicron*, abbreviation marks (two small red letters, S-shaped signs), horizontal strokes above numerals. Frame: 32 x 237 cm. Height of letters: 4 - 8 cm **(Fig. 2)**.

Bibliography: Al-Muheisen and Tarrier 1997: 493, text in capital letters, with an additional commentary by M. Piccirillo on page 494 (Michel 2001: 422; *SEG* 47, no 2064).

Cf. D. Feissel, *Bull. ép*. 1999, no 577 (= Feissel 2006, no 862); Piccirillo 2005: 385-386.

† Θείᾳ χάριτι ἐπὶ τοῦ ὁσ (ιωτάτου) Ἰωάννου ἀρχιεπισκ(όπου)σπου|δῆ Κυριακοῦθεοσ(εβεστάτου) πρε(σβυτέρου) (καὶ) παραμο(ναρίου) ἐψηφώθη ὁ ναὸς| οὗτος μη(νὶ) Ἀρτεμησίου α΄, χρ(ονοῖς) ιγ΄, τοῦ υλ΄ ἔ[τ]ους· Ἠλίας στρατ().

L. 3. τοῦ υλε΄, translated "year 430" (edd. pr.). The letters CTPAT followed by an abbreviation mark could be the beginning of the word στρατ(ηγός), στρατ(ιώτης) or στρατ(ηλάτης). Previous editors have opted for the reading στρατ(ηγός), but see commentary below.

Translation: "By divine grace, under the most pious archbishop John, by the zeal of the pious priest and *paramonarios* Kyriakos, this church was paved with mosaics, on the 1st of the month Artemisios, in the time of the 13th indiction, in the year 430 (= 21 April 535 AD); Elias, strat—."

The invocation to the divine grace is well attested on mosaics from the same region (see Gatier 1986, no 74, from Mount Nebo, dated 531 AD).

John, archbishop of Bostra, is mentioned in *ca* 539 / 540 AD (Sartre 1982, nos 9128-9134, dated 434 or 435 of the provincial era, beginning on 22 March 106 AD; see Feissel 1989: 821-822). The name of the archbishop, the order of the alphanumerical signs and the date according to the computation of the *Provincia Arabia* fit well together and clearly show that al-Husn belonged to the territory of Bostra, metropolis of the province. It shows the large size of the territory of Bostra, which extended far to the south and the west.

Elias must have been the donator of the mosaic. His function is not well defined. If he was *strategos*, he may have been governor of the province (cf. e.g. SEG 37, no 1271: epigram in honour of a *strategos*, Mousaios, who was probably the provincial governor of Cilicia). Both *strategos* and *stratelates* translate the Latin title *magister militum*, which refers to senior military officers (Landelle 2014). One Elias was for instance *magister militum* in Egypt in 539 AD (*PLRE* 2, p. 437, Elias 3). However, for a person of distinction, we would expect a clearer description. A modest dedication at a secondary



*2. Mosaic dedication from al-Husn church, 535 AD.*

site like al-Husn may rather point to another function, that of *stratiôtes* or "soldier". We know of a good parallel at Jericho, where another soldier, Μαγνιανὸς σ<τ>ρατιώτ(ης) (*SEG* 37, no 1492), gave a mosaic to the church of Saint Andrew. Another solution would be to consider *strategos* as a translation of *duumuir*, referring to the leading magistrate of the Roman colony of Bostra. However, it would be a little late for such an occurrence (for a late example at Heliopolis Baalbek in 430 / 431 AD see Rey-Coquais 1967, no 2831, with D. Feissel, *Bull. ép.* 1994, no 645). Without further information, it may be better to leave the abbreviation as it stands.

The personal name, Elias, was very common in the Byzantine period. See below, no7.



*3. Mosaic from Khirbat Daraiyya church, Byzantine period.*

**3. Mosaic from Khirbat Daraiyya Church, Byzantine Period**

Jordan Museum, inv. JMA 215 (formerly IR 11). From Khirbat Daraiyya. Mosaic pavement from the church of SS Kosmas and Damianos (also partly preserved in the Irbid Museum). Height of letters: 7 - 8 cm **(Fig. 3)**.

Bibliography: Karasneh 1997: 21-36 (*SEG* 57, nos 1841-1846, with further references and comments by L. Di Segni).

Cf. Michel 2001: 135-136.

Name of a donor (*SEG* 57, no 1843): Δανι|ήλ, i.e. "Daniel".

The standing figures of four donors have been badly defaced, most probably during the iconophobic crisis.



*4. Dedication from Jarash, ancient Gerasa, Roman imperial period.*

**4. Dedication, Roman Imperial Period**

Jordan Museum, inv. G. 1196. From Jarash, ancient Gerasa. Small horned limestone altar. Dim.: 22 x 13.5 x 13.5 cm. Dice: 6.5 x 11 x 11 cm. Height of letters: 1.5 cm **(Fig. 4)**.

Unpublished.

Ἀρτεμι-
δώρα ἀ-
νέθη-
4 κεν.

Translation: "Artemidora consecrated (this)."

This very simple votive altar is an example of the small offerings that lower class individuals were accustomed to dedicating to the gods. The offering was paid for by Artemidora, whose name means "gift of Artemis". At Gerasa, personal names paying honour to Artemis, one of the two main divinities of the city, are relatively scarce. The absence of her father's name is an indication of the low status of Artemidora.

**5. Signature of the Alexandrian Sculptor Antoninus on A Statue, Roman Imperial Period**

Jordan Museum. From Jarash, ancient Gerasa; found in the northern courtyard of the Eastern Baths compound. White marble fragment. Lower portion of a statue of a figure standing on a rock, very likely Apollo Kitharoidos or a Muse. 'Oval alphabet' (Welles 1938: 363). Dim.: 37 x 38 x 57 cm. Height of letters: 1.5 - 2 cm **(Fig. 5a-c)**.

Bibliography: Donderer 2001: 178, no 6 (*SEG* 51, no 2047); Friedland 2001: 468-471, Greek text in capital letters, photo, fig. 9-11; Weber 2002: 487-488, no C 6; Friedland 2003: 439-442, no 3, capital letters, photo, fig. 3; Weber 2004: 225-226, capital letters, photo, fig. 6a-b.

Cf. Weber 1990: 50, mention (*SEG* 40, no 1392).

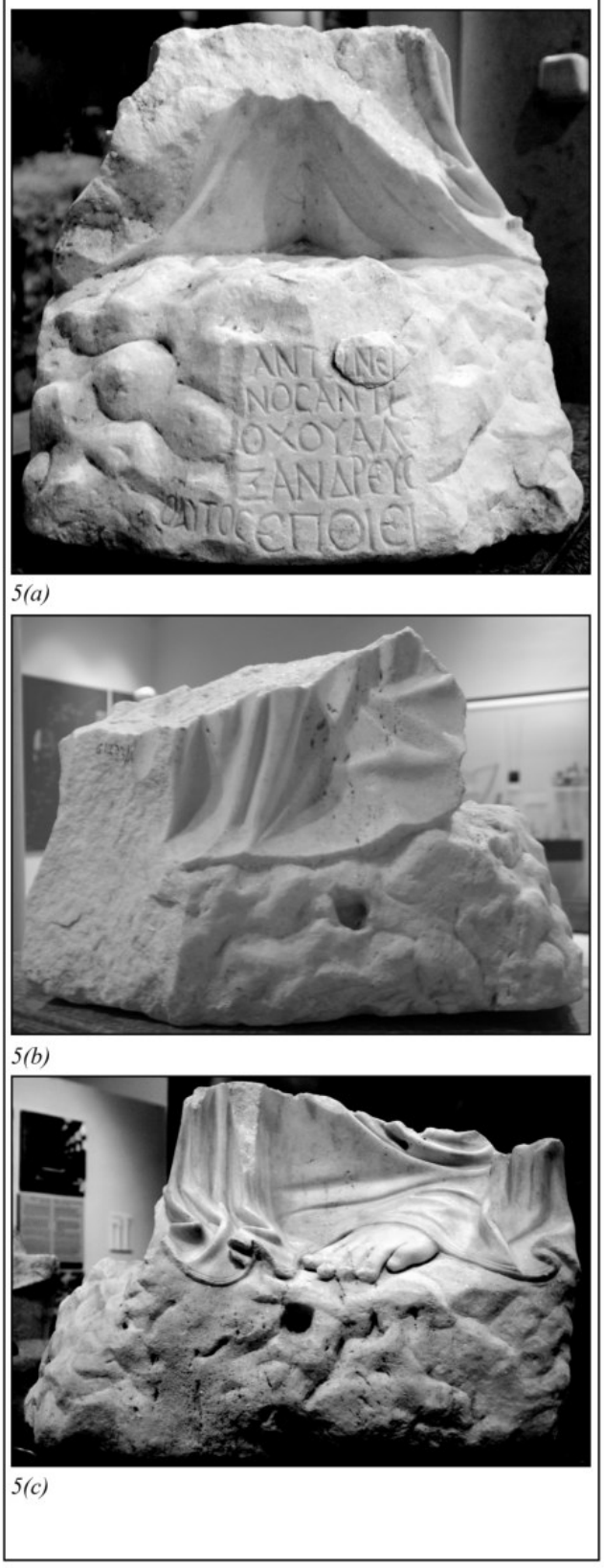
Ἀντωνεῖ-
νος Ἀντι-
όχου Ἀλε-
4 ξανδρεὺς,
ὁ αὐτὸς ἐποίει.

L. 5. The two words ὁ αὐτός, "hi mself",

seem to be a later addition carved by the sculptor on the left side of the panel.

Translation: "Antoninus, son of Antiochos, from Alexandria: he made (this) himself."

This inscription is one of the very rare



*5(a)*

*5(b)*

*5(c)*

*5. Signature of the Alexandrian sculptor Antoninus on a statue from Jarash, ancient Gerasa, Roman imperial period: (a) front; (b) right side; (c) left side.*

sculptor's signatures in the Near East. The white marble was quarried on the island of Thasos, according to an analysis (Friedland 2001: 471). Another inscription shows the signature of the same sculptor on a base that probably supported the statue. Donderer (2001: 178-179, no 7 [*SEG* 51, no 2048]) published the last two lines: Ἀντονῖνος Ἀντιόχου Ἀλεξανδρεὺς | ἠργάσατο. The full text of this second inscription was published in capital letters by Weber (2004: 226). It is a dedication of a statue offered by a Gerasene, Lysias, son of Ariston, to the city of Gerasa, his homeland, in the year 181 or 281 of the Gerasene era (118 / 119 or 218 / 219 AD). According to Weber (2004), the first date would fit more accurately with the slight remains of the hundreds digit. Without knowing of the second inscription, and based only on stylistic comparanda of the statue and of the shape of the letters, Friedland (2001, 2003) suggested that the statue was sculpted in the late second or early third century AD. The personal names of the donor, devoid of Roman influence, are more consistent with Weber's hypothesis.



*6. Epitaph of the slave Eutyches, from Jarash, ancient Gerasa, early 2nd century AD.*

**6. Epitaph of the Slave Eutyches, Early 2nd Century AD**

Jordan Museum, inv. G 1232. From Jarash, ancient Gerasa. Gabled white limestone stele with a triangular tympanum. On the tympanum, a rosette in low relief; text inside a square moulded panel. Punctuation: *hedera* (L. 6). Dim.: 64 x 44 x 10.5 cm. Height of letters: 1 - 3 cm **(Fig. 6)**.

Unpublished.

Χαῖρε σοὶ καὶ ὁ
ἀναγινώσκων ·
Μ(ᾶρκος) Οὔλπιος Σώφρων
Σεβ(αστοῦ) ἀπελεύθερος ἐποίη-
σεν Εὐτύχῃ τῖ ἰδίῳ δούλῳ
ἀξίῳ γενομῳ
ζήσαντι ἔτη
ιθ΄.

L. 1. ἀναγινώσκων for ἀναγιγνώσκων. L. 5. τῖ for τῷ. L. 6. γενομῳ for γενομένῳ.

Translation: "Farewell, to you and to the reader, Marcus Ulpius Sophron, imperial freedman, made (this) for Eutyches, his own slave, who was worthy of it and who lived 19 years."

This fine and well-carved tombstone is a good example of the bonds that linked some slaves and their masters. Marcus Ulpius Sophron, the master, was one of several imperial freedmen and slaves who held a position in the financial office of *Provincia Arabia,* under the authority of the equestrian procurator at Gerasa. This province is remarkable because the two heads of the Roman administration were located in two different towns: the governor at Bostra and the procurator at Gerasa. When he was a slave, Sophron had a simple Greek name ("Wise", "Temperate"), very appropriate for his function of clerk. He was certainly freed by the Emperor Trajan (Marcus Ulpius Trajanus), whose *cognomen* and *nomen* he obtained while becoming a freedman and Roman citizen.

Eutyches ("Well-chanced", "Fortunate") is a name frequently given to slaves. At Gerasa, an altar was dedicated by Parthenios, son of another Eutyches, in 158 AD (Welles 1938, no 124); both father and son have names which look servile. The Latin inscription on the funerary altar of a third Eutyches, "freedman of the emperors", points to the same social milieu of Greek- and Latin-speaking slaves or ex-slaves with strong financial skills (Welles 1938, no 210).

**7. Christian Dedication by Elias, Byzantine Period**

Jordan Museum. From Kfayr Abu Sarbut (al-Khattabiyya), 4 km north of Madaba. Mosaic floor of one of the two Byzantine churches discovered in this village. The pavement is partly destroyed: a tree with a bird in the branches and a ram on the left are the only remains under the two short lines of the inscription. Inscribed part: 18 x 96 cm. Height of letters: 8 cm **(Fig. 7)**.

Bibliography: Gatier 1986, no 114, photo, pl. 23 (Michel 2001: 363).

Κ(ύρι)ε, πρόσδεξε τὴν
προσφ(ορὰν) τοῦ δούλου Ἠλίου.

Translation: "Lord, receive the gift of your servant Elias."

Elias was one of the most popular names in the Madaba region and in the whole Near East during the Byzantine period. See above, no 2.



*7. Mosaic dedication from Kfayr Abu Sarbut church (al-Khattabiyya), near Madaba, Byzantine period.*

**8. Christian Prayer Addressed to Saint Sergios, Byzantine Period**

Jordan Museum, inv. M 4875. From Umm al-Rsas, ancient Kastron Mephaa; discovered by the Swiss mission inside the northern church of the Byzantine fortress (*castrum*). Candelabra (*polycandelon*) in cast brass. Diameter: 21 cm. Thickness: 0.4 cm. Height of letters: 1 cm **(Fig. 8).**

Bibliography: Rey 1992 (D. Feissel, *Bull. ép.* 1993, no 646; *SEG* 42, no 1494; Michel 2001: 415).

† Ἅγιε Σέργι βοήθι Θωμᾷ, ἀμίν.

Translation: "Saint Sergios, help Thomas, amen."

This object belongs to a well-known series of lamp-bearers, common in Near Eastern Byzantine churches. The so-called 'church of the rivers', where it was discovered, must have been dedicated to Saint Sergios. The cult of Saint Sergios, martyr in Sergiopolis (Resafa in Syria), was widespread in the Byzantine provinces of Arabia and Syria. Thomas donated the object.



*8. Christian Inocation addressed to Saint Sergios on a polycandelon, from Umm ar-Rasas, ancient Kastron Mephaa, Byzantine period (photo courtesy of the Jordan Museum).*

**9. Christian Epitaph of Esdou, Son of the lector Georgios, 661 AD**

Jordan Museum, inv. K 239. Karak region. Rectangular tombstone, made of light whiteish-yellow limestone with brownish-yellow patina; intact, apart from some modern breaks and scratches. Rear side slightly convex. Decoration of crosses, mouldings and ripples on the upper part of the monument and below the text. The text is well engraved inside a recessed frame, rounded on top. S-shaped abbreviation marks (L. 5 - 7), horizontal strokes above numerals (L. 7 - 9). Dim.: 56x 30x 16 cm. Inscribed frame: 39x 22 cm. Height of letters: 1.5 - 3.5 cm **(Fig. 9).**

Unpublished.

† Ἐνθά-
δε κῖτε
Εσδου Γε-
ωργίου, ἀνα-
γ(νόστου),
ζήσας ἔτη
ζ΄, τελ(ευτήσας) ἐν
μ(ηνὶ) Δίῳ τοῦ
ἔτους φνς΄.

Translation: "Here lies Esdou, son of the lector Georgios, who lived 7 years and died in the month Dios, in the year 556 (= October / November 661 AD)."

Most of the inscriptions from the Karak plateau (ancient Moab) are short Late Antique Greek epitaphs engraved on rectangular tombstones made of local limestone and adorned with Christian symbols (Canova 1954; Aliquot, Weber and Shdaifat 2014, with bibliography). Their features, the shape of their letters, abbreviations and ligatures are generally characteristic of the period ranging from the mid-fourth to the mid-seventh centuries AD. Their dates have to be calculated according to the provincial era of Arabia, which was used in the land of Moab as everywhere else in Palaestina Tertia (formerly the southern part of *Provincia Arabia*) in Byzantine times. The tombstone in the Jordan Museum is one of the latest monuments of its kind, since it was engraved in the Islamic period (Gatier 2012: 8, with an updated list of a handful of comparable documents from the same area, at most between six and fourteen epitaphs). The name of the child, Esdou, is an undeclined Greek transliteration of a Semitic name (comparable to Esdaos at Umm al-Jimal, cf. Bader 2009: 146, no 229). However, his father's name is extremely common and reminds us of the popularity of the soldier-martyr Saint George amongst the Christian population. More remarkable is the profession of the deceased's father: Georgios was a lector, i.e. an ecclesiastical reader, who read scripture and lessons in church services. This adds to the evidence for continuity of Christian rites in the land of Moab under the Umayyads.



*9. Epitaph of Esdou, son of the lector Georgios, from Karak region, 661 AD.*

**10. Epitaph of Theodoros, Son of Alphios, 2nd / 3rd Century AD**

Jordan Museum, inv. JMA 1092 (formerly JP 5839). Found along the Ayl - Tayyiba road, south-east of Petra. Tombstone of reddish sandstone, worn on top and scratched on the surface; rough-hewn base. Inscription inside a

hatched frame. Abbreviation mark < (L. 4). The narrow letters BOY were seemingly added at the end of L. 5 and topped by a small lambda. Dim.: 80 x 23 x 26 cm. Height of letters: 2 - 4 cm **(Fig. 10).**

Unpublished.

[- - -]
Θεοδώρ-
ου Ἀλφί-
4 ου ἐτ(ῶν)
κη΄ βουλ(ευτοῦ).

Translation: ". . . of Theodoros, son of Alphios, 28 years old, member of the city council."

The Greek name Theodoros is as common in the Near East as in the other Hellenised regions of the Roman world. However, the father's name is a local one, especially widespread in the southern part of *Provincia Arabia* (Meimaris and Kritikakou-Nikolaropoulou 2005: 93-94). It has been suggested that it was the Greek transcription of a common Nabataean name, ḥlfw / ḥlfy / ḥlf, which means "successor", like the Arabic *khalaf*, "caliph" (for its origin and parallels in various Semitic languages, see Sartre 1985: 172-173, 1993: 127, no 99; cf. Negev 1991: 29-30 with another possible etymology). The spelling Ἄλφιος may be influenced by that of the genuine Greek name Αλφειός.

The first words of the inscription are lost. We may restore for instance μνημεῖον, "tomb" or "funerary monument", but an epitaph with the name of the deceased man in the genitive case is also possible. If our understanding βουλ(ευτοῦ) at the end is correct, then the inscription relates to a *bouleutes*, a member of the local *boule*, i.e. the city council of Petra, and it must be dated to after the annexation of the Nabataean kingdom (106 AD). Another epitaph of a bouleutes of Petra was found long ago in al-Ji, not far from the area where the present text was discovered (Sartre 1993: 104-105, no 68). As elsewhere, the richest citizens and landowners chose to be buried on their estates rather than on the outskirts of the city.



*10. Epitaph of Theodoros, son of Alphios, from Petra region, ca 2nd / 3rd century AD.*

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# THE GREAT ARAB REVOLT PROJECT: 2012 AND 2013 FIELD SEASONS

*Neil Faulkner, Nicholas J. Saunders, John Winterburn and Susan Daniels*

## Introduction

The Great Arab Revolt Project (GARP) was planned as a ten-year project to investigate the history and archaeology of the Great Arab Revolt (1916 - 1918). It commenced in 2006, and earlier work is reported on in three successive ADAJ reports published in 2008 (covering the 2006 and 2007 seasons), 2010 (the 2008 and 2009 seasons) and 2012 (the 2010 and 2011 seasons). A general introduction to the project, its organisation and its methods appears in the first of these reports.

The academic directors of the project are Neil Faulkner and Nick Saunders (both Bristol University). They are supported by a field team which, during the 2012 and 2013 seasons, included: David Thorpe (field director 2012), Susan Daniels (project administrator and planner), Ali Baldry (photographer), Cat Edwards (site supervisor), Anna Gow (finds supervisor), David Spencer (site supervisor), Roger Ward (metal-detectorist and IT specialist), John Winterburn (Landscape Archaeologist) and Odette Nelson (finds and planning assistant). Additional support was provided by our Jordanian colleagues: Fawzi Abudaneh (al-Hussein bin Talal University), Hani Falahat (Department of Antiquities), Sate Massadeh (Department of Antiquities representative), Abdullah Rawashdeh (Department of Antiquities) and Sa'ad Twaissi (al-Hussein bin Talal University).

The main foci of our first two field seasons were: (a) the Late Ottoman trench-fortress around Ma'an; (b) the Late Ottoman defences in and around Wadi Rutm station, which lies approximately 60 km south of Ma'an on the Hejaz Railway.

The main foci of our second two field seasons were: (a) the Late Ottoman defences in and around Baṭn al-Ghūl station, approximately 55 km south of Ma'an on the Hejaz Railway, and (b) the Late Ottoman redoubts and Hashemite tribal army base at Wuhayda, approximately 18 km west-south-west of Ma'an on the Aqaba road.

The main foci of our third two field seasons were the militarised landscapes along two stretches of the Hejaz Railway as follows: (a) the northern extent, between Ma'an and Aqabat-Hijaz, and (b) the southern extent, between Wadi Rutm and Mudawwara **(Fig. 1)**.

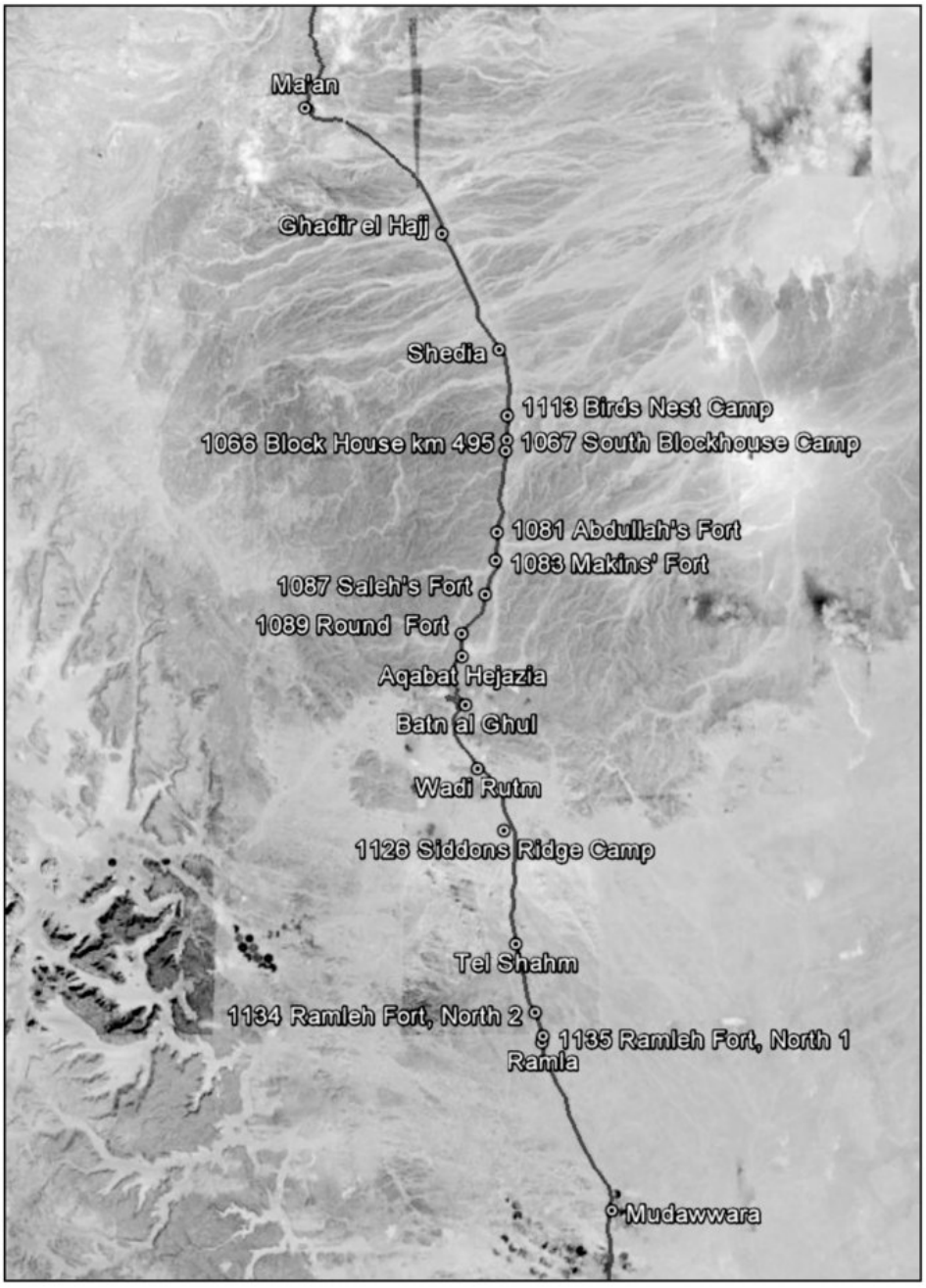
This report summarises the results of work in 2012 and 2013 on:

## Wādī Rutm and Mudawwara

We returned to Wadi Rutm in order to investigate the hilltop fort and associated complex which lies at the top of the ridge to the east of Wadi Rutm station. This location has commanding views to the west, south and east, and was clearly central to effective control over the entire stretch of landscape from the Baṭn al-Ghūl escarpment in the north to Tall Shahm in the sand desert to the south.

We also investigated Mudawwara, an extensive complex comprising three large hilltop forts and a reused Late Ottoman (18th century) fort and associated buildings. Mudawwara was (and is) a major oasis on the Darb al-Ḥajj route through the sand desert and was heavily militarised during the Great Arab Revolt period.

*Wadi Rutm fort* **(Fig. 2)**




*1. Map showing sites investigated by GARP. Copyright: 2012 Google Earth, 2012 Cnes/Spot Image, 2012 GeoEye.*

A Late Ottoman hilltop redoubt on the eastern escarpment overlooking Wadi Rutm station comprising an oval dry-stone breastwork perimeter. The main northern entrance is hidden and protected by a small extent of projecting wall, while a subsidiary southern entrance leads to a track running down the escarpment towards the station. On the western edge of the plateau extending northwards beyond the fort are two observation posts. The eastern side of the plateau, in contrast, appears to have comprised a domestic area, including two small structures with small ovens. Large quantities of expended munitions were recovered, with the heaviest concentration on the western wall of the fort, implying a fierce firefight for control of the position.

*Siddons' Fort* **(Fig. 3)**

This is a small but exceptionally well-constructed Late Ottoman intermediate fort (i.e. one lying close to the former Hejaz Railway but between stations).



*2. Wadi Rutm fort.*
*© Susan Daniels, GARP.*



*3. Siddons' Fort.*
*© Alison Baldry, GARP.*

It was probably intended to guard a large multi-span bridge. Although the defensive circuit is incomplete, there being a wide gap on the eastern side, the rest of the construction is impressive, with a wide U-shaped ditch (a feature unique to this site), a wide earth bank and a carefully coursed and tiered dry-stone wall behind. The interior is dominated by two conjoined circular banks. It is likely that these served as troop accommodation, perhaps with an awning over the top supported on poles and weighted around the edge with large stones. Munitions were concentrated at the north-western corner of the fort and in and around a small external structure of indeterminate purpose immediately east of the fort.

*Mudawwara* **(Fig. 4)**

Extensive Late Ottoman remains comprising southern, central and northern redoubts were surveyed and plans were drawn of each complex. Sample excavation and a metal-detector survey were completed at the northern redoubt. The northern redoubt comprises two main elements:



*4. Mudawwara northern redoubt.*
*© Susan Daniels, GARP.*

(a) an outer perimeter dry-stone breastwork wall enclosing an extensive area in all but the south-eastern quarter (the latter left open probably because it was secure from attack); (b) an inner defended zone on the highest part of the hill, enclosing sunken, high-walled tent-rings. Munitions were abundant and included outgoing and incoming small-arms, shell and grenade shrapnel, and shrapnel balls; there was also clear evidence for high-explosive damage to the walls, either by artillery or aerial bombardment.

*Wuhayda* **(Fig. 5)**

We surveyed and sample-excavated two campsites: (a) the headquarters and main encampment of Prince Feisal's Arab Northern Army at Wuhayda; (b) a small British camp at a site near Tall Shahm. Both of these sites will be the subject of further investigation and analysis, and will therefore be reported on more fully in due course.

*Hallat AmmarAmbush Site (NearMudawwara); Baṭn al-Ghūl Ottoman Army Encampment; Mudawwara Southern Redoubt*

*Hallat Ammar Ambush Site* **(Near Mudawwara) (Fig. 6)**

This site is located very close to the Saudi - Jordanian border and required special permission to work. Our aim was to investigate the archaeological remains of the train ambush and demolition carried out by Arab forces in September 1917 and recorded in T. E. Lawrence's *Seven Pillars of Wisdom.*

A GPS survey was carried out of the entire battlefield, subject to military restrictions on movement on to the high ground towards the southern extent of the site, as was a metal-detector survey of much of the battlefield, mainly to recover expended munitions indicative of exchanges of fire. The large dump of railway debris believed to relate to the demolition carried out in September 1917 was investigated, as was a large mound and some disarticulated human remains found on the surface believed to relate to a field cemetery established immediately after the battle in September 1917. The final work on this site was the recording of a blockhouse beside the railway, believed to have been built by the Ottoman Army after September 1917.

Baṭn *al-Ghūl Ottoman Army Encampment* **(Fig. 7)**

We returned to this site, previously investigated in the 2007 and 2008 seasons, in order to increase the size of our sample of material culture relating to Ottoman military occupation. In fact, we not only achieved this, but also considerably enhanced our understanding of the form, layout and anthropological implications of the tent-rings characteristic of such occupation.

A GPS survey was carried out of the entire extent of



*5. Wuhayda.*
*© Alison Baldry, GARP.*



*6. Hallat Ammar ambush site.*
*© Alison Baldry, GARP.*

tent-rings and other features comprising the southern, northern and north-eastern encampments, with a total of 104 tent-rings recorded. A metal-detector survey was carried out of the entire area, but with a focus on the northern and north-eastern encampments, rather than on the less finds-rich southern encampment. Eleven stone enclosures, comprising four sunken-floored tent-rings, two surface tent-squares and one surface tent-ring in the northern encampment, plus four sunken-floored tent-rings in the north-eastern encampment were cleared and recorded.

*Mudawwara Southern Redoubt* **(Fig. 8)**

The heavily militarised landscape of the Mudawwara oasis was first explored in 2012, when we focused on the northern redoubt, one of three hilltop forts covering the western approaches to Mudawwara station in 1917 - 1918. On this occasion, we explored the southern



*7. Baṭn al-Ghūl Ottoman Army encampment. © Alison Baldry, GARP.*

redoubt. Our aim was to test contemporary accounts of the three major actions fought here, in particular the well-documented final and successful attack in August 1918, and to add to our understanding of these events.

We added further detail to the GPS survey carried out in 2012. A metal-detector survey was completed of the entire redoubt, mainly to recover munitions so as to establish the direction and identity of both outgoing and incoming fire. Three sections of breastwork, two small integrated blockhouses, one deep tent-ring, one substantial building of uncertain use and one small circular feature of uncertain use were cleared and recorded.

## Conclusions

The 2012 season advanced our knowledge and understanding of the Great Arab Revolt in southern Jordan in three main ways. First, it revealed something of the extent of British military involvement, both in providing special weapons units (artillery; aircraft; armoured cars; camelry) and in supplying the Arab forces (as evidenced by the finds assemblage from Wuheida). Second, it yielded evidence of the development of combined arms and special forces-type operations in this theatre of the First World War. Third, it highlighted the dramatic intensification of the war in the spring of 1918 and then, on a yet greater scale, in the autumn of 1918.

The 2013 season confirmed the location of the famous Hallat Ammar ambush described by T. E. Lawrence in *Seven Pillars of Wisdom*, increased our understanding of everyday life in an Ottoman Army camp and added important detail to our knowledge of the sequence of military clashes at Mudawwara between September 1917 and August 1918.

In our first report, we concluded that the Great Arab Revolt Project had confirmed the huge potential of modern conflict archaeology in southern Jordan by revealing the survival of an extensively militarised landscape dating from 1916 - 1918 in the desert areas. We argued that the remains indicated a military response to a threat that was, on the one hand, dispersed and low-intensity, but on the other, chronic and pervasive. We further argued that this contrasted sharply with the experience of the First World War on the better-known Western Front.

Our second report confirmed the intensity of the Late Ottoman militarisation of the landscape. In particular, detailed work at Baṭn al-Ghūl showed that the density of military remains previously revealed at Wadi Rutm is not exceptional.

Our third report amplified the growing surviving evidence for the intensity of the war,



*8. Mudawwara southern redoubt.*
*© Alison Baldry, GARP.*

but also added rich detail about the character of the counterinsurgency effort necessary to defend the landscape. Crucially, we are witness to the archaeological imprint of imperial 'overstretch'. The imperative was both to keep the whole line under observation and to ensure that information could be relayed fast enough to facilitate a rapid response to attacks. This meant that the Ottoman Army was strung out in many small packets, like beads on a necklace, depriving the individual posts of security through strength, as well as draining resources both from a more proactive counterinsurgency effort east of the Jordan river and from the defence of the trench-lines facing Allenby's army west of the Jordan river. The impression grows of a large-scale counter-insurgency operation in southern Jordan between July 1917 and October 1918 - testimony to the effectiveness of the Arab military effort.

With our findings from the 2012 and 2013 seasons, the Great Arab Revolt Project continues to contribute substantial new information and ideas to at least three distinct archaeologies: that of modern conflict, that of southern Jordan and that of desert movement and warfare. It also continues to reveal the potential that exists for the development of major new heritage tourism attractions in the region.

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# LANDSCAPE OF MURAYGHĀT PROJECT: 2014 SEASON

*Susanne Kerner, R. H. Barnes, M. Flender, I. Ruben and A. Andersson*

## Research History of Murayghāt

The site of Murayghāt is situated in the limestone hills 3 km south-west of Mādabā, close to Ma'īn and the Wādī Zarqā' Ma'īn **(Fig. 1)**. This large dolmen site has been known for many years and was mentioned by early travellers and other passers-by; the first western description (there might well be mentions in Arabic sources) came from Charles Irby and James Mangles who toured the region in 1817 and 1818 and already created the mental connection between the stone structures and "sepulchral monuments" (Irby and Mangles 1985: 465-66), often repeated in the literature. Claude Reignier Conder visited the site in 1881 and recorded the name of "El Mareighât … 'the things smeared,' with oil, or blood, or other thick liquid" (Conder 1889: 184). Other translations of the name include "site to picnic", "the site to enjoy the view" and meanings similar to the connection with thick liquid as reported by Conder. He described the site and its surroundings in some detail, estimating that 150 dolmens would have existed on the central knoll and the surrounding hills[1].

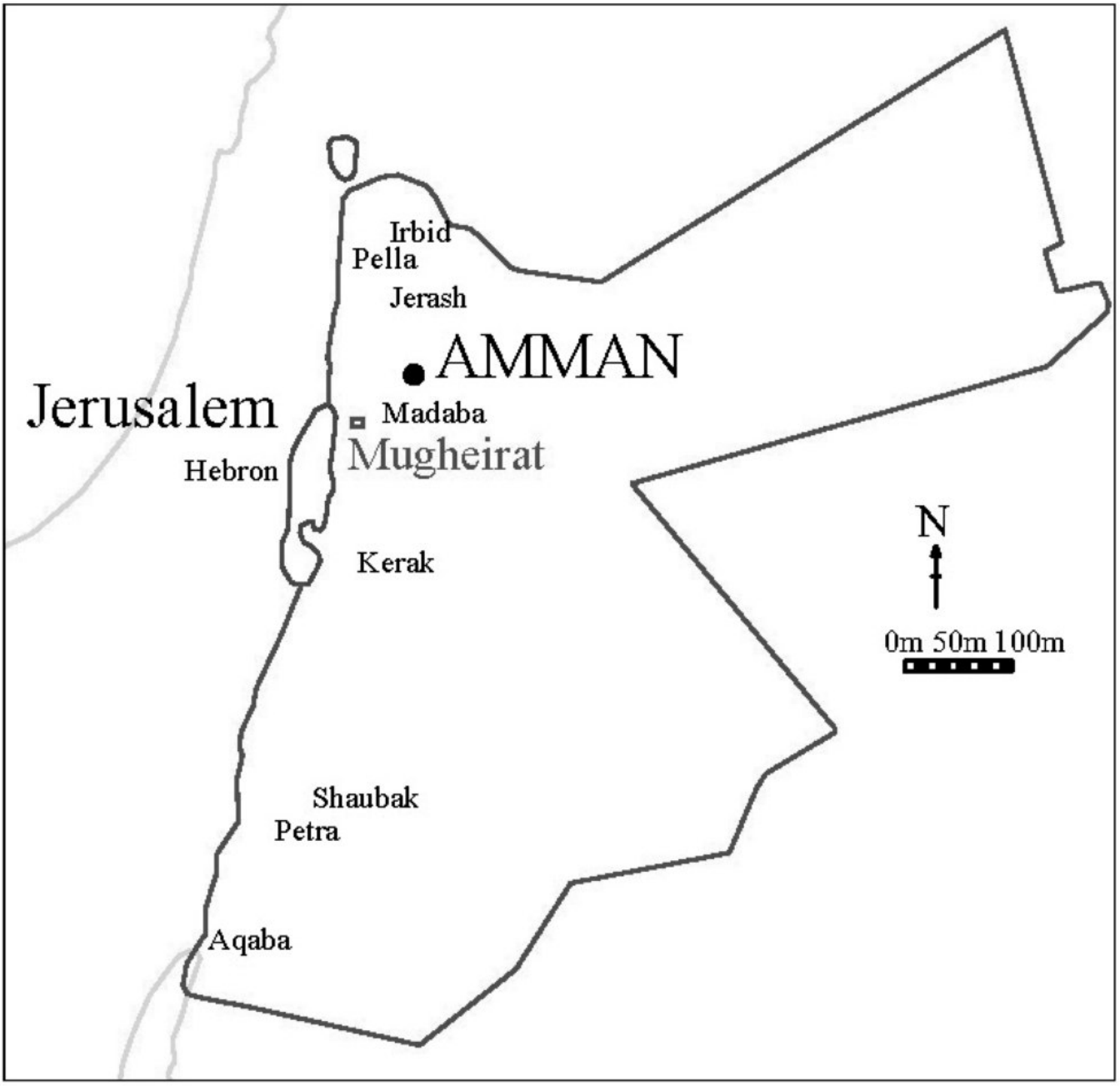
The Tulaylāt al Ghassūl team from the Pontific Institute reported Chalcolithic pottery in the 1930s (Mallon, Koeppel and Neuville 1934: 155, pl. 63: 4-9), so did Harrison in the 1990s, but stipulated that Early Bronze Age ceramics were also noticed (Harrison 1997: 29). Between 1999 and 2001 Savage and his team visited the site, surveyed random squares and documented several structures on the central knoll (Savage 2010; Savage and Rollefson 2001). They interpreted the results as "several structures on the hill made up of outlines of megalithic rocks (probably columns or column bases), with cobblestone floors" and "a series of concentric circles of standing stones" (Savage 2010: 36-37).

Several modern disturbances have affected the area around the site. Three quarries have been located in the vicinity of the site with the northern and southern quarries posing the greatest danger for the dolmen fields (Savage 2010; Scheltema 2008). This danger has lessened slightly, as the Department of Antiquities and the Jordanian Government have bought the dolmen fields west of the central knoll. A large number of dolmens have, however, already disappeared. Another disturbance was caused by the building of a road on the north-eastern side of the central area, which dislodged a number of large stones from their original locations. Further disturbances have been caused by agricultural activity. Pastoralists, who use the site every spring, have cleared smaller stones away from tent spaces and created pens for their animals. For these reasons, the Ritual Landscape of Murayghāt Project is primarily a salvage project that will document as much of these unique monuments as possible before they disappear; it is also a landscape project and as such, will include an examination of the wider environment around the site and how features within the landscape relate to each other.

## Megalithic Constructions in Jordan

In the southern Levant dolmens are recorded to the north and west as far as the Syrian and Lebanese borders to the area of Karak in the

1. 80 would have been on areas 3-5 of the landscape project, Conder 1889: 186.




*1. Location of Murayghāt in central Jordan (H. Barnes).*

south (Swauger 1966); they can occur singly, but they usually appear in groups (sometimes of more than 100). In Jordan there are at least 18 dolmen fields (Scheltema 2008; Polcaro 2013). Dolmens (Celtic for "stone-table") are described as buildings, graves or ritual structures but are unusually consistent in their construction; comprising two large upright stone slabs to create walls upon which are placed one or more stone slabs forming a roof. The floor construction can be either a stone slab or simply the bedrock (Zohar 1992).

Other megalithic constructions are often connected with dolmens. Single standing stones, for example, can appear in connection with dolmen fields, as is the case with the Ḥajar al-Manṣūb north-east of the dolmen in Murayghāt. A second standing stone exists to the north-west, although it is not quite as large as the Ḥajar al-Manṣūb. A similar connection between dolmen fields, standing stones and a circular structure (Conder's circle) suggests a possible ritual

landscape in the area south of Mount Nebo (Mortensen and Thuesen 1998; Thuesen 2009).

Dolmens, as the Celtic origin of the name implies, exist across large parts of Europe[2], such as the dolmens in Languedoc and Brittany in France, or in Tustrup, Denmark. Standing stones and stone circles are also a European phenomenon, for example, the stone circles of the Lake District and in Wiltshire in Great Britain. Interpretation of the significance of these structures is still disputed.

In Jordan these features appear to date to the very end of the Late Chalcolithic period or beginning of the Early Bronze Age I with re-use in the Middle Bronze Age II (Polcaro 2013; Stekelis 1961; Thuesen 2009; Yassine 1985). Some authors however, prefer an EBIV date for their re-use (Prag 1995). It is important to remember however, that it is not at all clear if dolmens, standing stones and other structures are all contemporary, or that all dolmen fields are themselves contemporary.

## Goals and Aims of the Ritual Landscape of Murayghāt Project

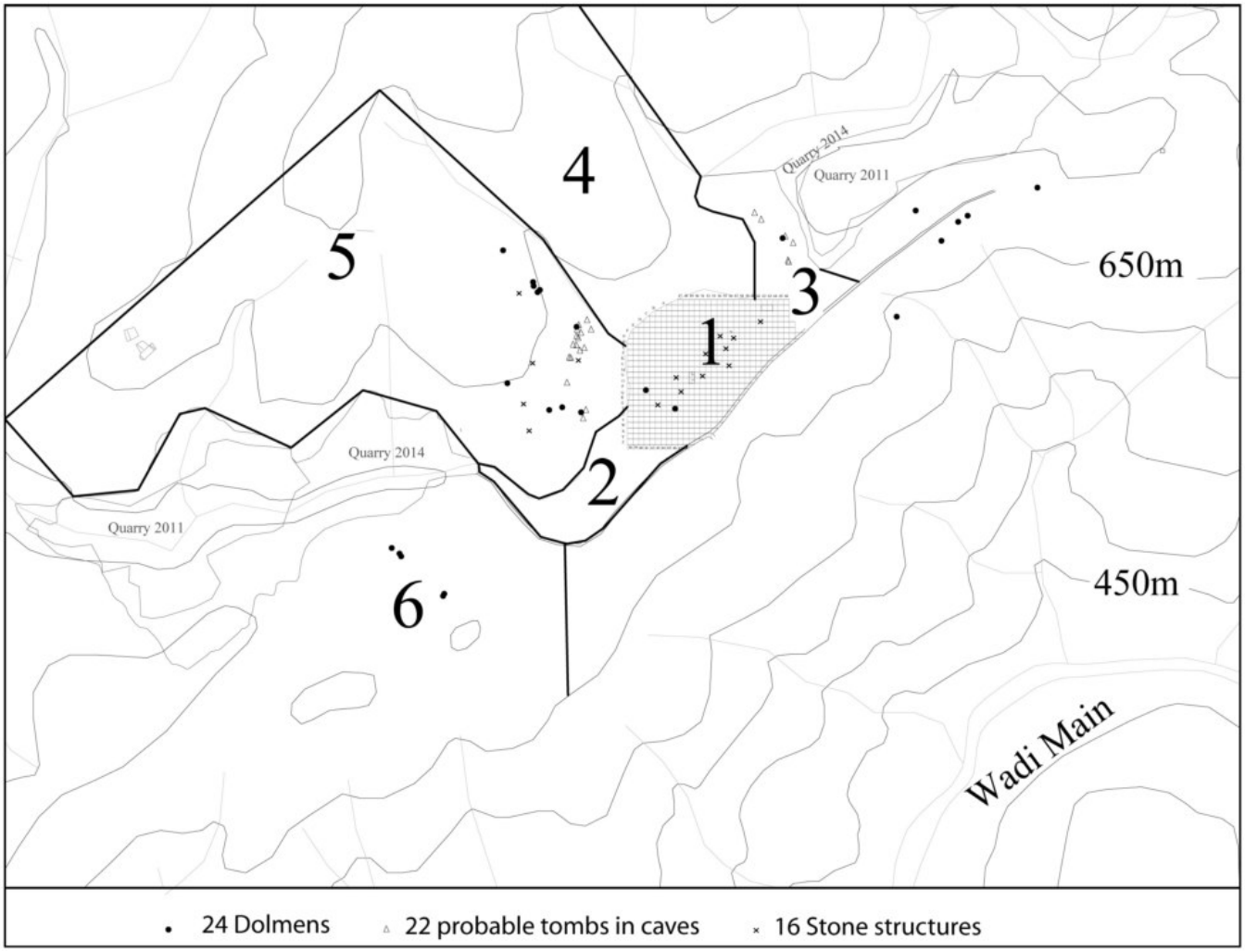
The Project is under the auspices of the University of Copenhagen (Institute for Regional and Cross-Cultural Studies) and directed by Susanne Kerner. The principal aim is to identify the role of ritual in the social and political make-up and development of the Late Prehistoric / Early Historic periods of the southern Levant. Rituals can be secular and part of everyday life, but they can also be part of religious ceremonies. Rituals structure life, which is one reason why they often appear in transitional phases. During periods when a strong political organisation is absent, such as in the Early Bronze Age, rituals would have played an important role in structuring life, but in later periods they would have facilitated communication and cohesion between different parts of society (individuals, families, clans). Dolmens and standing stones mark landscapes in a very visible way and could have worked as identity markers, particularly as there are different types of dolmens in the southern Levant, and at least two different sizes of dolmens in Murayghāt. The role of the central knoll as a meeting point between different groups has to be considered and tested through excavation. The Project will accordingly study Murayghāt as an endangered archaeological site, examine the date and construction of the dolmens and related structures, and construct an informed interpretation of these features and their relationship to the wider landscape. A landscape archaeological approach enables the study of Murayghāt in connection with other contemporary structures, and as such, is the most appropriate method by which to relate the dolmens, standing stones, possible domestic structures and cultic feature on the central knoll.

The combination of a central area with large numbers of wall lines, standing stones, dolmen fields and one of the largest single standing stones in Jordan, indicate that Murayghāt might have been a ritual site. Until now, dolmens have been interpreted as graves, but also as landscape markers, which might have been particularly meaningful in times of population unrest (as in the Late Chalcolithic period, the very beginning of the Early Bronze Age I or the beginning of the Middle Bronze Age II). In some cases, burials have been found in (or even underneath) dolmens (Polcaro 2014), but in many cases it has been difficult to prove that dolmen construction and associated burials were contemporary (Dubis and Dabrowski 2002; Yassine 1985).

## Archaeological Work in 2014

The central knoll (area 1) at Murayghāt is bordered by the Wādī Murayghāt (which flows into the Wādī Zarqā' Mā'īn) to the north-west and the road towards the Wādī Zarqā' Mā'īn to the south-east **(Fig. 2)**. It is surrounded by low hills to the north, west and south-west, while south-east of the road a low field drops down to the steep sides of the Wadi Zarqa Ma'in (area

2. And in other parts of the world e.g. India and Korea.



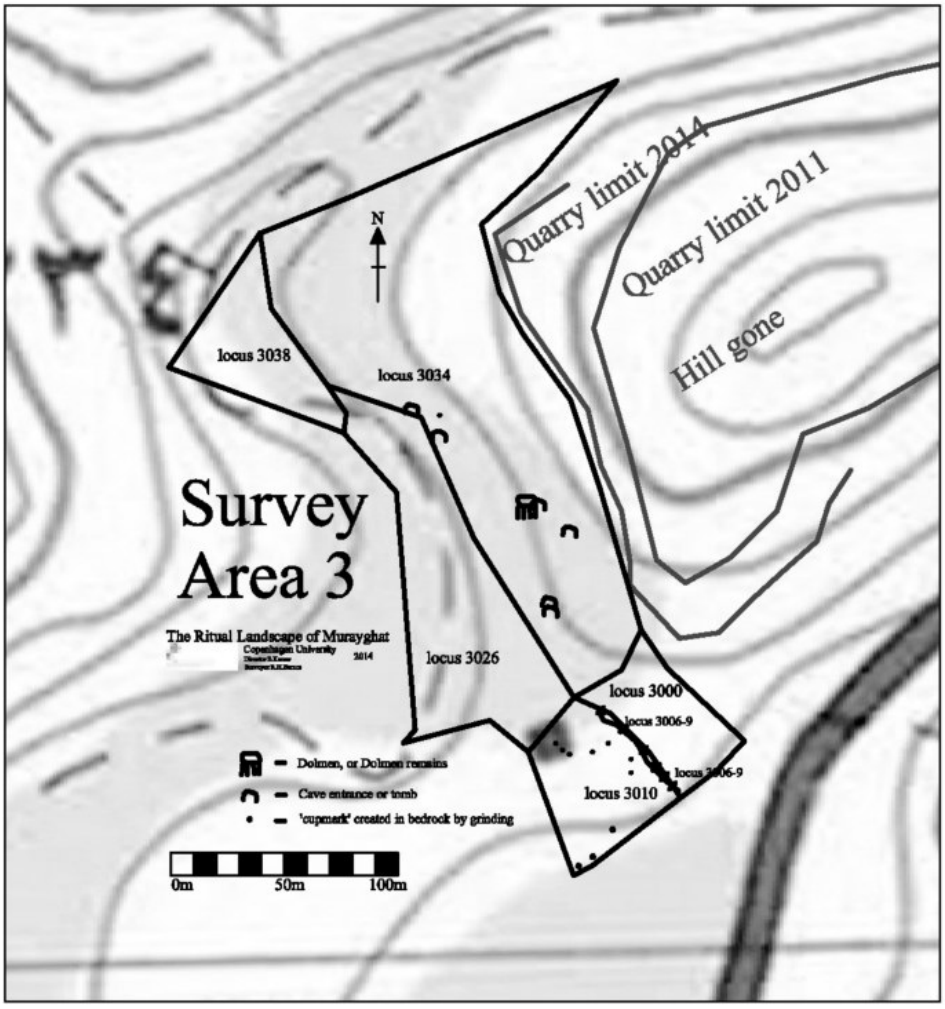

*2. General map of the "Landscape of Murayghāt", with area definitions (H. Barnes).*

7). The north-eastern hill (area 3) is severely damaged by a quarry, while the south-western hill (area 5) is also much affected by another quarry. Aerial photographs show the extent of quarrying from 2011 to 2014. Only the central hill (area 4) is untouched by the stone quarries. Along the road are some broken dolmens; according to information from the local people, these were destroyed in the last few decades.

*Systematic Survey of Dolmen Fields*

The systematic survey of the surrounding hinterland started with areas 3 and 5 **(Fig. 2)**, as these were the most threatened parts of the site. The work was carried out over four weeks in May and June 2014. The large areas (3 and 5) were divided into fields (loci) and the whole surface was then surveyed systematically. Single structures such as dolmens, standing stones, tombs and unclear structures were also given a locus number.

Area 3 is located north of the central knoll, and is constrained by the wadi in the south-west and west, the quarry to the north, the modern street to the east and the dirt road to the modern house in the south-east **(see Fig. 2)**. The ground slopes up from the central knoll and ends abruptly at the edge of the northern quarry. At the foot of the slope is a modern concrete house built in the early 2000s, with a modern well that uses older material in the well structure. The area contains one broken dolmen (L. 3033) and a collection of large boulders, stone slabs and standing stones, which seem to be in alignment (L. 3006-3009) running down the hill towards the modern road **(Fig. 3)**. Most elements in this alignment have




*3. Plan of Area 3 with surveyed fields, cup-holes, dolmen and caves/tombs in the area (H. Barnes).*

been moved from their original positions. Other large stone boulders are distributed over the hill without a clear pattern and might partly be the outcome of quarry work, meaning they might have tumbled down during quarrying. Around 20 carefully made cup-holes were recorded, with several of them grouped together in numbers of four or five **(Fig. 4)**. Six cave entrances were documented,[3] which were mostly carefully worked and might thus have been used as tombs **(Fig. 3)**. There was little surface material, such as ceramics or lithics, in the southern and western parts of the area towards the wadi, although a small number of finds were present on the eastern side and part of the upper slope. Pottery collected dated mostly to the Classical or Late Antique periods, perhaps giving an indication for the dating of the caves, which might have been tombs.

Area 5 is a much larger area west of the central knoll (area 1). Its northern limit is marked by a small wadi and its southern limit is formed by the southern stone quarry. The western limit of area 5 was artificially set. The area was divided into several fields **(Fig. 5)** [4], which were systematically surveyed; any structures recorded were assigned separate locus numbers.

Nearly all features found in area 5 are situated on the eastern side of the hill so that the central site (area 1) is visible from most features **(Fig. 5)**. Exceptions are a stone circle with connected wall / platform (L. 5008) and two small farmsteads. Nearly 20 caves, of which at least some might have been used as tombs,

3. These were also mentioned by Conder (Conder 1889: 185).
4. Surveyed fields: 5001, 5006, 5101, 5103, 5105, 5108, 5112, 5114, 5121, 5200, 5201, 5204, 5211, 5300, 5301, 5305, 5308.



*4. Example of cup-holes in area 3 (N. Tylor).*

were documented; they spread along the lower slopes of the hill. They are formed by either a square or an arched entrance into the rock **(Fig. 6)** and a superficial analysis of the pottery found in the vicinity of these possible tombs indicates a Classical or Late Antique date.

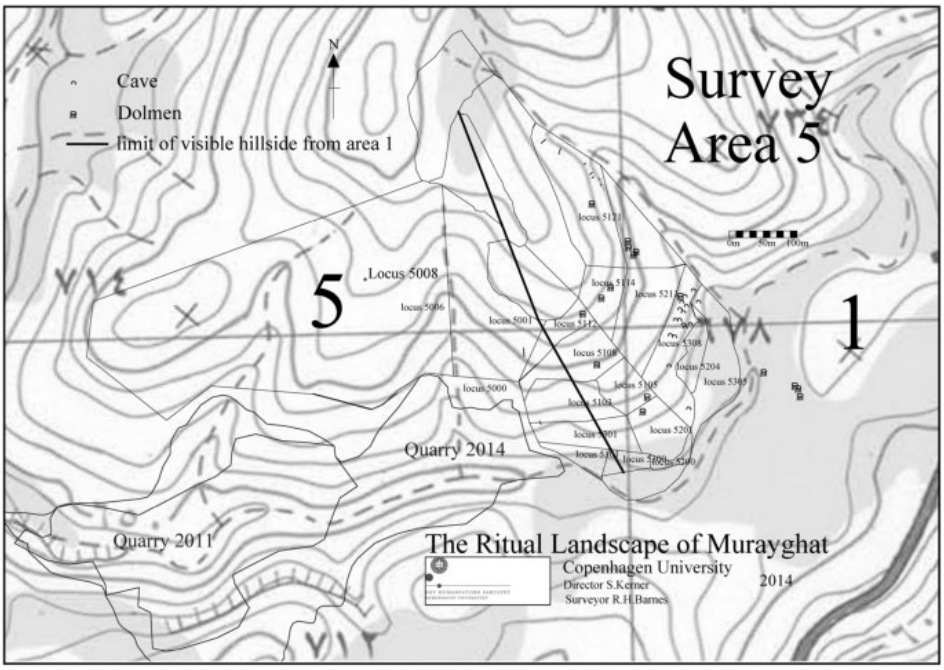
Clearly oriented towards the central knoll are eight dolmens in different stages of decay (some still complete), consisting of either one or two monolithic stones forming each of the side walls. Four to six other stone structures might have been dolmens but are now too destroyed to be certain **(Fig. 5)**. Other stone structures, including standing stones, circles and general stone accumulations were documented across all the slopes. Terracing walls and cisterns were also mapped.

Area 6, which is south of the southern quarry, was not part of the 2014 work-plan, but the frightening speed of the quarry's progress led to a photographic documentation of another five dolmens in that area.

*Intensive Survey of the Central Knoll*

Recording the archaeology of the central knoll (area 1) began with a total station survey **(Fig. 7)**. A 10 m x 10 m grid **(Fig. 8)** was laid over (area 1) in order to undertake intensive survey. Several structures were recognisable; although it was not always clear which of the walls or structures had been created by modern activities at the site (see above). The documentation of the standing stones and other architectural remains on the central knoll shows first of all a large wall around the southern and western part of the centre. At the western extremes, part of the wall had clearly collapsed (or been moved, possibly by a bulldozer according to a local interlocutor) down slope towards the Wādī Murayghāt **(Fig. 9)**. This curved, surrounding wall is, in places, a double wall, or at least has an inner and an outer face **(Fig. 7).**

At the highest point on the bedrock a small stone circle was recorded (squares N/O 52, **Fig. 7**), another was assumed (Savage 2010), but was not clearly identifiable. Other structures appeared mostly, but not exclusively, to the north-west and south-west of the highest point on the knoll; these consisted of circular or more often horse-shoe shaped structures **(Figs. 7 and 10)** and vary between 7 m and 22 m in length / diameter. Several rectangular structures (usually built from slightly smaller stones) have also been documented **(Fig. 11)**. Other structures



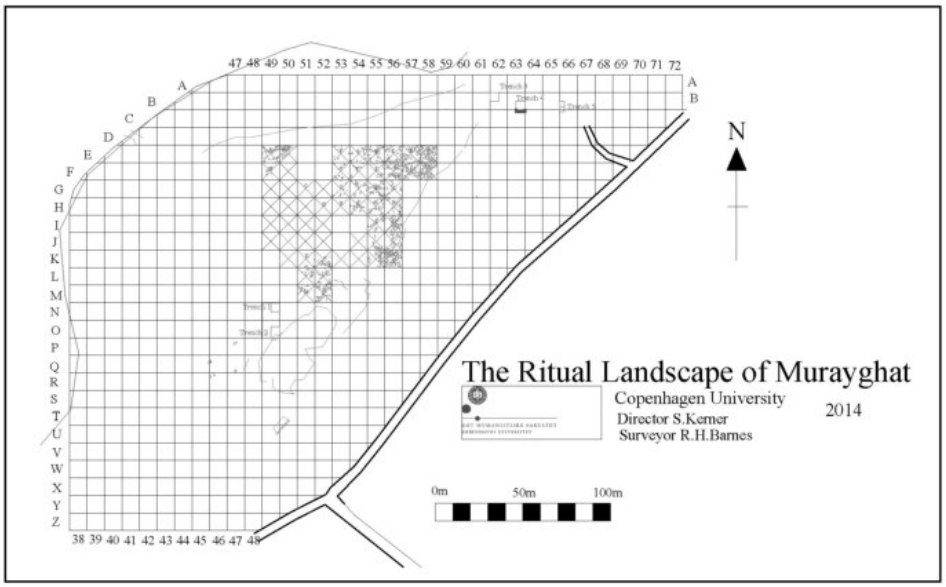

*5. Plan of area 5 with surveyed fields, dolmen and caves/tombs. Dolmen in area 1 also shown (H. Barnes).*



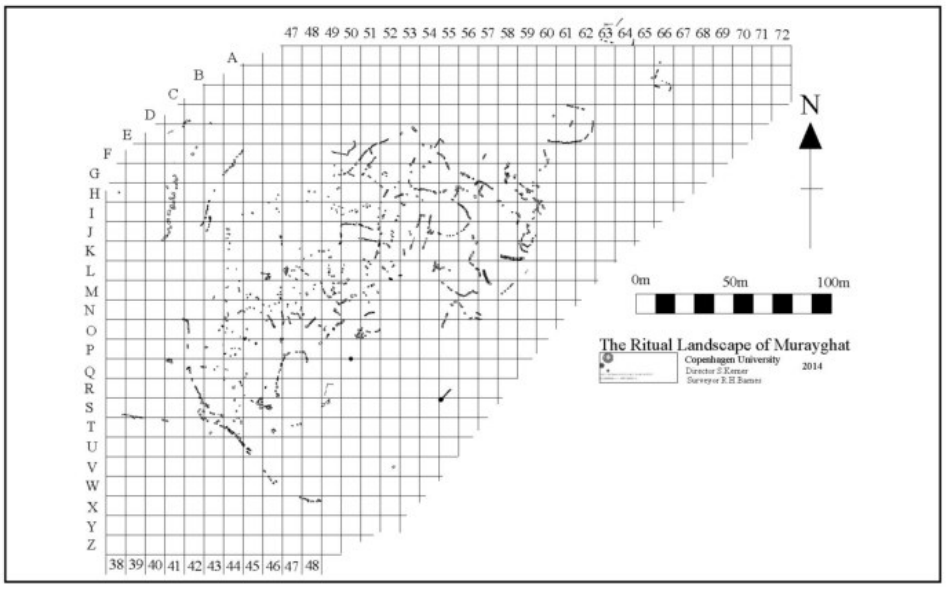
*6. Group of caves in area 5, close to small wadi towards area 4. (Asma Bibi Younas).*

include rows of standing stones **(Fig. 7)**. On the eastern slope of the central knoll two short double walls **(Fig. 7)** run up the hill forming an entrance-like structure. Numerous cup-holes have been documented on the central knoll and there is a concentration of them along the wadi edge, where in some cases groups of four and six have been found, while all over the knoll single cup-holes can be found.

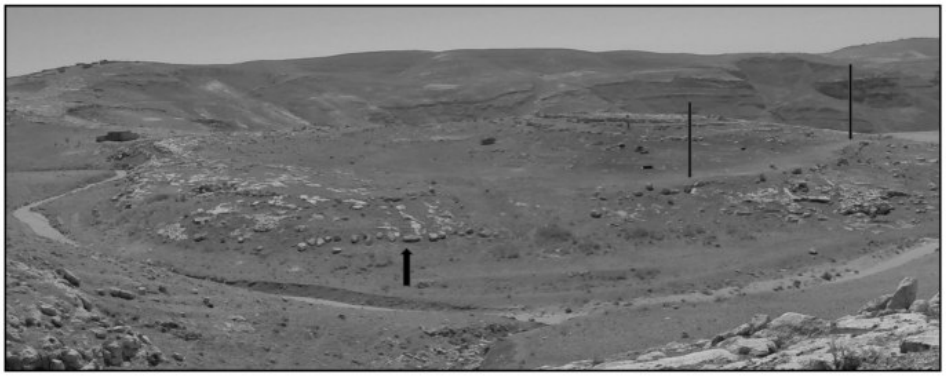
Several modern stone lines have also been documented; they include animal pens, tent structures and long lines directing the water flow towards the modern cistern at the edge of the wadi. The most obvious modern disturbance was created during the last decade when the entire northern part of the site (north of the



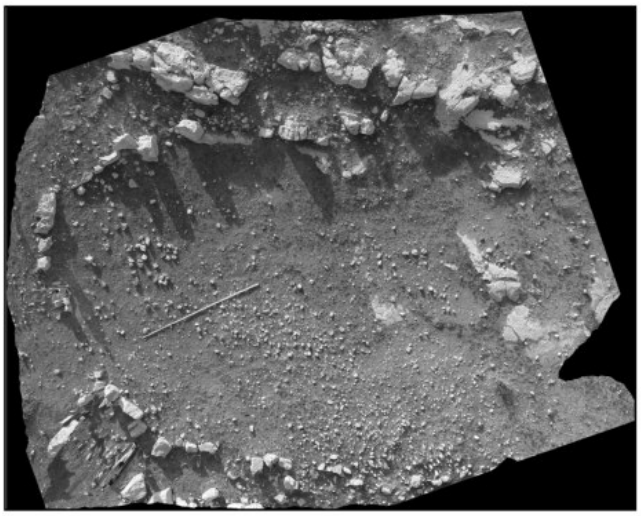

*7. Plan of area 1 with grid and structures visible on the surface (H. Barnes).*



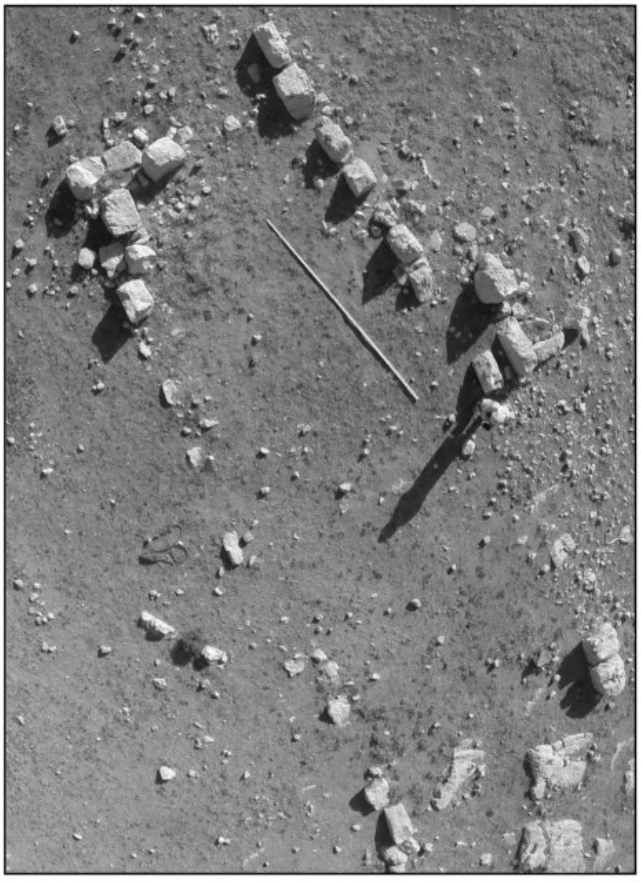

*8. Map of surveyed squares and excavation trenches in Murayghāt (H. Barnes).*



*9. View of area 1 (from W) with line of fallen stones on the slope towards the wadi. Long arrows to the right indicate the surrounding double wall, thick arrow on the left aims at fallen stones, which could have been part of that wall (S. Kerner).*



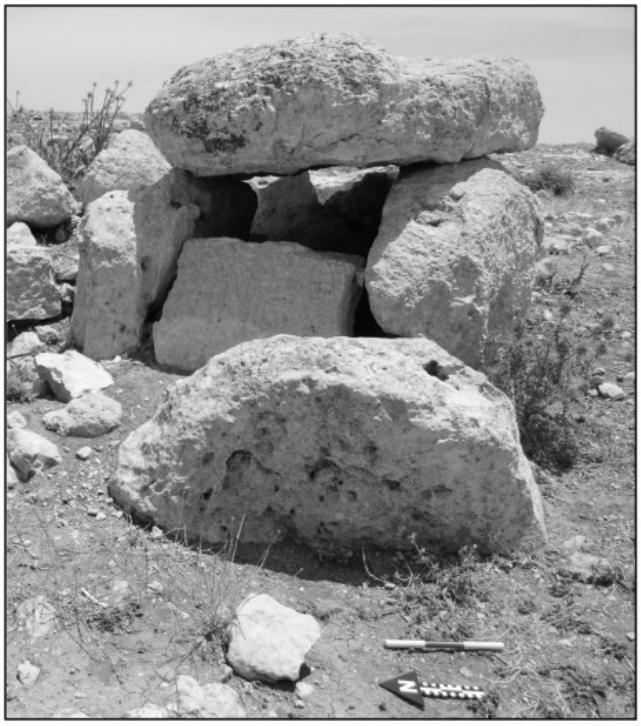
*10. Horse-shoe shaped structure in P/Q/R 47/48 (S. Kerner), scale (4m) points N (left). Distorted GoPro picture corrected by University for Applied Sciences Karlsruhe.*



*11. Rectangular structure in J/I 54, scale (4m) pointing N (S. Kerner). Picture distorted at the edges.*

actual bedrock area) was bulldozed, creating an artificial border between the bedrock and the area ploughed for agriculture.

In area 1, four dolmens were documented, they are all on the south-western outskirts of



*12.Dolmen in area 1 (L.1200) (A. Andersson).*

the central knoll. The best-preserved (L. 1200) is south of the above-mentioned double wall, in square Q41 **(Fig. 12)**. It is a 'type A' dolmen (Zohar 1990), with one upright stone slab on each side and one stone slab as its roof. The ends were each blocked by a smaller stone slab. This particular dolmen had at least 16 cup-holes of different shapes and sizes worked into the roofing slab. The other three dolmens are close together in squares S/T 46, ca 50 m south-west of the summit of the site. They are all much less well preserved than L. 1200, but are either type A or B, so might have had more than one upright forming each long side. L. 1205 has a stone slab as its floor, while the other two dolmens seem to be built on bedrock platforms.

The archaeological material collected on the central knoll consists of ceramics, lithic material and ground basalt tools. Nearly all of the basalt fragments were unidentifable, the only exception being a basalt bowl fragment found on an unknown spot on the surface and presented to us. The pottery (very small and fragmented) included Islamic and Roman fragments, but consisted mostly of Late Chalcolithic to Middle

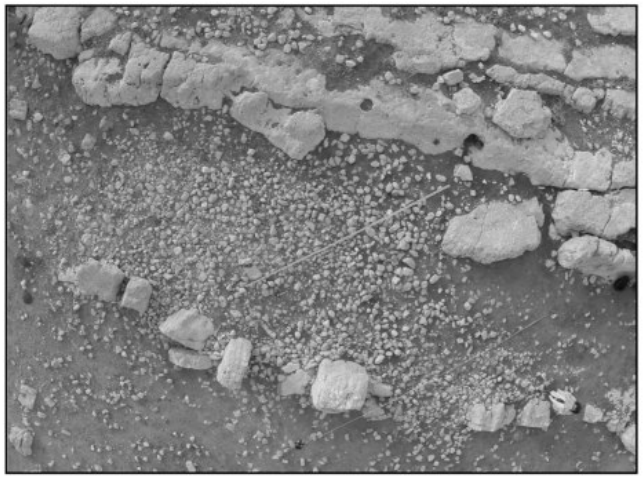
Bronze Age material, much of of which is still being analysed.

*Excavation*

The goal of the excavations was both chronological and interpretative as the precise character of all the structures visible on the surface needed to be established. The first two trenches (1 and 2) were thus laid out towards the middle of the central knoll in order to obtain information about the conspicuous stone surfaces **(Fig. 13)**, formed from fist-sized stones which cover parts of the site, and one of the rows of standing stones.

Trench 1 (O49) and trench 2 (N49) were each ca 30 m2 **(Fig. 14)**. Regrettably, work on those trenches had to be stopped after only seven days as the land owner of this part of the site forbade any further excavation. Trench 1 was situated between one of two large standing stones that form roughly the middle of a line of single standing stones, and the top of the central knoll. In trench 1, only three loci were defined: the modern surface 1100 including a cobblestone layer **(Fig. 13)**, the heavily disturbed soil 1101, and a second layer of cobblestones, 1102. Surfaces of cobblestones have been found at several locations on the surface of the site. The stones are mostly fist-sized and are laid closely together but without forming an even surface; they give the impression of being packing or foundation material. Trench 2 was laid out at the end of another line of standing stones. In trench 2, only four locus numbers were assigned: the modern surface 1000, topsoil 1001, lower topsoil 1002 and potential wall 1003 **(Fig. 14)**. Feature L. 1002 was again a layer of small cobblestones, although they were larger than the dense fields of small stones in trench 1.

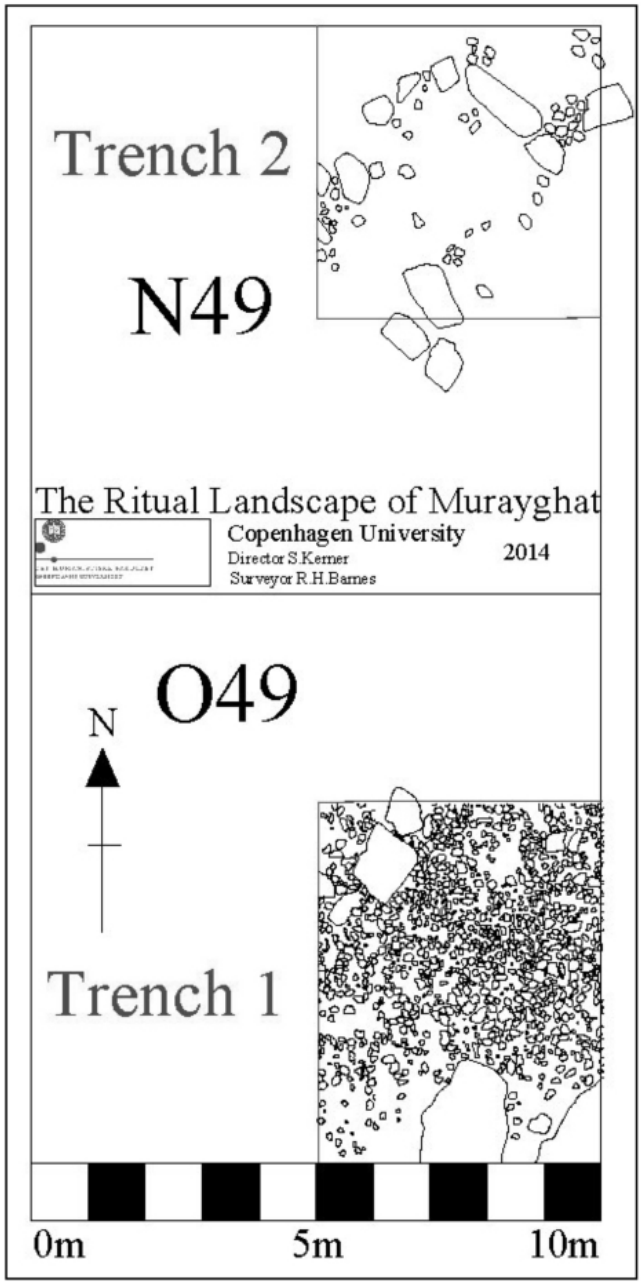
After these trenches had to be abandoned, three new trenches were opened in the area north of the bedrock knoll and the modern wall, in a ploughed area used to plant barley **(Fig. 15)**. The objective here was to establish the edge of the site. Trench 3 in B62 measured 5 m x 5 m and proved to be quite complex under the much disturbed topsoil layers (L. 1400-1401). Six small walls of different construction and character were excavated in this trench. Wall 1 (L. 1407) and wall 2 (L. 1408) form part of room 1 in the north of the trench, while wall 3 (L. 1409) and wall 4 (L. 1410) form part of room 2 in the southern part of the trench. Walls 1 and 2 were double-faced, constructed with two rows of stones, while walls 3 and 4 were made from a single line of large stone boulders, and wall 4 was rather more like a stone pile, and was therefore removed. This trench also yielded a very well made stone-lined bin of roughly 1.2 m diameter that consisted of upright standing stone slabs, which tilted outwards towards the top **(Fig. 16)**. The bottom of the pit was made of carefully laid small stones slabs.



*13. Surface in area 1 with fist-sized stones. Lower side of photo a wall of standing stones with two larger monoliths in the middle, to the upper end of the photo the natural bedrock step (Trench 2 before excavation, scale 4m, pointing roughly N) (S. Kerner).*

The walls in trench 3 were not very substantial and do not give the impression of having been house walls. Also, they are surrounded by platforms and rubble layers, so that only a larger exposure will enable us to give an interpretation of the structures.

The only complete ceramic profile of the season was found in trench 3 and shows one of the typical Middle Bronze Age II cooking pots with thumb-decorated application below the rim and a ledge handle **(Fig. 18)**. An arrowhead from the PPNA period was also found in this




*14. Trench 1 and trench 2 in area 1 (raw data: A. Andersson, I. Ruben; map: H. Barnes).*

trench **(Fig. 17)**.[5] Most material was located on the eastern side of the walls (so "outside" the excavated "rooms").

Trench 4 (B63) also measured 5 m x 5 m. The topmost layers were clearly contaminated after which were sandy and stone rubble layers containing a mixture of Byzantine and Middle Bronze Age material to a depth of 50 cm. Most of the trench showed remains of a thin clayey surface (L. 1308) that was broken in several parts by the overlaying stone rubble. This surface runs just over some stones of a wide, double-faced wall (L. 1307), and continues into the sections in both the northern and southern sides of the trench and will have to be excavated further **(Fig. 14)**.

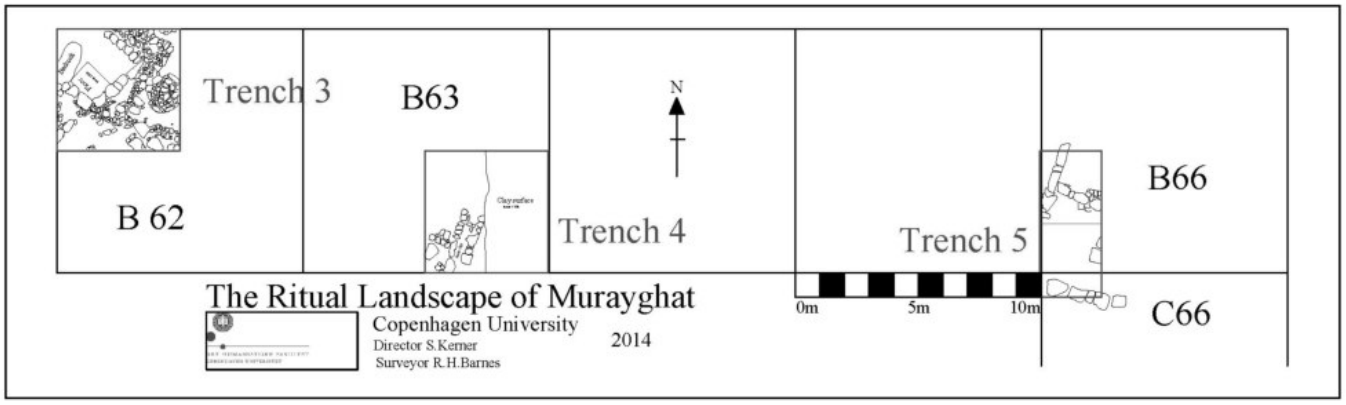
Trench 5 (B66/C66), to the east of trenches 3 and 4, was positioned to encompass stone lines visible on the surface. It first measured 3 m x 2.5 m and was later enlarged to 6 m x 2.5 m. Within this trench were four walls of different construction. Wall 1 (L. 1603), wall 2 (L. 1604) and wall 3 (L. 1610 ) clearly continue beyond the limits of the trench. The term 'wall' is used very loosely, as the structures are generally just rows of orthostats standing next to each other without much connecting material. Walls 1 and 2 form a right angle in the northern part of the trench, but their chronological relationship is not clear. Wall 1 had a foundation cut visible on one side, while no such cut could be found for wall 2. Wall 4 (L. 1613) is most likely an earlier phase under wall 2, built with smaller stones. Wall 3 was only just exposed in the eastern baulk. The trench was excavated down to bedrock between walls 1 and 2. After the initial mixed layers (including Late Antique material), most ceramics from the lower levels point towards a Middle Bronze Age date.

**Material**

Most of the archaeological material collected consists of small lithic material and badly damaged pottery.[6] The material is mostly from the surface or from the upper, disturbed, layers in the trenches. The fragments are thus usually quite small and often eroded. The lithic material consists of many blades, sometimes backed, and some are Canaanean blades **(Fig. 17:1)**, which could belong to the Early Bronze Age or Middle Bronze Age (Rosen 1997: 140-141). Tool categories include different blades **(Fig. 17: 2-3)**, scrapers **(Fig. 17: 4-6)**, borers **(Fig. 17: 7-8)**, burins **(Fig. 17: 9)** and one arrowhead

5. The arrowhead came from the lower levels in room 1.

6. No complete vessel and only one complete profile were found during the campaign.




*15. Trench 3, 4 and 5 (raw data: N. Tylor, Y. Pang, I. Ruben; map: H. Barnes).*

**(Fig. 17: 10)**. The AL-Khiam arrow-head dates to the PPNA and comes from the survey. Several cortical tools (fan-scrapers, **Fig. 17: 11-12**) were also in the collections, the best preserved example was unfortunately from the surface survey.

The ceramics have undergone an initial analysis, but only the material from the trenches could be studied, while the survey material has only been looked at cursorily and will be studied during the coming months. The pottery from the trenches comprises mostly Middle Bronze Age IIA cooking pots of relatively coarse fabric **(Fig. 18: 6)**, with finger-impressed bands and sometimes holes above this band. Common ware is usual for the many large and lesser small jars **(Fig. 18: 7-9)**. Only very few open bowls could be identified **(Fig. 18: 5)**. Many of the Early Bronze Age vessels are very badly preserved **(Fig. 18: 10-11)**. Nevertheless, some of the ledge handles are clearly of Early Bronze Age derivation **(Fig. 18: 12)**, while others looked more like duck-bill ledge handles, as also reported in Harrison and Savage (2003, **Fig. 4.1**). The Classical, Late Antique and Islamic pottery from the surface survey were all very badly eroded **(Fig. 18: 1-4)**.

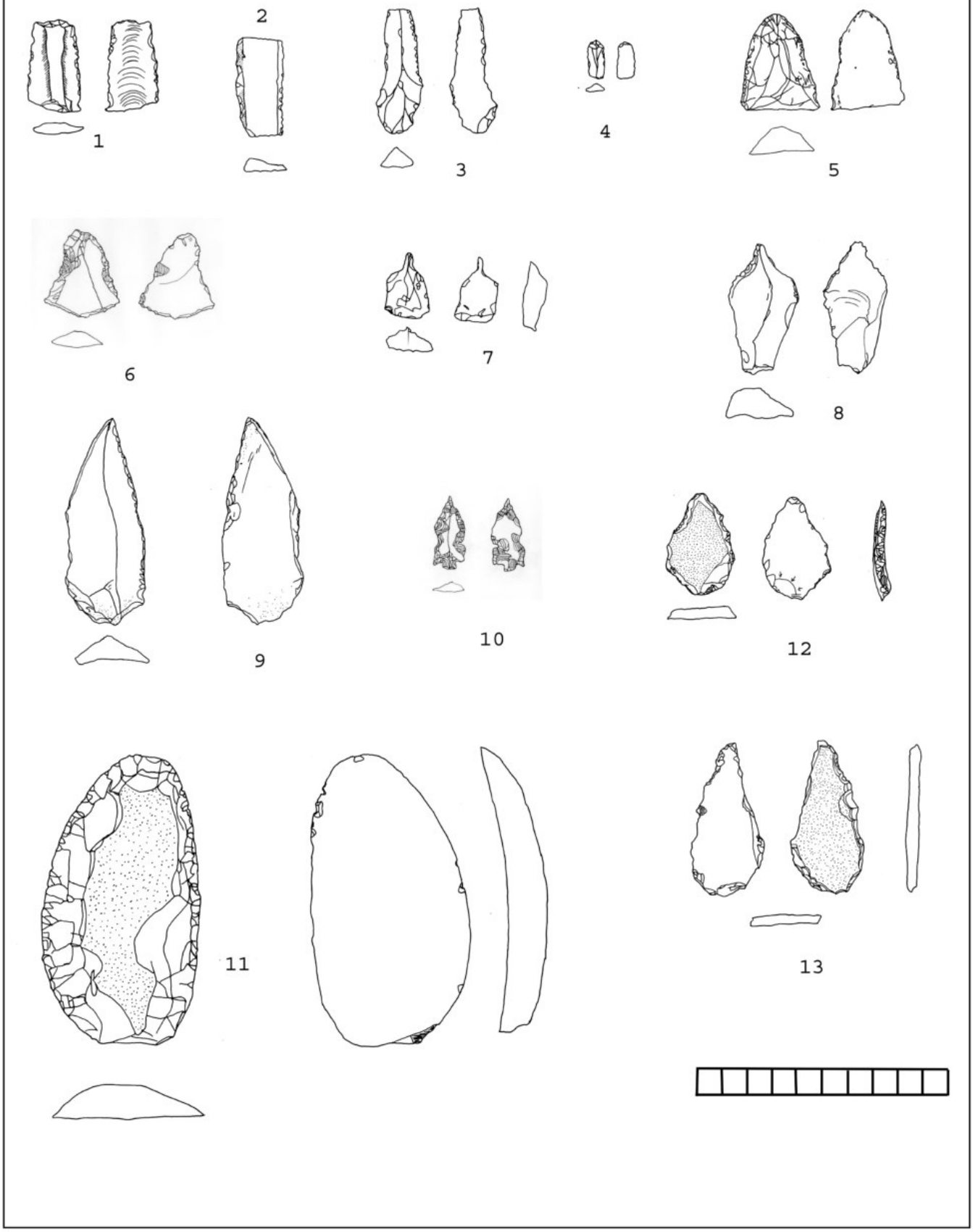
## Summary

The survey proved that the stone quarries had moved further towards the dolmen fields, and that the outer dolmens (area 3 and 5) had been badly damaged. Better preserved dolmens can only be found in area 1 and area 4 (the latter will be studied in 2015). Several other stone structures were documented, including a second (former) standing stone comparable with Ḥajar aL-Manṣūb. A large number of caves, which seem to have been used as tombs in the Late Classic period, were also recorded. The documentation of the numerous round, horse-shoe shaped and rectangular structures on the central knoll began in 2014, although excavation in the central part of the site was cut short. Trenches 1 and 2 reached only the depth of the fist-sized stone cobble layers, which are present in this part of area 1.

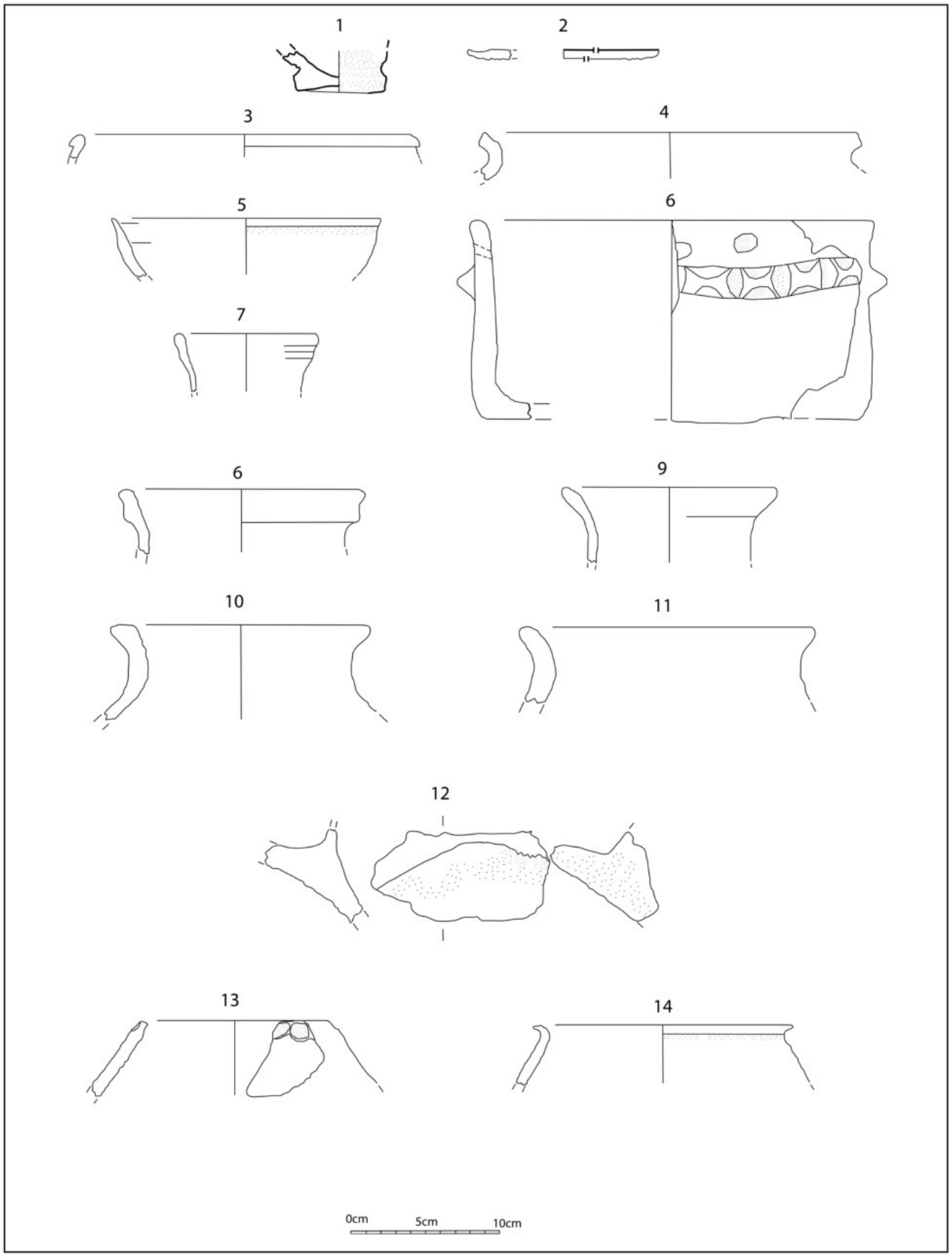


*16. Pit 1430 (Y. Pang).*

Trenches 3, 4 and 5 were laid out north of the central knoll and all contained Middle Bronze Age pottery. Trench 4 had an extensive surface laid above a wide wall, which needs to further excavation. Trenches 3 and 5 both had several walls which continued outside the excavated areas. The structures are not necessarily dwellings, although the pottery is mostly domestic.




*17. Stone tools (ink drawing: Ditte Michelsen, illustration H. Barnes).*




*18. Pottery.*

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In addition to the director, other members of the team were, Isabelle Ruben (vice-director) responsible for the excavation, Matthias Flender, responsible for the archaeological field survey in area 3 and 5, and Hugh Barnes, responsible for the surveying and analysis of spatial data. Ann Anderson worked on the pottery. The supervisors from Copenhagen University included Salwa Amzourou (find-documentation), Pia Holme Thomassen (survey of central site), Kristine Tophøj, Asma Bibi Younas, Tobias Terman Olsen (survey of areas 3 and 5), Yukkin Pang and Nikoline Tyler (excavations). They and all the students made sure that the work went smoothly.

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# JARASH WATER PROJECT: REPORT ON 2013 FIELD SEASON

*David D. Boyer*

**Abstract**

Despite the frequent references to water installations in publications describing the results of excavations within the Decapolis city of Gerasa (modern Jarash), very little has been published on the sources and water management system that sustained them. The purpose of the Jarash Water Project is to fill this knowledge gap through the analysis of historical records, photographs and archaeological reports and by conducting new field surveys. The 2013 field program included a pedestrian survey of selected areas in the valley and hills to the north, south and west of the city to locate and trace the historic aqueducts to the city and its hinterland, and a preliminary survey of selected areas within the upper Wādī al Majar-Wādī Tannur valley to gain an understanding of water management in the rural context. A total of 36 elements were recorded at 35 sites during the survey.

A potentially significant aqueduct has been confirmed approaching the city down a steep gradient from the north-west, and there is evidence from carbonate sediment deposits within this aqueduct of its use over a period of about 100 years. This aqueduct would have entered the city close to the North-West Gate. It is not known what this water was used for, or the period it was in use, but the high elevation of its likely entry point into the city (ca 630 m) means that theoretically its water could have been delivered to virtually any point within the city. Earthquake damage at one location points to a possible reason for its ultimate closure. Several aqueducts approach the city from the north on both sides of the Wādī ed Deir valley; aqueducts on the west side are sourced from ‹Ain esh Shawāhid and possibly ′Ain el Birketein, and an aqueduct on the east side sourced from ′Ain Bisās er Rūm may have supplied the eastern side of Gerasa. A masonry aqueduct of likely Roman - Byzantine date that crossed the central part of the valley immediately north of the city may have been sourced from Birketein, however its function and destination remain uncertain. None of the northern aqueducts can be observed to enter the city, however reuse of several of these aqueducts in the late Ottoman period to provide irrigation water for fields in the northern valley and within the city walls points to the possibility of the original aqueducts having the potential to deliver water to the city at a level that could have supplied the major water installations on the west side of the city. There is evidence of rock-cut aqueducts on both sides of the Wādī Jarash south of the city, including a rare section of tunnel that would have provided irrigation water to the rich soils of Wādī Jarash valley south of Jarash; a function that some of them still fulfil today.

While the results to date are sufficient to show that water from Birketein was not the sole source of water supply for the water monuments on the west side of the city, many uncertainties remain. Future work will seek to determine when the main aqueducts to the city were in use and went out of use, their ultimate destinations, the consumption requirements of the main water installation within the city and the importance of irrigation requirements in the overall water management system.

## Introduction

*Brief History of Gerasa*

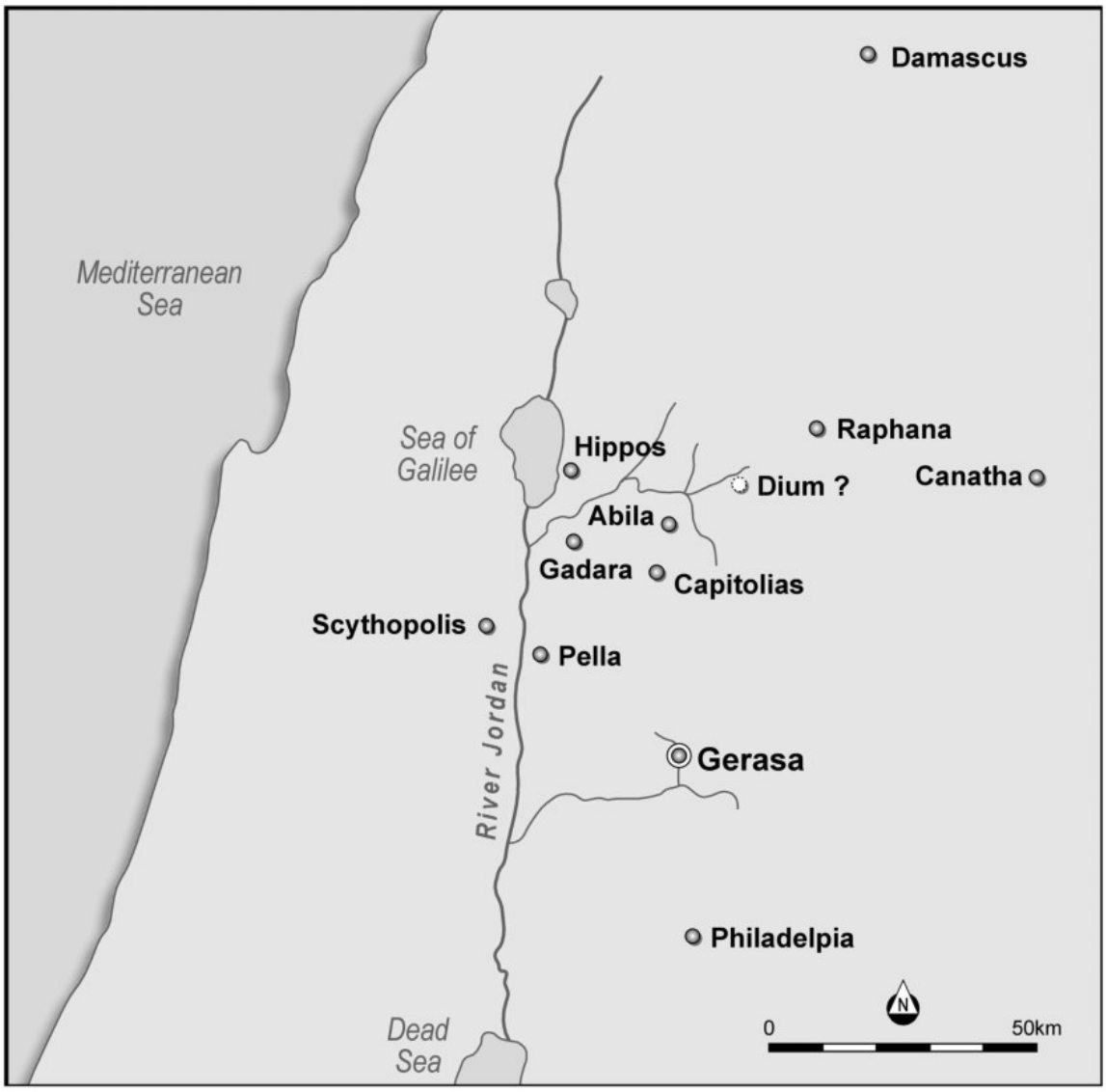
The ancient site of Gerasa lies in a fertile, and at one time, well-watered valley in the eastern ´Ajlūn highlands in north-west Jordan. The valley's natural advantages attracted human occupation from as early as the Lower Palaeolithic (Kirkbride 1958: 9-11). A Middle Pre-Pottery Neolithic settlement was subsequently established at nearby Tell Abu Suwwan (Al-Nahar 2010) and Chalcolithic settlements were established on the hills to the north east of Gerasa (Kirkbride 1958: 15-20), but the earliest evidence of occupation within the city area dates to the Bronze Age (Braemer 1989: 318). There is evidence of Iron Age occupation within the city in the vicinity of the small tell of Camp Hill (= museum hill) (Braemer 1987: 525). A Hellenistic colony and pottery industry were established on the site by the end of the 2nd century BC (Braemer 1989: 318; Kehrberg and Manley 2002: 197) - one of a number of similar colonies in the region that together formed the Decapolis **(Fig. 1)**. As only a relatively small part of Gerasa has been excavated the size of this early colony is uncertain, but the settlement grew rapidly in the early Roman period.

The 1st and 2nd centuries AD were marked by a sustained burst of city planning and public building activity on both sides of the Wādī Jarash, especially on the west side where city gates were established at either end of the main colonnaded street (the Cardo), the temples of Artemis and Zeus were monumentalised, fountains were established along the Cardo, and major water monuments were erected, including the West Baths and the Nymphaeum **(Fig. 2).** The separate parts of the city either side of the wadi were linked by at least two bridges. The extent of building that may have occurred on the east side of the city during this same period is largely unknown, as the Circassian village began to be built over the ruins in 1878 (Schumacher 1902: 115) and expanded before any systematic survey of this side of the city had been carried out. There is, nevertheless evidence for the construction of the East Baths (Lepaon 2008: 60-65), the monumentalisation of the Qairawan spring area (Seigne 2004: 175) and the building of residences for the rich elite[1].

New public monument construction activity had largely ceased by the end of the 2nd century AD, but the construction of occasional small bathing establishments continued. On the west side of the city the Central Baths were built immediately south-west of the South Tetrakionion in the second half of the 4th century (Walmsley *et al*. 2008: 126) followed by the Baths of Placcus in AD 455 (Lepaon 2008: 57-59), and on the east bank the small Byzantine Baths were in use by the mid 4th century AD (Lepaon 2008: 65-67).

Church construction started in earnest in the second half of the 4th century AD with the construction of the Cathedral and continued into the early 7th century AD, having reached a peak in the 6th century AD. Urban life survived the Islamic conquest and continued until the 9th century AD after which it declined. Very little is heard about Gerasa after the 9th century AD. A small fortress was established briefly in the 12thcentury, but in AD 1225 the Arab geographer Yāqūt described it as "a total ruin" (Le Strange 1890: 462). There is evidence of occupation in the late Mamlūk period (14th - 15t h century) at several locations within the city (Stewart 1986: 239; Clark 1986: 315), and some sort of settlement probably continued on the site until at least the end of the 16th century, when a settlement of a dozen families is recorded in an Ottoman census (Hütteroth and Abdulfattah 1977: 164). The site had no permanent settlement

1.This is evidenced from the high quality mosaic attributed to the house of a rich Roman resident discovered beneath the house of the Ottoman Mudir by German archaeologists in 1907 (Kraeling 1938: 351-2). Kraeling attributes a 3rd century AD date to the mosaic, as does Piccirillo (1993: 283), however Joyce (1980: 321) argues convincingly for a mid 2nd century AD date. More recently, a late 2nd to early 3rd century AD date has been proposed by Grossmann (2006: 151).




*1.The Region of the Decapolis.*

at the time of the first European visit to the site recorded by Seetzen in 1806 (1810: 32-34).

*The Principal Water Installations*

Aside from domestic-sized cisterns the main water installations within the city comprise bath complexes and fountains, with the greatest concentration lying on or adjacent to the Cardo on the west side of the city **(Fig. 2)**. A total of six bath complexes are known within the city and a further two outside - one at Birketein 1.6 km north of the city, and another probable site at el-Hammām thermal spring beside the R. Zarqa near its junction with Wādī Jarash 7 km south of Gerasa **(Table. 1)**.

The first construction dates of the two largest bath complexes - the West and East Baths - are not precisely known, but Lepaon's suggested early-2nd century AD date for the first phase of the West Baths makes this perhaps the earliest major installation within the city. A number of fountains have been located in the west side of the city between the Macellum and the North Theatre - in particular along the Cardo - that can be dated from the end of the first quarter of the 2nd century AD to the beginning of the 3rd century AD, implying a steady increase in reticulated water supply requirements through the 2nd century AD (Seigne 2008: 49). Likewise, in the eastern part of the city a supply would have been needed during the 2nd century AD to the East Baths, if the tentative late-2nd century

**Table 1:** *Summary of Bath Complexes.*

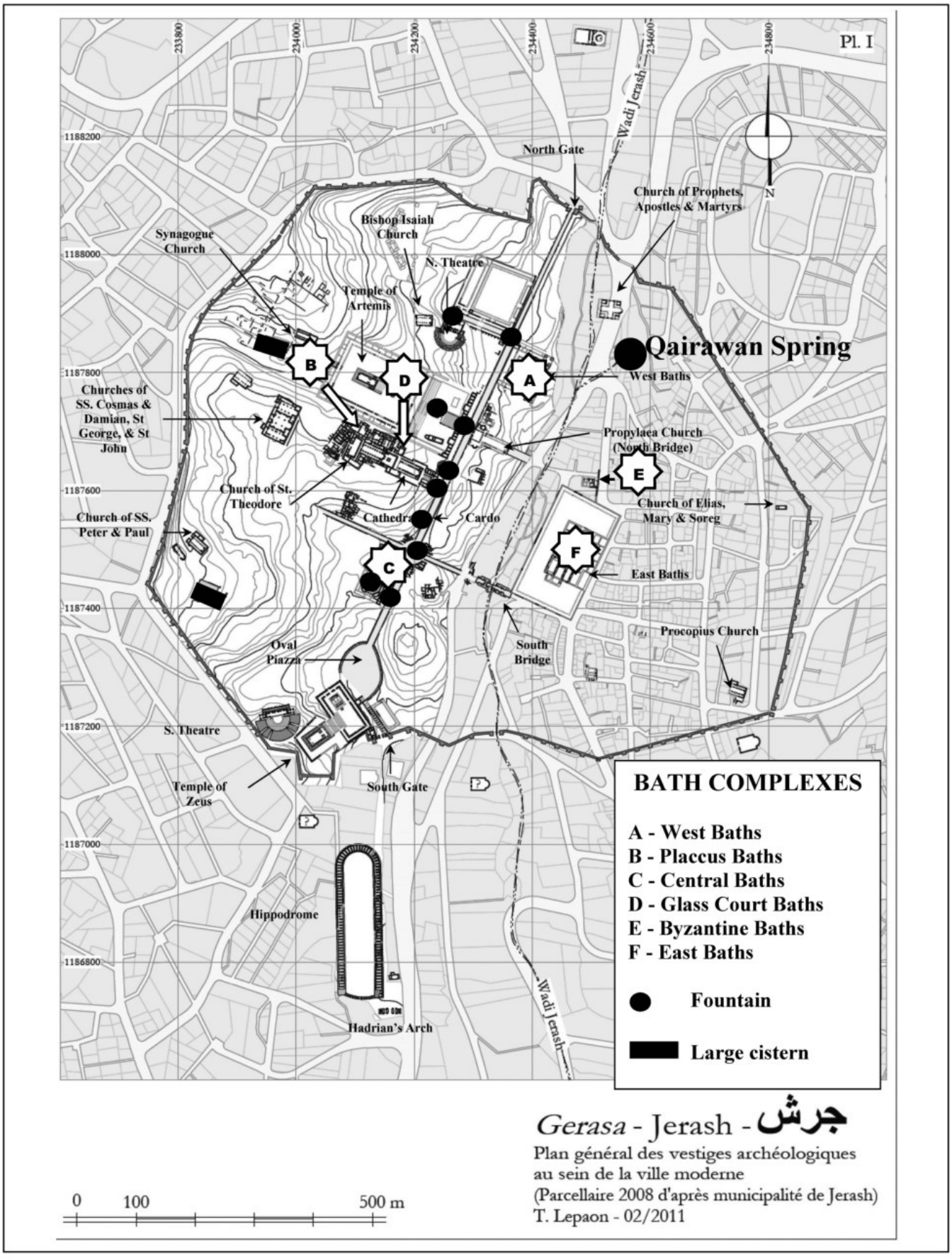
| Bath | Location | Construction Date (AD) First Phase | Final Size ($m^2$) | Reference |
|---|---|---|---|---|
| East | City East | ?2nd c. | 15,000 | Lepaon 2008: 60-65 |
| Byzantine | City East | Mid 4th c. | 373 | Lepaon 2008: 65-67 |
| West | City West | Early 2nd c. | 4,500 | Lepaon 2012: 117-123 |
| Central | City West | Late 3rd/early 4th c. | >280 | Walmsley *et al.* 2008: 126; Blanke *et al.* 2010: 312-317 |
| Placcus | City West | 454-455 | 780 | Lepaon 2008: 57-59 |
| Glass Court | City West | ?5th c. | 105 | Lepaon 2008: 59-60 |
| Birketein | Birketein | ? | >990 | Lepaon 2008:67-68 |
| El-Hammām | Zarqa | ? | ? | Glueck 1939:III: 220-221 |

date for the first stage of this bath complex is correct (Lepaon 2008: 65). It is not presently known when the West Baths and East Baths went out of use, but the Central Baths remained in use - albeit on a reduced scale – until the early 8th century (Walmsley *et al*. 2008: 126). The Byzantine Baths on the east side of the city were built in the 4th century using the same aqueduct from Qairawan spring that is believed to have supplied the East Baths 100 m further south, implying that the aqueduct to the East Baths was still available in the 4th century AD. No specific source(s) of supply have yet been identified for the major water consuming installations on the west side of the city, which all lie below an elevation of 600 m and above the elevation of Qairawan spring (566 m).

It would be expected that the aqueducts to the city would have delivered their supply to a castellum divisiorum for distribution to various end-users. While no such structures have yet been identified in Gerasa, the ruins of two large unexcavated cisterns or reservoirs that may have provided storage and/or distribution functions have been identified: one on the hill to the west of the Temple of Artemis at an elevation of approximately 616 m (40 x 20 m), and another on the hillside below the Church of Ss. Peter and Paul in the south-west corner of the city at an elevation of approximately 610 m (15 m x 35 m). The depth of these cisterns is not presently known but, if a depth of at least 2 m is assumed, would have been in the range 1000-1500 $m^3$.

Previous Studies

Hydraulic system studies have been published for most Decapolis cities in northern Jordan and adjacent areas - especially Gadara (Döring 2005; Kerner 2005) and to a lesser extent Abila (Mare 1995; Döring 2008), Hippos (Ben David 2002; Tsuk *et al*. 2002), Scythopolis (Fahlbusch 2002) and Pella (Watson 2001). There has been no similar published study for Gerasa. While publications on groups of water installations in Gerasa exist - examples being architectural studies of the baths (Lepaon 2008, 2012) and fountains (Seigne 2008), there has been little work published on the water sources and the overall water supply network to the city and its hinterland. Comment by Seigne (2002) and a subsequent brief study (Seigne 2004) have been the only recent published accounts on the supply of water to Gerasa in the context




*2. Plan of Gerasa showing major water installations (base plan from Lepaon 2012: Pl. 1).*

of its hinterland, but are limited by a lack of archaeological evidence, are preliminary in scope and have been superseded by new discoveries. Seigne's principal conclusions regarding the city's potable water supplies were that the open reservoir at Birketein was an unlikely source, due to its elevation relative to the monuments in the city and issues related to potential contamination. He suggested instead that the water supply came from another source or sources further upstream (2004: 176-177); the " 'Ayn ash-Shawāhid" spring was one suggested source, although this is a different spring to the esh Shawāhid spring referred to in this paper.

The most recent advances in understanding the area's water management system have come from the Jarash Hinterland Survey, which recorded 92 water installations in the city's immediate hinterland. The majority were found in the Wādī ed Deir valley north of the city, where elements of a masonry aqueduct of likely Roman-Byzantine date were identified, and south of the city where sections of aqueducts were recorded on both banks of Wādī Jarash (Baker and Kennedy 2011: 455-461). These results are discussed more fully below.

*Questions to Be Answered*

The project is critically examining the evidence for the water management system of Gerasa and its hinterland in the period 200 BC to the Islamic conquest in the 7th Century AD, from written and visual sources and from new field surveys. The study seeks to identify the system's main components, understand how it operated and determine to what extent it contributed to the region's growth, importance and ultimate decline. Answers are needed to a number of fundamental questions relating to the water management system, including:

1.What were the sources of supply?
2.Did these sources change over time, and if so why?
3.Were these sources close to the city or is there evidence of, and was there a need for, aqueducts bringing water from some distance away, as in the case of the system that supplied Adraa, Abila, and Gadara (Döring 2008)?
4.What were the delivery capacities of the aqueducts servicing the city and hinterland?
5.Do elements of the reticulation network predate the Roman period?
6.Were certain sources and aqueducts dedicated to certain water installations or uses?
7.What were the demand requirements of the main water installations within the city?
8.When did the system go out of use and why?

**Jarash Water Project**

*Project Area*

The project area is defined by the watersheds of the Wādī Sūf / ed Deir / Jarash valley (60 $km^2$) and the tributary valley of Wādī el Majarr and Wādī Tannur (47 $km^2$), a combined area of 107 $km^2$. It includes the site of the ancient city, the entire valley in which it sits and the adjacent valley to the east which, because of its proximity and the large area of rich soil within it, would have formed a key part of the city's agricultural hinterland **(Fig. 3)**.

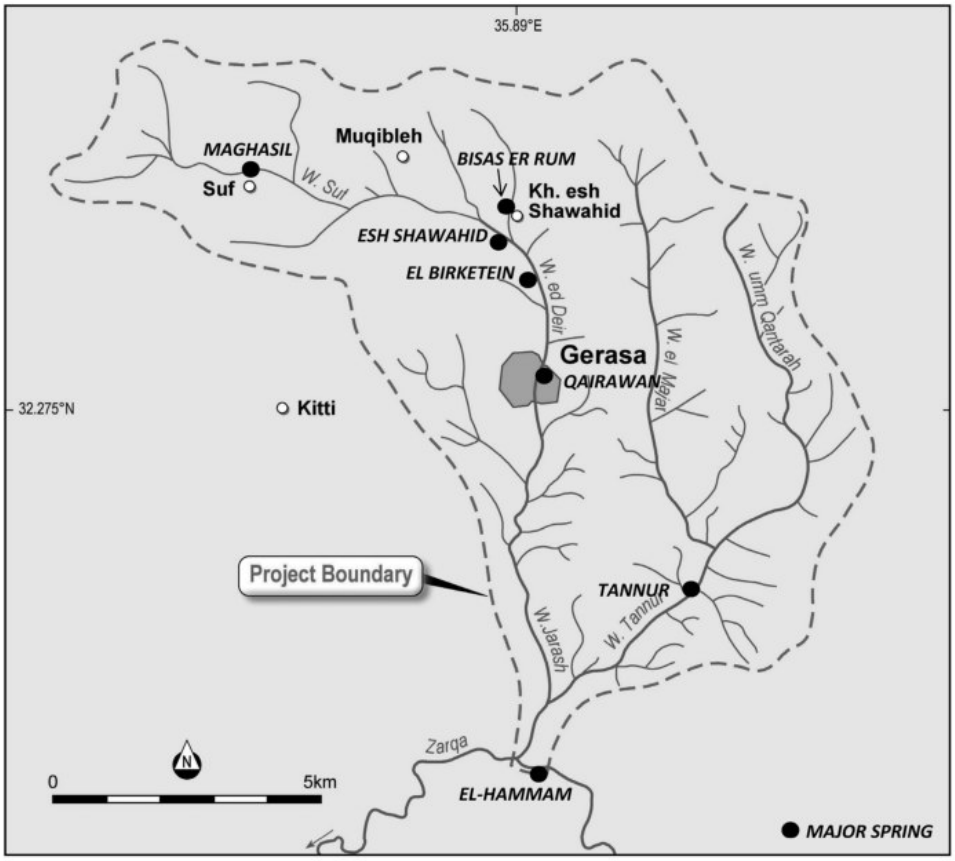
In a regional context the study area lies in the northern part of the Jarash Basin as defined by Kennedy (2004: 205, **Fig. 8**), which itself forms the western part of the much larger Zarqa River Basin as defined by Al-Abed and Al-Sharif (2008: **Fig. 3) (Fig. 4)**.

*Objectives*

The principal objectives of the field survey are:

1.To record surviving archaeological remains relating to water management.
2.To record the water installations in a database.
3.To date when the water installations were placed in use, and went out of use, and determine the water sources; and
4.To identify archaeological remains for conservation.

The primary aim in the 2013 field season was to survey selected areas in the Jarash Valley to the north, south and west of the city, with a view to locating and tracing the historic aqueducts to the city and its hinterland. A secondary aim




*3. Project Area showing drainages and major springs (D. Boyer).*

was to survey selected areas within the adjacent Wādī al Majar-Wādī Tannur valley to the east, to investigate water related sites (especially springs) to gain an understanding of water management in the rural context. The 2013 survey covered only a portion of the project area and it is anticipated that it will be followed by one or more additional field seasons.

*Methodology*

The survey focused on locating and recording sites related to water management. The survey involved:

1.Pedestrian survey of selected areas previously identified from a study of published material, plans, satellite imagery and aerial photography to identify water-related sites of any period. (All periods are covered because the dating of site elements is problematic especially when, as in the case of this project, no excavation is carried out. Also it is evident that there has been reuse of ancient aqueducts in the late Ottoman period and in particular the post-Circassian settlement period. Future surveys will also include the collection of mortar and/or plaster and carbonate sedimentary material (tufa, or calcareous sinter) for dating, chemical analysis and stable isotope determination (δ18 Oxygen and δ13 Carbon).

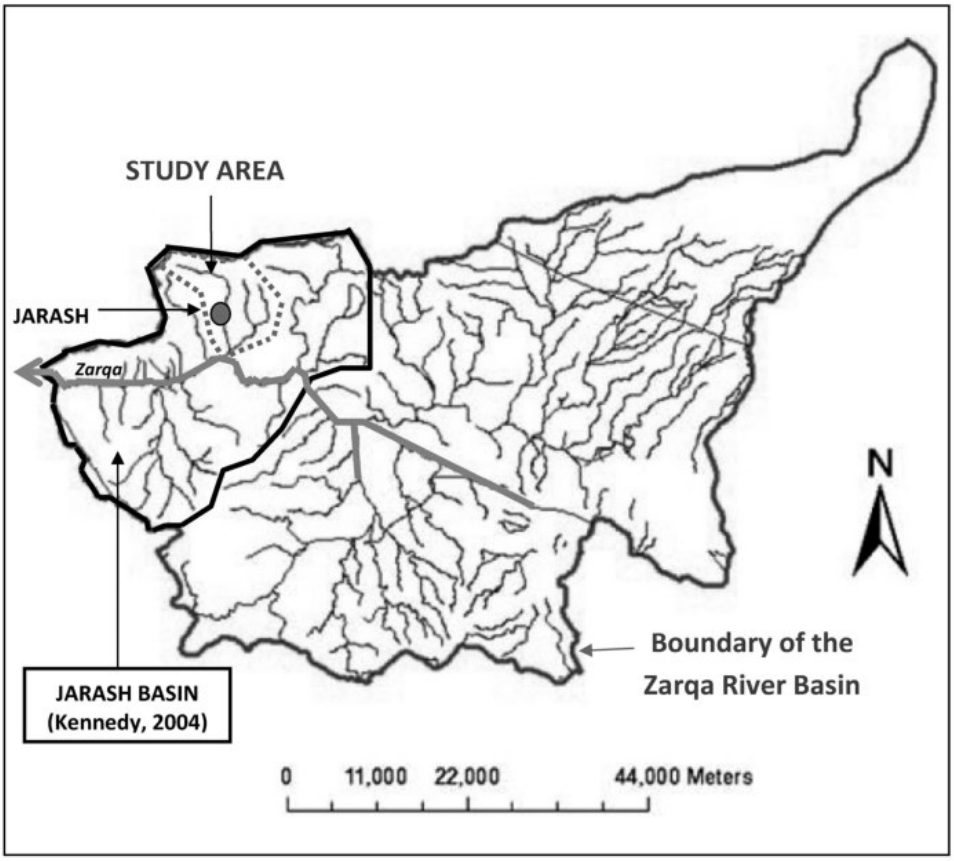
2.Location of all sites by hand held GPS (WGS84 datum).

3.Use of dumpy level to confirm gradients at selected locations.

4.Recording of all sites by allocating a unique project site number, providing a written description, taking colour digital photographs, making sketches and the entry of information onto *MEGA* Jordan forms.

5.For consistency, location names and spelling are taken from 1:10,000 series topographic plans (Department of Lands and Surveys of Jordan 1950) where possible.

Positioning in the field was by reference to hand held GPS (*Garmin GPSMap 76Sx*); generally




*4. The boundary of the study area in the context of the boundaries of the Jarash Basin (Kennedy, 2004) and the Zarqa River Basin (plan modified from Al-Abed and Al-Sharif, 2008, Figure 3).*

to an accuracy of +/- 4-6 m. Coordinates were recorded in decimal degrees (WGS84 datum). Elevations were also taken at each location; however this information should be taken as a rough guide only. Reference was also made to Jordanian 1:10,000 and 1:50,000 scale plans, however these are generally not accurate enough for in-field positioning.

*Site Types*

Site information, including GPS location, GPS elevation, and site type are presented in Appendix 1. Given the focus on water-related structures, there were only a limited number of site types recorded. A total of 36 elements were recorded at 35 sites; a breakdown by site type is shown in **Table 2** and site locations are shown in **(Fig. 5)**.

**Geographic Landscape**

Gerasa lies in the centre of a 15 km long valley that is a minor tributary of the Wādī Zarqa. The walled city straddles the floor of the valley, with the incised Wādī Jarash dividing the site into two distinct but unequal parts. Although a single drainage system, the valley is known by several names; the upper section, between Sūf and the junction with the north bank tributary Wādī Asfūr is named Wādī Sūf, the central section between Wādī Asfūr and Jarash is named Wādī ed Deir, and the lower section from Jarash to the junction with the Wādī Zarqa is named Wādī Jarash. Within the Wādī Sūf / ed Deir / Jarash drainage (hereafter the Jarash Valley) rich Mediterranean soils can be found on the banks of the valley and on the ancient terraces that line its slopes, with a similar accumulation of Mediterranean soils in the adjacent Wādī Majarr valley to the east. Colluvium covers the valley floors.

Geologically and topographically the area can be described as a dissected limestone plateau formed from flat lying units of the Upper Cretaceous ʻAjlun Group, with the sandstones of the underlying Lower Cretaceous Kurnub Group exposed in the Jarash Valley below Jarash

**Table 2:** *Site statistics*

| Site No (JWP_) | Aqueduct | Reservoir | Wine press | Spring | Mill | Unspecified | Total |
|---|---|---|---|---|---|---|---|
| 102 | | | | | | 1 | |
| 103 | 1 | | | | | | |
| 104 | 1 | | | | | | |
| 105 | 1 | | | | | | |
| 106 | 1 | | | | | | |
| 107 | 1 | | | | | | |
| 108 | | | | 1 | | | |
| 109 | | 1 | | | | | |
| 110 | | 1 | | | | | |
| 111 | 1 | | | | | | |
| 112 | 1 | | | | | | |
| 113 | | 1 | | | | | |
| 114 | 1 | | | | | | |
| 115 | 1 | | | | | | |
| 116 | 1 | | | | | | |
| 117 | | 1 | | | | | |
| 118 | 1 | | | | | | |
| 119 | 1 | | | | | | |
| 120 | 1 | | | | | | |
| 121 | 1 | | | | | | |
| 122 | | | 1 | | | | |
| 123 | | | 1 | | | | |
| 124 | 1 | | | | | | |
| 125 | 1 | | | | | | |
| 126 | 1 | | | | | | |
| 127 | 1 | | | | | | |
| 128 | 1 | | | | | | |
| 129 | | 1 | | | | | |
| 130 | 1 | | | | | | |
| 131 | 1 | | | | | | |
| 132 | 1 | | | | | | |
| 133 | | 1 | | | | | |
| 134 | | | 2 | | | | |
| 135 | 1 | | | | | | |
| 136 | | | | | 1 | | |
| **Subtotals** | **23** | **6** | **4** | **1** | **1** | **1** | **36** |

(Abdehamid 1995). The steep valley slopes are lined with natural and constructed terraces, some dating to antiquity, and cross-wādī walls are a feature of many tributary wadis.

The area enjoys a Mediterranean climate with wet winters and warm summers. It lies in the transition zone between the highlands in the west and the desert in the east, and this is reflected in the rainfall data; between 1950 and 2008 Jarash's annual rainfall averaged 356 mm, but rainfall reduces rapidly eastwards from the 'Ajlun highlands being 543 mm at Kitta 4 km west of Jarash to only 220 mm at Medwar 10 km east of Jarash (Al-Qaisi 2010, Table 11.1). The results of a recent study of palaeoclimate proxies for the southern Levant are interpreted by this author to suggest that the period of Hellenistic colonisation of the Decapolis coincided with the onset of wetter climatic conditions that persisted until around the 6th century AD (Mithen and Black 2011: Fig. 7.2), indicating that climatic conditions in this period may have been similar to those currently existing. Today, the project area enjoys relatively high levels of annual rainfall – nearly all of which falls in the winter months – supporting rain-fed farming wherever there are adequate soils[2].

The rainfall recharges groundwater stored in predominantly limestone aquifers that in turn supply a number of natural springs, with the spring flow fluctuating with the seasons. Early-19th century travellers noted strong natural springs at a number of locations within the Jarash Valley between Sūf and Gerasa. These remained in use until the pumping of groundwater wells in recent years lowered the water table in the esh Shawāhid - Birketein area, so that Qairawan within the ancient city of Gerasa is now the sole remaining high yielding spring of those noted by the early visitors. Historically, surplus flow from the many springs generated perennial flow along the streambed of the Jarash Valley, and these combined water sources sustained widespread irrigation opportunities within the valley. The aerial photographs taken by the Hunting Aerial Survey of Jordan in 1953 show that a 10 km section of the Jarash Valley - some 200 hectares - was under irrigation from north of Birketein to the junction with the Wādī Zarqa, but lowered water tables and a gradual reduction in annual rainfall have since reduced this area drastically in the Jarash Valley upstream of Jarash. These photographs also point to the irrigation potential that probably also existed in the Roman - Byzantine period within the Jarash Valley.

2.There is significant variation in total rainfall year on year and the timing of that rainfall, which has important implications for rain-fed agriculture now and potentially in the past. At Jarash, between 1970 and 2002 the average rainfall was 347.2 mm, but varied from a low of 145 mm in 1978/9 to a high of 668.7 in 1991/2 (Al Mahamid 2005: 53, Table 2.3). Al-Qaisi (2010: 30) notes that in the 1950's-1960's most rainfall within the Zarqa Basin fell in December-January but now (2010) occurs later in the season in February-March.

**Overview of Water Sources**

As is the case today, water sources in the project area in the Roman - Byzantine period would have included seasonal stream flow in the various wadis – probably perennial flow in the case of the Jarash Valley – and from natural springs. Spring sources in the Jarash Valley would have included high-yielding springs at Sūf, esh Shawāhid, Bisās er Rūm, Birketein and Qairawan **(Fig. 3)**, plus a plethora of smaller springs on the slopes and floor of the valley. Flow rates for the major springs are listed in **Table. 3**.

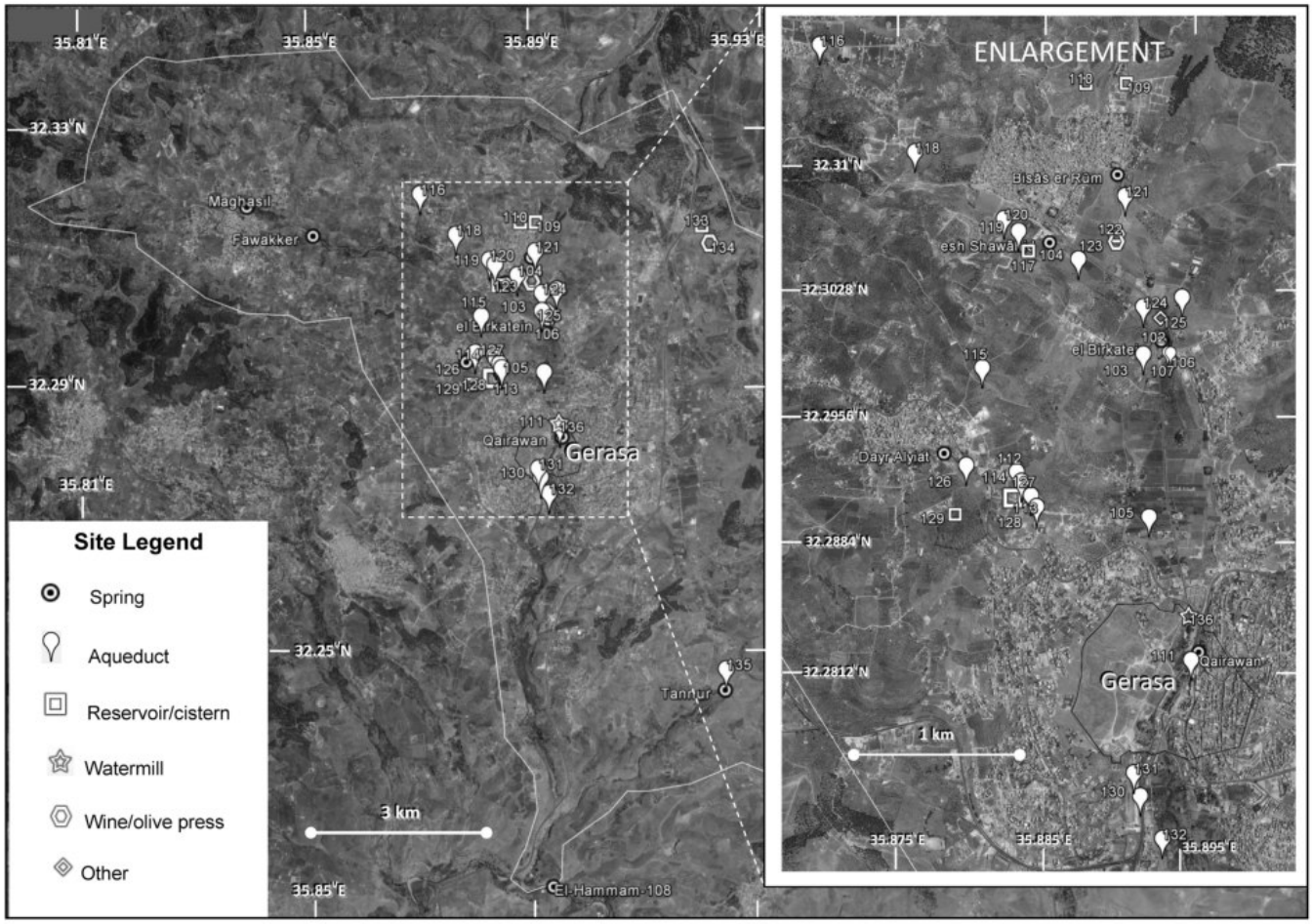
**Wādī Sūf**

The town of Sūf is located at the head of the Jarash Valley. It is an ancient site, with evidence of occupation from the Middle Bronze Age onwards (Mittmann 1970: 95). In 1812 the Swiss traveller Johann Ludwig Burckhardt noted "the stream [from Souf]…is supplied from three copious springs that issue from under a rock near the village …and with their united waters the narrow plain of Djerash is irrigated" and "at the spring of Ayn Keykebe, which is covered by an arched building, I copied some characters from a broken stone" (Burckhardt 1822: 248-251). George Robinson, who visited Sūf in 1830, reported similarly (Robinson 1837: 242). The springs lie at an elevation of approximately 880 m. A maximum discharge rate of 757 $m^3$/hr (210 litres/sec) has been reported by the Ministry of Water and Irrigation (MWI) for the Maghasil spring at Sūf and an average flow rate of 45.2 $m^3$/hr (12.5 litres/sec), however in summer the flow can be reduced to a trickle (MWI 1997: **Fig.5)**.

'Ayn ash-Shawāhid (elevation 650 m) lies on the south bank of the Wādī Sūf opposite the junction with Wādī Asfur and is identified from the 1:10,000 topographic plan (sheet 27/88)

**Table 3:** *Flow rates of major springs (from MWI 1997: Fig. 5)*

| Spring Name | Drainage Name | Max flow $m^3$/hr | Min Flow $m^3$/hr | Average Flow $m^3$/hr |
|---|---|---|---|---|
| Maghasil | Wādi Sūf | 757.0 | 0.2 | 45.2 |
| Esh Shawahid | Wādi ed Deir | 162.6 | 0.0 | 44.9 |
| El Birkatein | Wādi ed Deir | 619.0 | 0.0 | 98.0 |
| El Qairawan | Wādi Jarash | 359.0 | 60.0 | 148.1 |
| El Tannur | Wādi Tannur | 356.0 | 3.1 | 105.3 |




*5. Site locations, 2013 field season. (D. Boyer and Google Earth).*

published in 1950 and from a description by Steuernagel (1925: 270), which also refers to the ruins of Byzantine buildings. It is to be distinguished from a spring ('Ayn Bisās ar-Rūm - see below), which lies 600 m to the north east, and which is named 'Ayn ash Shawāhid on some plans. A maximum flow rate of 162.6 $m^3$/hr (45 litres/sec) and an average flow rate of 44.9 $m^3$/hr (12.5 litres/sec) is quoted for 'Ayn ash-Shawāhid (MWI 1997: **Fig.5**), which can run dry in the summer months. It still flows intermittently but flow rates have been substantially reduced by pumping from the nearby Shawāhid borefield.

'Ayn Bisās ar-Rūm (elevation 675 m) lies in Wādī Asfūr, a north bank tributary of Wādī Sūf, adjacent to Khirbet esh Shawāhid, close to the second Roman milestone on the Gerasa-Adraa road. Use of the spring in the Roman period is suggested by its name, and Roman occupation of the adjacent Khirbat ash-Shawāhid site in 2nd to 3rd centuries AD is attested by a number of inscriptions (Welles 205 and Welles 216 in Kraeling 1938: 448-51). It no longer flows, presumably as a result of pumping from the nearby Shawāhid borefield.

**Wādī ed Deir**

'Ayn el Birkatein or Birketein (elevation 620 m) supplies the Birketein reservoir on the west bank of the Wādī ad-Deyr. The masonry reservoir at Birketein is of Roman date. Occupation of the site goes back to at least the Early Bronze Age (Mittman 1970: 98) and as noted by Seigne (2004: 177) the Roman reservoir may have replaced an earlier structure. McCown (Kraeling 1938: 167) suggested that the pools were constructed during the Antonine period at the latest, and Seigne argues that the construction of the pool postdates the construction or rebuilding of the adjacent Gerasa-Adraa road in Trajanic times

(Seigne 2004: 177). An inscription on a column fragment dates the construction of part of the colonnade around the Birketein reservoir to AD 209 to AD 211 (Kraeling 1938: 167), so the pool was constructed prior to this date. Current flow rates from Birketein are intermittent, but a maximum flow rate of 619 $m^3$/hr (172 litres/sec) and average flow rate of 98 $m^3$/hr (27.2 litres/sec) have been reported (MWI 1997: **Fig.5**).

**Wādī Jarash**

'Ayn al Qayrawān (Qairawan) (elevation 566 m) on the east bank of the Wādī Jarash is the most significant spring within the walled city of Gerasa and in the Wādī Jarash, and still contributes substantial water supplies to the town system. The spring source is contained within the remains of an original stone structure that Seigne dates to the 2nd century AD on the basis of the quality and style of the mouldings of the monumental wall that forms the east wall of the present site (Seigne 2004: 175). In the 1930s a team of archaeologists from Yale recorded on a 1:2500 scale plan that this monumental wall lay at the western end of a wall at least 40 m long (Yale University Art Gallery Negative number: 1938.5999.5004.30) **(Fig. 6)**. This wall is shown as being part of a pool on C.S. Fisher's plan of Gerasa (Kraeling 1938: Plan 1), however the nature and extent of the early structures in the vicinity of the spring requires further study. Although Seigne states that there is no evidence of deification or of a sanctuary in the vicinity (2004: 175), references made by several 19th-century visitors point to the existence of more extensive buildings than are now evident, including a possible shrine. Guillaume Rey visited Gerasa in 1858 and commented "…et autour d'une belle fontaine d'eau vive, nous voyons les restes d'une construction monumentale où nous remarquons des traces de niches destinées, sans doute, à recevoir des statues. Nous trouvons aussi quelques inscriptions chrétiennes, mais toutes sans intérêt." (Rey 1861: 251). Rey's reference to Christian inscriptions is unique (they do not seem to have survived) but the existence of altars in the vicinity of the spring is also noted in Baedeker's 1876 English edition of his *Handbook for Travellers* – "By a spring farther to the S. there seems to have been another handsome edifice containing altars" (Baedeker 1876: 397).

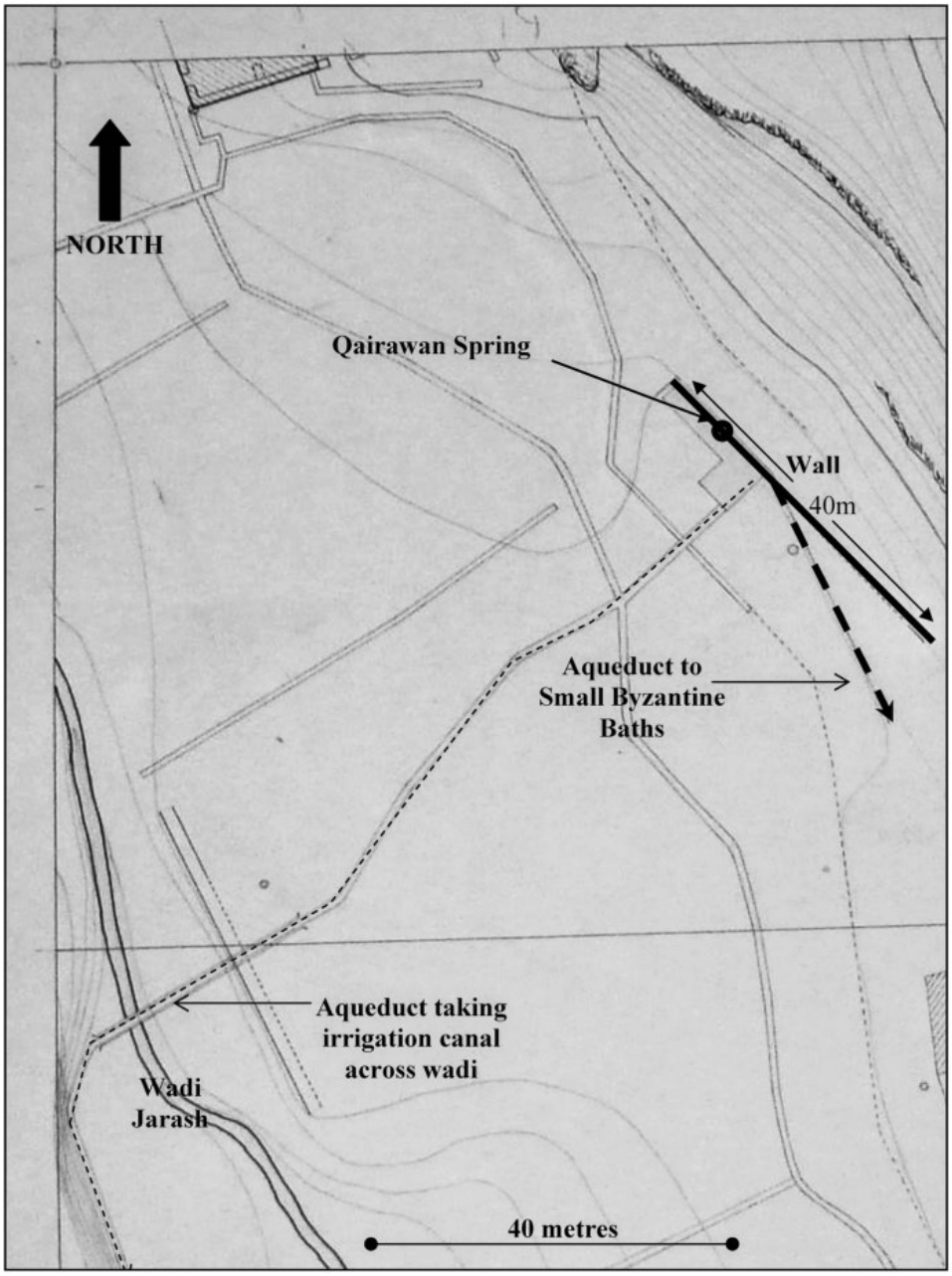
Qairawan was likely to have been a strong spring in ancient times and remains so today. A maximum flow rate of 359 $m^3$/hr (100 litres/sec) and minimum flow rate of 60 $m^3$/hr (16.7 litres/sec) were reported for the period 1938 to 1996 (Daane and McNeil 1997: 18). In the five years to 1996 the average summer flow was 120 $m^3$/hr and the average winter flow was 170 $m^3$/hr (Daane and McNeil 1997: 20).

**Wādī Tannur**

'Ayn Tannur lies at the head of Wādī Tannur, which forms the lower part of the Wādī al Majar-Wādī Tannur valley. There is evidence of early occupation near 'Ain Tannur; Khirbet el-Meshetta, with evidence of occupation dating back to the Chalcolithic or possibly Neolithic period, lies 700 m to the west of the spring. Evidence of Roman - Byzantine occupation has been reported from Khirbat Tannur immediately east of the spring, and occupation at Khirbat Mansub located 0.5 km south south-west of Khirbet Tannur dates from the Middle Chalcolithic period (Glueck 1951:IV: 87). The Roman site of Mehbethah lies to the east of Khirbet Mansub (Glueck 1951:IV: 89). There seems little doubt that the strong flow from 'Ain Tannur has been used since the prehistoric period and is still used today to irrigate the valley.

**Wādī al Majar**

No major springs are known within this drainage. The most significant are likely to have been at the southern end in the vicinity of the Roman - Byzantine settlement of Khirbet Shereiyit ('Ayn Shereiyit) (Glueck 1951, IV: 86) and particularly Khirbet 'Ayn Riyashi, where Glueck (1951, IV: 69-70) reports evidence of Early Bronze Age to Roman - Byzantine




*6. Part of Yale 1: 2500 scale plan of Gerasa showing features recorded in the vicinity of Qairawan spring (Yale University Art Gallery Negative number: 1938.5999.5004.30).*

occupation. 'Ayn Riyashi lies 1 km upstream of 'Ain Tannur, and it is likely that the *ca* 20 hectare valley floor between the two springs was irrigated during the Roman-Byzantine period.

There are several small springs at the northern end of the Wādī al Majar valley, but although there is evidence of occupation in this area in the Roman - Byzantine period at both 'Ebta and Khirbat al-Hute (Mittmann 1970: 118-9), there is no evidence that the greater part of the rich valley was irrigated. If this is correct, then it means that farming would have been largely rain-fed, which would have reduced production capacity from the rich soils along the floor of the valley of which at least 300 hectares is potentially cultivable. This compares with roughly 350-400 hectares that is potentially irrigable in the Jarash Valley.

## Aqueducts

*Basic Typology*

Around two thirds of the site elements recorded during the survey were aqueduct components. The aqueducts fall into three groups.

1.Rock-cut construction: the canal is cut

directly into limestone bedrock. This is a very common form of construction; a good example is the 100 m long section of the aqueduct from ‘Ain Bisās er Rūm at site 125. Other examples include sites 112, 114, 117-120, 124, 127-128, 130-131.

2.Masonry construction: with a ‘U’ shaped canal cut into a dressed limestone block. There is some variation of the size of the canal. The major masonry aqueduct of likely Roman - Byzantine date (DW01-see below) that crosses the valley floor of the west of the Wādī ad-Dayr and described by Baker and Kennedy (2011: 458-9) was constructed of dressed limestone blocks up to 1000 mm long, 800 mm wide and 700 mm high. A channel with a width of 300-450 mm and a depth of up to 300 mm has been cut into these blocks. Examples of similar sized elements were found at sites 103, 105 and 106. Blocks with a smaller channel width (150-200 mm) located in the Jarash Hinterland survey (Kennedy and Baker 2009: **Fig. 11**) were interpreted to be part of side channels supplying local agricultural users in the valley.

3.Masonry construction: with a cement canal lying on a frame support wall comprising a core of cemented rubble and an outer wall of dressed limestone blocks. The sole example of this is the remnant section of the Roman aqueduct from Qairawan spring located immediately north of the small Byzantine baths and 180 m south south-west of the spring (site 111).

There is evidence of the plastering or cementing of all three types, a good example being the buried rock-cut aqueduct at site 128 where there is a thick accumulation of carbonate sediment lying on a plaster base. There is some direct evidence of the covering of the aqueducts; some original capstones are still in place at site 111 and 135, and at Muqibleh (site 116) the underground canal from the spring is covered by a short section of tunnel. Individual aqueducts are shown in (**Fig. 7)** and are described in more detail below.

*Wādī Sūf-Wādī ed Dayr*

*Muqibleh Spring Tunnel and Aqueduct*

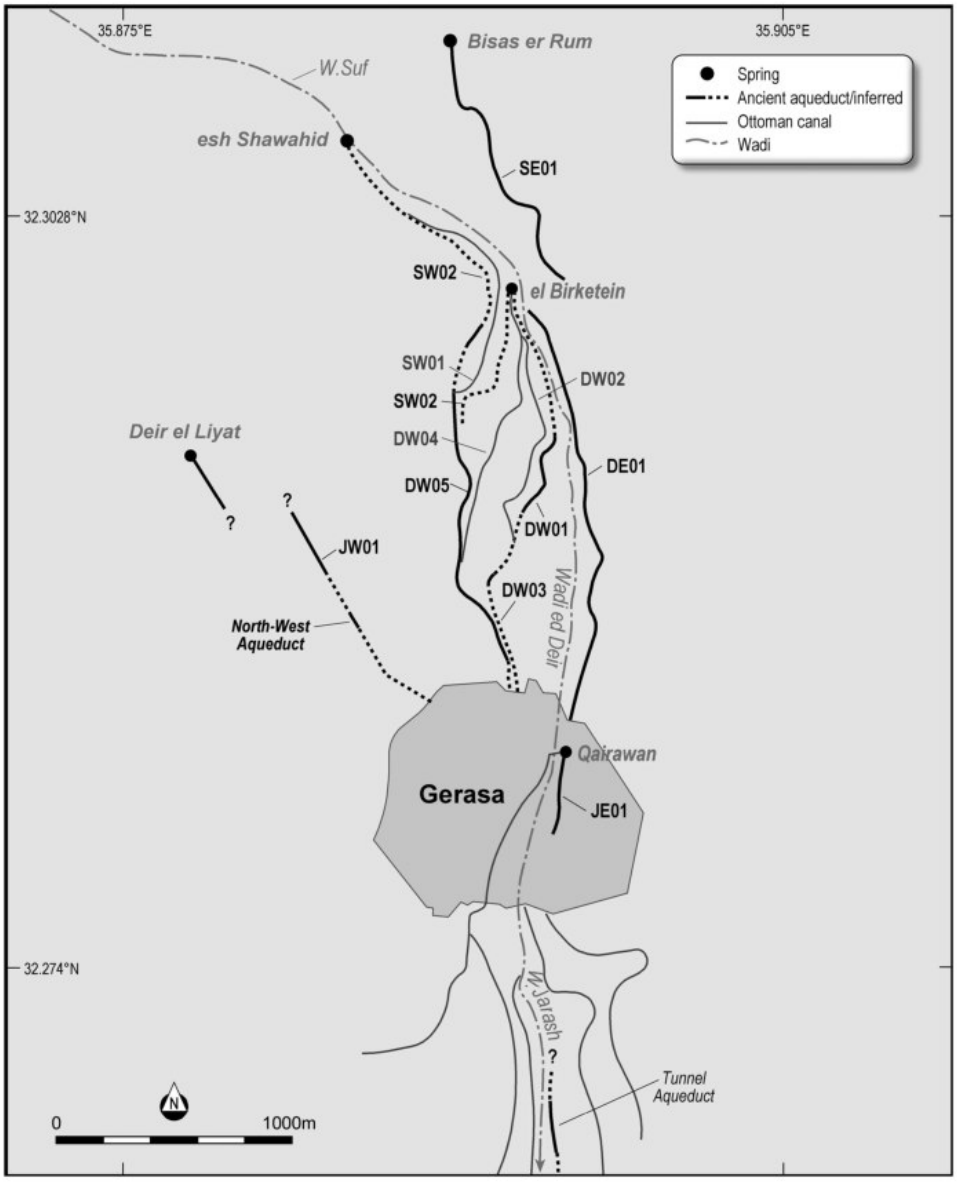
The small village of Muqibleh lies 3 km east of Sūf on the northern side of the Wādī Sūf valley. A spring is located on a south-facing slope, and at one time its waters irrigated fields on the north bank of the wadi. The site is unusual for the masonry tunnel constructed over a short length of aqueduct that carries water from the spring. It is one of only two tunnel sites in the project area - the other being a section of rock-cut tunnel 1 km south of the city in Wādī Jarash. The Muqibleh spring tunnel was excavated by Thompson and de Vries (1972), who considered it to be probably Roman - Byzantine in date based on the corbelled roof, the quality of well-dressed limestone masonry, and analogy with a similar tunnel at Balata (1972: 90). Thompson and De Vries recorded a canal 28 m long open at its northern end, with a 7 m long section of corbelled tunnel at the southern end. The corbelled tunnel is up to 2.1 m high and 1.3 m wide, with an aqueduct 0.4 m wide cut into the limestone bedrock **(Fig. 8)**.

The corbelled tunnel remains intact but the stonework at the entrance needs to be stabilised. Although the current flow is small - even at the end of the wet season - the size and quality of the structure, and the existence of a side canal 0.6 m above the floor of the aqueduct near the entry, point to higher flow rates in antiquity.

*Wādī ad Dayr Masonry Aqueduct (Aqueduct DW01)*

Displaced elements of this aqueduct were first recorded over a distance of 450 m across the floor of the valley by the Jarash Hinterland Survey (Baker and Kennedy 2011: 459). As the aqueduct crossed a soil covered area it was necessary to construct it of large limestone blocks with a ‘U’ shaped channel 0.35 m by 0.35 m in section cut into them **(Fig. 9)**.

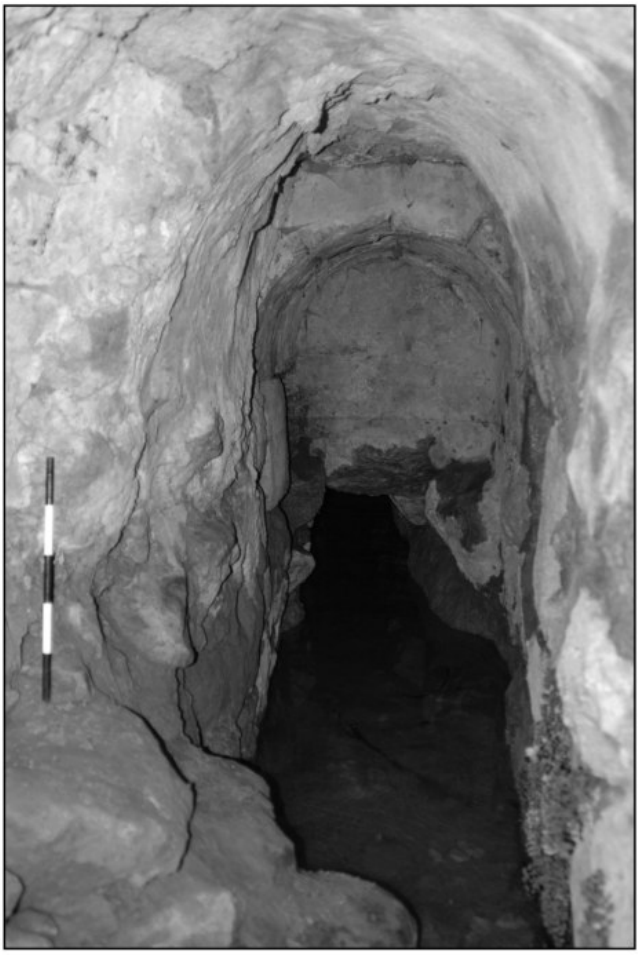
While none of these elements are *in situ*, they lie very close to the position of a 370 m long section of an apparently *in situ* aqueduct (DW01) along the 608 m contour shown on a plan produced by




*7. Aqueduct plan (D. Boyer).*

the Yale team in the 1930s (Yale University Art Gallery: "Area south of Large Birketein Street", Negative number: 1938.5999.5004.50). The aqueduct blocks at site 105 in the 2013 survey represent the southern end of the masonry aqueduct on present information. The elements at this site are also not *in situ*, but lie very close to another section of aqueduct shown on the Yale plan approximately 450 m north of the north wall of the city. Downstream from this point the aqueduct alignment merges with the alignment of an irrigation canal re-established in the late Ottoman period (aqueduct DW02) that continued southwards and crossed the north wall of the city at *ca* 599 m elevation (see below).

While occasional remnant sections of rock-cut aqueduct in the vicinity DW02 along this section point to its possible use as a supply to the city in antiquity, it is not certain that DW01 was used for this purpose. The uncertainty is exacerbated because the source for DW01 is unknown. The northern end of the known section of DW01 lies close to the Wādī ad Dayr stream, and this together with the position of the 608 m contour suggests that the Wādī stream may have been the source. If correct, this would almost certainly mean that DW01 was used only for irrigation as it is difficult to believe an irregular, potentially contaminated, source such as the wādī being used for a potable supply in the city. It is also



*8. View of spring tunnel with corbelled roof at Muqibleh (D. Boyer).*

possible DW01 was sourced from Birketein; the masonry aqueduct blocks at site 106, 70 m south-east of Birketein, have the same dimensions as those that make up DW01, 475 m to the south. If site 106 does form part of DW01 it means that the alignment of DW01 from Birketein would have closely followed the west bank of the wadi stream on a fairly steep gradient of close to 2%. If the aqueduct was merely designed to supply the city, then a shorter, more direct route with a lower gradient would have been possible, so the placement of DW01 appears to be specifically directed to end users in the lower half of the Wādī ad Dayr valley that is closest to the city.

*Birketein Aqueducts*

Water from Birketein reservoir is currently channelled along two concrete canals to irrigate the Wādī ed Deir valley when there is sufficient water in the reservoir to do so. Aerial photographs show that these canals are a modification to the system used in late Ottoman times. Up until the first half of the 20th century, prior to restoration, water from Birketein spring flowed over the rubble-filled reservoir and was directed into two channels. The path of these channels can be traced on early aerial photographs and on 1:2500 plans drawn by the Yale team in the 1930s and held in the Yale University Art Gallery archives. The upper channel (DW04) initially followed the 619-620 m contour and then trended south-westerly across the floor of the western part of the Wādī ad Dayr valley and linked up with the southern end of the lower esh Shawāhid aqueduct (SW01-see below) at a point approximately 550 m north of the city, before ultimately crossing the north wall of Gerasa close to 603 m elevation. The lower channel (DW02) initially followed the 618 m contour, and traversed the central part of the Wādī ad Dayr valley before crossing the north wall close to 599 m elevation, approximately 30 m east of the upper channel.

Between them, in the late Ottoman period channels DW02 and DW03 provided irrigation water to most of the western part of the Wādī ed Deir valley and to the Circassian fields within the north-west quarter of the walled city below 603 m elevation. DW03 and the first 600 m of the lower channel DW02 are still in use today when circumstances permit, although irrigation water is no longer supplied into the Gerasa Archaeological Park.

The survey has not yet resolved the issue of the importance, or even use, of Birketein as a source of water for the city; today, only modern canals can be seen carrying water from the reservoir. Many of the features that were observed by Schumacher when he surveyed the site in the late-19th century (1902: 165-171) can no longer be seen in the restored Birketein reservoir visible today, so his detailed description and associated plans and photographs provide a unique and valuable historic record of the site as it existed in the late Ottoman period. The Yale team



*9. Masonry aqueduct block from aqueduct DW01 (D. Boyer).*

subsequently did some excavation within the reservoir in the 1930s, which was reported by McCown (Kraeling 1938: 159-167). McCown was critical of Schumacher's work, but his own published work added little new information on the water installations.

Schumacher was perhaps the first to propose that water from Birketein supplied the city, and this explanation has been generally accepted (see for example Baedeker 1906: 142; Rostovtzeff 1932: 83; Freeman 2008: 21-22), although disputed by Seigne (2004: 175-178). Ian Browning is even more emphatic, stating "This was one of the main reservoirs for ancient Gerasa; indeed the Nymphaeum and the Fountain Court are known to have been supplied from here" (Browning 1982: 213). A re-examination of Schumacher's evidence in the context of what is known of the aqueducts that lie between Birketein and the city is therefore warranted in light of these disparate comments.

The key evidence regarding the Birketein water installations supplied by Schumacher is as follows:

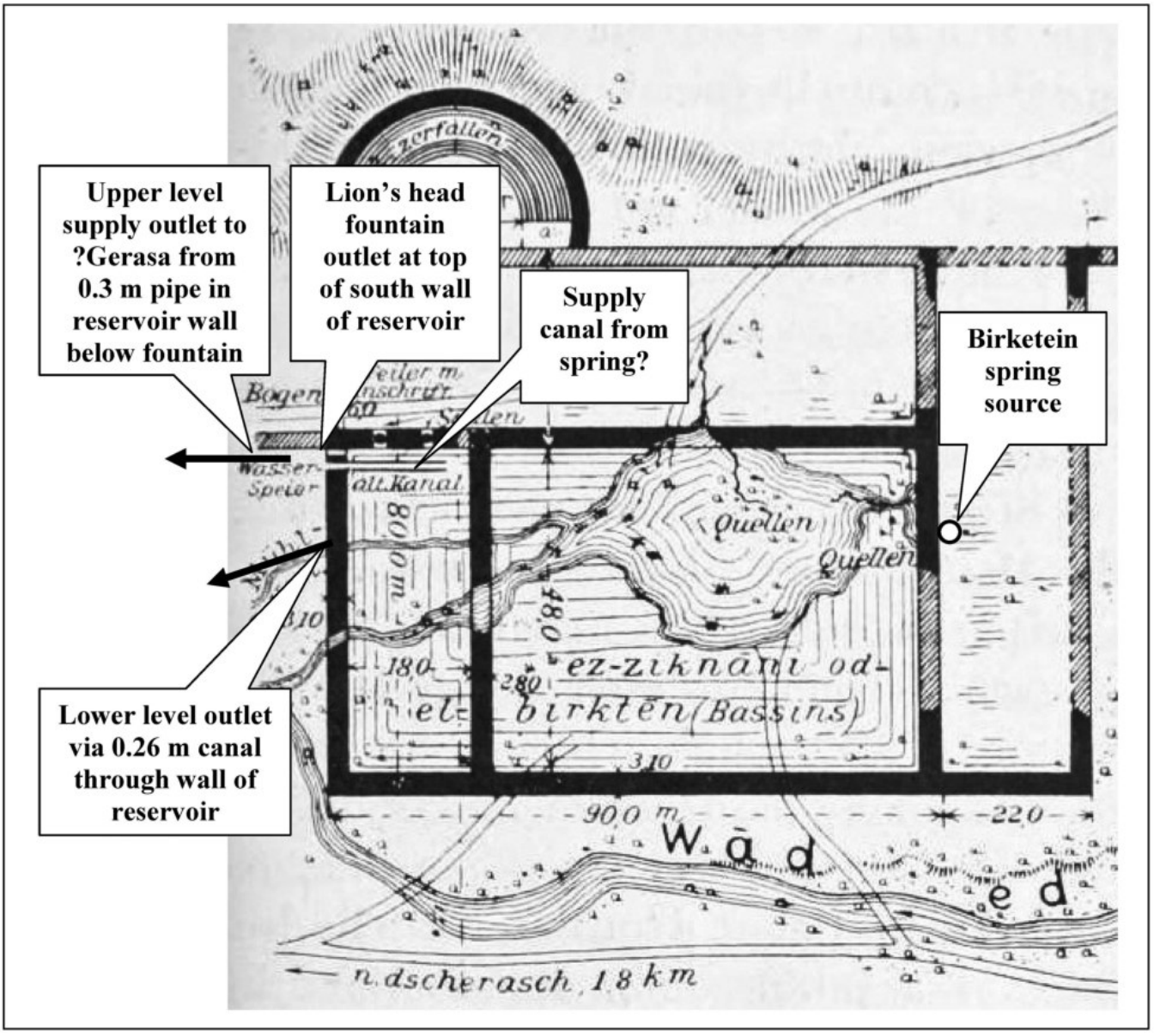
1.Schumacher states "In der südwestlichen Ecke des unteren Behälter finden wir als Wasserspeier einen Löwenkopf, durch dessen Maul ein Kanal von 0,40m Weite und 0,33 m Höhe nach Gerasa geführt wurde (s. Abb. 40)." (1902: 167), which translates to "In the southwestern corner of the lower basin, a channel 0.40 m wide and 0.33 m high discharged water to Gerasa through an outlet in the form of a lion's head". This is consistent with Schumacher's accompanying plan **(Fig. 10)**, which shows the supply channel located inside the reservoir and close to its west wall. Schumacher then describes a second outlet in the wall nearby but 0.6 m lower. This was cylindrical and 0.3 m in diameter. McCown's interpretation of Schumacher's description differs in that he describes "a spout through a lion's head leading the water into a canal 0.4 m wide and 0.33 m deep" (Kraeling 1938: 162).

2.A third outlet through the reservoir wall discharged water in a channel 0.26 m wide. Schumacher thought that this supplied the el-'adebije water mill at the North Gate, but he was mistaken as early aerial photography confirms that this mill was supplied directly from Wādi ed Deir via a purpose-built canal with its offtake 600 m from the North Gate.

3.Water also discharged over the threshold of the ruined south wall of the reservoir and joined with the stream in the nearby wadi.

4.At the time of Schumacher's visit the water level in the pool was 3 m below the lion's head spout, implying that the spout was located near the top of the reservoir wall.

On the above interpretation, Schumacher did not describe water flowing into a channel from the south-western corner of the reservoir, but rather that it flowed out of the lion's head fountain. It can be assumed that the purpose of this fountain was to deliver a potable supply to local residents since, being set near the top of the south wall




*10. Interpretation of outlets from Birketein reservoir (from Schumacher 1902: 169, Fig. 41).*

of the reservoir at an estimated elevation of around 622 m and above the level of the top of the dividing wall between the two reservoir compartments, it can hardly have been used as a reservoir overflow device. A potable supply would need a contamination-free source, and this would have been achieved by connecting the supply canal described by Schumacher on or parallel to the west wall directly to Birketein spring, although Schumacher's plan does not show the supply canal extending into the larger northern compartment of the reservoir. If this supply canal was also connected to the adjacent 0.3 m diameter pipe set 0.6 m lower in the wall, then a potable supply could have been directed to an aqueduct to Gerasa along the 621-622 m contour. On present information the only evidence for such an aqueduct is a channel element 275 m south of Birketein (Kennedy and Baker 2009: **Fig. 4**) and a linear feature on an early aerial photograph. The aqueduct would have followed around the western edge of the Wādī ad Dayr valley floor, possibly merging with the lower section of aqueduct SW01 650 m south-west of Birketein.

From Schumacher's description "Der heutige

Wasserspiegel liegt 3 m tiefer als der ehemalige Ausfluss durch das Löwenmaul." (1902: 168) the elevation of the 0.26 m wide channel outlet (to the North Gate mill) through the south wall of the Birketein reservoir is estimated to have been at an elevation of around 619 m. This outlet could possibly have connected with an aqueduct in the valley to the south that was re-established in the late Ottoman period and is still in use today (aqueduct DW04). An aqueduct block with a channel width of 0.19 m has been found next to this irrigation channel 60 m south of Birketein (site 107) but is not *in situ*. DW04 flows midway down the western part of the Wādi ad Dayr valley and is interpreted to have approached the North City wall close to 603 m elevation, and was used to irrigate Circassian fields within the city area.

*Wādī ad Dayr East Bank Aqueduct*

There is evidence of a channel (DE01) on the east side of the Wādī ad Dayr that was probably sourced direct from the wadi, with the offtake close to 620 m elevation located approximately 50 m east of Birketein reservoir. This channel lies just below the western edge of the modern road on the east side of the Wādī ad Dayr between Birketein and the city and would have irrigated the fields that occupied a narrow section along the eastern bank of the wadi – an area of only about 10 hectares - and any water mills located in the same area. It was in active use until recently but has largely disappeared, however occasional rock-cut sections point to construction in antiquity. It approaches the city wall at an elevation above 570 m and may have delivered a supply to the eastern part of the city above the level of Qairawan.

*Bisās ar-Rūm Aqueduct*

A 200 m long section of aqueduct (SE01) has been identified at approximately 640 m elevation to the north-east of Birketein on the east side of the Wādi ad Dayr valley (site 125). The channel is 0.5 m wide and mainly of rock-cut construction **(Fig. 11)**. The source is likely to have been the now defunct 'Ayn Bisās ar -Rūm (elevation 675 m) adjacent to Khirbat ash -Shawāhid, 1.1 km to the north-west, although some sections of the alignment are difficult to trace. The destination is uncertain, although an aqueduct at this elevation could have supplied the eastern side of Gerasa 2 km to the south.

*Ash-Shawāhid Aqueducts*

'Ayn ash-Shawāhid spring (elevation 650 m) to the south of the Sūf refugee camp is the source for at least one of two aqueducts that lie above the level of the Birketein Spring. In the Ottoman period the lower ash-Shawāhid aqueduct (SW01) supplied fields on the west side of Wādi Sūf and the water mill (tāhūnit as-samūri) installed in the Tomb of Germanus at Birketein. From here water was carried southwards in an earthen canal over the ruins



*11. Rock-cut aqueduct from Bisās ar-Rūm at site 125 (D. Boyer).*

of the festival theatre at Birketein[3] and then via an aqueduct along the west side of the Wādī ed Deir valley at an elevation of approximately 630 m. The southern rock-cut section of it can be traced to a point just north of the north wall of Gerasa on early aerial photographs. A section of it located just south of Birketein at an elevation close to 632 m is shown in a plan published by Kraeling (1938: 161)[4]. Early aerial photographs show that it went out of use prior to the early 20th century and was likely out of use prior to Circassian settlement. The section between ʻAyn ash-Shawāhid and the Tomb of Germanus is still used today for irrigation.

A short 70 m section of rock-cut aqueduct is located 120 m south-west of the Birketein reservoir. This aqueduct (SW02) has a 1 m wide channel and lies parallel to and to the west of the lower esh Shawāhid aqueduct SW01 at the higher elevation of approximately 640 m. Its source is uncertain but could have been ʻAyn ash-Shawāhid or another source higher up the Wādī Sūf valley. Its destination is also uncertain, but it may have been part of the system that also supplied the nearby Birketein baths and at one time perhaps joined with the lower esh Shawāhid aqueduct to the south closer to Gerasa. The existence of rock-cut side channels indicates that at least part of its function was to supply irrigation water. The working hypothesis is that the higher level aqueduct was constructed first – and from Steuernagel's evidence relating to esh Shawāhid spring (1925: 270) could have been in use in the Byzantine period – with the 1.5 km section closest to the source being replaced in the (?) Ottoman period by the lower level aqueduct. A later date for the lower aqueduct is implied by the fact that part of it passed over the ruins of the Birketein festival theatre.

*North-West of the City, Including Dayr Aliyat North-West Aqueduct*

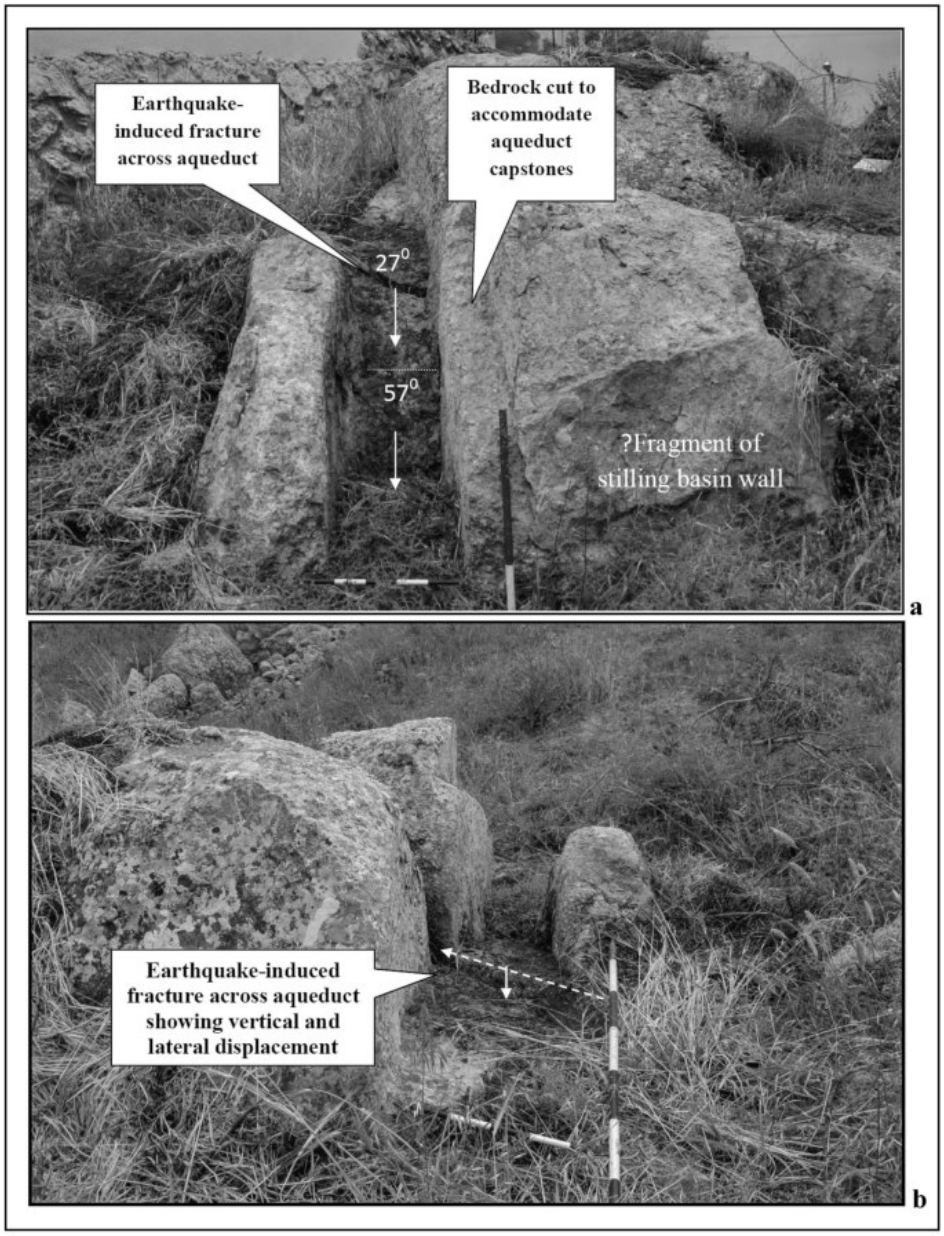
West of the city, important new discoveries have been made of elements of the aqueduct (North-West Aqueduct or JW01) that would likely have entered the city close to the North-West Gate. Three important new sections of this aqueduct were located during the survey, the longest being a 35 m rock-cut section at site 114.

Based on surviving in *situ* elements at six locations, the alignment of this aqueduct can now be traced for approximately 1 km north-west of the North-West Gate. Direct evidence of the aqueduct was first reported by the Jarash Hinterland Survey (Kennedy, Baker and Sharman 2005: Site 143), who recorded a southeast-trending 30 m long section of plastered rock-cut aqueduct about 170 m north-west of the North-West Gate of the city. This site has since disappeared under a building site. The source is not presently known, although it must lie above 740 m elevation. The steep 10% gradient of the 1 km section closest to the city would have caused engineering problems for this aqueduct. Water flow in aqueducts with such steep gradients had the potential to damage the structural components, so devices such as chutes, cascades and stilling basins were typically employed by Roman engineers to reduce the impact. An example of what is believed to be a stepped channel cascade (Chanson 2000: 47-8) has been identified in the rock-cut aqueduct at site 127. The base of the cascade is not exposed but there are two steps in the floor of the aqueduct – one with a gradient of 270 the other with a gradient of 570 – and a remnant of what may have been the wall of a settling or stilling basin at the foot of the cascade **(Fig. 12a).** The limestone bedrock had been cut to accommodate capstones over the aqueduct. The installation shows unrepaired earthquake damage in the form of a fracture with associated displacement **(Fig. 12b).**

At site 128, 100 m down slope to the southeast of site 127, a cross section through another section of the aqueduct buried under 2.4 m of soil is exposed in a road cutting **(Fig. 13a).**

3.The Ottoman period earthen canal can be seen in photographs taken during the Yale expedition in May 1931. Examples include Yale University Art Gallery Negative number: gerasa-b287~01 b-287 and Negative number: gerasa-b273~01 b-273.

4.Seigne (2008: 176) postulates that the aqueduct at ca. 633 m elevation south of Birketein could have connected via a bridge or siphon with a spring (on the north side of the wādi) near the main pumping station, which he refers to as " ʻAyn ash-Shawāhid", although there is no evidence for such structures. The aqueduct he is referring to is in fact sourced from a spring on the south side of the wadi, referred to as ʻAyn ash-Shawāhid in this paper, and consequently there is no need to invoke a hypothetical bridge or siphon across the valley.




*12. (a) Aqueduct with stepped chute and fragment of a possible stilling basin wall–site 127 (D. Boyer). (b) View down slope of aqueduct showing fracture and displacement by earthquake (D. Boyer).*




*13. (a) Buried section of North-West Aqueduct (JW01) exposed in road cutting at Site 128 (D. Boyer). (b) Detailed view of aqueduct showing plastered walls and rhythmic carbonate sedimentary layering representing approximately 100 years of stream flow (D. Boyer).*

The aqueduct is trapezoidal in section, 0.35 m wide at the base, and was cut up to 0.7 m into limestone bedrock. A zone of rhythmically layered carbonate sediment or calcareous sinter (Sürmelihindi *et al*. 2013: 962) up to 145 mm thick lies on 10 mm thick plaster layer at the base of the aqueduct and is overlain by chaotic rubble fill. There is no evidence of capstones at this location. There is at least one major discordance in the layered carbonate sediment, but comparison with similar deposits described by Sürmelihindi *et al*. (2013: 961) – where the rhythmic layering of coarse crystalline carbonate alternating with finer grained layers has been shown to reflect seasonal deposition of carbonate in wet and dry seasons respectively – the layering in the aqueduct at site 128 indicates consistent aqueduct usage over a period of perhaps 100 years **(Fig. 13b)**.

*Dayr al-Liyāt Aqueduct*

The Dayr al-Liyāt Spring site was investigated as a possible source for the North-West Aqueduct. A section of a small rock-cut aqueduct was located 250 m south east of the spring at site 126, but at an elevation of *ca* 730 m it is too low to be the main source for the North-West Aqueduct and no trace could be found of a direct link between the two. The Dayr al-Liyāt spring may be the source of the small plastered aqueduct that passes under the threshold of the South-West Gate to a presumed destination in the south-west quarter of the city.

*Wādi Jarash - East Bank*

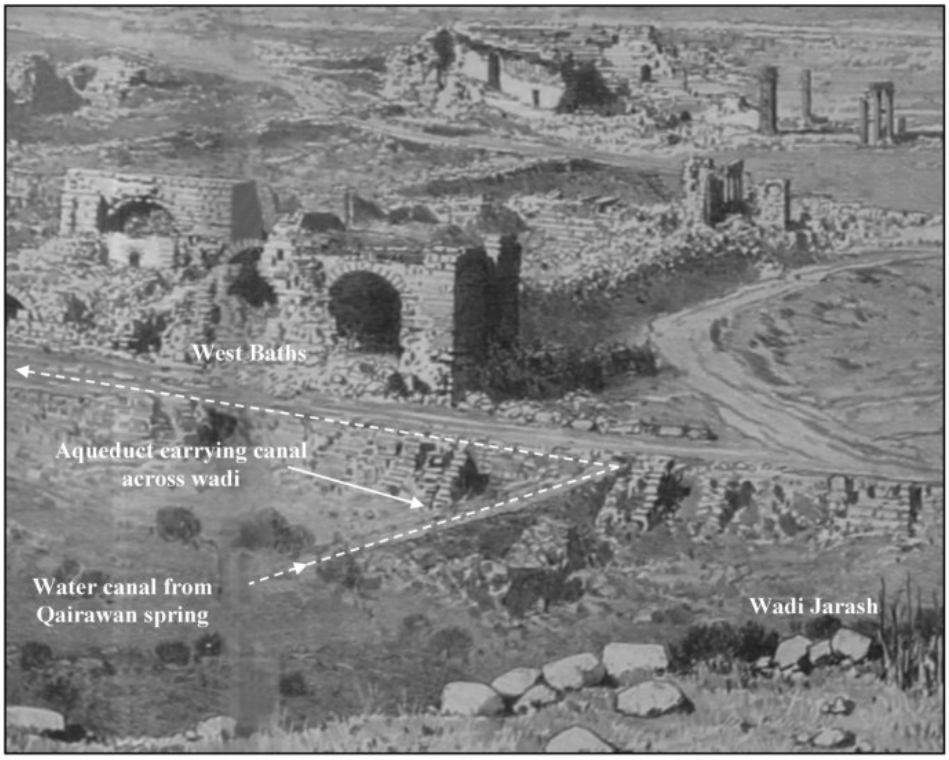
*Qairawan Aqueduct*

The low elevation of the Qairawan spring outlet at 566 m (Seigne 2004: 35) limited the potential use of its waters to destinations on the lower part of the eastern side of the city. Its use to supply the small Byzantine Baths is attested from the work done by Lepaon (2008: 65-67) and it is likely that the aqueduct continued a further 100 m to the south to supply the larger East Baths. It may also have continued beyond the East Baths to irrigate the Wādi Jarash south of the city, as it does today. Published reports by Buckingham (1821: 393) and many subsequent early-19th century visitors confirm that water from Qairawan was also carried westwards over the wādi via a crudely constructed aqueduct that connected with an aqueduct that carried water along the west bank to supply fields within the Hippodrome and further south. In 1816 Buckingham noted:

"From this fountain-head [Qairawan], the water goes off in two separate streams. One of these streams runs westward where it joins the channel worn by the rains, and joins the temporary brook….The other stream is carried by a sunken and stuccoed channel for about a hundred yards to the southward, when it turns off sharply to the west, and goes by a raised or arched aqueduct over the other portion of its own stream, now on a much lower level, until, gaining the brow of the western hill, it continues running along by it to fill the channels of the naumachia [Hippodrome] without the city walls." (1821: 393).

Robinson (1837: 234) describes the aqueduct over the stream as "a solid flat-looking structure, coming from the eastern hills, and not at all an attractive piece of architecture", and a rare image of this simple structure appears in a lithograph of a photograph taken by Rey in 1858 (Rey 1861: plate XX) **(Fig. 14)**.

A branch of this aqueduct carried water at a lower level along the west bank of the wādi to supply watermills and provide irrigation water. The system is poorly described by early visitors, but sections of it were clearly earthen canals dating to the Ottoman period prior to Circassian settlement. Charles Barry (1819: Diary 5th May 1819) refers to it as "an aqueduct formed of open channel stones" which could be a description of aqueduct blocks similar to those that form the DW01 aqueduct in the Wādī ed Deir valley. Despite the proximity of the West Baths to the aqueduct over the wadi and Qairawan spring, the West Baths and all of the water monuments on the west side of the city lie at a higher level and therefore the source(s) that supplied these



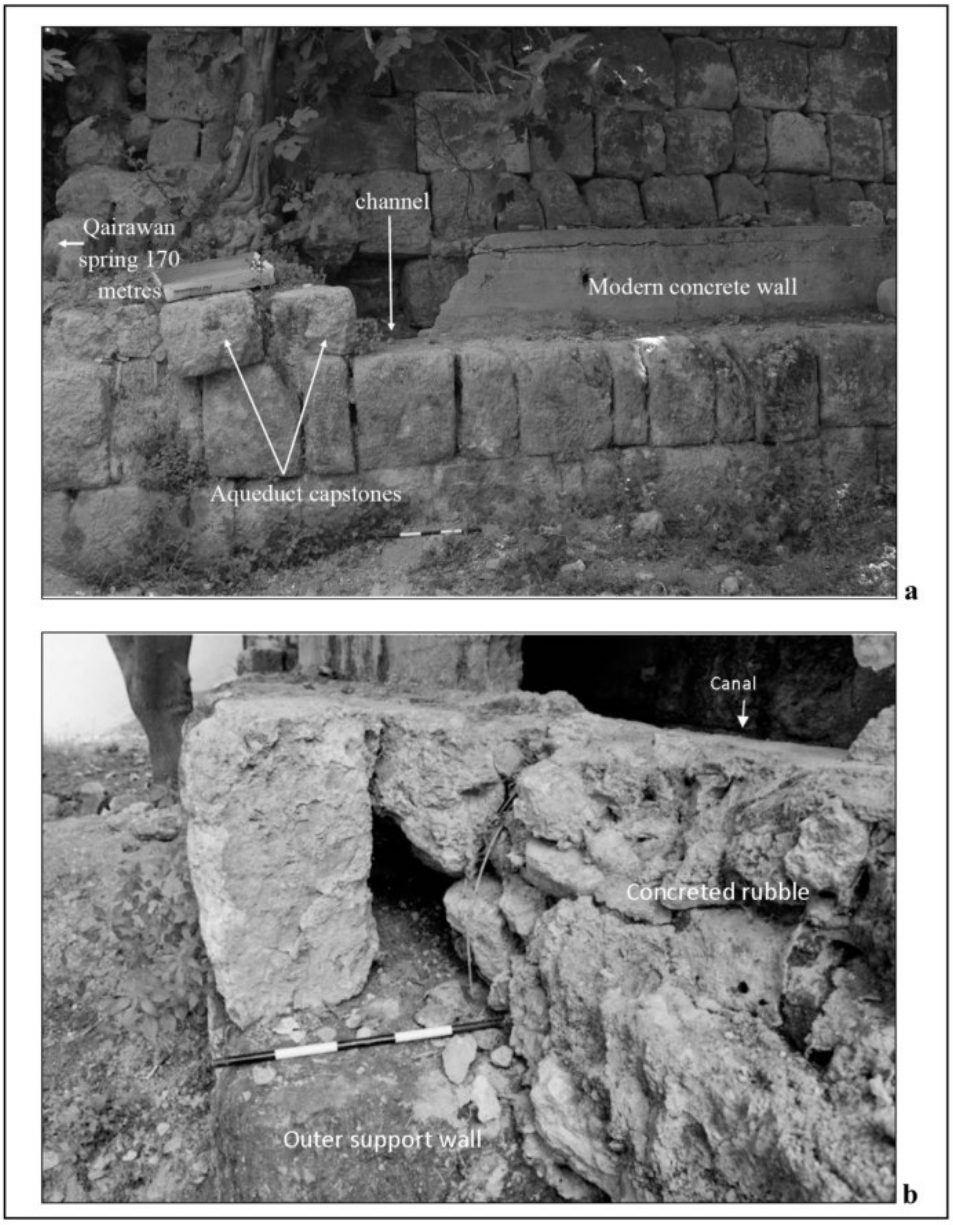

*14. View of aqueduct carrying canal from Qairawan spring to west side of Wādi Jarash (From Rey 1861: Plate XX).*

monuments must be found elsewhere. If water was supplied to the west bank from the east bank it must have come from a higher-level source than Qairawan.

A 25 m long section of aqueduct draining southwards from Qairawan spring was recorded by the Yale team in the 1930s on a 1:2500 scale plan (Yale University Art Gallery Negative number: 1938.5999.5004.30). A section of the aqueduct was recorded in the city in 2013, surviving as the rear boundary wall of a property (site 111). It is part of the section of the aqueduct that supplied the small Byzantine Baths - and almost certainly the larger East Baths further south – and is the only surviving section of the aqueduct on a 4 m high wall adjacent to the small Byzantine Baths reported by Lepaon (2008: 66-7). The plastered canal, 0.52 m wide and 0.62 m deep, lies on top of a masonry frame wall 20.8 m long **(Fig. 15)**. It stands 1.7 m above the present ground surface, but according to the property owner the wall was originally about 3 m high. Capstones are present over the canal at the northern end of the site, but they have been replaced by modern concrete at the southern end.

*Tunnel Aqueduct*

Approximately 1 km south of the city a 60 m long section of a rock-cut tunnel is preserved on the western edge of an outcrop of Kurnub Group sandstone that forms that east bank of the wādi at this point. It is the only known rock-cut aqueduct tunnel in the project area. The site was recorded by the Jarash Hinterland Survey in 2010 (Baker and Kennedy 2011: 459). The remains of what appear to be a group of rock-cut channels can be seen cut into the same limestone outcrop immediately down slope of the tunnel. The tunnel is at an elevation of approximately 500 m, but its source is not known. The tunnel has an irregular cross section, with a width of up to 0.75 m and a height of up to 1.5 m. It would have had a substantial carrying capacity, so the source is either a major spring - perhaps Qairawan - or stream flow from the wādi. Downstream from the tunnel an irrigation canal that was reused in the late Ottoman period can be traced down the east bank of the wadi for a

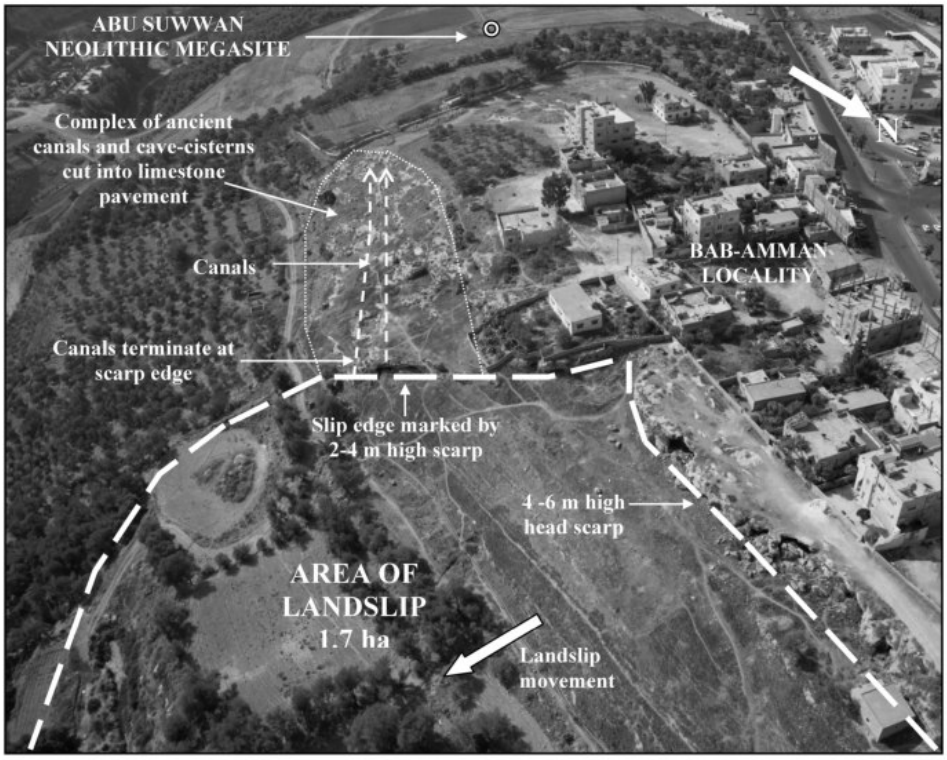



*15. (a) Support wall and capstones of Qairawan aqueduct at site 111 (D. Boyer). (b) Construction components of Qairawan aqueduct (D. Boyer).*

distance of almost 4 km.

*West Bank Aqueducts*

A system of rock-cut aqueducts and cisterns preserved in a limestone pavement over a distance of 150 m on the west bank of Wādī Jarash 250 m south east of Hadrian's Arch was visited to confirm the direction of flow. Levelling confirmed a southerly flow direction; the site had been recorded by the Jarash Hinterland Survey in 2010 (JHS site 744 - Baker and Kennedy 2011: 459). There is a particularly dense concentration of water installations at this location – collectively designated JW02 - which presumably directed water for irrigation to fields downstream in the vicinity of Bab Amman. To the north the aqueducts and limestone pavement terminate abruptly at a 4 m high scarp, which represents the southern edge of a large landslip that at some point in antiquity removed a 150 m long section of the eastern edge of the hillside above the location and also disconnected the aqueducts from their source. This slip - which is clearly visible on aerial photographs (**Fig. 16)** - covers an area of *ca* 1.7 hectares and was probably triggered by an earthquake. The source for the aqueducts is not known but must lie above 550 m elevation. The outflow from the




*16. Bab Amman landslip locality showing termination of ancient canal complex. (Photograph Don Boyer © APAAME_20101021_DDB-0397).*

drain east of the Hippodrome (see below) may have fed into these aqueducts.

*Drain east of the Hippodrome*

A short section of a rock-cut channel was identified under the east wall of the Church of Bishop Marianos (site 130) east of the Hippodrome. It is large, having a width of 1.7 m and a rock-cut depth of 1.0 m. The east wall of the Church of Bishop Marianos, built in AD 570 (Gawlikowski and Musa 1986: 137), was built over the drain **(Fig. 17a)** and provides a terminus post quem for its excavation and use.

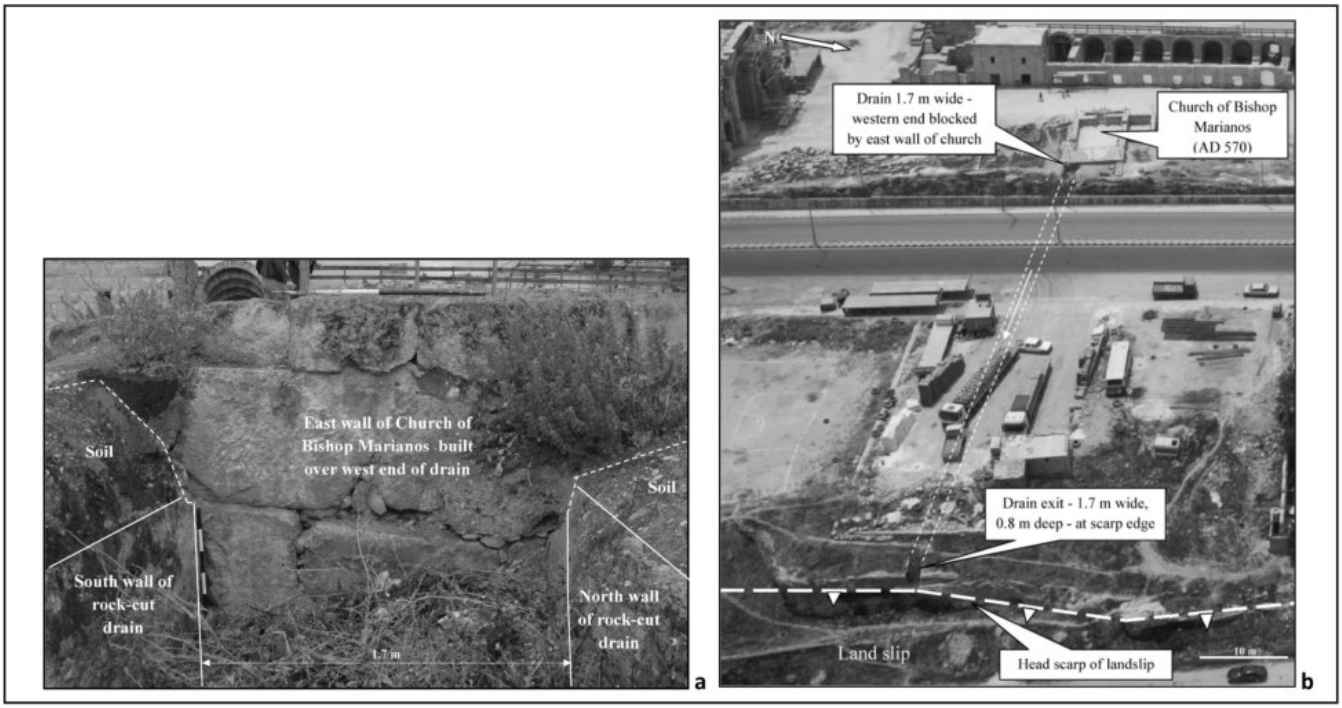
There is no trace of the channel west of the Church of Bishop Marianos but it can be traced on aerial photographs 80 m eastwards to the edge of the limestone scarp above Wādi Jarash where a short section is visible as a rock-cut channel 1.7 m wide and 0.8 m deep **(Fig. 17b)**. The size of the channel implies a high water carrying capacity, but its source is not known. It may have linked to the drains from the Hippodrome that exist under the north eastern section of the Hippodrome, but there is no direct evidence of such a link.

**Wādī al-Majar**

A very brief survey was conducted in the Wādī al-Majar and Wādī Tannur valleys to identify water structures. No spring-fed aqueducts were located within the Wādī al-Majar, which may be a function of the paucity of major spring sources in the valley and/or the preliminary nature of the survey, however a small rock-cut reservoir (site 133, previously a quarry) and a reasonably well preserved wine press and cistern installation (site 134) were recorded to the east of Khirbat al-Hute.

**Wādī Tannur**

Elements of a short, masonry aqueduct, including what may be a short cascade, were identified at Tannur spring (site 135). The channel is lined with *opus signinum* plaster and is entirely choked with carbonate sediment, which would have eventually caused it to pass out of use **(Fig. 18)**.




*17. (a) The drain at site 130 east of the Hippodrome, looking west. The east wall of the Church of Bishop Marianos can be seen built over the west end of the short section of drain, which is 1.7 m wide (D. Boyer). (b) Aerial view showing interpreted alignment of drain and drain end at edge of scarp. (Photograph Stafford Smith © APAAME_20100601_SES-0483)*



*18. Masonry aqueduct below 'Ain Tannur (site 135).The specus is entirely filled with carbonate sediment.*

## Reservoirs / Birkets

*Birketein*

With a length of 88.5 m and a width of 43.5 m, the Roman reservoir located adjacent to the spring at Birketein 1.6 km north of the city is the largest reservoir in the project area. It is built of strong masonry, with a cross-wall dividing it into two unequally sized compartments; there is no evidence that it was roofed. A study of photographs in the Yale University Art Gallery collection suggests that the outer walls were originally 4 m high, with the top of the dividing wall being about 1 m lower. These dimensions give the reservoir a theoretical maximum capacity of 14,900 $m^3$ with the compartments having a reduced capacity of 11,100 $m^3$ to the top of the dividing wall. The smaller southern compartment has a maximum capacity of 2,300 $m^3$. Water flow from the larger to the smaller compartment was controlled via a sluice gate in the dividing wall (Kraeling 1938: 162). The reservoir is interpreted to have had the joint functions of storage and flow control.

The water from the southern reservoir

compartment would have been distributed via outlets in the southern wall, but there are few original features remaining as a result of the modern restoration of the reservoir. Today, the only outlet is a concreted irrigation canal that supplies the valley downstream but in the late 19th century there were two outlets in the south-west corner - a lion's head fountain and a lower ceramic pipe – and a canal through the central part of the south wall (Schumacher 1902: 165-171). There has been no published excavation of the area immediately south of the reservoir that could provide information on the distribution system downstream of the reservoir in the Roman period.

*Other Reservoirs*

Small reservoirs with original capacities estimated to be in the range 50-250 $m^3$ were identified at six locations. They have all been at least partly cut into limestone bedrock, and reuse of pre-existing quarry areas is suspected. There is one case (site 133), which is entirely rock-cut, and sites 109, 119 and 129 have evidence of masonry construction on at least one wall. Where observable, the floors are bedrock, but site 117 is unusual in that it had a mosaic floor.

The source of water for the reservoirs is sometimes difficult to determine. In the case of sites 109 and 133 the reservoirs stored water from the harvesting of rainfall from adjacent limestone pavements. An aqueduct source is suspected in the case of sites 113, 117 and possibly 110, although rainfall harvesting may also have been a factor in the latter case. The reservoir at site 129 stored water from a nearby (unnamed) spring.

**Springs / Sources**

The only spring site recorded during the survey is that of el-Hammām on the Wādī Zarqa near its junction within the Wādī Jarash (site 108). This is a *MEGA* site but very little information is available on it. El-Hammām is a mineral spring but is not very warm, and today the flow is weak. The spring is enclosed by a horseshoe-shaped platform of ancient concrete incorporating miscellaneous materials including some of dressed stone that is presumably the foundations of a spring-house or fountain-house dating to the Roman period **(Fig. 19a).** This was originally faced with a variant of *opus testaceum* known as *structura testacea*, made of level courses of tiles and mortar rather than bricks (Van Deman 1912: 390-1), and a small exposure of this facing material is visible on the west side of the structure **(Fig. 19b).** Schumacher visited the site in 1902 and referred to it as a Roman bath (1904: 74) but provided no description of the ruins. Glueck (1939, III: 220-221) reported evidence of what he thought to be a bathing establishment dating to Roman times, including fragments of Corinthian columns and an inscription, but no trace of these remain.



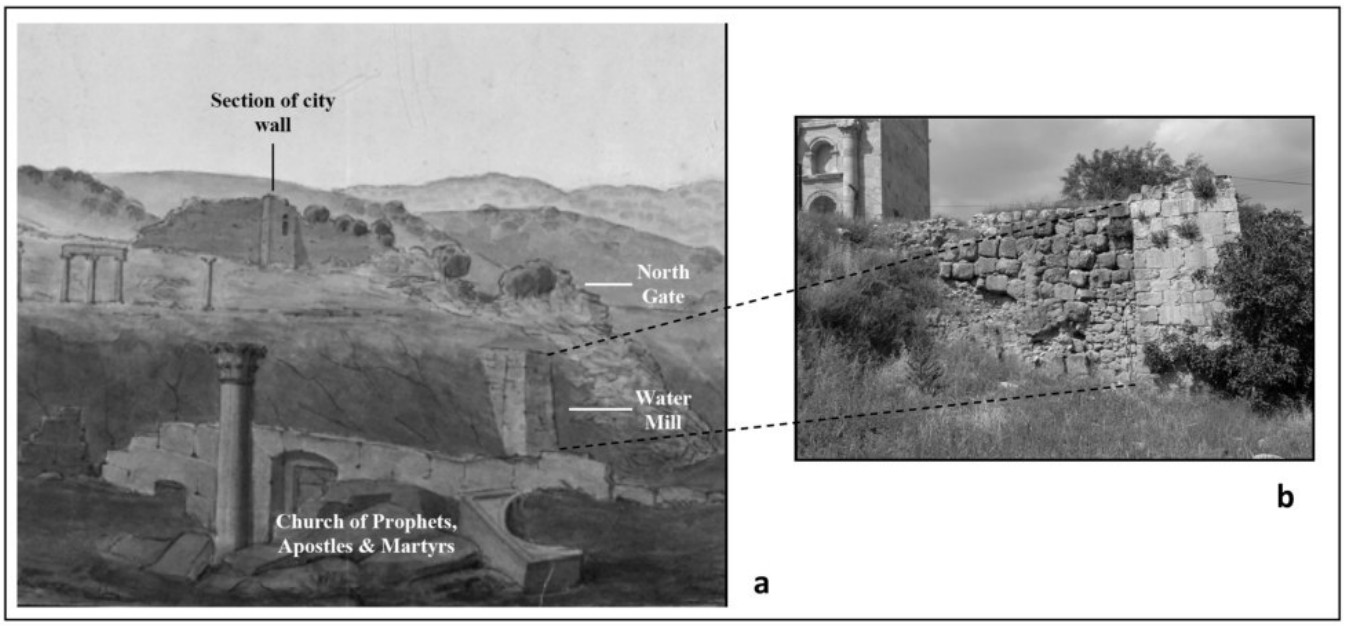

*19. (a) Roman concrete foundations surrounding el-Hammām mineral spring (site108) (D. Boyer). (b) Ancient concrete, faced with structura testacea, on west side of structure (D. Boyer).*

**Water Mills**

The water mill near the North Gate of the city was recorded. It is of the penstock (Arubah) type, and one of the few water mills in the district where there is some documentary evidence as to its age and use. The 6 m high penstock tower is constructed of well-dressed and squared limestone blocks and ashlars taken from buildings in the city, and includes at least one architectural piece. Some care was taken in the construction of the tower, and the reduction of the footprint of the courses with height results in an elegant design not often seen in such utilitarian structures **(Fig. 20b).** The arcuate support wall for the 15 m long mill canal is more crudely constructed. It has an outer course of large squared and roughly dressed stone, with a core of rubble and mortar. Only a small section of the base of the mill canal remains.

A pre-1816 construction date is indicated by the appearance of the mill in a plan and a watercolour by W.J. Bankes dating to around 1816 **(Fig. 20a)**, and Charles Barry also described it in his travel diary of 5th May 1819 (Barry 1819). Evidence from Bankes' watercolour drawing and the fact that Barry did not recognise the structure as a water mill, despite the fact that he would have seen similar mill structures in use during his travels to and from the site, indicates that the mill had been out of use for some time prior to the visit of these two men. It was recommissioned some time after Barry's visit, and was certainly in use in the post-Circassian period of settlement. Aerial photographs from the 1920s show a 600 m long canal on the west bank of the Wādī ad-Dayr that carried water from the Wadi to the mill through the North Gate via a crude masonry canal constructed over the Roman pavement (Fisher 1934: 5). The canal was in place at the time of Schumacher's visit in 1898 and the mill at that time was known as al-'Adabijeh (Schumacher 1902: 119).

A water mill was built into the ruins of the Tomb of Germanus near Birketein, with the two levels of the tomb substituting for the conventional penstock tower. It was recorded as tāhūnit as-Samūri (as-Samūri mill) by Schumacher (1902: 162-164; **Fig. 36**), and the ruined state of the water supply canal evident from Schumacher's photograph suggests that although of likely Ottoman date, its construction and use predates Circassian settlement. This mill was supplied via an aqueduct (SW01) from ash-Shawāhid spring.




*20. (a) Penstock water mill at site 136 near Gerasa's North Gate as it appeared in 1816 watercolour by William John Bankes (Bankes Archive, Dorset History Centre ©: D/BKL:HJ IIIA). (b) Same water mill as it appears today (D. Boyer).*

**Wine Presses**

A number of rock-cut wine presses were recorded in the survey. They comprise a treading floor that drains into a cistern or tank at a lower level, and fall into two groups. The first is a small, domestic sized installation with a treading floor <1.5 m2 draining to a small cistern – examples are sites 122 and 134; the second is much larger with treading floors of 5-20 m2, draining to one or two large vats, examples being sites 124 and 134.

**Overview of the 2013 Survey Results**

A total of 36 elements were recorded at 35 sites during the 2013 survey, the majority being aqueduct elements (23), reservoirs / tanks (6) and wine press installations (4). Most of the sites had not been previously recorded.

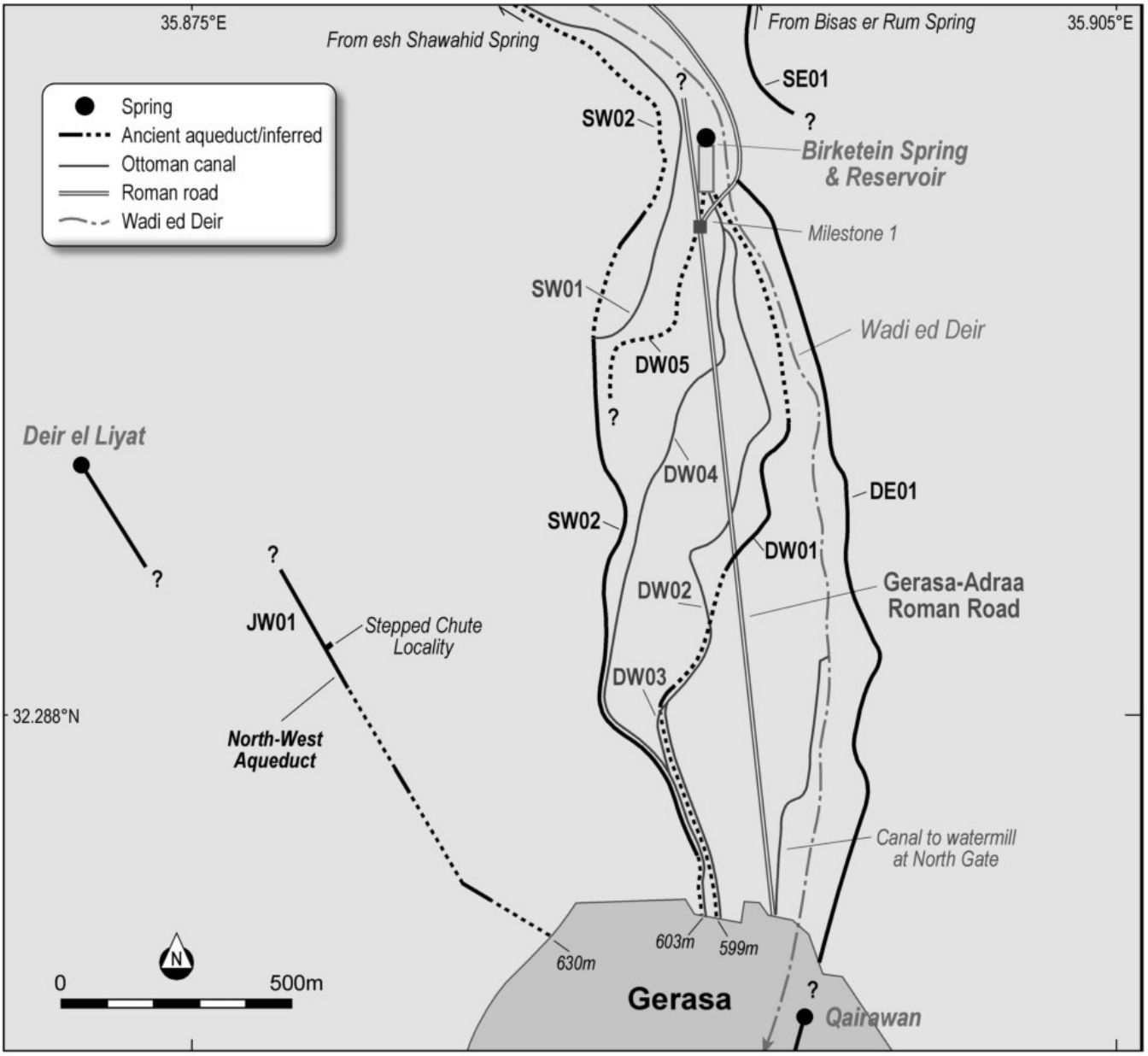
In 2008 the Jarash Hinterland Survey identified displaced elements of a masonry aqueduct of likely Roman - Byzantine date strewn over a distance of 450 m across the fields immediately west of the Wādī ad Dayr stream (Baker and Kennedy 2011). Unpublished evidence from the Yale mission in the 1920s and 1930s shows that although these aqueduct elements were not *in situ*, they closely relate to a section of aqueduct that could be traced over a distance of 370 m close to the 608 m contour. This aqueduct (DW01) lies close to the Wādī ad Dayr stream bed and may have been sourced from either the wadi stream itself or from Birketein 500 m upstream to the north-west. **(Fig. 21)**

DW01 can be traced to a point 450 m north of the north city wall, and may have continued to the city as a rock-cut aqueduct and entered the city close to 599 m elevation, however no point of entry of the aqueduct into the city dating to the Graeco-Roman period has been identified. Early aerial photographs and evidence from the Yale mission show this 450 m section certainly formed part of a larger system that supplied irrigation to the city area in the late Ottoman period. The function of the DW01 aqueduct is likewise unclear; it crosses the western part of the fertile valley of Wādī ad Dayr and the existence of aqueduct blocks with smaller channels suggests that at least a portion of the supply was directed to agriculture in this area.

The 2013 survey of Wādī ad Dayr area identified several masonry aqueduct blocks immediately south of Birketein. These are similar in size and design to the aqueduct blocks that make up JW01 500 m to the south, but there is no hard evidence of a connection between the two.

Elements of higher-level aqueducts exist on both sides of Wādī ad Dayr valley. On the east side, a 200 m long section of a largely rock-cut aqueduct exists to the north east of Birketein at *ca* 640 m elevation. The source is probably the now abandoned ‘Ayn Bisās ar-Rūm Spring adjacent to Khirbat ash-Shawāhid, but the destination is uncertain. An aqueduct at this elevation could have supplied the eastern side of Gerasa, but no link to this area has been found to date. On the west side of the valley there is evidence of at least two aqueducts above the level of the Birketein spring; one definitely sourced from the esh Shawāhid spring on the south side of Wādī Sūf that was used in the late Ottoman period to deliver water to the city area via a channel that crossed the wall at *ca* 603 m elevation, the other probably an earlier aqueduct from the same source. The latter aqueduct is only known from a single rock-cut section <100 m in length south west of Birketein reservoir. While its destination is not currently known, it may have formed part of an aqueduct that supplied the west side of the Wādī ad Dayr valley and Gerasa.

West of the city, important new discoveries have been made of elements of the aqueduct (North-West Aqueduct) that would have entered the city close to the North-West Gate. Based on surviving *in situ* elements at six locations the alignment of this aqueduct can now be traced for approximately 1 km north west of the gate. The source (or sources, as the aqueduct may well have drawn from a number of springs) is not presently known, although from the elevation of the highest known section it must lie above 740 m elevation. Springs at around 800 m elevation located midway between Dayr al-Liyāt and Sūf are considered to be the likely source; if correct,




*21. Details of aqueducts north of Gerasa (D. Boyer).*

this would give the North-West Aqueduct a length of around 5 km from the North-West Gate, its likely entry point into the city. The approximate 10% average gradient of the 1 km section of this aqueduct so far confirmed would have created a number of constructional problems related to high water flows. Flow reduction methods such as the use of cascades and stilling basins were in use during the Roman period, and part of a probable stepped cascade was discovered *in situ* in a short section of the aqueduct during the survey (Site 127).

Aside from the well known reservoir at Birketein, which had a theoretical maximum capacity estimated to be 14,900 $m^3$, reservoirs of likely Roman-Byzantine date were identified at six locations outside the city. All were either entirely or partially of rock-cut construction, probably representing a reuse of previously quarried areas. Only one is complete, with original capacities estimated to be in the range 50 to 250 $m^3$. While some were connected to local spring supplies, others (e.g. site 133) represent likely opportunistic reuse of a quarry

area for rainwater catchment. The reservoir located on the hillside west of the esh Shawāhid Spring is unusual in that it had a mosaic floor (site 117). The existence of well-dressed blocks in a nearby farm wall, including a Christian cross cut into one block, suggests some early Christian occupation and raises the possibility that the structure had some other use – perhaps as a bathing pool.

A very brief survey was conducted in the Wādī al-Majar and Wādī Tannur valleys to identify water structures. Elements of a masonry aqueduct (including what may be a short cascade) were identified at the Tannur Spring, where it carried spring water to a possible tank at its base, and the spring also supplied rock-cut aqueducts for downstream use on both sides of the Wādī Tannur. No spring-fed aqueducts were located within Wādī al-Majar during the brief survey, which may be a function of the limited survey coverage.

Water installations are often difficult to date, and this is particularly the case in surface surveys where there is no excavation to place the structures in context. None of the sites recorded has been dated, with the exception of the large drain from the Hippodrome area that was built over by the construction of the Church of Bishop Marianos that effectively gives a pre-AD 570 date for the construction of the drain (Gawlikowski and Musa 1986: 137). However many of the sites recorded during the survey have vestiges of wall and floor plaster, and the possibility of dating the plaster will be investigated. There is evidence of several applications of plaster over time in the case of the buried section of the North-West Aqueduct (site 128), and the dating of these components could provide a valuable insight into aqueduct use. Use of the distinctive red coloured *opus signinum* plaster was noted on walls at a number of sites, including aqueducts, reservoirs, cisterns and wine presses. In rural settings, domestic sized rock-cut wine press installations (treading floor area <1.5 m2) were recorded at two locations; in both cases larger, probably commercial scale installations lay either immediately adjacent or close by (sites 123 and 136).

**Preliminary Conclusions**

A substantial and relatively sophisticated water delivery system to and within the city must have been in place by the beginning of the 2nd century AD in the case of the west side of the city, and probably sometime in the 2nd century AD on the east side, but the actual date of the establishment of the hydraulic system is not known. The existence of an irrigation system between the Birketein reservoir, 1.6 km north of Jarash, and the western side of the city in the late Ottoman period demonstrates that it would have been possible to have delivered water from Birketein to the city in the Roman - Byzantine period at a level (599-603 m) that would have been adequate to supply all the major monuments on that side of the city[5]. While there is little substantive evidence of water actually being supplied to the city by an aqueduct directly from Birketein during the Classical period it is possible that this was the case, however it would likely have been one of a number approaching the city from the north and therefore the popular hypothesis that the spring and reservoir at Birketein was the sole source of water to the monuments on the west side of the city is not supported by the available evidence. To the north of the city there is evidence of aqueducts approaching the city on both sides of the Jarash Valley. On the west side, potable water from two west-bank springs - esh Shawāhid and probably Birketein - was carried in mainly rock-cut aqueducts and delivered to the city at approximately 599-603 m elevation. On the east side, an aqueduct from Bisās ar -Rūm spring at Khirbat ash-Shawāhid may have delivered potable water to the eastern part of the city at a higher elevation than Qairawan spring,

5.This resolves the levelling concern expressed by Seigne: “De plus leur niveau de départ, situé à ± 618 m, et la topographie locale ne leur permettaient apparemment pas de rejoindre la cité à un niveau suffisant.” (2004: 176).

and within the city an aqueduct delivered water from Qairawan to and the Byzantine Baths and probably the East Baths. From the north-west, a major aqueduct (North-West Aqueduct) approached the city from a high level on a steep 10% gradient and would have entered the city close to the North-West Gate, however the source has not yet been identified. It is likely that water from the North-West Aqueduct was delivered to large cisterns or reservoirs located on the hills on the west side of the city - such as the 40 m by 20 m cistern located west of the Temple of Artemis. It could have readily provided supplies to virtually any part of the city, but the reticulation network remains to be demonstrated.

In the late Ottoman period much of the Jarash Valley was irrigated by a network of canals from spring and wadi sources over a distance of 10 km from Khirbat ash-Shawāhid to the junction of Wādī Jarash with the Wādī Zarqa, and it is likely that this was also probably the case in the Roman - Byzantine period. Cultivation of the floor of the Wādī ad-Dayr valley over the centuries has removed much of the evidence of the early aqueduct system from Birketein reservoir, but displaced sections of a major masonry aqueduct discovered by the Jarash Hinterland Survey in 2008 probably formed part of an irrigation system – perhaps shared with a supply to the city - sourced from either Birketein or the wadi stream. The agricultural areas in the Jarash valley south of the city were well serviced by a number of aqueducts on both sides of the wadi, including one aqueduct on the east bank that includes a rare tunnel section. To the east of Gerasa the absence of major springs and of any evidence of aqueducts point to the soils of the Wādī al-Majar valley not being irrigated during the Roman - Byzantine period, however the strong springs in the Wādī Tannur valley downstream probably sustained an aqueduct system that serviced both sides of the small wādī as is the case today.

While the sources of water supply to Gerasa have been clarified, there is much that is still obscure or uncertain. Fundamental questions still remain as to when the various aqueducts were in use, when they went out of use and where the supplies were directed. The aqueducts approaching the city from the north may have served dual functions in supplying both the city and the agricultural hinterland, whereas the North-West Aqueduct probably only supplied potable water to the city. While the evidence of carbonate sediment in the North-West Aqueduct indicates continuous use over an extended period – perhaps 100 years – it is not known when the system was constructed or when it went out of use, however evidence at one locality points to severe earthquake damage that would have rendered it inoperable if the aqueduct had been in use at the time. There is a critical need to date the construction and use of the various elements of the hydraulic system, and to identify where the various water supplies were used. Future work will include the sampling of plaster and cement lining the water installations to obtain dating information and the sampling of the carbonate sediment to yield climate proxy data and data on the chemistry of the various water sources.

Ongoing housing development in the Jarash area is destroying many archaeological sites before they can be recorded, and housing development is now moving away from the immediate city area to include neighbouring rural areas. The recording of sites is therefore a race against time. Experience from the Jarash Hinterland Survey has shown that even important sites where further work or preservation has been recommended are not immune to this destruction.

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## **Appendix:** Site details

| Site No. (JWP_) | lat (N) | long (E) | Elev | Remarks |
|---|---|---|---|---|
| 102 | 32.30124 | 35.89284 | 628 | Kerb of part-dressed stone in Wādi |
| 103 | 32.29798 | 35.89167 | 635 | Aqueduct *specus* |
| 104 | 32.30342 | 35.88726 | 644 | ?part of stone aqueduct |
| 105 | 32.28872 | 35.89203 | 609 | Aqueduct *specus* |
| 106 | 32.29836 | 35.89358 | 623 | Aqueduct *specus* |
| 107 | 32.29848 | 35.89329 | 617 | Aqueduct *specus* |
| 108 | 32.21409 | 35.89371 | 234 | el-Hammam mineral spring |
| 109 | 32.31461 | 35.89049 | 724 | Rock-cut reservoir |
| 110 | 32.31465 | 35.88779 | 738 | Rock-cut reservoir & quarry |
| 111 | 32.28055 | 35.89484 | 562 | Roman stone aqueduct |
| 112 | 32.29129 | 35.88309 | 743 | Rock-cut aqueduct |
| 113 | 32.29095 | 35.88286 | 735 | Rock-cut reservoir |
| 114 | 32.29077 | 35.88352 | 730 | Rock-cut aqueduct |
| 115 | 32.29722 | 35.88078 | 760 | Rock-cut aqueduct & ? reservoir |
| 116 | 32.31563 | 35.86983 | 770 | Muqibleh Spring water tunnel (Ain Hussein) |
| 117 | 32.30507 | 35.88397 | 671 | Rock-cut reservoir + mosaic floor |
| 118 | 32.30952 | 35.87624 | 690 | Rock-cut aqueduct-part plastered |
| 119 | 32.30501 | 35.88323 | 689 | ?aqueduct |
| 120 | 32.30571 | 35.88223 | 681 | Rock-cut aqueduct |
| 121 | 32.30702 | 35.89041 | 669 | Stone & rock-cut aqueduct |
| 122 | 32.306 | 35.88986 | 663 | Small wine press |
| 123 | 32.30559 | 35.88989 | 668 | Large wine press |
| 124 | 32.30071 | 35.89164 | 637 | ?aqueduct |
| 125 | 32.30124 | 35.89426 | 642 | Rock-cut aqueduct |
| 126 | 32.29165 | 35.87971 | 731 | Rock-cut aqueduct |
| 127 | 32.28991 | 35.88402 | 718 | Rock-cut aqueduct--chute cascade |
| 128 | 32.28931 | 35.88449 | 710 | Rock-cut aqueduct, plastered |
| 129 | 32.29001 | 35.87904 | 692 | stone & rock-cut reservoir |
| 130 | 32.27281 | 35.89141 | 574 | Rock-cut drain/aqueduct |
| 131 | 32.27414 | 35.89101 | 565 | Aqueduct, rock-cut and concrete |
| 132 | 32.2704 | 35.89297 | 553 | Rock-cut aqueducts & reservoir |
| 133 | 32.31403 | 35.92029 | 840 | Rock-cut reservoir (ex quarry) |
| 134 | 32.31165 | 35.92198 | 820 | Wine presses & cistern |
| 135 | 32.24372 | 35.92457 | 473 | Stone-built aqueduct |
| 136 | 32.28422 | 35.89476 | 588 | Water mill, Arubah type |

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# AN IRON AGE BASALT STATUE FROM THE AMMAN THEATRE AREA

*Joel S. Burnett and Romel Gharib*

In April 2010, a rescue excavation by the Department of Antiquities of Jordan (DoAJ) uncovered an anthropomorphic basalt statue measuring over two meters in height in the 'forum' area in front of the Roman theatre in Amman **(Figs. 1 and 5)**[1]. What follows is an account of the discovery and excavation, a description of the statue, and preliminary remarks regarding comparisons with smaller statuary from Amman and with monumental sculpture from the broader ancient Near East. As this discussion will show, the Amman theatre statue depicts an Ammonite king from Iron Age II.

**Discovery and Salvage Excavation**

The statue was discovered on 11 April 2010, in the early stages of construction in the Greater Amman Municipality's recent development



*1. Amman forum plaza construction, 11 April 2010, looking south from the Citadel (Jebel al-Qal'a). Photo Department of Antiquities of Jordan.*

1. The statue's discovery was initially announced in The Jordan Times 20 April 2010 (Luck 2010) and shared with the wider scholarly community on 9 June 2010 by Adeib Abu-Shmais at the 11th International Conference on the History and Archaeology of Jordan (ICHAJ) in Paris.

of Hashemite Square and the 'forum' area plaza in front of the Roman theatre **(Fig. 2)**[2]. In the course of grading and earth-moving operations, a mechanical excavator came into contact with a large stone object that lay buried just an estimated 0.35 m beneath the leveled ground surface[3]. Construction was immediately called to a halt and an emergency archaeological excavation was conducted for the statue, the area immediately surrounding it and other selected loci within the graded construction area across the plaza **(Fig. 3)**[4].

Upon excavation, the large, column-shaped stone object proved to be an anthropomorphic statue depicting a standing male figure. Thanks to the attentiveness both of the DoAJ inspector and the machine operator, the statue had incurred only glancing contact with the earth-moving equipment and remained intact without any broken pieces and with only a few lines of relatively superficial scraping across the lower part of the face (across the mouth area and on the right side of the beard) and on the right side of the torso and right arm of the statue **(Fig. 5)**[5]. No other pieces of the statue nor any material cultural remains were found in the area immediately surrounding the statue.

The only other ancient artifacts uncovered among the other loci of the salvage excavation on the forum plaza were the remains of interlocking terracotta pipes (*ca* 0.25 m diameter) from a Roman drainage system for removing rainwater. These pieces were discovered at roughly the same level as the statue (i.e. *ca* 0.35 m. beneath the



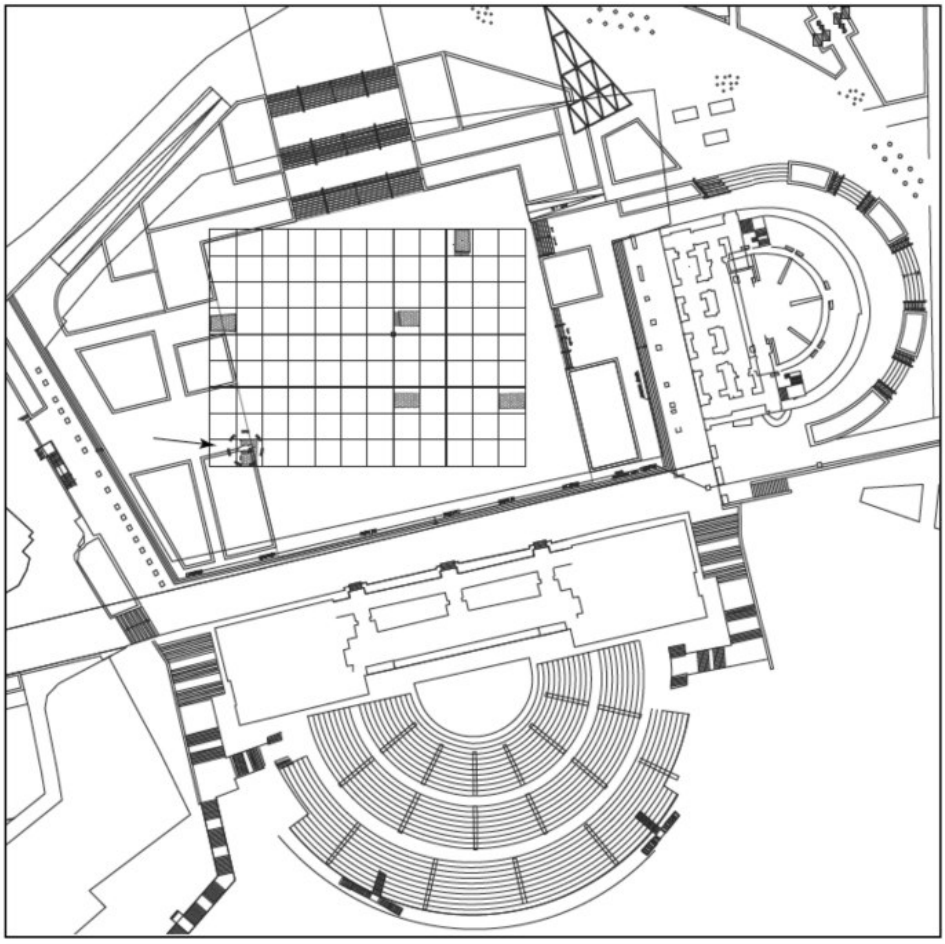
*2. The newly developed plaza, looking south (28 March 2014), photo by Regine Hunziker-Rodewald). The arrow indicates the statue find spot; see also figs. 3 and 4).*

2. The completed plaza and Hashemite Square complex was officially inaugurated for public use during the weekend of 28 March 2014 (Freij 2014). Since the term 'forum' has become the conventional label for the ancient plaza in front of the Amman Roman theatre (see, e.g., Hadidi 1974, 1978), we will henceforth use this familiar term without quotation marks and without implications for its specific function or architectural features during the Roman period.

3. This part of the construction work involved digging down below the graded soil level to form a footing, or foundation trench, along the northern side of an arbor installation that is now part of the new plaza design (Figs. 2 and 3).

4. Romel Gharib is the Department of Antiquities inspector who was on site for the construction project and who directed the emergency excavation (Fig. 4).

5. The break on the upper right arm occurred sometime in antiquity (see below).



*3. "Other darkened areas of the grid indicate test loci investigated during the salvage excavation".*

graded soil surface). As demonstrated in Hadidi's excavations of the north-western, southern and eastern areas of the plaza, this drainage system lay just beneath the Roman pavement level of the forum plaza and was associated with Roman pottery of the second century AD[6].

The statue was unearthed lying horizontal and face up, essentially level with the graded surface beneath which it was excavated and in keeping with the basic ground plane indicated by the Roman colonnades and surrounding Roman pavement level uncovered in the previous forum excavations by Hadidi during the mid-1960s (Hadidi 1974: 76-85, figs 3-6). The statue lay directionally parallel to the orienting side of the forum plaza running along the front of the Roman theatre **(Fig. 3)**[7]. As Hadidi's excavations showed, lower layers of fill contained mixtures of Roman, Hellenistic and Iron Age pottery (Hadidi 1974: 77-89 and figs. 4-6), indicating that the Roman-period construction of the forum involved digging out the entire area and filling it back in[8]. All of these factors together indicate that the statue was deposited within

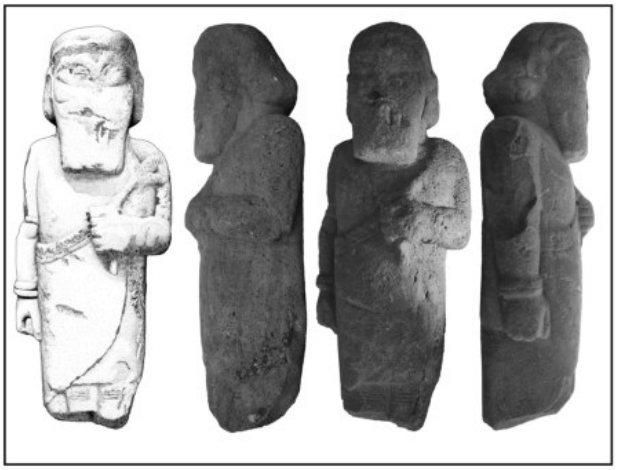
6. Hadidi excavated the same type of terracotta pipe from this Roman drainage system just below the Roman pavement level, at the foot of the steps descending from the colonnade on the forum's west side. See Hadidi 1974: 83, 84, fig. 6, pl. 26:B, 1978: 213.

7. Because the features of the modern plaza development are likewise oriented to the surrounding Roman colonnade, the statue was uncovered in digging along a straight line on one side of the arbor installation aligned to run parallel to the front side of the Roman theatre (see Fig. 4).

8. Hadidi 1974: 80, 82, 83. In the area excavated closest to the theatre, along the forum's south side, the bottommost depositional layers contained pottery that Hadidi characterizes as "purely Iron Age I sherds" (p. 82).



*4. Looking west, the statue next to its find location. The statue was removed from the north foundation trench (running east-west) for the modern arbor perimeter. The remaining perpendicular guideline painted on the ground marks the arbor's east side (running north-south). See also fig. 3.*



*5. Amman Theatre Statue (Drawing by B. J. Parker. Photos by the author.)*

the fill completing the Roman forum during the second, or perhaps early third, century AD. (that is, *ca* 200 AD).[9]

**Description of the Statue**

The statue depicts a standing male anthropomorphic figure, with part of the right upper arm and the lower legs having broken away sometime before the surviving portion of the statue came to be buried at its find spot during Roman times (see above). It is made of basalt and measures 2.1 m at its maximum length, 0.85 m at its widest point and 0.56 m at its maximum depth, with an estimated weight of *ca* 2 tons (4000 lbs / 1,814 kg) [10]. The surface of the statue shows considerable weathering, including the effects of water erosion over the entire left side of the body and head. Furthermore, many of the features of the statue appear to have been sculpted at a relatively superficial depth but nonetheless reveal considerable attention to detail.

The figure stands facing forward, with the right arm held straight down at the side and the right hand clenched in a fist. The left arm is bent at the elbow, with the left hand held to the chest in a fist grasping the stem of a large lotus flower, or Egyptian water lily, which lies across the left chest and shoulder. Also crossing the figure's chest is the edge of a shawl hemmed with a petal-patterned border, draped over the left shoulder and partially covered by the flower stem. Between the lower edge of the flower and the left forearm, traces of sculpted lines (though now badly eroded) represent garment features on the upper left torso that continue below the left arm in more elaborate detail, including front and side flaps of the shawl, another petalled border and vertically hanging tassels. Wristbands composed of two ribs appear on both arms. The lines of a short-sleeve tunic worn underneath the shawl appear just above the elbows of both arms. Emerging from underneath the bottom-front of the shawl, two ends of a belt tied underneath the shawl hang down

9. According to Hadidi, who carried out systematic excavations of the forum area from 1964 to 1967, the theatre was completed *ca* 175 AD and the forum plaza was completed during the following decades, as indicated by the second-century Roman pottery that prevailed in the upper fill levels he excavated in the southern and western portions of the forum. See Hadidi's reconstruction of the occupational history of the theatre and forum (Hadidi 1974: 85-88) and, specifically, his excavation of a coin of Elagabalus (218 - 222 AD) within a fill level belonging to the Roman construction of the forum (p. 75, fig. 3 and p. 82), *ca* 20 m south of where the statue was later uncovered at a comparable level in 2010.

10. Dr Don Parker, emeritus professor of geology at Baylor University and a specialist in igneous petrology, calculated the estimated weight based on the measurements.

vertically, displaying horizontal, ridged lines.

The figure looks straight ahead. The nose and surrounding portion of the face, now almost completely flat, were apparently defaced intentionally in ancient times[11]. The outlines of large eye spaces, probably once including inlays, are still visible, as is the upper outline of the beard, which extends downward at the bottom into a broad rectangular shape. The traces of a headband or diadem extend across the forehead and curve around just behind the ears on both sides. An irregularly rounded indentation near the center of the forehead appears to be the result of mutilation to the center part of the diadem or to the forehead more generally. Full, flowing hair hangs down from the sides and back of the head, gathering below and behind the ears into a bun of large sculpted curls. The top of the head is relatively flat with a drilled hole *ca* 3.25 cm in diameter and *ca* 4.35 cm deep, slightly rear of center[12].

The back of the statue is rendered in only the most basic outlines.[13] The outer shape of the hair continues around to the back of the head, though without any sculpted detail. The body curves around the shoulders and sides, and the back is flat all the way to the legs with no apparent effort to render naturalistic body features or clothing elements, save for the top border line of the shawl continuing under the right arm and just around the figure's right flank.

**Preliminary Comparative Analysis**

The scale and material of the Amman theatre statue bring it into comparison with a tradition of monumental sculpture in basalt well known from Zenjirli and other sites of north Syrian, or 'Neo-Hittite', culture during the ninth to early seventh centuries BC.[14] A broader Levantine tradition of monumental sculpture in basalt or similar stone is attested with a less certain date range south of Amman on the Karak plateau in several examples: (1) showing strong affinities to the 'Neo-Hittite' tradition, an orthostat carved in the form of a lion, (2) bearing motifs that align more strongly with Egyptian or Egyptianizing style, the Balu'a stele relief, (3) the Shihan (Rujm al-'Abd) relief, (4) the inscribed Karak fragment (the inscription dating to the ninth century BC) and (5) the mid-section of a kilted anthropomorphic statue at the Karak museum[15].

The north Syrian and 'Neo-Hittite' tradition prominently features anthropomorphic three-dimensional stone statuary, on a scale similar to that of the Amman basalt statue, in the depiction of gods and human kings (Orthmann 1971: 476, pl. 4b, 484, pl. 7d, 522, pl. 41d-e, 545, pl. 62c-d). The broader Syrian tradition of stone statuary depicting rulers or deities in the form of life-size standing figures includes the early example of Puzur-Ishtar (dated to Ur III period Mari, *ca* 2,100 BC, in diorite [Pritchard 1969: 150, 299 no. 433]) and the well-known basalt statue from Tell Fekherye in north-east Syria dating to the ninth century BC (Abou Assaf, Bordreuil and Millard 1982; Dion 1985). The basic stance and arm position of the Amman statue, one that is widespread in the Near East and eastern Mediterranean during the first millennium BC (Falsone 1989), is also found

11. The surface striation running across the mouth area and then turning down on the left and middle chin area was caused by contact with the earth-moving machine at the time of the statue's discovery (see above).

12. Two additional, smaller holes on the top left edge at the back of the head appear more pitted and irregular in shape and may thus have resulted from the extensive water erosion evident on this side of the statue (see above).

13. The object's size and weight are obstacles to producing unobstructed photographs of the back of the statue at this time.

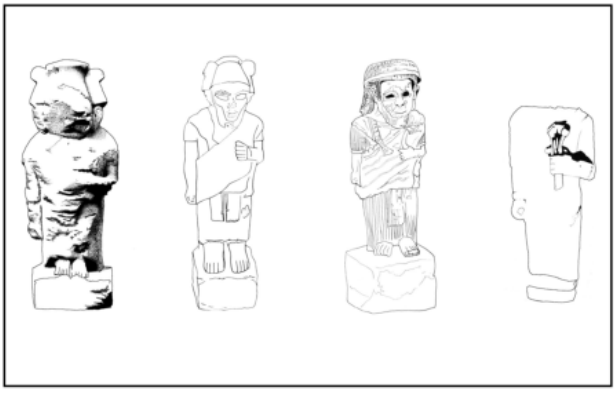
14. See Orthmann 1971 and the various articles and illustrations collected in the issue of *Near Eastern Archaeology* edited by Harrison (2009).

15. For the Balu'a stele relief, see Ward and Martin 1964 and Routledge and Routledge 2009. For the Shihan relief, including a thorough review of scholarship, see Hunziker-Rodewald and Deutsch 2014: 51-67 and pls 6-10. For the inscribed Karak fragment, see Reed and Winnett 1963: 1-9, especially 3-5 and fig. 1, and Parker and Arico 2015: 105-20. Parker and Arico suggest the stone of the Karak fragment may not be basalt, as identified by Reed and Winnett, but rather granodiorite (2015: 105). The rest of these pieces, with further bibliography, are noted in Routledge 2004: 178-80, 182.

in Assyrian stone statues of Ashurnaṣirpal II (883 - 859 BC) and Shalmaneser III (858 - 824 BC), and in a limestone statue of a king found at Assur measuring 2.55 m in height without the missing head and dating prior to the ninth century BC (Strommenger 1970: 11-13, 13-15, 16-17, pls 1, 6a).

This attitude also characterizes a series of smaller stone statues from Iron Age Amman and its vicinity, comprising several statuettes of male figures measuring less than one meter in height, mostly in limestone **(see Fig. 6)** [16].

The Amman theatre statue also resembles the Amman series of male statuettes in basic details of dress and adornment, especially with respect to the beard, the shawl hem crossing the chest from the left shoulder, and the hanging belt ends and tassels adorning the garment **(Figs. 5 and 6)**. Particularly noteworthy are the parallels with the statuette inscribed with the name Yarḥ'azar **(Fig. 6c)**, which wears a headband with the head otherwise uncovered (compare the atef-crown worn by the two statuettes in **(Fig. 6a – b)** and several statue heads from Amman [Abou Assaf 1980; 'Amr 1990: 158-67 and pls 7-8; Daviau and Dion 1994]) and which holds the lotus flower in the left hand against the chest. The lotus flower, which originates in Egyptian art as a symbol of life and renewal, passes into Levantine iconography to stand as a distinctly royal emblem during Iron Age times (van Loon 1986: 245-52, pls 59-61). This same statuette bears a label inscription that mentions "Yarḥ'azar, [son of Za]kar, son of Shanib" (yrḥ'zr /[br z]kr br šnb [Aufrecht 1989: no 43]), indicating the portrayal of a royal personage[17].



*6. A, B, C, D. Amman Statuettes. Drawings by B.J. Parker.*

**Conclusions**

The Amman theatre statue finds its place within a broader Levantine tradition of monumental basalt sculpture well represented during the ninth to seventh centuries BC. It finds its closest parallels of stance and motifs in the series of stone statuary consisting of smaller, mostly limestone statues and statue heads from Iron Age II discovered in and around Amman. The example closest to the Amman theatre statue in this respect, the Yarḥ'azar statuette, likewise bears the royal motif of the lotus and additionally includes an inscription indicating the royal status of its subject. These factors reinforce and specify what the monumental size of the basalt statue suggests, more generally, based on Syrian and Assyrian parallels, namely, that it depicts an Ammonite king.

The statue's monumental and royal character are consistent with its find location just below the Amman citadel (Jabal al-Qal'a), on which Iron Age monumental architecture and the greatest concentration of Ammonite stone sculpture have been recovered[18]. The citadel hill thus suggests one possibility for the Amman

16. For the four statues in Fig. 6, see Abou Assaf 1980: 7-102, here pls 1, 3, 6 and 7 (torso 11). The statuette in Fig. 6b is made of a hard, grey stone (Abou Assaf 1980: 22 and pl. 3; Bienkowski ed. 1991: 41, fig. 39). Two additional examples in limestone, with the same pose being evident despite considerable damage, are a statuette discovered on the Amman citadel in 1985 (Zayadine, Humbert and Najjar 1989: 357-63, especially 359, and pl. 51) and an unpublished limestone statuette on display at the Jordan Archaeological Museum at the Amman citadel. Another study of Ammonite statuary is the unpublished Masters thesis by Abdel Sami' Abou Dayyah 1978.

17. The apparent double patronymic suggests a royal lineage; the grandfather, Shanib, may be the Ammonite king mentioned by Tiglath-Pileser III around 734 BC (Pritchard ed. 1969: 282).

18. For both monumental architecture and stone sculpture recovered from the citadel hill, see Dornemann 1989: 89-94, 154-63, 198-99, 283-87; Zayadine, Humbert and Najjar 1989; Humbert and Zayadine 1992.

theatre statue's original location, from which it fell, or was pushed, to roll downhill and land in the perpetual stream *(the sayl*) at the foot of the hill. There it would have lain for some centuries prior to its removal in Roman times, a scenario consistent with the considerable water erosion covering the left side of the statue.

Alternatively, the statue might have originally stood closer to the location of its burial and modern discovery. Hadidi's excavations in the Roman forum uncovered considerable Iron Age pottery remains, including a level he recognized as comprising "purely Iron I" ceramics excavated on the south side of the forum, directly in front of the colonnade running in front of the Roman theatre (Hadidi 1974: 82). Although no architectural remains have emerged from the various probes of the Roman fill completing the forum's construction, a monumental stone fragment possibly once attached to an architectural structure was excavated in this same general area, namely, the Amman theatre inscription fragment, also in basalt[19]. Thus, one cannot dismiss the possibility that this area lying below the Amman citadel and inhabited during the Iron Age was an extension of that focal point of royal monumental display[20]. A more precise determination of the statue's original location would require additional evidence.

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19. The inscription is dated palaeographically to the sixth century BC. See Aufrecht 1989: 151-53 no. 58. In the *editio princeps,* Dajani describes the location of the object's discovery as occurring "at a depth of 2.60 m. in the west side of" the Roman theatre. See Dajani 1967-1968: 65. X-ray florescence testing of both the Amman theatre fragment and the Amman theatre statue conducted by Dr Don Parker and the authors in June 2012 indicate that the stone for the two artifacts likely originated from different quarries.

20. The recovery area of Ammonite royal and monumental cultural expressions extends well beyond the citadel hill, as illustrated by the bronze bottle inscription from Tall Siran (8 km north-west of Amman citadel [Zayadine and Thompson 1973]) and limestone statues discovered at Khirbat Hajjar (*ca* 7 km south-west of Amman citadel [Ibrahim 1971; Abou Assaf 1980: 21-22, 86, 87]) and at Abu Aland (*ca* 7 km south of Amman [Ibrahim 1971: 95; Abou Assaf 1980: 29-30, 31]).

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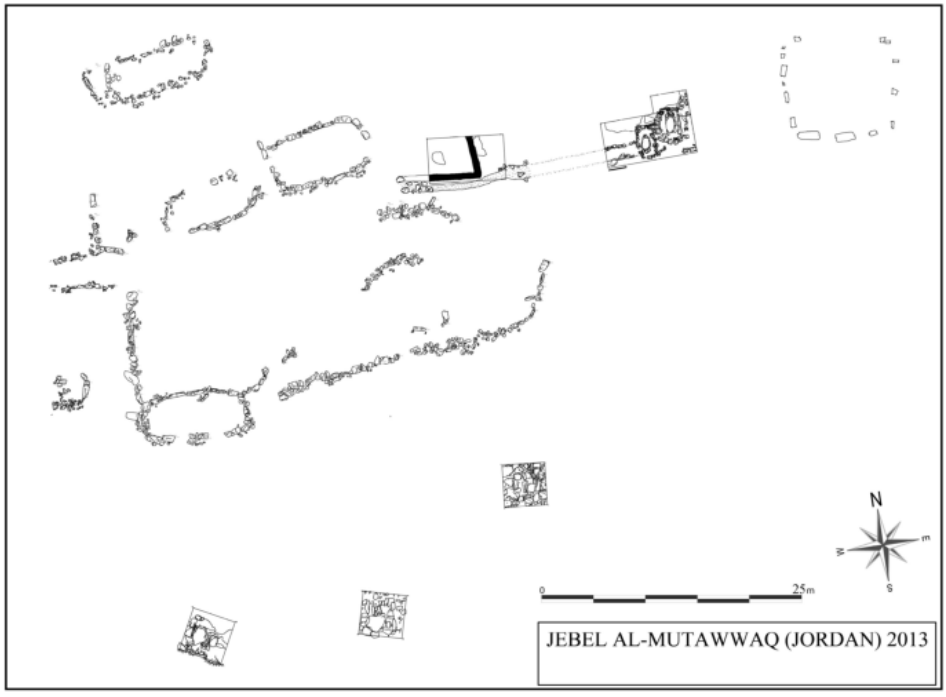
# PRELIMINARY RESULTS OF THE 2013 EXCAVATION SEASON AT THE EB I SITE OF JABAL AL-MUTAWWAQ IN MIDDLE WADI AZ-ZARQA

*Juan Muniz, Andrea Polcaro and Valentin Alvarez*[1]

Jabal al-Mutawwaq (32°12'36" N; 35°59'54" E) is located on the middle Wādī az-Zarqa, at the confluence between Wādī az-Zarqa, Wādī Hmeid and Wādī Deber, close to the spring of Qreisan and the modern village of Qunayah. The 2013 excavation, carried out by the Pontificia Facultad San Esteban of Salamanca and Perugia University, focused on two different areas of the south-eastern part of the Early Bronze (EB) I village, viz. Area A and Area B **(Fig. 1).**

**Area B: Dolmens and Street L.21**

In Area B, a 5 x 10 m excavation trench centred on two dolmens (nos 317 and 321; see **Figs. 2 and 3)** was opened. These two dolmens, with their entrances oriented to the north, were perfectly intact with the tumulus covering the entire structure to the height of the capstone[2]. In each case, the tumulus was supported by a retaining wall around the dolmen, with the gap between them being filled with layers of small and medium-sized stones to the full height of the lateral slabs. The retaining wall of dolmen 317 was straight on the left and curved on the right, giving it a distinctive apsidal shape. Dolmens 317 and 321 had different dimensions: the former had a tumulus of 2.8 x 4 m, the latter one of 2.5 x 3.7 m. Both entrances were sealed




*1. Plan of the 2013 excavation area.*

1.Pontificia Facultad San Esteban of Salamanca, Spain; Perugia University, Italy; Professional Association of Independent Archaeologists, Asturias, Spain.

2.The presence of a tumulus covering the dolmen to the level of the capstone was proposed after the excavation of three dolmens in the 2012 season (see Muniz et al. 2013; Alvarez, Muniz and Polcaro in press a; Muniz, Polcaro and Alvarez in press b).



*2. Dolmen 317, from north.*



*3. Dolmen 321, from north.*

with a large flat stone recovered in situ. The architecture of the burial chambers is identical to that of dolmen 228, excavated in the 2012 season, i.e. two lateral slabs supporting a large capstone, with a back slab and floor slab. The burial chamber of dolmen 317 is 1.8 m2, while that of dolmen 321 is 0.8 m2. Both had a *dromos* entrance, characterised by three steps of large flat stones leading to the burial chamber. These features seem not to be related to the size of the dolmens, but to their topographical position. Specifically, the structures, oriented to the north, follow the natural slope of the bedrock on this part of the mountain.

South of the abovementioned trench, another was opened; this measured 5 x 5 m and was centered on a third dolmen (no. 316; see **Figs. 4 and 5).** Dolmen 316 was larger than dolmens 317 and 321; its inner burial chamber was 1.8 m wide and 0.7 meters long (externally 2.4 x 2.1 m). The tumulus of this dolmen was not well-preserved and seemed different in construction



*4. Dolmen 316, from north-west.*



*5. Dolmen 316, from north-east; (left) natural bedrock and foundation layer of stones and earth.*

to the two other examples excavated in Area B[3].

In connection with dolmens 316 and 317, an east - west street was identified following the natural level of the bedrock. This was levelled with a layer of small stones, identical to those surrounding the stone slabs of the dolmens. This street (L.21), made of two rows of large stones and an inner fill of pebbles and compact earth, goes from the necropolis to the village and is *ca* 1 m wide **(Fig. 6)**. It seems to be connected to another street (L.22), this one running north - south, that skirts the eastern side of dolmen 317.

3.The construction of dolmen 316 seems rougher than that of the other two dolmens; the stratigraphy of the area suggests that it might belong to an earlier chronological phase.

The smaller dolmen 321 was built across street L.21, using the foundations of the street as the first course of the circular retaining wall around the structure. In fact, the stratigraphy of Area B indicates that street L.21, associated with dolmen 316, came first. Dolmen 317 was then built on the junction between L.21 and L.22. Finally, dolmen 321 was erected cutting street L.21, which was clearly no longer in use. This might indicate continued use of the necropolis after the first abandonment of the village[4].

The internal stratigraphy of the burial chamber excavated in 2013 consisted entirely of layers of stones and earth that almost completely filled the chamber, representing the final sealing of the structure. Just a few sherds and some chipped stone were recovered from these layers. However, in each dolmen excavated, the lowest layer directly above the floor slab yielded small fragments of human bone, such as teeth, finger bones and ribs. A possible hypothesis is that the dead were original interred within the chamber, decomposed and had their remains rearranged. Then, prior to the abandonment of the dolmens, when the people of Jabal al-Mutawwaq started to leave the site, the most important human remains such as long bones, skulls and funerary gifts were removed and the burial chamber was permanently sealed with layers of stone and earth[5]. The only exception discovered in 2013 was in dolmen 317. Here, under three fill layers of stone and earth, a flat stone 30 cm above the floor slab concealed another layer (stratum 51) where an intact burial (designated B.25) was discovered **(Fig. 7)**. The burial consisted of a complete human skeleton whose bones, after decomposition of the body, were re-arranged in the chamber with the long bones placed in a pile in front of the tomb entrance. The skull was placed behind the bone pile, with other small bones from the same individual being scattered over the floor slab of the chamber. In addition to B.25, other fragmentary human bones (mostly teeth and fingers) testify that another five people had previously been interred there and that their skulls and long bones had been moved to another location; the only individual left in dolmen 317 was burial B.25.

Two flint objects associated with the skull represent funerary offerings, but no complete vessels were recovered. The two flint objects were flat fan-scrapers, with two edges and the cortex visible on one side **(Fig. 8)**. The first (object 69) had an elongated shape and curved profile, with traces of red being visible to the naked eye on both its jagged edges. Micro-analysis of a similar flint blade from the EB II - III temple at Bab adh-Dhra determined that the traces of red might be animal blood, which stimulated a debate on the possible ritual function of these objects (see Rosen 1997: 74-75; Rosen 2011: 252). Future studies on the blade from dolmen 317 at Jabal al-Mutawwaq using laser analysis are planned to investigate whether or not this blade had also been used for the slaughter and butchery of animals. The second fan-scraper (object 70) had an oval shape and was very thin and flat, being typical for the Early Bronze Age but larger and more refined.

Objects very similar to these two finds have been found as funerary offerings in cave tombs in the west of the southern Levant, for example at Nesher-Ramla Quarry (Cave F-55 [Avrutis 2012: 215, fig. 7.3/C] and Cave F-257 [Avrutis 2012: 214, fig. 7.2/B]). A couple of similar flint tools were also recovered from house 75 at the EB I Temple of the Snakes at Mutawwaq[6]. This suggests that these objects may have been used

4. The previous Spanish excavations of Juan Antonio Fernandez-Tresguerres at other dolmens on Jebel al-Mutawwaq discovered at least two phases of use for some megalithic tombs in different areas of the necropolis during the Early Bronze Age (see Fernandez-Tresguerres Velasco 2004).

5. This was also proposed during the 2012 excavation season (see Alvarez, Muniz and Polcaro in press a; Muniz, Polcaro and Alvarez in press b).

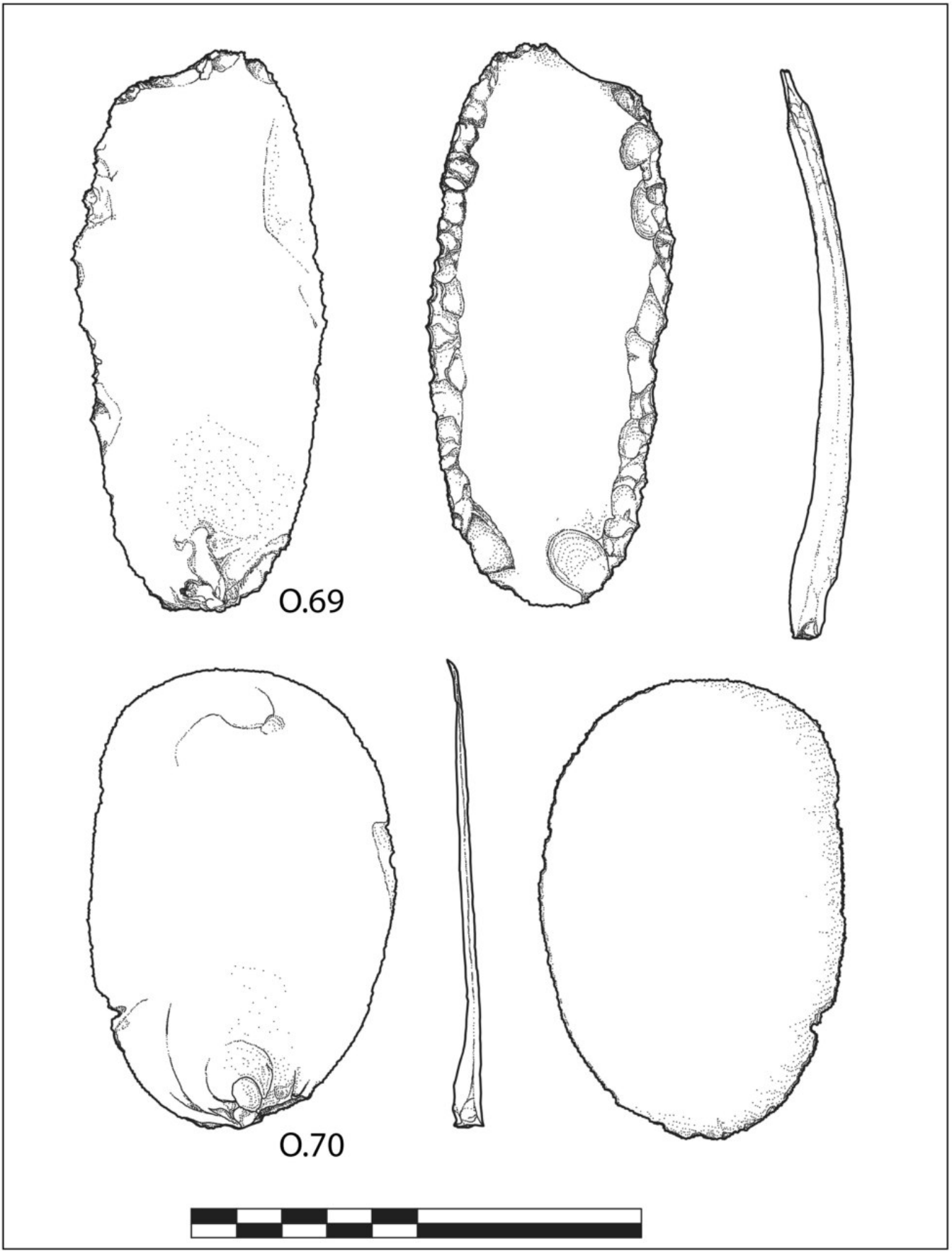
6. The only 'tower' identified to date by the earlier archaeological investigations of Oviedo University on Jabal al-Mutawwaq is located in the western part of the village, directly against the western slope of the mountain overlooking the confluence of Wadi Zarqa and the Qunayah spring (see Muniz, Polcaro and Alvarez 2013). A conclusive interpretation of this structure as defensive, ritual or a vantage point has not yet been achieved.



6. Street L.21, from north.



7. Layer 51 inside the chamber of dolmen 317; (foreground) long bones of burial B.25 and (left) object O.69.

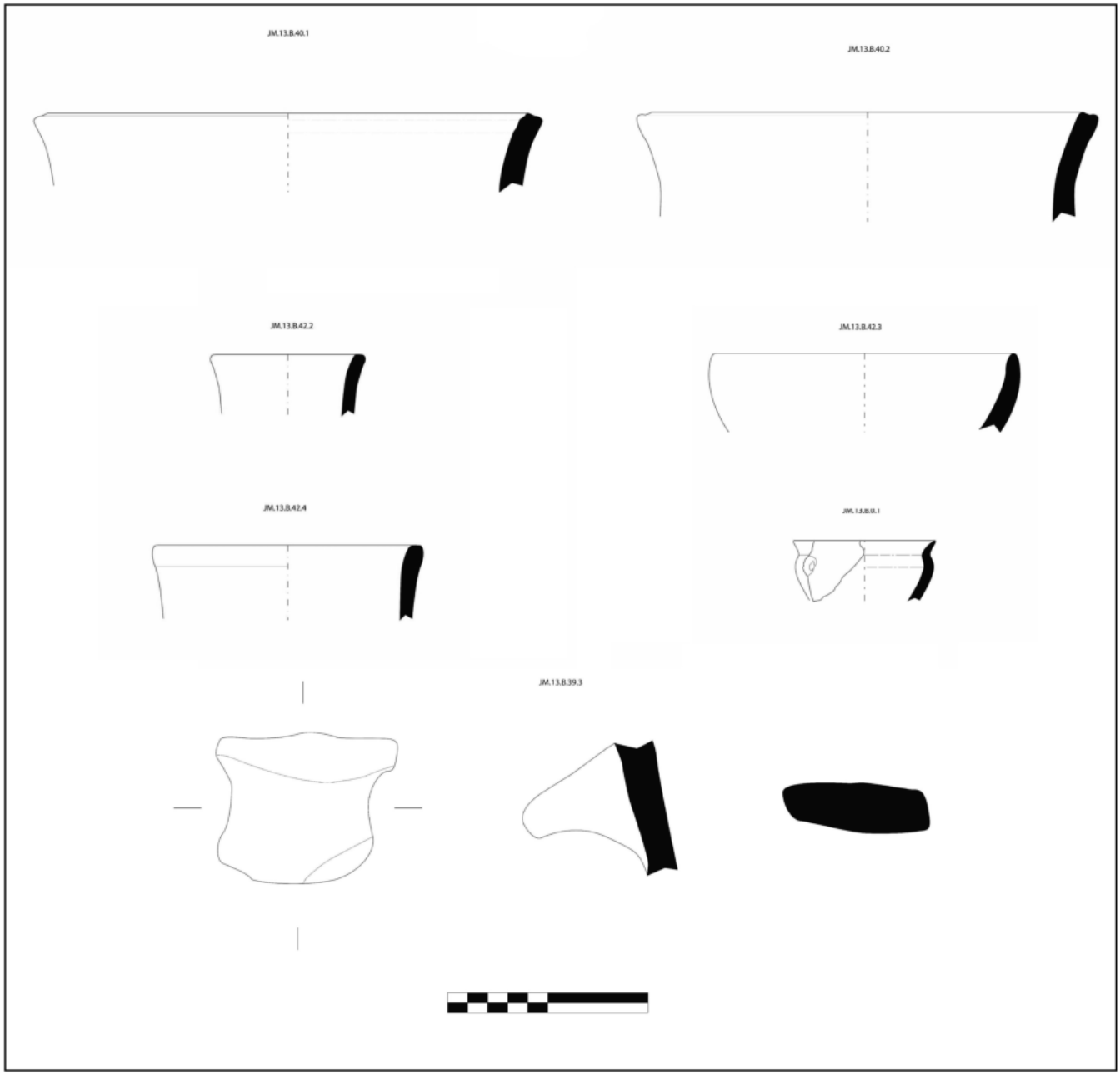



*8.Tabular scrapers from burial B.25.*

in ritual contexts, probably for butchery or for processing animal skins.

Preliminary anthropological analysis of the B.25 bones demonstrate that the individual was 30 - 40 years old, had very good health, no disease, enjoyed a balanced diet and displayed no evidence for muscular stress. Gender was not straightforward to determine, owing to poor preservation of the pelvis. The teeth displayed no signs of extra masticatory use, like the teeth of the earlier burials recovered from dolmen 317 and from other dolmens excavated over the past two seasons. These data allow us to hypothesise that B.25 represents a person from the EB I village at Mutawwaq, perhaps involved in rituals or in activities related to the killing and butchery of animals. The manufacture and deposition of the two large flint tools and, moreover, the clear intention to leave the deceased inside the dolmen might indicate a particular status for this person, at least at the moment of death.

A startling injury was observed on the skull. On the left parietal, in the ectocranial side, there was a triangular-section hole that ended in a




*9. pottery sherds from of the EBI Area B.*

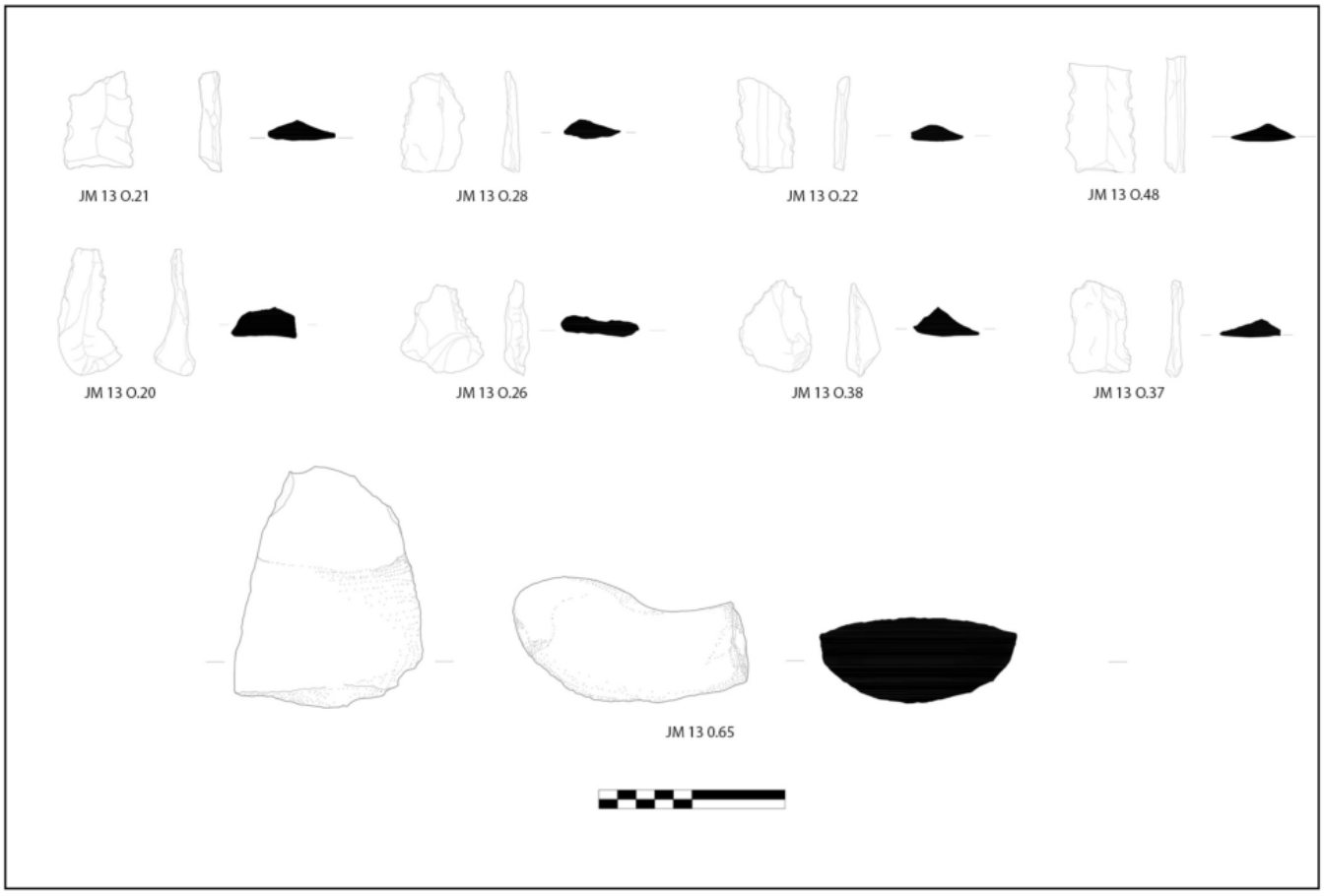
small hole in the endocranial side of the skull. Owing to the absence of cranial bone growth around it, the injury can be interpreted as either perimortem or postmortem. The absence of stones near the skull (that might have caused the damage) or in the layers covering burial B.25 suggests that this triangular-section hole may represent the cause of death, perhaps by means of a single precise blow, but further analysis will be necessary to confirm this hypothesis.

Regarding the pottery recovered from all three dolmens excavated in 2013, the sherds from the fill layers inside the burial chamber, those recovered from the bedrock around the tombs and those from the stone layers of the tumuli all date to EB I and have good parallels with pottery from the settlement. No intact vessels were recovered from the three dolmens excavated. The pottery was all hand-made, with a red-orange paste and many limestone inclusions. From the sherds it was possible to identify the original shapes of the vessels, mainly hemispherical bowls (the most common form), small cups with everted pointed rims and large storage jars with simple, plain ledge-handles (typical of EB I) and simple everted or ribbed everted rims **(Fig. 9).**

Small flint tools were found in the layers that sealed the dolmens' burial chambers and in the deposits around the structures. In particular, many basalt grinding stone fragments (only one well-preserved) and flint tools, mostly scrapers and small blades, were identified between dolmens 317 and 321 in the layers over the bedrock in front of the tombs and over streets L.21 and L. 22 **(Fig. 10).**

**Area A: The EB I Settlement Wall**

An important aim of the 2013 season was to clarify the connection between the southern area of the Jabal al-Mutawwaq necropolis and the EB I settlement. A 10 x 5 meter trench was therefore opened along the south-east corner



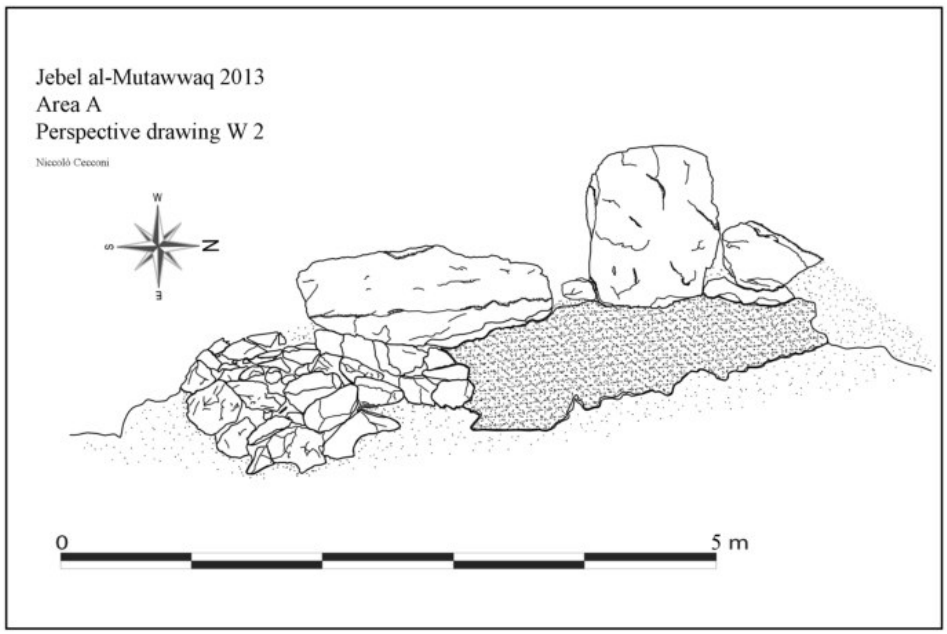

*10.Flint and stone tools from Area B.*

of the settlement wall that enclosed the entire EB I village, previously identified by Hanbury-Tenison's (1986; 1989) first survey and partially excavated in its northern and southern areas by Fernandez-Tresguerres Velasco (1999; 2006). A 5-meter north - south length (W.2) of the settlement wall, and another length measuring 5.5 meters east - west (W.4), were excavated **(Fig. 11)**. In preparation for construction of the wall, the natural slope of the bedrock was leveled with a layer of medium-sized stones and another layer of larger stones. Huge flat rocks were than placed vertically one against the other without any kind of mud-brick superstructure **(Fig. 12)**. The height of the wall probably never reached more than 1.6 meters and in the south-eastern corner of the enclosure there are no signs of towers or defensive features[7].

The absence of defensive structures along the wall, coupled with its low height, suggests that it had no military function but may instead have had ideological significance in separating the



*11. South-eastern part of the settlement wall (W.2 and W.4) excavated in Area A, from south.*




*12. Northern part of the settlement wall excavated in Area A.3*

7.The doors of the houses are usually 75 - 85 cm wide (see Muniz, Polcaro and Alvarez 2013).

land of the living from that of the dead.

Along the east - west part of the wall, two vertical stone slabs were identified as a possible gate (L.8). This gate is one meter wide, similar to the doorways of houses identified in the village[8] and clearly narrower than the gate to the inner settlement identified by Hanbury-Tenison (1989) to the west of Area A (ca 1.8 meters wide). Despite its small size, the gate is clearly associated with the settlement wall and gave access to two large, circular houses to the north and south. Moreover, another street (L.5) was identified along the settlement wall, starting from the south-east gate. This street is not well-preserved, but seems very similar to the one discovered in Area A (L.21) and follows the line of the dip in the bedrock, likewise filled in this area with small stones to level the ground during construction of the street. It is clear that street L.5 is a continuation of L.21, connecting the nearby dolmen area with the eastern part of the EB I village. The part of street L.5 adjacent to the south-east gate of the settlement consists of a number of steps made of large, flat stones, placed directly on the bedrock. However, the overlying huge collapsed stones from the southern part of the settlement wall at this point make it almost impossible to investigate the nature of the street close to the gate.

The material from the street and the excavated part of the village is all a good fit with EB I and seems contemporary with that discovered in Area B of the necropolis **(Fig. 13)**. Again, we did not discover any intact vessels but only sherds. From the rims and bases it was possible to identify the principal pottery shapes, mostly hole-mouth jars, small everted rim jars and hemispherical bowls. Simple, plain ledge-handles from large jars were also common. Fragments of chipped stone tools were also recovered, mostly small blades, points and scrapers **(Fig. 14)**. Fragments of two basalt grinding stones were recognized.

## Conclusions

The 2013 excavation achieved two important results. The first concerns the southern part of the megalithic necropolis of Jabal al-Mutawwaq. The finds from inside the burial chamber of dolmen 317 demonstrate that the dolmen was used as a tomb for several burials during Early Bronze Age I and that one interment may relate to an individual from the contemporary village, who was perhaps involved in activities performed in the sacred area of the main temple of the settlement. Moreover, street L.21 (also identified in Area A as L.5) was a path connecting the south-eastern part of the EB I village with the nearby funerary area during the period of use of dolmens 317 and 316. This demonstrates contemporary use of these parts of the village and the dolmen field outside the settlement.

The second main result concerns the nature of the settlement wall. The material recovered alongside the wall and from its foundation layers all relates to EB I, at least in the south-eastern corner. Furthermore, the nature of the settlement wall and its construction technique confirms the hypothesis proposed by J. A. Fernandez-Tresguerres and J. Muniz during previous investigations of the Jabal al-Mutawwaq village (Fernandez-Tresguerres Velasco 2006; Muniz, Polcaro and Alvarez 2013), namely that the settlement wall had no military or defensive purpose but was more probably ideological or practical in nature.

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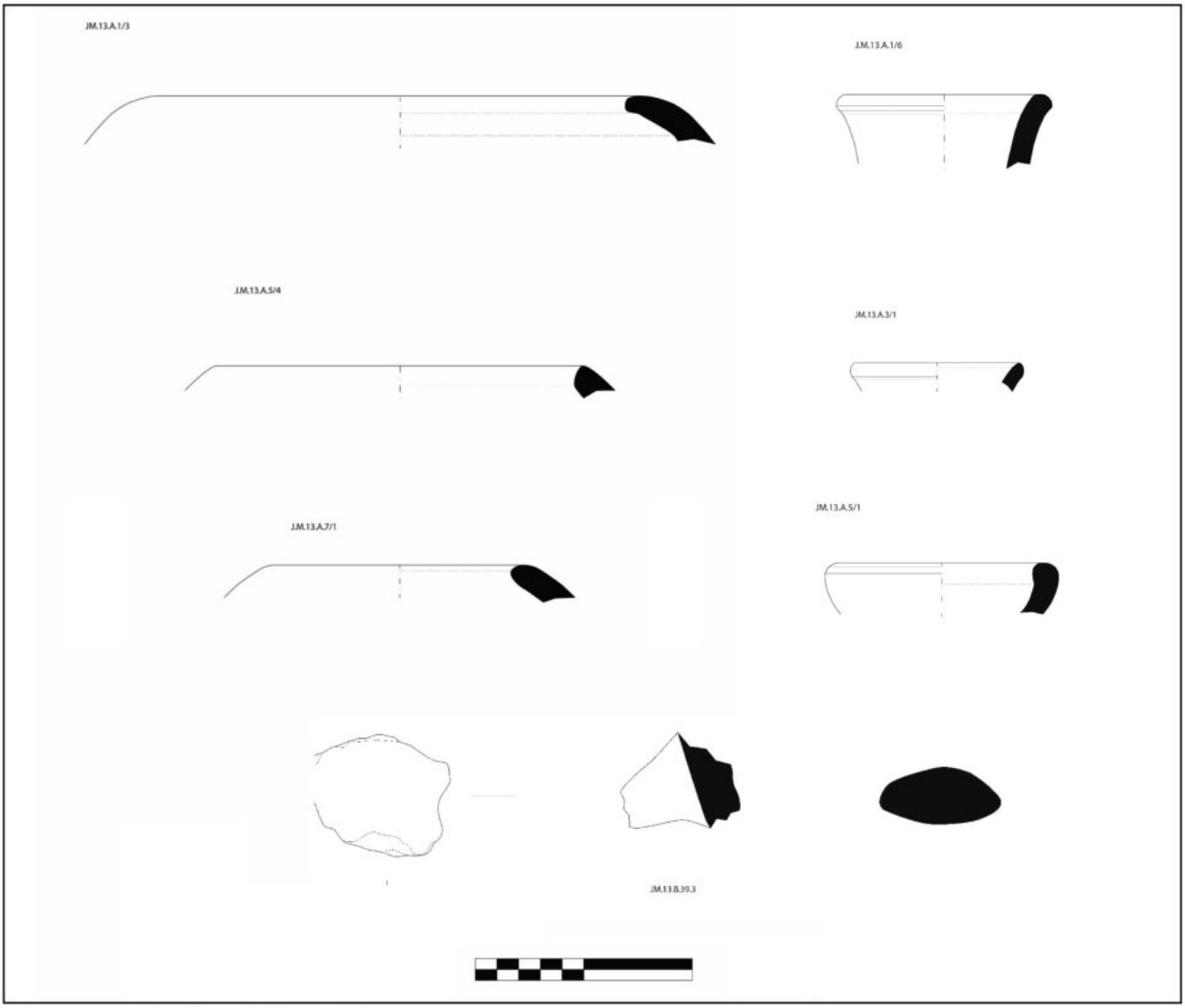
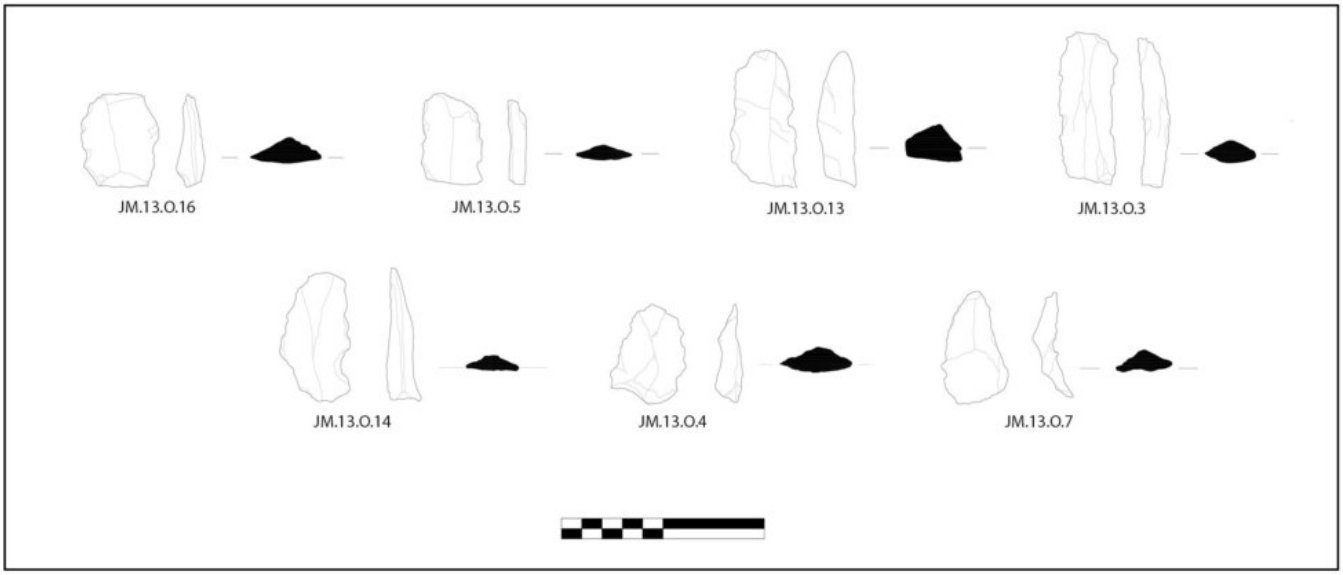



*13. pottery sherds of the EBI from Area A.*




*14. Flint and stone tools from Area A.*

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# JABAL AL-MUTAWWAQ PROJECT (ZARQA, JORDAN) SEPTEMBER 2014

*Juan Ramon Muñiz Alvarez[1] and Andrea Polcaro[2]*

Have been opened in order 2014 season, two excavation trenches to investigate two structures identified in the eastern part of the Early Bronze Age I (EB I) village[3]. The first structure was the Great Enclosure, a large open area of about 1,500 square meters that differed from the apsedal private houses of Jabal al-Muṭawwaq on account of its huge dimensions and monumentality of construction. The second structure was a house oriented north - south, with a square open courtyard on its eastern side (Building C). To complete this task we opened a 12 x 7 m area (designated Area C West) along the western part of the square open courtyard, previously identified by the Spanish team, in order to understand the chronological and stratigraphic relationship of the courtyard with the nearby apsidal house and dolmen C. The other area of excavations (designated Area C East) measured 21 x 12 m and was opened along the western part of the Great Enclosure, between the main circular wall and the inner side of the open structure, about 20 meters distant from Area C East. A third area was also opened (Area C Central), being a 5 x 5 m square centred on dolmen C, situated near the open courtyard of house C. The total area excavated was about 260 m2 **(Fig. 1).**

**Area C West**

*Architecture*

The excavations in Area C West identified a main building (designated building C). The trench extended from the eastern wall of the structure (wall W.53) towards the center of the neighbouring square open courtyard (L.51). Within L.51, a compact sealing layer of small stones and earth was exposed throughout the area, probably relating to the final phase of abandonment of the courtyard **(Fig. 2)**. Under this layer, the floor of the courtyard was recognized. It consisted of the natural bedrock, leveled in places with a foundation layer of small stones and pebbles. This was covered with a layer of compact earth representing the courtyard floor, but this was only identified in its northern part. In front of the main door of building C, a small circular platform was discovered (designated L.56). This seems to have been related to activities performed in the open courtyard; an entire hole-mouth jar with loop handles (JM.14.Cwest.US.106.1) was



*1. General view of the excavation areas, from south-east.*

1. Co-director, archaeologist: Facultad San Esteban Salamanca, Spain
2. Co-director, researcher and professor in Near Eastern Archaeology: Università degli Studi di Perugia, Italy.
3. For the prevecious excavation results, see: Alvarez-Muniz-Polacaro 2013; Polacaro et al. 2014; Muniz - Polacaro - Alvares 2016; Polacaro - Muniz - Alvarez 2016.




*2. General view of Area C West, from north.*

discovered just to its north. The chipped stone tools discovered in the courtyard suggest that some activities were carried out there **(Fig. 3)**.

To the south of L.51, other small structures were discovered, but these were badly damaged by the collapse of the southern wall of the courtyard and only survived to the west. In future seasons, this trench will be extended to the south to clarify the nature of these small structures close to the naturally sloping bedrock. They may have been associated with a southern passage or street running from the Great Circle in Area C West towards the central part of the village. Concerning the small preserved part of the southern wall of L.51 (wall W.52), it is evident that a foundation of medium-sized stones was constructed first, with a superstructure of two or three courses of large stones on top that probably stood to a height of no more than 1.5 m.

*Finds*

Many pottery sherds were recovered from the layers over the natural bedrock that served as the floor of the courtyard. The pottery from Area C West is relatively homogenous in terms of fabric and shape, pointing to an EB I date. All sherds are mineral-tempered: the most common grits are small- and medium-sized particles of limestone and flint, although iron oxides are present where red slip and paint is attested (Metallic Ware). All vessels are handmade and low-fired, but in some cases a metallic fabric is present. Cooking ware is characterized by an orange or reddish exterior surface, with traces of burning. The surface ranges from light pink to reddish brown, Whitish slip and wash are also common and, although rare, impressed decoration typical of the simple ware production are small bowls, with a hemispherical or sinuous body and pointed rim, and jars with a plain rim and beveled lip. The storage ware jars typically have a flat lip and more flaring neck. Hole-mouth jars are well-represented, both in simple and storage wares[4]. Some diagnostic specimens are also attested: two fragments of hole-mouth jar with knob-decoration and a line of small circular impressions on the top and at least three sherds with small horizontal appliqué with vertical incisions link this layer with US.110, the lowest layer in L.60. Also, some well-preserved flint tools were discovered just above the courtyard floor in its southern part. In particular, two blades, two scrapers and a point were recovered. A flint arrowhead was discovered in

4. For a preliminary anaelysis of the pottery see Casadei in press.



*3. Southern part of courtyard L.51, from south.*

association with these objects. The arrowhead, which dates to the Neolithic period, is clearly older than the building and the village of Jabal al-Muṭawwaq. It may have been kept inside the building as an heirloom **(Figs. 4 and 5**).

*Stratigraphic Phasing*

The stratigraphic phases identified in Area C West are:

Phase 1: construction phase

The natural slope of the bedrock on the southern cliff of the mountain was leveled with a layer of small stones. The foundations of the enclosure wall of open courtyard L.51 and of building C were then constructed. Finally, a layer of compact earth was laid to create the floor of L.51.

Phase 2: use phase

In this phase, open courtyard L.51 and the circular platform in front of the eastern door of house C were in use.

Phase 3: abandonment phase

The settlement wall was abandoned, the open courtyard was partially sealed with a layer of small stones and, finally, the larger stones of the enclosure wall of L.51 collapsed, destroying the small structures to the south. The area was buried under natural accumulation layers coming from the top of the mountain. It was probably many centuries later that dolmen C was built against the south-east corner of the courtyard, using the stones of the ancient structures.

**Area C East**

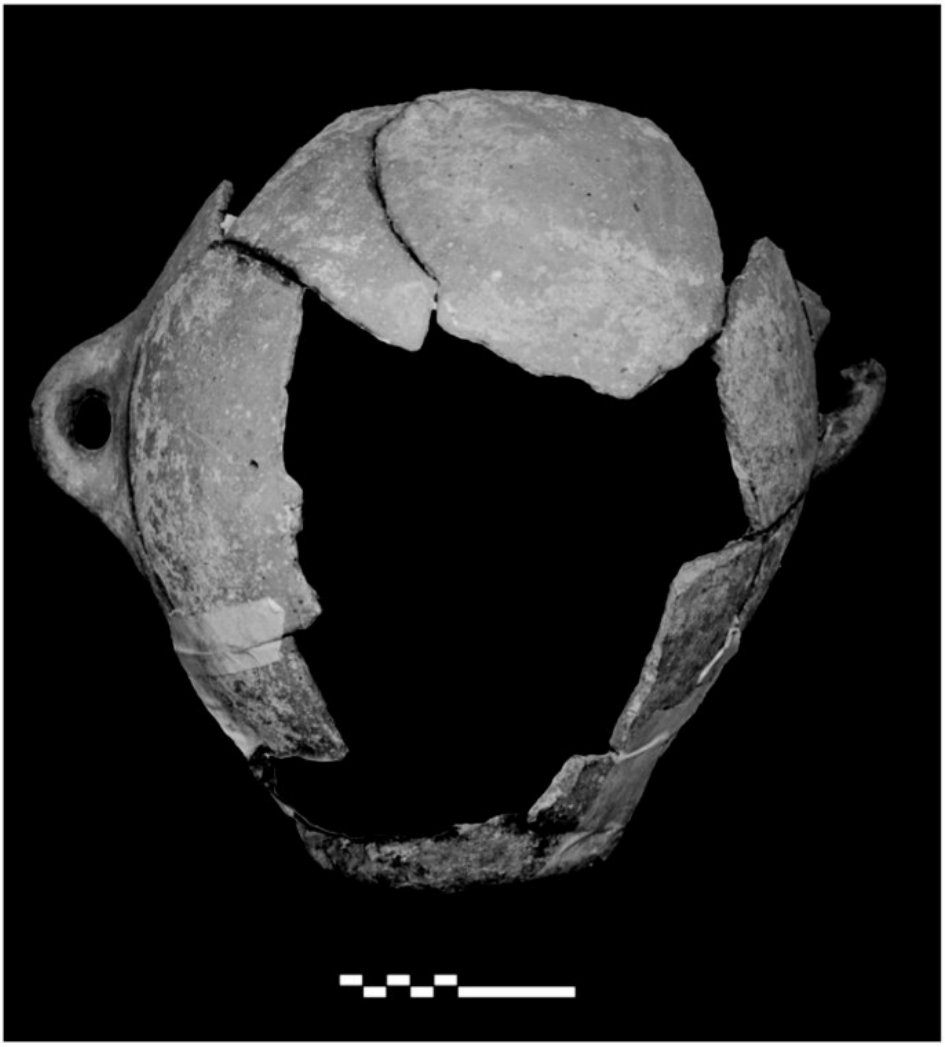
*Architecture*

The trench opened in Area C East aimed to clarify the nature and construction technique of the Great Enclosure (designated L.101). The semicircular perimeter wall is a huge structure, made of at least two rows of large stone blocks, preserved in some places to a height of three courses (**see Fig. 7**). After the removal of the collapsed stones and blocks (US.201) of the Great Enclosure perimeter wall (W.102), a layer of compact earth and small stones (US.203) was discovered around the entire length of the wall. This probably relates to an external path running around the Great Enclosure **(Figs. 6, 7, and 8)**.

In the southern part of W.102, a large flat stone was interpreted as one of the possible entrances to the Great Enclosure. On the outer and inner sides of the entrance, a street (L.105) delineated by two rows of stones, 1 m apart with a fill of compact earth and small stones, was recognized. The street is perhaps the same as that identified in Area C Central along the south-eastern side of the open courtyard excavated in Area C West. In this southern part, the Great Enclosure perimeter wall (W.102) was very badly preserved owing to its stones being robbed out to build a later large tumulus (about 12 m across). The date of the tumulus was not established because the trench did not reach its northern part; this will be one of the objectives of the next excavation season.



*4. Flint tools recovered in L.51.*



*5. Entire vessel recovered near circular platform L.56.*



*6. Western external face of the Great Enclosure perimeter wall (W.102); [foreground] layer of compact earth and stones named US. 203.*

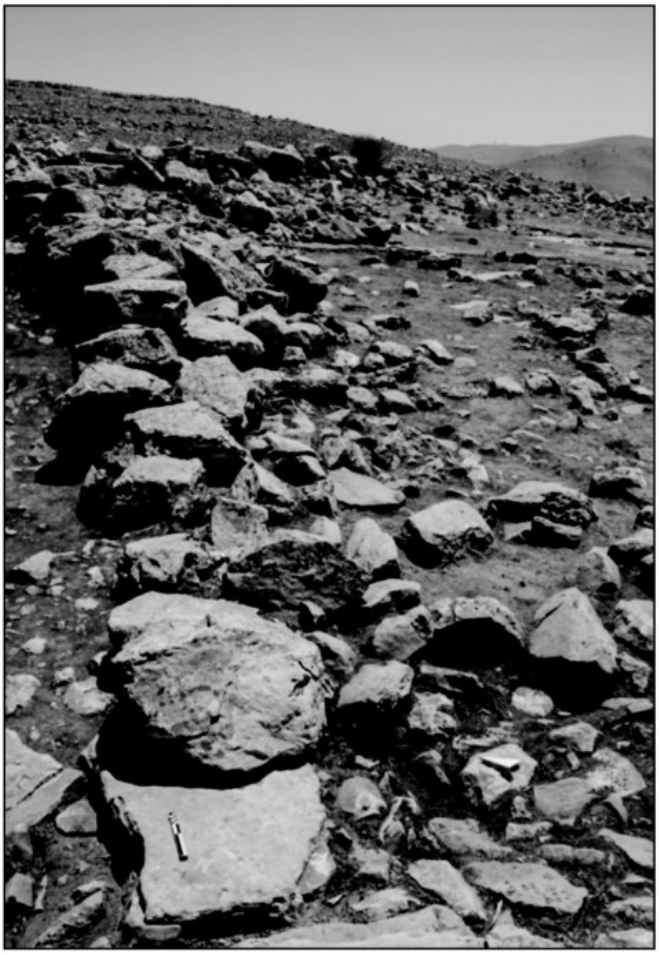
The eastern part of the trench inside the Great Enclosure identified some circular structures (designated walls W.104 and W.111) that were characterized by a small internal circular stone installation on one side (I.109). Inside and outside these structures, a compact layer of earth - probably the floor of the Great Enclosure - was recognized (US.204; US.205). Owing to the poor preservation of the area, where the high bedrock is exposed to natural weathering and erosion, and is consequently covered with only 10 cm of topsoil, no significant finds were recovered. However, it seems clear that these structures are in architectonic association with the Great Enclosure. The few pottery sherds recovered inside them are also *Early Bronze Age* in date, as are those recovered near W.102 and its collapse layers **(Fig. 9)**.

*Finds*

Pottery is less common in Area C East than in Area C West. It is characterized by a light buff to reddish fabric, usually smooth, with small to medium limestone grits. All vessels are handmade and low-fired. Simple ware is best represented; it has a light pink smooth surface and small limestone grits. The most common shape is a hemispherical bowl with a pointed vertical rim and small base, probably a small jar or jug for daily use. Storage ware is similar to the simple ware, being buff to light pink but with a higher frequency of mineral and vegetal inclusions. Sometimes the core of the fabric remains non-oxidized, in which case the light buff surface should indicate bad control of firing. Usually, the jars have a straight or slightly inturned neck, a plain rim and a round, flat or beveled lip; all bases are flat. Rope decoration with large, circular impressions is well-attested on both simple and storage wares, with the latter being predominant. Concerning other artefact categories, a few badly preserved objects were recovered in Area C East. These include small blades similar to the scrapers found in domestic contexts, five grinding stone fragments and a basalt vessel fragment with two knobs near the rim, the latter being a common find in the houses of the EB I village. Two interesting objects were discovered amongst the collapsed stones of W.102, viz. fragments of two mace-heads, one made of basalt (O.74) and the other of an as yet unidentified red stone (O.73) upon which strange black traces are present on the external surface; these will be subjected to future analysis in order to better understand their nature **(Fig. 10).**

*Stratigraphic Phasing*

The stratigraphic phases identified in Area C East are:



*7. Western part of W.102, from south; [foreground] large flat stone interpreted as one of the entrances door [L.106] to the Great Enclosure.*

Phase 1

Construction of main wall W.102, street L.105 and the circular structures inside the Great Enclosure. From architectonical and stratigraphic points of view, it is currently impossible to say whether there might be more construction phases or whether or not the internal circular structures (W.104 and W.111) were built after the main perimeter wall of the Great Enclosure in a second phase.

Phase 2

Use phase of the Great Enclosure, street and internal circular stone structures, associated with the compact earth surfaces identified inside and outside these areas (US.204 and US.205).

Phase 3

Abandonment Phase. All structures exposed in Area C East were abandoned and the main circular wall W.102 collapsed, partially covering the small internal structure in the western part of L.101.

**Area C Central - Dolmen 534**

Improving our understanding of the dolmen and its relationship with the nearest domestic space was one of the primary objectives of the season.

*South-eastern Part of the Courtyard (L.51) of House C*

In this area, we were able to demonstrate that the floor of the open courtyard was laid on a foundation layer of small stones that levelled the natural slope of the bedrock. This courtyard was delimited by an east - west stone wall, recognized in Area C West as W.52. In its south-east corner we identified a doorway (L.151), in front of which a street (L.152) led off in a south-westerly direction. The street was delineated by two rows of large stones turning to the south to the left of the entrance to courtyard L.51. The street had the same form as the one (L.105) identified in front of the Great Enclosure. The main element identified in Area C Central was dolmen C (L.153). The dolmen was built to the south of street L.152 using the collapsed stones of the southern wall of the courtyard. This megalithic monument was built with a tumulus of large stone blocks encircling the burial chamber and covering the entire dolmen to the height of the capstone. In the center of the structure, there was a burial chamber consisting of two standing stone slabs and a large capstone (L.154). The dolmen entrance (from the east) consisted of a lateral corridor at an angle of 90° to the burial chamber. This was the most unusual feature discovered this season, so far without parallel at Jabal al-Muṭawwaq. Because the corridor was not fully excavated for reasons of security we can only say that the entrance had a *dromos* consisting of at least one stone step. The entrance was sealed with stones and compact earth in front of the chamber; this was different to the dolmens excavated in previous seasons, which were sealed with a large flat



*8. Large tumulus built over Great Enclosure perimeter wall W.102.*



*9. The internal Circular stone structures [W.104 and W.111) discovered inside the Great Enclosure [L.101]).*

stone blocking the entrance **(Figs. 11, 12)**.

Inside the burial chamber (1.8 x 0.9 x 1.1 m), which had been partially violated in modern times, we discovered some artefacts (pottery; chipped stone tools; bronze objects) and human and animal bone. Fortunately, some funerary gifts were found *in situ*, including stone and bronze beads, decorated bone and two complete vessels discovered in front of the entrance of the burial chamber. The megalithic tomb was probably used just once, because there was no stratigraphic evidence for disturbance of the entrance corridor. The funerary gifts recovered from the burial chamber, in particular two fine bronze arrowheads, are evidence that the dolmen was not contemporary with the *EB* village[5]. **(Fig. 13).**

## Conclusion

The results of this season have allowed us to reconstruct the chronological relationship between

5. For a complete report of excavation of dolmen 534, see Polcaro - Muniz in pressa.



*10. Two mace-heads [O.73; O.74] discovered in L.101.*



*11. Entrance of Dolmen C, from North.*



*12. Pottery Sherds from a complete jar discovered inside the burial chamber of dolmen 534.*

the domestic and public buildings of this part of the settlement with a number of megalithic structures identified inside the Early Bronze Age village. In particular, the 2014 excavations have demonstrated that dolmen C was built and used as a tomb at a time when the EB I village, Building C (and its open courtyard) and the Great Enclosure were already abandoned and their walls had collapsed.

This is just a brief report of the 2014 season in area C . A complete report of excavations in area C was presented at the ICHAJ 13 congress (Polcaro-Muniz , in pressa).



*13. Funerary gifts and some of the human bone discovered in dolmen C.*

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# ARCHITECTURAL ORIENTATION AND EARTH - SUN RELATIONSHIPS IN PETRA

*Tom Paradise*

**Abstract**

Using innovative geographic information systems (GIS) and extensive ground-based measurements, a significant number of Petra›s tombs, structures and monuments in this preliminary architectural inventory were found to display distinctive alignments with the Sun on its primary marker days of the solstices and equinoxes. Of Petra›s most prominent monuments, façades and structures, roughly >70% of the Nabataean structures were found to exhibit related orientation. Three categories of alignments to / with the Sun were identified: (1) structures facing the rising or setting sun on a marker day (i.e. Urn Tomb on solstices and equinox); (2) a structure in alignment (i.e. High Place of Sacrifice on the summer solstice sunrise) with the rising / setting sun intersecting a prominent landmark on the horizon (i.e. the peak of Jabal Harun); (3) exhibiting sunlight infiltration into chamber interiors (Palace Tomb at sunset during the winter solstice and equinox) where it illuminates pronounced interior niches, alcoves and / or sandstone glyptic features (i.e. notches; grooves). These findings may support Strabo›s early notion that the religion of the early Nabataeans focused on the worship of the Sun or, at least, it may link an early understanding of Earth - Sun relationships with Nabataean conceptions of urban planning and form, agriculture, philosophy, astronomy, architecture and / or cosmology.

**Keywords:** Petra; Jordan; archaeo-astronomy; Earth - Sun relationships; Nabataean religion

*Roman architect Marcus Vitruvius Pollio (ca 75 - 15 BC) wrote, "One who professes himself as an architect should be acquainted with astronomy and the theory of the heavens. From astronomy we find the east, west, south, and north, as well as the theory of the heavens, the Equinox, Solstice, and courses of the Stars.*" (De Architectura Libri Decem I: 3,10)

The integration of the Sun in the design and orientation of structures and monuments is an age-old tradition having roots in worship, agriculture, health, wellbeing and comfort. Over time, the orientation of architecture with the annual passing of the Sun took on broader scales to include urban form, with significance placed on solar marker days (i.e. equinox; solstice) that were indicators of the passing year and its harvest (and ritualistic) cycles. The great megalithic structures of Stonehenge, Giza, Chichen Itza, Chaco Canyon and Newgrange, to name but a few, have been linked to these celestial paths (Sofaer 2007).

Our world is divided into four seasons, where the solstices and equinoxes represent gates into each season. The summer solstice marks the beginning of summer on 20 - 21 June, when the Sun is highest in the northern sky with a zenith of 23½°N (and lowest in the southern hemisphere). From the summer solstice, daylight will then decrease in length until the winter solstice on 21 - 22 December, when the length of daylight is the shortest and the length of night-time is the longest. On the winter solstice the Sun is lowest in the northern hemisphere sky, at a zenith of 23½°S, marking the beginning of the longer spans of daylight. The equinoxes, however, mark the midpoint of the solar year when the Sun is directly over the equator at noon (at zenith) and the length of daylight and night-time

are equal across the planet: 12 hours of dark, 12 hours of light on 20 - 21 March (vernal equinox) and 22 - 23 September (autumnal equinox). It is these solar marker days that define our sunlight cycles and dramatically influence agriculture, behavior, architecture and culture. The thrust of this preliminary research is to better understand how the Nabataeans of Petra integrated the Sun›s pathways and its related illumination onto facades and into chambers, to their individual structures and monuments, and also to the larger urban morphology of the city.

In Petra, such relationships have been implied since the early western writings of Brünnow and Domaszewski (1904 - 1909), Libbey and Hoskins (1905) and Bachmann *et al*. (1921). Research in the 1990s addressed relationships regarding the Theatre and its direct alignment with and orientation to the winter solstice sunsets, and the equinoctial orientation of the Urn Tomb (Paradise 1995). However, with the advent of innovative spatial analysis and geographic information systems (GIS), we are able to associate nutated solar paths to Petra's primary tomb façades, structures and chamber interiors (Paradise & Angel 2015). Rising and setting solar tracks, and their apparent horizon crossings on these annual marker days, were combined with tomb façades and chamber orientations. These were measured, analyzed and documented over years of research at Petra, with striking results. Not only were a significant number of façades found to be oriented in relation to solstitial and equinoctial paths, but interior niches and wall glyptics were found to be associated with these seasonal solar markers as well. The thrust of this research was to identify and inventory these associations for later interpretation and inference. However, at this time it is crucial that an inventory is created that records the Earth - Sun relationships with architecture in Petra.

The primary tomb chambers, façades, structures, monuments and broader urban orientations in Petra have been recorded as a part of a holistic research project and GIS (Paradise and Comer 2012). Both hewn and built structures were measured using GPS, laser and remote sensing, in addition to Brunton©, Sunnto© and Sokkia© measurement technologies.These precise locations and dimensions were combined with solar path risings (sunrise) and settings (sunset) on the solstices and equinoxes - vital relationships used in cultural, social, agricultural and religious rituals, designs, reckonings and feast-days (Sofaer 2007).

Analysis of the Urn Tomb was undertaken first since it had been initially identified as exhibiting these relationships of structure design and orientation to inner chamber illumination on marker days when, during the sunsets on both solstices and equinoxes, sunlight penetrated the back chambers of the Urn Tomb to illuminate the rear niches, and only on these days. It would follow that the Urn Tomb was either (1) hewn and oriented specifically to accommodate the entering sunlight or (2) the doorways were modified to permit this sunray penetration. In either case, this phenomena was not arbitrary, but calculated engineering by the Nabataeans. This was a bellwether of more relationships to be found linking the Sun to architecture in Petra.

In recent work, Belmonte *et al*. (2013) used associations between the Sun and facades to identify passing exterior shadows (i.e. ad-Dayr; al-Khazneh) to mark the important seasonal solar markers. Passing seasonal shadow-forms were the predominant focus of their findings - similarly speculated in the design and orientation of Petra's theatre 2,000 years ago (Paradise 1995). However, as our empirical investigations and computer analyses continued at Petra, it became apparent that a growing number of structures were oriented and / or designed and / or modified to create an association between the structure and the Sun›s paths on the seasonal marker days.

**Methods**

To understand these complex Earth - Sun relationships that were used in Petra›s city planning and architecture during its heyday, it was first crucial to create horizon diagrams, with aspects of precession, nutation and refraction,

in conjunction with topographical, proprietary horizon silhouettes (from each location's perspective) and various geographical data. It was the implementation of GIS technology that enabled this complicated analysis.

Using GIS technologies to investigate Earth and celestial relationships, however, presented challenges. The majority of GIS analyses are appropriate in terrestrial, topographic and distributive analyses, in both two- and three-dimensional landscape analyses. However, it is often difficult to combine terrestrial with astronomical data, especially when the representation and calculation of historic or prehistoric celestial events are required. These complex analyses were achieved by combining ArcGIS Python libraries *(ArcPy©; PyEphem©),* which merged terrestrial, astronomical and historic iterations while compensating for changes in precession and celestial refraction 2,000 years ago. Moreover, it was difficult, but crucial, to validate the legitimacy of these relationships without visualization. It was also necessary to substantiate these associations using the ArcGIS *Matplotlib* library.

The process was simplified by (1) collecting geospatial attributes for each structure, (2) analyzing all possible land-based obstructions between structures and between structures and solar paths, (3) generating a horizon diagram for each structure (i.e. Palace Tomb) and / or monuments (i.e. high places) and (4) overlaying these solar paths for specific events (i.e. sunset summer solstice) for the particular date (*ca* 20 AD). Using ArcGIS's Python libraries and *Matplotlib©*, analyses created topographical data from digital elevation model (DEM) vector data to create horizon diagrams displaying the solar pathways on the solstices and equinoxes.

The key to this study was to determine the solar paths that crossed Petra's skies, then and now. The Sun›s paths were generated for each structure based on their individual attributes (i.e. elevation; latitude; longitude). For example, a starting date was used in *PyEphem©* (i.e. 21 June 20 AD) to identify each solstice and equinox. Rising and setting times were then determined for that day and added to the horizon diagram for each structure. This analysis made it possible to recreate the passing of the Sun and its azimuth and altitude throughout that day - an analytical procedure difficult to conduct without this new technology. Fieldwork was then carried out in 2010 - 2014 to follow-up, corroborate and re-measure ground-based alignments, aspects and horizon diagrams.

Finally, each solar pathway was added to each horizon diagram on each annual marker day (i.e. solstice) from each specific perspective (i.e. from the Corinthian Tomb). In many cases, the sunrise and / or sunset passed below the horizon at a prominent landmark as well (i.e. Umm al-Biyāra; Jabal Hārūn). This upheld the hypothesis that the orientations of many of these structures at Petra were engineered and not accidental or arbitrary.

**Findings**

It was found that many Nabataean / Roman structures, tomb façades and monuments built during Petra's 'golden age' were designed, constructed and / or hewn in alignment with the Sun on the prominent marker days (solstices; equinoxes). Many of Petra›s primary structures were found to display solar alignments on the major solar marker / feast days with three distinctive purposes: (1) to face the rising or setting sun (i.e. Urn Tomb) and / or (2) to align with the rising / setting sun intersecting a prominent landmark on the horizon (i.e. the peak of Jabal Hārūn) and / or (3) to allow sunlight to penetrate chamber interiors where it illuminated pronounced interior niches, alcoves and / or sandstone glyptic features (i.e. notches; grooves). In addition, some sites and structures were found to have broader relationships with other special landmarks and lines-of-sight (i.e. Jabal Hārūn), or those co-aligned within the urban fabric itself. However, the focus of this research was to investigate the solar pathways and façade / chamber orientations of Petra's primary structures and monuments. Of the

thirty primary Nabataean - Roman structures addressed in the early inventories of Brünnow and Domaszewski (1904), Libbey and Hoskins (1905) and Bachmann (1921), many structures in this study exhibited Earth - Sun relationships - some obvious and significant, and some tenuous **(Table 1)**.

Alignments with the **summer solstice sunrise** were revealed in five (17%) structures including the Roman Soldier and Temple Tombs (Wādī al-Farasa) **(Fig. 6)**, and at Qaṣr al-Bint where the Sun enters between the far left-hand side (eastern wall) and column to penetrate to the back chambers during midsummer's eve. Al-Khazneh (the Treasury) was found to be in direct alignment with the axis of sunrise on the summer solstice. However, it appears that the high cliffs surrounding al-Khazneh at the juncture of the outer and inner siqs may obscure the early morning illumination. Mid-morning

**Table 1**: Inventory of the principal structures, tombs, and monument facades in Petra. Orientation of 30 facades and chambers were examined for solstitial and equinoctial relationships (sunrise, sunset). 85% of these structures exhibited alignments on a marker day. Note: B&D=Brünnow & Domaszewski documentation number, ESR= Equinox sunrise, ESS=Equinox sunset, WSR=Winter sunrise, WSS=Winter sunset, SSR=Solstice sunrise, SSS=Solstice sunset

* Each dark rectangle represents a relationship

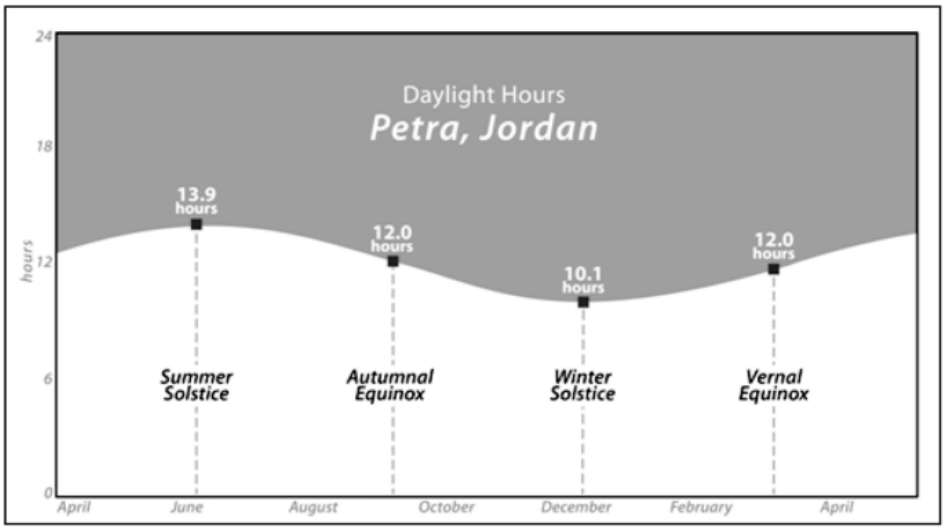
| TOMB/STRUCTURE | B&D | ESR | ESS | WSR | WSS | SSR | SSS | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| Ad-Deir (Jebel Deir) | 462 | | | | ■ | | | Direct alignment with Jebel Haroun |
| Armor Tomb (Mughur an-Nasara) | 649 | | | | | | ■ | |
| Broken Pediment (al-Farasa) | 228 | | ■ | | ■ | | ■ | |
| Columbarium (Al-Habis) | 395 | | | ■ | | | | |
| Corinthian Tomb (Royal Tombs) | 766 | | ■ | | ■ | | ■ | |
| Entrance Tomb (Siq al-Barid) | ---- | | | | | | ■ | |
| Garden Tomb (al-Farasa) | 244 | | ■ | | ■ | | | |
| High Place Sacrifice (al-Madhbah) | 86 | | | | | | ■ | Direct alignment with Jebel Haroun |
| Southern High Place (al-Habis) | ----- | ■ | ■ | | | | | Direct alignment south, equinox *(hewn face)* |
| Khazneh (Outer Siq) | 62 | | | | | ■ | | Direct alignment *(although horizon is high)* |
| Lion Triclinium (Jebel Deir) | 452 | | | | | ■ | | |
| Obelisk Tomb (Bab as-Siq) | 34 | | ■ | | | | ■ | |
| Obelisks (Madhbah) | 90-89 | ■ | ■ | | | | | Direct alignment along equinoctial axes |
| Palace Tomb (Royal Tombs) | 765 | | ■ | | | | ■ | |
| Pylon Tomb (Wadi Numeir) | 270 | | | | | | | |
| Qasr al-Bint (City Center) | 403 | | | | | ■ | | |
| Renaissance Tomb (al-Farasa) | 229 | | ■ | | ■ | | ■ | |
| Roman Soldier Tomb (al-Farasa) | 239 | | | | | ■ | | Direct alignment *(although horizon is high)* |
| Sextius Florentinus (Mataha) | 763 | | | | | | ■ | |
| Temenos Gate (City Center) | 406 | | | | | | | * No Earth-Sun relationship found |
| Theater (Outer Siq) | ---- | | | | ■ | | | Direct alignment *(although horizon is high)* |
| Roman Temple Tomb (al-Farasa) | 258 | ■ | | | | ■ | | |
| Tomb 825# (Outer Siq) | 825 | | | | ■ | | | |
| Triclinium (Bab as-Siq) | 35 | | | | | | ■ | |
| Triclinium (Wadi al-Farasa) | 235 | | ■ | | ■ | | ■ | |
| Turkmaniya Tomb (Turkmaniya) | 633 | | | ■ | | | | |
| Uneishu (Outer Siq) | 813 | | ■ | | | | ■ | |
| Unfinished Tomb (al-Habis) | 396 | ■ | | | | | | Direct alignment east (hewn cliff) |
| Urn Tomb (Royal Tombs) | 772 | | ■ | | ■ | | ■ | |
| Winged Lions Temple (City Center) | 422? | | | | | | | * No Earth-Sun relationship found |

illumination of the façade is speculated, but requires empirical corroboration on the summer solstice.

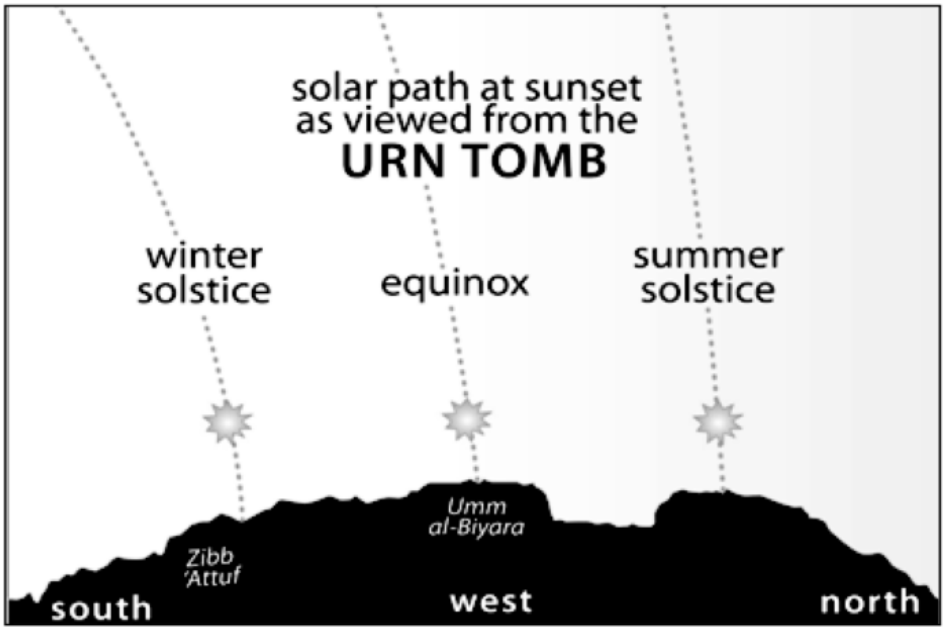
Orientations to the **summer solstice sunset** were found to be associated with ten (33%) structures, including the Palace and Corinthian Tombs (Royal)**( Figs. 2 - 5)**, Renaissance and Broken Pediment Tombs (Wādī Farasa), Triclinia (al-Farasa; Bāb as-Sīq) and the Entrance Tomb in Little Petra›s Siq al-Bārid **(Fig. 6)**. Most of these alignments also exhibited seasonal solar interior illumination of a hewn chamber wall, niche or glyptic feature.

Alignments with the **wintersolstice sunrise** were only related to two (7%) structures: The Columbarium (al-Ḥabīs east) and Turkmaniya Tomb. However, during the wintersolstice sunset, it was found that the Sun illuminates eleven tomb chambers (37%) in the main valley, including the Palace, Urn and Corinthian Tombs of the Royal Tomb Complex **(Figs. 4)**, and the ‹Uneishu Tomb on the western flank of Jabal Khuṭba **(Fig. 10)**.

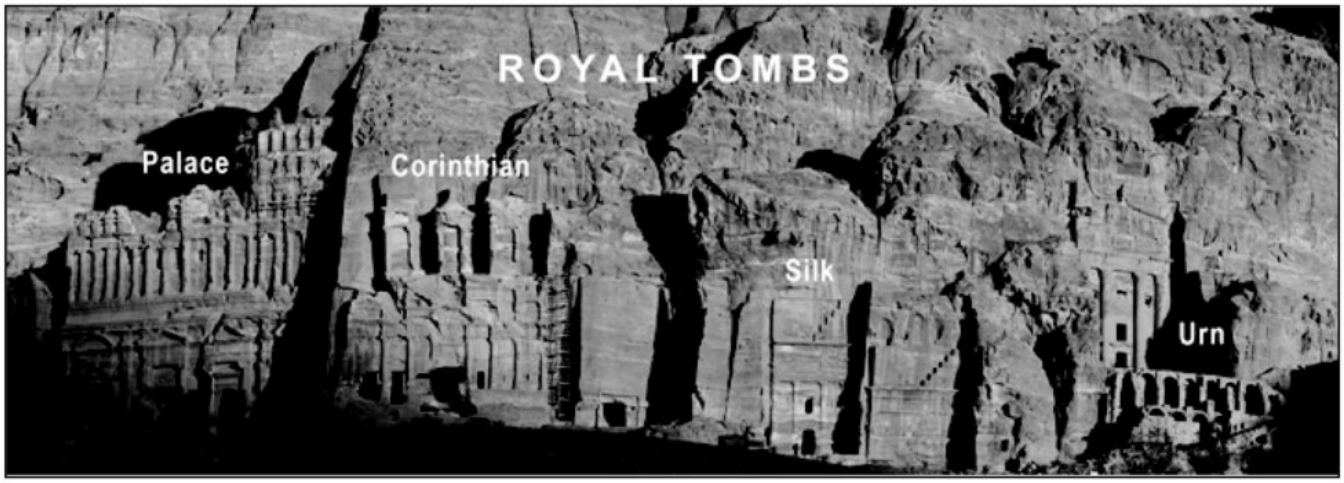
Beyond the main valley, it was found that the Triclinium, Renaissance and Broken Pediment Tombs in Wādī Farasa **(Figs. 6 and 7)**, the Lion Triclinium on Jabal ad-Dayr **(Fig. 10)**, the Obelisk Tomb and Triclinium at Bāb as-Siq **(Fig. 9)** and the Tomb with Armor on Muġhur an-Naṣārah **(Fig. 11)** all displayed alignments



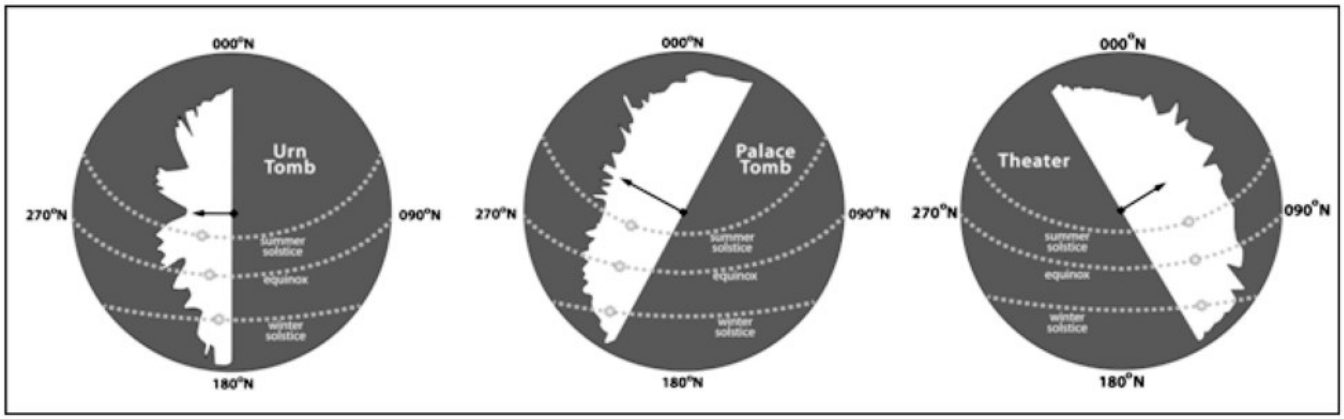

*1.The illustration represents the daylight and night-time variation in Petra, Jordan (latitude 30°). On the summer solstice (the longest day of the year) Petra receives 13.9 hours of daylight, while on the shortest day of the year, the winter solstice, Petra sees 10.1 hours of daylight.*




*2. The graph represents the solar pathways of the Sun from the front of the Urn Tomb, on the marker days of the Solstices and Equinoxes.*




*3. The Royal Tombs are located at the base of Jebel Khutba and consists of the Palace, Corinthian, Silk, and Urn Tombs. On the summer solstice and equinox sunsets, sunlight illuminates the far corner niches of the main chamber of the Urn Tomb where the façade was aligned precisely along the true west cardinal alignment of 270°N. (see Figures 2, 4, 5).*

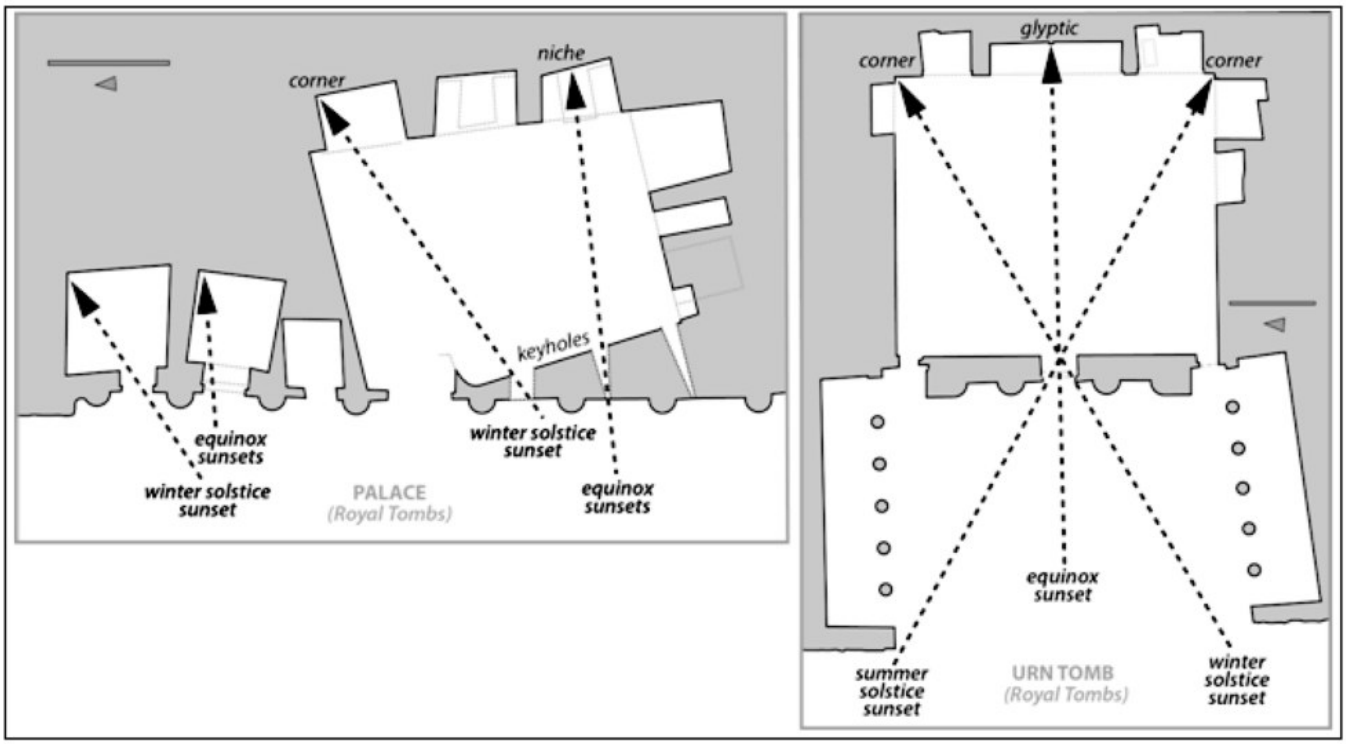



*4. Horizon diagrams of two Royal Tombs, the Urn and Palace Tombs, and the Theater, displaying their marker solar paths. The two adjacent tombs (Urn, Palace) have distinctive, differing horizon markers during the summer solstice sunsets where the Sun sets on prominent horizon features: the towering plateau of Umm al-Biyara (Palace Tomb), and the famous burial site of Aaron, Moses brother, on Jebel Haroun (Urn Tomb).*

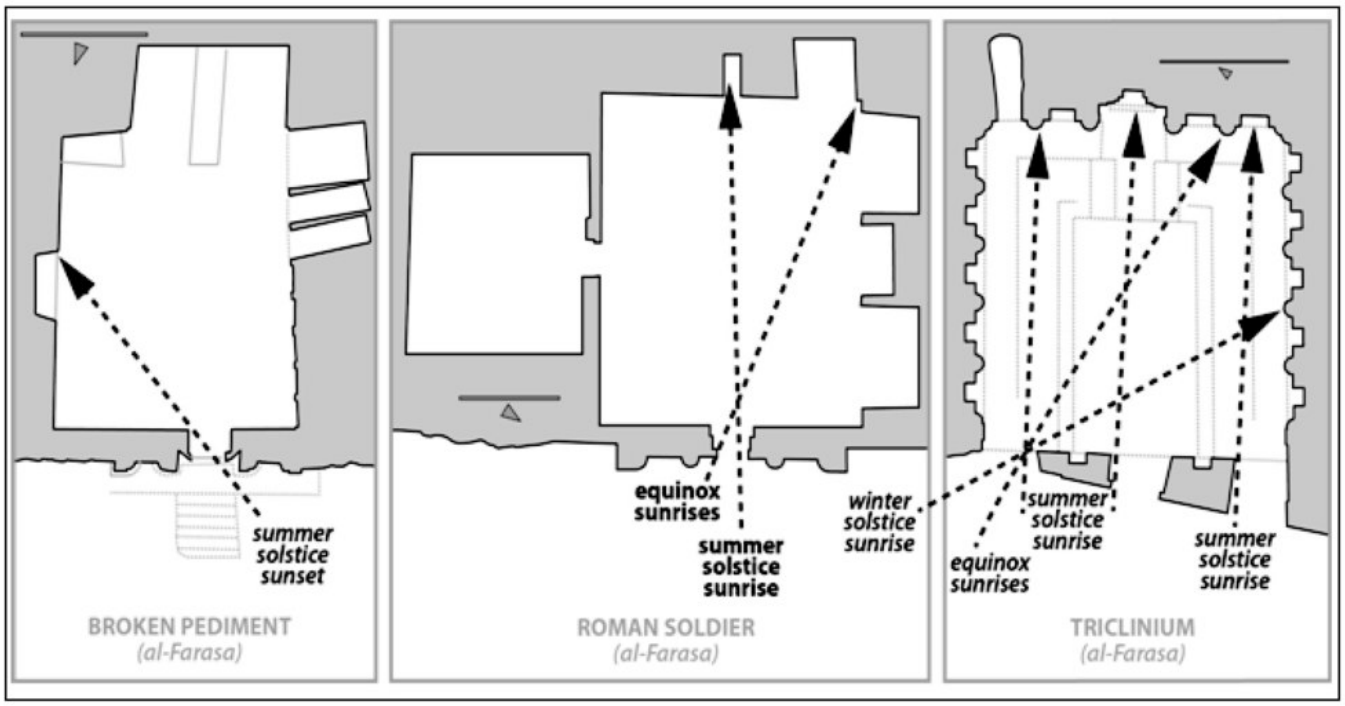
with the winter solstice. Direct winter solstice alignments were found in the main theatre on the outer siq and the Garden Tomb in Wādī Farasa **(Fig. 7)**, however the high cliffs which surround each site obscures the seasonal light-fall on these marker days at sunset.

Unusually, small "keyholes" or specific holes were hewn directly into the sandstone of many of these tombs and structures, in alignment with marker day illumination. Many of these keyholes do, indeed, allow sunlight to penetrate into tomb chambers like the Palace Tomb. However, we must ponder why similar ‹keyholes› were painstakingly worked into the stone at the Garden Tomb, with engineering precision, while the cliff faces obscured the possibility of in-chamber illumination on a marker day. For structures like the Theatre or Garden Tomb, we must question whether the precise orientation of these structures was planned or arbitrary, given that the equinoctial and solstitial illumination is actually somewhat obscured. However, when the alignment is within two degrees of meticulous solstitial alignment, were these alignments habitual and customary even when actual sunlight penetration (whether fully or partial) was not possible?

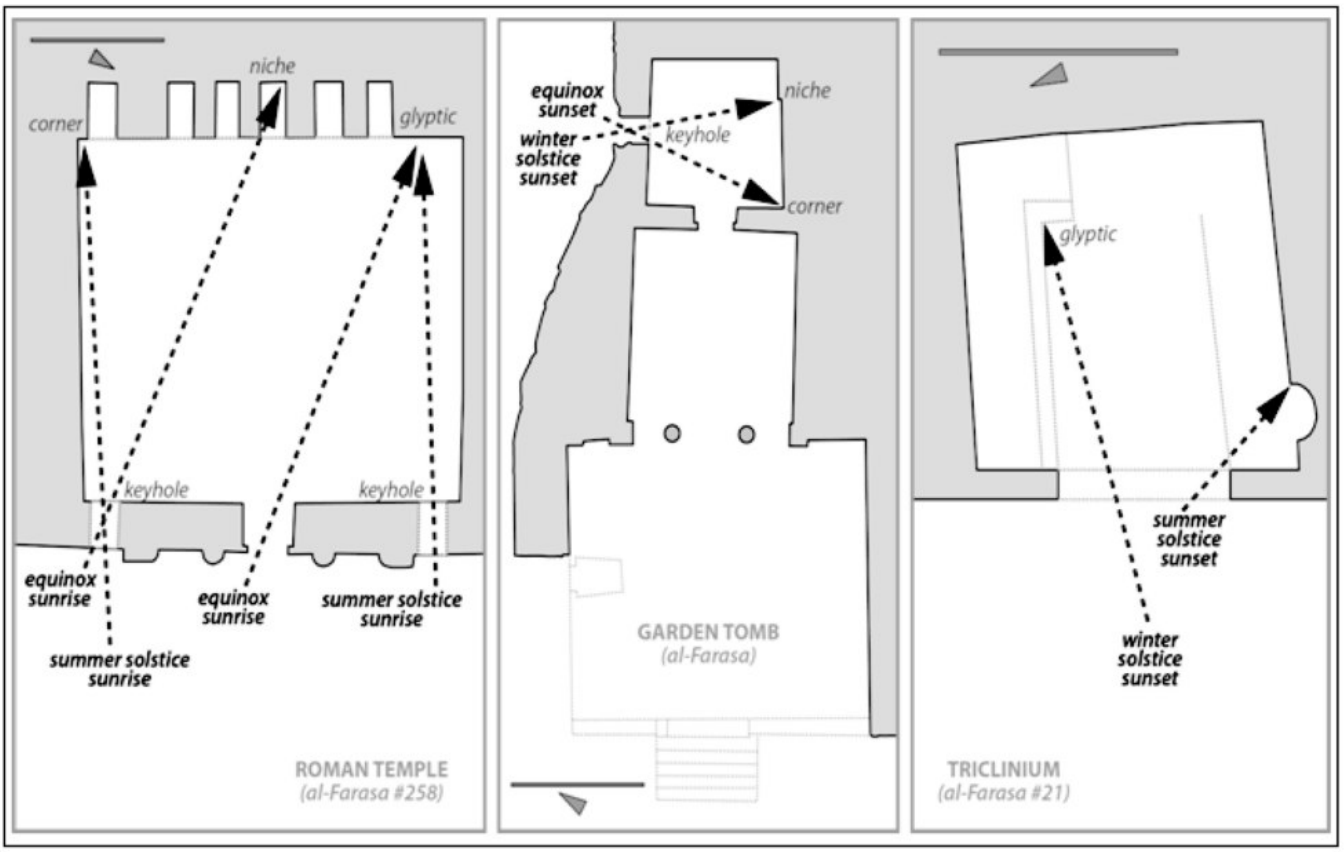
**Equinox Sunrises** were found to align with four (13%) structures, including the Unfinished Tomb (al-Ḥabīs east) and the Roman Soldier and Roman Temple Tombs in Wādī Farasa **(Figs. 6-8). Equinox sunsets** were found to align with and illuminate



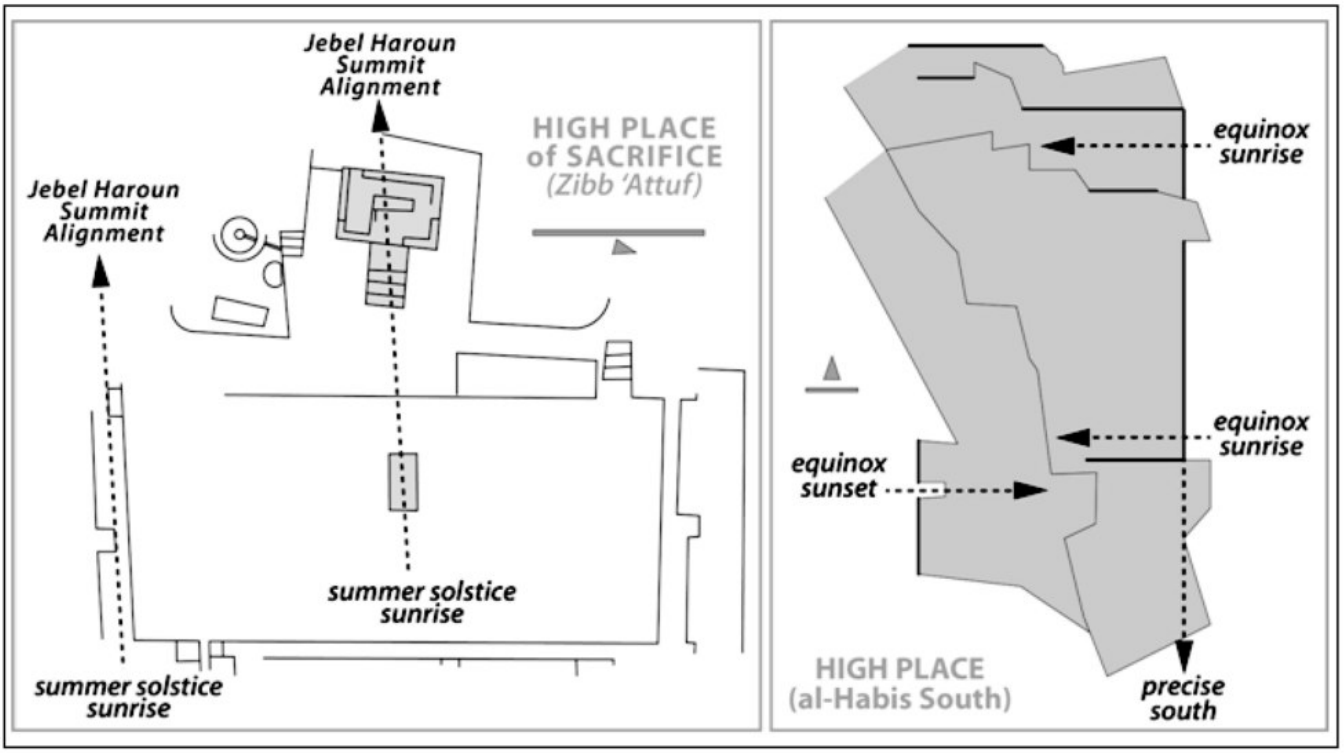

*5. Plans of the Palace and Urn Tomb chambers illustrating the paths of incoming sunlight on solstices and equinoxes. The sunlight enters the Corinthian tomb through distinctive wall slits and doorways in the tomb façade. While in the Urn Tomb the sunlight enters through the central doorway. Not only do both tomb façades face prominent solistitial sunset points on the horizon, but also display remarkable (and engineered) internal illumination on the same solsititial sunsets.*



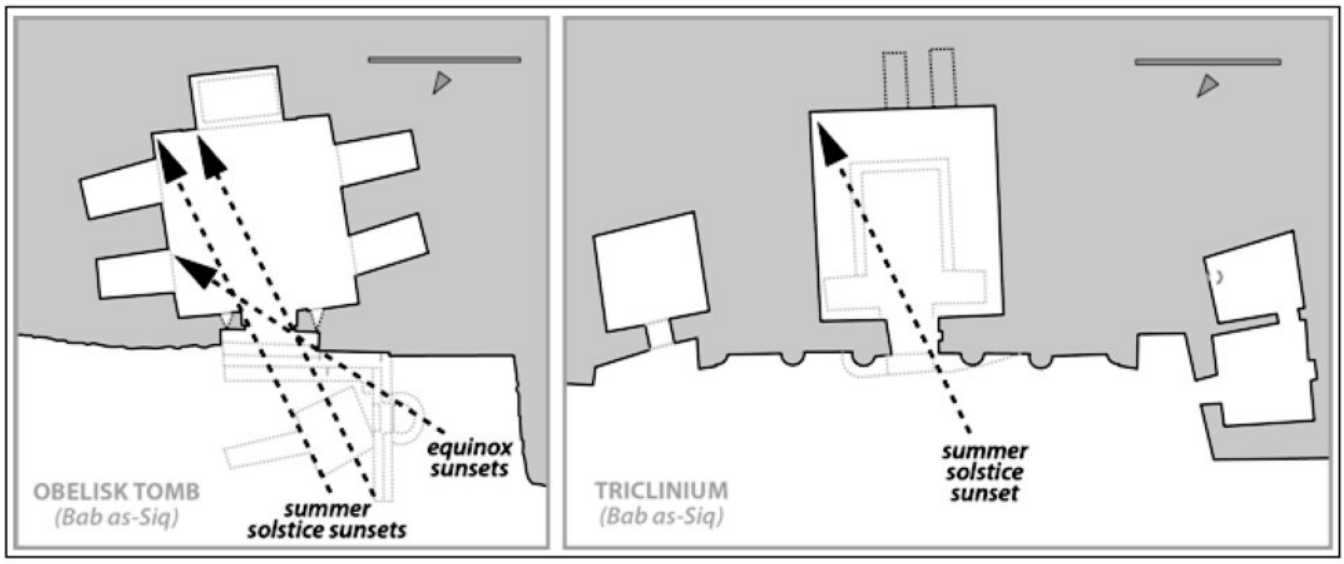

*6. Plans of Broken Pediment, Roman Soldier, and Main Triclinium in Wadi al-Farasa showing interior chamber illumination on marker days: summer and winter solstices, and the equinoxes.*




*7. Plans of Roman Temple, Garden, and Triclinium #21 in Wadi al-Farasa showing interior chamber illumination on marker days: summer and winter solstices, and the equinoxes.*




*8. Plans of the High Place and Plaza (of Sacrifice), and the Southern High Place and Plaza on al-Habis showing alignments to distant landmarks (Jebel Haroun), and marker days illumination: summer solstice sunrise, and the equinox sunrise.*




*9. Plans of the Triclinium and Obelisk Tomb in the Bab as-Siq showing interior chamber illumination summer and equinox sunsets.*

twelve (40%) structures, including ad-Dayr (the Monastery), the Lion Triclinium on Jabal ad Dayr, the Armor Tomb and Tomb of ‹Uneishu **(Figs. 10 and 11)**, and the Obelisk Tomb at Bāb as-Sīq **(Fig. 9)**. These structures were aligned with the east - west axes of the equinox, with primary aspects facing the sunrise in the east or sunset in the west.

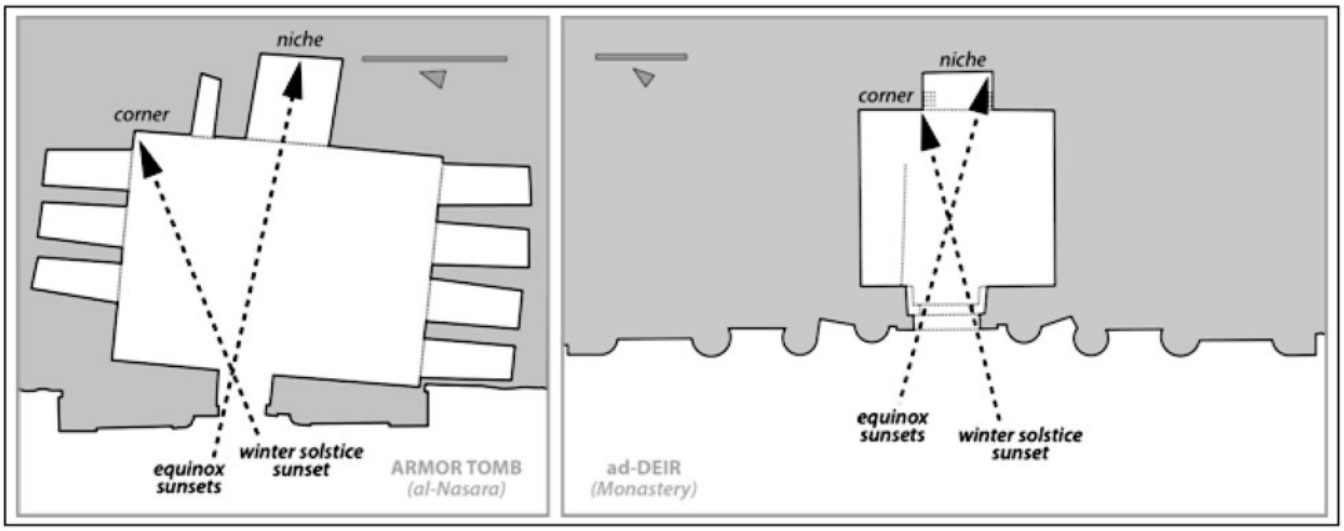
Some monuments and structures were found to have east - west alignments along the equinoctial axes without a specific aspect or façade, such as the prominent obelisks atop Jabal al-Madhbaḥ. Monument alignments with or along an east - west axis were use commonly to signify or define the passage of time between the dark and light halves of each year (on each equinox). The passing of the solar path between the northern and southern hemispheres marked the beginning and end of the dark (dormancy) and light (growth) stages on Earth - widely held notions of our earliest ancestors which represented agricultural, ritualistic, societal and practical divisions (Frazer 1900). Prior research indicates that the obelisks were objects of worship with little or no religious significance attached to their east - west alignment:

*...They (obelisks) may have been left standing in the quarry in respect and reverence for Dushara, a kind of monumental group of standing stones, while all rock around was cut away.* (Wenning 2001: 91).

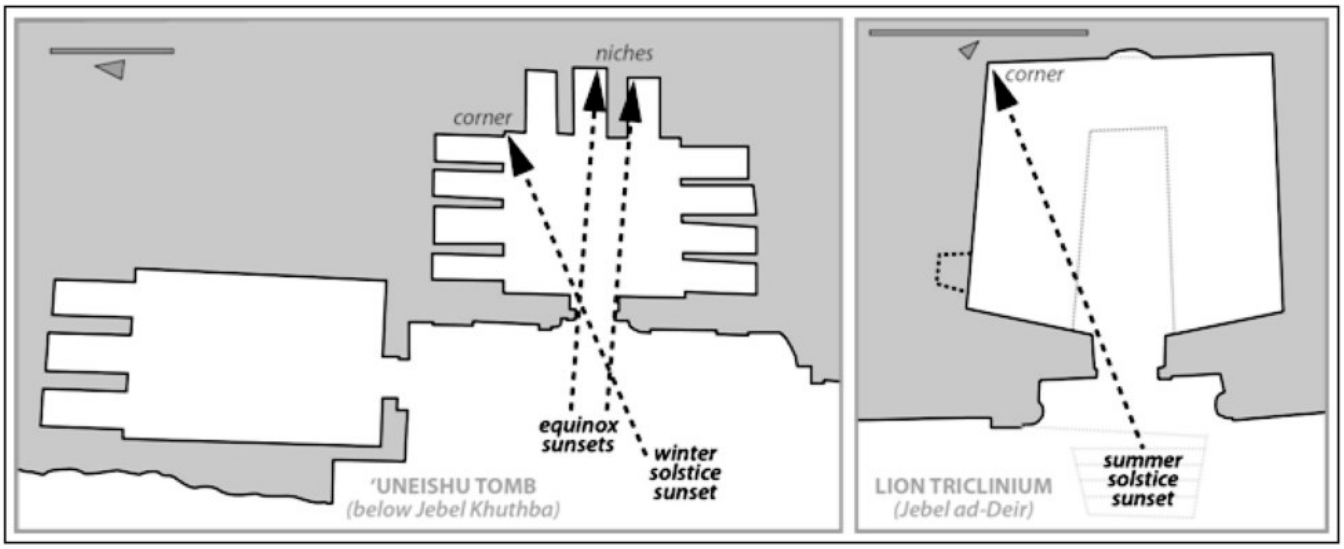
However, in addition to the obelisks on Jabal al-Madhbaḥ, the Southern High Place on al-Ḥabīs also displays distinctly aligned grooves, platforms and couloirs hewn into the sandstone along precise east - west lines. So, were these simply objects representing divine aniconic betyls (Wenning 2001), or were they also used to link this deific symbolism (i.e. Dushara block or betyl) to their aegis (i.e. agriculture; harvest; the Sun), with the equinox heralding the beginning and end of the harvest cycles. Whatever the motivation or function of these equinoctial alignments, they are seemingly intentionally engineered in their construction, location and precision.

**Summary**

Overall, this preliminary study represents a watershed work from which further research can be initiated and developed. These primary monuments, façades and structures represent some the earliest, and most prominently discussed and recorded, in Petra (Brünnow and




*10. Plans of Tomb of Armor, and ad-Deir (Monastery) showing interior chamber illumination on the sunsets of winter solstice, and the equinox.*




*11. Plans of the Tomb of 'Uneishu, and the Lion Triclinium on Jebel ad-Deir showing interior chamber illumination on the sunsets of winter solstice the equinox.*

Domaszewski 1904). Many exhibit distinctive alignments and / or orientations with the rising and setting sun on the solstitial and equinoctial marker days - many strong and obvious (i.e. Urn Tomb) and some lesser and relatively tenuous (i.e Qasr al-Bint). However arbitrary or accidental these alignments may appear, these early findings indicate that they might indeed be intentionally planned and engineered. The integration of the solar calendar into life and culture has been believed to be fundamental to Nabataean religion since Strabo first described individual homes as having altars for Sun worship on their rooftops (Strabo 25 AD). From early epigraphic evidence, it is believed that the Nabataeans "venerated celestial bodies" as a vestige of their origins in northern Arabia (Healey 2001). The worship of heavenly bodies commonly included the more visible planets (i.e. Venus), stars (i.e. Sirius) and the Moon. However, the Sun often represented the primary focus of adoration and observation since it was a marker of the seasonal cycles that influenced weather, comfort and agriculture (Sofaer 2007).

If the religion of the Nabataeans focused and / or exalted the power of the high places within

their theology / cosmology (Healey 1987) and these locations across Petra display distinct cardinal orientations (east; west; north; south) used in solstitial and equinoctial observations, ritual and / or celebrations, then Strabo›s reference to ubiquitous sun altars at Petra may imply that Nabataean worship of the Sun may, to date, have been somewhat underrated. It would follow that this preliminary inventory of Petra's prominent structures and monuments associated with Earth - Sun relationships is crucial to our understanding of Nabataean religion and society. As we delve into the complexities of Petra›s past, an understanding of the links between the Sun›s annual pathways and their relationship with Nabataean architecture may be vital to understanding Petra's culture, society, agriculture and even urban morphology and civic planning during its 'golden age' roughly 2,000 years ago.

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# PRELIMINARY REPORT ON THE INAUGURAL SEASON OF EXCAVATION AT KHIRBAT AL-MUKHAYYAṬ*

*Debra Foran, Annlee Dolan, Steven Edwards, Jennifer Lewis, Abigail Buffington and Teresa Wight*

## Introduction

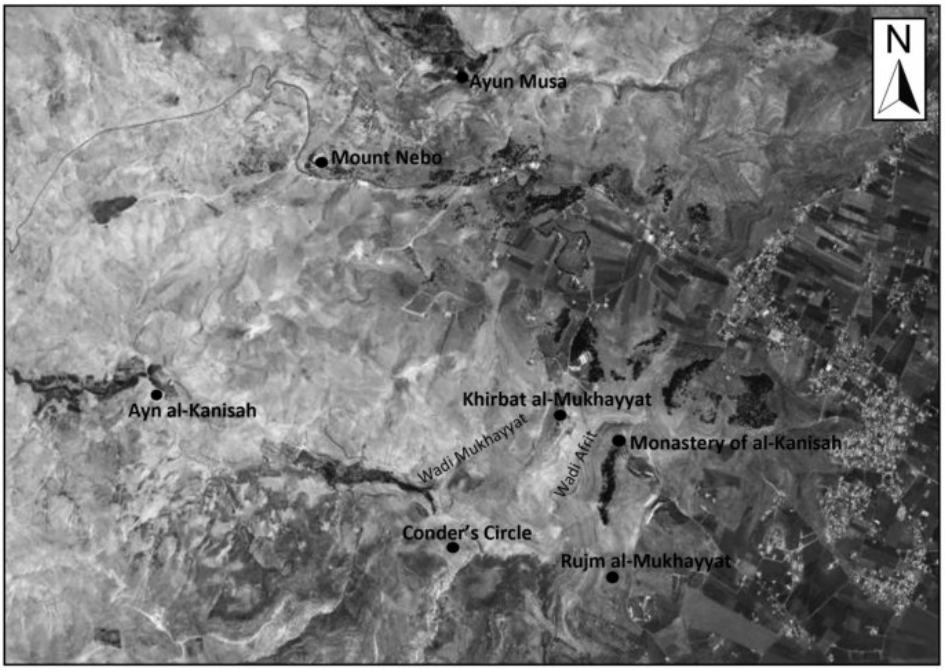
Khirbat al-Mukhayyaṭ (hereafter Mukhayyaṭ), also called the Town of Nebo (Piccirillo and Alliata 1998: 53-83; Saller and Bagatti 1949: 204-217), is located approximately 9 km north-west of Madaba on a steep limestone promontory. The site overlooks the Dead Sea and Jordan valley to the west and is framed by Wādī ʻAfrit to the east and Wādī Mukhayyaṭ to the west **(Fig. 1)**. Material culture from a wide range of periods has been documented at and around the site, including Byzantine churches and mosaics, Hellenistic structures, a well-preserved Iron Age fortification system, and an array of tombs, caves, cisterns and various agricultural installations.

Archaeological research at Mukhayyaṭ has given us a broad understanding of certain occupation phases at the site (Michel 1998; Mortensen 2002, 2005; Mortensen and Thuesen 2007; Piccirillo 1988, 1989, 1993; Piccirillo and Alliata 1998; Ripamonti 1963; Saller 1941, 1966; Saller and Bagatti 1949; Schneider 1950; Thuesen 2009). Meanwhile, intensive surveys of archaeological sites in the Nebo region (Glueck 1935; Graham and Harrison 2001; Mortensen 1992, 1996, 2009; Mortensen and Thuesen 1998; Mortensen *et al*. 2013; Stockton 1967; Thuesen 2004) have provided a solid foundation for exploring the extensive occupation in the area. While this work has provided a significant contribution to our knowledge of the history of the region, the lack of systematic excavations and the absence of excavated material from a wide range of time periods has left a gap in our understanding of Mukhayyaṭ's role within this archaeologically and historically important region. With this issue in mind, the Khirbat al-Mukhayyaṭ Archaeological Project (KMAP) was conceived to address this lacuna and explore broader themes, such as pilgrimage, economy and landscape, across multiple cultural and historical periods. Additionally, KMAP has been established as a Community Based Archaeological Program (CBAP) with the hope of engaging with the local community that resides near the archaeological site.

## Previous Research at Mukhayyaṭ

The first mention of the site appears in the accounts of Félicien De Saulcy, dating to 1863, which are ordinarily credited with being the first instance where the name Khirbat al-Mukhayyaṭ was recorded (De Saulcy 1865: 289-296). Mukhayyaṭ was visited in 1872 by Henry B. Tristram (1874: 324) and in 1881 by Claude R. Conder (1889: 191-219). Alois Musil was the first to systematically explore the site in 1901 (1907: 334-340). The site was then further explored and documented in 1907 by Antonin Jaussen and Raphaël Savignac (1909-1914: 17-20). Nelson Glueck visited Mukhayyaṭ in 1932, comparing its well-preserved fortifications to a Moabite fortress that he documented at nearby ʻAyun Musa **(Fig. 1)**. Glueck also noted the *rujm* located to the east and the presence of a moat at

* Specific contributions were made by individual authors to the following sections: Macro-botanical Remains Analysis (A. Buffington), Ottoman village documentation project (T. Wight) and community engagement (J. Lewis).




*1. Map of the Nebo area.*

the southern end of the site (1935: 110-111).

Much of our current understanding of Mukhayyaṭ is the result of the efforts of the Studium Biblicum Franciscanum. Systematic explorations by the Franciscans began in 1932 under the direction of Brother Jerome Mihaic (Saller and Bagatti 1949). In the 1960s, an expedition led by Julian Ripamonti conducted excavations at *Rujm* al-Mukhayyaṭ as well as a survey of the area around the site that produced two Iron Age tombs (Ripamonti 1963; Saller 1966: 165-298). Work continued in the early 1970s under the direction of Fr Michele Piccirillo (Piccirillo 1973, 1988, 1989, 1993; Piccirillo and Alliata 1998: 221-244). In the late 1980s and early 1990s, excavation work continued on the acropolis, resulting in the recording of part of the occupational sequence at Mukhayyaṭ (Michel 1998).

In more recent years, the Tall Madaba Archaeological Project conducted three survey seasons at Mukhayyaṭ. The 2000 and 2001 seasons were devoted to topographic and surface collection surveys (Graham and Harrison 2001). The results of these two seasons have largely shaped the strategies for the renewed explorations at Mukhayyaṭ. The 2012 season focused on preparing the site for excavation in future seasons and documenting the various caves, tombs and architectural features visible on the surface.

**History of Mukhayyaṭ**

The ancient town of Nebo is first mentioned on the mid-9th century BC monumental stele known as the Mesha Inscription (Dearman 1997; Gass 2009; Gibson 1971; Pritchard 1950; Routledge 2004). Although the term Nebo is most often associated with Siyagha, or Mount Nebo, located 2.5 km north-west of Mukhayyaṭ **(Fig. 1)**, the Mesha Inscription implies that ancient Nebo was in fact a settlement, most likely a small town. Archaeological investigations at Mount Nebo have not uncovered any significant Iron Age occupation levels; thus, ancient Nebo must be associated with the nearby settlement at Mukhayyaṭ, as evidenced by the presence of considerable quantities of Iron Age material collected in 2001, the visible architecture at the site and the previously excavated Iron Age tombs (Piccirillo and Alliata 1998: 110-127; Ripamonti 1963; Saller 1966).

The Mesha Inscription points to a strong cultic function for the site. Indeed, Mukhayyaṭ may have been at the centre of a sacred landscape that has its roots in much earlier periods. A large

stone circle dating to the Early Bronze I (*ca* 3300-3000 BC) was first documented by Conder **(Fig. 1)** during his survey east of the Jordan river (Conder 1889) and later investigated by Peder Mortensen while he was conducting his survey of the Mount Nebo region (Mortensen 2002, 2005; Mortensen and Thuesen 2007; Thuesen 2009). This prominent feature highlights the ritual importance of this area from an early time.

Mount Nebo and the region surrounding it feature prominently in a variety of Jewish sources dating to the Late Hellenistic and early Roman periods. Most of these texts reiterate that this area is the location of the death and burial of the Prophet Moses. There are also a handful of texts that refer to inquiries about the tomb of Moses made by the Roman government in the 1st and 2nd centuries AD and their inability to locate it (Piccirillo and Alliata 1998: 65-69).

In addition to its association with the Mesha Inscription and the Late Hellenistic / Early Roman literature, Mukhayyaṭ is perhaps best known for its cultural material dating to the Byzantine period. The town housed a number of churches that catered to the local Christian population and the growing influx of pilgrims during the 6th to 8th centuries AD. Monasteries in and around Mukhayyaṭ include the Monastery of al-Kanisah in Wadi ʻAfrit (Piccirillo 1998: 205-209), the Monastery of the Theotokos in Wādī ʻAyn al-Kanisah (Piccirillo 1994, 1995; Piccirillo and Alliata 1998: 209-217) and, of course, the Monastery of the Memorial of Moses on Mount Nebo (Foran 2005; Piccirillo and Alliata 1998: 151-205; Saller 1941). The Byzantine structures at Mukhayyaṭ seem to go out of use in the 7th century AD (Michel 1998: 380), at which time the site appears to have been abandoned completely. Occupation at Mukhayyaṭ only resumed during the Late Ottoman period, sometime in the late 19th century AD, and this new settlement was confined to the slopes on the north-eastern side of the mound.

**2014 Field Season Objectives**

During the 2012 season, three potential fields of excavation were identified. Field A is located along the southern slope of the acropolis, Field B is situated at the top of a ridge to the south of the acropolis and Field C comprises a flat area north of the acropolis. Several excavation units were opened in each of these three fields **(Fig. 2)**. The primary objectives for the 2014 season were to: (1) locate and explore the village associated with the Late Byzantine churches previously excavated on the site, (2) elucidate the occupational history of the site and (3) investigate the extent of the Iron Age fortification walls already visible on the surface along the perimeter of the site [1].

Although our main objectives for the 2014 season were focused on excavations, time and resources were also allocated to several other projects. Work resumed in the small Ottoman village to the north-east of the mound, where our objective was to systematically document each building, including a detailed description of all architectural features. In an effort to engage with the local community, one of our other objectives for the 2014 season was to lay the foundations for KMAP - CBAP in the nearby village of Fayṣaliyah.

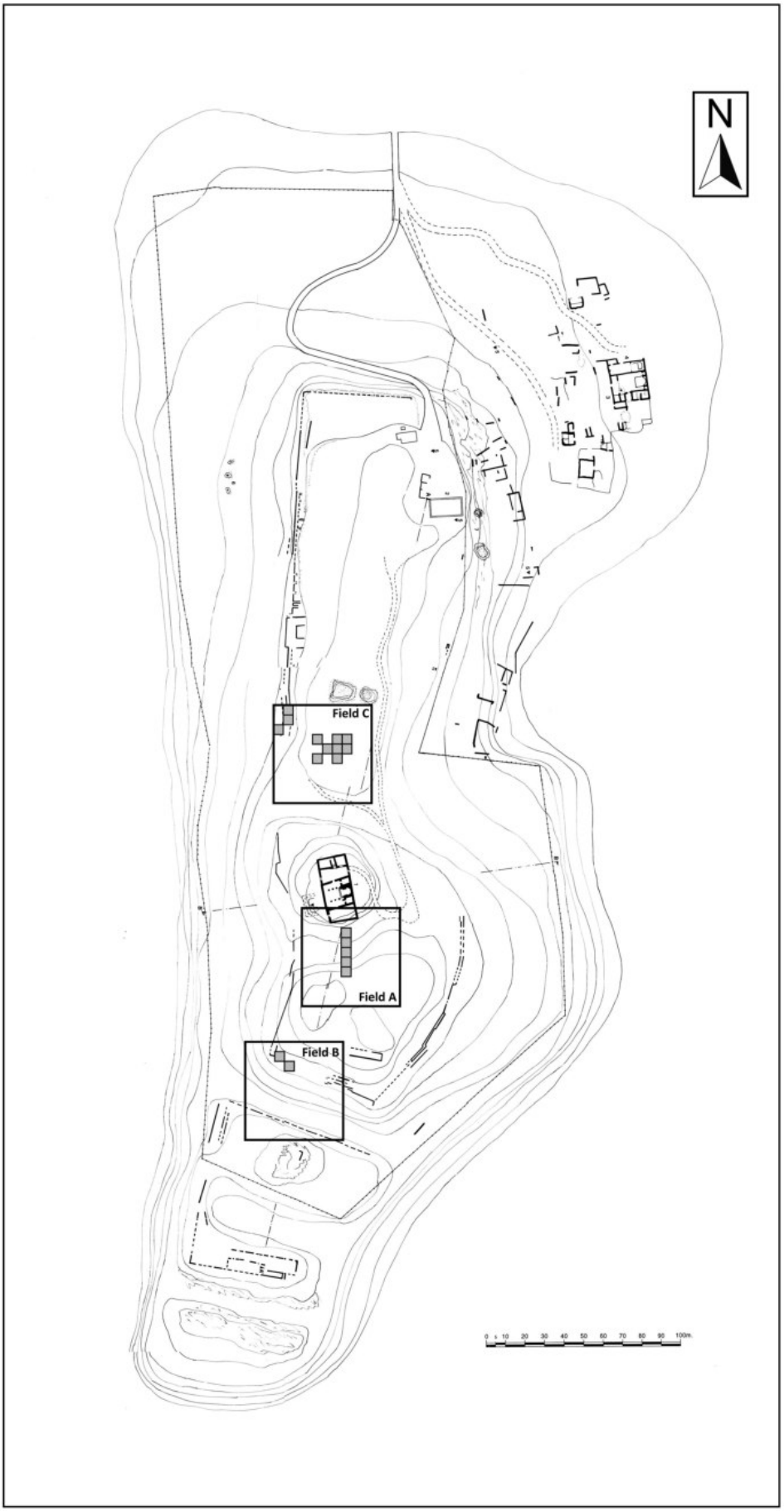
**Results of Excavation**

*Field A*

A trench consisting of five squares (A25, A35, A45, A55 and A65) was opened on the southern slope of the acropolis (Field A) in the hopes of exposing the remains beneath the Church of St George and elucidating the occupational history of the site. To this end, three of the five squares were opened for excavation.

Excavations began in square A25 at the northern end of the trench. Three east - west walls were exposed in A25 **(Fig. 3)**. Owing to

1. The 2014 season was conducted between 18 May and 16 June, with Debra Foran acting as Project Director, Annlee Dolan as Associate Director, Jennifer Lewis as the Director of the Community Based Archaeology Program and Steven Edwards as Field Supervisor. An archaeological field school was also run with students from Wilfrid Laurier University and the University of Toronto. Kholood Agrabawi served as representative of the Department of Antiquities.

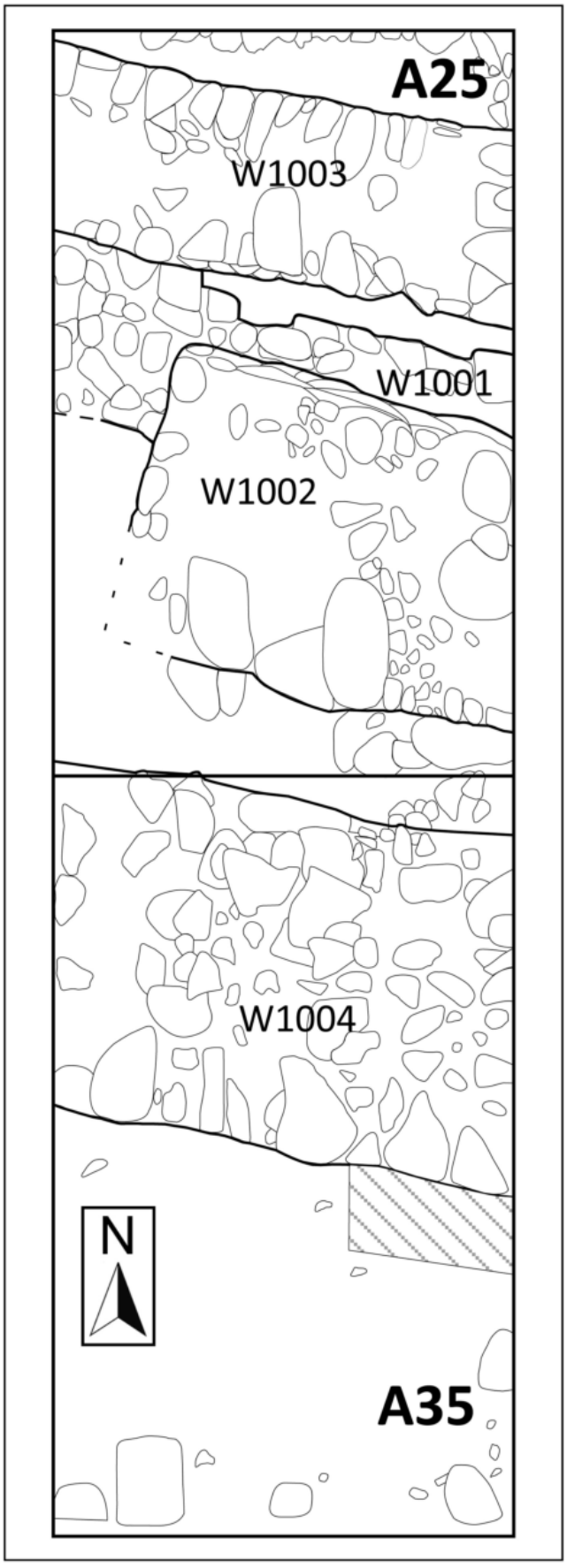



*2. Plan of Mukhayyaṭ with 2014 excavation areas.*

spatial constraints, the soil between the two earliest walls (W1001 and W1002) could not be fully excavated. Pottery from this area dates from the Iron Age to the Byzantine period and thus cannot aid in establishing a precise date for this architecture. The depositional sequence of the walls in A25 is a follows: W1001 (A25:14) was built first followed by W1003 (A25:10), with W1002 (A25:13) representing the final construction phase. W1001 was likely still exposed when W1003 was built as no foundation trench was identified between the two walls and the bottom of W1003 clearly lies much deeper, despite the fact that its exposure was impossible. W1001 also lies partially beneath W1002 and, while W1001 runs across the entire square, W1002 does not reach the western baulk perhaps because it has eroded down the slope of the acropolis. A35, to the south of A25, was opened later in the season when further excavation in A25 became too difficult. Another east - west wall, W1004 (A35:8), was uncovered but the bottom of this wall was not exposed **(Fig. 3)**.

While it is not yet possible to determine the function of these walls, they did contribute in two key ways to the formation of the stratigraphic deposition in this area. Not only do they prevent the erosion of material down the slope, their deterioration provides a source for new material moving towards the base of the acropolis. These walls were likely part of a retaining system used to secure this part of the acropolis and support the paved courtyard annexed to the southern side of the Church of St. George.

Above these tumble deposits is what appears to be an intentional levelling layer for the top of the acropolis (A25:3, 4) done prior to the construction of the Byzantine church. This thick layer consisted of many boulders and decomposed limestone; our excavations seem to confirm what was recognized during the earlier excavations to the west of the church (Michel 1998: 359-369), namely that the top of the acropolis was levelled prior to the construction of the Byzantine church.




*3. Plan of Field A excavations.*

*Field B*

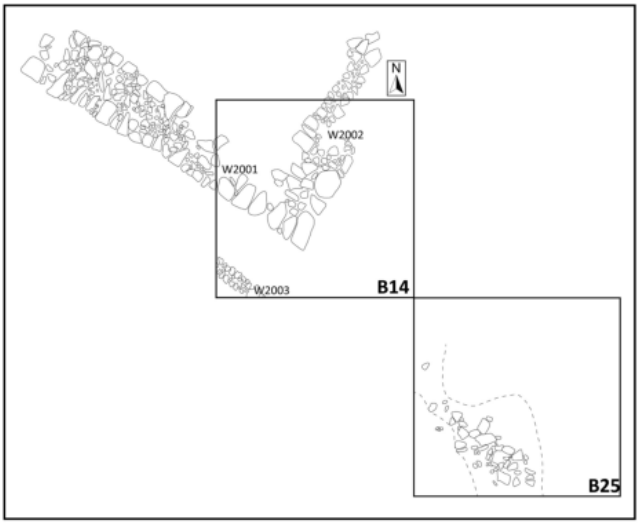
Two excavation units (B14 and B25) were opened on the top of a ridge located to the south of the acropolis where wall lines belonging to a large structure were already visible **(Fig. 4)**. The corner formed by walls W2001 (B14:4) and W2002 (B14:5) incorporates ashlars at the junction where the two walls meet. These walls were constructed of semi-hewn and hewn boulders measuring more than 1 m in length.

A third wall, W2003 (B14:10), was exposed running through the south-western corner of B14. Stratigraphically, we cannot say with certainty if this wall was constructed earlier or later than W2001 and W2002, as none of the foundations of these walls were exposed and a surface (B14:14) extended between them. While this indicates that all of these walls were in use at the same time, the difference in construction techniques between W2003 and W2001 / W2002 suggests that they were not constructed at the same time or, at the very least, had different functions. Unlike W2001 and W2002, W2003 was constructed in a boulder and chink fashion and was made of unhewn and semi-hewn cobbles. W2001 and W2002 likely represent the corner of a tower or bastion-like structure dating to the Hellenistic period.

There appears to be a secondary use of this space as there are several surfaces (B14:14 = B25:7 and B14:9 = B25:3/5) that were found sealing against the outer face of these monumental walls. Though no architecture was unearthed in B25, there is occupational continuity with the surfaces from B14 extending through the entire area. In B25, these surfaces follow the natural slope of the site, which is unusual given the severity of the angle (more than 20° from horizontal).

The surfaces that extend through B14 and B25 held a number of complete Hellenistic cooking pots that were found upright, a surprising fact considering the angle of the slope in B25. More than 20 cooking pots **(Fig. 5)** were found on or embedded into these surfaces.

Additional finds from this occupation include three small Hellenistic bowls, four coins, ceramic figurine fragments **(Fig. 6:1)**, a bone spatula **(Fig. 6:2)**, two spindle whorls **(Fig. 6:3-4)**, two ostraca **(Fig. 6:10-11)** and a fragment of a stone vessel. The lack of Byzantine ceramics suggests a *terminus ante quem of sometime* in the Early Roman period for this area.




*4. Plan of Field B excavations.*

*Field C*

Two areas in Field C were selected for excavation in 2014. Eight 5 x 5 m squares were opened along a gently sloping hill to the north of the acropolis (Field C Central). Three additional squares were opened along the western edge of the mound (Field C West).

Field C Central Area

Our initial assessment of this area, prior to excavation, was that it was a good candidate for the location of the Byzantine settlement associated with Mukhayyaṭ's churches. This assessment was further supported by the Byzantine ceramics collected in this area during the 2001 survey. However, after one season of excavation, we can state with certainty that there are no Byzantine structures in the central area of Field C. Instead, this area is dominated by ancient fill layers that are likely the result of the clearing of a large cave located nearby as well as agricultural activity. All of these



*5. Hellenistic cooking pots from Field B.*

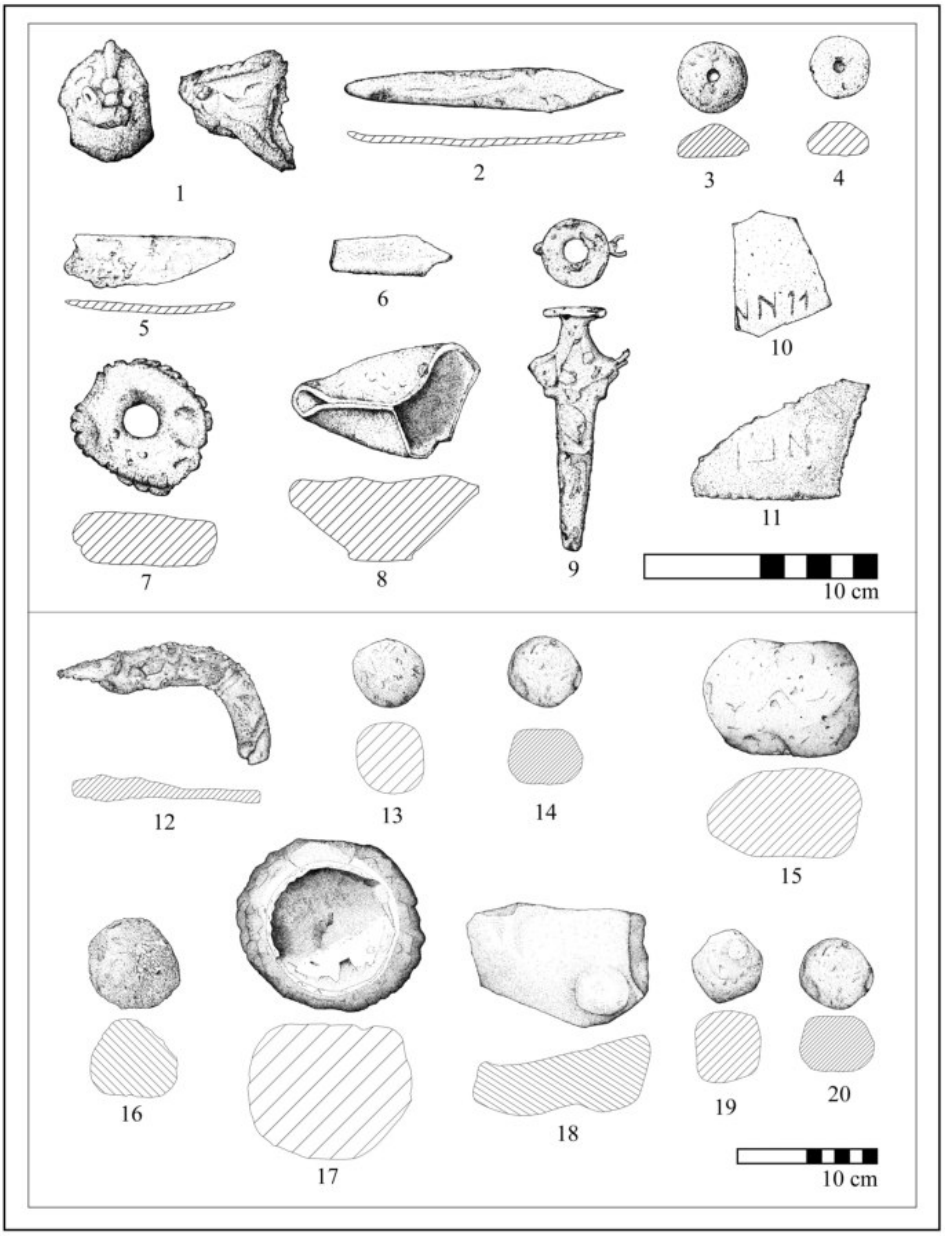
squares included numerous sloping layers of alternating pebbles, cobbles and boulders **(Fig. 7)** that contained a mix of ceramic material. The overall impression is that these deposits represent ancient fill layers, resulting from the clearance of nearby areas for agricultural purposes or building activities. If the central part of Field C had once been occupied, any standing architecture was removed in antiquity.

The only clear cultural contexts in this area come from two bedrock features, C100 and C200, excavated in squares C37, C38, C46 and C47 **(Fig. 8)**. That the bedrock contained the best-preserved cultural material is further proof of the limited occupation in this area. C100 is a small stepped rectangular installation cut into the bedrock. At the bottom of the steps are two piers and a threshold providing access to the main room of the chamber. This threshold area leads into the main room which is roughly rectangular in shape. The feature appears to have been open to the sky as there are no signs of any kind of roofing material. The eastern edge incorporates a slight bedrock overhang. Plaster found along this wall may have been used to maintain the integrity of the overhang.

The soil that filled this installation contained numerous artefacts, including 12 coins, several iron nails, an iron sickle blade **(Fig. 6:12)**, a small ceramic lamp **(Fig. 6:9)**, a stone spindle whorl **(Fig. 6:8)**, a painted juglet, a fragment of a bone spatula **(Fig. 6:5)** and several groundstone tools **(Fig. 6:13-15)**. The ceramic assemblage from C100, characterized by several examples of cooking pots and amphorae, suggests a Hellenistic date for the final use of this installation. The ceramic and artefact assemblages from C100 bear a striking resemblance to that from Field B, indicating that the occupation in these two areas is contemporary. The exact function of the feature remains unclear. While it may have functioned as a tomb in an earlier period, in its final use phase the room appears to have served as a storeroom for household items.

To the south-west of the rock-cut installation is a circular, plaster-lined reservoir (feature C200, C46:10). This reservoir is cut into the bedrock and measures 3.84 m in diameter **(Fig. 8)**. The eastern half of C200 was excavated down to a depth of 1.9 m, but the bottom was not reached. At the top of the reservoir, a hard-packed beaten earth surface was found sealing its contents. This surface (C47:14) was 0.15 m at its thickest along the northern edge of the reservoir. Below the surface were a series of cobble and boulder layers mixed with loosely-packed soil all of which yielded Iron Age and Hellenistic pottery. The reservoir walls widen from top to bottom and are plastered in their entirety. The objects recovered from C200 include a well-preserved bronze *kohl* jar **(Fig. 6:9)**, a stone pounder **(Fig. 6:16)** and a small, poorly hewn stone bowl **(Fig. 6:17).**

It is difficult to discern the relationship between this feature and the nearby rock-cut chamber. However, it is not unreasonable to assume that they were in use at the same time as they both yielded similar pottery. Moreover, the complete lack of structural remains from the other squares in the central part of Field C implies that the




*6. Objects from Fields B and C.*

reservoir cannot be directly associated with any contemporary buildings.

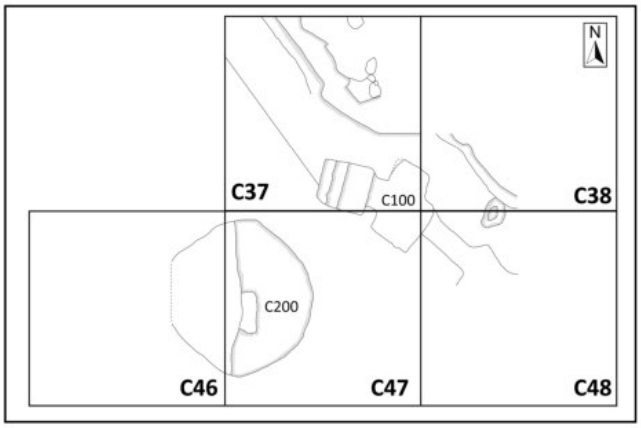
Field C West

Although this area was not initially selected for excavation, the presence of wall lines on the surface suggested the presence of architecture on the western edge of the mound. After it was determined that the central area of Field C was mainly comprised of fill layers with mixed cultural contexts, three additional squares (C2, C12 and C21) were opened along the fortification wall that circumscribes the site.

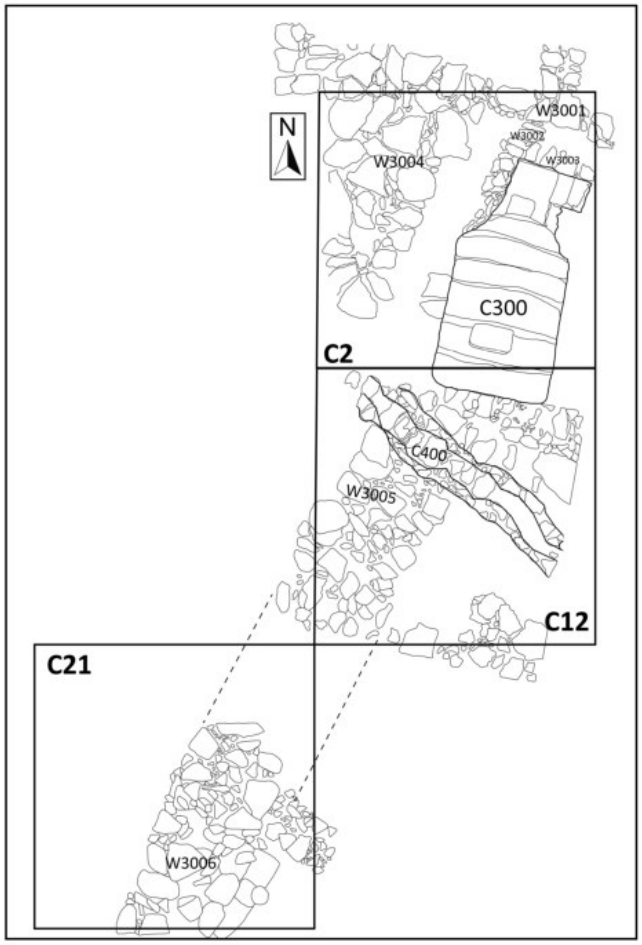
C2 yielded arguably the most significant remains of the 2014 field season. In the eastern half of the square, a large plaster-lined installation (feature C300), framed at the surface by walls W3002 (C2:21, 22) and W3003 (C2:9), was excavated **(Fig. 9)**. C300 consists of ten steps plus the landing at the bottom, all of which are lined with thick plaster. Two steps are located at the top of the installation, on the north-eastern side, and are oriented to the west. From there, a small flat area opens up to a much smaller step to the south. This fourth step is bounded on both sides by plastered ledges that restrict the width



*7. Fill layers from Field C Central Area.*




*8. Plan of Field C Central excavations.*




*9. Plan of Field C West excavations.*

of the step. Below are seven additional steps, all oriented towards the south. These steps widen considerably after the fourth step, as they span the full width of the pool. The main chamber, which is located to the south of the fourth step, is plastered in its entirety and descends nearly 3.5 m.

Feature C300 appears to have functioned as a ritual bath. A cistern, located directly east of the installation, is likely the source of water that was used to fill the pool. Given its depth, a person could easily be fully submerged when standing on the bottom steps. There is no drain at the bottom of the pool. Similar installations have been uncovered at Tall al-'Umayri (Herr *et al*. 1991: 37-52), Herodium (Netzer 1981: 47-50, ill. 79), Macharaeus (Corbo and Loffreda 1981: 269-274, fig. 33), Jericho (Netzer 2001) and Qumran (Magness 2002).

The soil layers inside the pool were carefully excavated in order to preserve any potentially significant cultural remains that would help identify and date the feature. One coin was recovered on the third step. Once analyzed, this coin will provide an absolute date for the feature, or at least its *terminus ante quem*. Other finds include groundstone tools **(Fig. 6:19-20)**, stone basin fragments **(Fig. 6:18)**, a small ceramic bowl, a globular juglet and a fragment of a bone spatula **(Fig. 6:6)**. The ceramic and artefact assemblages recovered from C300 are also very similar to those from C100 and Field B, indicating that all three of these areas were occupied during the Hellenistic period.

West of feature C300 is a large wall, W3004 (C2:16), that forms part of the Iron Age fortification system. It appears to follow an offset - inset layout, with the walls measuring roughly 1.9 m thick. Parts of the same wall were exposed in both C12 (W3005; C12:15) and C21

(W3006; C21:3). In the latter case, the western face is clearly footed on bedrock and the eastern face of the wall is founded on hard-packed soil. Further exploration of this fortification system is required.

C12 also yielded a stone-lined channel (C400; C12:6) capped with flat-lying stones. At present, this feature does not appear to be connected to C300, but further excavation may reveal that this channel was used to transport water into the pool. The ceramics recovered from C12 and C21 date mainly to the Iron II period which suggests that this is indeed part of Mukhayyaṭ's Iron Age fortification system. Only a single surface (C12:14) was uncovered in the western part of Field C; it remains unexcavated. More work will be conducted here in order to elucidate the nature of the Iron Age occupation on this area of the site.

**Macro-Botanical Remains Analysis**

The first season of excavation at Mukhayyaṭ provided the opportunity to implement a comprehensive soil sampling and analyzing strategy designed to provide robust comparisons with other sites in Jordan. The initial hypothesis for Field C Central material was based on the assumption that excavations in this area would produce substantial Byzantine remains. This field was expected to yield a pattern of plant use that reflects a strong reliance on a locally-based (evident plant processing) and focused mixed-cultivation strategies (summer and winter crops) with potential irrigation technology employed (Ramsay and Smith 2013: 59). It was also hypothesized that a secondary emphasis on Vitis vinifera (common grape) and *Olea europea* (olive), the two economically most important crops during the Byzantine period, might be evident (Jacquat and Martinoli 2001). The hypothesis for Fields A, B and C West was that plant remains will largely reflect the construction debris and filling episodes of the various phases represented by the architecture. Southern Jordan has been the focus of paleoethnobotanical studies of material dating to the Early Roman and Late Byzantine periods. However, only limited work has been undertaken in the more agriculturally productive Madaba Plains region (see LaBianca and Lacelle 1986: 123-140). The long term goal for this study is to resolve this unevenness and provide comparative material for the paleoethnobotanical record from southern Jordan.

Following field analysis of 40 samples, it is possible to come to certain preliminary conclusions about the macro-botanical remains at Mukhayyaṭ. Of the 40 samples analyzed, three were from Field A, three from Field B and 34 from Field C. The three Field A samples reflect a mix of activities with low numbers of cereals (both barley and wheat), legumes and olive pits, and an overall low density of archaeological material. The one find of *Phalaris* sp. (canary grass) could be indicative of irrigation (Fatkin *et al*. 2011: 260) but this is too preliminary to state definitively.

The three Field B samples all came from contexts associated with the intact Hellenistic cooking pots that were uncovered in *situ*. The interior of one of the vessels from square B25 (14.106) produced a concentration of cereals and legumes that were badly preserved. The interior of one of the vessels from B14 (14.199) was largely composed of intact charcoal pieces, indicating a single depositional event. The plant remains recovered from the soil underneath this vessel reflect a mix of firing activities (cereals, legumes and fruit). The remaining samples from these cooking pots have been sent to the archaeobotany laboratory at Ohio State University for further analysis.

Of the 34 samples from Field C, 28 reflect the contents of installations C100, C200 and C300. The samples collected from C100 likely represent an intentional filling event owing to the large number and diversity of seeds in the assemblage. Additionally, the sample taken from the floor of this installation is composed completely of cultivated seeds: *Phoenix dactyifera* (date), *Vitis vinifera* (common grape), *Triticum aestivum / durum* (bread / macaroni wheat), *Triticum*

*diccocum* (emmer wheat), *Lens culinaris* (lentils) and *Hordeum vulgare* (common barley); there is no evidence of processing. This is likely not a domestic surface but may reflect burned storage or cooking activities (Cartwright 2000: 101-2). Palmer and van der Veen (2000: 197) have noted the association between economic crop plants and intentional depositions in Roman ossuaries throughout the eastern Mediterranean. The samples taken from the surface and fill associated with C200 indicate an intentional filling event. Those taken from C300 suggest an aeolian or fluvial deposition.

*Vitis vinifera* (common grape) was present in the highest numbers in the economic plants beyond cereals and legumes, although it does not make up a significant portion of the seed count in any of the Field C excavation units. A concentration of 31 grape pips, associated with burnt pottery sherds dating to the Iron Age, was recovered from square C21.

There is a significant diversity in the agricultural practices at Mukhayyaṭ as evidenced by the excavations in Field C. There are both hulled and naked varieties of six-rowed barley as well as emmer and bread / macaroni wheat. Rather than an intense focus on a selection of varieties, there is evidence of a more diverse strategy. Emmer was a culturally appreciated variety by the Romans and it was only later that T. *aestivum / durum* (bread / macaroni wheat) became the standard staple. *Phoenix dactyifera* (date) was relatively common in the Field C assemblages which could indicate a long-term practice of orchard cultivation although they also are well preserved in dried form (Ramsay and Smith 2013: 61). Few *Olea europea* (olive) remains were recovered. This preliminary study confirms the presence of a steady mixed-cultivation subsistence pattern during the Hellenistic period at Mukhayyaṭ.

**Ottoman Village Documentation Project**

During the summer of 2014, work in the Ottoman village at Mukhayyaṭ, located on the eastern slopes of the mound, was focused on the four standing buildings present in this area of the site. These buildings were constructed after 1881 and were still in use in the late 1930s (Picirillo and Alliata 1998: 39; Saller and Bagatti 1949: 36). The structures were documented using the Historic American Building Survey method which is the standard for documenting heritage buildings in North America (National Parks Service 2011). Each of the buildings, walls and features were first labeled so that they could be referred to with ease. A record for each building was created using forms that were specifically designed for this purpose. Only one building could not be recorded as it was locked. Coordinates were recorded for each structure and preliminary drawings of the architecture and certain features was also undertaken. More detailed drawings will be completed in future seasons.

The buildings are in various states of preservation, ranging from complete to half standing. They were all built using the boulder and chink method. Several reused, dressed Byzantine stones were incorporated into these walls. Pottery is used as chink stones in some places and more recent repairs have been made with rolled up garbage bags. All the doorways within the buildings except for one had an arch behind it.

Although the first building (OV100) was locked, the arch above the door was documented because of its decoration. The stone at the top of the arch has a number of symbols carved into it **(Fig. 10)**: a cross inscribed in a circle, a common symbol in Byzantine art, and a crescent moon with a star, an Islamic motif often used in the Ottoman period (McQuitty 2008: 561). The second building (OV200) was the largest and had five different rooms with three areas entirely separated from each other, indicating a high level of privacy and different functions for these rooms. OV300 was built in the southern aisle of the Byzantine Church of Amos and Kasiseus. One of the doorways in this structure contains a reused Byzantine stone with a Greek inscription (Saller and Bagatti 1949: 180-181; Di Segni 1998: 445). The last building (OV400) had an



*10. Decoration of archway of OV100.*

arch with a hook built into it and walls that are on average 0.2 m wider than the other buildings. This structure conforms to McQuitty's stone-built barrel-vaulted style of building (2008: 548). The data collected as part of the Ottoman village documentation project season will allow a better understanding of vernacular architecture during the Late Ottoman period in Jordan.

**Community Engagement**

Community-based participatory research (CBPR) is a method that engages local and descendant communities as partners and stakeholders in archaeological research. Often, archaeology is seen as a luxury by the communities where projects take place. CBPR aims to make archaeology reciprocal and relevant to communities in tangible economic, social and political ways (Atalay 2010: 418). As Sonya Atalay notes of her own CBPR program (2010: 420) at the site of Çatalhöyük, Turkey, CBPR relies upon three principles: (1) reciprocity and clear benefits to all partners, (2) power sharing on all levels of planning, research and output, and (3) applied knowledge and research, or action.

The 2014 inaugural season of the KMAP - CBAP at Mukhayyaṭ aimed to investigate the capacity for CBPR with the nearby village of Fayṣaliyah. The methods for gauging the level of community engagement and participation in the CBAP were simple: to approach community members and speak with them about their association with the site, including their families' history in the region, their own understanding of foreign archaeologists working in the region in the present and in the past, and any ways they felt an archaeological project might benefit their community. In general terms, the 2014 season aimed to gauge a larger project's ability to contribute to capacity, education and knowledge building within Fayṣaliyah. During this process, senior members of the Mukhayyaṭ team facilitated informal, unstructured interviews; community members led discussions and were not considered to be subjects of the discussion. An interpreter, who was known to all involved community members, was provided by the Madaba Archaeological Directorate.

From the outset, regardless of the ultimate products of the KMAP - CBAP, the primary aims are to: (1) solicit, and re-solicit, community

feedback on the project at all stages, (2) revisit the stated community wishes for the product deliverables and (3) maintain transparency regarding project methods and goals. We are keenly aware that, in order for a project to be truly driven by community involvement, we must accept the level (or lack) of participation by the community as stakeholders in the project, as determined by them.

**Results**

In total, five informal discussions and project introductions were conducted with seven community members **(Table 1)**. All discussion participants were afforded anonymity, though none requested it. Participants gave permission for Mukhayyaṭ staff to take rough, hand-written notes during these discussions; no recording devices were used. All members who participated in the discussion expressed interest in continuing these discussions more formally in subsequent seasons.

Also during the 2014 season, senior staff of the Mukhayyaṭ team (Foran and Lewis) introduced the project to the Director of the Madaba Archaeological Directorate, Mr Bassem al-Mahamid, and obtained his permission to gauge local interest in a community-based project. In addition, current members of the KMAP - CBAP Steering Committee met (Foran, Dolan and Lewis) and established goals for the 2016 season.

**Future Work**

Subsequent seasons of the KMAP - CBAP will build upon the foundational introductions and conversations between project staff and community members in order to guide the following goals. These goals will be reformulated throughout the project and are designed to facilitate and guide data collection, information reciprocity and community feedback. They seek to: (1) collect and report information from community participants in the project in order to identify their personal goals, objectives and expected / ideal outputs and level of involvement; (2) collect and report on pre- and post-project socio-economic realities of participants; (3) collect and report information from non-participating community members, both pre- and post-project, in order to understand their level of knowledge regarding the project

**Table 1.** Summary of 2014 discussions with community members.

| Individual | Date of Conversation | Home community | Comments |
|---|---|---|---|
| A | May 26, 2014 | Faysaliyah | Worker with the Venezuelan team in 1960s (Ripamonti); same family as translator |
| B | May 26, 2014 | Desert | Museum employee |
| C | May 26, 2014 | Faysaliyah | Museum employee; translator |
| D | May 26, 2014 | Faysaliyah | Worker on KMAP; previously worked at Tell Madaba |
| E | May 27, 2014 | Faysaliyah area | Worker with the Venezuelan team in 1960s (Ripamonti); brothers; here for more than 45 years; brother of Individual F |
| F | May 27, 2014 | Faysaliyah area | Worker with the Venezuelan team in 1960s (Ripamonti); brothers; here for more than 45 years; brother of Individual E |
| G | May 27, 2014 | Faysaliyah area | Worker with the Venezuelan team in 1960s (Ripamonti) |

and its goals, outputs and value; (4) collect and report information on the traditional activities within a study area around the proposed project location (this ethnographic information will be used to inform a better understanding of potential project effects on the community, as well as identify potential research goals that may be of benefit to the community today); (5) collect and report information on levels and trends of consumption of traditional foods; (6) provide a comparative and self-reflexive study of the project and its impact on the community, from an individual to a group level, from inside and outside of the project participants.

It is hoped that the above goals, if accepted by the community during the 2016 season, will enable discussions on how the project may dovetail with local education, knowledge and economic goals. Reciprocally, this information will aid in creating an ethnography of the site of Mukhayyaṭ and make the project and site not only historically and archaeological relevant, but socially relevant in the present [2].

**Conclusions**

The 2014 excavation season at Mukhayyaṭ succeeded in uncovering several different structures and features previously unknown at the site. Although many of our original objectives were not met, the occupational history of the site is now more complete.

The excavations in Field A, on the southern slope of the acropolis, revealed multiple east - west walls that are associated with the construction of the Church of St George on the top of the acropolis in the 6th century AD. It appears that a large area to the south of the church was levelled off in order to create a large outdoor space that was perhaps used for rituals performed in the building.

Work in Field B, to the south of the acropolis, uncovered part of a large defensive structure that likely dates to the Hellenistic period. The excavation of these walls was not completed during the 2014 field season; therefore, an exact date has not yet been determined. However, it is clear that the area ceased to be defensive in nature and was reused for a different purpose as more than 20 complete cooking pots were recovered.

Excavations in Field C, north of the acropolis, indicate that this area was not used for habitation during the Late Byzantine period. On the contrary, it seems that the residents of Mukhayyaṭ used this location as a space for dumping soil and stones, perhaps in preparation for agricultural activities. The bedrock that lay under the successive fill layers contained two distinct installations, both associated with the use of the site during the Hellenistic period. To the west of the main excavation area, the presence of a large, plastered, stepped pool associated with a cistern are further testament to the Hellenistic occupation at Mukhayyaṭ.

Although excavation formed the focus of our work, resources were also allocated to the documentation project focused on the Late Ottoman remains to the north-east of the mound. In addition to meticulously documenting all of the architectural features of these buildings, an effort was made to track the use and deterioration of these structures as well as complete the recording of the reuse of ancient building materials within these late 19th century structures.

A significant amount of recent illicit excavations were noted around the site during the 2012 season. We have continued to document (and subsequently record in MEGA-Jordan) this activity. In an effort to dissuade the local residents from pursuing this type of activity and to include them in our work at Mukhayyaṭ, we took preliminary steps during the 2014 field season to develop a community-based archaeology project in the nearby village of Fayṣaliyah. By working closely

2. Achieving these goals relies upon two crucial and integrated aspects that are of primary importance to the 2016 and subsequent seasons: Research Ethics Approval from Wilfrid Laurier University's (WLU) Office of Research Services (ORS), and the continued participation - as interview participants, educators, students, hosts and recipients - of Faysaliyeh community members. Interview guides, consent forms and interview schedules have already been completed and will be submitted to WLU's ORS for approval prior to the 2016 season.

with the schools and community groups in the village, we hope to educate the people of this region about our work and encourage them to actively participate in our research.

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# REPORT ON A LATE BRONZE TO EARLY IRON AGE TOMB ON TALL IRBID

*Mohammad Al-Shalabi, Teresa Bürge and Peter M. Fischer*

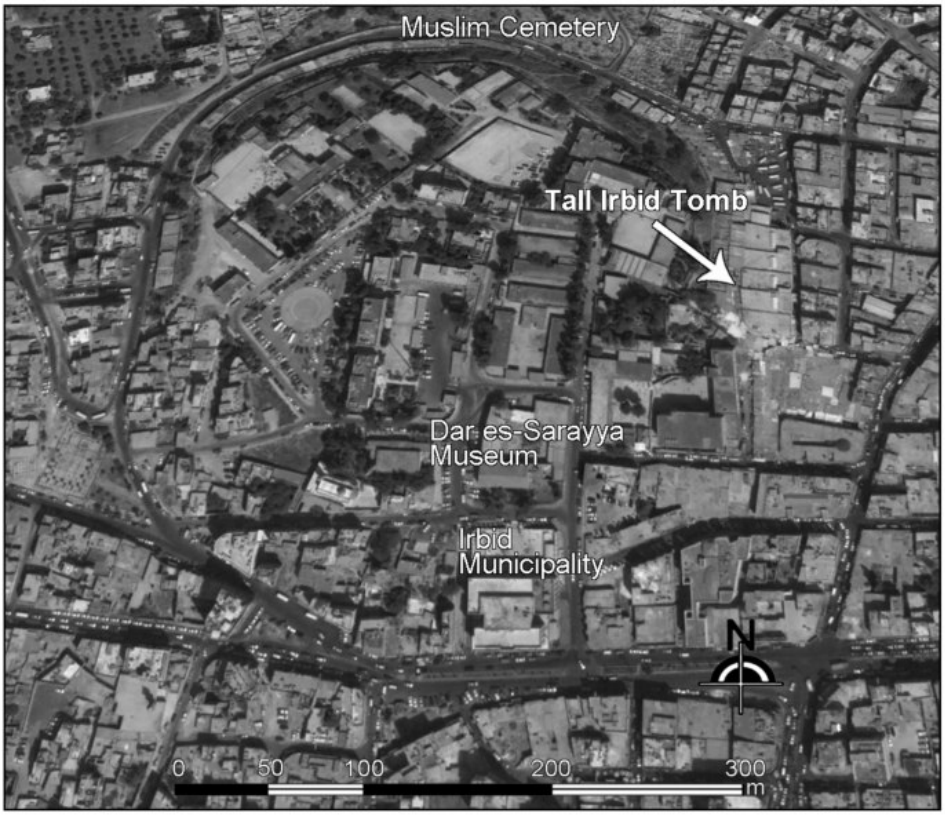
## Introduction: Discovery of the Tomb

During construction work for an Irbid municipality commercial building in 2001, a tomb was partly exposed by a bulldozer. A limited area of the tomb entrance was destroyed as the workmen were unaware that archaeological remains might be present. Professional excavations directed by Mohammad al-Shalabi from the Irbid Department of Antiquities took place as soon the presence of a tomb was verified. The tomb is located at UTM 32°33′32.05" N, 35°50"57.78"E **(Fig. 1)**.

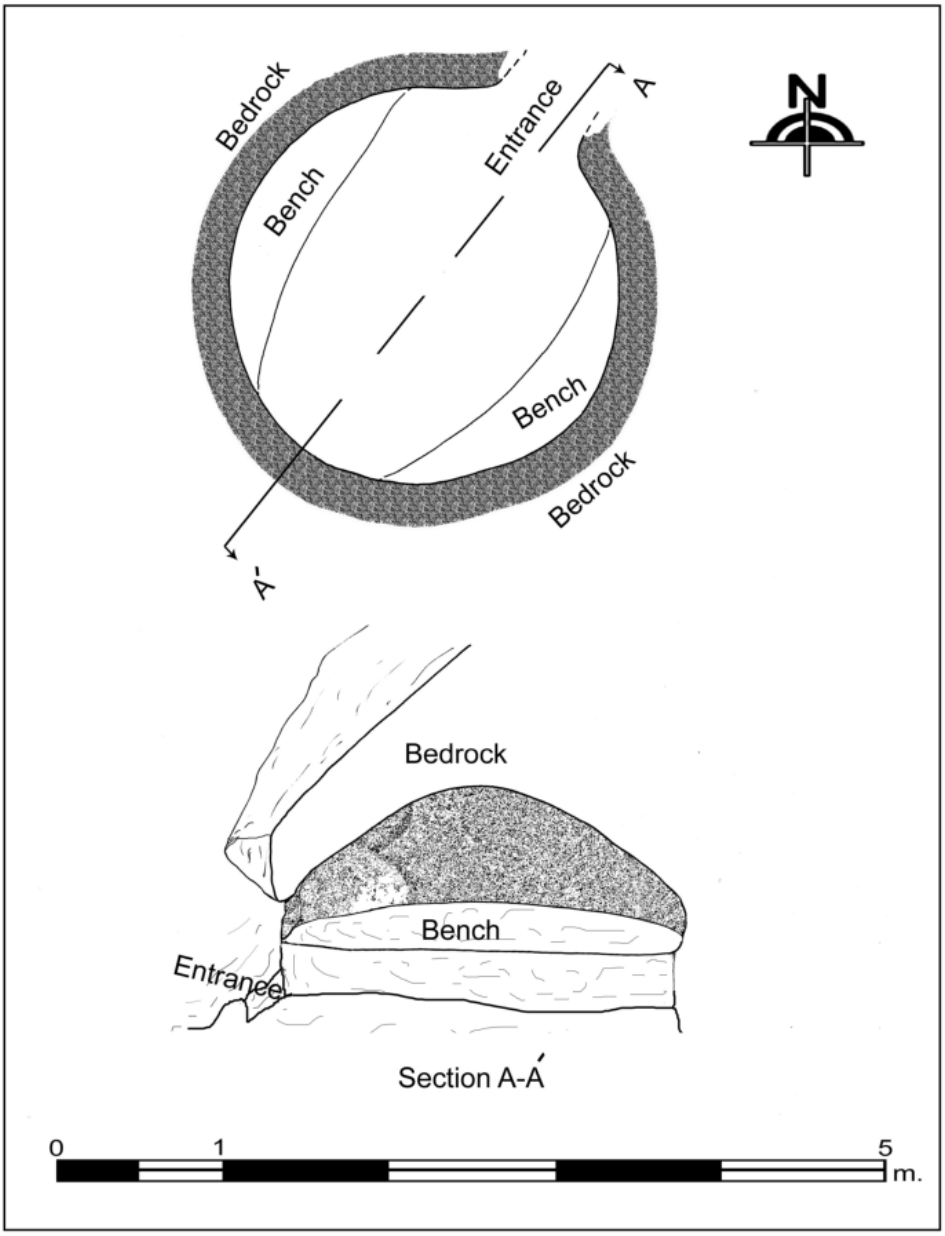
## The Structure and its Context

The burial chamber of the rock-cut chamber tomb was carved into soft limestone. Parts of a 0.6 m-wide by 0.6 m-high shaft were preserved to the north-east, which is the area of the accidental bulldozing. From this shaft, the chamber to the south-west could be entered. It was circular, measuring 2.3 m in diameter, and had a domed ceiling with a maximum height of ca 1.4 m **(Fig. 2)**. The tomb fill consisted of a layer of clay-rich soil ca 0.3 m in depth which contained a single human skeleton with jewellery, ivory objects and numerous complete and broken pottery artefacts, including intact jugs and lamps. Below this clayey layer, the original floor consisted of levelled bedrock that sloped slightly down to the south.

Two benches were carved into the limestone




*1. Location of the tomb on Tall Irbid.*




*2. Plan and section of the tomb.*

on the north-western and south-eastern sides of the chamber. These were wedge-shaped, being ca 2 m long and 0.3 - 0.4 m high, with a maximum width of 0.5 m. Several vessels were found lying on these benches.

**Human Remains**

The skeleton was difficult to expose because of the relatively high humidity in the tomb and the limey soil that adhered to the brittle bones. The tomb contained just one skeleton, lying in a stretched position in front of the entrance with its head turned towards the west. Only the cranium could be used for sex and age estimation.

The most indicative traits of the skull are its thin cranial vault bones, the shapes of the forehead, orbita, supraorbital margins and brow ridges, the widths of the zygomatic arcs, and the development of the nuchal lines. All these traits are indicative of a female. Numerous teeth had been lost during life and dental disease was apparent. On the basis of the closure of the cranial sutures, the female appears to have been around 30 years at death, or perhaps in her fourth decade.

**Tomb Material**

The tomb contained 23 complete ceramic vessels (see selected pottery at **Figs. 3 and 4)**.

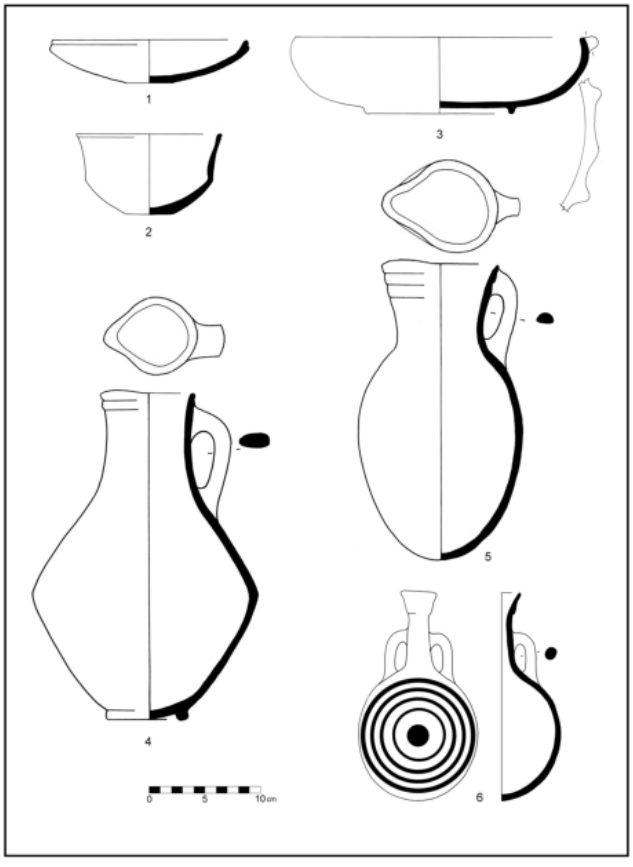
Other finds included a white marble stamp seal **(see Fig. 10:1)** and a rock crystal scarab **(Fig. 10:2)**. A necklace was found in situ around the neck of the skeleton; it consisted of a white marble pendant and several beads, including one large glass example **(see Fig. 11:2)** and others of stone, mainly carnelian **(Fig. 11:3)**. Metal finds comprised a bronze bowl **(see Fig. 9)**, bracelet and anklet, and a gold earring **(Fig. 11:1)**.

The most striking tomb goods were made of ivory. These included three exquisitely carved palettes **(Fig. 5:2-4)** and a lid **(Fig. 5:1)** belonging to one of the palettes. There was also a horn-shaped object with carved decoration **(Fig. 5:5a)**, a lid **(Fig. 5:5b)** and a small, approximately funnel-shaped object **(Fig. 5:5c)**, all from the same item.

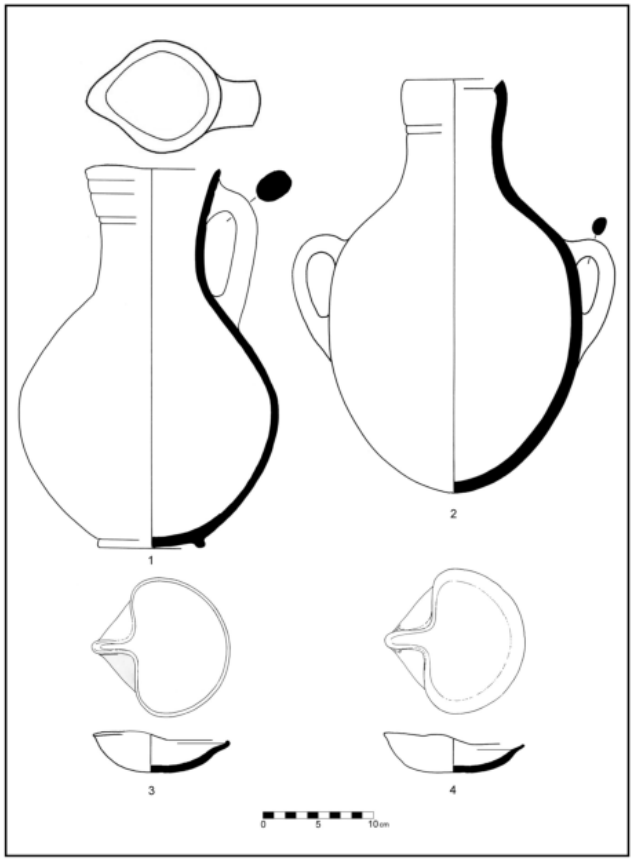
This report will focus on the most important finds and on those of chronological significance. These include the pottery, the ivory objects and the bronze bowl. The stamp seal and the scarab are described, but their chronological usefulness is restricted.

**Pottery**

The repertoire of pottery shapes comprises shallow bowls with stepped rims and flat bases, a rounded bowl with a ledge handle and ring base, and deep carinated bowls with flat bases (Fig. 3:1-3). The jugs and jars have spherical, ellipsoidal or slightly biconical bodies, mainly with trefoil mouths, and rounded or low ring-bases (Figs. 3:4-5 and 4:1). Single handles that extend from just below the rim to the shoulder predominate, but there is also a jar with a circular mouth and two handles on the mid-section of the body (Fig. 4:2). The single pilgrim flask (Fig. 3:6) has a folded-over rim, long neck and depressed globular body. It is decorated with reddish-brown concentric circles on one side only. The lamps have oblique or slightly upturned rims and deeply pinched mouths above shallow body profiles **(Fig. 4:3-4).**




*3. Selected pottery.*




*4. Selected pottery.*

**Carved Elephant Ivory**

The three circular, decorated ivory palettes can be divided into two categories:

Two palettes which are almost identical **(Figs. 5:2-3 and 6**). This type is thick-walled and has a deep profile. It has two rectangular ledge handles that are perforated in order to fasten a flat lid with string or a peg. Both palettes are decorated on the flat rim. One of the palettes had a flat lid of carved ivory **(Fig. 5:1)**. The lid is circular with two rectangular ledge handles with perforations corresponding to those of the palettes.

A single palette with a shallow profile **(Figs. 5:4 and 7)**. It is decorated with two pairs of exquisitely carved felines on either rim of the palette. Centred between the felines on the rim are two pyramidal knobs, one on each side. The base of the bowl is decorated with a carved fourteen-leaved rosette.

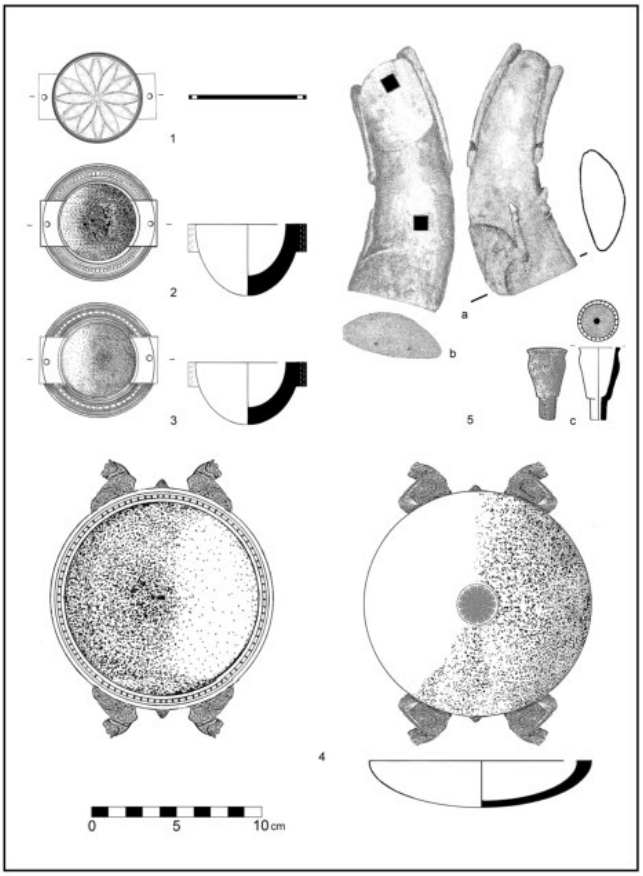
**Carved Hippo Ivory**

This carved object, consisting of a hippo lower canine tooth, is approximately 15 cm long and hollow, with an opening on one side only **(Fi gs. 5:5a and 8)**. The surface has been carved in high-relief, leaving a slightly elevated representation of a pair of hooved legs and the front and hind parts of a bull on both ends of the object. On the upper side of the object are two rectangular openings. There is a small funnel-shaped juglet of ivory **(Fig. 5:5c)** that is an exact fit in each of two square holes. There would undoubtedly have been another funnel that has not been discovered. The open, wider part of the object was closed with a perforated lid **(Fig. 5:5b)** that exactly fits the opening.

**Bronze Bowl**

This medium-deep bowl has a maximum diameter of 11 cm **(Fig. 9)** and a flat rim that protrudes inwards somewhat.

**Seals**




*5. Ivory objects.*



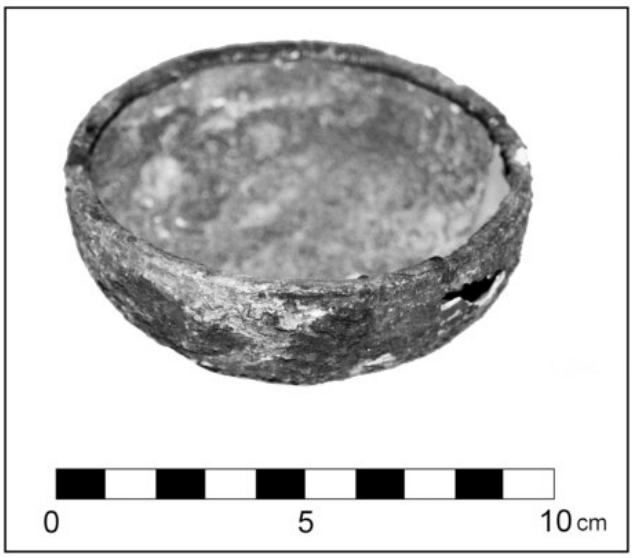

*6. Ivory palette.*




7. Ivory palette with felines.




8. Horn-shaped object.




9. Bronze bowl.

The stamp seal is of white marble and has an elongated half-spherical shape **(Fig. 10:1)**. It is pierced at the top. The flat base is carved with a cross and square. The pierced scarab of rock crystal has a flat underside with no carving **(Fig. 10:2)**.

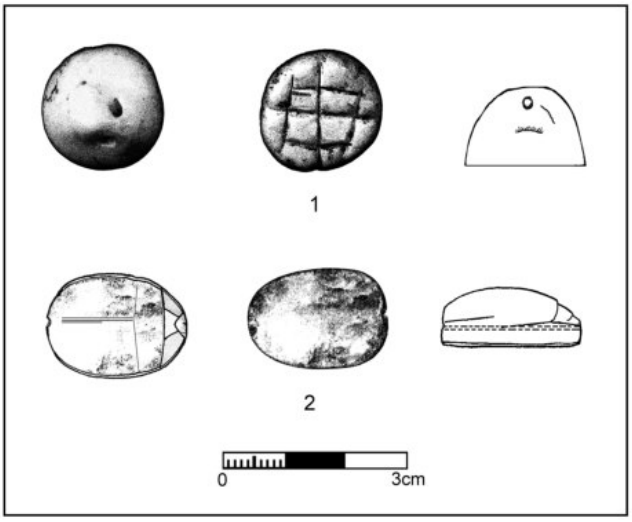
**Discussion**

The deep carinated bowls **(Fig. 3:2)** are part of the repertoire of the later part of the Late Bronze Age. At Saḥm, ca 22 km north of Irbid and 5.5 km south of the Yarmouk river, the pottery shapes that correspond to these types have ring bases (Fischer 1997: 109, fig. 6:1-3). Parallels with flat bases come from the Late Bronze Age temple at Kamid al-Lawz (Metzger 1993: pls 98-100) and from Tall Dayr ʻAllā, Phase E (Franken 1992: 29, fig. 3-7:3), which corresponds to Phase 12 (van der Kooij 2006: 224, table 10) and is dated to the end of the Late Bronze Age II (1,186 BC).

The rounded bowl (Fig. 3:3) is, except for the handles, a clear imitation of bronze counterparts (cf. Saḥm [Fischer 1997: 131, fig. 28:5], or Megiddo and Gezer [Gershuny 1985: pl. 3:40-41] - both without handles). It has a close parallel in clay from Megiddo, Stratum VIII that is dated to Late Bronze Age IB/C (Loud 1948: pl. 61:21). The bowl from Megiddo, however, has a shallower profile and a different handle.

The form of the biconical jug (Fig. 3:4) survived from the Late Bronze Age into the Iron Age. There is, for instance, a matching vessel at Saḥm (Fischer 1997: 112, fig. 9:1). A remote parallel comes from Beth Shean, Stratum R-1b that has been dated to the late 15th century BC (Mullins 2007: 509, pl. 60:7; but here with a wider neck). A similar jug comes from Megiddo, Stratum VIA (Loud 1948: pl. 75:12) that has been dated to Iron Age I or the beginning of Iron Age II.

The pilgrim flask with its long neck and two handles (Fig. 3:6) has its closest parallel at Saḥm (Fischer 1997: 118, fig. 15:1). A similarly long neck is reported from Stratum VII (12th




*10. Stamp seal and scarab.*




*11. Necklace, gold earring and glass bead.*

century BC) at Megiddo (Loud 1948: pl. 72:9), but this is wider with a funnel-like flaring rim. Pilgrim flasks with this type of neck are attested at Megiddo until the first Iron Age deposit, Stratum VI (e.g. Loud 1948: pl. 86:5-9).

The lamps with slightly folded-over / inturned rims (Fig. 4:3-4) clearly indicate a date extending from the later part of the Late Bronze Age into the Iron Age. Similar lamps from Saḥm usually have flaring rims (Fischer 1997: 123-125, figs 20-22). At Megiddo, for instance, this type of lamp appears in Stratum VIII, becoming more frequent in Strata VII and VI (Loud 1948: passim). At Tall Dayr ʻAllā they are frequent in Phase E (Franken 1992: 29, fig. 3-7:5-7; 39, fig. 4-2:4; 49, fig. 4-9:21-22; 54, fig. 4-14:7), which is dated to the end of the Late Bronze Age II, ca 1,186 (see also Phase 12 [van der Kooij 2006: 224, table 10]).

A parallel for the small, deep ivory palettes **(Figs 5:2-3 and 6)** comes from the ʻMycenaean Tomb' at Tell Dan (Ben-Dov 2002: 145, fig. 2.103; dated to the end of the 14th and beginning of the 13th centuries BC); this also has a lid. A similar bowl comes from the cemetery at Tall as-Saʻidiyyah, Tomb 101 (Pritchard 1980: 39, fig. 3:8; dated to the 13th century BC); this also has a lid but with less elaborate decoration. It is suggested above that the lid is likely to have been fastened with pegs. There are preserved pegs from the royal palace at Ugarit (Gachet-Bizollon 2007: 359, pl. 9:62, 63), which was destroyed at the beginning of the 12th century BC.

The shallow palette with felines (Figs. 5:4 and 7) has parallels from the royal palace at Ugarit, to the extent of the felines having backwards-turned heads (Gachet-Bizollon 2007: 399, pl. 49:414).

Parallels for the carved horn-shaped object with its lid and inserted funnel-shaped juglets **(Figs. 5:5 and 8)** are difficult to demonstrate. As regards the perforated lid there are two vessels, though of a totally different type (i.e. upright standing flasks) but with two or three perforations, from Tomb 101 at Tall as-Saʻidiyyah (Pritchard 1980: 39, fig. 3:6, 7). The closest parallel for this object comes from the ivory hoard from the Stratum VIIA palace at Megiddo (Loud 1939: pl. 24:129; destroyed 1,130 BC); this only has incised decoration including, inter alia, rosettes, but none in high-relief. Other similarities with our object are the facts that the item from Megiddo has small circular holes, though not the square ones of our object, and that the ivory hoard included several funnels (e.g. Loud 1939: pl. 24:131; the shapes are somewhat simpler in design, more like standard funnels). It is most likely that such objects were used in libation ceremonies: a liquid or various liquids may have been poured into the funnels and were subsequently mixed in the horn.

The seal and the scarab **(Fig. 10)** are difficult to date. However, the bronze bowl **(Fig. 9)** is of chronological significance (see the rounded bowls in Gershuny 1985: pl. 2, in particular no 24 from early Iron Age Stratum VI(B) at Megiddo, which is larger but shallower). We maintain that the floruit of bronze vessels in the southern Levant was during the later part of the Late Bronze Age and early Iron Age (see also Gershuny 1985: 57-58). However, the repertoire of vessel shapes did not change over that period.

**Conclusions**

Considering all the evidence and comparanda, we date this rich tomb to the very end of the Late Bronze Age, i.e. around 1,200 BC or possibly the beginning of the 12th century BC. It is most likely that this tomb was built for a single individual. The 30 - 40 year-old female must have been of very high social status in view of the associated tomb offerings of ivory, gold and bronze, all of which were luxury items.

Four other tombs, though not as rich as the one under discussion here, dating from the later part of the Late Bronze Age into the Iron Age were excavated nearby in 1958, on the northern slope of Tell Irbid (Dajani 1964, 1966; see also Kafafi 1977). One of the tombs, Tomb D, was dated by Dajani to 1,350 - 1,100 BC (Dajani 1964: 101), although the illustrated material does not permit a date later than the 13th century BC. While Tombs A and C can be dated to Iron Age IIA on the basis of associated material, Tomb B was in use from the Late Bronze Age until well into the Iron Age (as suggested by Dajani 1966: 95). This means that the area was used as a cemetery for quite a long time, i.e. from the second half of the Late Bronze Age until at least Iron Age IIA.

**Acknowledgements**

We would like to thank the Department of Antiquities and its personnel, in particular Director-General Dr Monther Jamhawi, for all their support. Thanks to the excellent drawings by Muwafaq al-Bataineh (Yarmouk University, Irbid), long-time collaborator of the Swedish Jordan Expedition, we were able to study the material in detail after returning to our home countries. Muwafaq al-Bataineh also co-ordinated the recording and conservation of the material for which we are very grateful. Professional conservation was carried out by Dr Abdelrahman Sarouji (Yarmouk University, Irbid) for which we are all - Department of Antiquities included - greatly obliged. Many thanks to Hussein Debajah (Yarmouk University, Irbid) who took all photographs; these were invaluable for the study of the material. Additional help was received from Dr Abderaheem Malkawi who studied the stone objects and Dr Nasser Gharaibeh who gave a second opinion on the osteological material.

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# TALL ḤISBĀN 2013 AND 2014 EXCAVATION SEASONS: EXPLORATION OF THE MEDIAEVAL VILLAGE AND LONG-TERM WATER SYSTEMS

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*with contributions by Tarina Greer, Aren LaBianca, Stuart Borsch, Warren Schultz,*
*Chiara Corbino, Annette Hansen and Sofia Laparidou*

Phase II excavations at Tall Ḥisbān, which adopted anthropological (food systems theory and 'great and little traditions') and historical (the model of political ecology) methods of inquiry, began in 1996 with two goals in mind: (1) to present the site to the public and do limited restoration, and (2) to more fully explore the Islamic periods at the site and answer historical and stratigraphic questions about this period not addressed in Phase I fieldwork (*the Heshbon Expedition*). Since then, there have been five seasons of site-wide excavations and surveys (1998, 2001, 2004, 2007 and 2010) and two seasons of site cleaning and small-scale excavation in support of restoration and site development (2011 and 2012), in addition to a three-phase formal restoration project conducted between July 2005 and December 2006 that was funded by an Ambassador's Grant from the US Embassy. Fieldwork centered on the Mamluk complex on the western half of the summit (Fields L, N and Q) and, to a lesser degree, on the western and south-western slopes of the *tall*, where remains of the mediaeval (Field C) and Early Modern (Field O) village were identified. Excavations in Field M in the north-eastern corner of the site and the upper north-eastern slopes have targeted the classical (Roman and Byzantine) and ancient (Iron and Bronze Age) remains of the site. Excavation has been done concurrently with archival research in mediaeval Arabic manuscripts, a bit of a novelty for Islamic archaeology in Jordan. This phase of site-wide excavations came to an end in 2010 **(Fig. 1)**.

Fieldwork in 2013 launched the Phase III excavation (part of the newly designed *Hisban Cultural Heritage Project*), which no longer focus on the summit of the *tell* (the focal point of imperial officialdom), but on the slopes of the *tell* and the saddles and flatlands below.[1] This physical shift in focus parallels a new, systematic investigation of rural society (namely the mediaeval village) and the lands and water system that helped to support it. To these efforts the project has integrated a broad-based environmental study with pollen, phytolith, faunal and geomorphology specialists, always in conjunction with the continued study of mediaeval Arabic texts and ethnographic research.

The 2013 and 2014 seasons, each held for a three-week period from mid-May to early June, were designed to address very specific questions

1.The Phase III excavations at Tall Ḥisbān are directed by Bethany Walker (University of Bonn) and are part of the larger Hisban Cultural Heritage Project, under the senior direction of Øystein LaBianca (Andrews University) and assisted by Maria Ronza as Jordan coordinator. The project is a joint American - German one and received support in 2013 and 2014 from Andrews University, the Annemarie Schimmel Kolleg of Mamluk Studies of the University of Bonn, Missouri State University and the American Schools of Oriental Research (through a Harris Grant for the project "Laser Mapping and Water Simulations of Subterranean Systems at Tall Hisban"). In addition to students from these three universities, senior Mamluk scholars joined the team in 2014 in staff capacity: Stuart Borsch (Assumption College – historian of Mamluk water systems and demographics) and Warren Schultz (De Paul University - Mamluk numismatics). As always, we are appreciative of the support we receive from the Jordanian Department of Antiquities, the Madaba Museum, the American Center of Oriental Research and the municipality of Hisban . Bob Bates and Jeff Hudon served as Field Supervisors for Fields B and the reservoir clearance project respectively.

related to the history and development of the mediaeval Islamic settlement, the fortifications of the summit and the extensive water systems that were at the heart of settlement, defense and land use in all periods **(Fig. 2)**. Field O - on the south-western slopes of the *tell* and the saddle below it - was chosen to study domestic and peasant life in the mediaeval era. The field produced evidence of clusters of pre-modern farmhouses and cisterns in previous seasons and was promising for this kind of household study. Continued investigation of Field M - on the upper slopes of the *tall* below the north-east corner tower of the citadel - had as its aim clarification of the development of the fortification system and the use of the northern slopes through the mediaeval period. Fields B and G - the Iron Age reservoir and the caves and cisterns connected to it - would become the target of a multi-faceted study of the water systems at the site. They did, however, also produce remains of domestic structures of the Byzantine and Mamluk eras. While none of these are new fields of excavation, they do represent new lines of inquiry and expansion of methods. The Phase III project has integrated, moreover, many new technologies, including paperless recording on iPads, the use of octocopter and mini-plane for low-flying aerial photography, and a multi-media database (in Filemaker format).

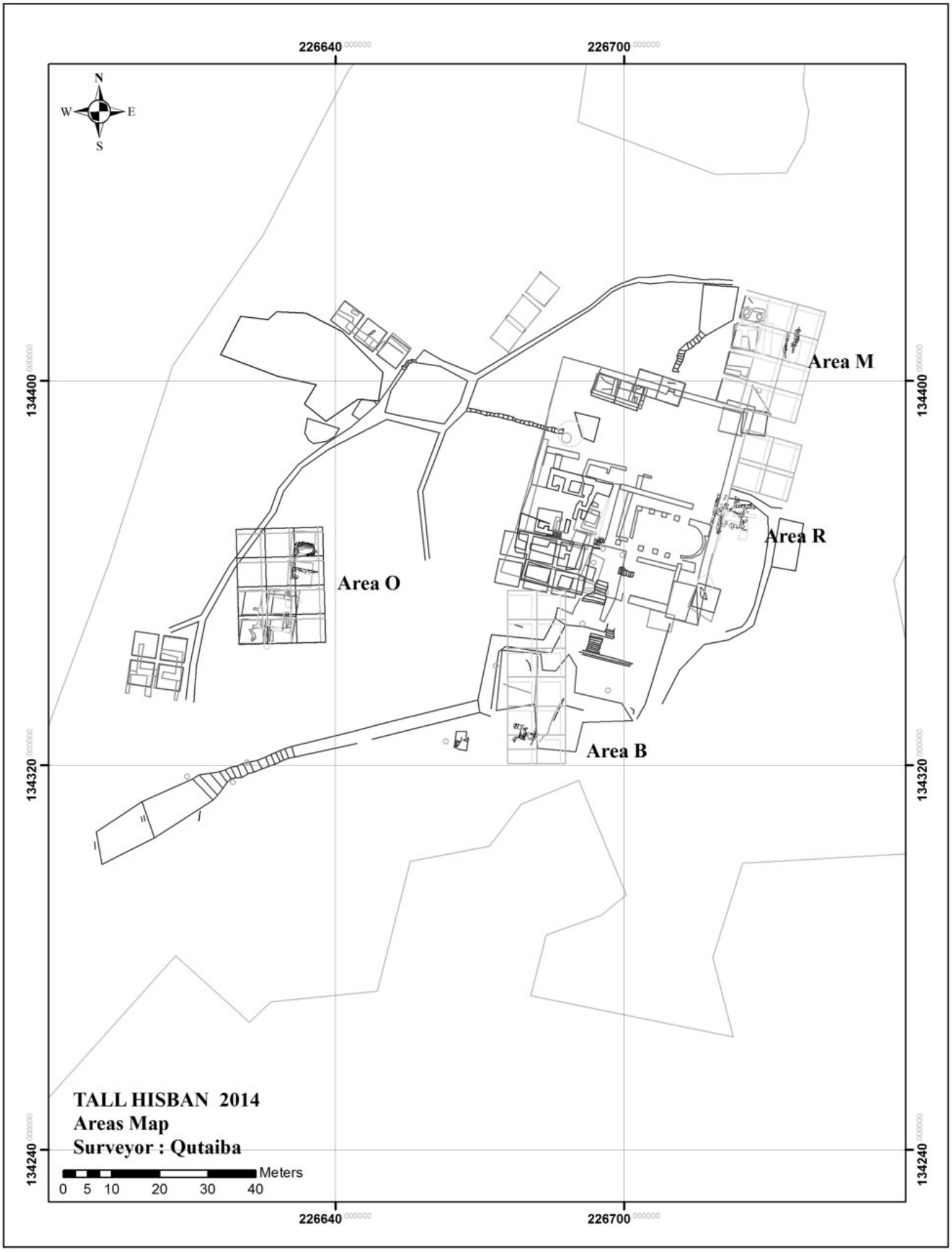
**Field O** (Bethany Walker - drawing on report by Tarina Greer)

*Previous Work and 2013 Season*

The undulations of the ground surface, visible when looking down from the summit of the *tall*, are the remnants of wall lines and the spaces in between them the depressions left by collapsed vaulted ceilings **(Fig. 3)**. The *tell* is surrounded by a densely occupied and built space. *The Heshbon Expedition* (1968 - 1975) investigated such structures on the slopes of the



*1. Aerial photo of Tall Ḥisbān (courtesy of David Kennedy, APAAME).*




*2. Fields of excavation (courtesy of Qutaiba Dasouqi).*



*3. Aerial photo of Tall Ḥisbān and mediaeval village below (courtesy of Ivan LaBianca).*

*tall*, but it was not until the Phase II project that excavations commenced at the base of the *tell* and beyond. In Fields C (flat land to the west of the *tall*) and O (flat land to the south-west), two isolated and quite substantial buildings were uncovered, identified as Mamluk and Ottoman-era farmhouses, respectively.

Work in Field O began in 2004, in order to uncover a building first discovered in 2001 while probing for a possible location to build a dig house. The 2004 excavation uncovered a large, one-room farmhouse of the Late Ottoman era.

The building belongs to a typology of traditional rural architecture in central Jordan with meter-thick walls, barrel vaulted roofing, the installation of *qiwaras* (grain bins) in the walls and an exterior courtyard equipped with animal troughs and a light wall dividing the space for different kinds of livestock. At one point the interior was divided into two, as well, through the construction of a new wall. Exterior house walls were preserved to a height of ten courses. Such buildings were used, as well, in the Mandate period and later. The material culture, which included pipes, however, suggested a 19th - century date. The absence of any building on the western slopes of the *tell* in aerial photos from the early 20th century and interviews with elderly local residents, who remember only empty space there, suggest that the building was long covered by erosional debris by the 20th century and must date to an earlier period.

The 2007 excavation was located just north-east of the 2001 farm house on a spur that betrayed similar wall lines near the surface. Initially four squares were laid out in a manner to uncover what was believed to be the walls and the inner room of the farm house. These squares were 105, 106,107 and 108 respectively and covered the wall lines of the standing architecture. Two additional squares were opened to the north-east corner of square 107. These new squares were strategically placed along what seemed to be a wall line extending from the extant building. The season was essentially devoted to rubble removal, which is a common problem at Tall Ḥisbān. Here, vault collapse, architectural tumble from the *tell* and heavy erosional debris overlay structures that would have otherwise lain at the surface. By season's end, however, rubble clearance had revealed two one-room structures, built adjacent to one another and sharing a wall **(Fig. 4)**. The plan of the structures was quite similar to that of the farmhouse excavated downslope and to the south-west in 2004: single-room buildings of roughly 5 - 8 meter dimensions with a single doorway, barrel vaulted and with thick walls (one meter thick,




*4. Floor plan of house in O10 (boom shot and drawing by Qutaiba Dasouqi).*

with two faces and rubble fill). Building material was local limestone in roughly cut blocks and reused blocks of Byzantine masonry. Mortar use was limited.

What began as a study of traditional architecture grew into a study of Mamluk-era village and family life by 2013. Excavation resumed in this field in order to determine the spatial planning of domestic space in the mediaeval and Ottoman eras and to determine layout of the larger settlement, in conjunction with excavation in other fields of the site. The excavation units, which now straddled both buildings, were renumbered O5 (from 105), 7 (from 107), 9 (from 109) and 10 (from 110) respectively, as the project shifted to a new grid system (following true north - south, rather than the *tall*-oriented coordinates of the 1970s). The first surface was reached at the end of the season - beaten earth floors throughout the squares that were dated to the Mamluk period by the associated pottery. Across the field, the same general pattern was noted: Mamluk (namely 14th century) was the latest pottery, Byzantine sherds appeared in large quantities throughout the field and the walls of both buildings were plastered (noted for the first time outside the citadel by the current project).

*2014 Season*

Squares O9 and O10, in the northernmost of the two adjacent farmhouses, were re-opened to produce a floor plan of the Mamluk structure and a better picture of village economy in this period. In 2013, a thick plaster floor (loc. 14) was discovered in O10; this season it was followed across the building, where it sealed against all four house walls **(Fig. 5)**. It was the last of a series of plastered and beaten earth floors, which appear to have been laid in quick succession. Pottery associated with plaster floor 14 was consistently Mamluk and represented a wide range of table wares (including glazed imports) and cooking wares. A robber's trench (loc. 15) uncovered at the end of the last season and located along the building's northernmost wall was excavated this year, exposing a wall line (loci 40 and 42) underneath and running in a slightly difference direction **(Fig. 6)**. The pottery from the trench was Byzantine-dominant. The structure, then, would appear to be a house of the Mamluk period, which was built on a pre-existing (likely Byzantine) structure.

The baulk that separated the two squares (O9 and O10) was almost entirely removed this season revealing a wall (O9.26) that bisected the room, built in a second phase of building use (but still within the Mamluk period). Against this wall, on its southern face, was a midden, the contents of which were sampled for laboratory analysis. This presented several new questions about living space during the Mamluk period.



*5. O10 house, detail of plaster floor, view north (courtesy Bethany Walker).*



*6. O10 house with robbers' trenches, view south-west (courtesy Bethany Walker).*

This wall did have an opening (doorway) on the western side, while the doorway of the main structure is located on the eastern side near this bisect. The pottery in both O9 and O10 was Late Byzantine, Early Islamic and Middle Islamic, with Late Islamic (Early Ottoman) sherds appearing regularly. The house was occupied for a longer period, then, than the vaulted buildings in Field M (see below). A few fragments of 19th-century chibouks were recovered from building fill. The house also produced jewelry of the Mamluk and Ottoman periods (namely glass bracelets) and a waster of a glazed vessel, suggesting local production of glazed ceramics in the Mamluk era.

A probe (O11), placed outside the doorway inside what was the exterior courtyard shared by the two abutting houses, had as its goal the exploration of outdoor spaces associated with livestock care and water use. Two cisterns fell within the lines of this excavation unit. This area yielded a rather large amount of pottery (spanning mostly the Late Byzantine to Mamluk periods), broken glass, coins, metal fragments (which appear on first inspection to be mostly farming implements, bits and harness pieces) and bone, indicating that the courtyard was used as a place of frequent trash disposal. Soil samples were taken for palaeobotanical and phytolith analysis.

All three squares produced a large amount of storage jars of all sizes, but it should be noted that several of these jars were very large water and sugar jars. We also had a very high count on cooking pots.

**Field M** (Bethany Walker - drawing on report by Aren LaBianca)

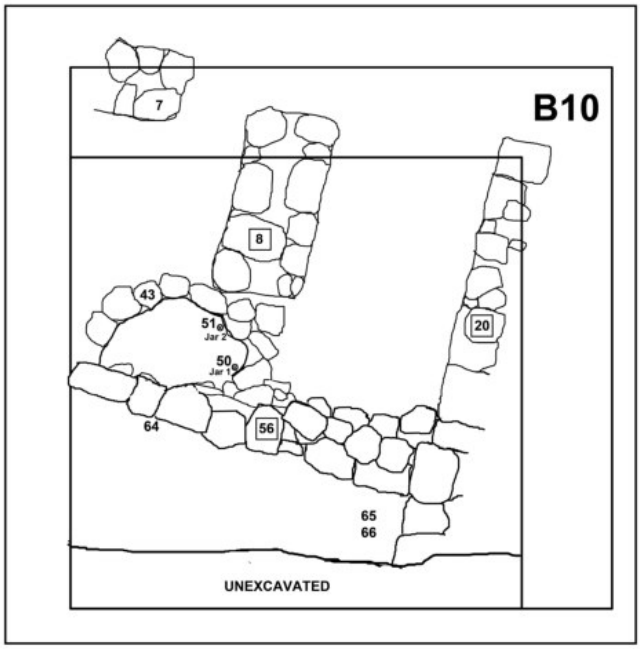
*Previous Work and 2013 Season*

Although *the Heshbon Expedition* conducted limited fieldwork on the northern slopes of the *tell* in the 1970s, full investigation of this part of the site began in earnest in 1998. The original goal was to date with more confidence the acropolis wall, which was best preserved on the north side of the *tell*, and to better understand the development over time of the fortifications on the summit. With the exposure of what appeared to be an interrelated series of mediaeval vaulted structures, the field objectives expanded. These structures - single, long and narrow rooms (four meters wide) covered by low, barrel-vaults - followed nearly identical plan and scale, and were built against one another, covering a portion of the northern slope at mid-slope. They faced downslope, towards a row of cisterns, and appear to have been spatially organized by a system of ancient terraces, visible as wall stubs of boulder-and-chink construction. The Mamluk-era structures (which represent the last phase of use of these spaces) reused Roman and Byzantine water facilities (channels; cisterns; drains) and architecture, which further guided spatial organization. The particular organization of these units required a fieldwork strategy that went beyond the study of the acropolis wall only. The dating of this wall has yet to be accomplished.

During the Phase II project, the eight excavations units (each 5 x 5 meters) of Field M produced tantalizing evidence of water use and fortification over a long period (squares M1 - 3), and possible storage facilities related to the needs of the citadel in the Mamluk period (squares M4, 5 and 8). The north-east corner tower of the fortification wall (one of three extant on the summit - in squares M1, M6 and M7) was constructed in multiple phases, with extensive repairs in the Early Islamic era (wall patches in roughly-cut, medium limestone blocks with chink stones and regular, tightly-laid courses) and internal buttressing during the Mamluk period (largely with reused limestone blocks, some from Byzantine structures). The same pattern was documented in Field L near the south-west corner tower and garrison storeroom (Walker 2011a). Immediately outside this tower, an entrance was discovered in M2 leading to an extensive network of passageways, cisterns and chambers of apparent multiple function (some perhaps originally tombs, with lamp niches on the walls). These caves and their connecting corridors were fully explored and mapped, and

limited sherding was done on a random square basis. This system was devoted to water capture and storage in the Byzantine period (the last plasterings of the walls were of this date), and its function had apparently shifted by the Mamluk period to storage, rubbish disposal and perhaps defense, though the recovery of water jars of Middle Islamic date suggests that some of the spaces still functioned for water storage in this period. A lateral corridor extending from this network led from the citadel to some 50 meters beyond (underneath the sift piles for Field M), suggesting a function akin to a sally port.

Squares 4, 5, 8 and 9 - located downslope from the tower - produced a series of parallel, vaulted rooms, all Mamluk in date but reusing elements from the Early Islamic and Byzantine periods. The room in M4 was excavated to bedrock, exposing a complex architectural phasing of Roman, Byzantine, Early Islamic and Middle Islamic elements **(Fig. 7)**. The four phases of use of the room / one-room building in the Mamluk period suggest changing function from domestic use or use as a stable to storage space or midden. The structure in the Byzantine period appears to have been used domestically (as a kitchen?), and incorporates a Roman water system of channels leading to a cistern. The entire structure sits atop




*7. Floor plan of house in M8.*



*8. B10 top plan, B10 house with three pits, view north.*

what appears to be a large olive press of Roman date.

In 2013, the beginning of the Phase III project, excavations in this field focused on the series of parallel vaulted structures at mid-slope **(Fig. 8)**.

Fill and architectural tumble in M8 was removed and a probe opened on the west side of the room, bisecting wall M8.3, in order to investigate the underlying stratigraphy. Here three surfaces were reached at the very end of the season (M8.7 - 9), all of which sealed against Wall M8.3 (the western wall of the room, with remains of the vault springer at one end). The vaulted structure in M9, located directly east of M8 and abutting the vaulted room excavated there, was investigated in order to look for the continuation of the Mamluk architecture found in M4 and M8. After rubble removal, nearly identical plans and occupational histories were documented in the M8 and M9 structures as had previously been documented in M4.

Across the field there have been four periods of major occupation followed by an earthquake and abandonment of the area. It is possible that this field was occupied in the Iron and Bronze Ages as well, though excavation has not yet penetrated the Byzantine and Roman levels in any of the squares, except for M4. The phasing of the field can be summarized as follows:

<u>Middle Islamic 3 / Post-Middle Islamic 3</u>

M8 and M9 experience erosion fill

and M1 and M7 are used as a pottery dump; earthquake (misaligned stones in architecture throughout field; collapse of vaulting and walls) destroys parallel chambers in M4, M5, M8 and M9; area abandoned.

Mamluk / Late Mamluk

Chamber in M8 is possibly abandoned and used by squatters. It is later plastered and a secondary period of usage begins.

Mamluk

Parallel chambers constructed with walls running through squares M4, M5, M8 and M9; the inside of the north-east corner tower walls are buttressed by boulders and loose stones.

Early Islamic

Evidence of occupation (miscellaneous sherds found in fill throughout field).

Byzantine

Walls constructed, including wall phase M4.31b in the baulk of M4 / M5; Roman quarry is possibly reused as an olive press in M5; north-east corner of tower is rebuilt; evidence of occupation (misc. sherds found in fill throughout field; evidence of a tessarae-lined hearth in M4)

Roman

Numerous walls and installations are constructed as well as evidence of quarrying (M5) and occupation (misc. sherds found in fill throughout field); (wall phases M4.31d and M4.31c are possibly constructed during this period).

Iron 2 - Hellenstic

Occupation; north-east tower constructed (M1, M6 and M7) and repaired after collapse; (wall phases M4.31d and M4.31c are possibly constructed during this period).

*2014 season*

In 2014, M1 - the northern half of which was excavated in 1998 - was reopened in order to better understand the usage of the upper northern slope of the *tall* and to better expose the acropolis wall. Fieldwork also commenced again in M8 to determine the function(s) of the barrel-vaulted chamber in that square through extensive sampling of the three surfaces found in the square in 2013 (compact earth matrix M8.7; plastered floor M8.8; beaten earth floor M8.9 made of terra rossa and ash).

M1 straddles the north-west corner of the north-east corner tower, as well as the eastern half of the northern acropolis wall. The first soil locus (M1.10), which covered the entirety of the square, produced large quantities of Mamluk pottery and can be roughly dated to the Late Mamluk period. The following earth loci (M1.11, 12, 13 and 14) are earlier Mamluk-era fills. Large quantities of animal bone, charcoal and ashy lenses in these layers suggest that this deep fill constituted a kind of midden for the disposal of kitchen and domestic refuse from the citadel. The faunal material is currently under study by the project zooarchaeologist (Corbino) and archaeobotanist (Hansen). Notable, as well, is the recovery of many coins from these loci, several of which have been read and appear in the coin report below. Only the last locus excavated this season (M1.14) produced significantly earlier pottery, with minimal Middle Islamic sherds, significant quantities of Byzantine sherds and some Iron II.

Square 8 - another 5 x 5 meter unit - is located downslope from M1, to the north-east of the north-east tower, and abutting the vaulted building in M4. The primary concern of excavation in the square was the date of and depositional processes creating the three surfaces uncovered in the 2013 season. The first, M8.7, was originally thought to be a Mamluk-era beaten earth floor, but upon excavation seems rather to be fill that became hard-pressed when the barrel-vaulting of the Mamluk chamber collapsed, presumably

in the Late Mamluk period. This fill is directly on top of M8.8, a plaster floor also tentatively dated to the Late Mamluk period. Sealed by M8.8 were several small middens (M8.9; M8.13) and a large one (M8.14). The middens were composed of alternating layers of reddish clay-like soil, thin lenses of ash and plaster, and brown soil. Samples of each of these loci were carefully sampled by the project phytolith specialist (Laparidou) and archaeobotanist; these analyses are underway in laboratories in Texas and Groningen. These loci represent secondary usage of the Mamluk chambers, with a potential period of squatter usage. The original floor of the Mamluk chamber has not yet been reached.

It is not entirely clear what the function of these rooms were. At least four vaulted rooms of more or less identical plan and width were built against one another, with no doors connecting, and facing downhill. Three and, in some cases, four Mamluk phases can be identified with changes in room function. The recovery of equestrian accoutrements (horseshoe; large iron rings; sections of chain) from M3 in 1998 and a large bronze ring from M8.6 in 2013 - all from beaten earth surfaces - may indicate conversion of the room to stables late in the Mamluk period. However, the quantity of glass and glazed sherds, and cooking wares from most squares, recovered from lower levels suggests that the original function of the rooms (or, as is more likely, single-room buildings) may have been domestic. They are, however, much smaller than the farmhouses of the same period excavated in Fields C and O in previous seasons and the current ones, and a storage function cannot be ruled out. The results of the palaeobotanical and archaeozoological analyses should shed light on changing room function in this period.

**Field R** (Bethany Walker)

Continuing work begun in 2012, two 5 x 5 meter squares were excavated in 2013 along the eastern side of the summit, in an effort to locate the eastern portion of the acropolis fortification wall (Bates, Hudon and LaBianca 2014, n.d.). The eastern side of the *tell* is poorly known and until recently has not been a priority of excavation. *The Heshbon Expedition*'s excavation dumps were located at the base of the eastern slope and it has remained a favored location for sifting since then. The gentle slope of this side of the *tall* and the apparent absence of monumental architecture discouraged architecturally focused fieldwork. The goal of excavations in this field, then, were to address this lacuna and to try to identify the eastern portion of the wall (which was not visible), date it if possible and investigate whether a gate existed on this side, as was the case on the north and south sides.

Excavations in 2013 did reach bedrock but did not recover the acropolis wall, which appears to have collapsed in a massive earthquake sometime in the later Mamluk period. Pottery throughout the fill and on the bedrock was predominantly Mamluk, with only a single Hellenistic sherd and no Iron Age to assist with dating the original wall. Tumble from what was likely the original acropolis wall (R5.11) had fallen onto wall stubs of the Mamluk period (R5.10=R6.13, R6.7 and R6.8), which were built slightly downslope and on bedrock. It appears that the acropolis wall, at least in this sector, was of boulder-and-chink construction and founded on bedrock that had been shaped to form a foundation for the wall. The Mamluk-era walls to the east of the squares together formed a kind of chamber; R.6.7 and R.6.8 were bonded together. R5.10=R6.3 seems to have extended around the north-east corner of the *tell* and may be related to a construction of that period excavated in M6. Work was not continued in this field in 2014.

**Field B** (8 / 10) (Bob Bates) - **see Fig. 2**

*Previous Work*

Area B was initially excavated at Tall Ḥisbān in the 1970s as part of *the Heshbon Expedition*. Several significant discoveries were made in this area, including an extensive Iron Age water system with a large reservoir and several channels and cisterns. The length of the eastern

side of the reservoir was verified by two plastered corners that turned westward, forming the north and south walls; however the south and west sides of the reservoir were not excavated.

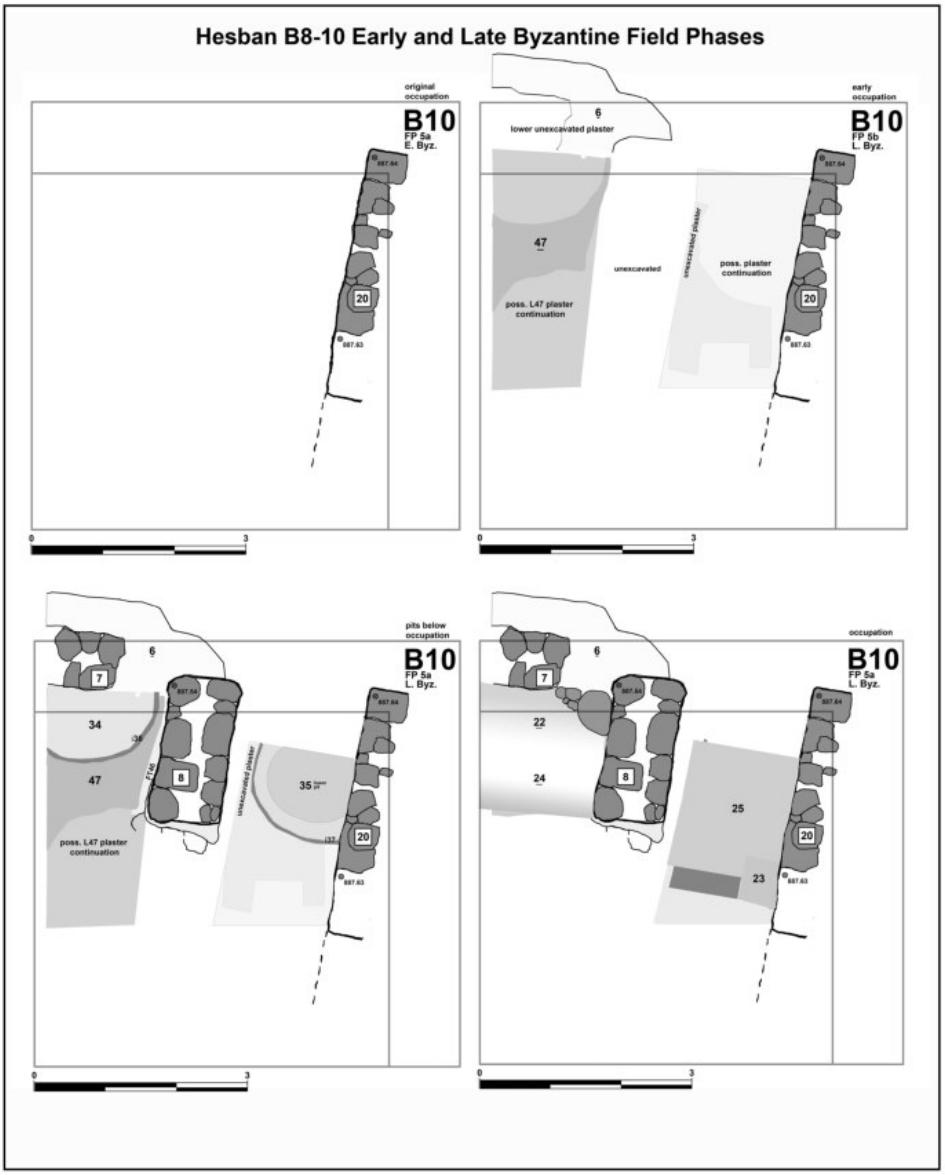
In 2011, as part of the Phase II excavations of Tall Ḥisbān, two new squares (approximately 6 x 6 meters) were opened in Field B (squares B8 and B9) on the western edge of the reservoir trench (Bates, Hudon and LaBianca 2014, n.d.). The purpose of these two squares was to begin the excavation process of uncovering the south and west sides of the Iron Age reservoir in the hope of answering questions regarding the actual size and purpose of this water system. Although the purpose of the 2011 excavation was to locate the edge of the reservoir, excavations in square B9 uncovered three Mamluk-era plaster floors. Similarly, numerous Late Islamic sherds were found in the fill of square B8, along with two Early / Middle Islamic coins and gaming dice. On the south side of B8, two plaster surfaces were also uncovered. These plaster surfaces appear to form an entrance flanked by two walls (walls 7 and 8). Unfortunately, both walls were in the south baulk, so further excavation and interpretation was not possible.

*2013 Season*

In 2013, square B8 was expanded southward by three meters to examine the origins of wall 8 and a plaster floor, in hopes of finding the context for the aforementioned objects. Two walls (8 and 20) and three pits were found in the small extension. The earliest phase excavated in 2013 was wall 20a. Erosion has caused part of the western side of the reservoir trench - which also includes the eastern baulk of square B8 - to reveal four to five courses of a stone wall. This wall is made up of finely hewn ashlars, approximately 40 - 50 cm x 30 cm, that were freshly quarried from hard limestone in antiquity before being dry-fitted in place. This type of stone masonry resembles other stones that make up some of the Byzantine architecture found on the site. During the 2011 season, similar stones were found to be in line with the four to five courses exposed on the western side of the reservoir trench. The current excavation revealed that wall 20a represents the earliest construction of the wall. Although pottery from the soil layers sealing against the wall are largely Late Byzantine in date, there is no doubt that wall 20a represents the first building phase from an earlier period. Two courses were exposed. The actual height of the building has not been determined, but based on the stones seen in the eastern face of the reservoir trench it was at least 2.2 m high. Wall 20 is the eastern side of a building whose remaining walls have yet to be uncovered and its exact dimensions remain uncertain. Later, in Field Phase 5 (Byzantine), additional stones were added. For stratigraphic purposes wall 20a has been assigned to Field Phase 6 (Early Byzantine) until further excavation clarifies its construction **(Fig. 9)**.

In first phase (5b) of the Late Byzantine period, following a currently undetermined period of abandonment, wall 20 was repaired (wall 20b) using semi-hewn boulder-and-chink construction. Unlike the earlier phase, during which blocks were uniform with tightly fitting joints, wall 20b is made up largely of reused limestone blocks and semi-hewn boulders ranging from 25 - 40 cm x 20 - 30 cm. Chink stones of varying sizes (4 - 10 x 2 - 6 cm) were used to fill in the gaps between the larger building stones. Although three courses have been exposed, the coursing is neither evenly spaced nor level. The face of the wall looks rough and resembles stone construction from later periods (i.e. Mamluk). The uneven texture was most likely filled with wall plaster and would therefore have remained unexposed. Samples of smooth flat plaster including two painted pieces were found in the soil layers immediately adjacent to wall 20b.

Several plastered floors were found in the soil layers next to wall 20b. The earliest plaster floor of Field Phase 5b was 5 - 10 cm thick and sealed against wall 20b (elev. 885.04 m) approximately 6 cm above its first repaired course. Three successive plaster floors were added, each approximately 3 - 10 cm thick and also sealing




*9. Floor plans of B10 house with Byzantine phasing (courtesy Bob Bates).*

against wall 20b (visible in the sub-baulk). Late Byzantine pottery was found in all the soil layers below each plaster floor and in the plaster of locus 31. In addition, this plaster floor may have extended the entire width of the square. A *'terra rossa'* colored, 4 - 6 cm plaster floor (loc. 47) was found cut by a later phase of wall 8 and two pits. Its elevation of 885.43 m is consistent with the plaster floor of loc. 29 (elev. 885.39 m).

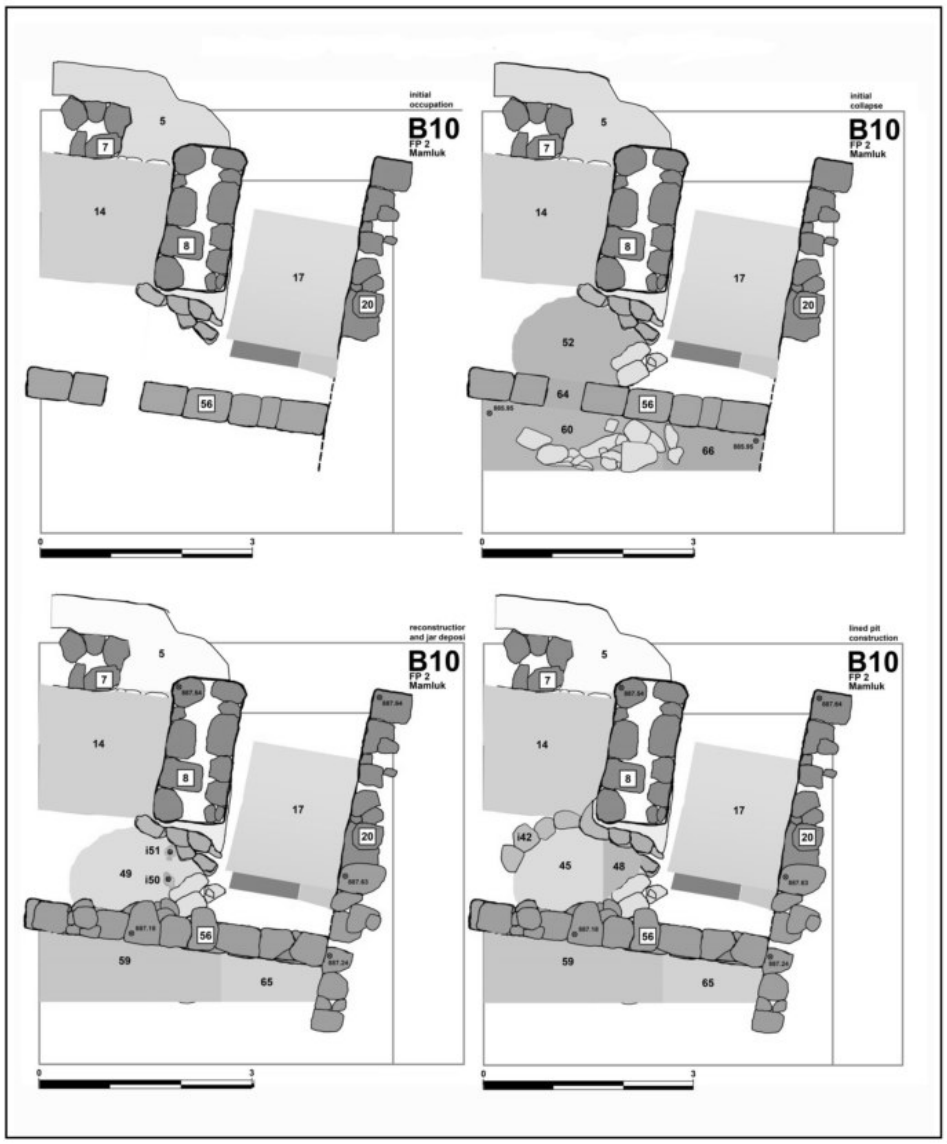
Two pits were cut into the plaster floors of Field Phase 5b. On the west side of the square a 1.2 m semi-circular pit that continues into the west baulk cut into the terra rossa-colored plaster floor (loc. 47) and appears to extend north under loci 6 - 7. The pit (LBYZ pit #1) was excavated approximately 15 - 20 cm and was sealed by a 10 cm layer of earth and an additional plaster floor (loc. 22), the latter of which sealed against wall 8 (discussed below). The pottery in the pit consisted of Late Byzantine jars and a basin, as well as one Iron Age 2b jar handle. On the eastern side of the square a similar pit (LBYZ pit #2) was cut into the earlier plaster floors mentioned above. This pit also had semi-circular shape that sealed against wall 20b and was approximately 1.4 m in circumference. The pit was excavated approximately 30 - 40 cm and the pottery included Iron Age 2, Persian and Late Byzantine sherds.

During the second phase (5a) of the Late Byzantine

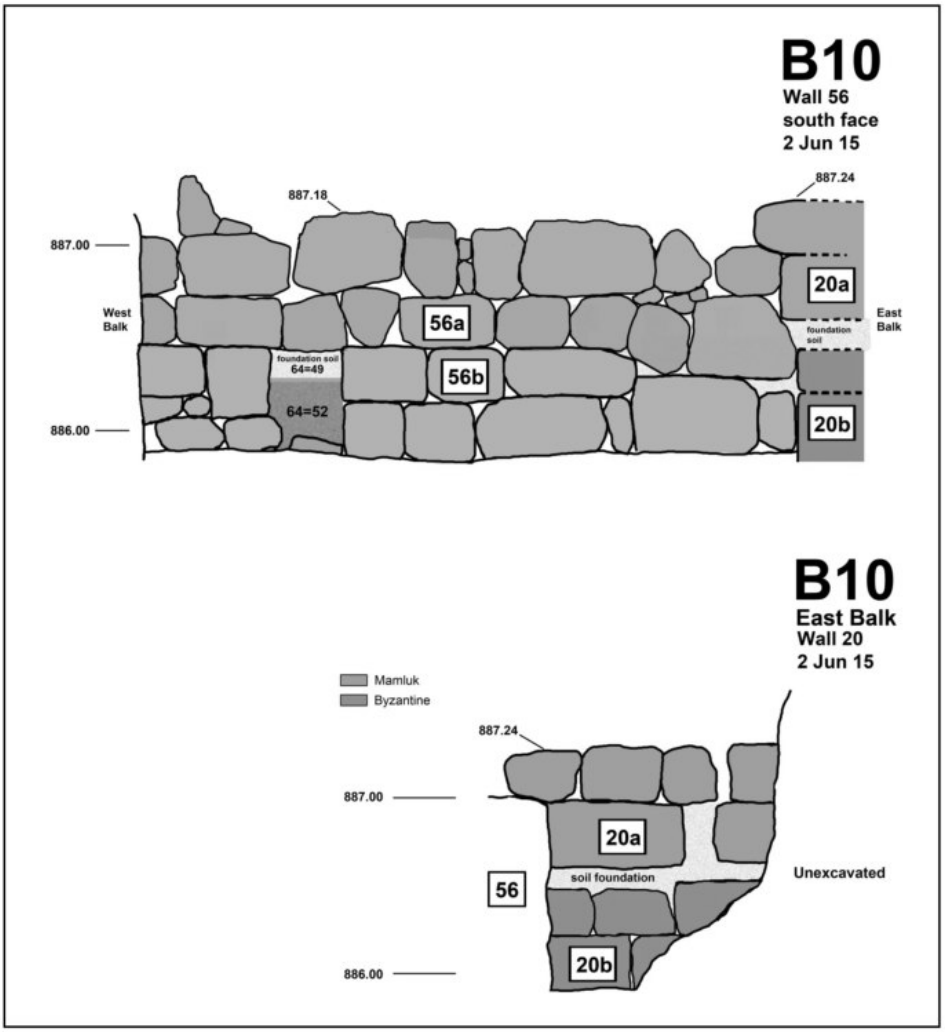
period, the occupation area - which extended across the entire width of square B8 - was divided into two rooms by a wall (8).

Wall 8 appears to have originally been founded on the last plaster floor of Field Phase 5b and may have cut into the *terra rossa* plaster (loc. 47) that was slightly higher (most of the plaster floors in square B8 slope either toward the east or toward the north). It may be that in an attempt to level the foundation of the wall, the builders cut into the sloping terra rossa plaster. An 8 - 10 cm soil layer was used to level the ground below the wall before two courses of foundation stones were added, followed by another 5 - 10 cm layer of soil and plaster. This foundation provided a stable base for the mixture of hewn ashlar, semi-hewn boulder, spolia and natural stones that range from 30 - 40 cm x 10 - 30 cm. The boulder-and-chink construction is similar to wall 8, but no plaster has been found to determine how it may have been faced. The wall was probably robbed out or cut into by a later phase; only 1.8 m and one course survive above the foundation. With the addition of wall 8, the east room was approximately 1.9 m wide. Unfortunately, the north side has been robbed out and the west room extends into the baulk so the exact dimensions cannot be determined.

During one of the building phases, a stone stand was reused as a stretcher in the wall construction **(Figs. 10 and 11)**. This stand measure approximately 30 - 40 x 90 cm and has




*10. Floor plans of B10 house with Mamluk phasing.*




*11.Architectural sections of Walls 56 and 20 in B10 house with Mamluk-era phasing.*

a triangular shaped incision approximately 10 - 15 cm long and 5 - 8 cm deep. This incision was probably fitted to another stone structure with a stone or metal insert (cf. tenon joint) to keep it in place. The base and the top are wider than the body but the rear side appears to be broken off. The top is square in shape with horn-like features and a round, concave surface that may have been used for offerings of libations. The stand is a four-horned altar of either the Roman era, which is common in the Levant, or Byzantine, for which there are several parallels in Jordan.[2] In either case, it was probably removed from the monumental cultic building of the Roman period that once dominated the summit of the *tall* (and which now underlies the Mamluk garrison) or the Byzantine basilica that stood on top of its ruins.

As in Field Phase 5b, there were at least three plastered floors in the west room and one plastered floor in the east room. The plaster floor in the east room was laid approximately 5 cm above the foundation stones and another plaster floor may have been laid 25 cm above the initial floor. Likewise, the west room had a plaster floor laid 5 cm above the foundation stones. This plastered floor, and the soil layer below it, contained Late Byzantine jar and bowl sherds. Two additional plastered floors, separated by a small ash lens, were added, including a thick (15

2.The lead author acknowledges the assistance of Renate Rosenthal-Heginbottom, Debra Foran, Bob Bates, Larry Herr and Sy Gitin in tracking down references. Byzantine parallels can be found in the Petra Church and in the mosaic at Mukhayyaṭ from the Church of Lot and Procopius.

*Sequence H14.B10: order of loci*

| order | Square | locus | notes | stratigraphy | pottery | |
|---|---|---|---|---|---|---|
| 26 | | 14=15 | | | Mam | LByz |
| 25 | B08 | 16 | mixture of abandonment | abandonment | Otto | LByz |
| 24 | B08 | 18 | | | Mam | EByz |
| 23 | B08 | 19 | Soil between W56 and W8; probable W56a collapse | abandonment | Mam | ERom |
| 22 | B10 | 54 | seals against S. side W56b; some modern fill | occupation/ abandonment | MIs | LByz |
| 21 | B10 | 55 | seals against S. side W56b; some modern fill | occupation/ abandonment | MIs | LByz |
| 20 | B08 | 30 | Soil over pit #2 and stone ring | | Otto | LByz |
| 19 | B08 | 32 | Soil over pit #2 and stone ring | occupation | Otto | Lbyz |
| 18 | B08 | 38 | Soil in pit #3 | occupation | Ott | LByz |
| 17 | B08 | 40 | Soil in pit #3 | occupation | Mam | Lbyz |
| 16 | B08 | i42 | Stone pit ring | | | |
| 15 | B10 | 45 | Pit matrix | abandonment | Mis | EByz |
| 14 | B10 | 48 | Jar matrix | abandonment | MIs | Hel |
| 13 | B10 | 50 | Islamic jar | occupation | | |
| 12 | B10 | 51 | Islamic jar | occupation | | |
| | | | Possible Wall 56a Collapse | | | |
| 11 | B10 | 49 | =64a; seals against W56a; foundation layer of Jars (50/51) | occupation | MIs | EByz |
| 10 | B10 | 57=58 | seals against W56a | occupation | MIs | LByz |
| 9 | B10 | B10:W 20a | extension of Wall 20 abutted by W56a founded on unexcavated soil layer (=63) | | | |
| | B10 | W56a | Mamluk wall phase 2; later construction | | | |
| 8 | B10 | 64a | =49; soil through wall 56 ; foundation for W56a | construction | MIs | LByz |
| 7 | B10 | 65 | fill/possible floor | | MIs | LByz |
| 6 | B10 | 59 | | | - | - |
| 5 | B10 | 52 | soil seals against N side W56b; foundation layer of Jar (50/51) | occupation | MIs | Rom |
| 4 | B10 | 64b | =52; soil through wall 2 phases | occupation | | |
| 3 | B10 | 66 | soil layer seals against W56b | occupation | LByz | LByz |
| | | | | | | |
| 2 | B10 | 60 | soil layer seals against W56b | occupation | Abb | Byz |
| | | | wall collapse | | | |
| 1 | B10 | W56b | Mamluk Wall phase 1; abuts W20; cuts into W8 and its foundation | construction | | |
| 0 | | | cut away W8 to build W56 | | | |
| | B8 | 17 | mix of Islamic and LByz | abandonment | MIs | LByz |
| | B8 | 16 | mix of Islamic and LByz | abandonment | MIs | LByz |
| | | | | abandonment | | |
| 24 | B8 | W7 | stone wall; poss. doorway with 4-5 cm plaster layer with stone stoop | construction | | |
| 23 | B8 | 21 | soil layer between W8 and W20 | occupation | LByz | LByz |

| | | | | | | |
|---|---|---|---|---|---|---|
| 22? | B8 | 23 | above L39; poss. = L25 | - | - | - |
| 21? | B8 | 39 | assigned unexcavated; poss. = L27 | | | |
| 20 | B8 | 25 | soil layer that covers pit L27,29,35; poss. beaten earth floor | occupation | LByz | EByz |
| | | | two additional plaster floors seen in balk | occupation | | |
| 19 | B8 | 22 | soil and plaster mix; seals pit | occupation | LByz | LByz |
| 18 | B8 | 6 | plaster floor; poss. cont. L24 | construction | | |
| 17 | B8 | 24 | plaster floor seals L26; seals against W8 | | LByz | LByz |
| 16 | B8 | 26 | soil layer above L28; sealed by L24 plaster floor | | LByz | LByz |
| 15 | B8 | 28 | soil layer covers pit L34 and terra rosa colored plaster floor L47 | construction | LByz | LByz |
| 14 | B8 | 44 | soil layer above W8 foundation | construction | LByz | LByz |
| 13 | B8 | W8 | stone wall with LByz spolia (altar) | construction | LByz | LByz |
| 12 | B8 | | W8 foundation stones and plaster | construction | | |
| 11 | B8 | FT46 | foundation trench for W8 | construction | LByz | LByz |
| 10 | B8 | 34 | pit contents | | LByz | LByz |
| 9 | B8 | i36 | pit; cuts L47 terra rosa colored plaster floor (see 5); continues under W7 | occupation | - | - |
| 9 | B8 | 27 | upper pit contents and soil layer covering pit | occupation | LByz | EByz |
| 8 | B8 | 29 | pit contents of the upper half | occupation | LByz | EByz |
| 7 | B8 | 35 | pit contents of the lower half | | EByz | Byz |
| 6 | B8 | i37 | pit; cuts L31 plaster and L33 soil layer and unexcavated lower plaster (see 2) | occupation | - | - |
| 5 | B8 | 47 | terra rosa colored plaster cut by pit | occupation | - | - |
| 4 | B8 | 31 | plaster layer cut by pit | occupation | - | - |
| 3 | B8 | 33 | soil above lower plaster cut by pit | construction | - | - |
| 2 | B8 | | lower plaster seals against W20; unexcavated | occupation | - | - |
| 1 | B8 | W20a | Byz Wall repair | occupation | Lbyz | EByz |
| 0 | B8 | W20a | Byz Wall | | | |

Key

| | | | | | | |
|---|---|---|---|---|---|---|
| Field | Phase | 2a | Islamic | | | |
| Field | Phase | 5a | Late Byzantine | | | |
| Field | Phase | 5b | Early Byzantine | | | |

order: order in which loci were laid down in sequence
notes: brief information on each locus
stratigraphy: whether a locus represents an construction, occupation or abandonment phase
pottery: pottery found in the locus from the most recent to the earliest

*12 . General stratigraphy of Field B.*

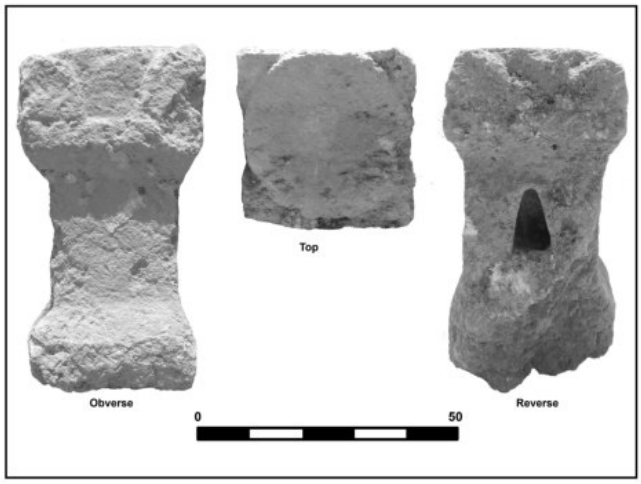
cm) plastered floor near what appears to be an entrance on the north side of the room formed by a break between walls 7 and 8. This plastered area may have served as a threshold.

The Middle to Late Islamic periods are represented by two field phases, Field Phase 2a and 2b **(Fig. 12)**. While inter-seasonal debris and vegetation were being removed from square B8, a small area of plaster approximately 0.3 x 0.5 m was uncovered. This plastered floor represents the final occupation of the square and comprises a compacted soil foundation. Unfortunately, it was relatively close to the surface and had been robbed out or removed during the recent attempts to create new paths at the site. Most of the sherds that were found in these soil layers were mixed and included Late Byzantine, Umayyad and Mamluk pottery. No architecture was associated with this phase and it appears to have followed a period of abandonment. For stratigraphic purposes this phase was assigned to Field Phase 2b (Mamluk).

The second phase for the Middle to Late Islamic period includes a large pit (pit 3 = loc. 43), with pottery spanning the Late Byzantine to Late Mamluk periods **(Figs. 13 and 14)**. In the south-west corner of square B8, pit 3 cut through an earlier plaster floor (loc. 28) and into a Late Byzantine wall (loc. 8). The pit was lined with nine 30 - 40 cm boulders in a semi-circular pattern (loc. 42). The pit measures approximately 2 m x 1.7 m and was excavated to a depth of 40 - 50 cm. A small foundation trench outlines the perimeter of the pit and joins the foundation trench for wall 8. This lined pit cuts into the *'terra rossa'* plaster floor mentioned above, as well as other plaster on the west side of the square. The pit also cut into the stones on the south side of wall 8. In addition, two of the stones lining the pit ran under the south-west corner of wall 8 and cut into the plaster floor on the east side of the wall. Since the pit lining runs underneath part of wall 8 it would suggest that the pit predates the wall. However, pottery from wall 8 under the cultic stand, the foundation trench and the plastered layer between the



*13.Altar reused in Wall 56.*




*14.Details of the altar.*

lining stones and the wall stones all date from the Late Byzantine period. It appears that the south-west corner of wall 8 was rebuilt when the Late Mamluk pit was initially dug, which was confirmed the following season.

The pit contained Middle Islamic and Late Byzantine sherds that were mixed together when the pit cut through the Late Byzantine occupation. Few bones were found in the pit, but one particular object was of special interest. A nearly complete, small, handleless, globular jar with an everted rim and small foot was uncovered on the west side of the pit **(Fig. 15)**. The jar was handmade and closely resembled a HMGP (Handmade Geometrically Painted Ware) jar from Field M that was excavated in

2001 and many sherds of handmade jars found at the site from Late Mamluk (late 14th century onwards) levels. There was a dark residue on the bottom of the jar; it has been sampled for residue analysis.

*2014 Season*

The purpose of fieldwork in this field in 2014 was to continue exploring pit 3 and expand the square southward in order to locate any associated architecture. In addition, square B8 was realigned so that the three-meter expansion of the 2013 season was incorporated into square B10, allowing a southward expansion to remain in the same square. The stratigraphic sequence of newly named square B10 consisted of a series of building phases, occupations and abandonment.

Part of the sequence was complicated by modern restoration and preservation efforts on the site and the debris left over from the Phase I excavations. The following sequence includes the pit excavation and a Middle Islamic wall.

Although two building phases from the Late Byzantine period were excavated in 2013, no Late Byzantine building phases were identified in 2014. Late Byzantine pottery was found in pit 3 and mixed with the pottery that sealed against wall 56. In addition, two courses of wall 20b/c were exposed below locus 65, and pottery in locus 66 consisted of Late Byzantine sherds. These courses may represent Field Phase 5a or 5b (Late Byzantine). A layer of soil was placed on top of these courses when the structure was abandoned and a Late - Middle Islamic extension of wall 20 was added. Pit 3 (loc. 43), excavated the previous season, was lined with nine 30 - 40 cm boulders in a semi-circular pattern and measured approximately 2.0 m x 1.7 m, but its south side was obscured by the south baulk. In 2014, it was discovered that the semi-circular, stone-lined pit was the final building phase of the Late - Middle Islamic period. The pit was completely excavated this season.

The earliest phase of the Late - Middle Islamic period (Field Phase 2b) consisted of an east - west wall (wall 56b) that transects the square



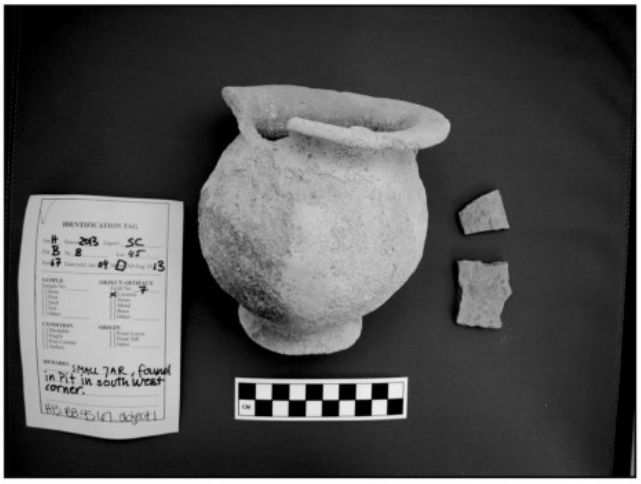
*15. Imported Mamluk jars buried in B10 wall collapse.*

and abuts wall 20 **(Fig. 16)**. Two courses of semi-hewn rough ashlar stones and boulders were exposed. The stones were approximately 30 - 50 cm x 20 - 30 cm. The pottery that sealed against this wall was a mix of Late Byzantine and Middle Islamic sherds. A small gap (loc. 64) between the stones approximately 40 cm wide appears to have been some type of opening in the wall. When the wall was abandoned two layers of fill dirt were added on both sides of the wall that passed through the small opening. On the north side of the wall two complete Mamluk-era underglazed-painted jars (loci 51 - 52) were found leaning against two large stones and covered with a clay and cobble mixed soil layer **(Fig. 17)**. It seems that they were deliberately placed there on their sides and were supported in their positions by a matrix of soil, small stones and gravel, soil was poured in and around and above them. At the westernmost end of pit 3, the handmade globular jar recovered in 2013 was laid on top of this soil cover.

Following the burial of the two jars, a second phase was added to wall 56 and wall 20. Two to three courses of each wall consisting of 30 - 50 cm x 20 - 25 cm boulders and roughly hewn ashlars were found abutting each other. Wall 20 was founded on a soil layer above the Byzantine wall phase and slightly over lapping its stones. This construction forms a north-east corner of a possible Mamluk building, although its purpose

is uncertain. Shortly after this construction, the lined pit (pit 3 = loc. 43) was made and refuse from the building was placed within the pit and around the jars **(Fig. 18)**.

The larger spatial context of this B8 building is not clear, as we know so little about the use of the southern slope and how it compares to the northern and western ones. The results of *the Heshbon Expedition* suggest that much of this space was terraced for agricultural use when the citadel was abandoned. To what degree the southern approach to the citadel contained housing units remains to be determined.



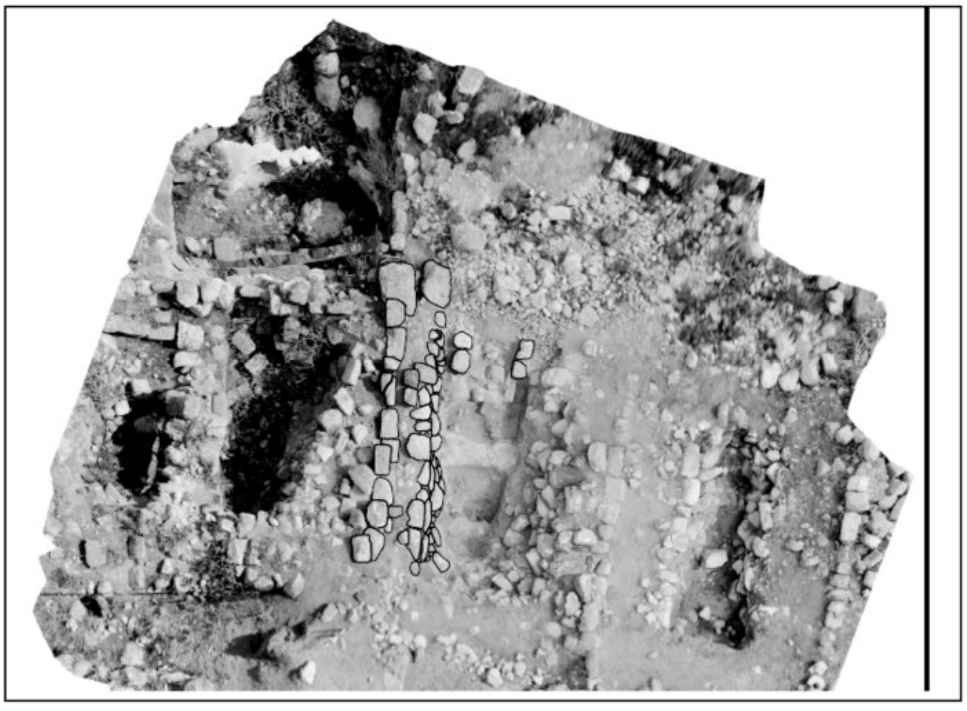

*16. Handmade jar of Mamluk period buried in B10 wall collapse.*

**Reservoir (B2 / 4)** (Jeff Hudon) - **(Fig. 19)**.

Cleaning some forty years of inter-seasonal debris and baulk collapse from the reservoir was also a goal of both the 2013 and 2014 seasons. The efforts aimed at accomplishing several objectives: to address some outstanding questions about the reservoir from *the Heshbon Expedition* (why it was located so far upslope; how it was filled; its history of use) and to locate its original corners (to determine ultimate holding capacity). This clearance and baulk trim work also provided the opportunity to sift materials from the reservoir and the surrounding areas, which



*17. Barrel vaulting and doorway of Mamluk house in Field M, view south.*



*18. Floor plan of house in M8.*

were notable for producing a rich assortment of epigraphic and other finds recovered during the original Heshbon Expedition. Cleaning in this manner also provided the opportunity to clarify and reinvestigate water channels and map their functional relationships to one another and to the adjacent caves. Different phases of water harvesting and use were revealed as a result, suggesting that at different times the reservoir was used as a quarry and then a reservoir, part of larger complex system of irrigating terraces, fields and gardens.

Careful sifting produced a number of small finds. A beautifully worked stone 'eye of Horus' amulet, perforated to wear as a pendant, was an especially significant find owing not to its rarity, but rather to it having been found at Ḥisbān **(Fig. 20)**. This amulet was recovered from baulk collapse in the reservoir. It is approximately 3.1 x 2.3 cm and is made of pale green faience (2.5BG 9/2). It was usually worn as a necklace under the garment near the heart with other scarab charms. This amulet was made in the shape of the all-seeing 'eye of Horus' that was meant to give the wearer a sense of security in unfamiliar circumstances. It dates to the Late Iron Age and, although it has an Egyptian design, it was probably made at a local workshop in ancient Palestine.[3]

Three iron arrowheads, including one of the Scythian type, and a round ivory or bone gaming piece with markings were also found. Arguably the most significant find, however, was a scaraboid seal bearing a design with a framed male ibex and its kid, flanked by two date palm trees. Though it carries no inscription, it finds close parallels with seals and seal impressions from other sites dated to the 7th - 6th centuries BC. The recovery of a broken clay seal impression (bulla) from Ḥisbān in 1973 shares a somewhat similar design. It has been tentatively identified as the seal of an Ammonite official (Hudon 2013).

Cleaning also made more visible a series of rock-cut features, partially obscured by earthquake-enduced breaks in the bedrock **(Fig. 21)**. The function of these channels, cup marks and shallow square basins is not clear, but their spatial relationship with the reservoir and a connecting entrance to the Field G cave / cistern complex would indicate a water distribution or water raising function, such as a *shadūf*.[4]



*19.General view of reservoir, facing south (courtesy Daniel Redlinger).*



*20. Bird's-eye view of rock-cut features and earthquake damage in reservoir, facing west.*

**Water Study** (Bethany Walker, drawing on Walker n.d. "Water Culture" with reference to work done by Thomas Mewes and Henning Nitzschke; technical water report by Stuart Borsch)

3.This pendant is currently under study by Bob Bates and will be published soon.

4. We are grateful to Prof. Terje Stordalen (University of Oslo) for this suggestion.



*21. 'Eye of Horus' pendant from reservoir cleaning.*

The history of settlement at Tall Ḥisbān is intimately tied to the development of the site's water systems. The *tall* sits atop what is best described as a vast bedrock-cut, underground water tank: a system of natural caves and interconnecting tunnels that have been modified for use as cisterns, canals and a reservoir since the Iron Age. The water serving these installations came from three sources: winter rainfall (carefully collected from rooftops and fields to cisterns), seasonal diversion of waters from two nearby wadis that flank the *tall* (Wadi Majar and Wadi al-Marbat), and one permanent).

'Ayn Ḥisbān , lying three kilometers north-west of the *tall*) and several seasonal (Fariyya, AL-Fedheyli, Sumiyya, AL-Fallāḥ, AL-Mushaqqar and Ṭīn) springs in Wādī Majar. These systems provided water for the Mamluk citadel on the hill (and the Roman temple and Byzantine basilica that occupied that space before it), the individual households, and the vast grain fields and orchards of the Ḥisbān hinterland.

A multi-disciplinary study of these water facilities, in conjunction with a closely coordinated environmental project and clearance of the Iron Age reservoir, began in 2014, with soil sampling, a water holding and land carrying capacity assessment, and 3D mapping of the most extensive of the cistern / cave complexes at the site. The efforts built on the studies of the ancient cisterns conducted by the original *Heshbon Expedition* in the 1970s. At this early stage of the current project, a few preliminary observations can be made. If the holding capacity of the cisterns and reservoirs is a fair indication, water use and development at Ḥisbān peaked in the Iron Age, Roman, Byzantine / Umayyad and Mamluk periods. Many of the cisterns and feeder channels built in the Roman and Byzantine to Umayyad periods either continued to be in use or were renovated and put back into use in the thirteenth and fourteenth centuries. This was particularly true for the household cisterns of the farmhouses on the *tall* slopes and immediately below them. A large reservoir located a half kilometer to the south-east of the *tall*, and originally a Byzantine construction, was cleaned, re-plastered and put again to use during the Mamluk era (Herr 1976; Merlin 1994: 219-20). At least three cisterns (two on the summit and one on the west slope) were built anew at this time (Merling 1994: 220-1). The farmhouses below the *tall*, which seem to have largely housed nuclear families, had their own cisterns - located outside the doorway and in the courtyard. Clusters of houses on the south-west slope shared a cistern, possibly reflecting an extended family arrangement. To date, all of these cisterns, as well as the houses they served, were constructed at a much earlier date (Roman or Byzantine / Umayyad) and were renovated for use in the early Mamluk era. Their holding capacities, however, have yet to be determined. Finally, textual sources allude to the growing importance of the village and the Madaba plains for their wheat fields and orchards in the fourteenth century. Phytolith analysis from recent excavations suggests a spike in irrigation of wheat (which is normally dry-farmed in Bilād ash-Shām) in the same period, suggesting that an effort was made locally to increase yields through irrigation, or to use irrigation as a risk-buffering strategy in years of low rainfall, but whether under state or local initiative is unclear (Walker 2011b; Laparidou n.d. "Changing Land Use Strategies"). There is some evidence, one should note, that the water facilities of the citadel and of the village were interconnected, raising important questions about the relationship between

the garrison serving there and the local community.

One of the greatest anomalies of this water system is the vast covered cistern, created from a modified cave, just beyond the south-west base of the *tall* in Field G **(Fig. 22)**. Dubbed the 'Abu Nur Cave' by the excavation team, mapping and dating the extensive complex of rooms, tunnels, cisterns and connecting chambers have been daunting tasks. As is the case with many subterranean water systems and caves, collapsing ceiling, heavy erosional overburden and extremely narrow passageways have made it difficult over the years to determine the full extent of the complex and determine its function(s). Nonetheless, through strategically placed excavation probes and intrepid subterranean survey in 2010, preliminary soil sampling for geomorphological study in 2013, and laser and 3D mapping by engineers from Berlin in 2014, the cistern complex has begun to shed light on the very complex technologies of water harvesting at the site and its transformation during the Mamluk period.

The covered cistern **(Fig. 23)** is constructed with a stone vault and at its western end is supported by four arches, each of which lead to other chambers and from there via tunnels to smaller cisterns of possible bell-shaped form. Monumental cisterns of this covered form are known from the Roman and Byzantine periods in the Hawran, for example, where they are part of larger monuments, such as temples, churches or baths (Braemer et al. 2009: 43). The larger complex is entered by a series of steps and a built doorway, above which is a second chamber which is barrel-vaulted and once stood above-ground **(Fig. 24)**. In construction style the upstairs vaulted chamber appears to be Crusader (or Ayyubid / Mamluk) in date and echoes the description of a garden cistern in Wādī Karak in a Mamluk-era *waqfiyyah* (Islamic endowment document) in Cairo.[5] One of the side chambers leads to directly to the monumental reservoir of the *tall*'s south slope, which was built in the

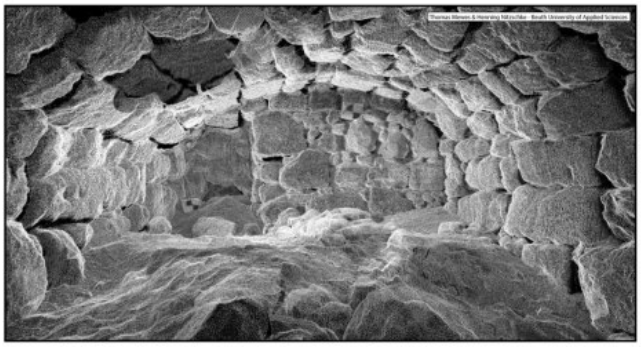



*22. 3D mapping of Field G cave / cistern system, cut-out (overall plan) (courtesy Thomas Mewes and Henning Nitzschke).*

5. The manuscript can be found in Cairo's Dar al-Wathā'iq as doc. #49. The description of the cistern has been published in Ghawanmeh 1982: 290-2 and the larger document is discussed in Walker 2011b: 154-161.



*23. 3D mapping of Field G cave / cistern system, entrance chamber (courtesy Thomas Mewes and Henning Nitzschke).*



*24. 3D mapping of Field G cave / cistern system, vaulted room above entrance (courtesy Thomas Mewes and Henning Nitzschke).*

Iron I period, enlarged in the Iron II (11th / 10th centuries BC) and was supposed to have gone out of use sometime in the Hellenistic period, when it was filled in (Ray 2001: 93, 137). The covered cistern complex appears to be connected through the reservoir (and possibly another tunnel) to the expansive network of tunnels that connect the cisterns under at least two of the fortifications' corner towers on the *tall* and several of the cisterns in the center of the citadel. During the Mamluk period, the cisterns of the two corner towers were still used for water collection, though at more reduced levels than before, as was the southern end of the covered cistern. Many other parts of this latter complex went out of use and were used as refuse pits.

It remains unclear exactly how the covered cistern was filled with water. If the reservoir was, in fact, filled in with debris by the Hellenistic period, the water could not have come from that source; alternatively, some part of the reservoir may have continued to function and this filled the cistern. The cistern may have been filled by hand, with water carried in goat skins bags or jars from the wadis below or from their feeder springs, though the complex is too large to have made this an effective solution. This was certainly the practice in the village until recent times, and it is documented by Mamluk-era historians, as well. Two accounts, in particular, describe the conditions of water supply to the citadel of Safad in the fourteenth century, contemporary to the expansion of water systems and intensification of land use at Ḥisbān. In an account that remains in manuscript form, Sham al-Dīn al-ʿUthmānī, a judge (qāḍī) in the city of Safad, describes the use of a satūrā to raise water to the citadel reservoir there for the garrison's use. This device was operated by means of three mounted riders who turned it to lift buckets of water of water pipes inside the castle. Siginificantly, al-ʿUthmānī also notes that surplus water was then redistributed to the town below (Lewis 1953: 481, cited in Luz 2014: 179). According to al-Umari, a contemporary historian from Egypt, pack animals brought water from the wadi below to supply the citadel of Safad (al-ʿUmarī 1971: 372).[6] It is likely, then, that a combination of methods was employed in the Mamluk period to raise water to hilltop citadels.

A brief visit and preliminary sampling by a soil genesis specialist in 2010 indicated that water flowed through the cistern with some speed and quantity during at least one period of its use, suggesting that perhaps the complex functioned as a kind of *qanat* (underground aqueduct).[7] Although such systems are known from northern and southern Jordan, their peak of construction and use was the Byzantine and Umayyad periods (Lightfoot 1997, 2000, n.d. "Jordanian Qanat Romani", n.d. "Syrian Qanat Romani"; Abudanj and Twaissi 2010). There was clearly more water available in the past than now, and we have much more to learn

6. I am grateful to Prof. Yehoshua Frenkel, University of Haifa, for this reference.

7. We thank Dr Bernhard Lucke of Erlangen University for this suggestion. The project plans for a more comprehensive geomorphological study of the complex in a future season.

about this complex and the diverse hydrological organization supporting it.

The Ḥisbān citadel was abandoned by Mamluk officialdom in the mid-14th century, when the entire garrison (as well as the qadi and marketplace) were moved to Amman. The water system in the citadel and on the upper slopes went out of use first. The village thereafter slowly declined in size until it was gradually abandoned by its residents sometime in the early Ottoman period, and with it the cisterns at the base of the *tall*. While the village was occupied sporadically and perhaps seasonally after the 16th century, it was not permanently resettled until the 19th century. Many other villages of the Transjordanian highland plateaus suffered the same fate at the end of the Mamluk period. Water scarcity, exacerbated by political conflicts and, ironically, encouraged by economic opportunities may have been the cause of the population shifts of the 15th and 16th centuries (Walker 2011: 211-232). With the greater privatization of farmland in this period, and years of droughts destroying rain-fed grains, local peasants had the opportunity to move to leave the plateaus for other locales, in lands made newly available for purchase and development. These had better hydrological conditions, more appropriate to market-oriented, irrigated agriculture. The kinds of water systems developed previously at Ḥisbān may not have suited the economic and environmental challenges of the time.

**3D Laser Mapping - see (Figs. 22 - 24)**.

It has been a priority of excavations at Ḥisbān since the 1970s to map at least some of the components of the vast subterranean water installations.[8] Extensive fill and collapse of some built elements have made the personal inspection of the chambers and rooms and mapping by hand difficult and dangerous. To address the logistical complications, and to determine to what degree the reservoir and cisterns on the *tell* and slopes were interconnected, 3D laser mapping of the largest of the complexes (in Field G) commenced in 2014. This complex was mapped in its entirety (with floor plans and elevations), details of building materials and techniques documented, changes in slope recorded, and the physical and functional connections with the reservoir confirmed (Mewes and Nitschke 2014). The steep slope (42%) from the entrance chamber to the largest cistern in the back of the complex could provide a context for testing the theory that the complex may have served, at some point in its history of use, as a qanat (underground aqueduct). Future work in the complex will include a comprehensive geomorphological and soil study to determine when the superstructure of the complex stood above ground, under what conditions its components went out of use and the nature of water flow in the chambers.

**Holding and Carrying Capacity Estimates** (Stuart Borsch)

In support of the larger study of water technology and the settlement's water needs over the centuries, a historian of Mamluk-era irrigation systems joined the project in 2014 to create models of water harvesting and storage capacity and population estimates. According to his preliminary study, four options were open historically for water supply to Tall Ḥisbān : rainwater capture, hauling water from the wadi (some 60 m below the *tall*), a syphon-qanat and / or an artesian spring. Of these possibilities, the strongest hypothesis is that there was once a spring / artesian well which became extinct - quite possibly as early as the eighth century BC. The following analytical notes address each of these four possibilities.

Assessment of the rain capture potential of the site indicates that rainwater catchment facilities may have sufficed for the cisterns in the Greco-Roman and Islamic periods, but not in Iron Age I when the reservoir was apparently in use.

8.Excavation probes in 1998 and 2010 in the entrance chamber and rear cistern determined that the at least part of the complex remained in use for water storage and redistribution into the Early Islamic period, though at reduced capacity. By the end of the Mamluk period, it had gone out of use in this function (Walker and LaBianca 2003 and 2012).

Merling's 1994 study estimated the holding capacity of the reservoir at 2,202,530 liters, the Hellenistic and Roman cisterns at 598,000 liters, and Islamic-era cisterns and irrigation water at 18,540 liters (Merling 1994). Against modern rainfall patterns, assuming they have not changed significantly from the past, the following patterns of water need and surplus are suggested:

| | Number of Cisterns | Average Cistern Volume (m^3) | Total Volume of Water | Catchment surface area (ha) | Rainfall (mm) | Rainfall (m) |
|---|---|---|---|---|---|---|
| Iron Age | 1 | 2.203 | 2.203 | 0.50 | 269 | 0.2693 |
| Roman | 7 | 85 | 598 | 0.50 | 269 | 0.2693 |
| Mamluk | 3 | 6 | 19 | 0.50 | 269 | 0.2693 |

| Capture Ratio | Potable Water (m^3) | Water use per person per day (liters) | Water use per person per year (meters cubed) | Estimated Maximum Papulation | Surplus Water = Rain Collected - Total Cistern Volume | |
|---|---|---|---|---|---|---|
| 50% | 673 | 50 | 18.25 | 37 | -1.529 | Deficit |
| 50% | 673 | 50 | 18.25 | 37 | 75 | Surplus |
| 50% | 673 | 50 | 18.25 | 37 | 654 | Surplus |

How water reached the storage facilities on the *tall* (and its slopes) remains an open question. Outside of the capture of winter rains and channeling them to cisterns (a method that would have never filled the reservoir), three methods could have filled the reservoir and the hilltop cistern: *qanats*, manual transport and artesian wells.

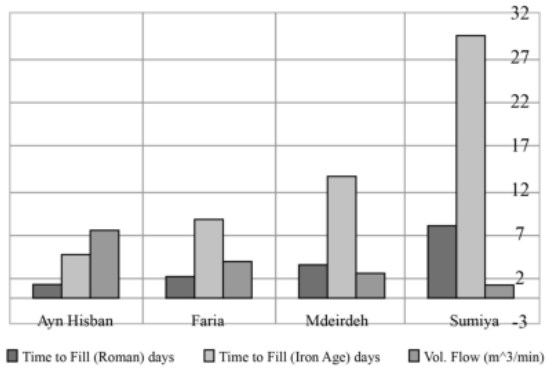
The theory that there was a qanat feeding Tall Ḥisbān is gravely weakened by the fact that the reservoirs (and cisterns) of Tall Ḥisbān are at a level substantially higher than the valley below. Though a spring like 'Ayn Ḥisbān would be at a higher level, the fundamental problem is that the supply water has to run upwards against gravity when it reaches the *tall* itself. It seems that the only viable solution would be to use a siphon that would pull the water upward when it reached the *tall*. There are historical precedents, particularly Greco-Roman precedents, for preindustrial water siphons. However, they were apparently quite limited in application. There are few examples of siphons for the Islamic period, though investigation is ongoing. Moreover, there appear to be no parallels for siphon use as early as the Iron Age. Pressure presents a further complication: a siphon must be sealed from the atmosphere along the lower (*wadi*) length of the supply line. Inspection shafts would cause a loss of pressure that would render the siphon impractical. This precondition limits our ability to search for a channel, as we would not expect to find the neat inspection holes of qanats that signal their presence from the air. Thus, if such a channel existed, it would be hard to identify it from the air (or satellite).[9]

It is conceivable that menial labor was used to haul water up from the wadis below (that were fed by several springs in addition to the substantial capacity for run-off capture). The problem with this means as an explanation for filling the reservoir is that it would involve a heavy and long-term investment in labor to keep the reservoir filled. The reservoir might have had a purely religious function, which might explain the labor expenditure but, given the overall volume of work, it seems unlikely for this site. For example, transporting a volume of two million liters of water, i.e. 2,000 metric tons (if the reservoir were filled to capacity), would require some 9,000 trips up the *tall*, if carried by a camel. So, for example, if some 20 camels were employed per trip, and 20 trips were made per day, the process would still take about three weeks to completely fill the reservoir.

An ancient spring or artesian well seems to be the most likely explanation for how the reservoir was filled. The absence of a spring today on Tall Ḥisbān at present and the low aquifier level does not weigh against this explanation. If there was a spring at the site, some 3,000 years ago, the abundant and powerful earthquakes would easily explain why the spring has since disappeared. Unlike the other possibilities, the existence of natural water under pressure would explain the water needs and infrastructure in their entirety. The spring capacities at present in the area, which may have been considerably more

9 .Two kinds of remotely controlled, low-flying aircraft were used these seasons for aerial photography. The ultimate goal was to visually capture ancient field lines from the air and to try to identify possible *qanat* maintenance holes and raised siphons. Work is on-going on the walls and terraces; there was, however, no evidence for the shaft holes or closed canals.

powerful in antiquity, would certainly explain the quantitative parameters. The following graph depicts the local spring capacities at present in the context of water use at Tall Ḥisbān.




Spring capacities of the four most powerful springs in the region (Lacelle 1986).

| Volumetric Flow | Vol. Flow (m^3/min) | Time to Fill (Roman) days | Time to Fill (Iron Age) days | Time to Fill (Mumluk) days |
|---|---|---|---|---|
| Ayn Hisban | 7.56 | 1 | 5 | 0 |
| Faria | 4.17 | 2 | 9 | 0 |
| Mdeirdeh | 2.697 | 4 | 14 | 0 |
| Sumiya | 1.248 | 8 | 29 | 0 |

Spring capacities of the four most powerful springs in the region (Lacelle 1986).

**Environmental Study** (based on reports by Chiara Corbino, Annette Hansen and Sofia Laparidou)

In 2013 a new design for environmental and palaeobotanical research was piloted to facilitate interdisciplinary research and writing from the stage of data collection. To this end, an 'environmental' team of a zooarchaeologist (Dr Chiara Corbino, Marie Curie Intra-European Fellow, University of Sheffield), archaeobotanist (Annette Hansen, University of Groningen) and phytolith specialist (Sofia Laparidou, University of Texas - Austin) was assembled, building on the design of environmental research developed by Walker for the *Northern Jordan Project.* The team members collect samples together, from largely the same contexts, during the excavation season and coordinate their research through regular long-distance consultation and collaborative writing. Beyond serving as proxies for environmental and climate change, the data assembled by this team will shed light on changing land use, diet and economy from Late Antiquity to the Islamic periods. This sub-project was put into full operation in 2014.

*Zooarchaeological Report* (Corbino)

During the 2014 excavation season at Tall Ḥisbān, the analyses of fauna were concentrated on the animal bones recovered in the village on the *tell* slopes. The archeological inquiry demonstrates a long-term occupation of the village. More specifically, the remains come from Fields B, C, M and O investigated in 2004, 2007 and 2013. The analyses were focused on selected periods: Byzantine, Early Islamic and Mamluk. A diachronic approach aimed to assess changes in the inhabitants' lives and in the micro-environment around the site through time.

The identification of faunal remains was based on specific atlases as well as on the LaBianca bone reference collection preserved in Madaba. The NISP (Number of Identified Specimens) was calculated to assess the relative taxonomic and skeletal frequencies. The ontogenetic ages of several specimens were assessed based on long bone epiphyseal fusion and tooth eruption and wear. Bone measurements, to assess size changes through time and sex ratio, were recorded. Female domestic chicken were identified by the medullary bone which forms during the egg-laying period. The distribution of osteopathologies was also recorded. Every kind of bone-surface alteration was recorded: weathering, trampling, root etching, abrasion / polishing, carnivore activity (bites; gnawing marks) and human-derived modifications. The latter include carcass butchery marks as well

as burning. Fracture patterns were used to establish the fresh or dry state of bones at time of breakage.

In total, 777 bone fragments were analyzed. The complete list of the identified taxa includes Camelus *dromedarius* (camel), Equus caballus (horse), *Equus asinus* (donkey), *Sus scrofa* / *domesticus* (pig / wild boar), Bos *taurus* (cattle), Ovis sp. / Capra sp. (sheep / goat), Gazella sp. (gazelle), Felis catus (cat), birds (including Gallus *gallus* [chicken] and *Calumba livia* [pigeon]), rodents and fish (likely parrotfish).

The chart below shows the NISP frequencies of the taxa. For the periods under consideration, the zooarchaeological analyses show that the inhabitants of Ḥisbān fed principally on domestic animals: mainly sheep and goats. Wild animals were quite rare. They were preferentially slaughtered at sub-adult and adult age. The analysed bones show a relatively wide range of modifications, which include root etching, weathering, trampling, butchering marks, burning and gnawing.

In 2013, the archaeozoological analyses focused on the citadel remains, with the aim of defining food supplies, as well as changes in the surroundings during the Mamluk period. The results indicated that animals were not bred in the citadel but were butchered and processed outside, and that high quality butchered carcass parts were likely brought into the citadel from the nearby village to satisfy the demand of the elite group based in Ḥisbān.

This season (2014) was aimed at reconstructing the connections between the elite occupants of the citadel and the local population. Future research will focused on investigating exploitation of the surrounding area through time.

*Preliminary Archaeobotanical Report* (Hansen)

The focus of the 2014 excavation season was to implement the sampling protocol developed by Laparidou and Hansen in order to coordinate sampling for microbotanical (phytoliths) and macrobotanical (seeds; fruits; wood charcoal) remains. 28 soil samples were taken in 2014 for macrobotanical material, particularly from sealed contexts including living surfaces, beaten earth surfaces, floors, pits (including hearths), middens and sediments within ceramic vessels. Wood charcoal, archaeological dung, plaster, mudbrick and tabun samples from 1997, 2001, 2004, 2013 and 2014 are being evaluated for their archaeobotanical material and such material will be identified to genus, species and sub-species level if possible. The identification of plant materials is important to the understanding of the plant diversity within the site and also to indicate the relative economic importance of plants within each period.

| | | NISP | |
|---|---|---|---|
| | **Byzantine** | **Early Islamic** | **Mamluk** |
| Dromedary | | | |
| Horse | | | 3 |
| Donkey | | | 1 |
| Pig/wild boar | 3 | | 3 |
| Cattle | 9 | 5 | 5 |
| Sheep/Goats | | 41 | 96 |
| Gazelle | | | 1 |
| Cat | | | 1 |
| Chicken | 1 | 9 | 17 |
| Pigeon | 1 | | |
| Avifauna | 1 | 3 | 9 |
| Parrothfish | | 3 | 7 |
| Rodent | 2 | | 5 |
| Small ungulate | 13 | 51 | 205 |
| Large ungulate | 2 | 6 | 17 |
| Non id. | 12 | 30 | 214 |
| **Total** | **44** | **149** | **584** |

NISP frequencies.

*Update on Phytolith Analysis* (Walker Drawing on Laparidou)

Sampling for phytolith analysis began during the last season of Phase II (2010) and was coordinated with sampling from the Field G cave / cistern complex for soil genesis and geomorphological study. The study, under Laparidou, aims at comparing patterns of food acquisition and preparation between the citadel and village and between contexts related to agriculture and pastoralism, from the Byzantine

to Islamic periods, with an emphasis on the Mamluk era. Evidence for a culture of peasant resilience is to be explained by irrigation signals in wheat for a brief period in the 14th century (Laparidou n.d.). Samples currently under analysis are from the 2013 - 2014 seasons, as well as from the Phase II excavations and include appropriate contexts from the citadel and mediaeval village (hearths, storage facilities, stables, surfaces / floors, middens etc.).

*Ceramic Report - Middle Islamic Wares*
(Bethany Walker)

The underglaze-painted jars in pit 3 of B10 **(see Fig. 17)** were relatively valuable imports from Syria of a type widely exported as apothecary jars in the late 14th century (Atil 1981). Though heavily corroded (a common problem with alkaline glazes in acidic soil), their forms were complete. The jars measure approximately 26 - 28 cm x 19 - 20 cm with a 10 - 14 cm base. The fabric is a fritware and both vessels carry black-and-blue designs, which were badly obscured by glaze corrosion: one floral in radial panels and the other calligraphic. These jars were found on the east side of the pit and were 10 - 15 cm below the globular jar that was found in 2014 on the west side of the pit. There were no contents in these jars, with the exception of loose soil (from the surrounding fill). The soil was sampled by the phytolith specialist, archaeobotanist and zooarchaeologist, who confirmed the fill quality of the contents in the jars. In one jar, however, the remains of a lizard were found. It appears that the two jars were deliberately placed outside the house wall and then enclosed in a stone-lined pit, after the destruction of the wall but before its repair. The reason for this is not known. There are no known parallels for such 'jar burials' of this period[10], if we can refer to them in such a way, outside of their use as burial goods or tomb covers in Israel (Gophna, Taxel and Feldstein 2007; Gorzalczany 2009) and as burial goods in the Black Sea region of the southern Ukraine for Kipchak nobility (Holod and Rassamakin 2012). In the latter case the grave included a contemporary apothecary jar, though of very different form. The jars in pit 3, which are in the Madaba Museum, have been sampled for residue analysis and it is hoped that the results will shed some light on this extraordinary context[11]. A comprehensive study of these jars will be published shortly by Walker and Bates.

The value of the discovery of these two jars goes well beyond their preservation and unique spatial context. Their association with the handmade jar discovered at the other end of the pit in 2013 **(see Fig. 15)** is invaluable: the well-dated imports provide a secure chronology for a handmade ware that has been dated anywhere in the Middle and Late Islamic periods. Many of the technical characteristics of this ware, which our jar shares, have been attributed to later periods - usually into the Early Ottoman - viz. a coarse, pale orange fabric with quartz inclusions and chaff scars, and 'blushing' of the surface, the result of firing in an outdoor kiln. One side of the jar has been burned, evidence of having been set against a cooking surface at one point.

No longer an anomaly at Ḥisbān, random sherds of early 14th century Cypriot sgraffito ware are appearing nearly every season, and in 2014 they were recovered from house fill in Field O. The discovery of complete bowls of this ware as burial goods in intrusive burials in the north church raises important questions about religious and ethnic identity (Walker 2013). Equally noteworthy is the occasional appearance of Mamluk-era Egyptian sgraffito and slip-painted ware of a militarized style with inscriptions and blazons (Walker 2004). Extremely rare outside of Egypt, and usually associated with Egyptian garrisons, they have been found recently in small numbers at Ḥisbān. This season, sherds of what appear to be imitations of the same ware in a

10.Walker expresses her appreciation to the members of the Islamic Ceramics Virtual Lab for suggestions regarding this jar burial.
11.Parallels can also be seen in the Amman Museum.

Syrian fabric were recovered **(Fig. 28.j)**. The example illustrated here in **(Fig. 28)** comes from the latest midden in M1, which has been identified as a refuse area that serviced the citadel.

A full ceramic report is being prepared for a separate article. What is provided here in **(Figs. 25 – 36)** are a few key loci, with representative pottery pails. Their stratigraphic contexts are as follows:

**Figs. 25 - 26**: B10.65.86 - first 'clean' Late Byzantine locus that seals against wall 20 in the south-east corner. It may represent the transition between the Mamluk and Late Byzantine phases. It is below the courses added to wall 20 in the Mamluk period.

**Figs. 27 - 28:** B10.Probeunderwall85 - soil under the courses of the second phase of wall 56. This may be the foundation soil for the 'jar burial'.

**Figs. 29 - 30:** M1.CuB.55 - the first locus after cleaning post-season debris, rich in Mamluk pottery and objects (mostly glass and metal).

**Figs. 31 - 32:** O10.B-CuVCollapse.53 - debris associated with vault collapse in the O9 / 10 farmhouse. This locus lies right above the final plaster floor (O10.14), covers a midden (which is a second phase use of the room) and is full of wall plaster. This is the final phase of the building's use.

**Figs. 33 - 34:** O11.3.7 - first locus below wall collapse in the courtyard outside the O9 / 10 farmhouse. Rich in glass and metal.

**Figs. 35 - 36:** O11.5.11 - beaten earth surface in the courtyard outside the O9 / 10 farmhouse. Samples taken for phytolith analysis.

**Coin Report** (Warren Schultz)

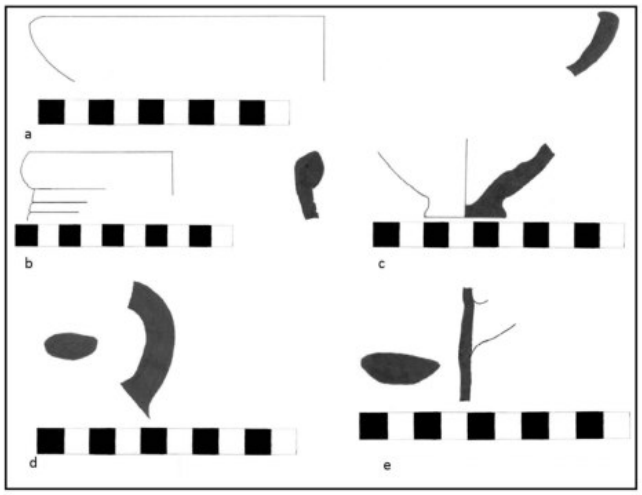
Processing a backlog of coins from previous seasons began in 2014, when a Mamluk numismatist, Warren Schultz, joined the team for fieldwork. While the results of the re-reading of earlier *Heshbon Expedition* coins appear in **(Fig. 37)**, the readings of those recovered in 2014 appear below. The context of the latter coins should be noted: fill from a mediaeval farmhouse on the south-west slope (B and F) and a possible midden associated with the citadel (I - L). Several coins from earlier seasons were re-dated to the Ayyubid and Mamluk periods. 'Small change', in the form of copper fulūs, constitutes most of the Middle Islamic coinage at the site, with the coins clustering in date around the middle of the 14th century. Further study of the coins in the aggregate will aid in defining the kind of markets that existed at the site in the 14th century and the degree to which the settlement participated in a monetized economy throughout the Islamic periods.

**Conclusions**

As the focus of excavation has moved from the summit of the *tell* to the village below, different patterns of settlement and spatial organization of the *tell*'s slopes and flatlands, over *la longue durée,* are slowly emerging. The relationship between the Mamluk-era citadel and its supporting village / town is coming into sharper focus and the history of the ever-evolving water systems is raising more questions than we can at this point answer. The upper slopes seem to have a different history of use than the lower slopes and flatlands and may reflect a different relationship to the activities on the summit of the *tell* (Walker 2013). The spatial organization of the northern slopes (Field M) suggest some kind of official planning in the Mamluk period, which made use of pre-existing structures and water facilities. This space was abandoned and remained derelict from the end of the 14th century. Larger, self-sufficient farmhouses in clusters around cisterns, however, seem to have characterized the rest of the site, possibly reflecting extended

Ḥisbān 2014: The 12 Coins Found in the Excavations

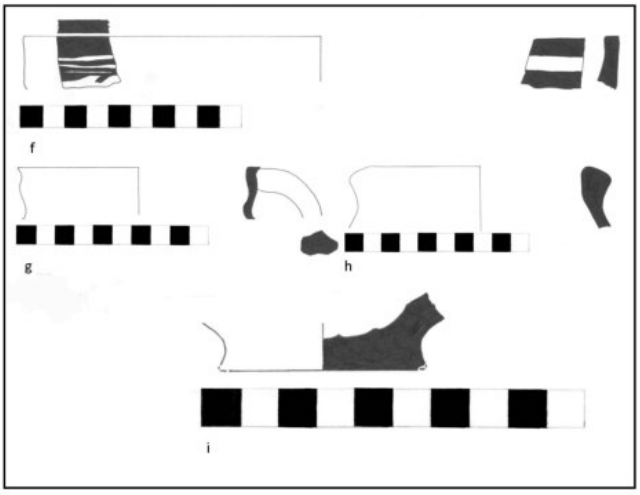
| WCS # | Diameter (m) | Weight (g) | Illustration# | Item number. *Comments* |
|---|---|---|---|---|
| A | 30 | 13.74 | Hisban2014Aa&b | H – 14 – O – 11 – 4/L – 10N. *Byzantine folles, Æ, pierced, Justinian, probably Antioch (but mint mark is effaced).* |
| B | 15 | 4.27 | Hisban2014Ba&b | H – 14 – O – 9 – 14/E – 41. *Probable Umayyad Æ, mint and type not determined. The reverse has a central inscription of three words in three lines. Top: Muh.ammad. Middle: Rasūl. Bottom: (Allāh). The obverse similarly arranged: Top: Lā Illāh. Middle: Illā Allāh. Bottom: Wah.dah. There are trace circular inscriptions surrounding the central field on both sides. No sign of a circular border, either linear or of dots, on either face however. (See SNAT IVa, Palästina).* |
| C | 12 | 1.73 | none | H – 14 – B – 2-4 – Balk/ – 46. *Unidentified Æ, with flue or jewelry loop?* |
| D | 10 | 0.99 | none | H – 14 – M – 1 – C – 72. *Unidentified Æ.* |
| E | 13 | 0.62 | none | H – 14 – B – 2/4 –B/T – 31. *Unidentified Æ.* |
| F | 21 | 2.85 | Hisban2014Fa&b | H – 14 – O – 11 – 5/E – 11. *Mamluk Æ,* ***Balog CMSES*** *type 374, Damascus (762 H), al-Nasir Hasan.* |
| G | 16 | 1.10 | Hisban2014Ga&b | H – 14 – B – 2/4 – B/T – 33. *Unidentified Æ with trace Arabic inscription. By fabric probably middle Islamic.* |
| H | 20 | 2.93 | Hisban2014Ha&b | H – 14 – B – 5/6 – 40. *Mamluk Æ,* ***Balog CMSES*** *type 220, Cairo, undated, al-Nasir Muhammad.* |
| I | 13 | 0.57 | Hisban2014Ia&b | H – 14 – M – 1 – Clean up/B – 59. *Unidentified Æ with trace Arabic inscription. By fabric probably middle Islamic.* |
| J | 15 | 1.74 | Hisban2014Ja&b | H – 14 – M – 1 – 13 – 64. *Unidentified Æ with trace Arabic inscription. By fabric probably middle Islamic.* |
| K | 20 | 2.44 | Hisban2014Ka&b | H – 14 – M – 1 – Cleanup/B – 51. *Mamluk Æ,* ***Balog CMSES*** *type 257 variant, al-Nasir Muhammad. Balog listed as no mint and no date, but Ilisch (FINT, as yet unpublished) attributes to Damascus in al-Nasir's second reign.* |
| L | 16 | 2.34 | Hisban2014La&b | H – 14 – M – 1 – clean up/B – 51. *Unidentified Æ with trace Arabic inscription. By fabric probably middle Islamic.* |




*25. Plate 1: Pottery profiles, select sherds from B10.65.86 (Courtesy Anna Abdulaziz).*

| No. | Registration | Ware | Form | Decoration and fabric | Published parallels | Date |
|---|---|---|---|---|---|---|
| a | H14.B10.65.86.1 | slipped, wheelmade | large bowl | red-slipped interior, exterior plain; fabric slightly coarse but well levigated with very small black inclusions; 5YR 6/6 (reddish yellow) | Gerber 2012: 467, Fig. 3.90 | L Byz |
| b | H14.B10.65.86.6 | | jug | surfaces washed white; grey core; fabric coarse with medium-sized quartz, 10YR 7/3 (very pale brown) | Herr 2012: 123, Fig.229.15 | IR II/Per |
| c | H14.B10.65.86.4 | plainware, wheelmade | jug (base), string-cut | grey core; fabric fine with a few tiny black inclusions, 5YR 6/4 (light reddish brown) | Gerber 2012: 473, Fig. 392.19; Magness 1993: 246 | L Byz |
| d | H14.B10.65.86.2 | plainware, wheelmade | jug (handle) | finger-smoothing on surface; fabric fine with very few tiny black inclusions, 5YR 6/6 (reddish yellow) | Gerber 2012: 459, Fig. 87.14 | L Byz |
| e | H14.B10.65.86.3 | plainware, wheelmade | cooking pot | fabric thin, gritty brittle, fine, high-fired, 5YR 8/2 (pinkish white) | Gerber 2012: 413. Fig. 3.70 and 455, Fig. 3.$_{86}$.9; Magness 1993: 219 (Cooking Pots Forms 4A) | L Byz |

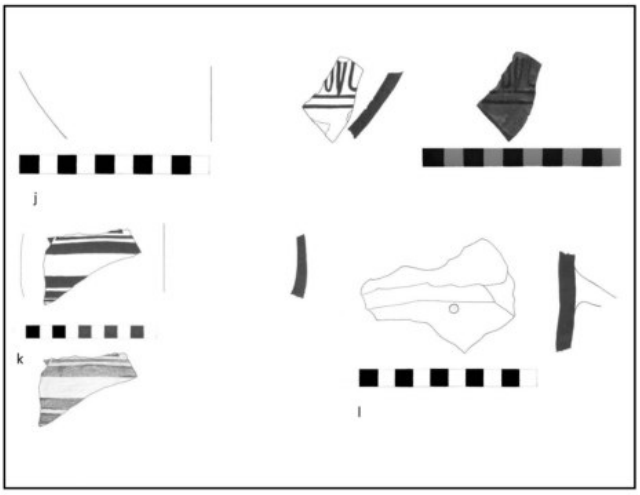
*26. Chart 1: Pottery readings for Plate 1 (Courtesy Bethany Walker).*




*27. Plate 2: Pottery profiles, select sherds from B10 Probeunderwall85 (Courtesy Anna Abdulaziz).*

| No. | Registration | Ware | Form | Fabric | Published parallels | Date |
|---|---|---|---|---|---|---|
| f | H14.B10.Probeunderwall.85.4 | HMGP | jar | painted design on slip-paint; fabric well levigated with tiny black inclusions, 7.5 YR 6/3 (light brown) | | MIS |
| g | H14.B10.Probeunderwall.85.1 | wheelmade | cooking pot | interior self-slip (5YR 5/6 – yellowish red) ; exterior grey-slipped (GLEY 4/5 – dark bluish gray); fabric gritty, 5YR 6/4 (light reddish brown) | | EByz |
| h | H14.B10.Probeunderwall.85.3 | plainware, wheelmade | jar | White slip on beveled rim exterior; fabric well levigated with few inclusions, 5YR 6/6 (reddish yellow) | | LByz/ EIS |
| i | H14.B10.Probeunderwall.85.42 | wheelmade | Jug (base – interior pared with a knife) | fabric fine with no visible inclusions, 5YR 6/6 (reddish yellow) | Gerber 2012: 473, Fig. 3.92.17 | LByz |

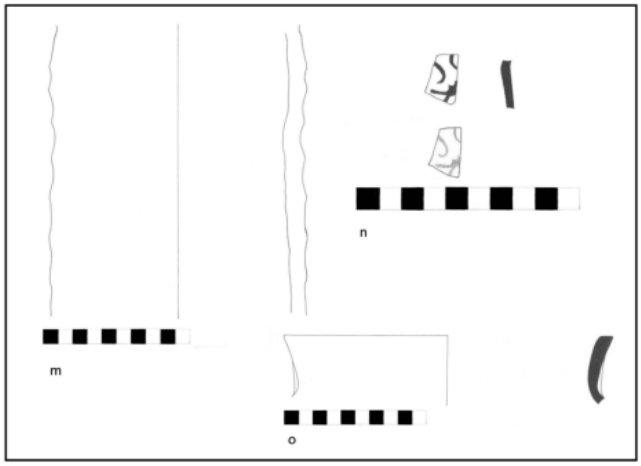
*28. Chart 2: Pottery readings for Plate 2 (Courtesy Bethany Walker).*




*29. Plate 3: Pottery profiles, select sherds from M1.CuB.55 (Courtesy Anna Abdulaziz).*

| No. | Registration | Ware | Form | Decoration and fabric | Published parallels | Date |
|---|---|---|---|---|---|---|
| j | H14.M1.CuB.55.4 | Sgraffito ware ("Egyptianizing" style in a Syrian fabric); wheelmade | bowl | pale yellow glaze over a white slip, inscriptional register in sgraffito; fabric fine with few visible inclusions, 7.5 YR 7/3 (pink) | none | MIS |
| k | H14.M1.CuB.55.8 | HMGP | large jar | dark brown painted design over heavy white slip; fabric poorly levigated and coarse with air pockets and medium-sized red and black inclusions, 5YR 8/2 (pinkish white | Note: similar vessels found in Citadel storeroom in Phase II excavations | MIS |
| l | H14.M1.CuB.55.1 | ? | basin (with ledge handle and suspension hole) | fabric fine with few visible inclusions, 7.5YR 7/2 (pinkish grey) | none | ? |

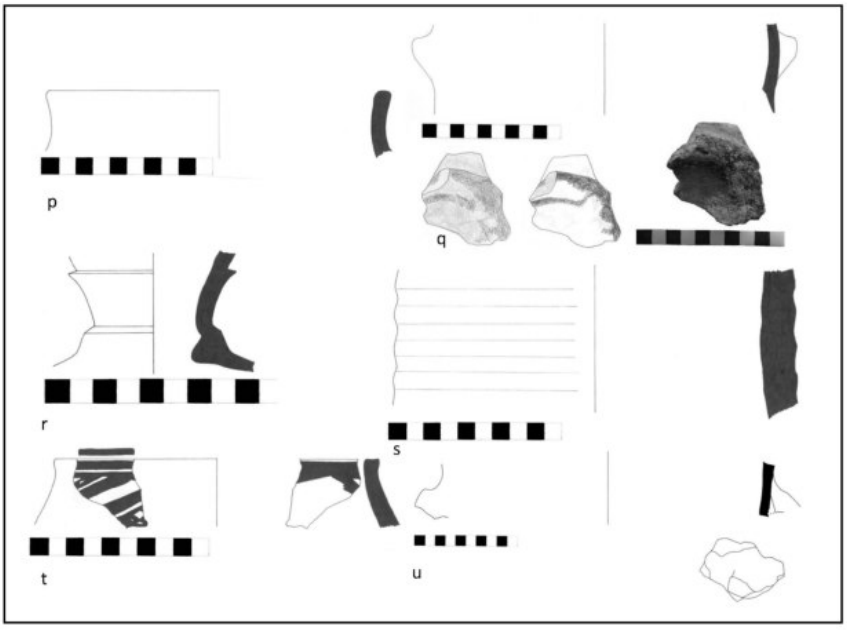
*30. Chart 3: Pottery readings for Plate 3 (Courtesy Bethany Walker).*




*31. Plate 4: Pottery profiles, select sherds from O10.B-CuVCollapse.53 (Courtesy Anna Abdulaziz).*

| No. | Registration | Ware | Form | Decoration and fabric | Published parallels | Date |
|---|---|---|---|---|---|---|
| m | H14.O10.BCuVCollapse.53.2 | handmade | molasses jar | coil-formed and finished on a slow wheel; fabric poorly levigated with many air pockets, yellow core, surfaces 5YR 6/6 (reddish yellow) | Walker 2012: 570, Fig. 4..20.13 | MIS |
| n | H14.O10.BCuVCollapse.53.1 | fine painted ware, wheelmade | cup | painted design (5YR 6/6 – reddish yellow); exterior self-slipped; fabric very fine with no visible inclusions, 5YR 7/3 (pink) | | EIS |
| o | H14.O10.BCuVCollapse.53.2 | handmade | cooking pot | Red-slipped surfaces; fabric coarse with medium-sized quartz; interior and exterior burned completely through | | MIS/LIS |

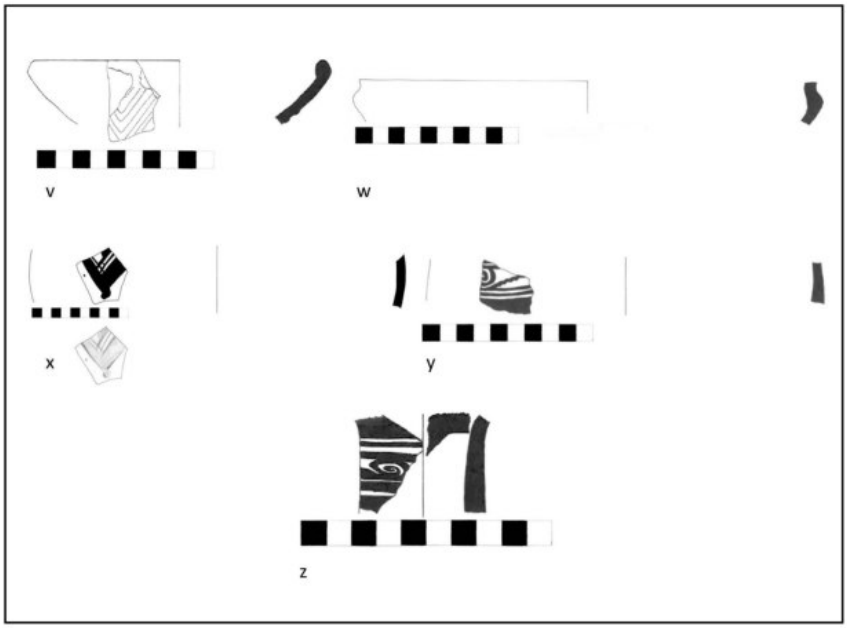
*32. Chart 4: Pottery readings for Plate 4 (Courtesy Bethany Walker).*




*33. Plate 5: Pottery profiles, select sherds from 011.3.7 (Courtesy Anna Abdulaziz).*

| No. | Registration | Ware | Form | Decoration and fabric | Published parallels | Date |
|---|---|---|---|---|---|---|
| p | H14.O11.3.7.2 | burnished, handmade | cooking pot | Surfaces with burnished red slip; fabric coarse with medium-sized pebbles, 5YR 6/6 (reddish yellow) | | MIS |
| q | H14.O11.3.7.1 | horseshoe handles CP, handmade | cooking pot | Exterior smoother with some burning, interior left rough; grey core, fabric poorly levigated and coarse, medium pebbles and chaff scars; 2.5 YR 6/6 (light red) | Walker 2012: 563, Fig. 4.18.3 | MIS |
| r | H14.O11.3.7.6 | plainware, wheelmade | jug (spouted form) | Fabric fine with no visible inclusions | identical to H01.L2.70.5 1 (from Citadel storeroom); Avissar and Stern 2005: 109, 45.6; Milwright 2008: 361, Cat 14.9) | MIS |
| s | H14.O11.3.7.5 | handmade | Molasses jar | coilmade; fabric relatively fine with some small quartz and black inclusions, 2.5 YR 6/8 (light red) | Walker 2012: 570, Fig. 4.20.13 | MIS |
| t | H14.O11.3.7.4 | HMGP | jar | Surfaces white-slipped (7.5 YR 7/4 – pink); fabric with small red and black inclusions, 10YR 8/3 (very | | MIS |

*34. Chart 5: Pottery readings for Plate 5 (Courtesy Bethany Walker).*




*35. Plate 6: Pottery profiles, select sherds from 011.5.11 (Courtesy Anna Abdulaziz).*

| No. | Registration | Ware | Form | Decoration and fabric | Published parallels | Date |
|---|---|---|---|---|---|---|
| v | H14.O11.5.11.1 | Glazed Relief Ware, wheelmade | bowl | Green glaze over white slip, relief pattern on exterior; fabric fine with a few small black inclusions, 7.5 YR 7/3 (pink) | Milwright 2008: 370, Cat. 23.16 | MIS |
| w | H14.O11.5.11.5 | slipped, wheelmade | bowl (carinated) | grey-slipped exterior; fine fabric with no visible inclusions, 5 YR 6/6 (reddish yellow) | | Byz |
| x | H14.O11.5.11.2 | HMGP | jar | exterior with light brown-painted design over a thick white slip; fabric coarse with small quartz and black inclusions, 5 YR 6/4 (light reddish brown) | | MIS |
| y | H14.O11.5.11.4 | HMGP | jar | surfaces with pale slip (7.5 YR 8/2 – pinkish white), brown-painted design on exterior; fabric semi-coarse with many small red and black inclusions, 7.5 YR 8/3 (pink) | | MIS |
| z | H14.O11.5.11.3 | HMGP | jug | dark brown and black-painted design on exterior; fabric coarse with medium inclusions; sherd burned throughout and appears to have been also | | MIS |

*36. Chart 6: Pottery readings for Plate 6 (Courtesy Bethany Walker).*

| DoA-Museum Amman - Coins- 2014 (List by Nur Özdilmac - oezdilmac@uni-bonn.de) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **current no.** | **H (Year)** | **Area** | **Square** | **Pail** | **Locus** | **Date** | **Period on the sheet** | **object** | **Length, in mm** | **weight in grams** | **material** | **Remarks** | Notiz |
| 1 | H76 | C | 8 | 30 | 18 north | 28. June | Mam | coin | 20.00 | 2.26 | copper | Mamluk, Az-Zahir ?, 1382-1399 | #2471 |
| 2 | H76 | C | 1 | 874 | 119 | 21. June | Ayy | coin | 24.00 | 6.05 | copper | Ayyubid, al-'aziz 'Uthman 1193-98 | #2350. Ccf. No 293 in the 1974 report |
| 3 | H76 | CE | 9 | 34 | 10 | 08. July | Ayy | coin | 2.31 | 10.23 | silver | Ayyubid, coin | #2590 |
| 4 | H76 | G | 14 | 52 | 26 | 28. July | Els Um | coin | 17.00 | 2.82 | copper | Early Umayyad | #2877 |
| 5 | H74 | | | | | | Um | coin | 22.00 | 2.53 | copper | Umayyad | #1946 |
| 6 | H74 | | | | | | Mam | coin | 20.00 | 3.05 | silver | Mamluk, An-Nasir. Hasan 1341-51, 1354-61 | #1924 |
| 7 | H73-76(?) | | | | | | Ayy | coin | 24.00 | 4.15 | copper | | #1533 |
| 8 | H68 | C | 1 | | 2 | 08. May | Mam | coin | 23.00 | 2.87 | copper | Mamluk, Arabic | #J.12382; #197; Co-6021; Co-6022; Basket 14 |
| 9 | H68 | C | 2 | | 1 | 17. July | Mohammed | coin | 20.00 | 2.90 | copper | | #J.12390; #131; Co-6029; Co-60-30 |
| 10 | H68 | C | 1 | | 6 | 09. Aug. | Mam | coin | 18.00 | 1.24 | copper | Mamluk, Mansoor, Arabic | #J.12385; #199; Co-6020 |
| 11 | H68 | D | 1 | | 8 | 06. Aug. | Mam | coin | 19.00 | 2.44 | copper | Mamluk, al-Malik, arabic | #J.12389; #204; Co-6037; Co-6038, Basket 38 |
| 12 | H68 | A | 2 | | 2 | 13. Aug. | Mam | coin | 18.00 | 0.99 | copper | Sultan, Mamluk | #J.12388; #255; Co-6061, Basket 64 |
| 13 | H68 | B | 1 | | 5_4 | 18. July | arabic | coin | 19.00 | 2.84 | copper | Saladin because of title | #J.12379; #195; Co-6023; Co-6024; Basket 21 |
| 14 | H68 | A | 2 | | 2 | 13. Aug. | Um | coin | 19.00 | 3.56 | copper | Umayyad, 8th c. date 100+?, arabic | #J.12377; #254; Co-6059; Co-6060; Basket 62 |
| 15 | H68 | C | 1 | | 5 | 26. July | Mam | coin | 16.00 | 2.43 | copper | Mamluk, al-Malik, arabic | #J. 12394; #127; Co-6032; Co-6033; Basket 31 |
| 16 | H68 | C | 1 | | 2 | 25. July | Mam | coin | 21.00 | 2.74 | copper | Mamluk, Malik al-Nasir, arabic. Possible Saladin because of title | #J.12404; #121; Co-6048; Co-6049; Basket 28 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | H68 | B | 1 | 2 | 17. July | Mam | coin | 15.00 | 1.33 | copper | Mamluk, Al-Nasser | #J.12401; #113; Co-6005; Co-6006; Basket 9 |
| 18 | H68 | C | 1 | 4 | 22. July | Mam (?) | coin | 18.00 | 2.50 | copper | Mamluk, Sultan al-Malik, later then Mamluk? | #J.12408; #120; Co-6007; Co-6008; Basket 14 |
| 19 | H68 | B | 1 | 1 | 16. July | Mam | coin | 15.00 | 1.14 | silver | Mamluk, Mansoor, | #J.12403; #114, Co-6003; Co-6004; Basket 5 |
| 20 | H68 | D | 3 | 9 | 14. Aug. | | coin | 24.00 | 5.18 | copper | Brother of Saladin, arabic | #J.12402; #258; Co-6068; Co-6069, Basket 51 |
| 21 | H68 | C | 4 | 5 | 22. Aug. | Mam | coin | 16.00 | 2.10 | copper | Mamluk, arabic | #J.12411; #285; Co-6072; Co-6073; Basket 19 |
| 22 | H68 | A | 2 | 11 | 09. Aug. | Mam | coin | 21.00 | 2.64 | copper | Mamluk, Sultan | #J.12396; #193; Co-6025; 6026; Basket 19 |
| 23 | H68 | A | 1 | 10 | 15. July | Um | coin | 19.00 | 3.52 | copper | Umayyad, 8th c. date 100+?, arabic | #J.12399; #104; Co-6016; Co-6017; Basket 10 |
| 24 | H68 | C | 1 | 4 | 25. July | Ayy | coin | 18.00 | 1.33 | copper | Ayyubid, (?) Saleh Aiydin | #J.12405; #122; Co-6046; Co-6047; Basket 26 |
| 25 | H68 | D | 1 | 10 | 16. Aug. | Um | coin | 16.00 | 2.87 | copper | Umayyad; | #J.12400; #278; Co-6063; Co-6064; Basket 58 |
| 26 | H68 | B | 1 | 2 | 17. July | Mam | coin | 17.00 | 1.12 | copper | Mamluk, Sultan al-Malik, name missing | #J.12395; #116; Co-6054; Co-6055; Basket 2 |
| 27 | H68 | A | 1 | 5 | 25. July | Um | coin | 19.00 | 2.15 | copper | Umayyad | #J.12407; #107; Co-6011; Co-6012; Basket 21 |
| 28 | H68 | C | 2 | 1 | 17. July | Mam later | coin | 18.00 | 1.71 | copper | Mamluk, later | #J.12410; #130; Co-6031; Basket 4 |

*37. Coins re-read in Amman Museum (Courtesy Warren Schultz and Nur Özdilmac)*

family units. They remained occupied long after the citadel was abandoned in the middle of the 14th century. Although the study of the site-wide water systems is at a preliminary stage, and owes much to the work done in the 1970s, it appears that the *tell* and the areas around it were somehow connected by a network of water channels and cisterns. Preliminary results of the palaeofaunal analysis suggest some degree of meat sharing and distribution, which tied the mediaeval citadel closely to the village. The ceramic record of both spheres is remarkably similar, contradicting images of segregation reflected in the ceramic record of other 'castle towns'. The emerging picture of Mamluk Ḥisbān is one of symbiosis between the state and local communities. Environmental, palaeobotanical and palaeofaunal analyses continue this year, with the specialists working in close collaboration with one another. The results of this work promises to answer many questions about these relationships from a science perspective. With fieldwork centered now in the settlement below the *tell*, the opportunity exists to explore the same issues for earlier periods.

The laboratory analyses of soils and plant samples for the environmental project continues unabated this year, facilitated by workshops and intensive writing groups in Bonn, and we await the results of the residue analysis for the three jars buried in the Field M 'pit'. The vast quantities of metal and glass from the mediaeval farmhouses excavated these seasons, and in previous ones, are being processed and studied now, as windows on the culture behind agriculture and village and family life in the mediaeval Islamic and Byzantine periods. A focus in this regard will be comparison of the general assemblages of ceramics and small finds from the midden areas of M1 and O11, associated with the citadel and village respectively, in order to compare disposal patterns by the garrison and the villagers. Research on Arabic and Turkish sources continues as well, as the team now works closely with an Ottomanist from Bonn.

The *Hesban Cultural Heritage Project* plans its next full-site excavation in spring 2016, continuing work in the same fields and expanding the specialists' staff to include an on-site geomorphologist.

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# THE WĀDĪ RAMM PROJECT: PRELIMINARY REPORT ON THE 2014 SEASON

*Saba Farès and Jérôme Norris*

**Acknowledgments**

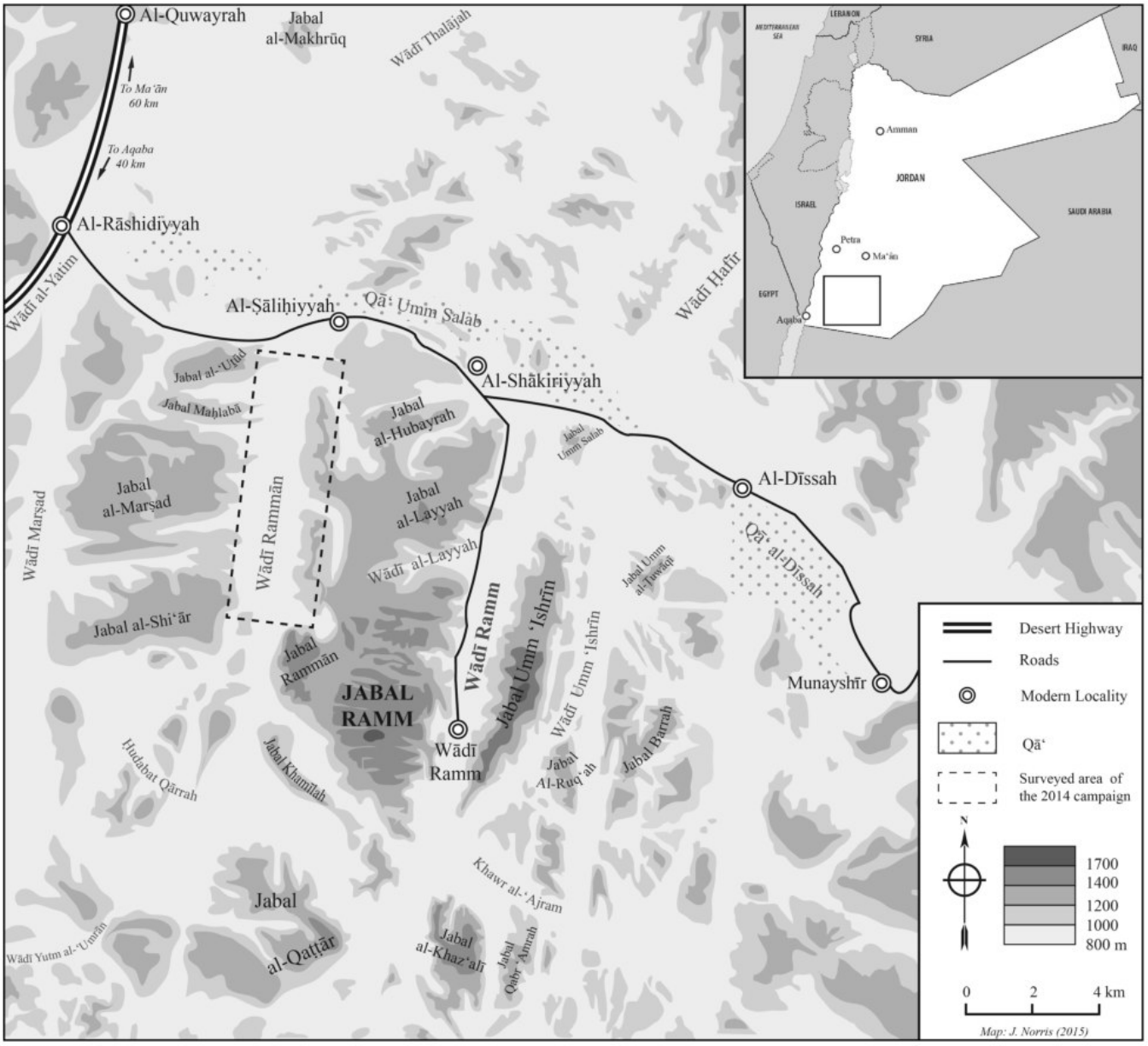
The 2014 season of the Franco-Jordanian Wādī Ramm project lasted from 29 November to 20 December. This project, funded by the French Ministry of Foreign Affairs, is part of the French *De Pétra au Wadi Ramm* program directed by Laurent Tholbecq (Université Libre de Bruxelles). We would like to thank Dr Monther Jamhawi, Director-General of the Department of Antiquities (DoA), and Aktham Oweidi, Director of Excavations and Surveys, for their support and for granting us the permit. We would also like to thank Ahmad Lash (DoA) for his constant help and kindness, as well as Zuhair al-Zoubi, Director of Amman Citadel and the Jordan Archaeological Museum, for his warm welcome and permission to study Thamudic Inscription no. J.14202. Many thanks are also due to Thibaud Fournet of the Institut Français du Proche-Orient (IFPO) Amman, for his cooperation and for providing us with lodgings in Amman.

The 2014 field season staff consisted of Dr Saba Farès (Director [Université de Provence, Aix-Marseille, France]) and Jérôme Norris (PhD student [Université de Lorraine, Nancy, France]). The Department of Antiquities representative was Khaled al-Tarawneh, to whom we are most grateful for his assistance and involvement in the project. Logistical support was provided by Mustafa Smadi.

**Introduction**

Located in southern Jordan, to the east of Aqaba and along the Saudi border **(Fig. 1)**, the Wādī Ramm region belongs to the Ḥismā desert that extends from the Rās an-Naqab escarpment to the Tabūk area of Saudi Arabia. Famous worldwide for its natural beauty, sandstone mountains and the sojourn of T. E. Lawrence during the First World War, the site was inscribed on UNESCO's World Heritage List in 2011. Since the first archaeological work undertaken at Wādī Ramm in the 1930s by Savignac and Horsfield (1932: 581-597; 1933: 405-422; 1934: 572-589; 1935: 245-278), the place has usually been identified with ancient *Iram* of the Coran. During the Hellenistic and Roman periods it appears to have been an important religious center of the Nabataean kingdom, which was devoted to the Arabian goddess Allāt. Iram was also a major stop on the incense caravan route and an area densely occupied by nomadic camel herders who left thousands of carved inscriptions and drawings on the desert cliffs.

Intensive surveys started in 1996 with the launch of the Franco-Jordanian Wādī Ramm project by Fawzi Zayadine and Saba Farès, with the purpose of carefully documenting all ancient remains and adopting a multidisciplinary approach (archaeology; epigraphy; geography; ethnology). Since then, the project has had two primary objectives. First, to study the human occupation of a desert area and the ways in which its inhabitants were able to acquire their resources, particularly water, from prehistory to Islam. Second, to analyze the cultural practices of the Arab tribes living between southern Jordan and northern Arabia during Antiquity through the study of their languages (Ancient North Arabian and Nabataean Aramaic), religion, social organization and economy. The results of surveys and excavations conducted between 1996 and 2010 have been presented in




*1. Wādī Ramm area.*

various articles (Farès-Drappeau 1996; Zayadine and Farès-Drappeau 1998; Farès-Drappeau *et al.* 2001; Farès-Drappeau and Zayadine 2004), as well as in a recently published edited volume (Farès 2013a). After fourteen years of research, it also seemed appropriate to establish an international bi-annual colloquium on the history and geography of Wādī Ramm, viz. Men and Deserts. This meeting aims to facilitate the diffusion of our results and compare them with those of other research teams involved in desert archaeology[1].

The 2014 field season was devoted to the exploration and intensive survey of a little-known sector of the research area: Wādī Rammān (وادي رمان) **(Figs. 1 - 4)**.

## Wādī Rammān: Location and Setting

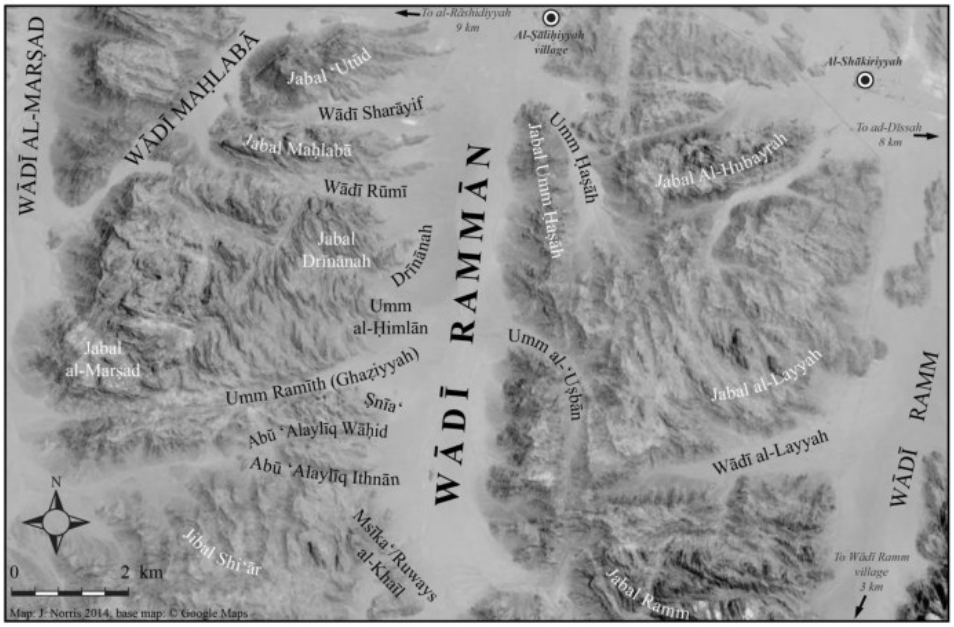
Wādī Rammān[2] is a valley on a north - south axis that runs parallel with and immediately west of the Wādī Ramm 'corridor' **(Figs. 1 and 2)**. It

1. To date, two iterations of this meeting have taken place. The first was held at the Wadi Rum Visitor Centre on 11 - 13 November 2011 (Farès 2013a and b). The second was held on 5 - 7 March 2014; its publication is in preparation.

2. The vocalisation of this toponym is given according to the pronunciation of the local bedouin: Rammān.

extends approximately 18 km from the road of al-Dīsah and the modern village of al-Ṣāliḥiyyah (29°42″39.1″N; 35°22″45″E) towards Jabal al-Qaṭṭār (29°31″59″N; 35°22″7″E). Around two kilometers wide, it is flanked on the east by the foothills of Jabal al-Hubayrah and Jabal Ramm (1764 m), *viz*. Jabal Umm Ḥaṣāh (1205 m) and the dominant peak of the valley, Jabal Rammān (1404 m). On the west, it is bordered by the mountain ranges of Jabal ʻUtūd (1172 m), Jabal Maḥlabā (1090 m), Jabal Marṣad and its foothill Jabal Drīnānah (1128 m), and finally Jabal Shiʻār (1276 m). The hills on its west side consist of sandstone, whereas those on the opposite side are more granitic. On the sandy valley floor, vegetation is typical of the Wādī Ramm region (Herveux 2013), being dominated by small shrubs of *Haloxylon* sp. and *Retama raetam*. Some scattered acacia trees are found in areas where water collects during rainfall, as well as one palm tree that stands at the foot of the huge cliff in Wādī Umm Ramīth (or Umm al-Ghadhiyyah) **(Fig. 5)**.

In the late 1990s, the valley became a protected reserve of the Sheikh Mohammad Bin Zayed al-Nahyan foundation, in order to reintroduce Arabian oryx and Nubian ibex to the region **(Figs. 6 and 7)**. Closed and controlled by guards,




*2. Wādī Rammān and its tributaries.*



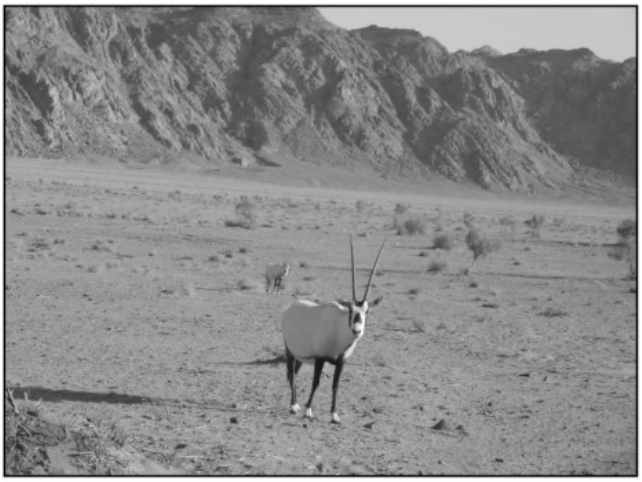
*3. Overview of Wādī Rammān, from the north-east.*



*4. Wādī Rammān, from the south-west.*



*5. The palm trees of Wādī Umm Ramīth.*



*6. Arabian oryx in Wādī Rammān.*



*7. Nubian ibex at the foot of Jabal Drīnānah.*

access to the site is only possible by obtaining special authorization from the reserve's director.

**Previous Surveys and Archaeological Work in Wādī Rammān**

The Rammān area was first described by Alois Musil in 1907 - 1908, who listed Jabal Rammān amongst the major mountain peaks of the Ḥismā (1907: 4, 262; 1908: 227-228). He later visited an area very close to the valley, since he crossed the parallel Wādī Marṣad during his trip between Ma'ān and Aqaba in June 1910. A description of Jabal Rammān and its position in relation to Jabal Ramm and Jabal al-Qaṭṭār is found in his travel report (Musil 1926: 45, 50, 68), but the explorer gave no account of the presence of ancient inscriptions or archaeological remains.

In 1980 and 1981, the late Dr William Jobling (University of Sydney) carried out, amongst other activities in the region, the first scientific research in Wādī Rammān. Interesting discoveries were made during these two surveys. First, surface material such as flint tools and ceramic sherds from the Chalcolithic, Iron Age and Roman periods (Jobling 1981a: 107, 108, 110-111, pl. XXXI-XXXII; 1982: 201-202). Second, a stone structure, named *Ruways al-Khail*, located in the south-west part of the wadi. Jobling described it as a cluster of house or wall foundations but did not publish any photo or drawing of this installation (Jobling 1982: 201). Third, North Arabian Thamudic inscriptions and rock art. The photos of two ibex drawings were published in his first reports (Jobling 1981a: fig. 1-2, pl. XXVIII; republished in 1981b: pl. 98, **fig. 3)**. Of his Thamudic discoveries, only one text was read and published: AMJ 1 by Geraldine King (Jobling 1981b: pl. 98, fig. 2; 1982: 202, n. 6, pl. LVII, fig. 4; 1983: 32, fig. 8; King 1990: 523). A second text (AMJ 2), discovered in 1980, was brought to the Amman Museum and registered as no. J.14202. It is mentioned in several papers (Jobling 1982: 199, 202; Macdonald 1980: 200; King 1990: 523), but has remained unstudied to this day. Lastly, Jobling published a photo of a battle scene from an unknown place in Wādī Rammān accompanied by two Thamudic graffiti (Jobling 1981a: pl. XXIX, fig. 1; 1983: 32 fig. 7). These inscriptions were not included in the AMJ corpus compiled by Geraldine King (1990:

523-531) and have never been commented on.

More recently, an exploration of Wādī Rammān was conducted in 2001 during the sixth season of the Wādī Ramm project. This survey resulted in the discovery of a new structure in a north-west tributary of the Rammān valley named Wādī Rūmī **(Fig. 8)**. A sounding was excavated, yielding pottery sherds from the Nabataean and Roman periods (see Fares and Zayadine 2004; Fares 2004: 35-36; Kafafi 2013: 94, 114-116). Epigraphic material was also recorded during this season, including a Thamudic graffito published in the 2004 report (Fares and Zayadine 2004: 362, fig. 8). In sum, it had become clear that Wādī Rammān was an interesting area with great archaeological and epigraphic potential. As most of Jobling's discoveries remained unpublished because of his premature death, an intensive survey of this location was deemed desirable in order to place the site in its regional setting.

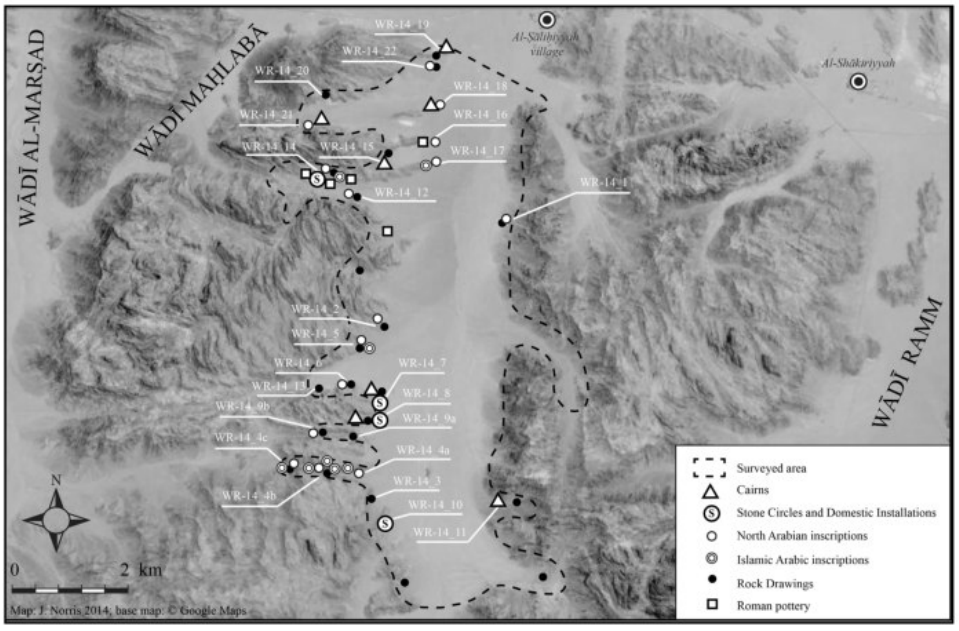


*8. Roman structure at Wādī Rūmī.*

**Objectives and Survey Methodology**

The 2014 field season had two main objectives. First, to record all locations in Wādī Rammān, both new and previously known, that might yield information about human activity during prehistory and Antiquity. This was to include all find-spots of archaeological material, petroglyphs and rock carvings. To this end, it was necessary to attempt to revisit and re-record the sites discovered by Jobling in 1980 and 1981, particularly that of *Ruways al-Khail* and the location of Thamudic inscription AMJ 1. Second, to focus on ancient carved inscriptions which might shed light on the identity and lifestyle of the ancient inhabitants of this area.

Owing to time constraints, it was decided to focus on the northern part of the *wadi*, from the road to al-Ṣāliḥiyyah village (29°41′24.1″N; 35°21′39.2″E) to the southern edge of the oryx reserve (29°36′11.1″N; 35°21′28.5″E). The exploration of the southern sector, which needs more time, will be conducted during a future season. The survey was made on foot and focused on three areas **(Fig. 9)**. First, the west side of the valley and its five tributaries (Wādī Sharāyif,




*9. The survey area and recorded sites.*

Wādī Rūmī, Umm Ramīth, Abū ʻAlaylīq Wāḥid and Abū ʻAlaylīq Ithnān). Second, the east side of the wadi and its two tributaries (Umm Ḥaṣāh and Umm al-ʻUṣbān). Third, the isolated hills, boulders and massifs situated in the bed of Wādī Rammān. Any place displaying traces of ancient occupation was recorded as a 'site'. Twenty-two such sites were visited **(Table 1, Fig. 9)**. These were designated WR-14_1 to _22 (WR-14 = Wādī Ramm 2014). Each of them was located using a handheld Global Positioning System (GPS), described and photographed with a whiteboard indicating its number.

Ancient inscriptions were photographed, measured and recopied by hand. We also read all texts on-site in order to interpret them within their landscape context. The surface material was not collected, but only recorded and photographed on the field in order to evaluate the potential of a site. After the survey, a few days were spent in Amman to study Jobling inscription AMJ 2 (Amman Museum reg. no. J.14202) so that it could be included in our corpus of North Arabian inscriptions from Wādī Rammān.

**Archaeological Remains**

The discoveries included stone structures and some surface material. Eighteen structures distributed over nine sites were recorded (WR-14_7, _8, _10, _11, _14, _15, _18, _19 and _21). If we exclude the previously known site of Wādī Rūmī (WR-14_14), two categories can be distinguished.

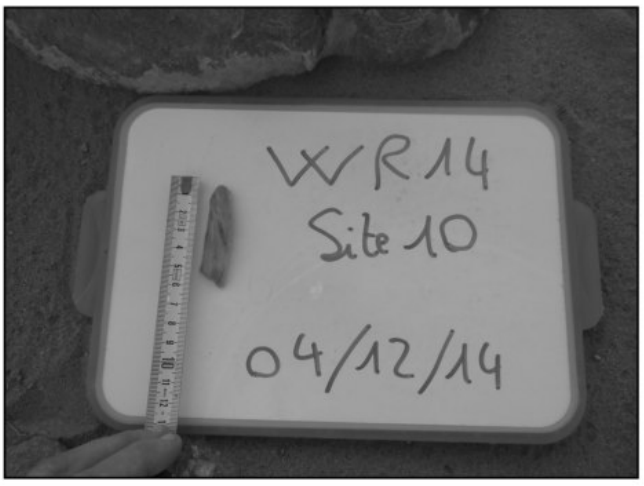
First, the stone circles at sites WR-14_7, _8 and _10 **(Figs. 9-11)**. These constructions are enclosures built of non-worked stone that form circles varying from 3 to 18 meters in diameter. Only one had associated surface material: WR-14_10 **(Fig. 11)** in the south-west part of Wādī Rammān. From its location and organisation, it seems highly probable that this is the stone alignment discovered by Jobling in 1980 - 1981 which he referred to as *Ruways al-Khail* (Jobling 1982: 201). The construction stands at the foot of the cliff, on a north - south orientation. Its dimensions are approximately 18 meters north - south by 13 meters east - west. The presence of two small flint tools on the ground surface suggests a prehistoric or protohistoric occupation **(Fig. 12)**. Similar structures are known in the Wādī Ramm valley, in particular at the site of Ṭurayf al-Marāgh. According to G. O. Rollefson



*11. The structure of Ruweis el-Kheil: site WR-14_10.*



*10. The circular structure of site WR-14_8.*




*12. Lithic artifact at site WR-14_10.*

**Table 1:** List of sites.

| Site Number | Locality | Coordinates | Date Of Survey | Structure | Material | North Arabian Inscriptions | Islamic Inscriptions | Rock art |
|---|---|---|---|---|---|---|---|---|
| **WR-14_1** | Jabal Umm al-Ḥaṣāh | N‘‘46.9‘29°39 E‘‘14.4‘35°22 | 01/12/2014 | | | 2 | | Camel; wasm. |
| **WR-14_2** | Umm al-Ḥimlān | N‘‘46.6‘29°38 E“59.3‘35°20 | 02/12/14 | | Flint debitage. | 7 | | Camels; ibex; dogs. |
| **WR-14_3** | Abū ‘Alaylīq Ithnān (south-east) | N“09.7‘29°37 E“46.7‘35°20 | 02/12/14 | | | | | Horsemen; camel riders. |
| **WR-14_4a** | Abū ‘Alaylīq Ithnān (east) | N“26.6‘29°37 E“41.2‘35°20 | 02/12/14 | | | 1 | 1 | Horsemen; camel riders, hunting. |
| **WR-14_4b** | Abū ‘Alaylīq Ithnān | N“28.6‘29°37 E“11.2‘35°20 | 02/12/14 | | | 3 | 25 | Warfare; hunting; camel riders; cattle; camel; ibex; oryx; dogs; wasm. |
| **WR-14_4c** | Abū ‘Alaylīq Ithnān (west) | N“31.5‘29°37 E“51.1‘35°19 | 06/12/14 | | | 3 | 4 | Hunting; camel riders; horsemen; ostriches; ibex; dogs; wasm. |
| **WR-14_5** | Umm Ramīth | N“31.8‘29°38 E“49.1‘35°20 | 03/12/14 | | | 2 | 2 | Camel riders; camels; ibex; oryx; ostriches; wasm. |
| **WR-14_6** | Umm Ramīth | N“14.6‘29°38 E“32.3‘35°20 | 03/12/14 | | | 2 | | Ibex; wasm. |
| **WR-14_7** | Aṣ-Ṣnīa‘ | N“03‘29°38 E“51.1‘35°20 | 04/12/14 | 1 stone circle; 2 cairns. | | | | Ibex; dogs; human figures. |
| **WR-14_8** | Aṣ-Ṣnīa‘ | N“52.3‘29°37 E“49.8‘35°20 | 04/12/14 | 1 stone circle; 1 cairn. | | | | Ibex; oryx; dogs. |
| **WR-14_9a** | Abū ‘Alaylīq Wāḥid | N“44.1‘29°37 E“39.8‘35°20 | 04/12/14 | | | | | Camels; ibex; horsemen. |
| **WR-14_9b** | Abū ‘Alaylīq Wāḥid | N“47.8‘29°37 E“24.7‘35°20 | 04/12/14 | | | 4 | | Warfare; hunting; dogs; ibex; ostriches; wasm. |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **WR-14_10** | Msīka‘ al-Khail (Ruways al-Khail) | 29°36’57.8”N 35°20’57.9”E | 04/12/14 | 1 stone circle. | | | | |
| **WR-14_11** | Jabal Umm al-‘Uṣbān | 29°37’08.1”N 35°22.00.8”E | 05/12/14 | 1 cairn. | | | | Camel riders; dogs; wasm. |
| **WR-14_12** | Wādī Rūmī | 29°40’00.3”N 35°20’33.7”E | 05/12/14 | | | 2 | | Camels; wasm. |
| **WR-14_13** | Umm Ramīth | 29°38’11.1”N 35°20’14.9”E | 06/12/14 | | | | | Hunting; horsemen; ostriches; dogs; wasm. |
| **WR-14_14** | Wādī Rūmī | 29°40’13.8”N 35°20’19.4”E | 06/12/14 | Domestic installation. | Roman sherds. | 1 | 1 | Camel riders; horsemen. |
| **WR-14_15** | Between Wādī Rūmī and Wādī Sharāyif | 29°40’19.0”N 35°20’52.6”E | 07/12/14 | 1 cairn. | | | | Ibex. |
| **WR-14_16** | Wādī Sharāyif | 29°40’34.0”N 35°21’25.0”E | 07/12/14 | | Roman sherds. | 6 | | Horsemen; ibex; oryx. |
| **WR-14_17** | Wādī Rūmī | 29°40’18.7”N 35°21’32.7”E | 07/12/14 | | | 2 | 1 | |
| **WR-14_18** | Wādī Sharāyif | 29°40’50.5”N 35°21’33.2”E | 07/12/14 | 2 cairns. | | 3 | | Ibex. |
| **WR-14_19** | Wādī Sharāyif | 29°41’24.1”N 35°21’39.2”E | 08/12/14 | 3 cairns. | | | | Camel; ibex; dogs; wasm. |
| **WR-14_20** | Wādī Sharāyif | 29°41’00.6”N 35°20’19.2”E | 08/12/14 | | | | | Ibex; human figures. |
| **WR-14_21** | Wādī Sharāyif | 29°40’38.6”N 35°20’03.2”E | 08/12/14 | 3 cairns. | | 2 | | |
| **WR-14_22** | Wādī Rammān north-west | 29°41’15.1”N 35°21’25.7”E | 08/12/14 | | | 4 | | Ibex; oryx; dogs; wasm. |

who studied them (2007: 220-221; 2013: 210-213), these circular constructions should be regarded as ritual structures imprecisely dated between the Chalcolithic and Nabataean periods.

Second, the cairns recorded at sites WR-14_7, _8, _11, _15, _18, _19 and _21. They were built using both large blocks and small stones, with diameters varying from 3 to 8 meters. Most are found, like the stones circles, along the bases of the jibāl. In Wādī Sharāyif, however, five stand on the top of stone cliffs (sites WR-14_18 and _19) **(Fig. 13)**. No artifacts were found in association with these constructions. Three Thamudic texts were found on a stone at WR-14_18 but, as this was some distance from the cairns, no relationship between the graffiti and structures could be established.

Ceramic material was also noted, but exclusively in Wādī Rūmī and its surroundings. One isolated sherd was found along the north side of Jabal Drīnānah, with four others at site WR-14_16 at the foot of Jabal Maḥlabā. As noted in 2001, the only significant concentration of sherds is found around the Wādī Rūmī structure (WR-14_14). Dating to the Roman period, this material includes fragments of jars and bowls made of reddish-brown fabric **(Fig. 14)**.




*14. Roman sherds in Wādī Rūmī (WR-14_14).*

**Rock Art and Wusūm**

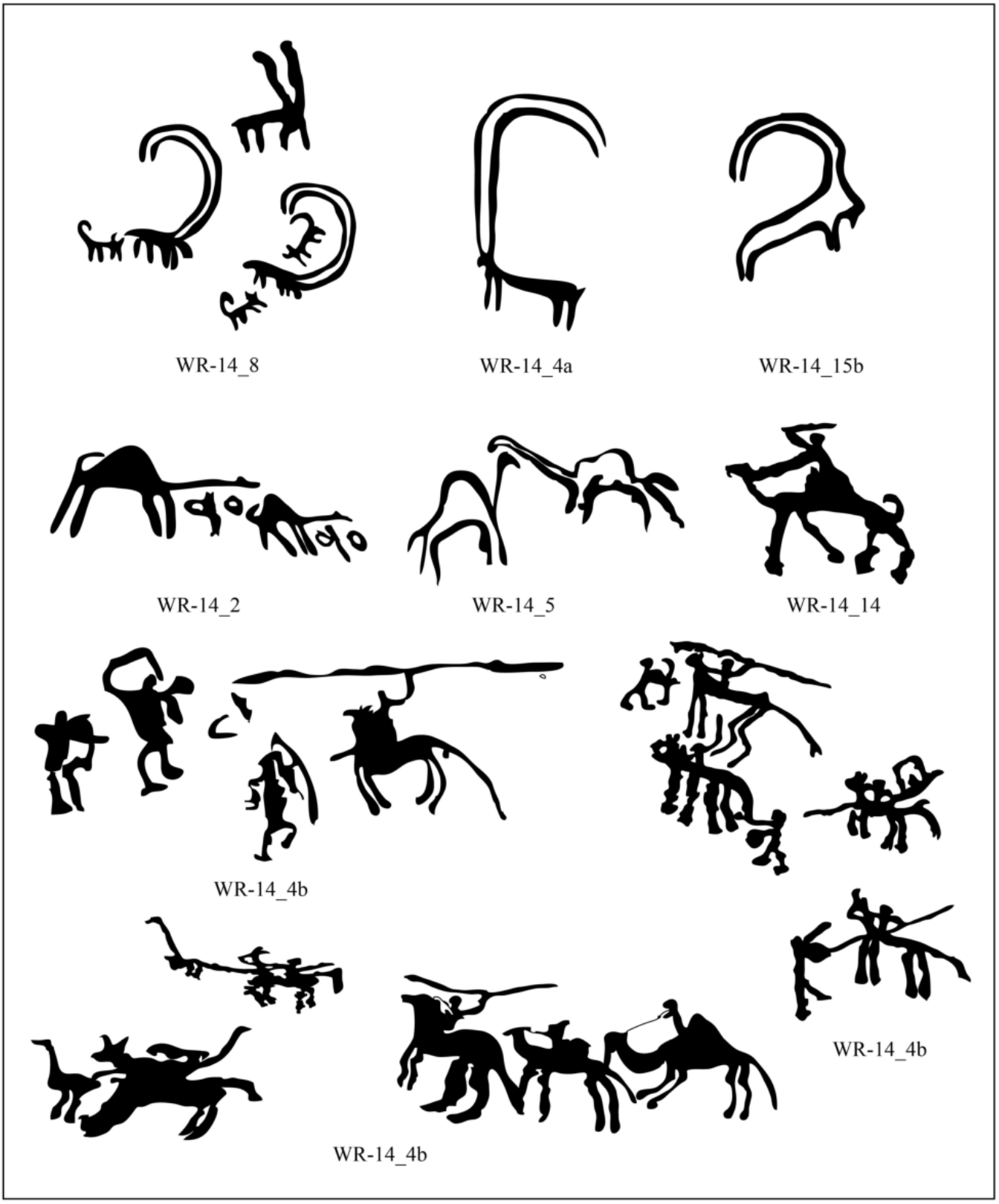
A total of 164 examples of rock art were recorded, distributed over nineteen of the twenty-two WR-14 sites **(Table 2)**. The engravings are dominated by depictions of animals. Of the taxa observed, Nubian ibex is predominant, with 49 depictions at 15 sites. The next most common animals are camel (18), dog (eight), Arabian oryx (five) and ostrich (four) **(Fig. 15)**.



*13. One of the cairns at site WR-14_18, on a hilltop in Wādī Sharāyif.*

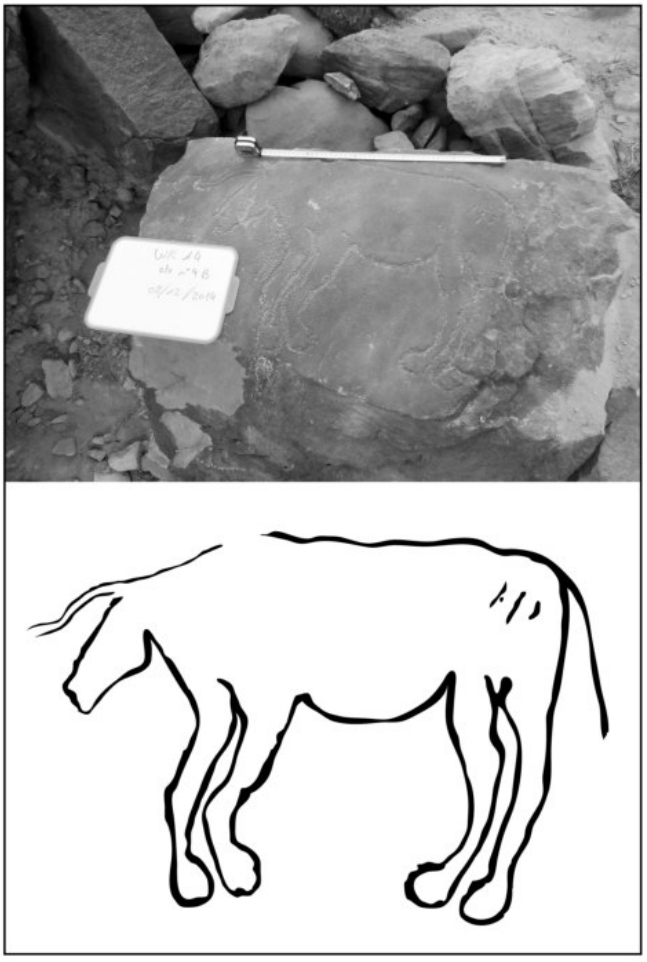
**Table 2:** Composition of Wādī Rammān Rock Art.

| Subject | Number of depictions | % |
|---|---|---|
| Animal | | |
| Nubian ibex | 49 | 29.8 |
| Arabian oryx | 5 | 3 |
| Camel | 18 | 10.9 |
| Ostrich | 4 | 2.4 |
| Cattle | 1 | 0.6 |
| Dog | 8 | 4.8 |
| **Subtotal** | **85** | **51.8** |
| Other | | |
| Hunting | 8 | 4.8 |
| Warfare | 3 | 1.8 |
| Camel rider | 11 | 6.7 |
| Horseman | 14 | 8.5 |
| Human figure | 3 | 1.8 |
| Wasm | 40 | 24.3 |
| **Subtotal** | **79** | **48.1** |
| **TOTAL** | **164** | **100.0** |




*15. Selection of rock art from various sites.*

A single bovid was noted. This is an elaborate carving found in Wādī Abū ʻAlaylīq Ithnān (WR-14_4b) **(Fig. 16a-b)**. It is engraved on the upper side of a block that stands on the south side of the *wadi* slope. It measures ca 57 cm in length by ca 40 cm in height. The animal is represented in profile, with a pronounced musculature and curved, forward-pointing horns. Its physiognomy argues for it being identified as the extinct aurochs, or *Bos primigenius*. As ever, it is difficult to determine the precise age of a rock art panel. However, several elements argue for a prehistoric date. First, this representation clearly predates the extinction of aurochs from Arabia that took place soon after the end of the Holocene wet phase at around 3,800 BC[3] . Second, the heavy degree of patination suggests that it is far older than the adjacent carvings (ibex drawings; Thamudic and Arabic inscriptions) which all have a fresher yellow patina. It is also significant that the figure is deeply carved. This is evidence that the panel was carved before the development of desert varnish during the Holocene arid phase (Olsen and Bryant 2013: 38). Finally, the artistic style of this carving has nothing in common with the way in which the cattle are usually depicted in Wādī Ramm (Campetti and Borzatti von Löwenstern 1983: tav. XXVI-XXVII; Farès 2006: 40) and, more generally, in all early Arabian rock art - of which the 'Jubbah style' is a striking example (Parr et al. 1978: 47-48; Jennings *et al.* 2013: 680). In contrast, it is done in the prehistoric realist style and shares many similarities with Late Palaeolithic cattle representations from the site of Qurta in southern Egypt (Huyge and Ikram 2009: 158-163). If the dating of this aurochs figure to the Late Palaeolithic or Early Neolithic period is correct, it would be one of the oldest known petroglyphs in the region, cf. those at Kilwa in northern Saudi Arabia (Horsfield *et al.* 1950).



*16a - b. Prehistoric aurochs depiction from Wādī Abū ʻAlaylīq Ithnān (WR-14_4b).*

The Wādī Rammān rock art also depicts many horsemen and camel riders **(Fig. 15),** as well as around eight hunting (WR-14_4a, _4b, _4c, _9b, _13 and _16) and three fighting scenes (WR-14_4b and _9b). The battlefield panel photographed by Jobling (1981a: pl. XXIX, fig. 1; 1983: 32 fig. 7) was rediscovered in Wādī Abū ʻAlaylīq Wāḥid and was recorded as site WR-14_9b. On a block ca 1.9 meters high by 3.2 meters wide, it shows fighting between horsemen armed with spears, amongst whom are hunters pursuing ostriches. It is not clear whether the two Ancient North Arabian (Hismaic) graffiti carved within the scene are the signatures of the artists or not. *Many wusūm* (tribal symbols) were observed during the survey. These were found in isolated contexts or in association with graffiti and drawings. However, only three

3. On the presence of aurochs in Arabia during the Holocene wet phase and their depiction in rock art, see the excellent discussion in Olsen and Bryant 2013: 37-39, 197.

symbols recur frequently; the most common takes the form of a curve accompanied by two little strokes **(Fig. 17).**

**Ancient North Arabian Inscriptions**

Around forty Ancient North Arabian graffiti were recorded at thirteen sites in the research area: WR-14_1, _2, _4, _5, _6, _9, _12, _14, _16, _17, _18, _21 and _22. Two texts were discovered in the east part of the *wadi* (nos 1 and 2 from site WR-14_1.), while all the others are written on boulders and mountain bases in the west part. This distribution is easily explained by the geology of Wādī Rammān. The sandstone rocks of the west side are better for carving than the granite rocks of the opposite side. This is also true of the rock drawings, since only two petroglyphs were found on the east side. The number of readable texts is reduced, however, by the fact that some are scratched or have deteriorated through erosion. For example, sites WR-14_2, _5 and _14 have examples of texts that have been completely erased. There is also the case of isolated characters, observed at sites WR-14_2 and _9c **(Fig. 15)**, which should certainly not be texts, but may be *wusūm*. In sum, the corpus of North Arabian graffiti from Wādī Rammān consists of a total of 36 readable texts: 35 were recorded in the field, to which should be added AMJ 2 from the Amman Museum[4].

Thirty-two belong to the so-called 'Hismaic' (Thamudic E) category of Ancient North Arabian, whereas three are Thamudic C (nos 3, 4 and 27) and one Dadano-Liḥyānite (or Dadanitic) (no. 5). Their content falls into four categories **(Fig. 18)**. Twenty-seven are texts of simple authorship (nos 1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 30, 34, 35 and 36), with one that includes a long genealogy (no. 13) and two in which a tribal affiliation is indicated (nos. 17 and 36). Two texts are prayers for remembrance addressed to the goddess *Lt* (nos 16 and 29).

Five are love texts or of a sexual content (nos 3, 4, 27, 31 and 32). One is the signing of a drawing (no. 5). There is also a text with no coherent sense (no. 33), which may be a writing exercise. Here is one example from the corpus:

***Inscription no. 9 (Fig. 19a - b)***

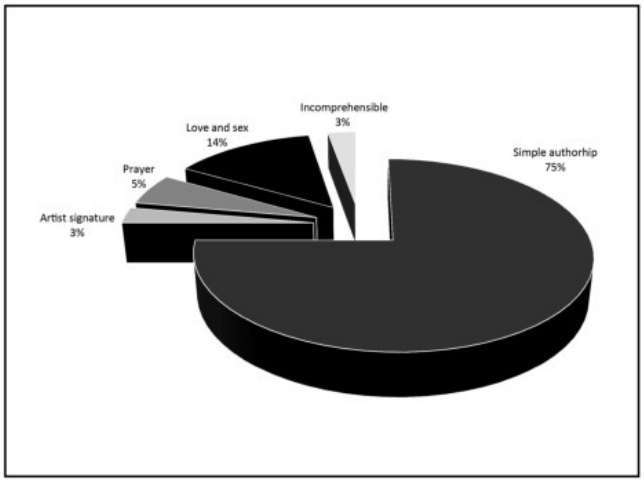
Site 4b, Wādī Abū 'Alaylīq Ithnān: length = 50 cm; average height of letters = 12 cm. This graffito is carved below a hunting scene and a Kufic inscription. It reads from left to right:

l qym bn 'slm

By Qym son of 'slm

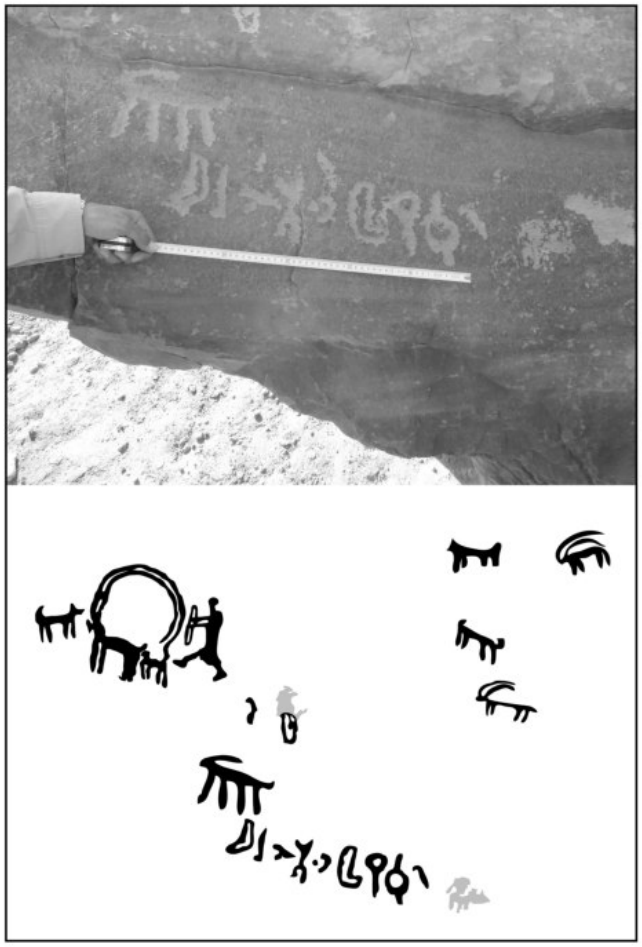


*17. Most common wasm found on the rocks of Wādī Rammān.*




*18. Content of the North Arabian inscriptions from Wādī Rammān.*

4. The study of this corpus of North Arabian inscriptions is being conducted by Jérôme Norris as part of of his PhD dissertation: Peuples et groupes sociaux en Arabie du nord-ouest aux époques nabatéenne et romaine.



*19. a - b. North Arabian Inscription no. 9 from Wādī Abū ʻAlaylīq Ithnān (Site WR-14_4b).*

All the letters are clear. This is a text of simple authorship introduced by the particle l (lām auctoris). In the absence of the word ḫṭṭ that could represent the participle "inscriber" or the verb "he engraved", it is difficult to say whether this text should be associated with the scene depicted above, *viz*. a man armed with a bow, surrounded by his dogs, who is hunting an ibex. The two names are well-known. Qym is mainly attested in Safaitic (Harding 1971: 492), but has also been found in around ten Hismaic texts. It appears three times in the Wādī Ramm sector (Farès in press), twice in Wādī Judayyid (KJC 319; KJC 664), twice in Wādī Ḥafīr (Corbett 2010: nos R430.5; R653.8), once at Jafr (Abdelaziz and Maʻani 2006: no. 2) and twice in northern Saudi Arabia (Koenig 1971: no. tdr 9; al-Theeb 1999: no. 181). Note that it is also attested in Nabataean as *qymw* (Negev 1991: 58).

The patronymic, *ʾslm*, is a name of the elative *ʾafʻal* form (cf. Arabic ʾAslam اسلم). It is found in both North and South Arabian inscriptions[5], as well as in Nabataean Aramaic (Harding 1971: 45; Negev 1991: 15). In regard to its attestation in the Jordanian Ḥismā, King has noted over eighteen occurrences (1990: 358) to which should now be added three new texts discovered in the southern part of the Wādī Ramm area (Farès, in press) and six others from Wādī Ḥafīr (Corbett 2010: nos R227.9; R244.1; R377.2; R627.1; 07-0026.1; 07-0026.4).

**Islamic Inscriptions**

Thirty-three Islamic Arabic texts were discovered or re-discovered[6]. Most are concentrated in the tributary of Wādī Abū ʻAlaylīq Ithnān (sites WR-14_4a - c). These are mainly signatures and prayers. Two recurrent types of religious formulas can be read: šahādah and invocations introduced by *Allāhumma*. It should be noted that the major part of these graffiti is by a single author, *ʻUmar bin ʻUqbah*, who wrote his name on numerous stones at sites WR-14_4a, _4b and _4c. Outside this *wādī,* one text was recorded in the immediate vicinity of the Roman structure of Wādī Rūmī, (WR-14_14), two at Umm al-Ḥimlān (WR-14_5) and a damaged one in the north-west part of Wādī Rammān (WR-14_17). Some of them are carved next to ibex drawings that show the same degrees of patination. This indicates that some Islamic inscriptions and animal representations are contemporaneous and by the same hand.

**Concluding Remarks**

Until now, Wādī Rammān was an area that had been poorly investigated. This might seem paradoxical when one takes into account its

5. In the Dadano-Liḥyānite inscriptions of al-ʻUlā, the name appears in JSLihy 237, D 151 (= AH 24, U 43), AH 258 and 296.

6. The study of the Arabic inscriptions recorded in Wādī Rammān has been assigned to Frédéric Imbert (Iremam, Université de Provence, Aix-Marseille, France).

proximity to the main center of the area, Wādī Ramm (ancient Iram). The survey of this valley allowed the recording of new and interesting material. The most striking findings are a corpus of Ancient North Arabian inscriptions and a set of rock art drawings. Two main observations can be made in the light of our results. The first concerns chronology. By cross-referencing the epigraphic and archaeological material, it appears that Wādī Rammān was permanently occupied from prehistory to the Islamic period. The few recorded lithic tools and possible Late Palaeolithic aurochs depiction in Wādī Abū ʻAlaylīq Ithnān are evidence of the most ancient phase of human activity in this locale. In absence of excavation, it is difficult to say if the stone circles of the valley belong to this early phase or not, as only one was found with associated artifacts. The North Arabian inscriptions and sherds of Wādī Rūmī belong to the next phase, i.e. the Hellenistic and Roman periods. A final phase is evidenced by a large number of Islamic inscriptions. The second main observation concerns the nature of human occupation and the role of this valley in its regional context. Despite its geographical orientation, the wadi seems not to have been a great communication axis between north and south. Liḥyānite and Thamudic C inscriptions testify to the presence of individuals from southern regions, but no Nabataean, South Arabian or Greek inscriptions were found there - a situation that contrasts with the nearly Wādī Ramm corridor. Moreover, very few rock art drawings and inscriptions are found in the *wadi* itself. Their concentration in the western tributaries suggests, in contrast, that Wādī Rammān was an east - west route. Of course, it will be necessary to explore the farthest tributaries, as well as the adjacent Wādī Maḥlabā and Wādī Marṣad, to confirm such a hypothesis. However, it is noteworthy that it was on this axis that the Roman installation of Wādī Rūmī was built. Concerning the stone structures recorded, their function(s) remains enigmatic but comparison with those of Ṭurayf al-Marāgh might indicate that they were ritual rather than domestic in nature. The absence of domestic structures, with the exception of the Wādī Rūmī example, suggests that occupation was mainly by nomadic groups who came to this valley to graze their camels and hunt, as depicted in numerous examples of rock art. Further survey in this *wadi* is therefore necessary, to explore its southern part and confirm the hypothesis developed above.

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# GHAWR AS-SAFI SURVEY, EXCAVATION AND CONSERVATION PROJECT 2013 AND 2015

*Konstantinos D. Politis*

Survey, excavation and conservation work was conducted in Ghawr as-Safi by the Hellenic Society for Near Eastern Studies (HSNES) in collaboration with the Department of Antiquities of Jordan (DoAJ) in 2013 and 2015. This work was supported in 2013 by the Al-Hima Foundation (Jordan) and Macquarie University (Australia), and in 2015 by the USAID-funded Sustainable Cultural Heritage through Engagement of Local Communities Project (SCHEP), ARAMEX LLC, the Australian Institute of Archaeology and the Comar-Fitzpatrick Trust. The team consisted of Jordanian, Greek, Australian, American and Turkish members directed by Dr Konstantinos D. Politis, under the supervision of Ms Jamila Shtewi and Mr Basil Halassa of the DoAJ.

## Survey

Contour surveying and mapping continued by adding new findings in the areas of Tawahin as-Sukkar (TeS), Khirbat ash-Shayk 'Isa (KSI) and Tulaylat Qasr Musa Hamid (TQMH), and for the first time at Ameri (A) and Umm Tawabin (UT) which produced the first maps of these sites. The result was an updated site map ready for publication and public use **(Fig. 1-2)**.

## Excavations

During 2013 and 2015, work continued to focus on understanding the origins and development of the sugar-cane industry at the factory complex of TeS and the adjacent urban centre of KSI.

*Tawahin as-Sukkar (TeS)*

A primary objective of both seasons' work was to reveal more of the functioning of the sugar cane factory at TeS. A great deal was discovered. Both of the two vaulted rooms below the pressing chambers were completely cleared, revealing the pivot stones (one *in situ*) and water chutes which powered the gearing mechanism **(Fig. 3)**. Careful excavation of the pressing chambers above also revealed the plastered conduits that channelled the sugarcane juices resulting from the pressing process **(Fig. 4)**.

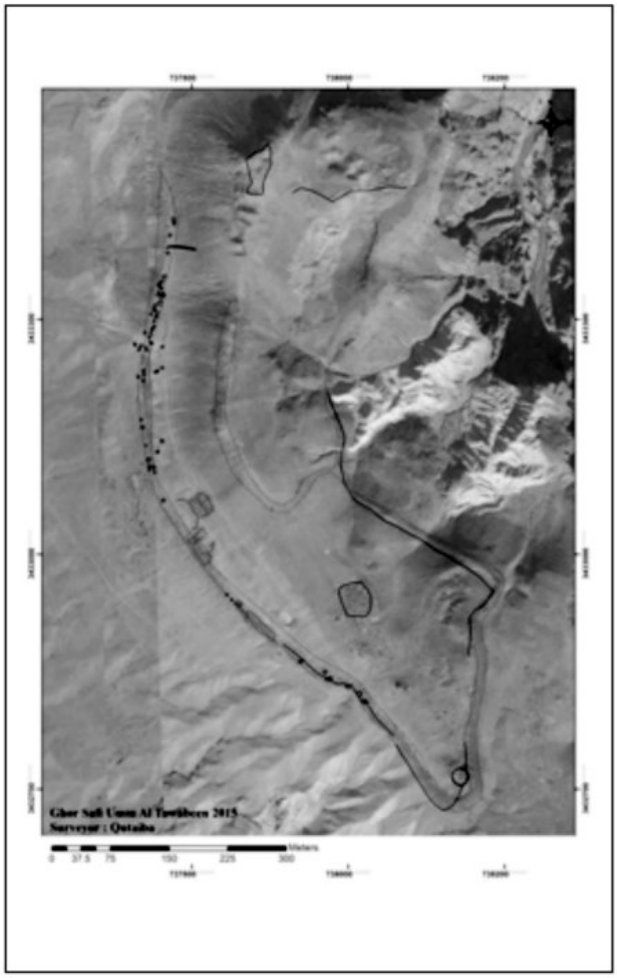
One of the walls outside the arched entrance of the lower chambers led northwards, presumably linked with the underground water channel flowing into agricultural fields. **(Fig. 5-6)** A stone-built stairway was also uncovered which apparently gave access to the rooms. This meant that the channel was lower than expected. Immediately to the east were remnants of arch supports for a small bridge that allowed the flow of the pressed sugar juices to continue northwards **(Fig. 4)**.

On the western side of the excavation trench was a building whose construction method and materials were different to the upper parts, which were made of mud bricks apparently belonging to a later (probably Late Ottoman) period. The level and architecture of this building indicates an earlier association with the pressing rooms and their lower chambers to the south. However, it was clearly re-used in its final stage.

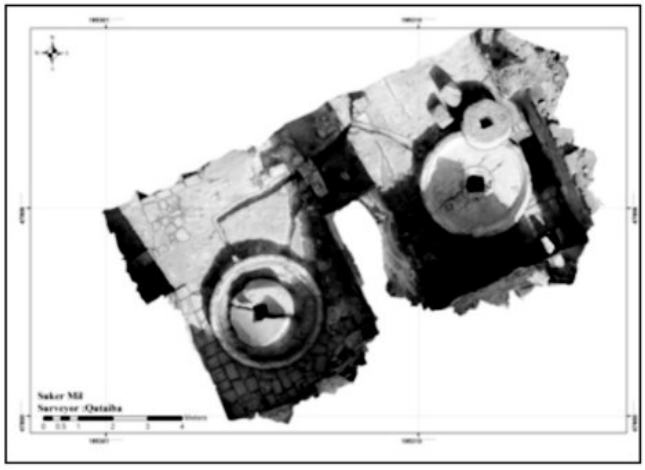
Closer investigation of all standing mud brick walls and study of related finds (particularly cartridge cases) indicate a final phase of occupation of the disused sugar factory when the structures were associated with hostilities related to the Arab Revolt in the early 20th century (Politis 2013: 200).




*1. Ghaw as-Safi Sites map.*




*2. Umm Tawabin map.*




*3. Pressing chambers with newly discovered sugarcane juice conduits Fig.4 below floors flowing northwards across a small bridge (overhead photo and plan by Q. Desuqi.*



*4. Reconstruction illustration by Y. Dray based on photo by K. D. Politis 2015).*

*Khirbat Ash-Shayk 'Isa (KSI)*

Khirbat ash-Shayk 'Isa (KSI) area excavations resumed in Trenches II and VIII (Politis 2013: 196). Three new trenches, IX, X and XI, were opened to the west with the objective of following the long, 3-metre high, well-built wall **(Fig. 7)**.

Trench II was extended north to complete the excavation, removing all subsequent Ayyubid - Mamluk and Abbasid architecture and



5. *Vaulted gearing rooms below pressing chambers with pivot stones being shown to Dr Monther Jamhawi, director general of DoAJ, Professor M. Ibrahim and Professor Z. Kafafi by Derio Comar and Mohamed Zahran (photo by K. D. Politis 2015).*




6. *Overhead photo and plan by Q. Desuqi).*




7. *Plan at end of KSI excavations in 2015 (Q. Desuqi).*

associated material finds to reveal the Byzantine pavement, **(Fig. 8-9)** with a third column base in an evenly spaced line running north - south. Fine white marble pavers, polycandelon glass lamp fragments and glass tesserae from a wall mosaic also found in this area indicate proximity to a church, possibly related to that found in Trench IX. If so, Trench II could be the atrium, making it one of the largest churches found in Jordan. Consequently, it was decided to maintain this phase for future consolidation and site presentation.

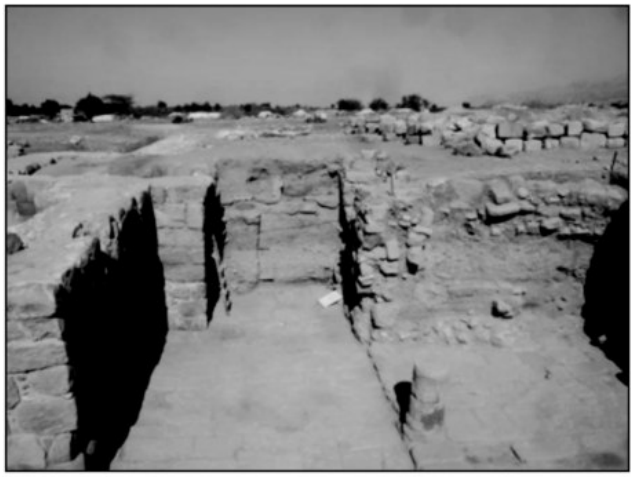
A deep sondage in Trench VIII below the mosaic pavement revealed Late Roman - Early Byzantine pottery sherds on wadi gravels, dating the earliest occupation on the site to the same period as that evidenced in the 2012 sondage in Trench II (Politis 2013: 196). However, the date of the wall was still enigmatic as it slightly overlaid the mosaic. Excavations in Trench IX helped to clarify this as the mosaic clearly ended at the wall. Additional finds, including a chancel post and screen fragments made of fine white marble, were strong evidence for a church in the immediate vicinity. The wall continued into Trenches X and XI. The upper strata of Trenches IX, X and XI mirrored the architectural remains in Trench VIII, viz. small, rough, stone-built rooms with finds dating to the Fatimid and Ayyubid - Mamluk periods (ca 12th - 15th centuries) and, in the lower phase, larger mud brick rooms that were apparently peacefully abandoned in the Abbasid period (9th - 10th centuries), evidenced by complete pottery sitting in thick sandy-silt soil layers.

Trench IX was completely excavated down to the mosaic floor of the church of Byzantine Zoara. The doorway was discovered as well as two marble chancel posts and many fragments of a Prokonesian marble column. Trenches X and XI were also excavated to a lower level but time and space constraints did not allow completion **(Fig. 10)**. However, these two trenches revealed substantial evidence for a pottery kiln, presumably primarily for the production of sugar pots. Evidently it is located immediately to the north of these trenches.

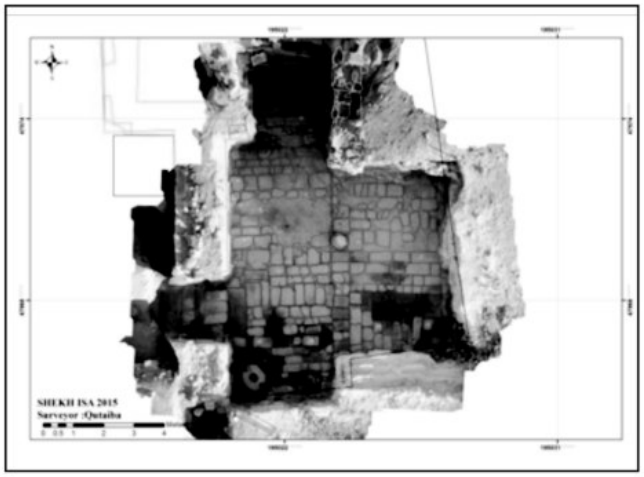
**Preliminary Conclusions**

Preliminary general conclusions for the main occupational phases of KSI are as follows. The area of KSI currently enclosed by a fence where we have conducted excavations since 2002 was probably the original location of the main, conceivably episcopal, church of Byzantine Zoara, as seen on the Madaba map **(Fig. 11) and other illustrations (Fig. 12-13)**.

The later phases of occupation are an Abbasid-period settlement in the disused (but not destroyed) church building that was abandoned



*8. KSI Trench II from south with pavement and equidistantly lined-up columns (photo by K. D. Politis 2015).*




*9. Overhead photo and plan (Q. Desuqi).*



*10. KSI Trench IX from south showing an entrance with mosaic flooring, marble chancel posts and columns. (photo by K. D. Politis 2015).*



*11. Zoara depicted on late 6th century mosaic map at Madaba (photo by K. D. Politis).*

around the 10th or 11th centuries. A substantial occupation followed which was closely associated with the nearby sugar factory and related industries (pottery- and glass-making; ironmongery) during the 12th - 15th centuries. Along with workshops and the probable sale of sugar products, KSI also seemed to serve as the location of a workers' village since numerous tabuns (small traditional bread ovens) and domestic items were discovered inside some of the small rooms. It is planned that one of the KSI excavation areas be left at this level in order to illustrate life at the mediaeval town of Zughar, which was primarily engaged in the industrial production of sugar.



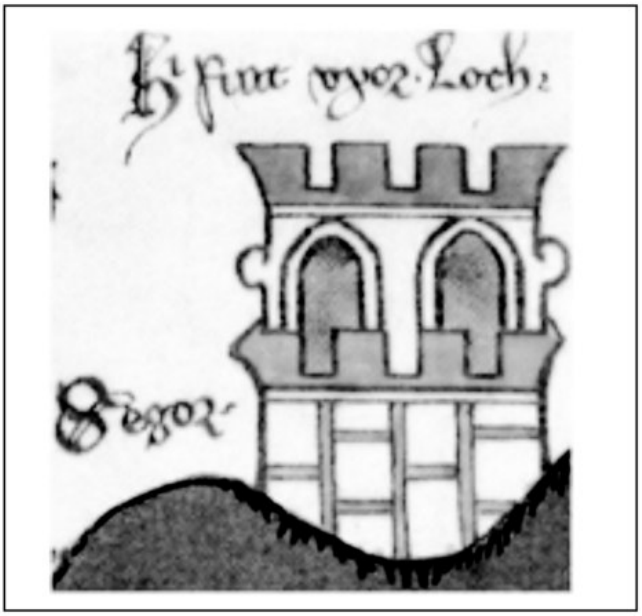
*12. Segor - Zughar city in ca 12th century illuminated Bible (St Catherine's monastery library, Sinai) 1458 map by Wm.*

*Ameri (A)*

Ameri is an area covering approximately 100 x 200 metres, located on the southern bank of Wadi al-Hasa about one kilometre from the modern location of Safi town. It is a low mound covered on its eastern side by a modern cemetery (al-maqbara) where an abundance of pottery sherds, glass and metal fragments are visible on the surface amongst the graves.

During early January 2015, we excavated a 3 x 3 metre sondage where a north - south wall intersected and bonded with an east - west wall, both walls being the only visible architecture on the site. This sondage was designated Trench I. It was excavated to the foundation of a rubble stone-made wall standing 13 courses at a depth of 3.3 metres **(Fig. 14)**.

This was the first authorised excavation at Ameri (previous illicit activities were evident) and has helped define the history of Ghawr as-Safi during the Middle Islamic period (14th - 15th centuries) after the main earlier Islamic settlement of Khirbat ash-Shayk 'Isa (9th - 14th centuries AD). Its location just south-west of the narrowest ford over Wadi al-Hasa is ideally placed for crossing the wadi in a north-easterly direction.



13. Wey (Bodleian, library, Oxford).

*Tulaylat Qasr Musa Hamid (TQMH)*

The site of Tulaylat Qasr Musa Hamid (TQMH) is an extensive low-lying mound **(Fig. 15)** covered by modern agricultural fields near the south-eastern shore of the Dead Sea. Its limits have not been clearly defined, but it seems to extend **(Fig. 16)** over at least 500 square metres. It has been associated with Zoar of the Old Testament (one of the five 'Cities of the Plain').

Excavations were conducted there for first time since 2000 (Politis et al. 2001: 189-193) by opening another 5 x 5 metre trench, but this time on the high central part of the site. The objective was to get maximum stratigraphy of occupational phases. Below 3.2 metres depth, **(Fig. 17)** two phases of mud brick occupation were discovered. These were dated on the basis of the large number of querns and pestles on the surface, it seems that TQMH was a substantial Iron Age agricultural settlement, with the possibility of industrial activity. From the excavation of remnants of mud brick walls, **(Fig. 18)** cooking installations, pottery sherds and animal bones, all of which showed extensive burning, we can conclude that there was a violent destruction of the site in the 7th or 6th century BC.



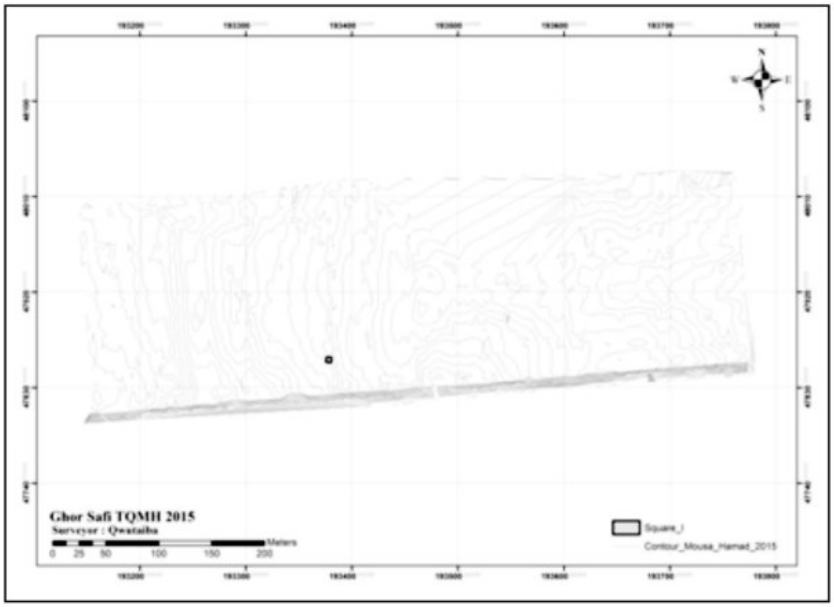
14. Trench I from east at final depth of 3.3 metres (photo by K. D. Politis 2015).



15. TQMH Trench I location from south (photo by K. D. Politis 2015).

**Conservation and Museum Management**

Restoration and conservation of objects found during excavations in Ghawr as-Safi was a high priority during the 2015 season as it greatly aided in their documentation, study and public display in the Museum at the Lowest Place on Earth. The emphasis was to employ and train locals in this task with the guidance of foreign




*16. on contour map (by Q. Desuqi).*



*17. TQMH Trench I (photo by J. A. Verduci 4 Feb 2015).*



*18. Pottery cup with pedestal and applied decoration. Iron Age IIC period, 7th - 6th centuries BC (photo by J. A. Verduci).*

experts. Good museum management practice was also taught.

The three storage rooms and some adjunct areas in the Museum at the Lowest Place on Earth were reorganised and new inventories were made. Some important inscribed stones were chosen to be placed on exhibition.



19-20. Several pots were reconstructed and some placed on exhibition. Documenting thousands of other fragments (mostly sugar pots) was also undertaken.



21-22. Newly conserved pots being placed on exhibition at the Museum at the Lowest Place on Earth (photos by K. D. Politis).



23-24. Storage and exhibition of inscribed stones in the Museum at the Lowest Place on Earth (photos by K. D. Politis).

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# A Modern Look at Dolmen Culture from Studies 2007-2014

*Kennett Schath*

**Abstract**

The article presents un-published results and understanding from research personally conducted, on dolmens in Jordan during the last decade. Though this article is about Jordanian Dolmen Culture, dating from Europe provides a topic of discussion. $^{14}C$ dating at Teleilat Ghassul (Tulaylat al-Ghassul) and pottery from undisturbed dolmens contributes to a clear profile for their age. Some background and theory is provided about dating issues. A holistic approach was used to study dolmens as part of the megalithic landscape at Tall al-Hammam Excavation Project (TeHEP), in 2007-2012 and independent studies from 2013-2014. This forms the Author's theory that dolmens are related to autonomous settlements and clusters of dolmens representing clans. Separation and group boundaries provide for autonomous relationships and many different cultural rituals were played out, in and near the dolmens. Both topographical and man-made structures such as, ridges and standing stones help delineate a clan's area. Further theory gives voice to the idea that each type of dolmen had an individual use based on their design and place, in relation to other megaliths, in a cluster, (clan group). Until types are recognized with their relationship to the megalithic landscape, their individual uses will remain a mystery. The material presented here is meant to open discussion and debate. This short article provides glimpses of data and collected material that sketches a picture of a dolmen culture. A discussion of dolmens in a holistic forum, by a collection of scholars knowledgeable in dolmens, is needed to move factual understanding forward.

**Pottery and the Age of Dolmens**

Dolmens around the world have existed since ancient times and are thought to be re-used in the Iron Age and Roman Period. I theorize on the other hand, that because of the absence of IA and Roman sherds in the chambers, dolmens were only used and re-used EB-MB Age, not the Iron Age or Roman Period, which are shown as divergent dates on **Table 1** and shows first use

**Table 1:** Archaeologist Dolmen Dating.

| Theories for the dating of dolmen use | | | |
|---|---|---|---|
| **PLACE** | **First Date** | **Second Date** | **Divergent Date** |
| Europe | 4600-4400 | 3700-3600 | 1200+332 |
| Levantine Experts | 4500-3100 | 3600-1800 | 1200+332 |
| HD-78 Ar-Rawdah Field | 3700-2600 | N/A | N/A |
| HD B.B Matabi Field | 3600-1600 | N/A | N/A |
| D317 Mutawwaq Field | 3600-3100 | N/A | N/A |

dates for dolmens, as represented by noted Archaeologists. European and Levantine researchers push construction and first use back as far as possible, into the Stone Age, with the re-use of dolmens during the Early Bronze Age,

then Iron and Roman Periods[1]. Superficial sherd surveys and regional pottery evidence was heavily relied upon. This is problematic due to the absence of datable material found directly in dolmens.

However, pottery was discovered in HD 78 and HD B.B, both excavated, by the Author and TeHEP team, in the ar-Rawdah and Matabi dolmen fields[2] and D317 excavated by an Italian team, at Jabal al-Mutawwaq, (A. Polcaro 2014). Pottery for dating was uncovered as well as a basalt tool and beads in HD-78 and flint tools in D317. Bones were found in all three dolmens **(Figs.1, 2 and 3).**

The objects and bones deposited in the chambers are indicative of the cultural and ritualistic aspect of dolmen use.

Pottery evidence shown in **(Fig. 4)**, represent the pottery discovered in HD-78, which had 45 separate vessels and **(Fig. 5)**, HD B.B, which had 4 vessels.

The even spread in dating, for the pottery found in HD-78 represent what could be considered generational use, but a variation in dating of ±50-100 years should also be considered. More pronounced is the 1000 to 500, year spacing of dates for the four vessels found in HD B.B. No matter how the dating for this pottery is viewed, it depicts use and re-use of the dolmens. **(Figs. 6 and 7)** portray the early and late dates of pottery from these dolmens.

The material found in Dolmen 317 at Mutawwaq only spans EB1, 3600-3100 BC[3]. Here the dolmens are integrated and an integral part of the village. Dolmens are found among an avenue and walled area of the village, which is organized and shows what seems to be some sort of hierarchy. The village at Jabal al-Mutawwaq, and its dolmen field is ca. 175 km, north of Tall al-Hammam (TeH) and provides a good comparison of an organized dolmen culture in different regions.

Radiocarbon dating gives data for the terminal dates at Teleilat Ghassul (A. Beavan and R. Sparks 2004). The Ghassulian culture was restricted to the Chalcolithic Period, ca. 4300 to 3600 BC and lends concrete reference dating for the Adiemeh dolmen field. This particular, article adds depth to the discussion about beginning dates for the dolmen culture.

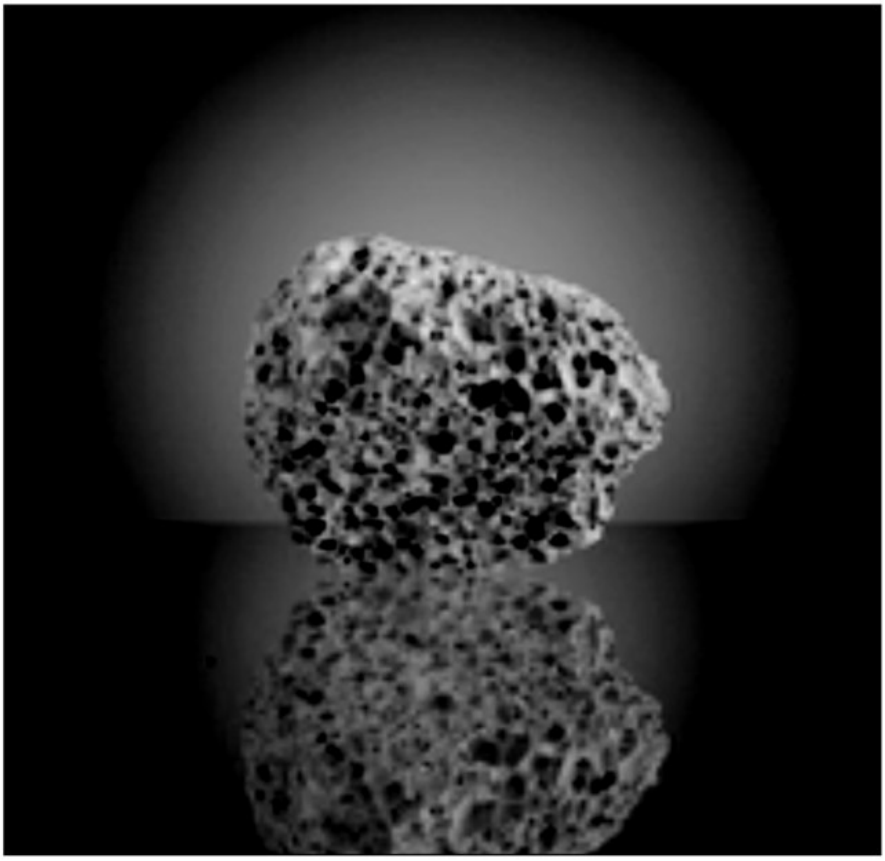


*2.Bones fragments.*

1. European Dolmen researchers referenced are J. Fergusson, R. Joussaume and J-P. Mohen Those for Jordan are, R. Dajani, A. Mazar, K. Prag, M. Stekelis, J. Swauger and K. Yassine.
2. K. Schath, From Dissertation, HD-78, 2010 and HD B.B. 2011 (TBP) TeHEP.
3. A. Polcaro *et al*. The referenced article does not give dating standards used so I have inserted a date of 3600 BC on Table 2.



*2. HD-78, Beads.*



*3.Basalt fragment.*

**Cultural Autonomy and Dolmen Dating**

**Table 2**, is included to introduce the Authors theory that EB I dating (A. Mazar, chronology 3300-3050 BC) is recognized, but for dolmen use throughout Jordan[4], if a long transition of cultural change is taken into consideration, pottery dates, are pushed back to EB I, 3600 BC, which many scholars attest. This theory is again, forwarded to provoke discussion/ debate for dating the dolmen culture.

**Table 2:** Dolmen Chronology.

| A. Mazar Chronology | | Dolmen Chronology | |
|---|---|---|---|
| N A+B | 6000-4300 | PN A+B | 6000-4500 |
| CH | 4300-3300 | CH | 4500-3600 |
| EB I | 3300-3050 | EB I | 3600-3100 |
| EB II-III | 3050-2300 | EB II-III | 3100-2300 |
| EB IV | 2300-2000 | IB | 2300-2000 |
| MB II | 2000-1550 | MB I | 2000-1800 |
| | | MB II | 1800-1550 |

Dolmen Chronology is backed by the progression of a megalithic culture, through many ages, in settlements of unbroken occupation, beginning in the Stone Age and moving forward through to Middle Bronze II. The high point of dolmens construction was likely during the transition of the Chalcolithic Period thru to Early Bronze II.

There are three cities that lie on the, rather small, ca. 24 km, circular plain north of the Dead Sea that have a deep impact on dolmen culture, because of their overlapping cultural histories. Jericho, Teleilat Ghassul, and Tall al-Hammam.

Jericho is on the west side of the Jordan River with a Neolithic culture using shaft and cave tombs. This puts its dating back in the Stone Age, earlier than PNA or 6000 BC, through to its destruction in MB II or 1550 BC.

Across the river, ca. 10 kilometers east of Jericho is Teleilat Ghassul. It had a ritualistic culture that utilized dolmens, cella and kists along with a temple during the Chalcolithic Period, or 4500-3600 BC.

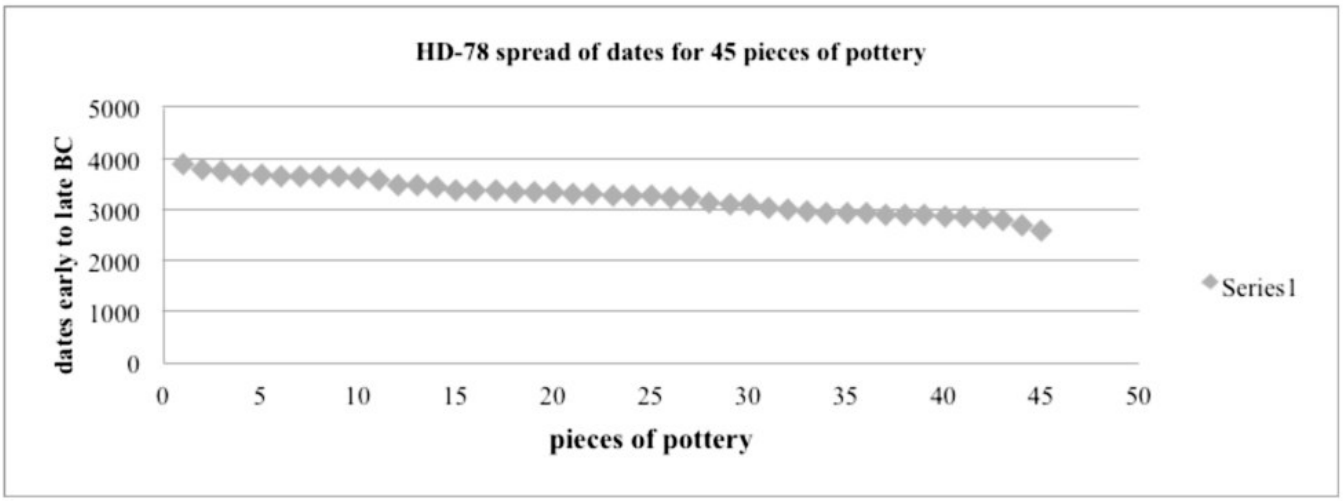
The Ghassulian culture went through a ritual and cultural transition from nomadic to sedentary settlement, (they did not just appear). Changes took place to the design of megalithic structures and rituals through many generations. The plethora of funerary structures also argues for multiple religious rituals. When these people moved off the plain it is highly likely they took their culture with them.

Teleilat Ghassul used dolmens but they also had two types of structures with distinctly different uses that seem to pre-date dolmens. One, the Kist/Cist and the other a Cella. A Kist/Cist looks like a coffin made with slabs of stone just underground level and visible at the surface. They often contained full skeletons and had no top stone. The Cella is a structure that looks like a dolmen without a top-stone. The Cella is made using unhewn stone and is closed on one end. Scholars have speculated that these structures had wooden tops and the absence of abundant stone in the Adiemeh field could answer for this phenomenon.

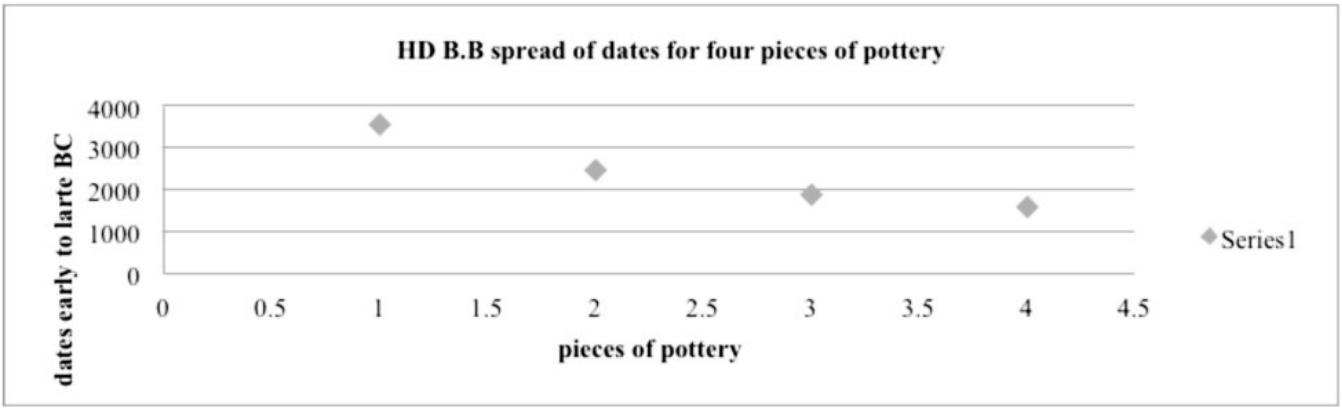
Tall al-Hammam which is the center of a large city/state is ca. ten kilometers east of Teleilat Ghassul. It used a wide mix of temples, shaft/cave tombs and megalithic structures for its ritualistic practices. The city shows an uninterrupted occupation beginning in EB1 and ending as late as MB2, or 3600-1550 BC[5].

The dolmen fields in this circular area adjoin each other to create what I term a "Greater Megalithic Field."[6] They begin at the Adiemeh dolmen field and follow the circular area on the eastern side and flow east up into the hills and

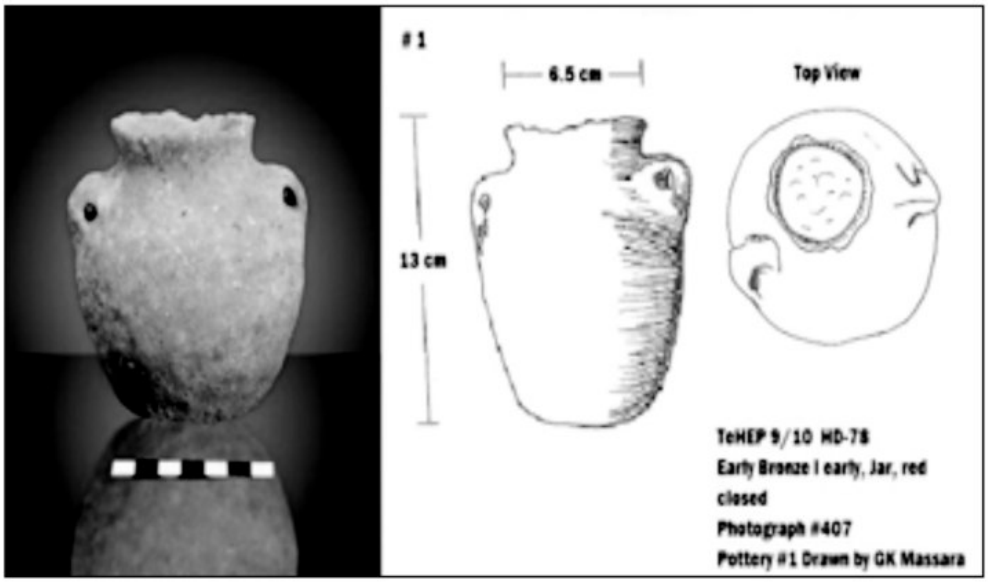
4. A.Mazar, 1990, p30.
5. See, S. Collins field reports 2006-2013 which provide details for the regions geography and dating.
6. "Greater Megalithic Field" is the whole of two or more complete Dolmen Fields adjoining each other to form one large field.



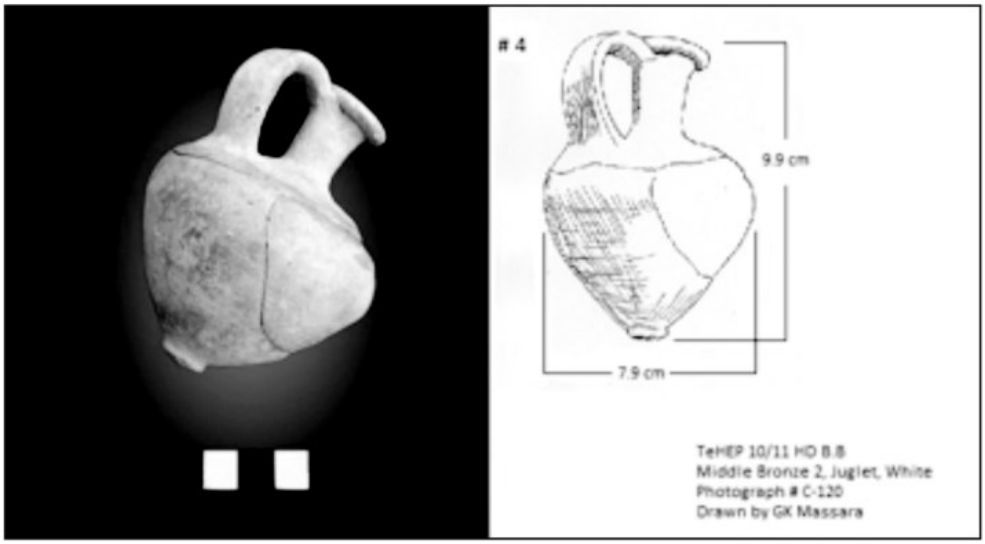

*4. HD-78, Pottery Dating.*




*5. HD B.B, Pottery Dating.*




*6. HD-78, Pottery Dating.*




*7. HD B.B, pottery.*

around to the north.

Having walked these dolmen fields which spread over 15-20 square kilometers, topographical boundaries and corresponding settlements are easily recognized. A description of the fields follow: the Adiemeh field at Tulaylat Ghassul, adjoins with al-Quttayn at Iktanu. At one time, there was reported to be some 200 dolmens, of Type A and E, design. The Type E dolmens, have two chambers vertically and are only found at al-Quttayn. This is an example of different types of dolmens with that settlement's design. Iktanu also made use of shaft tombs.

Continuing east, al-Quttayn adjoins with the Hisban dolmen field and the village of Ar-Rawdah on Wadi Hisban. This dolmen field has a distinctly different design with a simple A Type, appearing in the northern side of the Wadi and mixed with cave tombs. Another cluster of dolmens is found on the level plain to the south side of the wadi, which gives definite separation. The dolmens in this group are constructed with steps and/or thresholds

Next the Ar-Rawdah field with the village of Ar-Rawdah on Wadi Ar-Rawdah. This field lies just across the Wadi Hisban and a spur of the hill to the north and is an extremely complex field. It has large circles visible from the main highway that follows the Hisban Wadi from Amman to the Dead Sea. There are many dolmen types, megalithic structures including cave/ shaft tombs, standing stones and alignments. Here is where HD 78, a B Type dolmen, was excavated with dating is shown in (**Fig.4)**.

Then to the north, on the other side of the hill forming the boundary of the Ar-Rawdah dolmen field is the Matabi field and the huge settlement of Tall al-Hammam. Matabi is another complex field with ritualistic alignments and many Standing Stones appearing at boundaries of dolmen clusters. This field has an avenue directly east to a temple complex at Tall al-Hammam. The avenue begins near HD B.B, which was excavated with pottery dating shown on (**Fig. 5)**.

Two other villages continue back toward the west. The first Tall Tahanu, to the north of tall al-Hammam and west of Wadi Kafrayn, the second city is Tall Kafrayn, 2 ½ kilometers to the west of Tall al-Hammam. Both cities had EB shaft tomb type, ritualistic cultures.

because the dolmens are related to settlements with long occupation periods, ranging from the Stone Age to Middle Bronze II (4500-1550) and the wide range of cultural and ritualistic practices, scholars can be correct about dating construction and use across the entire spectrum. I therefore, let archaeology take care of dating dolmen fields, and research other issues.

**Types and Use of Megalithic Structures**

Dolmens of a specific design or "Type" must have some form of specific purpose or "use".

Each of the fields described in this article, had at least two types of dolmens and in every case, variations of the type[7]. Some of the variations are easily recognized and some very subtle. The platform of a dolmen is an easily recognized variation and steps or a retaining wall subtle. Defining the different "architectural components"[8] has shown how complex dolmens are.

An A type dolmen, is the simplest design. It typically has two side stones and a top stone. To make it complex, elements can be added: a platform, an end stone, passage, blocking stone, floor, sub-floor, steps, retaining wall, terrace, curb and alignments among others.

Complex variations of the six types have the potential of creating different types. Until recently the G Type was not recognized and unique types undefined. Recognizing an abundance of type has a constructive advantage on future dolmen research, as it would force scholars to move away from entrenched thought about dolmens and re-evaluate old assumptions.

The question of burial, inhumation, and ancestral deposits of bones is one example. In the words of J. Swauger,

"Now the why. Common sense tells us dolmens were tombs. But to have common sense say they are tombs does not make them tombs. It is opinion, not proof. We know they have been used as tombs within even our own times, but we have no conclusive proof that those who built them did so in order to use them as tombs. In company with most other students of the subject, I believe dolmens were built as tombs, but I would not like to be hanged on the basis of evidence I can muster to support my belief. [9]"

The clear majority of dolmens contain no bones and speculation no matter how logical, is reckless. Bones found in HD-78 and HD B.B were far from complete. In D 317 the discovery of an incomplete skeleton with disarticulated bones and a skull, was extraordinary.

Until we learn to differentiate types of dolmens and their place among other megalithic structures, their use will remain unknown.

**Structural Relationships in Clan Groups**

A survey was conducted in the Matabi and Ar-Rawdah fields in 2006, [10] looking at clusters of dolmens as clan groups. In 2009, a survey was done for the Greater Megalithic Field on the Jordan plain. (S. Collins, *et. al*. 2009). In 2010 and 2011, one undisturbed dolmen, HD-78, and one demi-dolmen HD B.B. were excavated. Each dolmen was prominent in a "Discrete Dolmen Field."[11]

When standing in one of the many dolmen clusters in the Matabi and Ar-Rawdah fields several factors become conspicuous: 1. Each cluster is situated in its own discrete area, usually divided by a ridge, wadi, or spur of a hill. 2. The cluster has some form of center, with an alignment or standing stone. 3. All clusters have a wide view of the area and the best view seems to coincide with some form of hierarchical order. 4. The view always takes in a location such as, a mountain top, a temple, or the cluster's center. 5. Topography such as, a ridge, slope, spur, hilltop or wadi along with man-made structures form "boundaries" and the "border" of a field[12].

With the recognition of what could arguably be called a city /state at Tall al-Hammam, the two highly organized discrete fields there, exemplified the concept of autonomous clan sites. The two undisturbed Dolmens excavated at Matabi and ar-Rawdah and the village/ dolmens at Mutawwaq strengthen the argument for autonomous clan groups. So, the Dolmen Culture Project began[13].

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7. Variations in the design of standard types of dolmen showed that the M. Zohar's 6 types, were no longer sufficient for current studies.
8. "Architectural Component" is a term coined by the Author to define elements of design included in a dolmen
9. J. Swauger 1966, p106.
10. Lucy Clayton, 2006 and 2007, with Hussein Al-jarrah estimated 15 clan groups.
11. "Discrete Dolmen Field" is a term used to describe a group of dolmens, thought to be a Clan Group with topographical or man-made boundaries.
12. A "border" is the term for the outer reaches of the entire field.
13. Schath *et al*. 2011

Because of the scale of destruction to dolmen fields throughout Jordan, the discovery of a complete discrete field is urgent.

**Conclusion**

Finding a dolmen field with an associated sedentary settlement is realistic with the number of dolmen fields un-surveyed using a holistic approach and examining their relationships to megalithic structures.

The religious aspect of the dolmen field at Mutawwaq and Tall al-Hammam are prime examples of the dolmen culture associated with a temple. The organized society with meeting places along with their characteristics of hierarchy speaks not only of clan groups, but also chiefdoms.

The Author theorizes that given a complete dolmen field, without agricultural, urban, or industrial destruction, ensures megalithic structures must be present. A dolmen field crossing a valley, wadi or series of ridges must have several discrete groups. (The field must not be large).

Two area in Jordan stand out as great candidates for the search and discovery of discrete dolmen fields with sedentary autonomous settlements. The first is the Hula Valley just south and east of Lake Tiberius. The second is the Al-Kūra and Aṭ-Ṭaybah regions near Irbid.

Further, the identification of architectural components of dolmens with types placed within the megalithic landscape will enable researchers to determine how dolmens were used.

Encroachment of agriculture, industrial and urban development threatens dolmen fields throughout Jordan making it urgent to locate and protect a complete megalithic field. The field must not be large, but rather complete and that field exists. Finding that complete megalithic field with at least two discrete field and conserving it is the goal for Jordan's Cultural Heritage.

**Acknowledgements**

I want to thank the many Department of Antiquities-Jordan, Archaeologists I have worked with in dolmen fields. Most important Tiberius Group, for the funding to work among Jordan's ancestral monuments.

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# RESTORATION OF THE TALL ZAR'Ā MOSAIC 2014

*Ziad Aziz Othman*

## Introduction

Tall Zar'ā has a strategic location that dominates the ancient trade route across the northern Ghor to Palestine, which connected ancient Egypt, Syria and the Mediterranean hinterland.

The site is located 40 km west of the city of Irbid and is 17 m below sea level. It has an ancient artesian well that is thought to have been the reason for the original occupation of the site, which is closely linked to Umm Qays.

Tall Zar'ā was occupied during the Early, Middle and Late Bronze Ages, the Iron Age and the Persian era, as well as during the Classical periods and into the Islamic era. Schumacher (Bakar 2013: 5) noted that the area of Wādī al-'Arab has plentiful water resources, which would have benefited both archaeological and modern sites.

The site is one of the closest archaeological sites to Umm Qays. It is thought that the original Persian- and early Hellenstic-era inhabitants of Gadara originated from Tall Zar'ā. It is also believed that the inhabitants of Tall Zar'ā moved to Gadara towards the end of the Iron Age, which would explain the absence of earlier domestic architecture at Umm Qays, as well as a break in occupation at Tall Zar'ā itself. The tall has many surface architectural remnants that indicate occupation in different periods.

After restoration, the glue residue was not properly removed from the mosaic, which again caused a change in colour from white to yellow when exposed to sunlight **(see Fig. 6)**. Additionally, the mortar used was not the correct colour.

## Tall Zar'ā Mosaic

Through the work of the German archaeological team, a mosaic was discovered at Tall Zar'ā. It consists of medium-sized tesserae and displays six lines of text, some of which are missing **(Fig. 1)**.



*1. Following the discovery of the mosaic, permission was sought from the Department of Antiquities (DoA) for it to be conserved by the restoration team at the DoA Bayt Ras office. As the site is unprotected, the team removed the mosaic to the restoration laboratory in order to start conservation and put it on a new base with fresh mortar.*



*2. After the restoration process was complete, some problems emerged. For example, a yellow instead of a white glue was used to paste the fabric on to the surface of the tesserae, which resulted in their colour changing from white to yellow.*



3. Another problem was that new mortar was applied before the old mortar had been fully removed, which resulted in loose tesserae. Also, the mosaic was placed inside an untreated iron frame, which could have had serious consequences for the mosaic in future.



4. The restoration team placed a metal mesh within the new mortar, which can lead to rust forming on the surface of the mosaic.



5. During the restoration process some tesserae were added or removed, which led to changes in the text.



6. Moreover, a second line of black tesserae was added to the lower part of the right side of the mosaic, which wasn't present in the original.



7. At the outset, the mosaic was in an iron frame measuring ca 1.2 x 1.5 m.

**Restoration of the Tall Zar'ā Mosaic**

On learning of the problems that had appeared after the initial restoration, the director-general of the DoA, Dr Monther Jamhawi, asked me to carry out additional work using appropriate materials in order to rectify the problems.



8. Dust and the remnants of glue on the surface of the mosaic were removed for the purpose of re-documenting it.



11. The fabric was allowed to dry .



9 . Fabric and diluted white glue were then applied.



12. The mosaic was then inverted.



10. and pressed on to the surface of the mosaic to ensure adhesion of the glue and fabric to the tesserae.



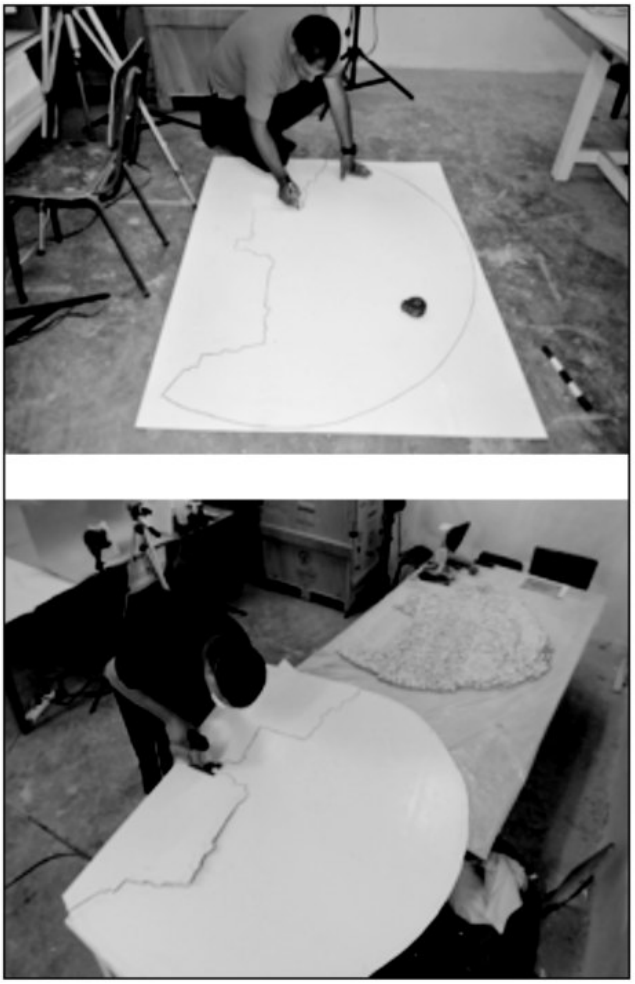
13. The process of removing the mortar started with the use of a grinder to create small squares.



*14. which were then gently removed with a hammer and chisel so as not to damage the tesserae.*



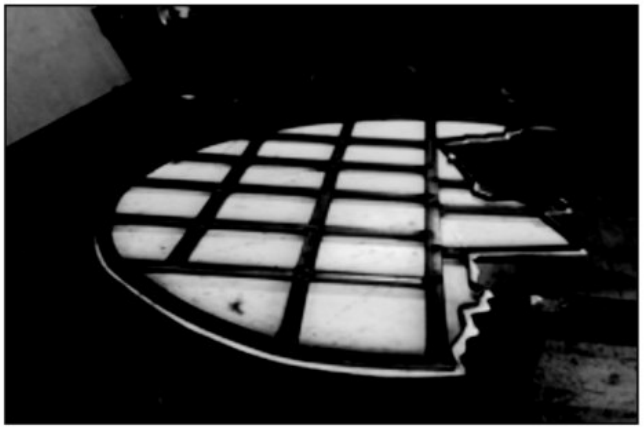
*15. After removing the mortar, a scalpel and air compressor were used to clean between the tesserae.*



*17, 18. A fibreglass board of appropriate size and thickness was designed and then cut to size.*



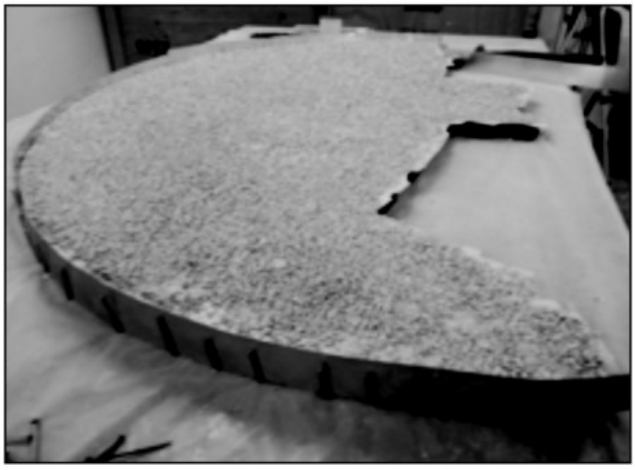
*16. An electric air-blowing device was also used to remove the mortar residue.*



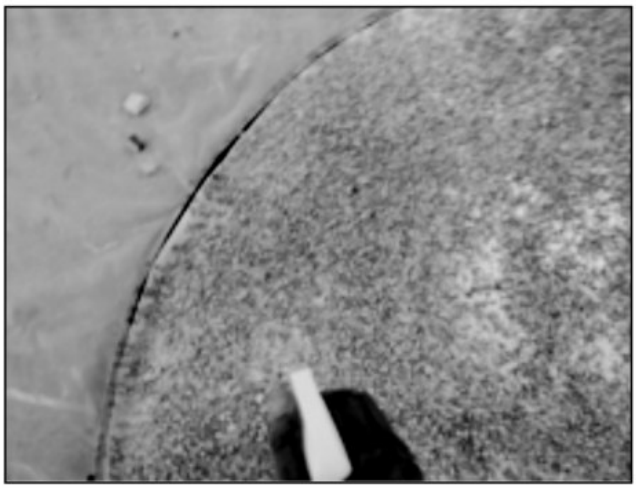
*19. A metal bridge was designed to hold the fibreglass, which was attached with screws.*



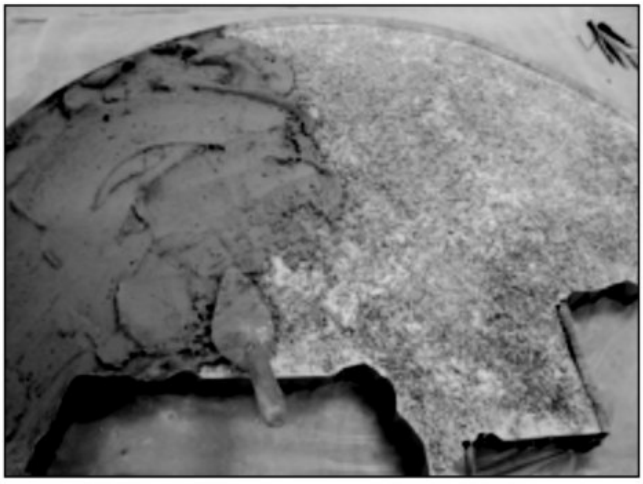

20. The surface of the fibreglass was then roughened using epoxy and beads in order to provide grip for the mortar.



21. The next stage was to attach the fibreglass board to a wooden board in order to facilitate the temporary attachment of a metal border around the mosaic using bolts, so as to delineate its edges.



22. Before applying the new mortar to the fibreglass, both fibreglass and tesserae were wetted by spraying water.



23. The new mortar, which was applied to both the fibreglass and the tesserae, was prepared using lime, marble powder and water.



24. Once secure within the metal border, the mosaic was turned.



25. The fabric removed after being wetted first with water and then with a substance known as Americana. A heavy, flatted, rectangular piece of iron measuring 12 x 17 cm, with an upper handle, was used to press the tesserae into the new mortar, thereby encouraging the mortar to penetrate between them.



26. The mosaic was left to dry and then rinsed with water. A rough brush was used to remove glue and calcination; the remnants of the old glue used in the first restoration were removed mechanically using a scalpel.



27. The metal border around the frame was then removed.



28, 29. Finally, diluted Paraloid was then applied to the surface of the mosaic to protect it from dirt and dust shows the mosaic after the first and second restorations.



30. The restored mosaic was placed in Dar AL-Saraya museum in Irbid province.

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# KHASHM AL-'ARFA: AN EARLY NEOLITHIC ENCAMPMENT IN THE EASTERN JAFR BASIN, SOUTHERN JORDAN

*Sumio Fujii, Takuro Adachi, Masatoshi Yamafuji and Kazuyoshi Nagaya*

## 1. Introduction

Since the first season in 2009, Phase 3 of the Jafr Basin Prehistoric Project (JBPP) has addressed the issue of the history of water use in the arid periphery. A series of general surveys makes it increasingly clear that the Neolithic Jafr Basin had a variety of water catchment facilities, and that the development of water exploitation technology in the arid periphery sustained the process of pastoral nomadization (Fujii 2007a, 2007b, 2010, 2013, n.d.).

An additional result of the surveys is the discovery of Khashm al-'Arfa, a small-scale Neolithic encampment in the eastern Jafr Basin. The excavation, which took place in summer 2013, suggested that the site accommodated a small group of early pastoral nomads. It is possible that they were involved in the construction and management of the cistern-type of Neolithic barrage, examples of which are dotted across the same area (Fujii *et al*. this volume). Given this, it would follow that the encampment and surrounding barrages combined to form a structural complex essential for the establishment of early pastoral nomadism. This report summarizes the results of our investigations at this unique site and briefly discusses its archaeological implications.

## 2. Site and Site Setting

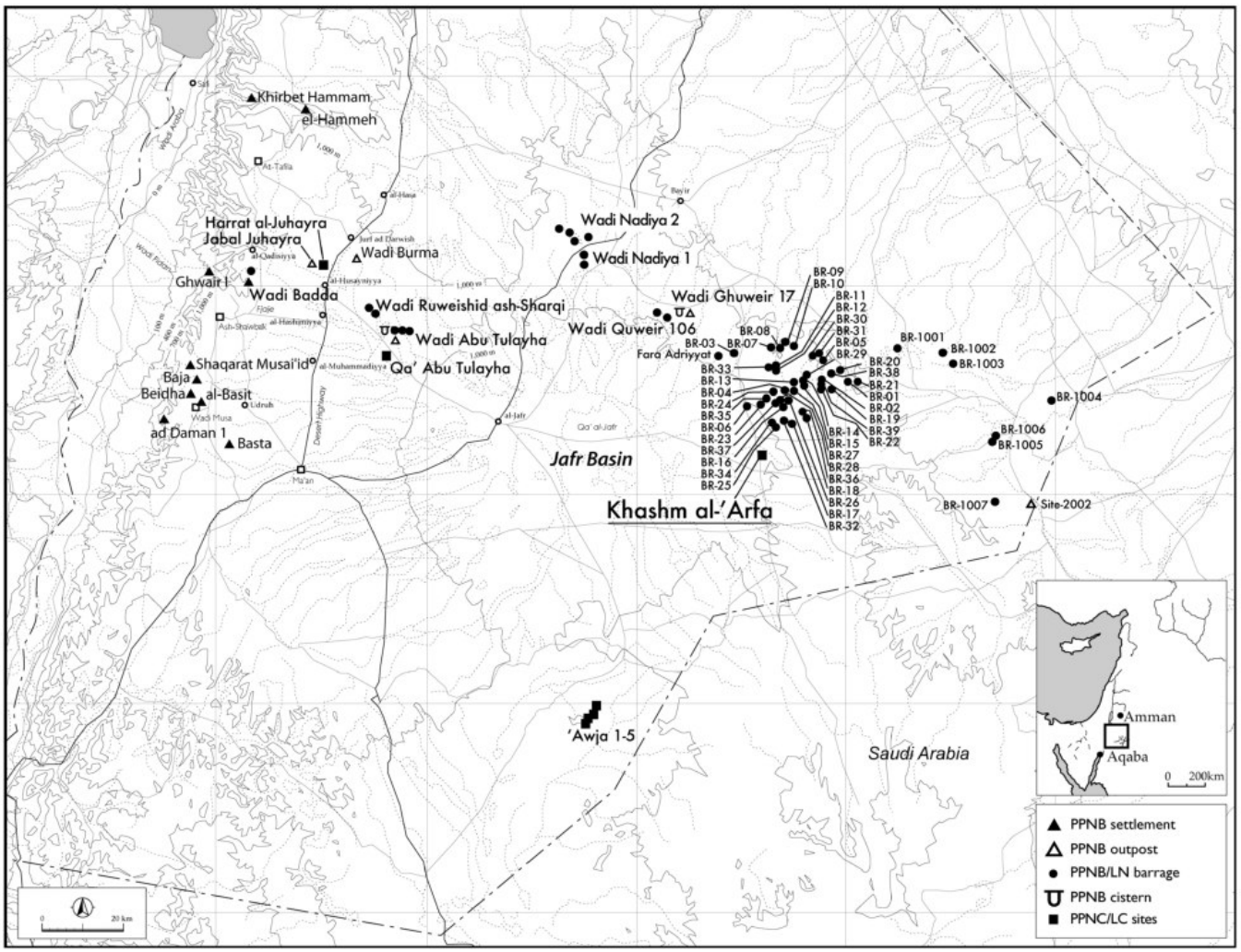
Khashm al-'Arfa is located in hilly limestone terrain fringing the eastern edge of the Jafr Basin **(Fig. 1)**. The site is far from traditionally settled areas in southern Jordan, being *ca* 140 km east of Wadi Musa, *ca* 65 km east even of al-Jafr in the center of the basin, but only *ca* 35 km north of the Saudi border. In terms of topography, it occupies the lower edge of a north-facing gentle slope, adjacent to a major track connecting the basin with the border area to the east **(Figs. 2 and 3)**.

The site was found by chance during our barrage survey in March 2013 and was provisionally registered as JF-1301 in our site registration code system. The excavation took place over two weeks in September that same year. The site proved to represent a small encampment of early pastoral nomads dated, on the basis of several C-14 dates and comparative studies of diagnostic finds, to the Late Pre-Pottery Neolithic B (hereafter LPPNB) - Pre-Pottery Neolithic C (hereafter PPNC) transition. Though small in scale and temporary in nature, this is the first post-PPNB settlement to be discovered in southern Jordan, let alone the Jafr Basin.

The setting of Khashm al-'Arfa is the same as that of the other Jafr sites, being characterized by a hyper arid climate with an average annual rainfall of less than 50 mm and consequently poor vegetation. Understandably, no traditional settlements exist and local land use has been limited to sporadic pasturing, taking advantage of perennial shrubs dotted in wadi beds and the appearance of annual grasses in early spring. The discovery of an early Neolithic encampment (and the supposedly contemporary barrages described elsewhere in this volume) was therefore all the more unexpected and requires yet another reassessment of the archaeological potential of the Neolithic Jafr Basin.

## 3. The Excavation

The site was identified through the presence



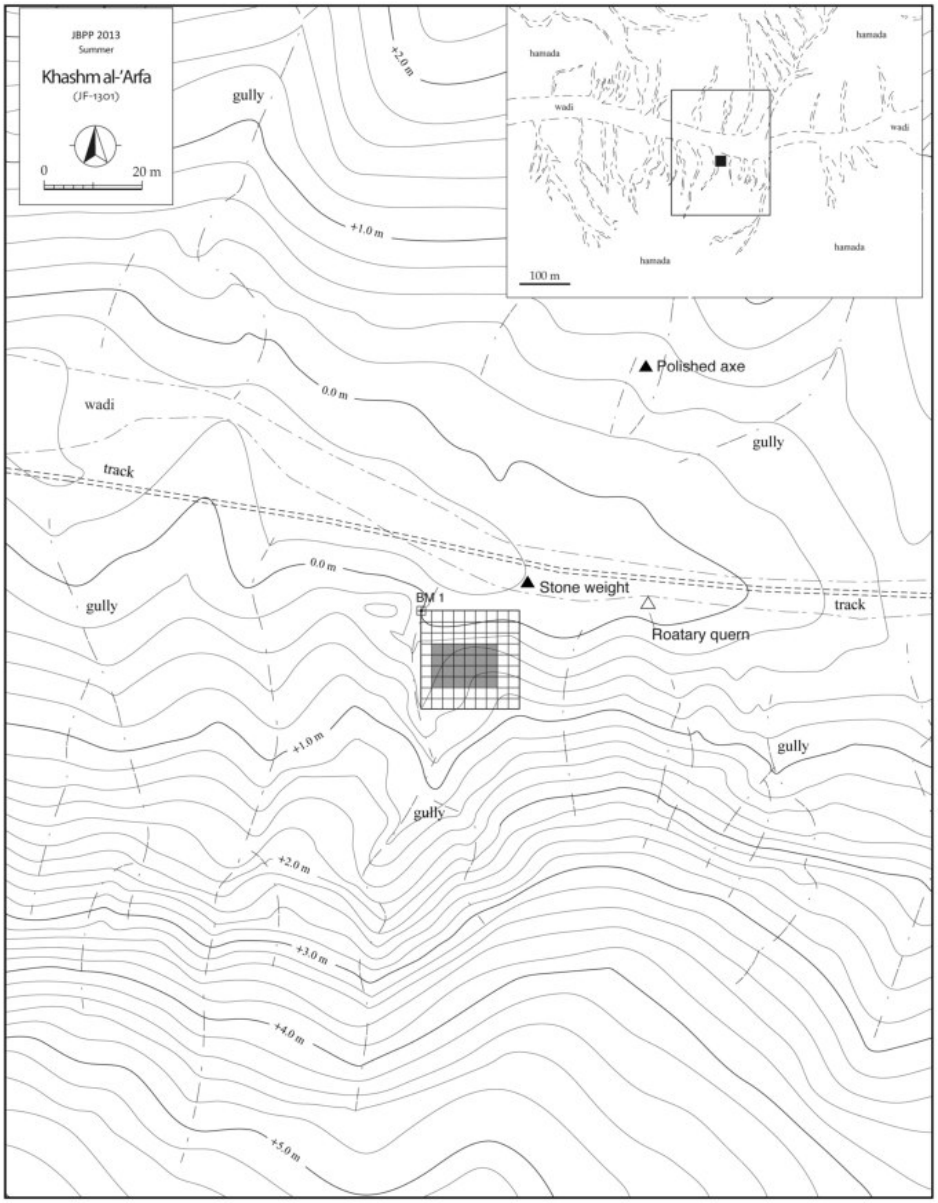

*1. Khashm al-'Arfa: location and surrounding sites.*



*2. Khashm al-'Arfa: aerial view (looking SE).*

of a few intermittent wall alignments protruding from the modern ground surface and flint artifacts scattered round them. Prior to the excavation, we set up an arbitrary benchmark (30º13.772 N, 036º54.282 E; elevation 912 m asl) at the north-western corner of the site and laid out a 2 x 2 m grid over the whole area of the flint scatter (*ca* 0.03 ha in total area). We then carried out an intensive surface survey of the eighty-one squares thus laid out. In addition, we undertook a less intensive surface survey within a 100-m radius of the grid.

The excavation took place in the central twenty-four squares where the wall alignments were exposed. The excavated area totaled 96 m2, being a little less than 30 % of the extent of the flint scatter. The site stratigraphy is as follows: Layer 1 or the surface layer (*ca* 3 - 5 cm thick) consists of light buff, loose silty - sand deposits including heavily abraded flint and limestone pebbles; Layer 2 (*ca* 5 - 7 cm thick) consists of buff, somewhat compact silty - sand deposits including a reduced frequency of similar pebbles;



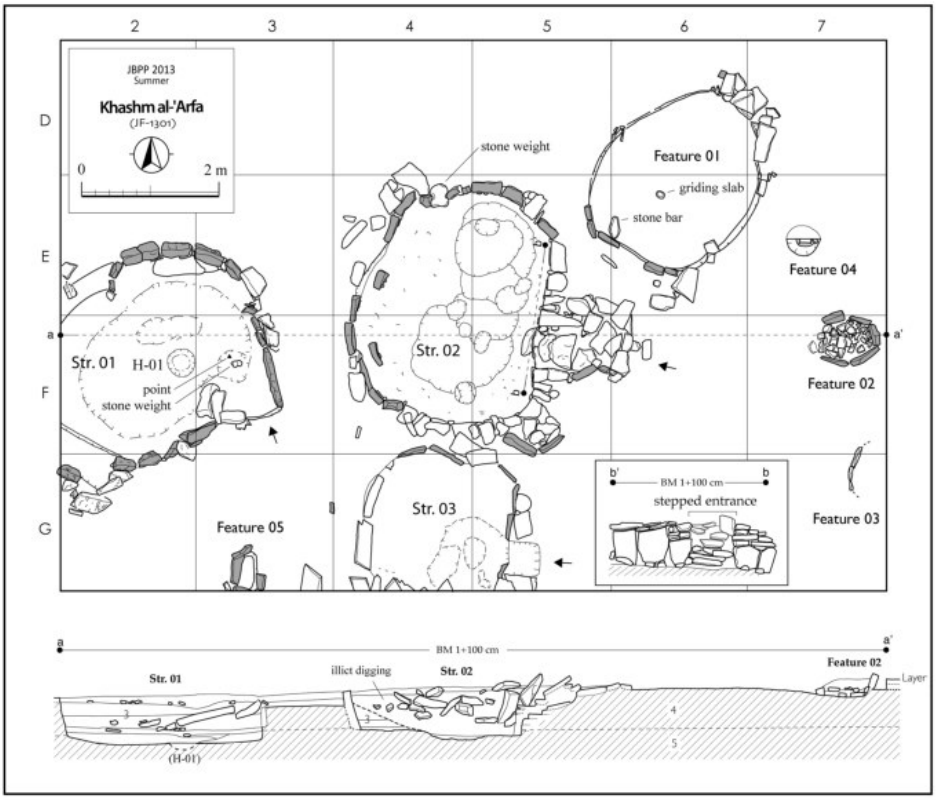

*3. Khashm al-'Arfa: contour map.*

Layer 3 (*ca* 60 - 70 cm thick) is a generic term for the fill deposits within the structural remains and includes a lot of fallen stones and a variety of aeolian and fluvial deposits; Layer 4 (*ca* 50 - 60 cm thick) consists of reddish buff, compact silty - sand deposits including small fragments of chalky limestone. The excavated features were dug into, or constructed on, the upper surface of Layer 4. The underlying chalky limestone layer (Layer 5) was partly exposed in the floors of the semi-subterranean structures. Evidence suggests that low-quality limestone slabs, which covered this layer, were used as the main construction material for the structures.

The excavation revealed three semi-subterranean masonry structures and five small surface features, which combined to form a small structural complex facing east or south-east **(Figs. 4 and 5)**. Surface observations suggest that the excavated complex represents almost the entirety of the encampment. Thus, it is tentatively concluded that the encampment comprises a single complex and has a total area of *ca* 0.01 ha. A brief description of each component follows below.

*Structure 01*

Structure 01 is located at the western edge of the excavated area. As noted above, it was found



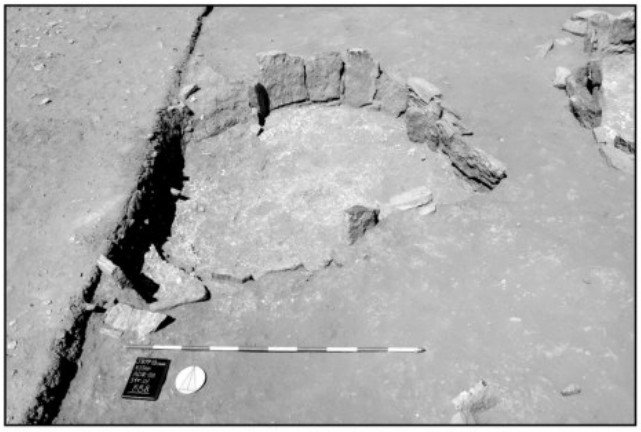

*4. Khashm al-'Arfa: plan and section of the structural complex.*



*5. Khashm al-'Arfa: general view of the structural complex (looking NE).*

partly protruding from the ground surface when we located the site. The excavation demonstrated that the exposed wall alignments represent an oblong semi-subterranean structure, which measured *ca* 4 m on its longer ENE - WSW axis, *ca* 2.5 m on its shorter NNW - SSE axis and had a maximum floor depth of *ca* 0.6 m **(Fig. 6)**. A single row and course of upright limestone slabs up to *ca* 0.7 m high constituted the wall; no unequivocal evidence for upper courses was found. A shallow depression in the center of the floor probably was probably where limestone slabs were detached from the upper surface of the chalky limestone layer. As is usual with such simple semi-subterranean structures, no clear evidence for a superstructure was found. Thus, thatched or tent-like roofing is conceivable, although neither postholes nor pillar bases were observed on the floor.

The structure consisted of a single room, with an entrance-like gap in the wall at the south-east corner. The floor utilized the chalky limestone layer (Layer 5) without any special treatment. A small hearth *ca* 40 cm in diameter and *ca* 10 cm deep was found roughly in the center of the shallow depression. What interested us was the south-western corner, where a remarkable irregularity of the wall and difference in the elevation of the floor were noted. Both these observations suggest that the corner collapsed at some point and was then reconstructed, extending the floor somewhat to the south-west in the process. The floor deposits included several diagnostic artifacts, including a small



*6. Khashm al-'Arfa: Structure 01 (looking N).*



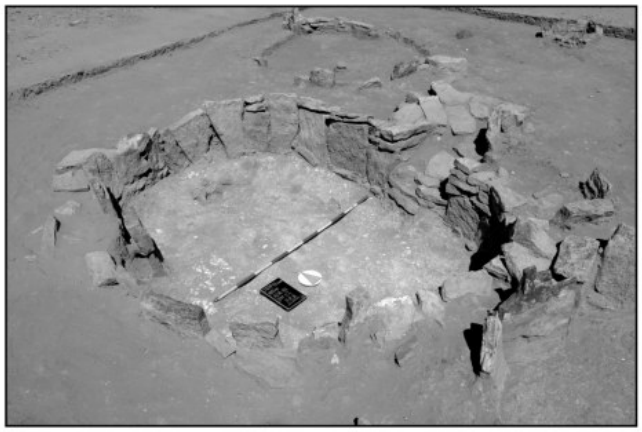

*7. Khashm al-'Arfa: in situ finds from Structure 01 (looking E).*

bilaterally notched stone weight **(Fig. 7; Fig. 22:13)** and a spearhead **(Fig. 7; Fig. 19:16).**

*Structure 02*

This structure occupied the center of the excavation area and was surrounded by the other structures and features. As with the neighboring Structure 01, it was also partly exposed when we located the site. Excavation confirmed that the exposed wall alignments form an oblong, semi-subterranean structure measuring *ca* 3.5 m on the longer axis, *ca* 2.5 m on the shorter axis and *ca* 0.6 m in floor depth **(Fig. 8)**. Again, the upright slab wall technique was used for the construction of the foundation course. The slabs used for the semi-subterranean retaining wall were *ca* 0.4 - 0.6 m high in most cases, but a few longer slabs up to *ca* 0.9 m high were also present. Many of them still retained unweathered chalky limestone cortex (similar to the floor material) on their surface, suggesting that they were detached from the upper surface of Layer 5.

What differed from Structure 01 was the existence of upper courses, which used a header or stretcher bond **(Fig. 9)**. The volume of fallen stone around the wall suggests that it originally had an above-ground height of *ca* 0.5 m. It follows that the structure was equipped with a low masonry wall between a thatched or tent-like roof and the semi-subterranean retaining wall. Another difference between the two structures is the orientation of the main axis. Unlike Structure 01, Structure 02 has a



*8. Khashm al-'Arfa: Structure 02 (looking NE).*



*9. Khashm al-'Arfa: the southern wall of Structure 02 (looking NE).*

main axis running NNE - SSW. An even more important difference concerns the presence of a stepped entrance *ca* 1.5 m long that was incorporated into the middle of the eastern wall. Though fallen in most cases, two rows of upright slabs lined both sides of the entrance. In

addition, a small external feature was attached to the south-east corner of the structure. This surface feature was both paved and lined with limestone slabs, suggesting its use as a storage compartment for firewood or similar. This series of noteworthy differences between Structures 01 and 02 strongly suggests that the latter was a core component of the complex.

In terms of typology, this structure was also of single-room type. No hearth was found, but irregular depressions left by a large looters' pit were noted across the floor. Once again, several diagnostic artifacts were found. Of special interest is a bilaterally notched stone weight, a hallmark of the Jafr Neolithic, which was reused as building material and incorporated into the above-ground masonry wall at the north-western corner of the structure **(Fig. 10; Fig. 22:12).**

*Structure 03*

Structure 03 is located at the central southern edge of the excavation area, abutting the southern wall of Structure 02. It has a floor area *ca* 2.5 m by *ca* 2 m and a floor depth of *ca* 0.4 m **(Fig. 11)**. It is a smaller version of Structure 02, sharing a similar plan and orientation with the main structure. It also bears some resemblance to Structure 01, in the sense that it is devoid of any clear evidence for an above-ground masonry wall and that a narrow slope, instead of a stepped entrance, is incorporated into - in this case - the eastern wall. This suggests that the complex consisted of a main feature (Structure 02) and two subsidiary components (Structures 01 and 03). No hearth was found, but a small number of flint artifacts were recovered from fill layers and floor deposits.

*Small Features*

The excavation revealed five small features, four of which were clustered in the frontal space of Structure 02, the core of the complex. Though different in the way it combined with other structures, the remaining small feature (Feature 05) likewise occupied the frontal space of Structure 01. This recurring layout was probably a response to the strong north-westerly prevailing wind (Fujii 2014) that, more specifically, may have been aimed at preventing smoke from the features from entering neighboring structures. The five features all have a round to oval plan but vary in dimensions. All of them are surface features with a shallow depression in the center, being lined - in most cases - with upright limestone slabs *ca* 10 - 20 cm high.

Feature 01 is the largest of the five, having a floor area of *ca* 2.5 m by *ca* 2.2 m and a floor depth of *ca* 0.2 m. It was seriously disturbed, with the original upright slab wall being preserved at the south-western corner only. Though superficially resembling the three structures, a series of key differences - *viz*. shallow floor depth, inferior construction quality, absence of an entrance or entrance-like slope, and the scarcity of small finds - clearly indicate that this feature had a different function. Its use as a temporary hut




*10. Khashm al-'Arfa: in situ find from Structure 02 (looking S).*



*11. Khashm al-'Arfa: Structure 03 (looking E).*

or workshop would be conceivable. No hearth was found, but a stone bar and a grinding slab were found *in situ* on the floor **(Fig. 12).**

Feature 02 is much smaller in size, measuring *ca* 80 cm by *ca* 60 cm in floor area and *ca* 10 cm in floor depth. It contained ashy deposits ca 12 - 15 cm thick in its base **(Fig. 13)**. Thus, it was probably used as an outdoor hearth. These deposits were covered with some small limestone cobbles, which may have been deposited in the hearth to prevent the ash from dispersing. Though poorly preserved, the remaining three features resembled Feature 02 in many respects, including the presence of ashy deposits **(figs. 14 - 16)**.

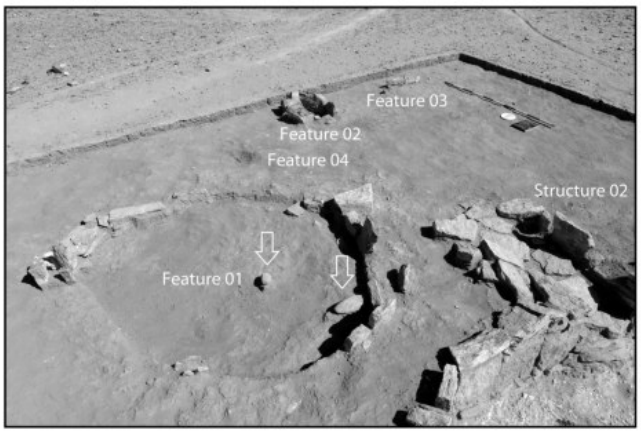
To summarize, the five small features fall into two categories: a hut- or workshop-like feature (Feature 01) and four outdoor hearths (Features 02 - 05). The frequency of open-air heaths is a correlate of the scarcity of internal hearths, again suggesting that the encampment was temporary in nature.

## 4. Small Finds

Small finds from Khashm al-'Arfa are limited to chipped stone artifacts, ground stone implements and faunal remains only. Other categories of artifacts, such as adornments or bone tools, were not found. The paucity of small finds again attests to the temporary nature of the encampment and the high mobility of the group concerned.

*Chipped Flint / Calcite Artifacts*

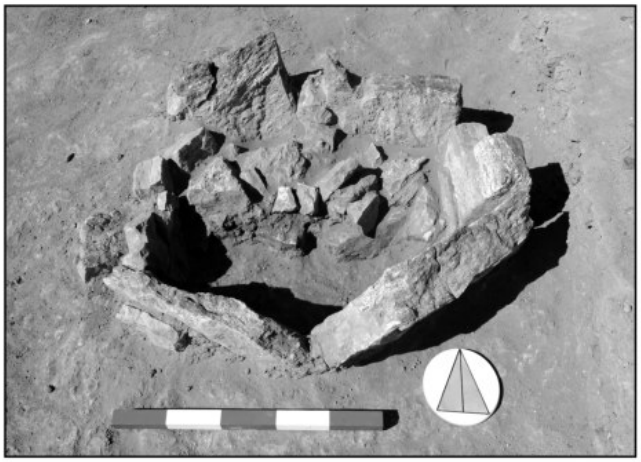
Aside from four hammer stones and one Levallois core, a total of 1,855 chipped stone artifacts were recovered from the surface survey and excavation **(Table 1)**. All were made of flint or calcite; no obsidian products were found. Since a detailed analysis is still in progress (Nagaya in prep.), the following description will



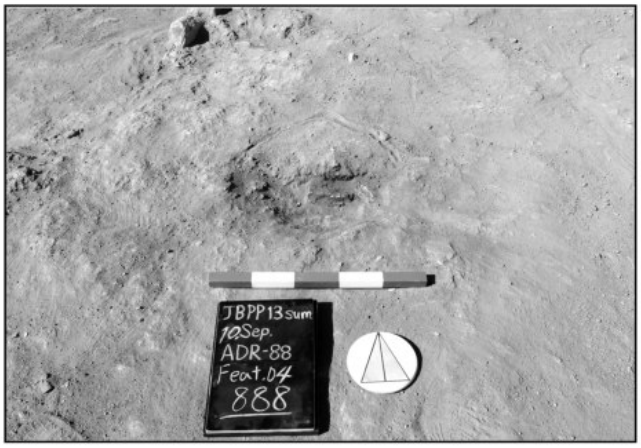

*12. Khashm al-'Arfa: Feature 01and its surrounding features (looking SE).*




*14. Khashm al-'Arfa: Feature 03 (looking NW).*



*13. Khashm al-'Arfa: Feature 02 (looking N).*




*15. Khashm al-'Arfa: Feature 04 (looking N).*




*16. Khashm al-'Arfa: Feature 05 (looking SE).*

**Table 1** : Inventory of chipped stone artifacts from Khashm al-'Arfa..

| **Categories** | N | *%* |
|---|---|---|
| Cores | 18 | *1.0* |
| Debitages | 1,722 | *92.8* |
| Tools | 115 | *6.2* |
| Total | 1,855 | *100.0* |
| Hammer sotones | 4 | - |
| Palaeolithic artfiact | 1 | - |
| Total | 1,860 | - |

deal with the general aspects of the assemblage.

The core class (total of 18 examples) is dominated by opposed platform cores **(Fig. 18:1-2)**, which include two naviform-type examples **(Fig. 18:3-4).** In addition, single-platform **(Fig. 18:5)**, multi-platform **(Fig. 18:6)** and change of orientation cores **(Fig. 18:7-8)** are present in small numbers. The scarcity of naviform cores is suggestive of a final or post-PPNB date for the assemblage. Incidentally, the absence of calcite cores (and scarcity of calcite debitage) indicates that most, if not all, of the calcite tools described below were brought to the site as finished or part-finished products.

The debitage class (1,722 pieces) comprises unmodified blades / flakes / bladelets, crested blades, core rejuvenation flakes, burin spalls **(Fig. 20:5-6)** and chips / chunks. The first group is thought to include a certain quantity of tool blanks without secondary retouch. The blade / flake ratio is 4 : 6. Thus, the assemblage can be regarded as being slightly flake-oriented, which accords well with the frequency of flake cores. The scarcity of primary elements retaining original cortex suggests that the initial stage of core preparation took place elsewhere, probably near a remote flint outcrop - a likely assumption when we consider that no high quality flint nodules are available around the site.

The tool class (115 samples) is dominated by retouched and / or utilised blades / flakes (45.2 %), burins (21.7 %) and points / spearheads (14.8 %). These three major categories account for more than 80 % of the total, with other tool types representing only a few percent or less **(Table 2)**. The first group is marked by snapped blades with a finely retouched or utilised lateral edge **(Fig. 21:8-9**). The second group is dominated by angle burins on a snapped or truncated end **(Fig. 20:9-13; Fig. 21:1-3)**, but transverse or dihedral burins on a pointed end are also included to a lesser extent **(Fig. 21:4-6)**. A predominance of burins with elongated burin scars, together with a high frequency of long burin spalls, is characteristic of the so-called 'burin sites' (Betts *et al*. 2013; Rollefson 1988) peculiar to the Jordanian badia during the Neolithic. This raises the possibility that standardized burin spalls were systematically produced as tool blanks for pointed implements such as drills (Finlayson and Betts 1990). Nevertheless, neither raw material nor finished pierced beads were found at the encampment. The point / spearhead class is dominated by Amuq-type points **(Fig. 19:2, 6, 8, 10, 14-15)**, but other types - including foliate spearheads **(Fig. 19:16-17)** - also occur in considerable numbers. A high frequency of hunting weapons appears to have been the norm during the Jafr Pastoral Neolithic, indicating that hunting was still a major subsistence activity for the earliest pastoral nomads as well as for earlier pastoral transhumants (Hongo *et al*. 2013).




*17. Khashm al-'Arfa: selected chipped stone artifacts.*

The tool kit also includes a small number of bifacial tools **(Fig. 17:1-4; Fig. 19:18-20; Fig. 20:1)**, scrapers **(Fig. 17:5-6; Fig. 20:2-4)**, notches / denticulates and borers. The bifacial tools comprise diagonally pressure-flaked examples and normal products, both of which are reminiscent of Late Neolithic Tuwailan assemblages in the Negev highlands to the south-west (Goring-Morris *et al.* 1994). They were probably used as knives, but it is also conceivable that the finer examples were imported as prestige items.

To summarize, the assemblage is of an eclectic nature, containing both typical PPNB components such as Amuq-type points and post-PPNB elements such as finely retouched bifacial knives. In this sense, it can probably be defined as transitional between the two periods. Suggestive in this regard is the stratified flint assemblage of Dhuweila in the Azraq Basin (Betts 1998: 59-119). In terms of its character, the Khashm assemblage appears to fall into an intermediate period between Dhuwayla hStage 1 (marked by typical PPNB elements) and Dhuweila Stage 2 (characterized by the presence of Herzliya / Nizzanim points, transverse arrowheads and tile knives). As mentioned below, this chronological perspective accords well with C-14 dates from the two sites.

*Ground Stone Artifacts*

The ground stone assemblage consists of a dozen grinding slabs, three bilaterally notched stone weights and a diagonally truncated stone bar. Neither querns nor stone vessels were found. Most of the ground stone objects are made of limestone or sandstone, but the stone weights include one flint example.

The grinding slabs are palm-sized, measuring *ca* 10 - 15 cm long, *ca* 7 - 11 cm wide, *ca* 2 - 7 cm thick and *ca* 0.3 - 1.4 kg in weight **(Fig. 22:1-10).** Most of them have an oblong or semi-rectangular plan, being equipped with a slightly convex dorsal surface and a flat working surface. Small pits and / or linear striations can be seen on the working surfaces of several samples, suggesting their use as smashing and / or grinding tools. The frequency of grinding slabs may correlate with levels of plant food exploitation. Of note is the absence of their lower counterparts (with the exception of three small fragments and a rotary quern described below), which contrasts with the PPNB agro-pastoral outposts where a variety of querns were used in combination with similar grinding slabs (e.g. Fujii 2008: figs 16, 29). This contrast probably means that heavy-duty querns were replaced with unmodified natural stones or exposed bedrock over the course of pastoral nomadization. The disappearance, or at least reduced use, of querns despite the continuous use of grinding slabs suggests that plant foods played a decreasing role amongst the earliest pastoral nomads in the Jafr Basin. As mentioned below, the absence of botanical remains also argues for this assumption.

Bilaterally notched stone weights made of limestone or flint are amongst the hallmarks of the Jafr Pastoral Neolithic and have been reported from every PPNB settlement and barrage known to date in the basin (e.g. Fujii 2007a: fig. 16; Fujii 2009: fig. 19, nos 7-9; Fujii, Adachi *et al.* 2011: figs 32-33; Fujii and Adachi 2012: fig.

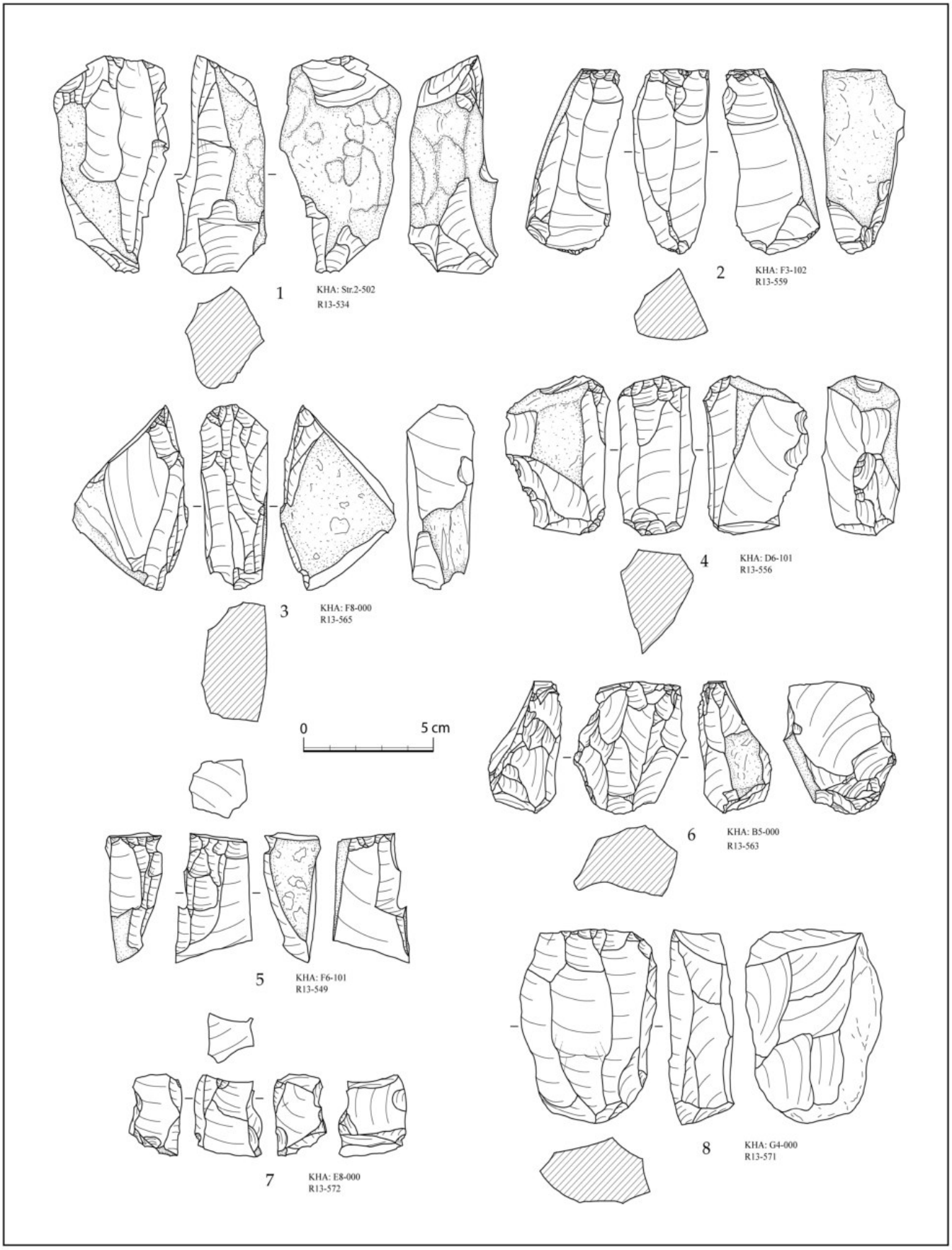
**Table 2 :** Inventory of tool classes from Khashm al-'Arfa.

| Tool types | lint | | Calcite | | Total | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Scrapers | 2 | *2.0* | 0 | *0.0* | 2 | *1.7* |
| Burins | 25 | *25.0* | 0 | *0.0* | 25 | *21.7* |
| Notches | 5 | *5.0* | 0 | *0.0* | 5 | *4.3* |
| Denticulate | 1 | *1.0* | 0 | *0.0* | 1 | *0.9* |
| Borers | 2 | *2.0* | 0 | *0.0* | 2 | *1.7* |
| Points/spearheads | 14 | *14.0* | 3 | *20.0* | 17 | *14.8* |
| Rod | 0 | *0.0* | 1 | *6.7* | 1 | *0.9* |
| Truncation | 0 | *0.0* | 1 | *6.7* | 1 | *0.9* |
| Retouched/used blades/flakes | 42 | *42.0* | 10 | *66.7* | 52 | *45.2* |
| Fine bifacial knives | 2 | *2.0* | 0 | *0.0* | 2 | *1.7* |
| Bifacial knives | 2 | *2.0* | 0 | *0.0* | 2 | *1.7* |
| Bifacial tools | 3 | *3.0* | 0 | *0.0* | 3 | *2.6* |
| Unidentified | 2 | *2.0* | 0 | *0.0* | 2 | *1.7* |
| Total | 100 | *100.0* | 15 | *100.0* | 115 | *100.0* |

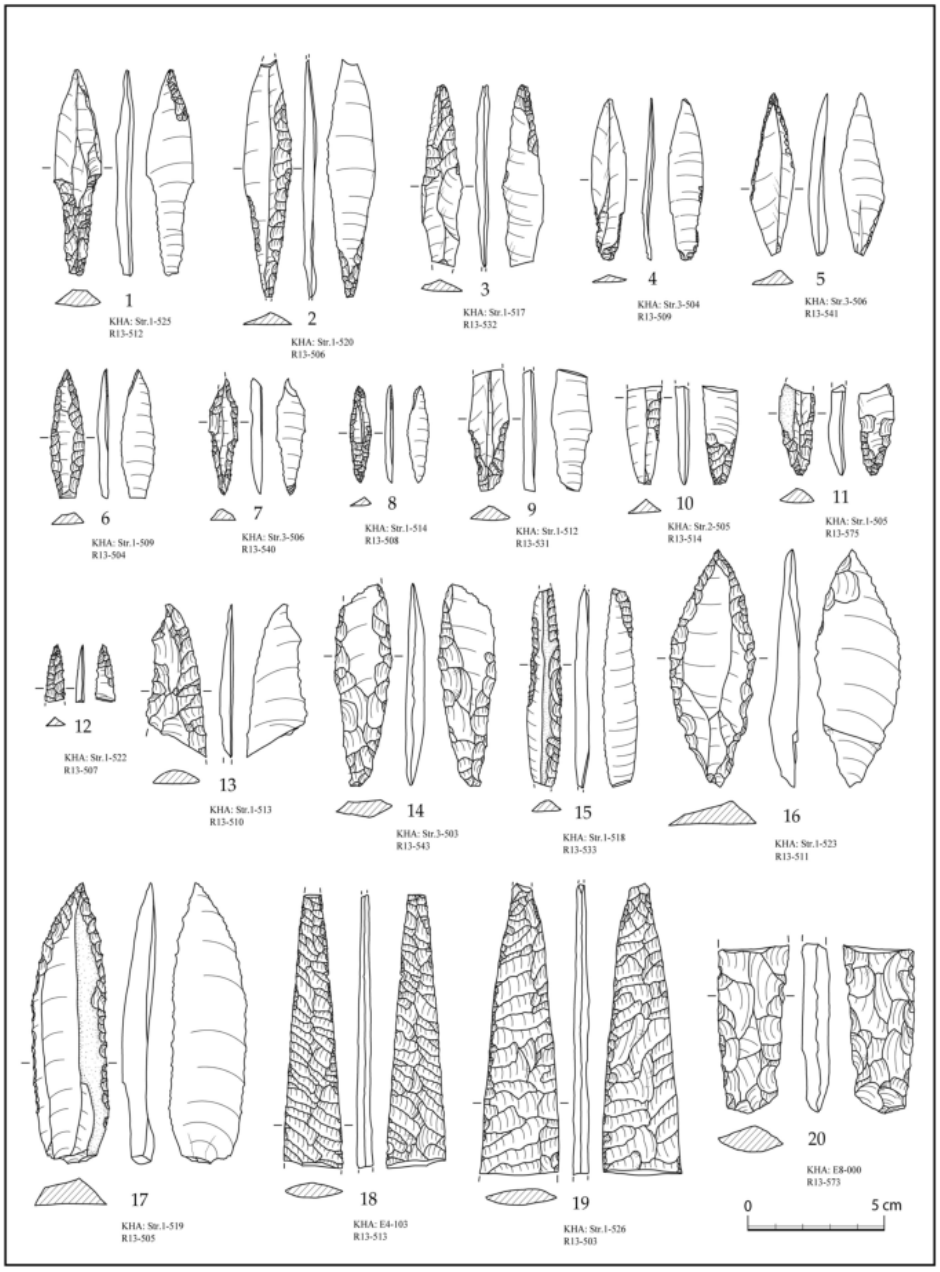
34, nos 1-2 and 4; Fujii, Adachi *et al*. 2013: fig. 24, nos 7-8; Fujii, Quintero *et al*. 2011: fig. 28, no 1). The three stone weights from Khashm al-'Arfa, two from the excavation area **(Fig. 22:12-13)** and one from a point *ca* 22 m ENE of BM-1 **(Fig. 3; Fig. 22:14)**, can be regarded as extensions of this tradition, but a remarkable reduction in size differentiates them from earlier examples. (While the PPNB examples are usually more than 50 cm long and weigh no less than 50 kg, later examples are much smaller and lighter). This contrast indicates that stone weights became smaller over the course of pastoral nomadization, a phenomenon that has parallels with the disappearance of querns. Incidentally, stone weights from the cistern-type barrages located around the encampment are also small in size, suggesting contemporaneity between the two (Fujii *et al*. this volume).

Diagonally-truncated stone bars made of limestone or flint are another hallmark of the Jafr Pastoral Neolithic, and many examples have been found at PPNB sites (e.g. Fujii 2008: fig. 31, nos 1-2; Fujii 2009: fig. 19, nos 1-3; Fujii, Adachi *et al*. 2012: fig. 34, no 3; Fujii, Adachi *et al*. 2013: fig. 17, no 8; Fujii, Quintero *et al*. 2011: fig. 27, nos 5-8). The find from Feature 01 can be taken as a less standardized form of the earlier examples (FIG. 22:15). This heavy-duty tool, *ca* 34 cm long and *ca* 4.8 kg in weight, was probably used for digging the large pits for the semi-subterranean structures and for detaching slabs of building material from the upper surface of Layer 5. The edge damage at both ends is also suggestive of such use.

In addition, a small polished axe made -




*18. Khashm al-'Arfa: chipped stone artifacts (Cores).*

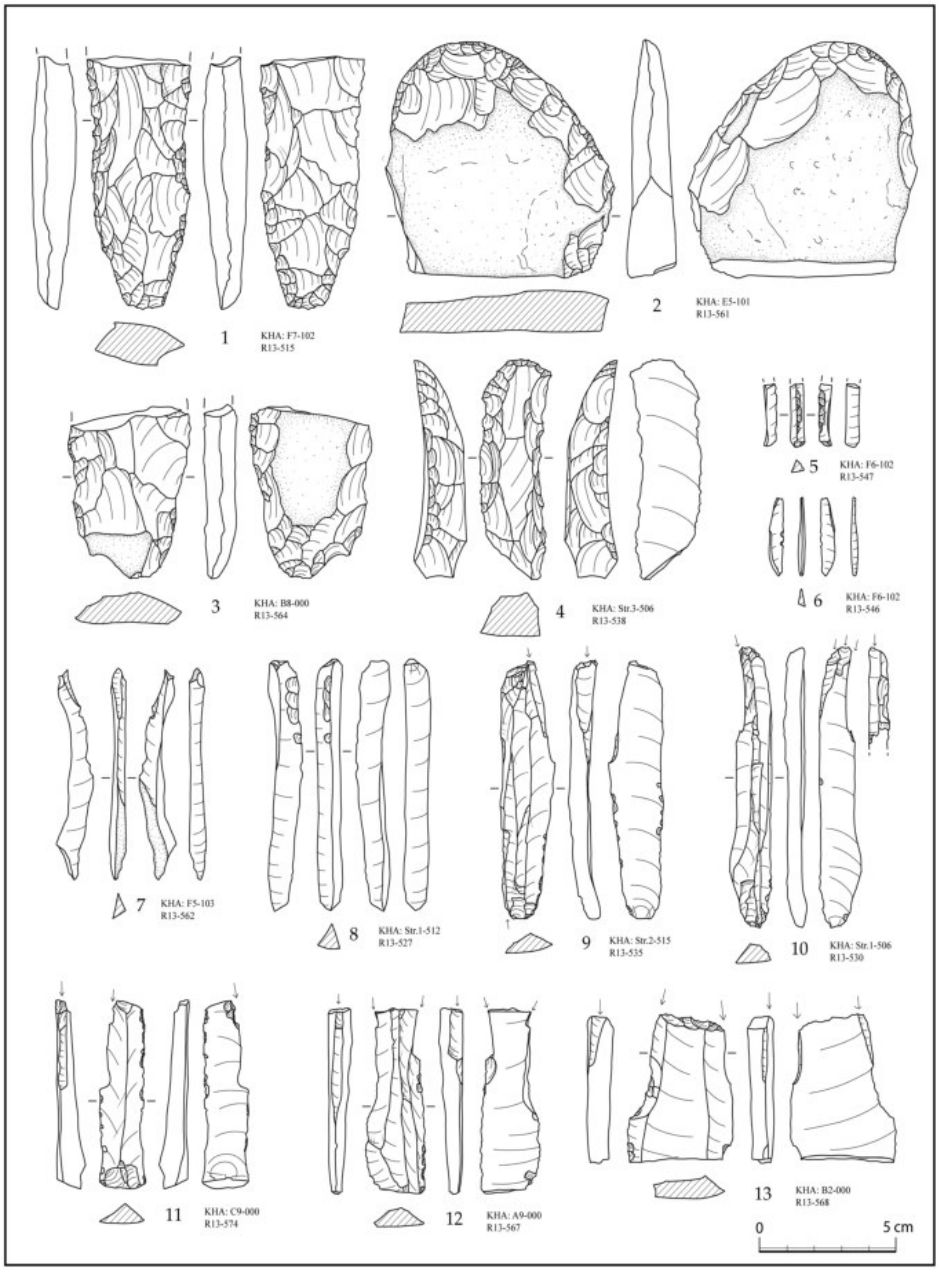



*19. Khashm al-'Arfa: chipped stone artifacts (points/spearheads, knives).*

probably - of chlorite schist was found at a point *ca* 70 m NE of BM-1 **(Fig. 3; Fig. 22:11).** This stray find derived, most likely, from the neighboring encampment. It has remarkable edge damage, suggesting that tree cutting and / or timber processing took place around the site, in an area that is now very poor in vegetation. Other stray finds include a small rotary quern fragment made of porous basalt, which was found at a point *ca* 45 m east of BM-1 **(Fig. 3)**. However, it is apparently of later date and has no direct relationship with the Neolithic encampment.

*Faunal / Botanical Remains*

A few bags of faunal remains were recovered from the three structures. Their analysis is currently in progress and is expected to provide valuable insights into hunting and herd management strategies at the encampment. In contrast, no botanical remains were recovered despite the flotation of a total of 86 litres of floor and hearth deposits (Nasu 2013). This again suggests that, unlike at the M - LPPNB agro-pastoral outpost of Wadi Abu Tulayha (Hongo *et al*. 2013), use of plant foods at this remote



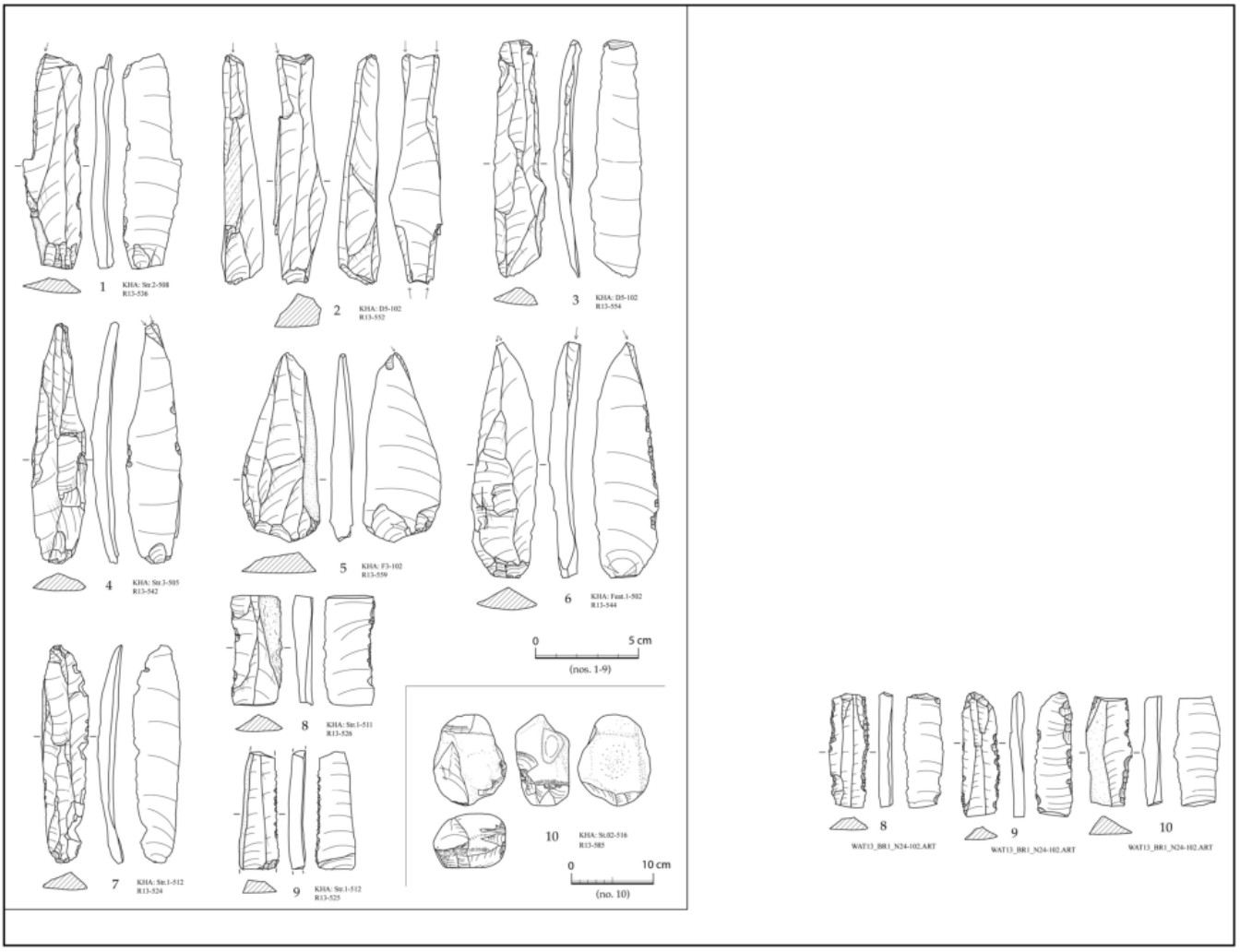

*20. Khashm al-'Arfa: chipped stone artifacts (knives, scrapers, burin spalls, burins).*

encampment of early pastoral nomads was very limited, if not nil.

## 5. Discussion

The site is relatively easy to date. All of the six C-14 dates converge on a short time span (*ca* 9,100 - 8,700 cal. BP), clearly indicating that the site falls into a transitional phase between the LPPNB (*ca* 9,500 - 8,900 cal. BP) and the PPNC (*ca* 8,900 - 8,300 cal. BP) **(Fig. 23)**. As noted above, the chipped stone assemblage was also characterised by an eclectic mix of typical PPNB and post-PPNB elements. The same was true of the ground stone artifacts, which inherited the PPNB tradition but exhibited a tendency towards remarkable size reduction. This all strongly suggests that the encampment was occupied in the transitional decades between the LPPNB and PPNC. To date, no contemporary settlements have been reported in the Jordanian *badia.* The site is therefore highly important in the sense that it provides a first glimpse into the very earliest stage of pastoral nomadization.

Similarly, the functional identification of



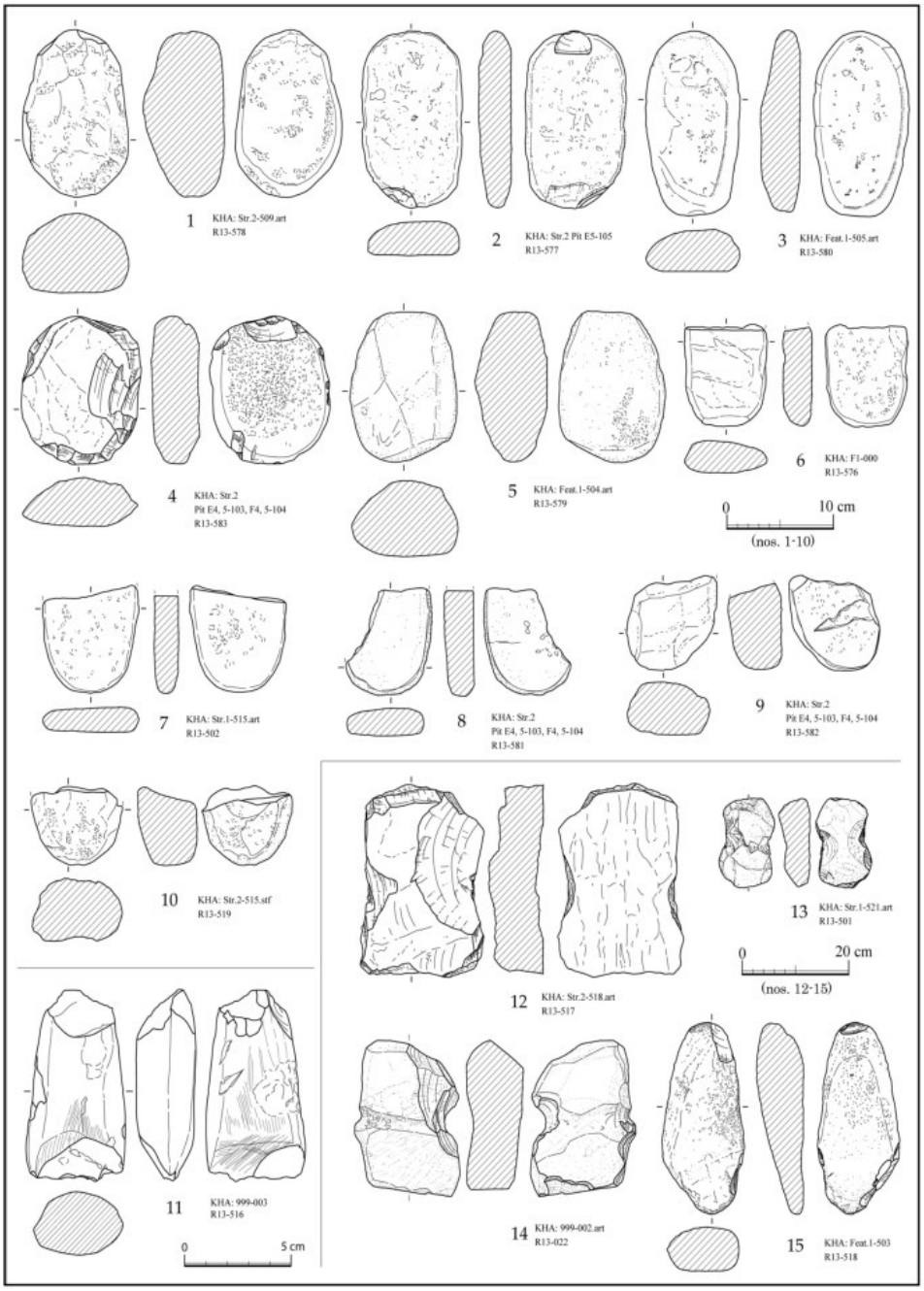

*21.Khashm al-'Arfa: chipped stone artifacts (burins, retouched/used blades, hammer stone).*

the site presents few difficulties. In view of the harsh site setting, the small site size, the shallow anthropogenic deposits, the simple site composition and the limited range of small finds, the site can be defined as the temporary encampment of a small-scale, highly mobile group. The question is whether the group represents local hunter-foragers or early pastoral nomads. This question is not easy to answer, however, because the faunal analysis is still ongoing. Nevertheless, we can argue that the site bears some resemblance to the PPNB agro-pastoral outposts in terms of both structural remains and small finds. It can, therefore, plausibly be regarded as their direct descendant. Given this, it would be reasonable to assume that the group inherited livestock from the agro-pastoral outposts. The existence of contemporary barrages within the same area also casts doubt on the hunter-forager hypothesis, being in favor of the nomad hypothesis. The frequency of hunting weapons is normal for the Jafr Pastoral Neolithic (e.g. Fujii 2009; Fujii, Quintero *et al*. 2011); it is unremarkable that the small encampment was still involved in hunting.

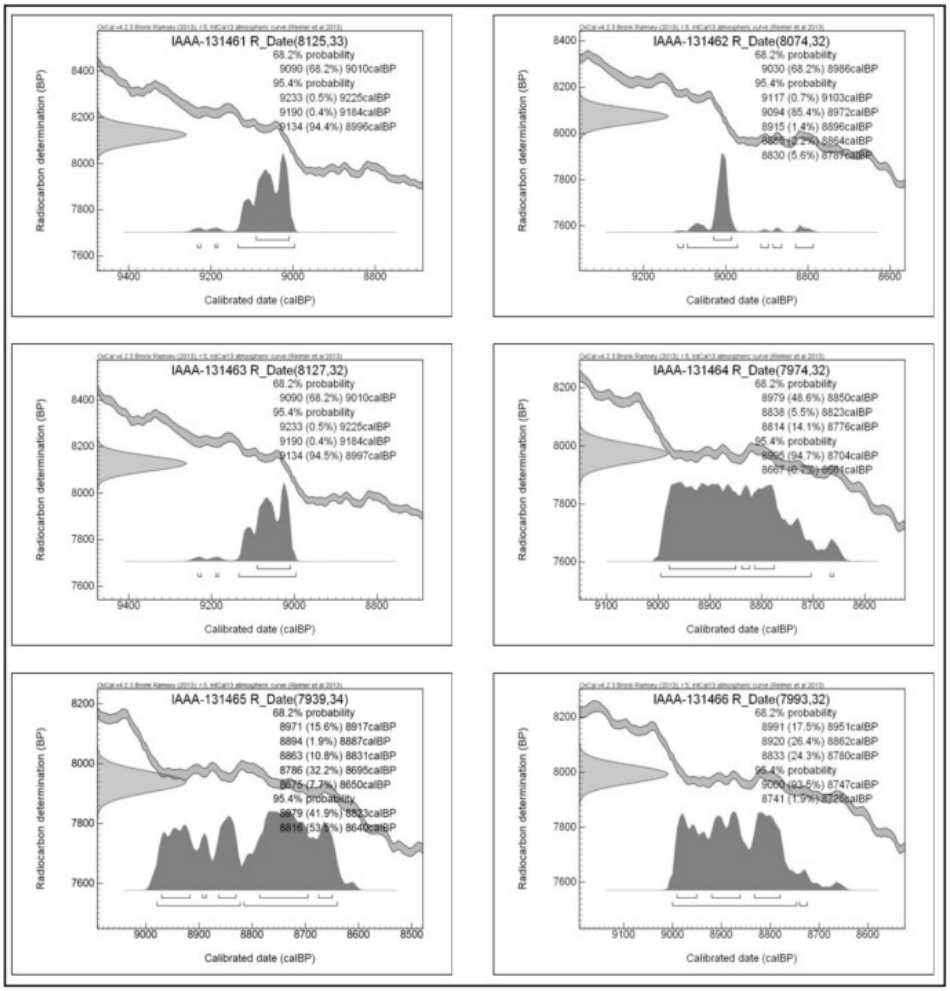
The above discussions lead to the conclusion that the site represents a temporary encampment of early pastoral nomads who immediately succeeded PPNB pastoral transhumants. The replacement of fixed agro-pastoral outposts in favour of a temporary encampment attests to the shift in life style. The series of noteworthy phenomena - *viz.* reduction in site size and artifact variety, disappearance of querns (despite the continued use of grinding slabs), size reduction of stone weights and absence of botanical remains - can all be understood as responses to increased group mobility. The scale and contents

of the excavated structural complex suggest that the early pastoral nomads formed a small group consisting of a few core families or an extended family. This is important when thinking about the basic unit of their social organization.

It is also worth noting that the group constructed stone-built structures even at a temporary encampment. This probably means that the earliest pastoral nomads did not yet reside in tents in the strict sense of the word. The apparent absence of residential tents likely reflects the fact that pastoral nomadism had only just started in the Jafr Basin at this stage. The semi-subterranean masonry structures were probably equipped with a thatched or tent-like superstructure, and would only later be supplanted by tents. In fact, no settlements post-dating the encampment at Khashm al-'Arfa have been identified in the Jafr Basin to date. The structural complex at Khashm al-'Arfa is highly significant in the sense that it illustrates the ordinary life of the earliest pastoral nomads immediately prior to the 'Tent Age'.




*22. Khashm al-'Arfa: groundstone artifacts..*




*23. Khashm al-'Arfa: C-14 dates.*

To conclude, a brief comment should be made about the relationship of the encampment with the cistern-type barrages dotted across the same area (Fujii *et al*. this volume). It is possible that the encampment was among their operating components, because similar stone weights are shared between the two. If this were the case, it would follow that the Neolithic population in the Jafr Basin abandoned the management of a fixed agro-pastoral outpost and its ancillary facilities, such as large-scale basin-irrigation barrages, and gradually shifted to a higher-mobility way of life sustained by small encampments and anthropogenic watering places. This working hypothesis is all the more worth testing because it has the potential to shed new light on the process of pastoral nomadization from the viewpoint of both settlement patterns and the history of water use. The small encampment of Khashm al-'Arfa (and the nearby cistern-type barrages) provide a key with which to start unlocking the issue.

## 6. Concluding Remarks

It is generally accepted that post-PPNB culture is of critical importance in tracing the process of pastoral nomadization in the southern Levant. However, our sources of information regarding this issue have been limited to extramural, non-residential installations, such as open sanctuaries (Fujii, Adachi *et al*. 2013; Fujii, Yamafuji *et al*. 2012) and barrages (Fujii 2010, 2013); no settlement data has been incorporated into the arguments. This is precisely because the archaeological visibility of residential space declined drastically in inverse proportion to the increase in group mobility. The small encampment at Khashm al-'Arfa has shed new light on the ordinary life of the earliest pastoral nomads. In this sense, it is highly important and requires further in-depth study. We would like

to continue our efforts towards a comprehensive understanding of the formation processes of the *badia* world as another dimension of Near Eastern history.

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# A PRELIMINARY REPORT ON THE NEOLITHIC BARRAGE SURVEYS IN THE EASTERN JAFR BASIN, 2013 - 2014

*Sumio Fujii, Takuro Adachi, Masatoshi Yamafuji and Kazuyoshi Nagaya*

## 1. Introduction

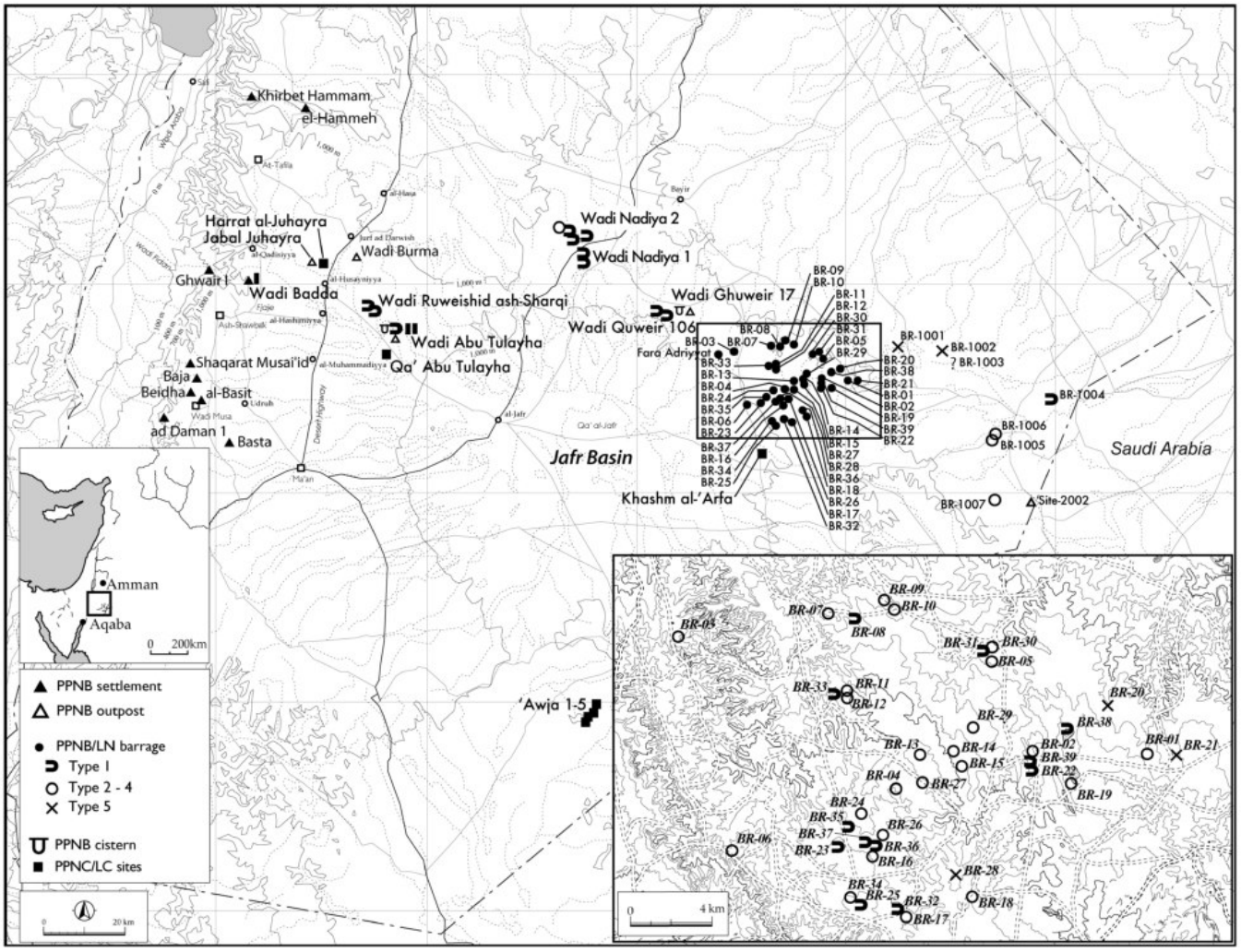
The Jafr Basin Prehistoric Project (JBPP) was established in 1995 with a view to tracing the process of pastoral nomadization in southern Jordan on the basis of archaeological evidence. The first two phases of the project, which took place in 1997 - 2002 and 2003 - 2008 respectively, focused on the establishment of a local chronology for the basin during the early Holocene. To achieve this objective, we successively excavated more than a dozen sites varying in date and nature from Pre-Pottery Neolithic B (hereafter PPNB) outposts to Early Bronze Age (hereafter EBA) cairn fields. This series of excavations have enabled us to draw a rough flow chart of the process of pastoral nomadization in southern Jordan (Fujii 2013).

The subsequent Phase 3 started in 2009 and continues until now **(Fig. 1)**. This phase has dealt with the history of water use in the Neolithic Jordanian *badia*, which was inspired by the discovery of basin-irrigation barrages and a cistern at the Middle to Late PPNB (hereafter M - LPPNB) outpost of Wadi Abu Tulayha in 2006 (Fujii 2007a, 2007b, 2007c, 2010b, 2010c). To date, we have conducted a total of eight seasons. The first, which took place in summer 2009, was devoted to a retrospective survey of supposedly prehistoric water catchment facilities known in the basin at that time (Fujii 2010a, 2010b). It enabled us to define a general direction for subsequent research.

The second season, conducted in summer 2010, dealt with a rescue excavation at Wadi Ghuwayr 106, a barrage system located above the escarpment fringing the north-eastern edge of the basin (Fujii 2012; Fujii, Adachi *et al*. 2011). The excavation provided insights into the procurement of construction material and the system by which Jafr Neolithic barrages were renewed. We also excavated the nearby PPNB outpost of Wadi Ghuwayr 17, which proved to be a promising candidate for an operating component of the barrage system (Fujii, Quintero *et al*. 2011). Not only that, a supplementary excavation undertaken in the summer 2012 showed that the outpost was equipped with a small-scale, semi-subterranean cistern as well. This series of findings confirmed once again that the 'triple set' evidenced at Wadi Abu Tulayha (i.e. the combination of an outpost for seasonal habitation, a basin-irrigation barrage system supporting a standalone cereal field, and a cistern as the major source of drinking water) was the norm for the Jafr Pastoral PPNB.

The third to fifth seasons, conducted from spring 2011 to spring 2012, excavated a total of six barrages constituting the newly discovered Wadi Nadiya 1 and 2 barrage systems in the northern part of the basin. The excavations suggested that the system started with a large-scale, open-type, basin-irrigation barrage which gradually morphed into a small-scale, semi-closed, cistern-type barrage over the course of downstream renewal (Fujii 2012b; Fujii, Adachi *et al*. 2012, 2013). It is our present interpretation that the former was part of the fully-fledged social infrastructure of PPNB pastoral transhumants, whereas the latter represents an ad hoc water-use facility associated with early pastoral nomads.

Following these results, the sixth to eighth field seasons, undertaken from spring 2013 to



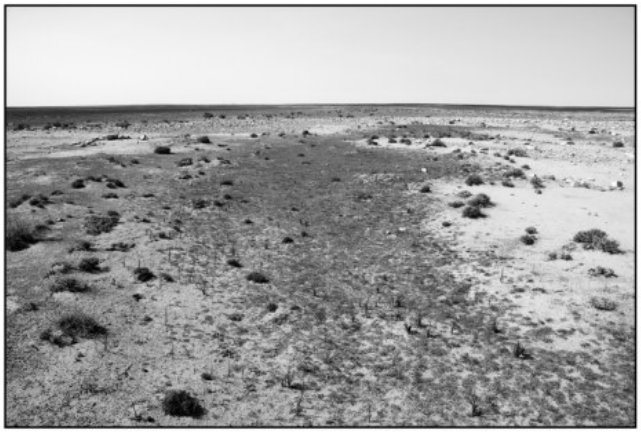

*1. Neolithic barrages located in the Jafr Basin (as of March 2014).*

spring 2014, moved to the eastern part of the Jafr Basin where several dozen barrages were newly discovered. The surveys have made it possible to trace the process of pastoral nomadization from the perspective of water use in the arid periphery. This report summarizes the results of the recent surveys in the eastern Jafr Basin and briefly discusses their archaeological implications.

## 2. Site Setting

As noted above, our recent surveys have focused on the hilly terrain fringing the eastern edge of the Jafr Basin. The natural environment of the area is characterized by a hyper arid climate with an average annual rainfall of less than 50 mm (Jordan National Geographic Center 1984: 114). Thus the local vegetation is very poor, with local land use being limited to seasonal pasturing taking advantage of thorny perennial shrubs dotted in *wadi* beds and the appearance of annual grasses in early spring. Understandably, no traditional settlements are present. All that can be seen, if anything, are isolated black goat hair tents and pick-ups driving off in clouds of dust.

This is not to say, however, that the hilly terrain is a sterile desert. In fact, it serves as a major migration route for modern local nomads. This is, first, because the terrain is actually relatively flat in topography and easy to pass through with livestock and, second, because it occasionally experiences unpredictable torrential rain and for this reason witnesses the appearance of seasonal watering places and pasture **(Fig. 2)**. What gives further advantage to the area is the presence of high-quality Eocene flint deposits **(Fig. 3)**, which were exploited - though intermittently



*2. Small pasture around BR-10 (looking north).*



*3. Tabular scraper flint mines in the Adriyyat area, eastern Jafr (looking south-east).*

- from the Palaeolithic to at least the EBA (Quintero and Wilke 1998a, 1998b; Quintero *et al*. 2002). The hilly terrain must have attracted prehistoric occupants for this reason as well. The concentration of Neolithic barrages in the area can be understood in these contexts.

## 3. The Survey

We conducted a preliminary survey over the last few days of the summer 2012 field season and confirmed that supposedly Neolithic barrages were concentrated in the western part of the hilly terrain (Fujii, Adachi *et al*. 2013). To cover this promising terrain, we established a survey area demarcated by the following four straight lines: latitude 30º28.000 N for the northern limit, latitude 30º17.000 N for the southern limit, longitude 037º08.000 E for the eastern limit and longitude 036º49.000 E for the western limit. The 2012 - 2013 surveys took place in this survey area, which covers *ca* 620 km2 and lies at an elevation of *ca* 850 - 1,000 m.

The surveys focused on water-catchment facilities only. When we encountered other archaeological features, such as cairns and enclosures, we briefly recorded their general traits, leaving their details to future investigation. Since the survey area was extensive, we examined satellite images from *Google Maps and Bing Maps* in advance to identify promising areas. We then visited these areas with a portable GPS receiver and registered, or occasionally rejected, individual examples on the basis of this ground-truthing. The barrages registered in this way account for nearly the half of the total. The other half consists of barrages that were newly discovered without prior reference to satellite imagery.

Forty-six barrages were registered. Thirty-nine (BR-01 to -39) were located in the original survey area, and the remaining seven (i.e. BR-1001 to -1007) were found by chance outside it during our day-off excursions. We recorded their attributes (including coordinates, surrounding topography, dimensions, construction, techno-typology and surface finds) and then produced a ground plan. When not windy, we tried aerial photography using a remote-control helicopter as well. In addition, we produced a site contour map of several typical examples and examined, in a few cases, their internal structure by means of excavating a test trench across the barrage wall.

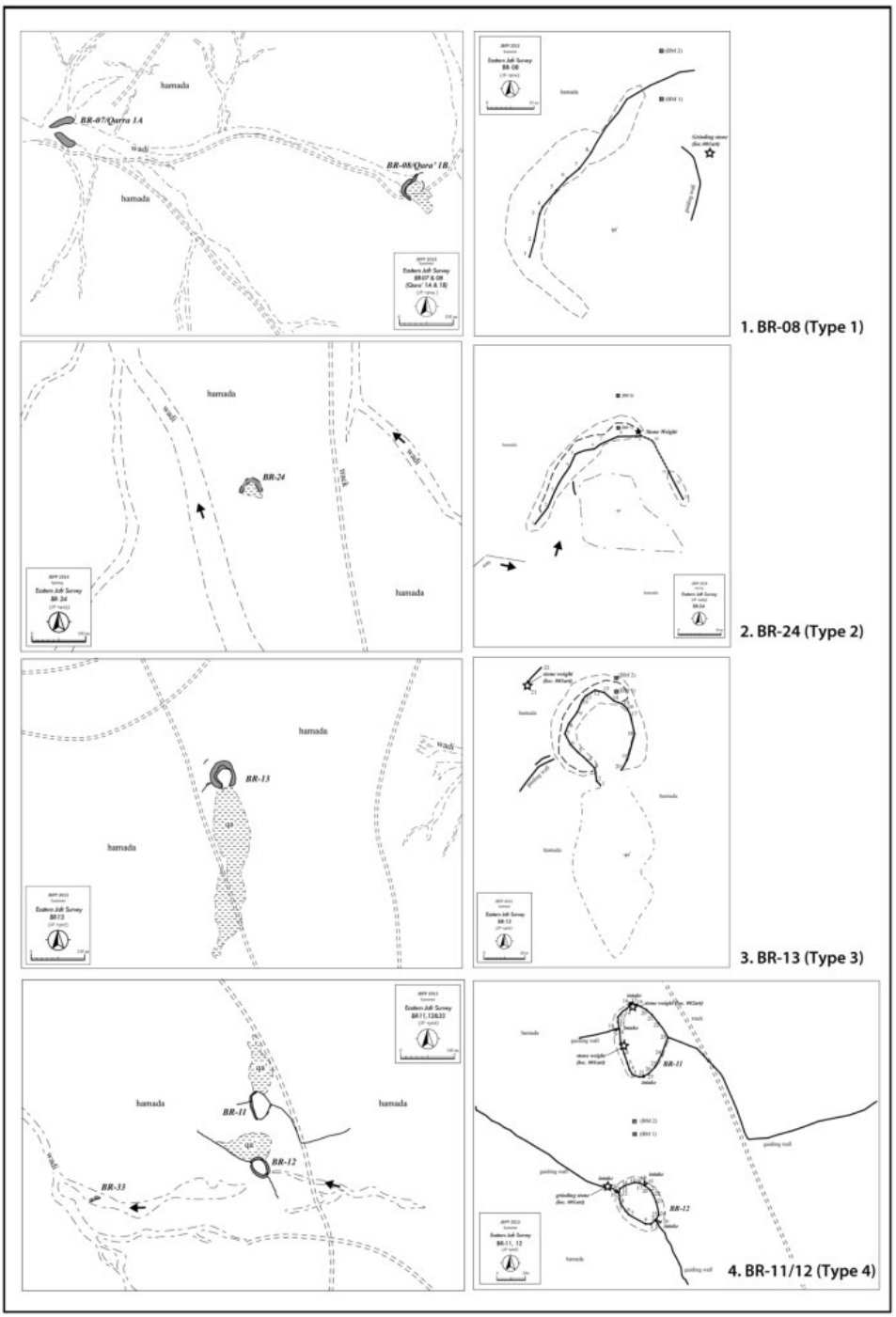
The following description will deal only with the barrages located in the original survey area, leaving the others for future publication. We would like to point out in advance that our surveys were less intensive and, therefore, require further scrutiny for grasping all the details of the Neolithic barrages in the area.

## 4. The Barrages

The registered barrages fall into the following five major types, including one variant. Since we cannot afford to go into the details of individual examples, the following description will only summarize the general traits of each barrage type.

*Type 1a*

This type of barrage is characterized by its large scale, open plan like a spread bird, and its location at the lower edge of a small- to medium-scale, semi-open drainage system or across a small-scale open drainage system **(Fig. 4:1; Fig. 5)**. It is simple in terms of structure, consisting only of a low masonry wall and undeveloped rear bank. Most of the PPNB barrages currently known in the western half of the Jafr Basin are of this type (Fujii 2010c, 2013). In contrast, the eastern Jafr Basin has only a few examples. Among them is Barrage No 08 (hereafter BR-08), which measures *ca* 55 m long and *ca* 0.3 m in preserved height. The Type 1a barrage has a shallow and extensive flooded area and would, therefore, have been unsuitable for long-term water storage. Thus, it




*4. Barrage Types 1 - 4: surrounding topography and plans.*

was probably used for short-term basin-irrigation of a standalone cereal field (Fujii 2010c). It may be meaningful in this regard that this type of barrage is predominant in the western Jafr Basin, closer to Neolithic farming communities, but is rare in the more distant eastern basin.

*Type 1b*

The Type 1b barrage is a smaller or miniature version of the Type 1a barrage, having a total length of *ca* 10 - 20 m in most cases and a straight or slightly curvilinear plan. The rear bank of this type of barrage is even more undeveloped than in Type 1a. The use of the Type 1b barrage has yet to be firmly confirmed, but a use similar yet supplementary to Type 1a is conceivable. In the western Jafr Basin, BR-2 and -3 of Wadi Abu Tulayha and BR-1 and -11 of Wadi Nadiya 2 belong to this type. In the east, a dozen examples, including BR-36, are similar **(Fig. 6)**. However, these might include *ad hoc wadi* barriers of a later period and thus require further scrutiny for final categorisation.



*5. BR-08 (Type 1a): general view (looking north-west).*



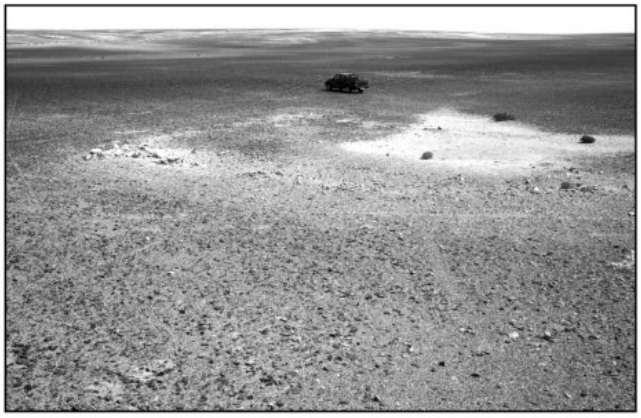
*6. BR-36 (Type 1b): general view (looking north).*

*Type 2*

Type 2 barrages have a semi-circular plan with a diameter of *ca* 20 - 40 m **(Fig. 4:2; Fig. 7)**. Unlike the Type 1 barrages, this type of barrage is usually located across a small gully or shallow depression surrounded by gentle slopes and equipped with a relatively high rear bank. These differences are suggestive of a functional shift from short-term basin-irrigation to long-term water storage. The Type 2 barrage can be defined a transitional form between these two functions. While the western Jafr Basin has only one example (BR-3 of Wadi Nadiya 2, being the final component of the Nadiya barrage system), the eastern Jafr Basin has several examples including BR-24. The focus of Jafr Neolithic barrage activity was to shift eastward from this type of barrage onwards.

*Type 3*

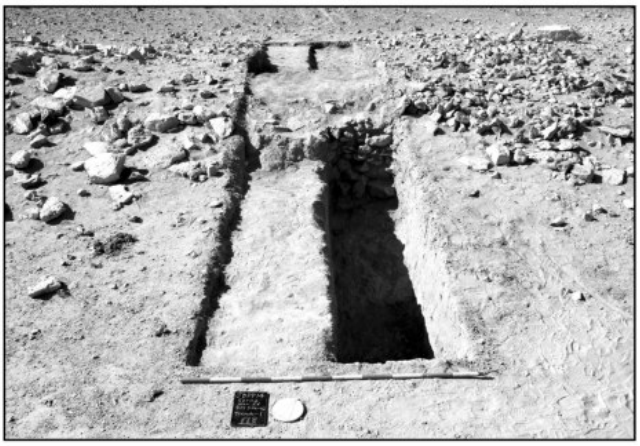
The Type 3 barrage has a more closed form, being characterised by a round to oblong plan, the incorporation of a relatively narrow entrance *ca* 5 - 10 m wide and the attachment of a few short water-guiding walls **(Fig. 4:3; Fig. 8)**. It is relatively large in scale, measuring up to *ca* 50 m in diameter (or across the longer axis) and up to *ca* 1 m in preserved height. In comparison with the Type 2 barrage, it has a tendency to be located in even smaller and more enclosed drainage systems. There is no doubt that the Type 3 barrage developed out of the Type 2 barrage with a greater focus on long-term water storage. A trench excavated across the north-western wall of BR-02 demonstrated that the barrage was associated with a shallow pond *ca* 1 m deep that was protected with a retaining wall **(Fig. 9)**. It is however possible that the pond was originally dug as an open-air limestone / flint quarry for barrage construction. No typical examples of this type have been found in the western Jafr Basin, whereas the eastern basin has a dozen



7. BR-24 (Type 2): general view (looking south-east).



8. BR-13 (Type 3): general view (looking north-east).



9. BR-02 (Type 3): trench excavation at the north-western wall (looking north-west).

examples including BR-13. As suggested above, this contrast probably means that the centre of gravity of seasonal pasturing shifted eastwards during the course of pastoral nomadization.

*Type 4*

This type of barrage represents the final form in this sequence of typological change and is characterized by a closed plan, the incorporation of a few very narrow inlets less than 1 m wide and the attachment of a few long water-guiding walls **(Fig. 4:4; Fig. 10)**. The location of Type 4 barrages is similar to that of Type 3 barrages, with a shallow depression or flat terrain surrounded by gentle slopes being preferred. There is no doubt that this type of barrage was used for water storage. Again, no examples have been located in the western Jafr Basin, but the eastern basin has several examples including BR-11 and -12. The Type 4 barrage is usually large in scale, having a long axis measuring *ca* 50 m in, for example, the case of BR-11. The trench excavations at BR-12 demonstrated that it incorporated a man-made pond *ca* 1.5 m deep within the barrage wall, and that the soil and rubble thus derived were used in the construction of the barrage wall and rear bank **(Fig. 11).**

*Type 5*

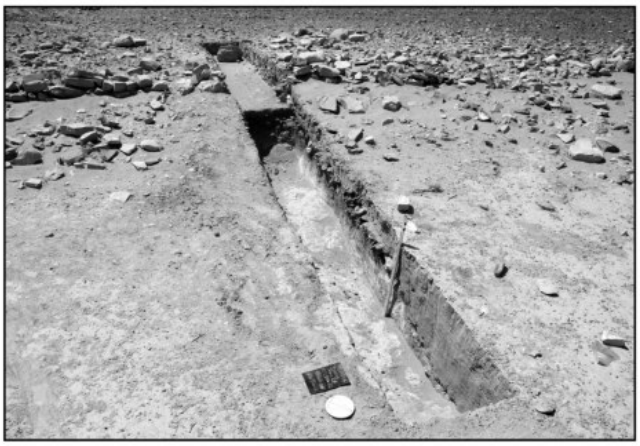
The Type 5 barrage is a catch-all category that includes all miscellaneous barrages other than the abovementioned types. They include a few large-scale, amorphous barrages such as BR-20 and -28 **(Figs. 12 and 13)**. This type of barrage differs from the others in terms of location and often occupies the flat bank of a medium-sized *wadi*. In addition, unlike the Type 1 - 4 barrages, it yields no diagnostic artifacts of the Jafr Pastoral Neolithic such as bilaterally notched stone weights or diagonally truncated stone bars. It is therefore likely that the Type 5 barrage belongs to a post-Neolithic period. Again, no parallel examples have been found in the western Jafr Basin.

**5. Small Finds**

Small finds from the barrages are scarce in both variety and quantity, being limited to a dozen bilaterally notched stone weights, a few diagonally truncated stone bars and other miscellaneous artifacts. This scarcity



*10. BR-12 (Type 4): general view (north-west).*



*11. BR-12 (Type 3): trench excavation at the western wall (looking west).*

of small finds is normal for Jafr Neolithic barrages, but makes sense when we consider they are extramural, non-residential structures. Some stone weights were found *in situ* in barrage walls, but all of the other artifacts (including the remaining stone weights) occurred as stray finds around the barrages.

*Bilaterally Notched Stone Weights*

The limestone bilaterally notched stone weight is a hallmark of the Jafr Pastoral Neolithic, being characterised by a figure-of-eight-shaped profile formed or emphasized by a pair of bilateral notches and / or bifacial grooves **(Fig. 14:1-2)**. It is conceivable that they were originally produced as stone weights for tightening the ropes of a thatched or tent-like structure and were then incorporated into a nearby barrage wall, either as repurposed building material or as a ritual object aimed at guaranteeing the safety and longevity of the barrage concerned (Fujii, Adachi *et al*. 2011: 203-204).

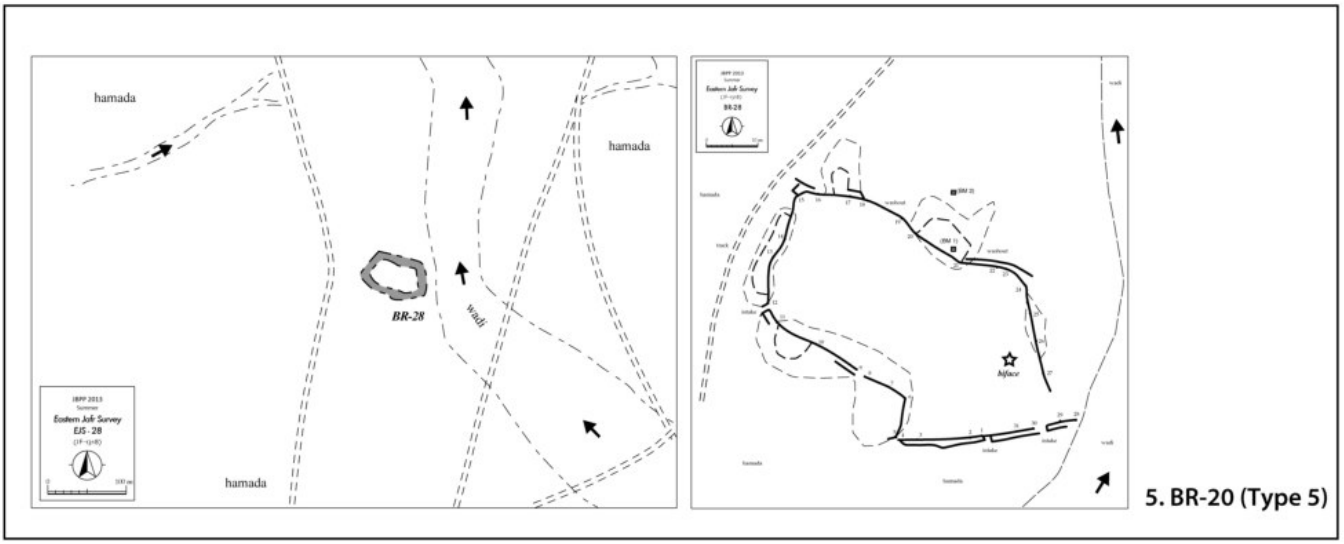
More than a dozen barrages (excluding Type 5 examples) yielded this unique artifact. The number of stone weights per barrage was usually one, less frequently two. (Only BR-10 yielded a total of four stone weights, which included three stray finds found by chance at points more than 100 m away from the barrage.) Similar limestone products occurred at most of the PPNB barrages known to date in the western Jafr Basin, indicating that the incorporation of these unique stone weights was normal for Jafr Neolithic barrages (Fujii 2013: fig. 13). It should however be noted that while the PPNB examples are usually large (> *ca* 50 cm long) and heavy (> *ca* 50 kg), all of the new finds from the eastern Jafr Basin are much smaller (< 30 cm long) and lighter (< *ca* 10 kg). This contrast seems to reflect a chronological difference between the two, noting that the nearby LPPNB / PPNC encampment of Khashm al-'Arfa yielded the latter type only (Fujii *et al*. this volume). Thus, these stone weights may serve as a chronological indicator for the eastern Jafr barrages.

*Diagonally Truncated Stone Bars*

The diagonally truncated stone bar made of limestone or flint is another hallmark of the Jafr Pastoral Neolithic and occurred, albeit as stray finds, at a few barrages (again excluding Type 5 examples) **(Fig. 14:3-5)**. They are less standardized than the PPNB examples from the western Jafr Basin and can be regarded as debased successors. The remarkable edge damage on these heavy-duty tools suggests that they were used for digging a pond (which doubled as a limestone / flint quarry) in front of barrage walls.

*Miscellaneous*

Miscellaneous finds consist mostly of flint tools, which are dominated by various types of hard-to-date digging tools **(Fig. 14:7-10)**. As




*12. Types 5 of Barrage: surrounding topography and plan.*

with the stone bars, these heavy-duty tools were probably used for digging a shallow pond in front of barrage walls. The consistent colocation of a barrage and digging tools is suggestive of chronological synchronism between the two, even more so when we consider how isolated the barrages are in the desert.

In addition, a sickle blade was found beside Type 1b barrage BR-22. It has invasive retouch along the lateral edge, suggesting a post-PPNB date. Remaining finds include a large limestone vessel or quern *ca* 60 cm in diameter **(Fig. 14:6)**, a few grinding slabs made of porous basalt and several dozen reddish ware sherds, but their dates and contextual association with adjacent barrages are still unknown.

## 4. Discussion

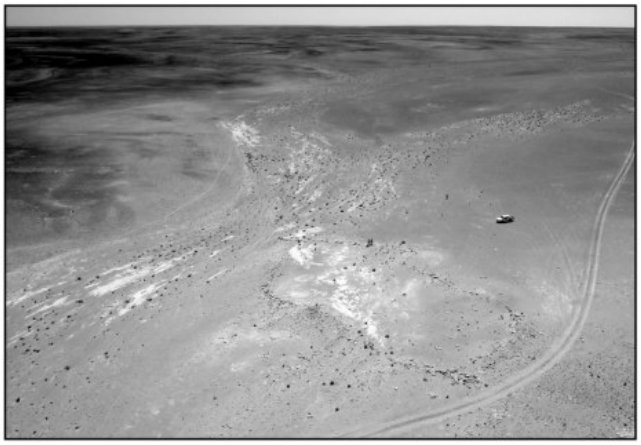
These surveys have provided basic information for tracing the history of water-use in the Neolithic Jafr Basin. The question is whether the barrages that were discovered really belong to the Neolithic and, if so, what their specific use was. The following discussion will deal with these essential issues.

### *Dating*

As with other extramural non-residential features, the stone-built barrages in the eastern Jafr Basin are deficient in contextual information, including C-14 data, and are therefore difficult to date. However, a few lines of collateral evidence suggest that most of them date back to the Neolithic.

To begin with, the horizontal stratigraphy at the Wadi Nadiya 1 and 2 barrage systems suggests that Jafr Neolithic barrages started with a large-scale, open type (Type 1a) which gradually gave way to a small-scale, closed type (Type 2) over the course of pastoral nomadization (Fujii, Adachi *et al*. 2012, 2013). The former type can be dated to the same horizon as the neighboring M - LPPNB outposts in view of the consistent colocation of the two. The latter type, on the other hand, probably dates to the immediately subsequent phase, *viz*. the end of the LPPNB or beginning of the PPNC. Assuming that the Type 3 - 5 barrages followed immediately on from Type 2, they could be attributed to the PPNC and / or Late Neolithic. It is our present perspective that the eastern Jafr Basin barrage complex covers, as a whole, a period from the M - LPPNB (Type 1a) to the PPNC / Late Neolithic (Types 2 - 4). Meanwhile, nothing can be said about the Type 5 barrage except that they probably postdate Type 4.

Further support for this provisional dating comes from the presence of bilaterally notched stone weights incorporated into barrage walls. As mentioned above, similar objects were found at the nearby encampment of Khashm



*13. BR-28 (Type 5): general view (looking south).*

al-'Arfa, which is tightly dated, on the basis of several C-14 dates and diagnostic artifacts, to the LPPNB - PPNC transition (Fujii *et al.* this volume). In addition, diagonally truncated stone bars, another hallmark of the Jafr Pastoral Neolithic, are also shared between the encampment and the barrages. (Thus, it is possible that the encampment was an operating component of the barrages dotted across the surrounding area.) These facts, together with the horizontal stratigraphy referred to above, strongly suggest that the eastern Jafr Basin barrages (excluding Type 5) date to the Neolithic. OSL dating is now in progress and is expected to yield specific evidence relating to the provisional dating outlined above.

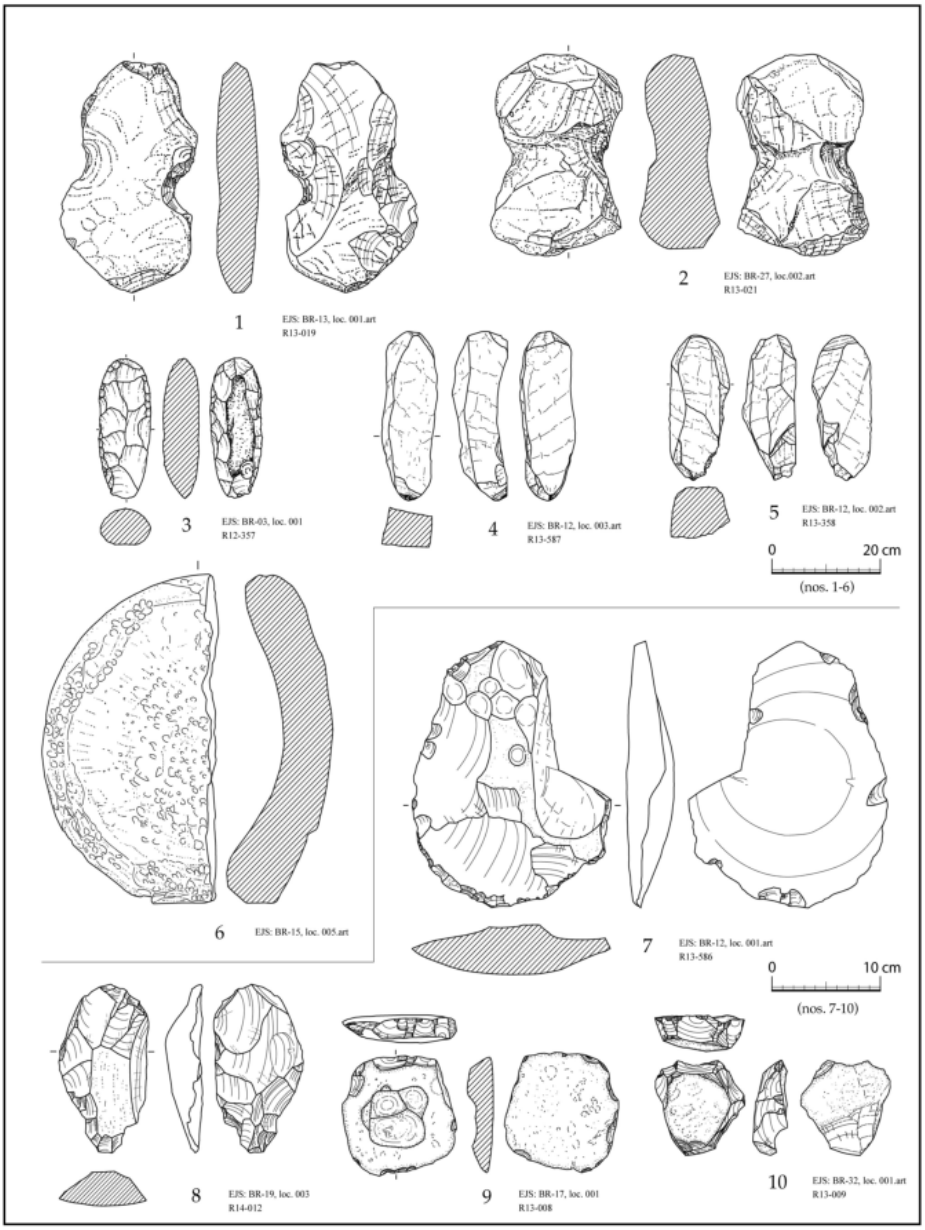
*Location and Use*

Our previous excavations in the western Jafr Basin showed that: (1) the M - LPPNB barrages are large in scale and open in plan, (2) they are located at the lower edge of a small-scale, semi-open playa system and (3) they are often combined with an agro-pastoral outpost such as Wadi Abu Tulayha or Wadi Ghuwayr 17 (Fujii 2010c, 2013). The first two observations suggest that the barrages were designed to produce an extensive, shallow, flooded area on permeable terrain adjacent to the barrage wall. Taking the third observation into consideration, it is likely that M - LPPNB barrages in the eastern Jafr Basin were used for basin-irrigation of a standalone cereal field or pasture. They were often renewed downstream along the same watercourse, which suggests that basin-irrigated agriculture in the arid periphery had to deal with salt damage (Fujii and Adachi 2011: 209-210).

The eastern Jafr Basin barrages stand in contrast to the M - LPNNB examples. Aside from the Type 1a and 1b examples common to both areas, they are not only smaller in scale and more enclosed in plan, but are also more typically located in even smaller-scale, semi-closed drainage basins. In addition, downstream renewal is rarely recognized with the exception of a combination that includes a Type 1a barrage as the upstream component. It is thus evident that most of the eastern Jafr Basin barrages were intended for long-term water storage rather than short-term basin irrigation. Most typical are the Type 3 and 4 examples, which were probably used as open-air cisterns for early pastoral nomads and their livestock. We may argue on the one hand that their location in the center of a small-scale, flat, semi-closed drainage basin made it possible to collect surface runoff water in safety, and on the other hand that they required the assistance of a few long water-guiding walls. The abandonment of downstream renewal is probably linked to the fact that cistern-type barrages no longer needed to worry about salinization of surface soil.

*Barrage Chronology*

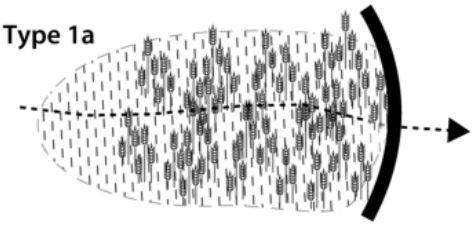
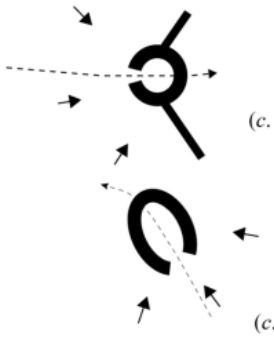
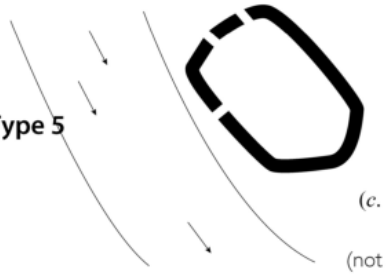
The above discussion leads us to the view that Jafr Neolithic barrages began with large-scale, open, basin-irrigation barrages (Type 1a) located at the lower edge of a semi-open playa system, and then gradually gave way to smaller-scale cistern-type barrages (Types 2 - 4) located across a small gully or in a shallow depression at the center of a semi-closed drainage basin **(Fig. 15)**. We should note that: (1) while the former are clustered in the western Jafr Basin nearer to PPNB farming communities, the latter penetrate deep into the desert far from settled areas; (2) while the former is often combined with a M - LPPNB agro-pastoral outpost, the latter is usually isolated in the desert and




*14. Small finds from Type 1 - 4 barrages.*

not associated with such a fully-developed operating component; (3) while the former is low in density (despite intensive survey), the latter is much more common (despite the limited number of surveys). All this seems to indicate that while the western Jafr Basin barrages were part of the fully fledged social infrastructure of M - LPPNB pastoral transhumants, most - if not all - of the eastern basin barrages were instead *ad hoc* watering places of subsequent early pastoral nomads. However, this is not to say that the eastern Jafr Basin was first exploited in the post-PPNB period. The presence of a few Type 1a barrages suggests that the area had been partially incorporated into the seasonal migration routes of M - LPPNB pastoral transhumants. Such a pre-adaptation probably paved the way for the florescence of early pastoral nomadism.

Though still tentative, the barrage chronology makes it possible to trace the process of pastoral nomadization from the perspective of water-use in the arid periphery. Incidentally, the M - LPPNB outposts were equipped with a semi-subterranean cistern as well as with basin-irrigation barrages (Fujii 2008, 2009, 2013, n.d.). Taking this into consideration, we can

| Barrage Types | Location | Western Jafr | Eastern Jafr |
|---|---|---|---|
| **LPPNB: Basin-irrigation barrage**<br>combined with an agro-pastoral outpost<br>**Type 1a**<br>  <br>(flooded area: *c.* 2-3 ha) | lower edge of<br>a semi-open<br>playa system | WAT: Barrage 1<br>WRS: Barrage 1, 2<br>WGW: Barrage 1, 2<br>WND 1: Barrage 1. 2<br>***downward renewal*** | BR-**08**, 32 |
| **Type 2**<br>  <br>(*c.* 0.1-0.2 ha) | small wadi/gully bed | WND 2: Barrage 2<br>***downward renewal***<br>WND 2: Barrage 3 | BR-07, 10, **24**, 26, 27, 30 |
| **PPNC/LN: Cistern-type barrage**<br>isolated in steppe and desert<br>  <br>(*c.* 0.1-0.2 ha)<br>**Type 3**<br>(*c.* 0.3-0.5 ha) | small, semi-closed | ? | BR-03, 06, 15, 29<br>BR-**13** |
| **Type 4**<br>  <br>(*c.* 0.3-0.5 ha) | small, semi-closed | ? | BR-**11**, **12**, 18 |
| **Later Period ?**<br>  <br>**Type 5**<br>(*c.* 1-2 ha)<br>(not to scale) | beside a turning point<br>of<br>a medium-scale wadi | ? | BR-20, 21, **28** |

*15. Tentative chronology of the Jafr Neolithic barrage.*

argue that early pastoral nomads combined the function of the cistern and the technology of the barrage to fulfill the demands of what was a new way of life in the arid periphery.

*Archaeological Implications*

In contrast to the relatively high archaeological visibility of the M - LPPNB pastoral transhumants, the presence of early pastoral nomads in the Jafr Basin has hitherto been barely understood through open-air sanctuaries such as Qa' Abu Tulayha (Fujii 2003), Harrat al-Juhayra (Fujii 2003) and the 'Awja sites (Fujii, Yamafuji *et al*. 2012; Fujii, Adachi *et al*. 2013). The newly discovered post-PPNB barrages, together with the small encampment of Khashm al-'Arfa, have offered us a first glimpse into their daily life. In this sense, they have the potential to lead to a breakthrough in coming to a comprehensive understanding of the formation processes of *badia* society.

To begin with, the survey data provide a means of exploring the distribution and migration patterns of early pastoral nomads. It is now evident that the hilly terrain of the eastern Jafr Basin was incorporated within their major itineraries. The question now concerns the seasonality of migration, which is typically constrained by rainfall patterns in Jordan and surrounding countries. Taking this into consideration, it is almost self-evident that use of the barrage would have been focused on a few months from late winter to early spring. Further support for this assumption comes from the faunal assemblage from Wadi Abu Tulayha, which indicates that M - LPPNB pastoral transhumants left settled areas to reside in the arid margins during late winter and spring (Hongo *et al*. 2013). Assuming that subsequent early pastoral nomads followed the same pattern, it would follow that the barrages in the eastern Jafr Basin represent pasturing in early spring. However, limited information is available at this stage and further investigation is required to understand year-round migration patterns.

The barrage data provide some insight into early pastoral nomad group size as well. It is needless to say that, aside from Type 1b, barrage construction would have necessarily have involved more than a nuclear family. The residential complex at the contemporary encampment of Khashm al-'Arfa is a good reference for examining this issue (Fujii *et al*. this volume). It consists basically of three small houses, suggesting that early pastoral nomads migrated as an extended family or aggregation of a few nuclear families, at least in their late winter to early spring locations. Given this, such a group or an aggregation of such groups would likely have been involved in barrage construction.

The barrages also offer an intriguing hint regarding herd size in early pastoral nomadic communities. In view of their scale, it is conceivable that the barrages were designed for a relatively large herd. At the very least, it is highly unlikely that they were constructed for a dozen or so animals. Turning the argument around, it was likely the expansion of herd size (and probably the establishment of herd management techniques) that first made a nomadic way of life possible which, in turn, probably required the establishment of anthropogenic watering places along migration routes.

To conclude, a brief comment should be made about the archaeological implications of the eastern Jafr Basin barrages in a broader context. The presence of Neolithic barrages in the eastern basin, together with the existence of a contemporary water harvesting and storage system in the Azraq Basin (Betts and Helms 1989), again demonstrates that water-use technology was key to the full-fledged penetration of the arid margin in the early Holocene. Suggestive in this respect is Mushash 1, a small PPNB settlement recently located near the Saudi border, which is also associated with a barrage (Fujii *et al*. 2014). The hilly terrain in which the cistern-type barrages cluster corresponds to an intermediate area between the easternmost PPNB represented by Mushash 1 and the Jafr Pastoral PPNB represented by Wadi Abu Tulayha. Considered in this light it

is no wonder that the area contains many post-PPNB Neolithic barrages, even more so when we consider that the existence of the Saudi PPNB is now becoming clearer (e.g. Conolly 2013; Crassard *et al*. 2013; Drechsler 2009; Fares and Rokitta-Kurmnov 2013; Fujii and Adachi n.d.; Rothert 1938). The location of the post-PPNB barrages in the eastern Jafr Basin can be understood in this broader context.

**5. Concluding Remarks**

Our recent surveys have suggested that a large number of Neolithic cistern-type barrages are located in the eastern Jafr Basin. This in turn suggests that, as with the case of pastoral transhumance, innovation in water-use technology lay behind the emergence of pastoral nomadism. In this sense, the techno-typological sequence of the Jafr Neolithic barrages provides a valuable key in tracing the process of pastoral nomadization in southern Jordan. If the sample size increases as a result of future investigations, and if a barrage chronology is fully developed, it might also become possible to discuss the issue phase by phase. We would like to continue the Neolithic barrage survey with a view to gaining a more comprehensive understanding of the formation process of *badia* society.

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# PROTECTION AND MANAGEMENT OF ARCHAEOLOGICAL HERITAGE IN JORDAN: LEGAL DOCUMENTS

*Mariusz Drzewiecki and Beata Drzewiecka*

A complete list of legal documentation concerning archaeological heritage in Jordan has never been published. This article aims to fill this gap. Mariusz Drzewiecki searched through Jordanian legislation announced in the Official Gazette (الجريدة الرسمية), while Beata Drzewiecka translated it from Arabic to English. The results are presented in chronological order in **Table 1**.

The first legal document was published in 1923, being a decision to establish the Department of Antiquities of Jordan (Official Gazette no 16 dated 10 September 1923). The last one included in the table is a law concerning the protection and management of Petra Archaeological Park, issued on 1 September 2014 (Official Gazette no 5299).

The list includes 145 documents covering legislation that makes direct reference to material predating 1750 AD (i.e. that defined in Jordan as 'Antiquities') as well as more recent material (i.e. that commonly defined in Jordan as 'heritage'). Legislation that indirectly affects archaeological heritage (e.g. environmental laws, agriculture laws, building laws, laws concerning religion etc.) is not included. Some of the legal documents dealing with tourism are on the list, but only those that focus on archaeological heritage management.

The most important legal documents are laws (قوانين), indicated in bold font in **Table 1**. The first Law of Antiquities (قانون العاديات) was published on 15 September 1925 in Official Gazette no 113.The next to be announced were in 1935, 1953, 1966 (which was a provisional law [1976 ,1968 ,(قانون مؤقت]), also a provisional law) and, most recently, in 1988. In the case of heritage, the first law was published in 2003 (as a provisional law); this was replaced in 2005 by a law that is still valid at the time of writing.

In addition to laws, other legislation such as regulations, amendments, decrees, statements etc. have also been announced. Most of them aim to solve practical problems, e.g. setting entry fees or specifying organisational structures. One can also find lists of archaeological sites known in Jordan at the time of announcement, changes in laws dictated by new circumstances and much more.

At the time of writing, all original legal documents are available *via* an online database created by the Department of the National Library of Jordan (http://opac.nl.gov.jo/adlibweb/default.aspx). The documents are in Arabic. **(Table 1)** gives the original title of the document in Arabic and an English translation, as well as the date of publication and the number of the Official Gazette in which the document was first published.

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**Table 1.** List of legal documents concerning archaeology and heritage issued by the Jordanian authorities in the Official Gazette.

| Antiquity protection and management legislation (published in Jordan's Official Gazette)<br>(تشريع في مجال حماية وادارة الاثار القديم ) نشر في الجريدة الرسمية في الاردن | | | |
|---|---|---|---|
| **Data of publication<br>تاريخ العدد** | **Issue no.<br>رقم العدد** | **Original title (in Arabic)<br>(عربي العنوان)** | **Title (English translation)<br>إنجليزي) العنوان)** |
| 1923-09-10 | 16 | قانون بشأن إدارة الآثار القديمة | Law concerning the management of antiquities |
| 1925-03-23 | 97 | بعض آثار شرقي الأردن | Some antiquities from Transjordan |
| 1925-04-06 | 99 | الآثار العربية في شرقي الأردن | Arab antiquities in Transjordan |
| 1925-04-13 | 100 | آثار بترا (وادي موسى) | Petra Antiquities (Wadi Musa) |
| 1925-05-25 | 105 | آثار شرقي الأردن | Transjordan antiquities |
| 1925-06-15 | 107 | آثار شرقي الأردن<br>هل في التلول لسائل رد ؟ | Transjordan antiquities<br>Can the ruins answer us? |
| 1925-09-15 | 113 | آثار شرقي الأردن<br>الآثار وتاريخ الحضارة | Transjordan antiquities<br>archaeology and history of civilization |
| **1925-09-15** | **113** | **قانون العاديات** | **Law of antiquities** |
| 1927-02-01 | 149 | نظام بمقتضى قانون العاديات | Regulation under the law of antiquities |
| 1927-03-01 | 151 | قانون موضوع تعديلا للمادة (١١) من قانون العاديات المؤرخ في ٢٢-٧-١٩٢٥ | Law introducing amendment to article 11of the law of antiquities from 22.07.1925 |
| 1927-05-15 | 156 | نظام بمقتضى قانون العاديات<br>المؤرخ في٢٢-٧-١٩٢٥ المنشور في العدد( ١١٣) من الجريدة الرسمية | Regulation under the law of antiquities<br>from 22.07.1925 published in Official Gazette no. 113 |
| 1927-07-15 | 161 | نظام في أصول المحاكم | Regulation of judicial procedures |
| 1927-08-15 | 163 | نظام بمقتضى قانون العاديات<br>لسنة ١٩٢٥ | Regulation under the law of antiquities<br>for year 1925 |
| 1928-03-01 | 182 | بلاغ رسمي | Official statement |
| 1930-06-16 | 263 | قانون العاديات<br>نظام بمقتضى المادة ٧ | The law of antiquities<br>regulation issued under article 7 |
| 1930-07-01 | 266 | تصحيح خطأ<br>نظام بمقتضى قانون العاديات المندرج في العدد ٢٦٣ من الجريدة الرسمية | Erratum to regulation under the law of antiquities published in Official Gazette no. 263 |
| 1930-09-16 | 275 | العاديات<br>بلاغ رسمي صادر عن رئاسة الوزراء | Antiquities<br>Official statement issued by Prime Ministry |
| 1930-11-01 | 282 | قانون العاديات<br>تعديل النظام المختص بجرش | Law of antiquities<br>Amendment to regulation concerning Jerash |

| | | | |
|---|---|---|---|
| 1930-12-01 | 286 | قانون العاديات<br>نظام بمقتضى المادة السابعة | The law of antiquities<br>regulation issued under article 7 |
| 1932-02-16 | 336 | قانون العاديات<br>نظام بمقتضى المادة السابعة | The law of antiquities<br>regulation issued under article 7 |
| 1932-05-01 | 345 | نظام أجور زيارة الآثار | Regulation for antiquities entry fees |
| 1932-06-16 | 351 | نظام أجور زيارة الآثار - بلاغ عام صادر عن رئاسة الوزراء | Regulation for antiquities entry fees - general statement issued by Prime Ministry |
| 1933-03-16 | 382 | قرار ٢٣- الديوان الخاص لتفسير المادتين الرابعة والتاسعة من قانون العاديات | Decision no. 23 - The Special Tribunal - to interpret article 4 and 9 from the law of antiquities |
| 1934-03-17 | 424 | ذيل لنظام أجور زيارة الآثار لسنة ١٩٣٤ | Appendix to regulation for antiquities entry fees for year 1934 |
| 1934-05-16 | 434 | ذيل ثاني لنظام أجور زيارة الآثار لسنة ١٩٣٤ | Second appendix to regulation for antiquities entry fees for year 1934 |
| 1934-09-16 | 450 | تعديل نظام أجور زيارة الآثار لسنة ١٩٣٤ | Amendment to regulation for antiquities entry fees for year 1934 |
| 1935-07-01 | 486 | نظام رسوم زيارة الآثار لسنة ١٩٣٥ | Regulation for antiquities visiting fees for year 1935 |
| 1935-07-01 | 486 | مشروع<br>قانون العاديات لسنة ١٩٣٥ | Proposal of law of antiquities for year 1935 |
| **1935-12-17** | **507** | **قانون العاديات لسنة ١٩٣٥** | **Law of antiquities for year 1935** |
| 1936-04-16 | 521 | نظام<br>بيع العاديات الصادر بمقتضى قانون العاديات لسنة ١٩٣٦ | Regulation of antiquities trade issued under the law of antiquities for year 1936 |
| 1937-08-01 | 570 | النظام<br>المعدل لنظام أجور زيارة الآثار لسنة ١٩٣٥ | Regulation<br>amending regulation for antiquities entry fees for year 1935 |
| 1937-11-01 | 579 | مشروع<br>قانون معدل لقانون العاديات | Proposal of amendment to the law of antiquities |
| 1938-01-16 | 584 | قانون رقم ٣ لسنة ١٩٣٨<br>قانون معدل لقانون العاديات | Law no. 3 for year 1938<br>law amending the law of antiquities |
| 1939-01-01 | 621 | اعلان<br>صادرمن دائرة الآثار<br>يحتوي على أسماء البلدان والقرى والأماكن الأخرى بالمشتملة على مناطق أثرية | Statement<br>issued by the Department of Antiquities<br>names of countries, villages and other places containing archaeological sites |
| 1939-04-01 | 629 | اعلان<br>صادر بمقتضى الفقرة ١ من المادة ٨ من قانون العاديات لسنة ١٩٣٥ | Statement<br>issued under paragraph 1, article 8 of the law of antiquities for year 1935 |
| 1939-12-02 | 656 | اعلان<br>صادرعن دائرة الآثار<br>نشرجدول يتضمن أسماءالأماكن المشتملةعلى مناطق أثرية مع أرقامهاعلى الخارطة | Statement<br>issued by the Department of Antiquities<br>about publication of a list that includes place names containing archaeological areas with numbers on the map |

| | | | |
|---|---|---|---|
| 1940-12-29 | 695 | نظام الآثار رقم ١ لسنة ١٩٤٠ | Antiquities regulation no. 1 for year 1940 |
| 1940-12-29 | 695 | قانون رقم ٤٢ لسنة ١٩٤٠<br>قانون معدل لقانون العاديات لسنة ١٩٣٥ | Law no. 42 for year 1940<br>law amending the law of antiquities for year 1935 |
| 1941-02-16 | 699 | نظام الآثار رقم ١ لسنة ١٩٤١<br>صادر بمقتضى المادة ٢٧ من قانون الآثار لسنة ١٩٣٥ | Antiquities regulation no. 1 for year 1941<br>issued under article 27 of the law of antiquities for year 1935 |
| 1941-07-01 | 711 | اعلان<br>صادر عن دائرة الآثار<br>اسماء المواقع الآثرية في شرق الأردن | Statement<br>issued by the Department of Antiquities<br>names of archaeological sites in Transjordan |
| 1941-10-16 | 721 | نظام الآثار رقم ٢ لسنة ١٩٤١ | Antiquities regulation no. 2 for year 1941 |
| 1944-08-01 | 799 | نظام الآثار رقم ١ لسنة ١٩٤٤<br>صادر بمقتضى المادة ٢٧ من قانون الآثار لسنة ١٩٣٥ | Antiquities regulation no. 1 for year 1944<br>issued under article 27 of the law of antiquities from year 1935 |
| 1946-07-16 | 867 | نظام الآثار رقم ١ لسنة ١٩٤٦<br>صادر بمقتضى المادة ٣٧ من قانون العاديات لسنة ١٩٣٥ | Antiquities regulation no. 1 for year 1946<br>issued under article 37 from the law of antiquities for year 1935 |
| **1953-02-16** | **1134** | **قانون رقم ٣٣ لسنة ١٩٥٣**<br>**قانون الآثار القديمة** | **Law no. 33 for year 1953**<br>**law of antiquities** |
| 1953-08-16 | 1154 | قرار الآثار رقم ١ لسنة ١٩٥٣<br>صادر بمقتضى المادة ٣٤ من قانون الآثار القديمة رقم ٣٣ لسنة ١٩٥٣ | Decree on antiquities no. 1 for year 1953<br>issued under article 34 from the law of antiquities no. 33 for year 1935 |
| 1954-07-08 | 1183<br>ملحق ثالث | قرار رقم ١ لسنة ١٩٥٤<br>صادر بمقتضى المادة ٣٤ من قانون الآثار القديمة رقم ٣٣ لسنة ١٩٥٣ | Decree no. 1 for year 1954<br>issued under article 34 from the law of antiquities no. 33 for year 1935 |
| 1954-12-16 | 1205 | قانون رقم ٢٩ لسنة ١٩٥٤<br>قانون معدل لقانون الآثار القديمة | Law no. 29 for year 1954<br>law amending the law of antiquities |
| 1955-02-01 | 1211 | قانون رقم ٣ لسنة ١٩٥٥<br>قانون تعديل مرسوم متحف الآثار الفلسطيني | Law no. 3 for year 1955<br>law amending the Palestinian Archaeological Museum decree |
| 1955-12-17 | 1250 | قانون رقم ٣٦ لسنة ١٩٥٥<br>قانون معدل لقانون الآثار القديمة | Law no. 36 for year 1955<br>law amending the law of antiquities |
| 1957-01-08 | 1311<br>ملحق | قرار رقم ١ لسنة ١٩٥٧<br>قرار الآثار من أجل تنظيم دائرة الآثار | Decree no. 1 for year 1957<br>decree on antiquities, relating to organization of the Department of Antiquities |
| 1957-01-08 | 1311<br>ملحق | قرار رقم ٢ لسنة ١٩٥٧<br>قرار الآثار تأسيس مجلس شورى الآثار | Decree no. 2 for year 1957<br>decree on antiquities - the establishment of the antiquities advisory board |
| 1957-01-08 | 1311<br>ملحق | قرار رقم ٣ لسنة ١٩٥٧<br>قرار الآثار حماية المخطوطات الأثرية | Decree no. 3 for year 1957<br>decree on antiquities - protection of ancient manuscripts |
| 1957-03-09 | 1321<br>ملحق ثاني | قرار رقم ٤ لسنة ١٩٥٧<br>قرار الآثار رسوم زيادة الآثار | Decree no. 3 for year 1957<br>decree on antiquities - increase of entry fees for archaeological sites visiting |

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| 08-12-1957 | 1358<br>ملحق | قرار الآثار رقم ٦ لسنة ١٩٥٧ | Decree on antiquities no. 6 for year 1957 |
| 25-08-1958 | 1395<br>ملحق | قرار الآثار رقم (١) لسنة ١٩٥٨ | Decree on antiquities no. 1 for year 1958 |
| 16-12-1959 | 1460 | قانون رقم ٣٩ لسنة ١٩٥٩<br>قانون معدل لقانون الآثار القديمة | Law no. 39 for year 1959<br>law amending the law of antiquities |
| 01-06-1960 | 1493 | قرار رقم ١ لسنة ١٩٦٠<br>قرار الآثار | Decree no. 1 for year 1960<br>decree on antiquities |
| 01-08-1960 | 1502 | قرار رقم ٢ لسنة ١٩٦٠<br>قرار الآثار | Decree no. 2 for year 1960<br>decree on antiquities |
| 01-09-1960 | 1508 | قرار رقم ٣ لسنة ١٩٦٠<br>قرار الآثار | Decree no. 3 for year 1960<br>decree on antiquities |
| 01-10-1960 | 1513 | تصحيح خطأ في قرار الآثار رقم ٣ لسنة ١٩٦٠ | Erratum to decree on antiquities no. 3 for year 1960 |
| 10-11-1960 | 1519 | قرار آثار رقم ٤ لسنة ١٩٦٠ | Decree on antiquities no. 4 for year 1960 |
| 01-03-1961 | 1537 | قرار آثار رقم ١ لسنة ١٩٦١<br>باستيفاء الرسوم عن المخطوطات | Decree on antiquities no. 1 for year 1961<br>determining the fees for manuscripts |
| 01-07-1961 | 1557 | قرار آثار رقم ٢ لسنة ١٩٦١<br>باستيفاء الرسوم عن زيارة آثار جرش | Decree on antiquities no. 2 for year 1961<br>determining fees of visiting archaeological site in Jerash |
| 10-10-1962 | 1643 | قرار آثار رقم ١ لسنة ١٩٦٢ | Decree on antiquities no. 1 for year 1962 |
| 10-06-1963 | 1691 | قرار آثار رقم ١ لسنة ١٩٦٣ | Decree on antiquities no. 1 for year 1963 |
| 25-10-1963 | 1716 | تطبيق نظام الانتقال والسفر | Implementation of transport and travelling regulation |
| 24-09-1964 | 1794 | قرار آثار رقم ١ لسنة ١٩٦٤ | Decree on antiquities no. 1 for year 1964 |
| 24-05-1965 | 1842 | قرار رقم ١ لسنة ١٩٦٥ | Decree no. 1 for year 1965 |
| 10-08-1965 | 1865 | قرار آثار رقم ٢ لسنة ١٩٦٥ | Decree on antiquities no. 2 for year 1965 |
| **16-07-1966** | **1936** | **قانون مؤقت رقم ٥١ لسنة ١٩٦٦**<br>**قانون الآثار القديمة** | **Provisional law no. 51 for year 1966**<br>**the law of antiquities** |
| 01-09-1966 | 1945 | قانون مؤقت رقم ٧٢ لسنة ١٩٦٦<br>قانون متحف الآثار الفلسطيني | Provisional law no. 72 for year 1966<br>law of the Palestinian Archaeological Museum |
| 15-09-1966 | 1948 | قانون مؤقت رقم ٧٧ لسنة ١٩٦٦<br>قانون معدل لقانون متحف الآثار الفلسطيني | Provisional law no. 77 for year 1966<br>law amending the law of the Palestinian Archaeological Museum |
| 01-10-1966 | 1953 | نظام رقم ١٢٠ لسنة ١٩٦٦<br>نظام المتاحف الشعبية | Regulation no. 120 for year 1966<br>regulation on folklore museums |

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| 1967-03-11 | 1992 | نظام رقم ١٦ لسنة ١٩٦٧<br>نظام المجلس الاستشاري لمتحف الآثار الفلسطيني | Regulation no. 16 for year 1967<br>regulation concerning advisory board of the Palestinian Archaeological Museum |
| **1968-04-16** | **2089** | **قانون رقم ٢٦ لسنة ١٩٦٨**<br>**قانون الآثار القديمة** | **Law no. 26 for year 1968**<br>**law of antiquities** |
| 1974-02-16 | 2473 | نظام رقم ١١ لسنة ١٩٧٤<br>نظام المتحف الشعبي للحلي والأزياء الشعبية | Regulation no. 11 for year 1974<br>regulation concerning folklore museums for traditional jewelry and clothes |
| 1975-12-01 | 2594 | نظام رقم ١٠٨ لسنة ١٩٧٥<br>النظام المالي للمتحف الشعبي للحلي والأزياء الشعبية | Regulation no. 108 for year 1975<br>regulation concerning funds for folklore museums for traditional jewelry and clothes |
| 1975-12-01 | 2594 | نظام رقم ١٠٩ لسنة ١٩٧٥<br>نظام معدل لنظام المتحف الشعبي للحلي والأزياء الشعبية | Regulation no. 109 for year 1975<br>Amendment to regulation concerning folklore museums for traditional jewelry and clothes |
| **1976-02-16** | **2608** | **قانون مؤقت رقم (١٢) لسنة ١٩٧٦**<br>**قانون الآثار** | **Provisional law no. 11 for year 1976**<br>**law of antiquities** |
| 1978-03-24 | 2769 | مشروع أراضي أم قيس الأثرية | Project of Umm Qais archaeological area |
| 1984-03-01 | 3217 | نظام رقم (١٦) لسنة ١٩٨٤<br>نظام رسوم الدخول الى المتاحف والمواقع الأثرية | Regulation no. 16 for year 1984<br>regulation concerning entry fees to museums and archaeological sites |
| 1988-03-17 | 3540 | قانون رقم ١٤ لسنة ١٩٨٨<br>قانون معدل لقانون الآثار | Law no. 14 for year 1988<br>law amending the law of antiquities |
| **1988-03-17** | **3540** | **قانون رقم ٢١ لسنة ١٩٨٨**<br>**قانون الآثار** | **Law no. 21 for year 1988**<br>**law of antiquities** |
| 1988-08-16 | 3565 | تعليمات رقم ٤ لسنة ١٩٨٨<br>بتحديد المهام والأعمال الخاصة بالأقسام والفروع في دائرة الآثار العامة | Directives no. 4 for year 1988<br>identify the missions and function of sections and branches of the Department of Antiquities |
| 1993-05-16 | 3896 | نظام رقم ٣١ لسنة ١٩٩٣<br>نظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Regulation no. 31 for year 1993<br>regulation concerning entry fees to museums and archaeological sites |
| 1994-09-17 | 3993 | نظام رقم ٤٤ لسنة ١٩٩٤<br>نظام معدل لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Regulation no. 44 for year 1994<br>amendment to regulation concerning entry fees to museums and archaeological sites |
| 1995-07-01 | 4052 | رسوم الدخول إلى المتاحف والمواقع الأثرية | Entry fees to museums and on archaeological sites |
| 1996-05-02 | 4115 | نظام رقم ٢٤ لسنة ١٩٩٦<br>نظام معدل لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Regulation no. 24 for year 1996<br>amendment to regulation concerning entry fees to museums and archaeological sites |
| 1996-10-01 | 4154 | تعديل رسوم الدخول إلى موقع آثار جرش | Amendment concerning entry fees to Jerash archaeological site |
| 1996-12-16 | 4172 | تأجيل تطبيق القرار المتعلق بتعديل رسوم الدخول إلى موقع آثار جرش | Postponement for implementation of the decree concerning amendment for entry fees to Jerash archaeological site |
| 1997-01-02 | 4176 | اعادة تشكيل مجلس تنظيم إقليم البترا | Reconstitution of Petra Development and Tourism Region Authority |

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| 1998-12-26 | 4315 | اعلانات صادرة عن وزير السياحة والآثار رئيس مجلس تنظيم اقليم البترا | Statements issued by the Minister of Tourism and Antiquities, the Chairman of Petra Development and Tourism Region Authority |
| 1999-10-10 | 4384 | الانعام بوسام الاستقلال من الدرجة الأولى على عطوفة مدير عام دائرة الآثار العامة السابق | Acknowledgment with Medal of Independence first class to the former Director General of the Department of Antiquities |
| 1999-11-01 | 4389 | نظام رقم٧٦ لسنة ١٩٩٩<br>نظام معدل لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Regulation no. 76 for year 1999<br>regulation amending entry fees to museums and archaeological sites |
| 2000-01-16 | 4406 | تصحيح خطأ مطبعي في المادة(١)من النظام رقم٧٦ لسنة١٩٩٩ على الصفحة رقم٤٣٥٣ من عدد رقم٤٣٨٩ | Erratum to article 1, regulation no. 76 for year 1999 page 4353 from no. 4389 |
| 2000-03-01 | 4416 | نظام رقم ٢ لسنة ٢٠٠٠ نظام معدل لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Regulation no. 2 for year 2000 regulation amending entry fees to museums and archaeological sites |
| 2000-03-26 | 4422 | إعلانات صادرة عن وزير السياحة والآثار رئيس مجلس تنظيم إقليم البترا السيد عقل بلتاجي | Statement of the Minister of Tourism and Antiquities, the Chairman of Petra Development and Tourism Region Authority Mr. Akel Biltagi |
| 2000-11-01 | 4463 | قرار صادر عن وزير السياحة والآثار | Decree issued by the Minister of Tourism and Antiquities |
| 2001-01-16 | 4472 | نظام رقم ٨٧ لسنة ٢٠٠٠<br>نظام الغاء نظام المتحف الشعبي للحلي والأزياء الشعبية | Regulation no. 87 for year 2000<br>cancelling regulation concerning folklore museums for traditional jewelry and clothes |
| 2001-02-15 | 4477 | نظام رقم ١٤ لسنة ٢٠٠١<br>نظام معدل النظام رسوم الدخول إلى المتاحف والمواقع الاثرية | Regulation no. 14 from year 2001<br>amendment to regulation concerning entry fees to museums and archaeological sites |
| 2001-03-18 | 4480 | اضافة المتحف الشعبي<br>للحلي والأزياء الشعبية إلى المواقع الأثرية والسياحية | Addition of folklore museums<br>for traditional jewelry and clothes to the archaeological and touristic sites |
| 2001-07-30 | 4499 | قانون مؤقت رقم ٣٦ لسنة ٢٠٠١<br>قانون سلطة إقليم البترا | Provisional law no. 36 for year 2001<br>law of Petra Region Authority |
| 2001-08-16 | 4501 | نظام رقم ٥٦ لسنة ٢٠٠١<br>نظام معدل لنظام رسوم الدخول إلى المتاحف والمواقع الاثرية | Regulation no. 56 for year 2001<br>amendment to regulation concerning entry fees to museums and archaeological sites |
| 2001-12-02 | 4520 | نظام رقم ٩١ لسنة ٢٠٠١<br>نظام معدل لنظام رسوم الدخول إلى المتاحف والمواقع الاثرية | Regulation no. 91 for year 2001<br>amendment to regulation concerning entry fees to museums and archaeological sites |
| 2002-02-17 | 4533 | نظام رقم ٦ لسنة ٢٠٠٢<br>نظام معدل لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Regulation no. 6 for year 2002<br>amendment to regulation concerning entry fees to museums and archaeological sites |
| 2002-02-17 | 4533 | قانون مؤقت رقم ٧ لسنة ٢٠٠٢<br>قانون معدل لقانون سلطة إقليم البترا | Provisional law no. 7 for year 2002<br>law amending the law of Petra Region Authority |
| 2002-05-01 | 4542 | نظام رقم ٤٠ لسنة ٢٠٠٢<br>نظام رسوم الدخول إلى المتاحف والمواقع الاثرية | Regulation no. 40 for year 2002<br>regulation concerning entry fees to museums and archaeological sites |
| | | نظام رقم ٤٣ لسنة ٢٠٠٢ | Regulation no. 43 for year 2002 |
| 2002-05-01 | 4542 | النظام المالي لسلطة إقليم البترا | regulation of Petra Region Authority financial system |

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| 2002-05-16 | 4547 | قانون مؤقت رقم ٢٣ لسنة ٢٠٠٢<br>قانون معدل لقانون الآثار | Provisional law no. 23 for year 2002<br>law amending the law of antiquities |
| **2003-06-16** | **4606** | **قانون مؤقت رقم ٤٩ لسنة ٢٠٠٣**<br>**قانون حماية التراث العمراني والحضري** | **Provisional law no. 49 for year 2003**<br>**law protection of architectural and urban heritage** |
| 2003-07-01 | 4608 | نظام رقم ٧١ لسنة ٢٠٠٣<br>نظام المتحف الوطني | Regulation no. 71 for year 2003<br>National Museum regulation |
| 2004-01-15 | 4639 | نظام رقم ١١ لسنة ٢٠٠٤<br>معدل لنظام المتحف الوطني | Regulation no. 11 for year 2004<br>amendment to National Museum regulation |
| 2004-06-01 | 4662 | قانون رقم ٢٣ لسنة ٢٠٠٤<br>قانون معدل لقانون الآثار | Law no. 23 for year 2004<br>law amending the law of antiquities |
| **2005-03-31** | **4702** | **قانون رقم ٥ لسنة ٢٠٠٥**<br>**قانون حماية التراث العمراني والحضري** | **Law no. 5 for year 2005**<br>**law protection of architectural and urban heritage** |
| 2005-03-31 | 4702 | اعلان بتعديل القانون المؤقت رقم ٤٩ لسنة ٢٠٠٣<br>قانون حماية التراث العمراني والحضري | Statement amending provisional law no. 49 for year 2003<br>the law of protection of architectural and urban heritage |
| 2005-08-31 | 4719 | المصادقة على اتفاقية حماية التراث الثقافي غير المادي | Ratification of the Protection of Intangible Cultural Heritage Convention |
| 2005-11-01 | 4726 | نظام ٦٣ لسنة ٢٠٠٥<br>نظام معدل لنظام رسوم دخول المتاحف والمواقع الأثريه | Regulation no. 63 for year 2005<br>amendment to regulation concerning entry fees to museums and archaeological sites |
| 2006-02-16 | 4746 | نظام رقم ٨ لسنة ٢٠٠٦<br>نظام معدل لنظام رسوم دخول المتاحف والمواقع الأثرية | Regulation no. 8 for year 2006<br>amendment to regulation concerning entry fees to museums and archaeological sites |
| 2006-05-16 | 4759 | نظام رقم ٣٨ لسنة ٢٠٠٦<br>نظام تحديد أسعار الخدمات السياحية المقدمة لزوار محمية البتراء الأثرية | Regulation no. 38 for year 2006<br>regulation concerning Petra Archaeological Park touristic services prices for visitors |
| 2006-10-01 | 4785 | قرار صادر بالاستناد لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Decree issued under regulation concerning entry fees to museums and archaeological sites |
| 2006-11-01 | 4790 | قرار صادر بالاستناد لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Decree issued under regulation concerning entry fees to museums and archaeological sites |
| 2007-03-15 | 4815 | نظام رقم ٢١ لسنة ٢٠٠٧<br>نظام نشر الثقافة والتراث | Regulation no. 21 for year 2007<br>regulation concerning promotion of culture and heritage |
| 2007-07-16 | 4837 | إضافة متحف دار السرايا في اربد إلى المواقع الأثرية التي يستوفي رسوم دخول عند زيارتها | Addition of Dar Al-Saraya Museum in Irbid to archaeological places which require visitors entry fees |
| 2007-08-06 | 4840 | نظام رقم ٧٨ لسنة ٢٠٠٧<br>نظام إدارة محمية البترا الأثرية | Regulation no. 78 for year 2007<br>regulation of Petra Archaeological Park management |
| 2008-01-31 | 4881 | نظام رقم ٦ لسنة ٢٠٠٨<br>نظام صندوق حماية التراث العمراني والحضري | Regulation no. 6 for year 2008<br>regulation concerning protection of architectural and urban heritage fund |
| 2008-06-16 | 4912 | تعليمات اللوازم والمستودعات لمحمية بترا الأثرية رقم ١ لسنة ٢٠٠٨ | Directives for supplies and storage for the Petra Archaeological Park no. 1 for year 2008 |

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| 2008-06-16 | 4912 | التعليمات المالية لمحمية بترا الأثرية رقم ٢ لسنة ٢٠٠٨ | Financial directives to the Petra Archaeological Park no. 2 for year 2008 |
| 2008-06-16 | 4912 | تعليمات موظفي محمية بترا الأثرية رقم ٣ لسنة ٢٠٠٨ | Directives for Petra Archaeological Park staff no. 3 for year 2008 |
| 2008-06-16 | 4912 | تعليمات استخدام الخيول والجمال في محمية بترا الأثرية رقم ٤ لسنة ٢٠٠٨ | Directives concerning the use of horses and camels in the Petra Archaeological Park no. 4 for year 2008 |
| 2008-12-01 | 4941 | قانون رقم ٥٥ لسنة ٢٠٠٨<br>قانون معدل لقانون الآثار | Law no. 55 for year 2008<br>law amending the law of antiquities |
| 2009-04-30 | 4960 | قرار صادر بالإسناد لنظام رسوم الدخول إلى المتاحف و المواقع الأثرية | Decree issued under regulation concerning entry fees to museums and archaeological sites |
| 2009-04-30 | 4960 | تعليمات معدلة لتعليمات موظفي محمية البترا الأثرية رقم ٣ لسنة ٢٠٠٨ | Amended directives for the Petra Archaeological Park staff no. 3 for year 2008 |
| 2009-08-16 | 4976 | قانون رقم (١٥) لسنة ٢٠٠٩<br>قانون سلطة اقليم البتراء التنموي السياحي | Law no.15 for year 2009<br>law concerning Petra Development Tourism Region Authority |
| 2009-10-15 | 4990 | المصادقة على اتفاقية حماية التراث الثقافي المغمور بالمياه | Ratification of The Convention on the Protection of the Underwater Cultural Heritage |
| 2009-11-01 | 4993 | قرار بحظر استيراد اللوحات الفسيفسائية | Decree imposing a prohibition on the import of mosaics |
| 2009-12-31 | 5006 | تعليمات تحديد أسعار الخدمات المقدمة لزوار محمية البترا الأثرية رقم (١) لسنة ٢٠٠٩ | Directives to determine the prices of Petra Archaeological Park services provided for visitors no. 1 for year 2009 |
| 2010-07-01 | 5040 | قرار صادر بالاستناد لنظام رسوم الدخول الى المتاحف والمواقع الاثرية | Decree issued under regulation concerning entry fees to museums and archaeological sites |
| 2010-07-15 | 5042 | تعليمات معدلة رقم ١\٢٠١٠ لتعليمات تحديد أسعار الخدمات المقدمة لزوار محمية البترا الأثرية | Amended directives no. 1/2010 determine the prices of Petra Archaeological Park services provided for visitors |
| 2011-05-02 | 5090 | قرار صادر بالاستناد لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية | Decree issued under regulation concerning entry fees to museums and archaeological sites |
| 2011-12-01 | 5129 | قرار صادر بالاستناد لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية رقم (٤٠) لسنة ٢٠٠٢ | Decree issued under regulation concerning entry fees to museums and archaeological sites no. 40 for year 2002 |
| 2012-06-17 | 5162 | قرار صادر بالاستناد لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية رقم(٤٠) لسنة ٢٠٠٢ | Decree issued under regulation concerning entry fees to museums and archaeological sites no. 40 for year 2002 |
| 2013-04-16 | 5217 | قرار بمعاملة السائح العربي معاملة المواطن الأردني فيما يخص استيفاء الرسوم المقررة لدخول المواقع السياحية والأثرية | Decree recognizing Arab tourists as Jordan citizens in term of entry fees to touristic and archaeological sites |
| 2013-07-01 | 5228 | نظام ٥٨ لسنة ٢٠١٣<br>نظام المجلس الاستشاري لدائرة الآثار العامة | Regulation no. 58 for year 2013<br>regulation concerning advisory board to the Department of Antiquities |
| 2014-01-16 | 5264 | قرار صادر بالاستناد لنظام رسوم الدخول إلى المتاحف والمواقع الأثرية رقم(٤٠) لسنة ٢٠٠٢ | Decree issued under regulation concerning entry fees to museums and archaeological sites no. 40 for year 2002 |
| 2014-09-01 | 5299 | قانون رقم ٨٢ لسنة ٢٠١٤<br>نظام إدارة وحماية محمية البترا الأثرية | Law no. 82 for year 2014<br>regulation concerning Petra Archaeological Park management and protection |

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# PETRA HINTERLAND ANCIENT ROADS PROJECT (PHARP) PRELIMINARY REPORT ON THE 2011 AND 2014 SEASONS

*Fawzi Abudanah, Saad Twaissi, Mohammad B. Tarawneh and Adeeb al-Salameen*

## Introduction

In 2011 and 2014, the Nabataean Centre for Archaeological Studies at al-Hussein Bin Talal University initiated two field seasons to record and map ancient road networks in the hinterland of Petra. This ongoing project is named the Petra Hinterland Ancient Roads Project (PHARP); the study area covers the ash-Sharāh mountains between Shawbak and Rās an-Naqab **(Fig. 1)**. The study area was divided into three major areas, each divided into smaller sub-areas. The three major areas, from north to south, are: Shawbak - Petra (Area I); Petra - Ṣadaqa (Area II); Ṣadaqa - Rās al-Naqab (Area III).

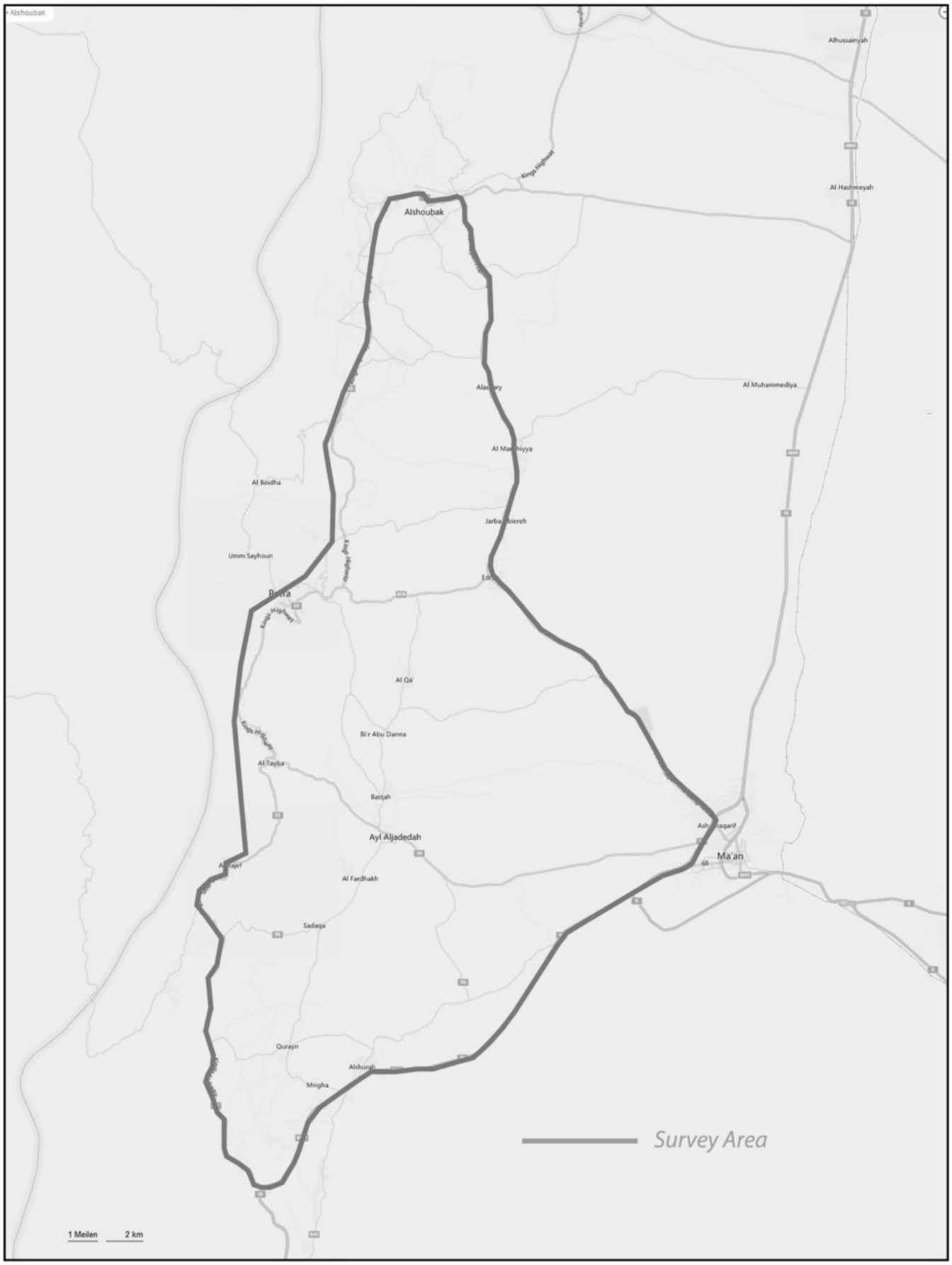
## Previous Studies

Previous work on the road networks of southern Jordan is very scarce, with data usually being obtained either from the accounts and observations of earlier travellers or from archaeological field reports. A number of publications do not address the project study area, but remain a source of information regarding the existence of ancient roads. In the late 19th century, the German scholars Brünnow and Domaszewski (1904: 433-479) recorded sections of ancient road and milestones in *Provincia Arabia*, but none were located in our study area as the German explorers followed a more easterly route. Thomsen's milestone corpus of 1917, which catalogued Roman milestones from Syria, Arabia and Palestine, provides little clarification (Thomsen 1917). In the 1930s, Nelson Glueck discovered a broken Roman milestone at Ayl and described several ancient roads in the study area (1935: 72-78; for the milestone see Glueck 1935: 75 [published in Graf 1995a: 418]). At around the same time, Sir Aurel Stein examined the *Via Nova Traiana* between Aqaba and Petra (Stein 1940: 436-438; Gregory and Kennedy 1985: 304-352). Important data regarding the road network in the study area were obtained from David Graf's large-scale project on the *Via Nova Traiana* in Arabia Petraea between 1986 and 1989 (Graf 1995b: 242). Graf's main interest was the Roman highway, but he also recorded an ancient road, *viz*. Darb ar-Raṣīf, in the study area (1995b: 249-250). Darb ar-Raṣīf is a local name for the so-called King's Highway. In 2012, MacDonald included ancient roads between Ayl and Rās al-Naqab in the results of an archaeological survey of the area (ARNAS), but he did not trace them and consequently did not fully record them (MacDonald *et al*. 2012). In 2013, Jouvenel published a paper on Iron Age roads in Edom that was based on Geographic Information Systems (GIS) analyses (2013: 55-60). The APAAME archive, created by David Kennedy and Robert Bewley, includes aerial photographs of some ancient roads in the study area.[1] Finally, Abudanh recorded a network of ancient roads in the Udhruḥ area; the idea for this project started then (Abudanh 2004; Abudanh 2006).

## Methodology

The team utilised Google Earth and Bing Maps to locate some ancient roads, while others

1. Aerial Photographic Archive for Archaeology in the Middle East (APAAME): www.apaame.org




*1. Map showing the study area, which extends further to the south-east to include the Rās an-Naqab area (© Mechthild Ladurner).*

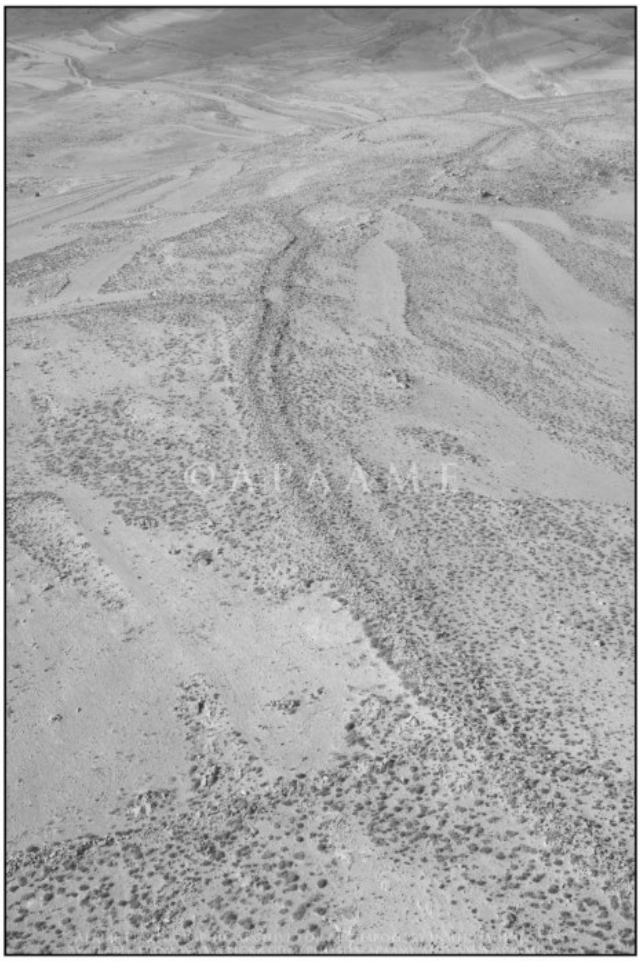
were identified in the field. All traceable routes (including major and minor secondary routes and paths) were measured, photographed and recorded. Wherever possible, team members walked down the centre of the road between the two walls defining its route whilst carrying a GPS. The device was usually set up to record a point every three metres. Accuracy was variable, but remained between ±1.15 and ±2m. The device used for this project was a Sokkia GRX1. The coordinates were then uploaded to ArcMap 10 to trace the paths of the roads and produce a proper map. Roads branching off the King's Highway were given the code KHJ (King's Highway Junction) followed by a number, regardless of the type of road. Ancient sites that were directly or indirectly associated with the King's Highway, or were located along its path, were given the code KHS (King's Highway Site) followed by a three-digit number. The majority of roads do not have names and were therefore named after the sites they terminate at, serve or pass.

The team collected ceramic material from a number of sites in order to better date stretches of road and a handful of sites. The team's ceramist, Sarah E. Wenner, reviewed the material at the Nabataean Centre for Archaeological Studies at al-Hussein Bin Talal University. On examination of the classical-era diagnostic sherds, whenever possible she identified the production location, vessel part and vessel type, and dated the sherds to the Nabataean (*ca* 63 BC – 106 AD), Roman (*ca* 106 – 324 AD) or Early Byzantine (ca 324 – 500 AD) periods.[2] The classical-era sherds were almost entirely locally made and were comparable to both published material from az-Zanṭūr (Schmid and Kolb 2000) and to material recovered by the Udhruḥ Archaeological Project. Unless otherwise specified, all sherds were Petra fabric from the az-Zurrāba / Wādī Mūsā kilns ('Amr 1987, 1991, 1999). The ceramic data have been fully presented in another paper (Abudanah *et al.* 2015).



*2. Path of a major secondary road south-east of ar-Rājif (© M.B. Tarawneh).*

2. The authors do not make claims for cultural identity on the basis of period names. Rather, 'Nabataean', 'Roman' and 'Early Byzantine' are used as rough historical markers. The ceramic traditions do not necessarily change at these markers (e.g. the Roman annexation in AD 106, marking the start of the so-called 'Roman' period), but a number of forms, fabrics and decorative styles can be dated to a specific chronological range. When more precise dating was available, this was included. Nabataean painted fine ware sherds are especially useful in this regard, as phases often span just a few decades and are easily identifiable. Stephan Schmid has published a chronological typology based on excavations at az-Zanṭūr (Schmid 1997; Bignasca *et al.* 1996; Schmid and Kolb 2000); no significant revisions have so far been made to this chronology.



*3. (a) Aerial photo showing an ancient road on the hills south-west of Ayl (© APAAME_20141019_DDB-0363.jpg).*



*3.(b) Aerial photo showing an ancient road near Bīr Khidād (© APAAME_20101016_DLK-0221.dng).*

**Layout and Stonework of Roads**

Ancient roads, regardless of their type, share similar characteristics throughout the study area. Two stone walls define the route; each wall consists either of two parallel rows of stones or, in a few cases, a single row **(Fig. 2)**. No mortar or rubble was seen filling the gap between the two rows of stones, but the first course of stones is firmly fixed into the ground. No correlation between stone size and road type was noted. Different sizes and types of stone were used to define the route of a single road. The stones were quarried locally or collected from the nearby ground surface. Standing stones were seen in the walls of some roads, but it is not clear whether these had a particular function. Generally speaking, the stone walls stand to a considerable height, making the roads a visible landmark - even from the air **(Fig. 3a-b)**. The height of some walls was three courses, or between 1 and 1.5 m. However, retaining walls standing up to 2 m high define the paths of some roads, particularly in *wadi* beds or on slopes **(Fig. 4)**. These walls had a twofold function, as they both defined the road and helped to protect it from landslide or soil erosion. Remarkably, the majority of roads appear not to have been paved. Paving may not have been necessary as these roads were most likely used for normal traffic of people and animals. Moreover, there is no evidence that carriages were used in the study area in ancient times for carrying crops or goods. Camels, horses and other domestic animals were and still are the most common means of transportation. The excavation of test trenches on some roads would however confirm the presence or absence of flagstones. The width of roads is variable and inconsistent, even on the



*4. Photo of two retaining walls defining the path of the Via Nova Traiana south-east of Petra (© F. Abudanah).*

same road. The typology below includes more information on the widths of different types of road, which typically range from 2 m to 8 - 10 m.

**Road Typology**

Four types of road or pathway were recognised in the study area, *viz*. major primary roads, major secondary roads, minor secondary roads and pathways. The major roads usually run north - south and follow the highest and longest ridges. Their layout and construction technique closely resembles those of the other types of road, but their width is normally about 6m and in some places exceeds 8m. The monumentality of the major roads is apparent from their width and the height of the curb stones.

Major secondary roads branch off major roads and run for long distances, both serving and passing ancient sites. Their curb stone walls are not as high as those of the major roads and their width ranges from 3 to 4m. Although not as monumental as the major roads, they are easily noticed in the landscape as they run mostly over high, long and contiguous ridges.

Minor secondary roads branch off major primary and major secondary roads, but only run for short distances. They typically connect sites with the road network of the area and also provide a link between major secondary roads. They sometimes run between fields to connect them with other minor or major roads and likely facilitated the movement of farmers and their animals. This type of road has mostly low curb stone walls; road widths range from 2 to 3m.

Pathways usually run between fields, on slopes or on difficult terrain. They likely linked fields with settlement sites where the terrain made a normal road impossible. Pathways are about 1.5m wide and are defined by two stone walls.

**Significant Results**

What follows is a summary of the results; detailed information and full discussion of the findings will appear in forthcoming publications. The 2011 and 2014 fieldwork revealed ancient roads in the three major areas of the study area. However, the frequency of roads varies considerably according to the number of ancient sites and the general state of preservation in each area. Many well-preserved roads were recorded between Petra and Ṣadaqa (Area II) and between Ṣadaqa and Rās an-Naqab (Area III). Ancient roads do exist between Shawbak and Petra (Area I), but these are not well-preserved and require further investigation. In Area I, the most significant result was locating stretches of the Roman *Via Nova Traiana* parallel to the modern road between Shawbak and Petra.

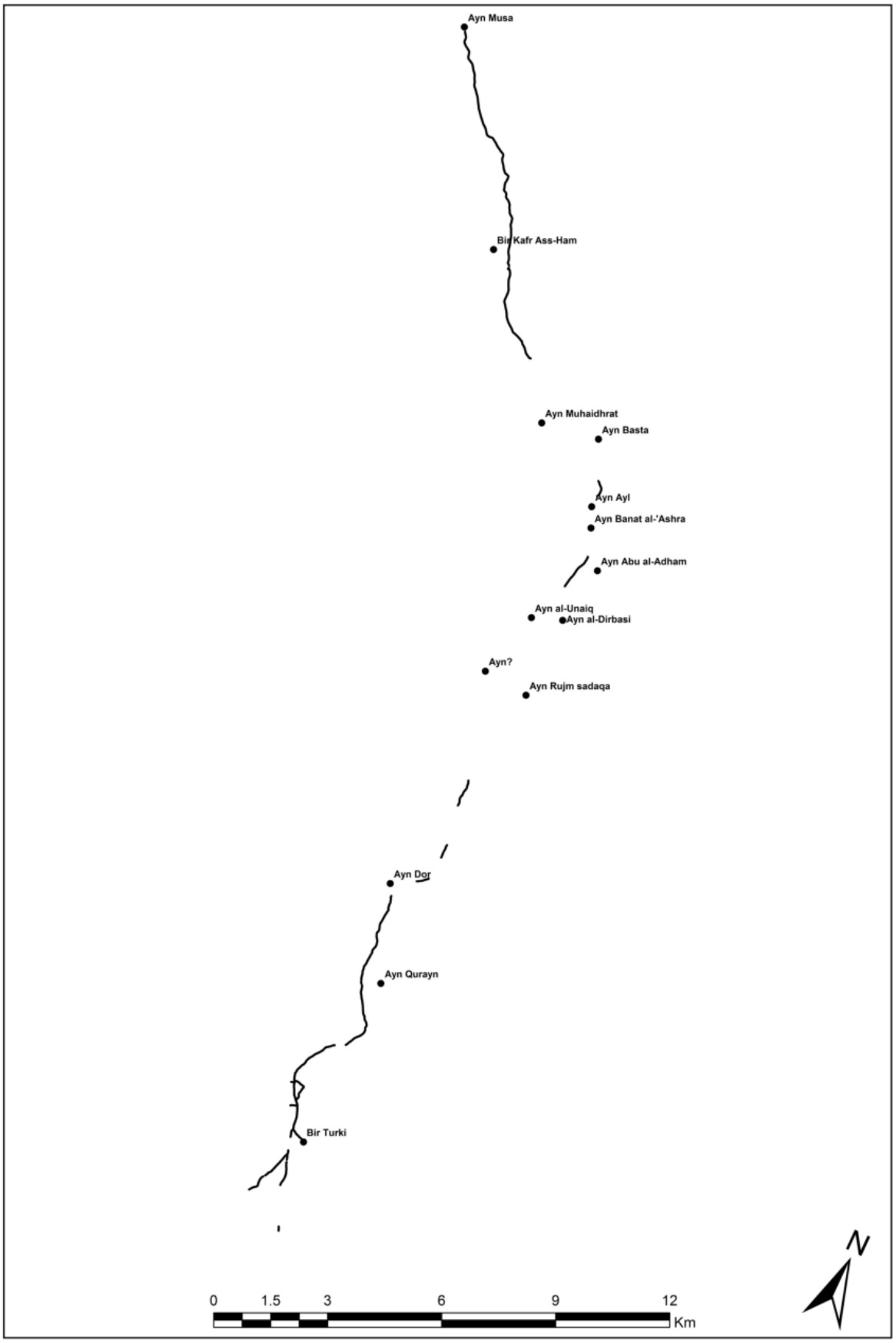


*5. Photo of the ancient road to Khirbat Umm Finain north-east of Petra (© F. Abudanah).*

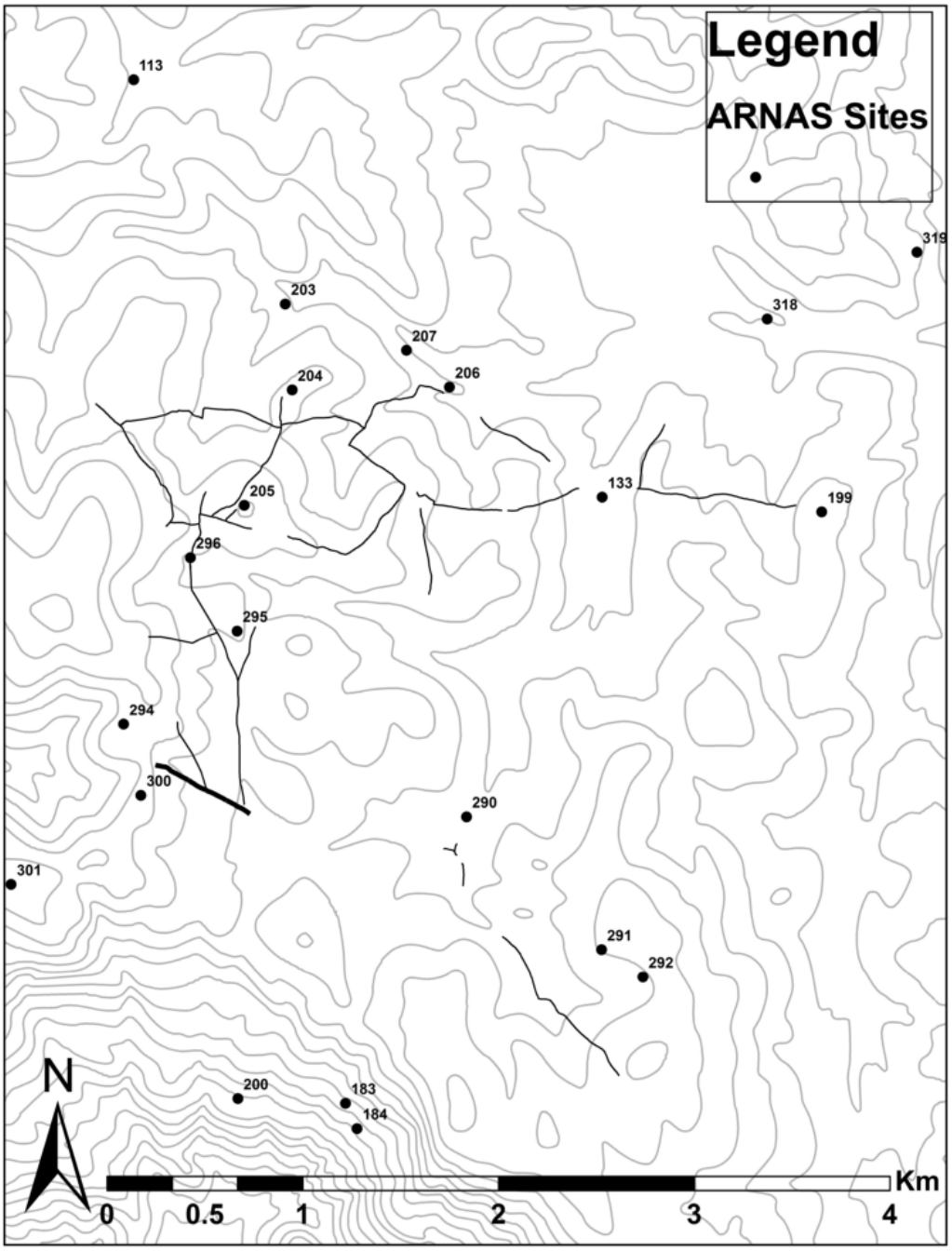
A road network was also recorded around the spring and ancient site of Malghān (Abudanh 2006) and south of Bīr Khidād in the same area **(Fig. 5)**. In Areas II and III, the *Via Nova Traiana* was traced from a point south of ʻAyn Mūsā to Rās al-Qana via Basṭa, Ayl and Ṣadaqa. Several minor roads, intersecting its path and leading towards ancient sites, were also recorded between these two locations **(Fig. 6)**. A cluster of ancient roads was uncovered in Area II south-east of Petra between Ayn al-Hujaim and Ayn al-Majdal (Abudanah and Twaissi forthcoming). The King's Highway is another significant ancient road in Areas II and III; reasonably well-preserved sections of this road were recorded from a point west of ʻAyn Mabrak southward to a point west of the modern Desert Highway in the Rās an-Naqab area. In the area between the modern police station at Dilāghah and the modern junction of Darb ar-Raṣīf with the Desert Highway alone, no less than twenty-four major and minor secondary roads were recorded branching off either side of the ancient highway (Abudanah *et al*. 2015). The secondary roads run for several kilometres and connect ancient settlements with the major road. KHJ002, for instance, branches off the King's Highway and runs for about five kilometres serving many ancient sites via minor roads before terminating at Dor. The ancient road to Umm Ḥamātah is another example, as it connects with other minor roads south-west of Tasan to form a network of roads connecting ancient settlements in the area with Khirbat Abū al-Lisān (ARNAS site 199; **Fig. 7**) to the east. Another important group of ancient roads were found around the ancient site of Ṣadaqa, to the west and south-west of the site. At Rās an-Naqab, which lies in Area III of the study area, the survey also revealed ancient roads, especially west and north-west of the site of al-Qarana (Kennedy 2004: 188-190). A major road was traced from a point close to Khirbat al-Qaran to a point south of Abū al-Lisān, passing several ancient sites including ʻAyūn.

**What Were the Roads For?**

The sheer quantity of roads and the effort and planning that went into them point to their importance. Amongst their multiple functions was the traditional one of facilitating and encouraging trade. Trade appears to have been active in the region on two levels, local and international, at least during periods of prosperity. Iron Age II and the Nabataean, Roman, Byzantine and Early Islamic periods experienced cycles during which long-distance trade flourished (Fiema 1991: 50-100). At least two roads in the study area seem to have been




*6. Map showing preserved sections of the Via Nova Traiana between Petra and 'Ayn al-Qana (© F. Abudanah).*




*7. Map showing network of ancient roads south-west of Tasan (for ARNAS sites see MacDonald et al. 2012) (© F. Abudanah).*

used for regional and international trade, *viz*. the King's Highway and the *Via Nova Traiana.* The date of the former is problematic, but the latter was heavily used and may have been first constructed during the Roman period (Graf 1995b: 241-268). The roads of the study area were also used for regional and local transportation in the first millennia BC and AD, during which the ancient land of Jordan bore witness to the emergence of several political and urban centres, including ʻAmman, Dhībān and Buṣayra in the Iron Age (Herr and Najjar 2001: 323-345), the Decapolis in the Greco-Roman period, and Petra, Ḥumayma, Bostra and Umm al-Jimāl in the Nabataean period (Freeman 2001:427-459; Schmid 2001: 367-426 ). Evidence from the study area shows that roads connected many villages and towns with the political and urban centre of Petra during the Nabataean period. The Roman *Via Nova Traiana* offered a safe and easy transportation between ʻAqaba on the Red Sea and Petra, whilst also connecting several

major settlements between these two points. Roads connected remote sites with each other and with major sites in the Petra hinterland. They facilitated the movement of people between their settlements (whether permanent or seasonal) and water sources in the study area. The location of agricultural fields was carefully considered when roads were constructed, as the latter eased the movement of people and of animals laden with crops between fields and settlements. Some roads terminate at threshing floors, which were usually located on exposed bedrock both close to and somewhat distant from fields. Roads followed the natural topography, avoiding agricultural fields whenever possible. In some cases, the bedrock was modified to keep roads away from land suitable for agriculture.

**Modern Threats**

The ancient roads of the study area are seriously threatened by natural and human factors. Human interference with the landscape owing to the many demands made on the latter has caused serious damage to and the disappearance of many ancient roads. Threats include the construction of modern roads, bulldozing of dirt tracks, agricultural activity and urban development. For example, the construction of the modern Petra - ʻAqaba road, better known as Darb ar-Rasīf, destroyed considerable parts of the ancient road known as the King's Highway. Modern dirt tracks, built to facilitate the movement of farmers to and from fields, have also had a negative impact. Indeed, some ancient roads have already been destroyed by bulldozing since first being documented by the project. In some cases, the damage caused by modern tracks has been partial, but in other cases the ancient roads have been obliterated **(Fig. 8)**. Recently, there has been intensive construction of dirt tracks in the area between Rājif and Rās al-Qana. Some agricultural activities, particularly ploughing, fencing and the construction of terrace walls, can also endanger the survival of ancient roads. In some cases, farmers have removed curb stones for the construction of field boundaries or to build protective stone walls. Flooding, mostly seasonal, is the only natural reason for the disappearance of ancient roads as they typically run along *wadi* beds that are prone to flooding. For example, floods have destroyed a small section of the *Via Nova Traiana* in the al-Biqaah area south-east of Petra.

**Conclusion**

Some preliminary remarks can be made on the basis of the results presented here. The construction of roads in the study area was not



8. Section of the King's Highway partly disturbed by a modern dirt track north-east of ar-Rājif (© Saad Twaissi).

unusual or restricted to certain time periods. Rather, it was part of the process of urbanisation during periods of prosperity in the region. Roads maintained a direct and permanent connection between Petra and its hinterland. The hinterland of Petra would have been economically and strategically important to any authority during times of prosperity. It had fertile land for agriculture, sources of water, villages, hamlets, farmsteads and strategic locations important for the security of the region. Archaeological evidence clearly indicates that roads were constructed and reconstructed through collective effort, mostly likely at state-level. Road-building had the potential to result in legal clashes with the owners of agricultural fields. However, it seems clear that roads seldom disturbed agricultural fields as they followed hard ground or ran between fields, thereby keeping loss of cultivable land to a minimum. Such a system may have relied on the imposition of certain laws by a central authority in order to maintain order. Finally, this project has demonstrated that traditional survey methods that focus on sites with structures may result in the loss of important archaeological data such as roads, the physical existence of which reflects the need for further archaeological investigation of the landscape.

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# AN ARCHAEOLOGICAL SURVEY OF THE SITE of SILA‘/ SELA’ (ṬAFĪLA)

*Rocío Da Riva, Juan R. Muñiz, Marta L. Corrada, Ehab Jariri, Diego Gaspar, Marisol Madrid, Roser Marsal*

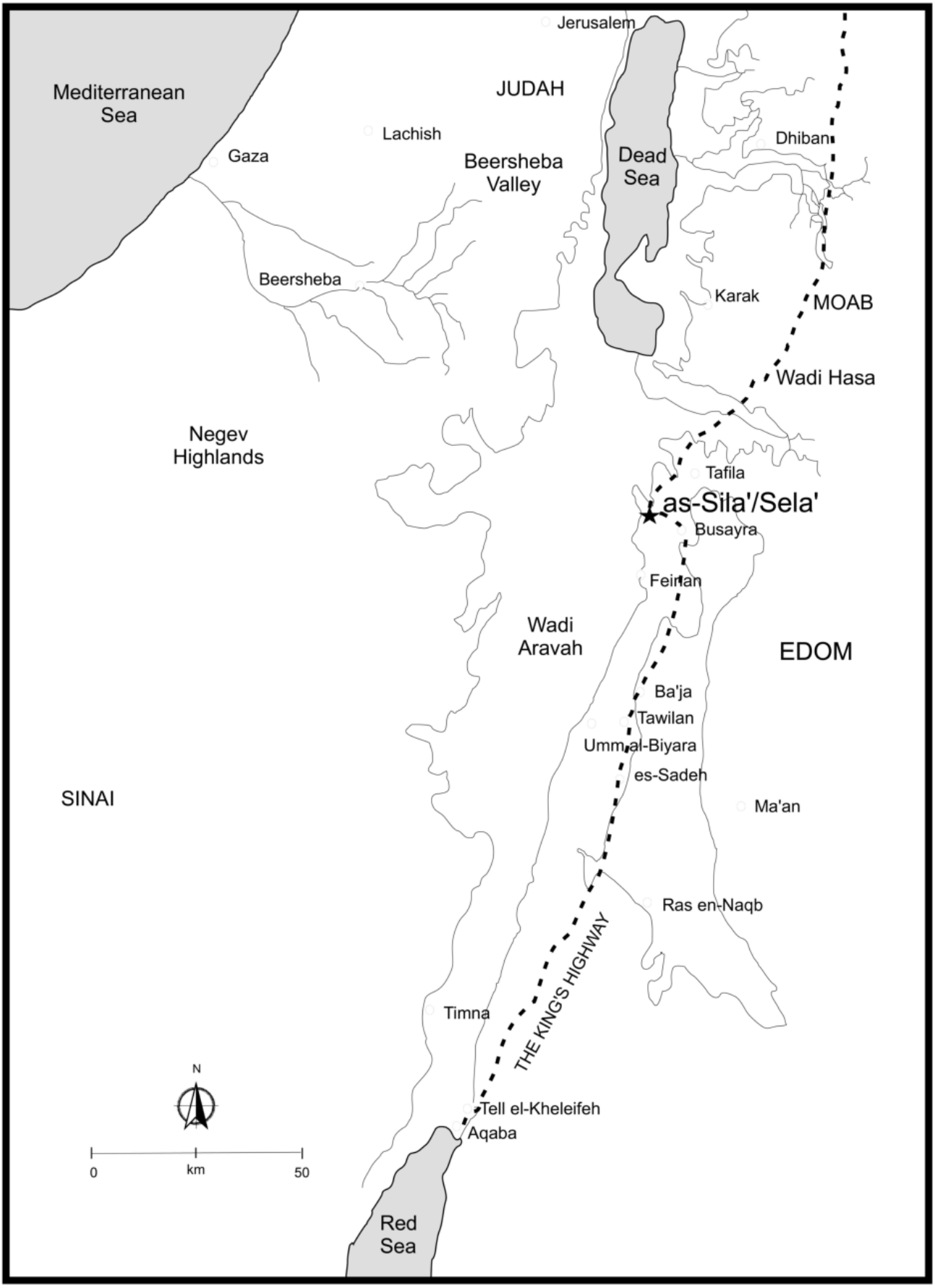
## Introduction

The archaeological survey of Sila‘/Sela’ (Ṭafīla) was undertaken between 6th and 13th April 2015. The aim of the survey was to carry out a topographical study and surface survey of the site (also known Sila‘ or Selá in some publications)[1]. The site is located near modern-day Buṣayra on the Edomite plateau, in the mountains of Ṭafīla, some four km off the King's Highway and about 50 km north of Petra **(Fig. 1)**. The geographical coordinates of the centre of the site are 30°46'50"N, 35°34'30"E and the average elevation is 867 m. The highest point of the promontory is 877 m above sea level and the total surface area of the site is 42 hectares. Selȧ is located on a rocky outcrop about 200 m above two surrounding *wadis*: Wādī al-Mashri‘ to the south, and Wādī Jamal to the north, and west of the outcrop. Both *wadis* flow into the Wādī Khunayzīrah, which in turn connects this system with the Wadi ‘Arabah. Further evidence of occupation was found in the fields east of the Wādī al-Mashri‘, and in the *wadi* itself.

As-Sela’ is a site of extraordinary scientific value and has enormous potential for broadening our understanding of the history of the Edomite plateau. Surface surveys have permitted the establishment of an approximate chronological framework for the site on the basis of the Iron Age, Nabataean and Roman pottery collected. Sela’ may have been occupied from the 8th century BC down to the 1st century AD, although at present we are unable to confirm that this occupation was continuous. A gap in settlement between the Iron Age II and the Nabataean periods has been observed at some neighbouring sites (MacDonald 2015: 40), but Sela’ is yet to be excavated and its chronology is not well understood. The many structures built for water storage and management (e.g. wells, cisterns, channels, reservoirs of varying sizes etc.) make Sela’ unique for the study of water management on the Edomite plateau during the 1st millennium BC. The site also has a carved inscription and relief of the Neo-Babylonian king Nabonidus (556 - 539 BC), the only one of its kind in the Hashemite Kingdom of Jordan.

During the survey several different kinds of features were identified, including streets, wells, gateways, stairways, rock-cut ‘houses’ and stone walls. The settlement has features that are characteristic of Iron Age II fortress sites, as well as features in common with Nabataean sites, such as Petra. Despite its isolation, or probably because of it, Sela’ is quite well preserved compared with other sites in Jordan. Many structures have extant entrance areas, stairways, gateways, central areas and towers. These architectural features share commonalities with similar sites from the Iron Age II period on the plateau such as Ba‘ja (Lindner 1987) and Umm al-Biyāra (Bienkowski 1992, 2011). In order to understand the relationship of features to each

1.The authors would like to thank Monther Jamhawi, Director General of the Department of Antiquities of Jordan (DoA), for permission to work at Sila‘. We would also like to acknowledge the support and assistance provided by the staff of the DoA in Amman and in Tafila. Financial support to undertake the project was provided by the ICREA Academia Research Prize (R. Da Riva). The University of Barcelona has granted institutional support to carry out the research. Special thanks are due to Burton MacDonald, who read the article and offered valuable comments. The photos illustrating this article are from R. Da Riva unless indicated. In this article we will refer to the site as Sila‘.




*1. Map of Jordan (by R. Marsal, after Porter 2004: 375).*

other, however, Sela' requires comprehensive and detailed archaeological excavation.

The site has been identified with Edomite Sela' which is frequently mentioned in the Bible (MacDonald 2000: 192), and many archaeological remains and textual sources bear witness to the significance of this site in different historical periods. The Nabonidus rock relief is the clearest indication of its importance during the Iron Age II. From the Nabonidus Chronicle we know that in the mid-6th century BC the king campaigned through this region, which he called Udummu, on his way from Babylonia to Arabia (Zayadine 1999; Lemaire 2003.). Indeed, the geographical setting and iconography of the monument suggest that it was carved to commemorate a military victory during Nabonidus' southern campaign. Its presence here also suggests that the area was under Babylonian administration at some point during Nabonidus' reign, although we know nothing of this rule.

**Archaeological and Historical Context**

Sela, (Sila') was first mentioned by Alois Musil (1907) and Gustav Dalman (1908, 1912), but Colonel F. G. Peake, commander of the Arab Legion, was the actual discoverer of Sela'.

Peake notified Glueck, who made the first archaeological visit to the site in 1937. Glueck compared Sela' to Petra (unfavourably) and identified virtually all the surface material and structures he found as Nabataean. Other visitors included de Vaux and Parr, Starkey and Bartlett (Lindner, Hübner and Gunsam 2001). Crystal Bennett noted the absence of Nabataean features at the site and reported a preponderance of Iron Age pottery. Zayadine, Lindner, Hübner, Gunsam and others worked on the site from the late 1960s to the late 1990s, but they did not make intensive interventions (Lindner, Hübner and Gunsam 2001). Hart included the site in his 1984 - 85 survey of the area (Hart 1986). Surface surveys at Sela' undertaken between 1999 and 2001 by a team led by B. MacDonald (the *Ṭafīla - Buṣayra Archaeological Survey* [TBAS]: MacDonald 2004) referred to the site as Nr 134 and uncovered Iron II, Iron Age and Nabataean pottery (MacDonald and Sawtell 2002: 479). The late Hamed K. Qatamine of Mu'tah University undertook excavations at Selả in 2001, (MacDonald and Sawtell 2002: 477) but we have no information at all regarding this work. The site has not been surveyed or excavated since Qatamine's work there.

Even though the ancient settlement of Sela' has not been excavated, surface finds from the summit indicate that it was occupied during several historical periods (including the Early Bronze Age, Nabataean and Mamluk periods) but it saw its most extensive occupation and use during the first half of the 1st millennium BC (Zayadine 1999: 85-86). There are indications of Iron Age II occupation (7th - 6th centuries BC) both on the plateau and in the village of Selả in the form of pottery and architectural structures similar to those found at other Iron Age II sites such as Umm al-Biyāra, Buṣayra and Ḥisbān, and the lesser known sites of Ba'ja III and Umm al-Ala (Lindner 1992).

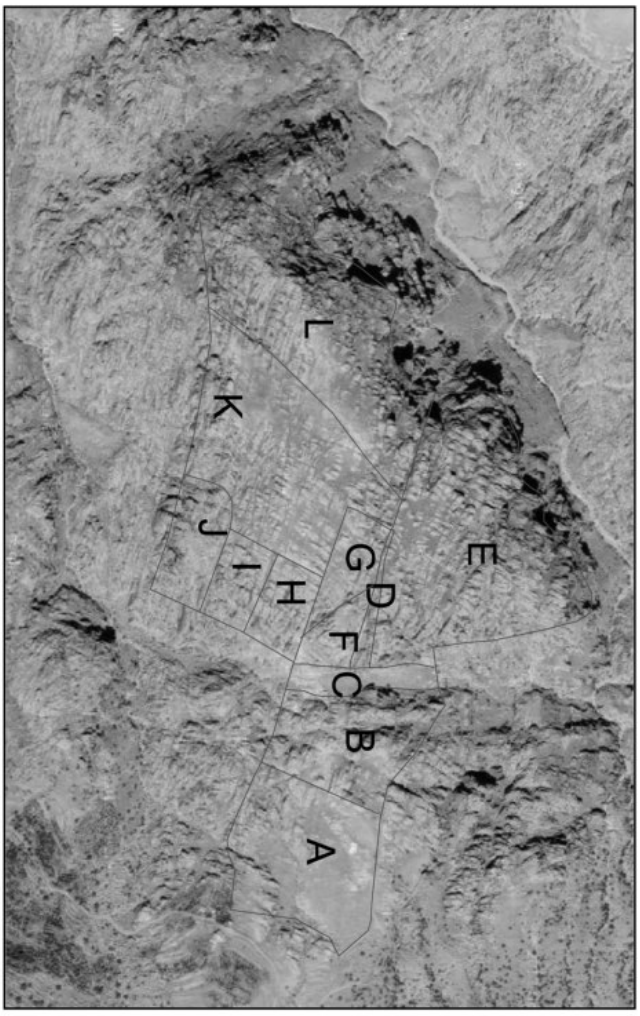
The plateau is reached by means of a rock-cut stairway called khandaq by Glueck, but apparently not by the locals, nor by the antiquities authorities in Ṭafīla (Lindner, Hübner and Gunsam 2001: 254). The plateau was protected by a tower and was entered through a gate building or gateway. To the right off the entrance is a narrow gorge that Glueck named after the *siq* in Petra (Lindner, Hübner and Gunsam 2001: 254). There are some rock-cut houses with traces of painted stucco in green, purple, red and blue, and many structures associated with water management. In fact, Lindner identified more than 30 reservoirs or catchment basins (some of them very large), which he dated to the Iron Age period, as well as channels and cisterns. Similar structures were found in the surface surveys carried out at Ba'ja and Umm al-Ala, and some authors have suggested the existence of a group of traditional cistern makers active in the region (Lindner 1992: 144). Other features observed at Selả are more difficult to attribute to the Iron

Age period, including some of the houses and the tower of the *khandaq*. Iron Age II as-Sela' shares some features with other contemporary sites in the region but it has a very personal and unique character which, as a result of its location near the King's Highway and the route to the Wādī 'Arabah, seems to have allowed it to function both as a temporary settlement and as a mountain stronghold / military outpost[2].

**Surveyed Areas**

The total area surveyed was 42.0089 hectares, distributed between the areas marked with the letters A - L on the sketch map **(Fig. 2)**. The site is reached from the east, descending to the *wadi* from the modern-day village of Sila' along a tarmac road. There is an area with cultivated fields east of the parking area (A). A surface survey has revealed the presence of Iron Age, Roman and mediaeval pottery, as well as lithic material, some iron slag and various metal objects. Within the *wadi* there are also rock-cut stairways and structures. West of A, so-called area B contains rock-cut structures ('houses' and reservoirs) and channels **(Fig. 3)**. In our opinion, area B functioned as a kind of entrance immediately before the *wadi* area (C) and the stairway (D) leading to the outcrop. Surface finds on area **B** include Iron Age II and Roman pottery. The wadi area (C) is located to the east of the beginning of the great stairway (D). To the north of this area, the remains of a large and thick plastered floor have been found **(Fig. 4)**. This area may have functioned as a kind of reservoir or basin, since a rock-cut channel leading from area B to the southern part of area C was also detected here. The rock-cut stairway (D) with approximately 160 steps begins in area C and ends at the entrance to the upper city (F). It is partially cut into the rock and partially built with stone ashlars **(Fig. 5)**. In the lower part of the stairway, some modern steps have been added to allow access. There are the remains of old sections of the stairway and of a tower in the upper section of the steps, and there is also evidence of repairs done on the stairway in the 1990s (Lindner, Hübner and Gunsam 2001: 252).

The north area (E) is one of the largest identified at the site: it comprises a partially built section where we find rock-cut steps leading from the wadi to the upper part of the site, as well as some rock-cut structures such as houses and cisterns. Surface finds include pottery (particularly Roman) and lithic material. The entrance area (F) includes a monumental gateway, a tower, and some 'houses' with stone walls, which seem to date to Iron Age II. The gateway is rock-cut, with a reinforcement of stone ashlars to support the walls **(Fig. 6)**. The great tower is hollow and seems to have also




*2. Sketch map.*

2. For the Iron Age II on the Edomite plateau, see Bienkowski 2014 and MacDonald 2015.

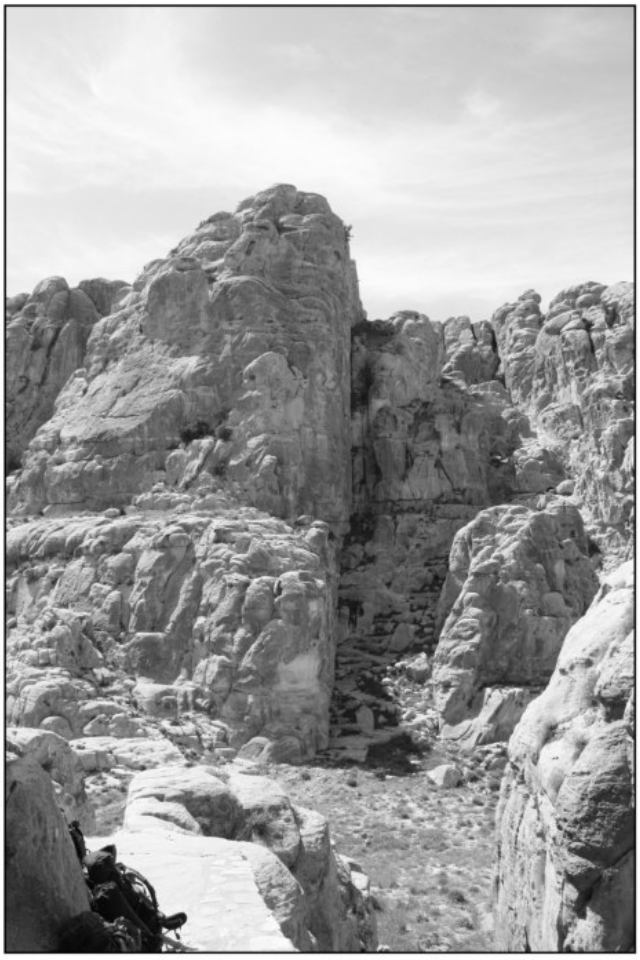


*3. Area B.*



*4. Floor in area C.*

functioned as a water cistern **(Fig. 7)**. We found traces of plaster and green, yellow, blue, purple and red paint on the walls of the nearby houses. Several cisterns were also detected, one of them with an elaborate sedimentation basin for separating mud and sand before the water was let into the main cistern **(Fig. 8)**. A grave cut into the rock was found on the northern edge of the cliff. In area G we detected the rock-cut layout of a large structure, some houses, cisterns and also some tombs (a 'necropolis'?), which seem to date to the Nabataean or Roman period. Area H contains two rock-cut houses, one of which at least seems to have functioned as a sanctuary: there is an altar and a sort of sacrificial pile or perhaps a *baetylus* **(Fig. 9)**. Nowadays this structure is used by shepherds and the walls are blackened by smoke. In area I we found several rock-cut stairs, houses and cisterns, and a large open area, which we called the 'Main Street'. Here we found many Iron Age II and Roman potsherds, as well as lithics and some iron slag. Area J seems to be less densely built than the other sections on this side of the outcrop:



*5. Stairs.*

it includes a *wadi* with a rock-cut stairway, an artificial cave (?), some rock-cut houses and cisterns, and a tower at the south-east end of the site. The central area K is the largest part of the site. We found numerous cisterns here, rock-cut houses and also a long channel. Surface finds (pottery, stone tools and metal objects) resemble those observed in other areas of the site. In area L, to the west, we found a tower and some rock-cut structures, including houses and cisterns. We also detected a limestone outcrop, which was probably the quarry for the plaster used for the walls and floors of the cisterns and the houses. Near the limestone outcrop, we found iron slag [3] and some fragments of basalt objects.

**Architectural and Hydraulic Structures**

The architectural structures observed at Selå are carved into the sandstone, built using stone boulders or ashlars, or constructed with a combination of these two systems (this is particularly evident in area F **see (Fig. 10).** There are also holes for the wooden beams carved into the walls, and longitudinal trenches or clefts cut in the ground as shallow foundations for the walls. Architectural structures of uncertain use (but possibly houses) are normally rock-cut, with additional stone ashlars used to build the walls **(Fig. 11)**. The walls are made of dry stone masonry but there is also evidence of a minimal use of limestone mortar or packing. Perishable materials such as wood and animal skins may also have been used. The size and shape of these structures vary, as they normally make use of the existing rock formation. The large boulders are hollowed out to create a cavity where, if necessary, extra elements such as stone walls, wooden beams may have been added. Examples can be seen in areas A and E, and elsewhere. In area F there are still traces of paint on the inner walls of the stone-cut houses, so at least some houses were decorated this way.

In area G we found the remains of a necropolis with a dozen cists made of flat limestone slabs (most of them already opened and emptied, perhaps in antiquity). A further grave (opened and lacking the capstone) was detected on the northern side of the entrance area (F), cut into the bare rock on the edge of the cliff **(Fig. 12)**.

At least one of the two stone-cut structures found in area H seems to have functioned as a place of worship, with an altar of some sorts cut into the rock inside the structure and the remains of holes and niches in the wall, where some perishable structures would have been added.

An interesting feature of Sela' is the presence of cisterns, water reservoirs perforated or carved

3. The presence of slag at the top of the Sila' is significant; the site could have been used for smelting because of the wind it receives (suggestion of B. MacDonald).



*6. Structure at the entrance (entrance gate).*



*7. Tower.*

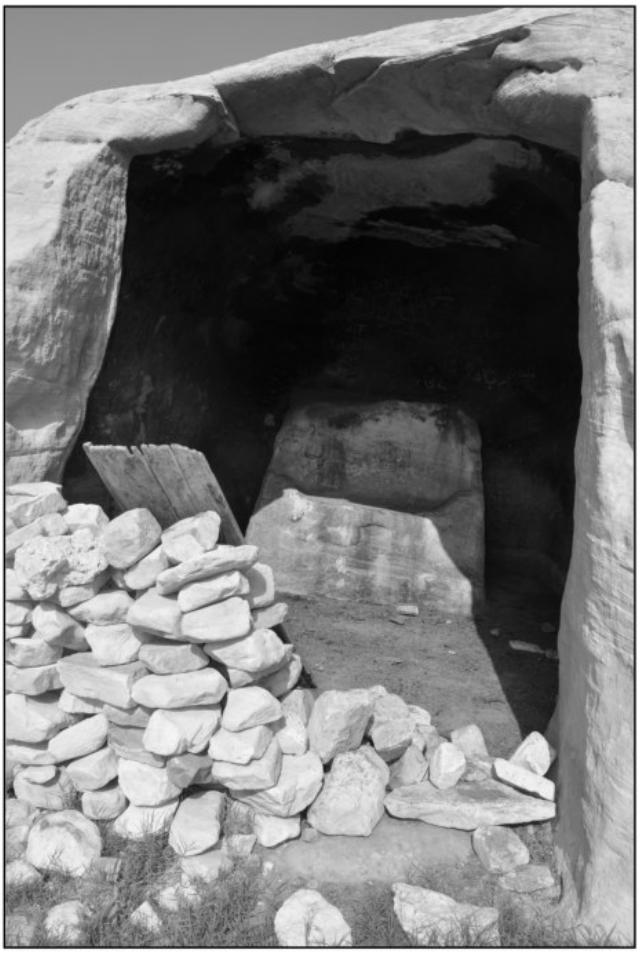
into the sandstone, presumably filled with rainwater through surface channels incised in the rock **(Figs. 13 and 14)**. We documented some forty of these cisterns, as well as some round pits, which seem to be unfinished cisterns that are carved to make use of a natural perforation of the sandstone. Some of the cisterns are cut into the sandstone at ground level, while others (like the tower from area F) are cut into the standing boulders. The shapes and sizes vary, as does the level of sophistication: some were technologically complex, with settling or sedimentation basins for stopping sediment and for separating mud and sand before the water was let into the main cisterns. Some cisterns are more or less oval in shape; others are rounded and some are cubic, with corners forming right angles. Some of the cisterns have plaster or waterproof cement on their sides and / or a capstone to seal them; this would have helped to improve the quality of the water, to extend the possible length of storage time and to reduce water loss through evaporation. Most of these cisterns are now filled with debris and



8. House and cistern.



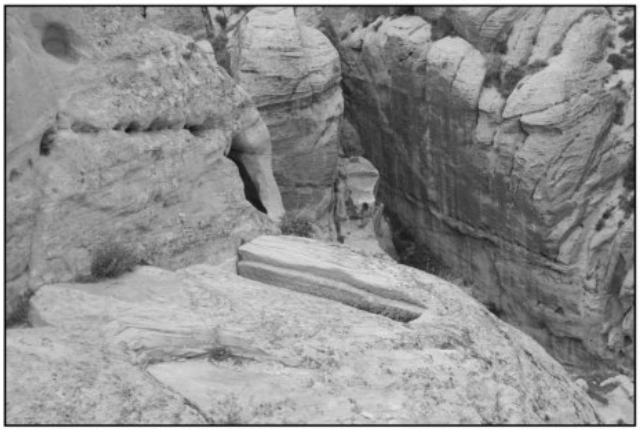
10. Wall.



9. "Temple".

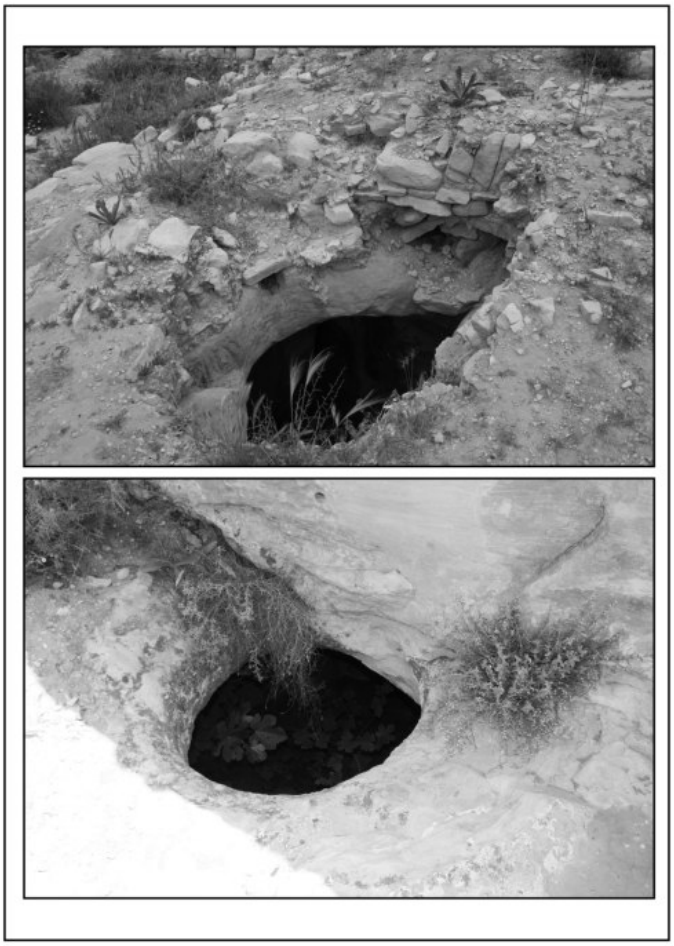


11. House.

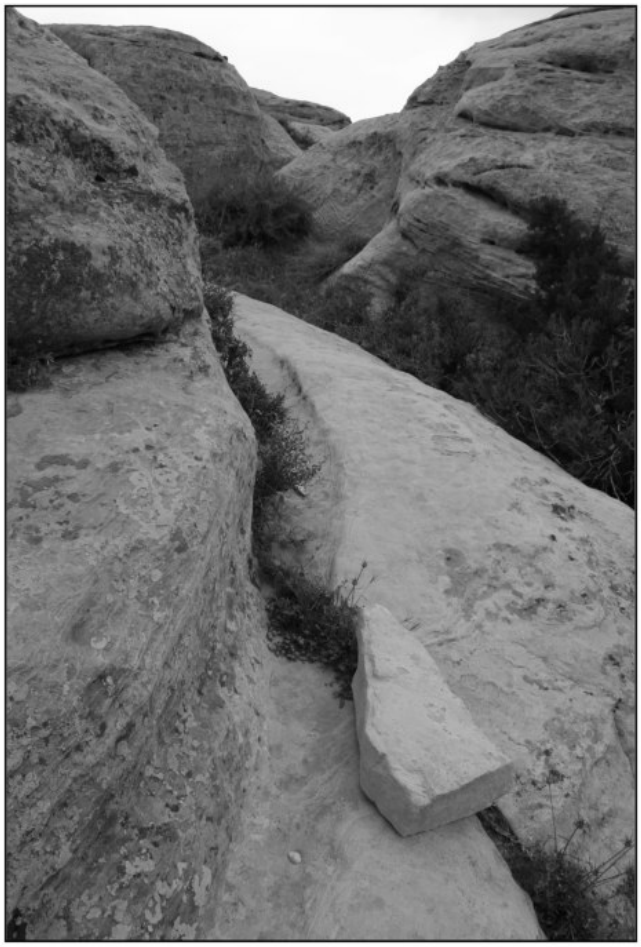


12. Grave.

sediment. There is no way of dating or analysing any of these structures without undertaking an archaeological excavation. A series of rock-cut channels and pipelines were detected in several areas of the site (A, B, E, K, J and I). Some of the channels are up to 20 m in length, and they seem to have been used to funnel the water into the cisterns **(Fig. 15)**. The so-called *siq*, a narrow gorge situated to the west of the entrance with plastered sides, has a channel incised in the left side of its stairwell and the channel is decorated with blue paint on a thick



13-14. Cisterns.



15. Channel.

layer of plaster. All these elements suggest the existence of a relatively developed system for collecting and storing rainwater using water channels, pipes and underground cisterns.

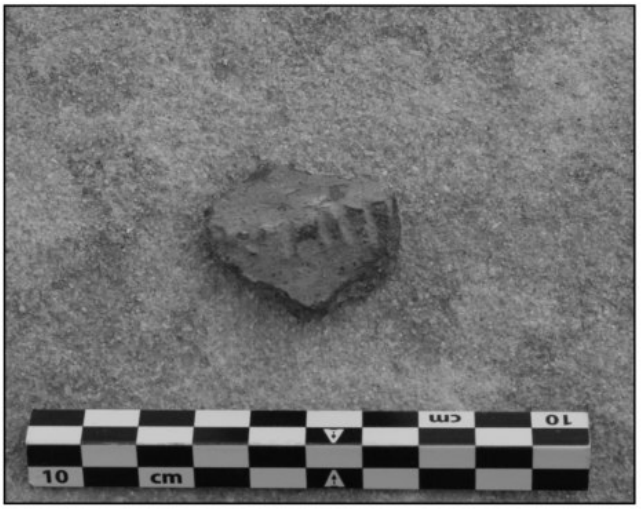
**Ceramic Remains in the Sila' Area: an Initial Appraisal of Their Forms and Decorative Patterns.**

The survey revealed ceramic material all over the surface of the site, in some cases in very high quantities. A thorough analysis of these materials will only be possible after excavation. At this stage, we would like to offer some preliminary remarks on some of the ceramic groups identified in three different areas of the site, each with its own particular features which might be related to different uses and or phases of occupation. This initial description will contribute to the assessment of the potential of the site.

The first area is located on a terrace in the north-eastern part of the site and is reached through the *siq* from the top of the main stairway (area E). The ceramic group identified here is composed of more than a hundred sherds in association with quartzite lithic remains, as well as some fragments of worked basalt. Within the ceramic material, we have identified a group of sherds with thick walls and flat bases, robust handles and large rims. These features, together with our calculations of the diameters, indicate that the original vessels were large, rough storage jars. A second group comprises pottery with rims of smaller diameter, probably intended for domestic use. The fabrics of both groups were coarse with temper visible to the naked eye; the storage jars show a beige and / or light grey body and a light ochre slip. In contrast, the second group shows a grey body and pink or orange slip and, in some cases, reddish or dark brown geometrical decoration on the outside **(Fig. 16)**.



16. Pottery.




17. Pottery.



18. Pottery.

The second area is located on the western side of the mountain (area L), among a group of rock-cut structures: stairs, cisterns and houses. The pottery found close to these remains of buildings is apparently related to them, although this assumption can only be confirmed through archaeological excavation. The ceramics in this group exhibit a coarse orange or sandwich (orange/ grey/ orange) body, with temper visible to the naked eye. They seem to be handmade and their main feature is external surface decoration of horizontal cordons with vertical incisions **(Fig.17)**. Next to these materials we found fragments of worked pinkish granite.

The third group of ceramics was found in a secondary context at the bottom of the mountain, under the vertical rock face in which the inscription of King Nabonidus was carved. The ceramics were clearly redeposited and appear to have been formed by fragments falling down through one of the vertical canyons, with the erosion perhaps caused by landslide from the top of the outcrop into the bottom of the *wadi*. About fifty sherds were found in this context, all highly fragmented. In most cases they are body sherds, which makes it difficult to establish the complete form of the ceramics. A hypothetical calculation of the diameters suggests that these were small, thin-walled ceramics with reddish or dark brown geometrical decoration on the external surface. In general the pottery is coarse, with a grey body and white temper visible to the naked eye. On the outside the sherds have a pink slip on which geometric motifs have been applied in black, red or dark brown paint. Motifs include straight lines, zigzags, chequering and cross-linking, both singly and in combination **(Fig. 18)**. The decoration of this ceramic group suggests that these are examples of 'Edomite' pottery, which dates from the 7$^{th}$ to 5$^{th}$ centuries BC, particularly of the so-called Busayra painted ware (Hart 1995: 53).

Despite the abundant recordings of this pottery from sites from southern Jordan, there is still no clear indication regarding its origin. There is, however, some evidence to suggest it may reflect a cultural phenomenon that occurred in various settlements in Jordan and the Negev (Tebes 2011). The only petrographic analyses undertaken to date on Iron II painted pottery were carried out on ceramics recovered from Negev

desert sites and these studies indicate a local source (Gunneweg *et al*. 1991). Therefore, we must wait for the results of analyses on the Sela' pottery to obtain a clear idea of its provenance.

**Inscribed Objects, Engravings and the Inscription of Nabonidus**

A number of inscriptions have been found in area K. Some are written in Arabic, but their chronology is uncertain, while others almost certainly contain *wusūm* or tribal marks, rather than letters **(Fig.19)**. Among other engraved material are some board games consisting of a series of small parallel perforations incised into exposed sandstone bedrock. These perforations, in series of 5 x 5, 6 x 4 and 6 x 5 were found at different points in areas E and K **(Fig. 20)**.

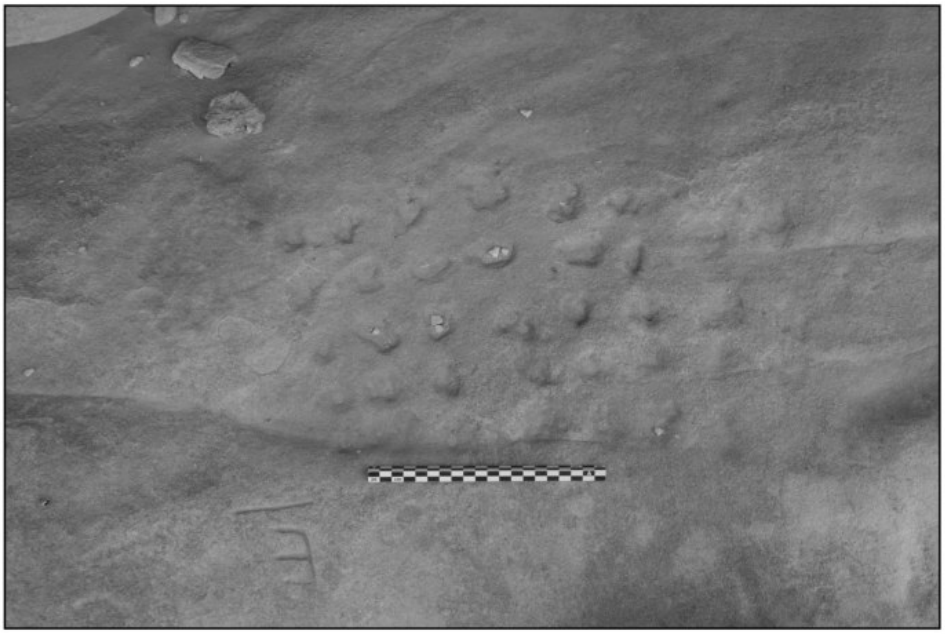
The most impressive engraving is undoubtedly the relief of the Neo-Babylonian king Nabonidus (556-539 BC), which is absolutely unique in the Hashemite Kingdom of Jordan **(Fig. 21)**. Similar reliefs of this monarch have been found at Ha›it and at Tayma in Saudi Arabia (Joannès 2014). The Nabonidus relief, discovered in 1994 by Dr Hamad Qatamine of Mu'tah University and studied by several scholars (Dalley and Goguel 1997: 169, 174 fig. 8), is the only firm evidence for Babylonian presence in the region during the Iron Age II period. The relief is located midway up the steepest part of the 150 m cliff, in a location where access is very difficult: ropes and scaffolding have to be used to reach it (Dalley and Goguel 1997: 170). The rock was engraved on a surface of six square metres: the king appears on the left-hand side, with the text being written on the right (Dalley and Goguel 1997: 174 fig. 8). Cut into a rectangular rock face, the relief shows the standing figure of a Mesopotamian king facing right, with the three divine symbols (the moon, a star and the sun) opposite him. The relief is not very well preserved, but the monarch's attire (his robe, long staff and headgear) is Neo-Babylonian, and it has been identified as a representation of King Nabonidus (Schaudig 2001: 544). There is sufficient documentary evidence of Nabonidus' activities on the Edomite plateau (Beaulieu 1989: 166; Glassner 2004: 234-245) during his Arabian campaigns to support this attribution (Beaulieu 1989: 180; Lemaire 2003: 287-288).

**Assessment of the Site: the General State of Preservation, Conservation and Restoration Work, Including Modifications and Recommendations**

The site is in a relatively good state of preservation considering its size and continued exposure to environmental elements over the



*19. Tribal marks.*



*20. Board game.*



*21. Relief of Nabonidus (photograph: S. Ríos).*

centuries. Most of the visible structures (rooms, stairways, channels, cisterns *etc*., and even the relief of Nabonidus, are carved into Ordovician Disi sandstone, a detrital sedimentary rock formed from the aggregation and cementation of grains of sand (quartz, feldspar, calcite etc.) and rock fragments. Despite its hardness, a combination of various factors has altered the sandstone, which now presents several pathologies:

1. The surfaces have eroded owing to the action of water and above all wind. The continuous impact of particulate matter has resulted in sandification, pitting, mass loss etc.

2. Strong variations in hygrothermal conditions over short time periods and continued exposure to the sun has caused thermal stress, resulting in significant expansion and retraction in the sandstone, which then cracks and fractures. These variations also trigger the dissolution and precipitation of soluble salts leading to expansion and contraction, as well as to chemical changes that cause mechanical damage, such as alveolization, disintegration and flaking.

3. Biodeterioration is another important factor,

since animal excreta contribute organic matter and soluble salts which favour the development of plant species, lichens, bacteria and fungi. These species secrete organic acids that produce physical and chemical changes, dye the surfaces and create crusts, while the roots of plants and shrubs produce mechanical damage (i.e. fractures) as they expand and grow, in addition to generating acids.

In general, the degradation is due to the interaction of mechanical, chemical and anthropogenic factors - for instance, the use of the site by shepherds to shelter their livestock, or the presence of hikers, not to mention wear or damage caused at the time the structures were fully occupied. The use of perishable or reusable materials also accelerates the degradation of the living spaces carved into the rock and makes their interpretation more difficult **(Fig. 22)**.

There are only a few walls that have not collapsed as a result of the original construction techniques, later dismantling of the foundations, disintegration of the mortar joints, effect of gravity, vandalism and other factors. In some instances, sections of of wall have been removed by shepherds who re-used the stone blocks to build temporary enclosures.

The images decorating the walls of a house in the entrance area, and in the channel of the *siq*, have eroded due to continued exposure to the wind and sun. Today, few pigmented areas remain. The mortars have also disintegrated, for the reasons mentioned above and due to the action of fungi and lichens. Several structures associated with the fortified cistern in the upper area were renovated, but we do not know when. Sections of the outer part of the wall were also consolidated with the insertion of ashlars, but this does not follow the original technique and thus was probably not contemporary. It did, however, prevent the wall from collapsing completely. In the same area, several ashlars have been bolstered with mortar to prevent the wall from falling **(Fig. 23)**.

Despite the above analysis of the condition of the site, the structures are not in grave danger and do not require consolidation. What is necessary is the cooperation of archaeologists and conservators in the planning of future excavation seasons in order to extract key architectural elements and reinforce some of the structures. They should also work together on the assessment of the structures found with a view to their restoration and adaptation for exhibition **(Fig. 24)**.

Of course, the intrinsic problems of the site require attention. The most important is the difficulty of access to the upper area, which



*22. Detail of one of the houses carved into the rock, used as a shelter. Note the erosion of the sandstone, alveolization, the formation of lichen crusts, and the washing of earth and material along the slope. These constructions are difficult to interpret given the loss of the masonry walls and the absence of elements such as wood, leather, and so on (photograph: M. Corrada).*



*23. Overview of the wall showing the platform in which the fortified cistern was carved. Several periods of construction can be distinguished, during which different materials and techniques were used. See the modern consolidation in the centre of the image (photograph: M. Corrada).*



*24. Destroyed structures: steps carved into the rock leading to a set of destroyed "houses" (photograph: M. Corrada).*

will cause problems for the supply of material. Similarly, the fact that many of the walls are next to steep vertical drops makes interventions of consolidation and restoration dangerous.

Given the significance of ancient Sela' it has enormous cultural and economic potential as a heritage site (in fact, it already attracts visitors) but needs a certain amount of presentation work in order to make its importance clear to tourists. The creation of a visitor route around the site would not be expensive and would add to its attractiveness.

Access to the site is straightforward (along a local road) and does not require the use of special vehicles. The Visitor Reception Centre, built in the present-day village of Sila' and which houses a Tourist Police office, should expand its activities and try to make the site accessible to all kinds of public - for instance, by creating panel displays showing objects from the site, printing maps with the route and so on. There is already a rest area, and services such as toilets, a shop and a café could easily be installed. From this starting point, visitors would be guided towards the site across the esplanade in the lower area (which could be redeveloped as a car park or as a rest area by installing benches and wooden tables). The route around the site would be signposted and a number of observation points indicated to help visitors to identify and understand the site's key features, for example:

1. Access area: location of the site; the visitor route; the landscape.

2. Descent to the *wadi*: the relief of King Nabonidus, the principal tourist attraction, is difficult to identify without help; in this area there is a small platform where the tour guides can describe the site. From this point one can see the stairway to the top and complete the 200 m climb in about 30 minutes.

3. Top of the rock: entrance; fortified elements; water management structures (channels and cisterns); houses and huts; streets and squares; shrines; cemeteries and so on.

These aims will be modified and expanded over time as the archaeological and historical documentation recovered increases. A tour of the site would actually be enhanced by an excavation: visitors would have the opportunity to see the work underway, and this experience may give them valuable insights into the world of archaeology.

Today, numerous visitors come to the site even though no special tourism and heritage trails have been established. Enhancing the visitor experience will be key to the continued

preservation and conservation of this important site. One way to consolidate and increase tourist visits would be to incorporate the site within a network of hiking trails, as it is in an ideal location just a few kilometres from the towns of Buṣayra and Ṭafīla, as well as being close to the King's Highway which traverses the country from north to south.

Strategic management of the site would boost the economy of the village and the surrounding locale, create employment for the local population, not just in research and conservation, but also in the important tasks of cleaning, maintenance and security. The creation of services for visitors (reception centre; shop and café; tour guides; accommodation and catering; crafts) would generate new jobs. Development would create infrastructure for the local population (e.g. rest areas, cafés and roads). It would also encourage members of the local community to identify with their collective past and raise awareness of the importance of preserving As Sila' and other heritage sites.

**Conclusions**

Sila'/Sela' is a site in the Ṭafīla area with an astonishingly rich archaeological heritage. In this regard, the site bears comparison with Bayda or Petra. Sila'/Sela' comprises many fascinating features, which can only be fully appreciated through further archaeological work at the site. The site's extent, the presence of many architectural structures, the surface finds (pottery, metal and lithics) and its general layout bear witness to its enormous archaeological potential. The many structures for water storage and management (cisterns, channels, reservoirs of different sizes etc.), as well as the dwellings and fortifications make Sela' a unique site for studying the economic use and social relevance of water management on the Edomite plateau during the 1st millennium BC. The site also has a carved inscription and relief of the Neo-Babylonian king Nabonidus (556 - 539 BC), which demonstrates its importance during the period of Mesopotamian expansion into the area of Transjordan. Selá also presents a great diversity of architectural forms, with several areas or sections identified by their streets, wells, gateways, stairways, 'houses', channels and so on. The Iron Age and Nabataean / Roman periods are represented at the site, the approximate chronology of which has been estimated through preliminary study of the surface pottery. It seems that Selạ was occupied in the Iron Age and Nabataean and Roman periods, i.e. from the 8th - 7th centuries BC until the 1st - 2nd centuries AD, although there is no conclusive evidence for continuous occupation.

This preliminary study conducted at Sela' in early April 2015 has drawn attention to the site's extraordinary scientific value as a source of evidence of past human activities in the Ṭafīla area. There is little mention of Sela' in the scientific literature, but the site is likely to contain recoverable information that can only be obtained over the course of an extensive and detailed archaeological excavation. We think we have established the basis for future work at the site, which may help to answer important research questions regarding the social and economic processes at work in 1st millennium BC Jordan. The topographic study and preliminary survey demonstrate the enormous potential of Silạ for contributing to our understanding of the past on the Edomite plateau and for helping us to solve questions regarding settlement patterns, water management systems and economic activity. Despite its isolation, or probably because of it, Sila' can be considered a relatively well-preserved site. Its structures have a value as a group (entrance area, stairway, gate area, central area, towers etc.) and they also form an archaeological ensemble with other similar Iron Age sites on the plateau, such as Ba'ja and Umm al-Biyāra. In addition, the archaeological monuments of Sila' could be exploited for cultural and educational purposes. Thus, the combination of its history and landscape make Sela' a potential pole of attraction for sustainable tourism in Tafila and a key landmark for educational work.

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# INTERIM REPORT ON FOUR SEASONS OF EXCAVATIONS (2008, 2010 - 2013) AT WADI MATAHA SITE 15, BD TOMB 676

*David J. Johnson, Scott Ure and Mariana Castro*

## Introduction

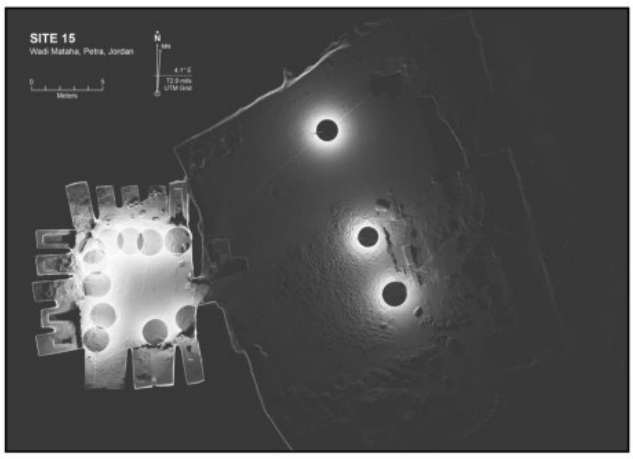
The Brigham Young University Wādī Mataha Project, sponsored by the Department of Anthropology and David M. Kennedy Center for International Studies, began in 1998 and has excavated a number of Nabataean tombs, water features, cultic niches and high places in the area west and north of the juncture between Wadi Mudhlim and the main Wadi Mataha. (Johnson *et al*. 1999; Johnson and al-Khouri 2005; Johnson *et al*. 2007; Johnson 2013). The main aim of this research is to test the theory that lithics, pottery sherds, fossils and other small objects were used by the Nabataeans as votive offerings in ritual situations, often decorated with the images of Nabataean, Egyptian and Greco-Roman deities such as Dushares, Allat, Isis, Harpocrates, Thoth, Bes, Hermes, Apollo and Selene.

Between 2008 and 2013, Tomb BD 676, WM Site 15 (located UTM 335865.97 N, 736107.20 E, elevation 947.32 m asl) was partially excavated. Originally described by Brunnow and Domaszewski in 1904 (Brunnow and Domaszewski 1904), it was later tentatively suggested by Schmidt, on the basis of surface features, that the complex in front of this tomb could contain two porticoes with columns surrounding an inner courtyard, similar to the complex in the front of the Tomb of the Roman Soldier in Wadi Farasa (Schmidt 2008: 214-217). The tomb has an elaborate façade and a square rock-cut chamber with 15 smaller rock-cut chambers, five each on the north, south and west sides, as well as four smaller chambers cut above the loculi on the west wall. The tomb is filled with a thick layer of animal dung **(Figs. 1 and 2).**

## Facade

The façade **(Figs. 3 and 4)** is cut into the face of the cliff at the east end of Mughar al-Mataha and is carved in a variation of what has been described as the Hegra type by Brunnow and Domaszewski (Patrich 1990: 114-115). The form is very similar to the more elaborate Treppengraber type as illustrated by Schmidt-Colinet (1980: 73). This type at Petra, especially BD #813 (Zayadine 1973: 81, 1974: 142-14), was associated with members of the nobility as evidenced by an inscription dedicating that tomb to Oneishu, minister of Queen Shaqilat.

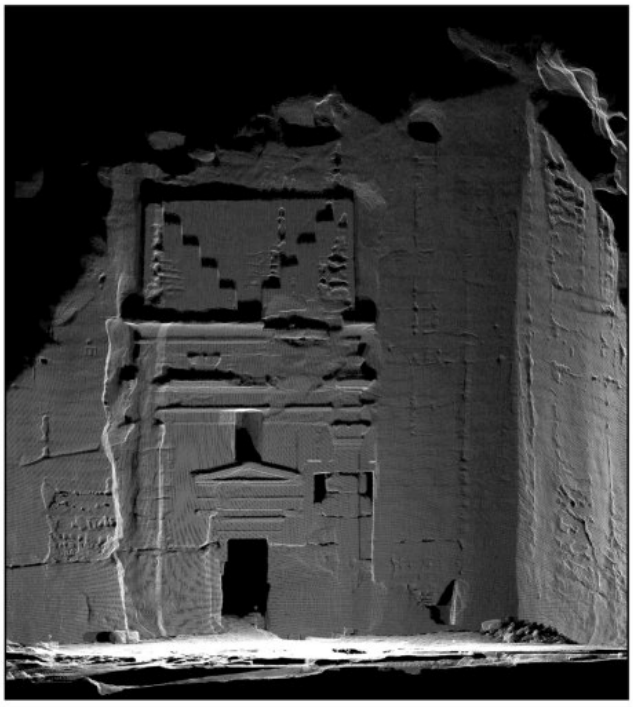
It has a number of features that vary from the standard pattern for this type of façade. First, in the center directly above the lower entablature over the door, there is a deep rectangular cut that does not penetrate to the interior of the tomb. Secondly, to the north of the entrance there is a window that has been filled in with masonry blocks, including two that form part of the outer pillar which is capped by a plain-faced Nabataean capital. The southern outer



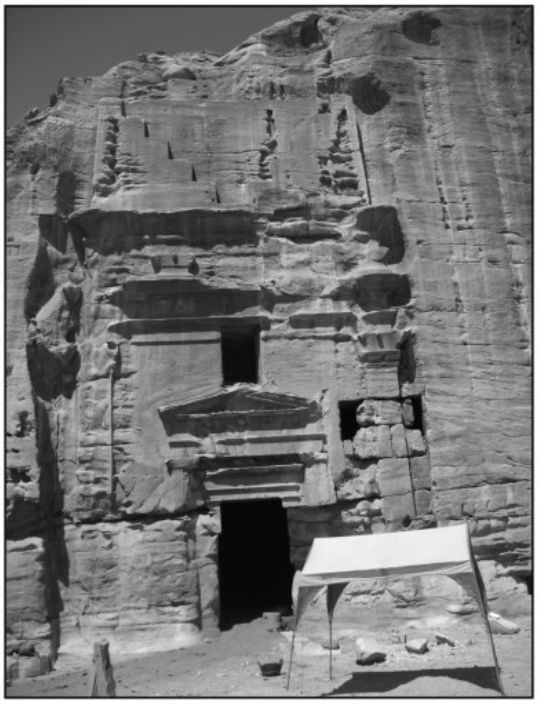

*1. Overall Plan of Site 15, BD 676 (Ure).*




*2. 3D Top View, Site 15 (Ure).*



*3. 3D Tomb Facade Site 15 (Ure).*



*4. Tomb Façade (Johnson).*

pillar is almost completely eroded and there are additional Nabataean plain-faced style capitals offset from the pillars above the first upper entablature similar to BD No 649. There are five-step crenellations in the upper register on the south, but the parallel northern group is almost completely eroded.

Finer details of the façade include evidence of a frieze in the register directly above the doorway (decorated to the north with the end of a ribbon), a rosette in the register above that one, the use of red-painted plaster framing the doorway and on the rounded pillars adjacent to it, and a possible grotesque human head above the window in-filled with masonry **(Fig. 5)**.



*5. Possible human head above doorway (Johnson).*

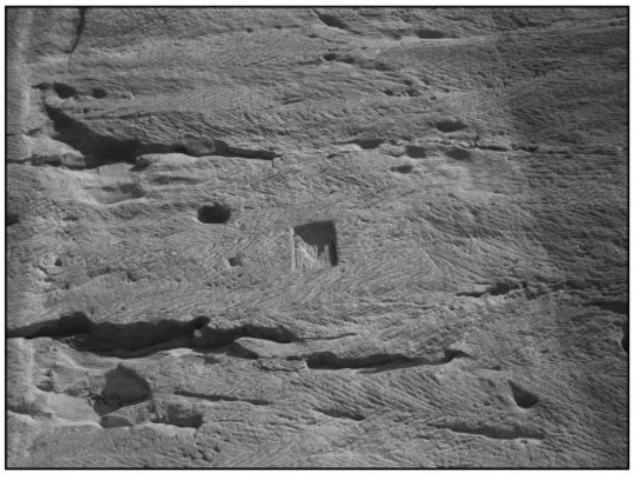
**Cultic Features**

There are five significant cultic features associated with the exterior of the tomb. Just north of the forecourt area and the rock spur defining it is evidence for an upper and possibly a lower water storage area. At the spillway between the two areas, about four meters above the ground, there are two rock-cut niches next to each other facing east, with carved cultic blocks of equal size. One is a plain rectangular slab with a simple base raised in relief and the other has evidence of a carved geometric face with eyes possibly representing Dhushares and his consort Allat or al-Uzza **(Fig. 6)** (Wenning 2001: 86-87).



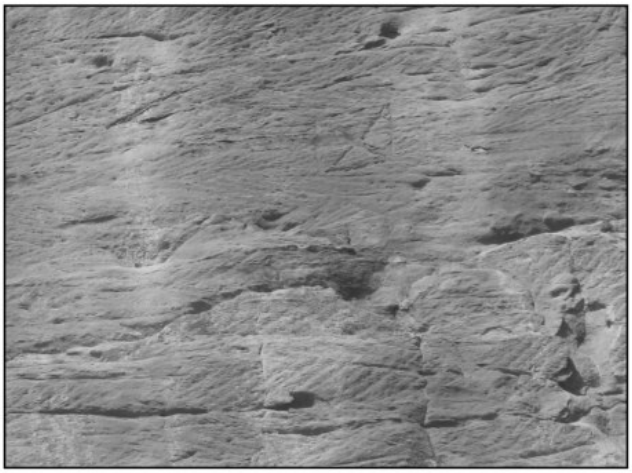
*6. Two cultic niches to right of tomb (Johnson).*

In the quarried area north of the tomb, the south face has a carved rectangular niche with either a raised in-relief angular horned altar similar to the top of the one shown on a lintel from Avdat (Patrich 1990: 94) or a recessed triangular shape **(Fig. 7)**.



*7. Carved rectangular niche with triangular shape in recess (Johnson).*

To the north of the façade is a shallow-cut square divided into four triangles by two diagonal lines **(Fig. 8)**. There are two cultic features to the south of the tomb façade, one low down just adjacent to the south column and one very high above the top of the tomb façade. The lower one is a niche with two equal-size stelae separated by a space with a circular cut above the recess **(Fig. 9)**. The higher one is a large niche near the



*8. Cut square with four triangles (Johnson).*



*9. Two stela with circular cut above (Johnson).*

top of the cliff face with a carved rectangular stela with a more elaborate base than that to the north of the tomb **(Fig. 10)**.

**Forecourt - Portico**

The area in front of the tomb entrance was divided into 5 x 5 m squares aligned with the visible wall lines, with the center of square 15A at the visible south-east corner of the structure. Squares were then assigned letters from south to north with A to E on the western edge, F to J in the next row to the west, K to O further west, followed by squares P to T, then U to Y nearest to the tomb entrance. Squares A, B, C, G and H were excavated in 2008, revealing a large ashlar-built platform sitting on bedrock. In 2010 the western half of square 15D was excavated; in 2011 the eastern half of square 15E was excavated; in 2013 a 3 x 3 m test trench was excavated in 15W. This trench lies immediately north of the entrance to the tomb.

Square 15W is a 3 x 3 m test trench north of the doorway into the interior of the tomb. A 40 cm layer of red windblown sand was sitting on bedrock throughout the area. The bedrock was carved into a ledge at the interface with the tomb façade, with the sides of three steps leading to a platform in front of the doorway with a water channel running east of the steps **(Fig. 11)**. A large number of lithics were found lying on bedrock in the area north of the steps as well as a piece of carved bone with a figure of



*10. Large rectangular block above tomb (Johnson).*



*11. Square 15 W near entrance (Johnson).*




*12. Lithics from 15 W (Johnson).*



*13. Built platform looking east (Johnson).*

Harpocrates, a stone spindle whorl and a bronze ring with a bezeled design. Lithics included two large chert cores as well as over 60 smaller worked pieces **(Fig. 12)**.

Squares A, B, C, G and H form the south-west corner of a large platform on bedrock with a built facing wall to the east and south **(Fig. 13)**. Both squares A and C reached bedrock in part of their area. Area A, at the corner of the wall, was excavated to bedrock in the south-west quadrant of the square with a depth of 2.8 m at the platform sloping to 3.1 m at the southern baulk **(Fig. 14)**. In C, bedrock was only about 65 cm below datum at the platform edge and 84 cm below datum to the east. Two levels of build were noted in the platform area. The upper level is more roughly built with flat irregular blocks and less leveling of the floor. In 15B, east of the platform a roughly built ramp leads up to the platform area from an unexcavated stairway leading to the tomb from the *wadi* bed. In both 15B and especially in the western half of 15G and H, a lower level of construction has a perfectly level floor made of finer-cut flat ashlar sandstone slabs. There appears to be a finer-built inner courtyard to the west entered through a low doorway in 15H **(Fig. 15)**. Ceramics associated with the strata in 15A and B indicate a period of use from the late 1st century BC to the late 1st century AD based on both Nabataean light red and dark red fine painted ware plate and bowl fragments in the levels. Significant



*14. Square A, South Wall of Platform (Johnson).*



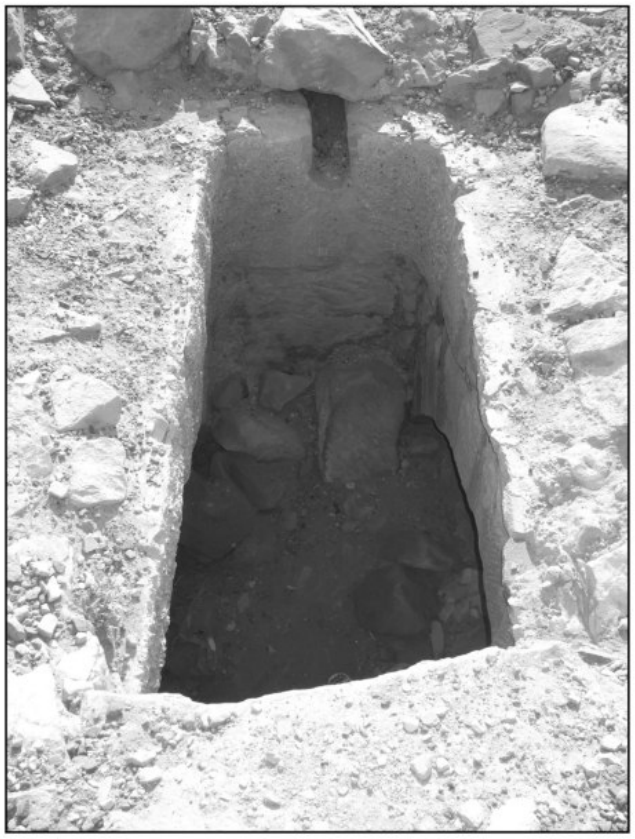
*15. Courtyard in 15 H (Johnson).*

finds include a carved bone Dhushara figurine and a coin of Malichus II and Shaqilat, as well as a number of lithics from the built surface in square H. To the north of this area, the western half of square 15D was excavated to bedrock in 2010. Three stratigraphic units were identified in the area. SU1 was a loose reddish-tan silt with small rocks and a heavy concentration of sherds, including Nabataean dark red painted fine thin ware, a Hellenistic black-glazed sherd, an orange jar with red-drip paint and coarse black ware with straw temper. Forms included jars, plates, juglets, cooking pots, storage jars, bowls, amphorae and unguentaria. A heavy concentration of lithics and a number of large cores also came from the area.

Below SU1, bedrock was reached in the eastern half of the area with some evidence of an ash layer at scattered locations. The bedrock in this area forms a shallow basin with a cobble and clay floor that extends west into the unexcavated square in 15I. This was probably a pool area since a water channel is cut into the bedrock on the eastern side where it abuts the large ashlar-built Wall #1 that defines the platform. This pool may have drained into the large rock cut cistern in area 15J.

In square 15E, the eastern half of the square was excavated to bedrock in 2011. The western half of the area is bedrock with a covered water channel cut into it that leads to an underground cistern with three arches **(Fig. 16)**. The channel is 50 cm deep, 17 cm wide at the top and 12 cm wide at the bottom, and 3.57 m long with 2.61 m of it covered by flat stones **(Fig. 17)**. The channel slopes away from the cistern and would have contained water that overflowed from it. It ends at a deep-cut edge in the bedrock where there is a 1.23 m drop. The bedrock then slopes steeply to the east with various features cut into it or built on top of it. Three stratigraphic units were identified in the area. SU1 was a loose reddish-tan silt with small rocks and a heavy concentration of ceramic sherds, including Nabataean dark red painted fine thin ware and coarse black ware with straw temper. Forms included jars, plates, juglets, cooking pots, storage jars, bowls, amphorae and unguentaria. A heavy concentration of lithics, including a truncated bladelet and a number of large cores, also came from the area.

Below SU1, bedrock was reached in the eastern half of the area with some evidence of an ash layer at scattered locations. The bedrock in this area slopes sharply to the east around the



*16. Arched cistern (Johnson).*

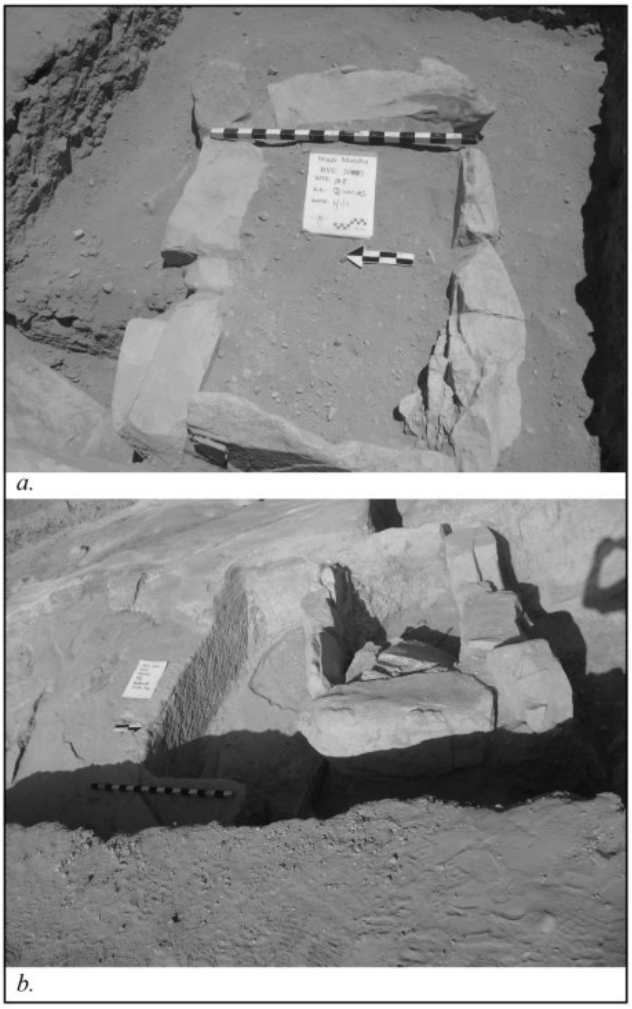



*17. Water channel (Johnson).*

square-built structure with a cut edge, with a triangular spur to the south and a water runnel to the north. The square-built structure sits on a layer of rubble over bedrock and was filled with a sterile layer of small stones and hard-packed white sand **(Fig. 18)**. The currently excavated squares indicate a large solid platform forming a plaza in front of Tomb 676, rather than a colonnaded portico as suggested by Schmid.

**Chamber - Ioculi**

The interior of the tomb has a large square rock-cut main chamber with 15 smaller rectangular rock-cut chambers, five each on the north, south and west side walls, as well as four smaller cuts above the larger chambers on the west side. The tomb is filled with a thick layer of animal dung. Nine of the larger lower chambers and two of the upper chambers have been excavated. The larger chambers were designated L1 - 5 on the south wall from east to west, L6 - 10 on the west wall from south to north and L11 - 15 on the north wall from west to east. The smaller upper chambers on the west wall were designated A1 - 4 from south to north.



*a.*

*b.*

*18. a.,b Square built structure in 15 E (Johnson).*

Chamber 15L1 is the first rock-cut chamber on the southern side of the tomb from the entrance on the east. It was filled with at least 1.5 m depth of goat, camel and donkey dung. After removal of the dung layer, SU2, a dark brown soil streaked with black decomposing cement, was found containing a pile of cut rocks sitting on bedrock that included three sculptural pieces **(Fig. 19)**. Each of the sculptural pieces has a base with diagonal dressing, and cuts and groves. One appears to represent a Harpocrates face as well as a moon goddess figure when illuminated by direct sunlight from above. Below this level was a soft tan sand that went down to bedrock. A small rectangular cut, 71 x 113 cm and 58 cm deep, in the bottom of the bedrock was filled with soft sand and had a ledge about 29 cm below the top of the cut **(Fig. 20)**. Three small beads, made of shell and glass, were found in this cut along with a number of animal bones (ungulate and bird), some of which had been burned; no human bones were found in this loculus. A second rectangular cut runs north - south against the eastern wall under the layer of dung towards the doorway. There is also a shallow circular cut forming a half circle in the rear south-west corner of the loculus about 4 cm deep with a sinuous grove against the western wall. A number of pieces of black coarse ware pottery were found in this loculus along with a number of lithics and quartz pebbles.

Chamber 15L2 is located on the southern wall of the tomb. Excavation of SU1, the dung layer and SU 2, i.e. the layer of blackened sand with straw, exposed a plain rectangular chamber 2.83 x 1.12 x 2.62 m in size, with no cuts in the floor. The western side is separated from 15L3 by a narrow ridge 30 cm wide with a circular hole near its southern terminus, 7 cm in diameter; this matches the diameter of the base of pyriform




*19. Sculptural piece from 15L1( Johnson).*



*20. Chamber 15L1 (Johnson).*

unguentaria from the 1st century BC.

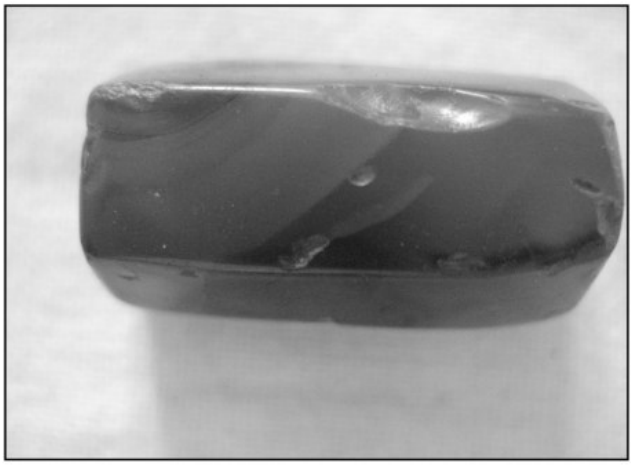
Chamber 15L3 is the third rock-cut chamber on the southern side of the tomb from the entrance on the east. It was filled with at least 1.5 m depth of goat, camel and donkey dung. After the removal of the dung layer, SU2, a dark brown soil streaked with black decomposing cement was found. Below this level was a soft red sand that went down to bedrock. A small cut, 100 x 40 cm and 24 cm deep, in the bottom of the bedrock was filled with soft sand. At the same level as the top of this cut, a large centrally pierced hexagonal carnelian bead **(Fig. 21)** was found. This cut contained no human bones, but a quantity of pottery sherds, including fragments of Nabataean dark red painted fine ware, were present. A lithic core, a number of bronze triangles and lumps of lead were also found in this cut.

Chamber 15L6 has a 1.45 m. x 3.17 m. chamber, with a small loculus 60 cm wide and 123 cm long cut into the floor **(Fig. 22)**. The loculus has a 12 cm wide ledge at a depth of 20cm below its top ledge and is 70 cm deep. The lower area curves in at both ends, forming an oval with flat ends. One cover stone was found in place over the lip on the west end.

Human remains recovered from 15L6 represented a single child 4 to 6 years of age based on bone size, fusion of distal epiphyses and the presence of deciduous teeth. Recovered skeletal material included the distal end of a femur, distal end of a right radius, a lateral and central incisor, two first molars and one second molar, part of a mandible, a number of phalanges, eight metacarpals, a talus, parts of the ischium and ilium, a humerus head, rib fragments and a trapezoid. The bones of the radius and one of the metacarpals showed evidence of osteomyelitis in the form of oval abscesses in the bone. This is caused by the transport of bacteria from an infected area such as the lungs, throat, sinus or chest **(Fig. 23)**. The oval holes will only appear in the bone of individuals who have survived the infection, so are not likely the cause of death.

Recovered artifacts from 15L6 included Nabataean dark red painted fine wares, a large brown and red chert core, 23 small chert flakes, numerous pottery sherds and a broken but nearly complete two-handled large coarse ware cooking pot with a thick flat disk base, an inverted rim and evidence of fire marks **(Fig. 24)**. This burial is especially significant in that this is the first example of a large chamber and loculus being used for the burial of an individual young child, indicating high rank and ascribed status in the upper levels of Nabataean society.

Chamber and loculus 15L7 was smaller than 15L6. The chamber was 1.27 m wide and 2.77 m long, with a rectangular cut in the floor 1.88 m long and 0.71 m wide with a 6 cm wide ledge 30 cm below the floor of the chamber. The lower part of the loculus was oval in shape; the bottom is 53 cm below the lip. This loculus was partially



*21. Carnelian bead, 15L3 (Johnson).*



*22. Chamber 15L6 (Johnson).*




*23. Radius, metacarpal-Osteomyelitis (De Castro).*

robbed in the last two years.

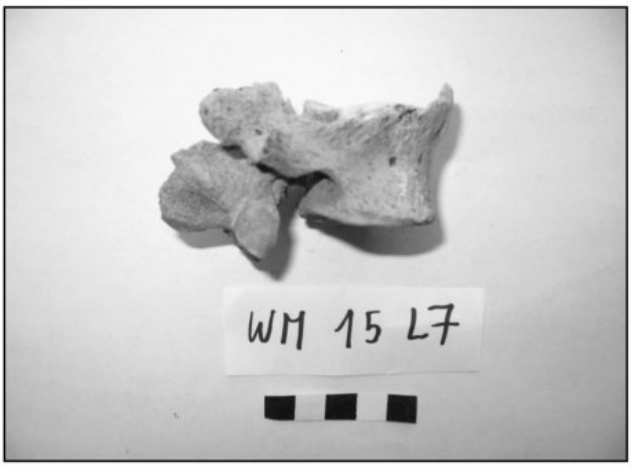
Human remains recovered from 15L7 were from a single adult female probably over 40 years of age. Sex was determined based on the very flat curvature of the fused sacrum and a gracile narrow rounded mandible. Age was based on tooth attrition based on White's charts of tooth wear. A complete radius indicates a stature of between 5'4" to 5'11". There was extensive evidence of osteoarthritis, especially in the vertebrae. One lumbar vertebra has a very large bone spur on the anterior edge of the superior side of the centrum **(Fig. 25)**. Bones recovered included a fused sacrum, an axis vertebra, cervical, thoracic and lumbar vertebrae, 18 rib fragments, two humerus fragments, a mandible fragment, an ulna fragment, a left patella, femur fragments, carpals, metacarpals and phalanges, as well as two metatarsals. The rest of the skeleton may have been removed during the attempted looting.

Significant artifacts recovered included Nabataean thin dark red painted fine wares, a wooden stick, a large grey chert core, a red ware sherd with white-painted faces, a rosette lamp fragment, numerous chert flakes of various colors, a Nabataean dark red ware sherd with two black-painted faces **(Fig. 26)**, a broken bronze and iron tube, four fragments of an orange- and green-colored glass bracelet and an oval brown pottery disk.

Chamber 15L8 is located on the western wall at the back of the tomb. It is the third loculus from the south wall of the tomb. After removal of the dung layer, SU2, a dark fine sand with straw, was uncovered over the entire area. A rectangular cut into the bedrock below SU2 was filled with a layer of chalky white and soft yellow rocks. This cut had a lower lip on the south and north upon which flat square cover stones were resting **(Fig. 27)**. Below the cover stones were layers of brown sandy silt, SU5, SU6 and SU7, with a darker soil SU8 above bedrock. The burial cut was 60 cm in depth, 161cm long and 41 cm wide; it contained the secondary burial of a single male adult about




*24. Cooking Pot, 15L6 (Johnson).*




*25. Lumbar vertebrae, 15L7 (Johnson).*

23 - 33 years of age. Many of the bones were fragmentary. Material with the burial included pottery sherds and a large number of lithics, rounded quartz pebbles and fossils. The burial dated to the later half of the 1st century BC based on the presence of Nabataean dark red or brown fine painted ware sherds in the lower levels. Two circular cuts to the north and west of the burial shaft have diameters that again fit the base size of unguentaria. A rectangular white stone with a triangular brown face painted on it **(Fig. 28)** was found in the cut.

Chamber 15L9 is located on the western wall at the back of the tomb. It is the fourth loculus from the southern face going north. After removal of the animal dung, a layer of dark brown silt, SU2, was uncovered over the entire area. Below this, a layer of reddish-brown soil, SU3, covered the cut bedrock around the edges of the loculus. Below this level, a large cover stone 10 cm thick, 74 cm wide and over 1.24 m long, was found covering a rectangular cut into the bedrock **(Fig. 29)**. This cut had a lower lip on the south and north on which the cover stone was resting. The cover stone was broken into two pieces by a large block that was wedged vertically in the cut **(Fig. 30)**. Below the cover stone was a reddish-brown sandy silt, SU4, that reached to the bottom of the burial loculus. Just below the cover stone near the area of the break, a bronze half circle with a floral and fruit design **(Fig. 31)** was found along with a gold seal with a lead attachment containing an Arabic inscription. The medallion and gold seal may have been placed in the grave to counter any evil that was perhaps thought to come out of it. Also in this layer were an iron ring, an iron needle, a yellow glass tessera, a green glass tubular bead and an oval green glass bead. The burial loculus was 95 cm deep, 180 cm long and 70 cm wide, and contained the possibly secondary burial of a single female adult about 40 - 50 years of age. The bones were highly fragmented and weathered. Most of the body was present except for the maxilla, sternum, patella, carpals and foot phalanges. All other major bones were at least partially present. A few metacarpals, phalanges, tarsals and the axis vertebra were complete. All other bones were fragmented.

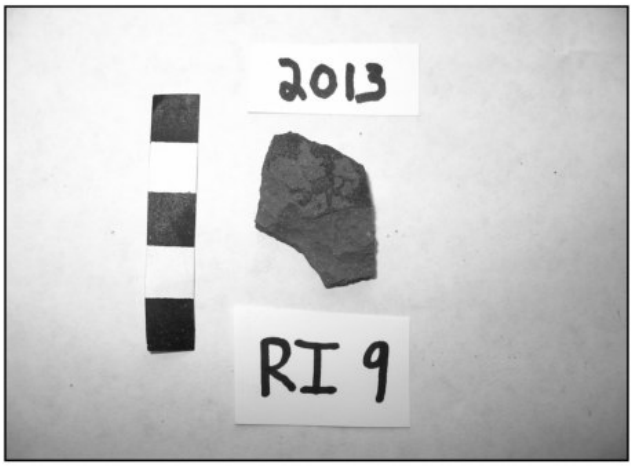
The individual had a small supraorbital ridge, a narrow mental eminence, a wide sciatic notch and a small femoral head (40 mm). A preauricular sulcus was also present, indicating that the individual had possibly given birth during her lifetime.

For determining age, the auricular surface of the innominate and the sterna rib ends were analyzed. The auricular surface exhibited microporosity, no apical activity and a coarse retroauricular surface, indicating the individual was between 40 - 44 years old at time of death. The sterna rib ends were porous, U-shaped and had an irregular sharp edge, indicating an age of 40 - 49. Taken together, this suggests the

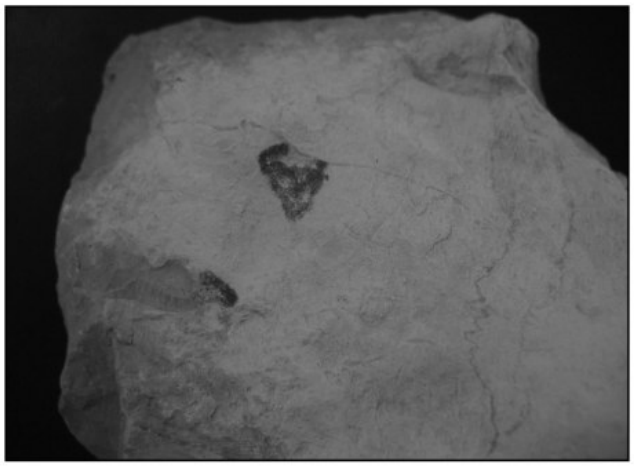
individual was in her early to mid-40s at time of death.

There were no teeth still in the sockets of the mandible (the maxilla was not present). Seven loose teeth were found with the remains: two incisors, one canine, one premolar and three molars. There were no caries in any of the teeth and the mandible did not show any evidence of ante-mortem tooth loss or abscesses. A premolar and molar both had extensive pulp exposure owing to attrition; the other molars showed no pulp exposure. All the teeth had mild to moderate calculus deposits.

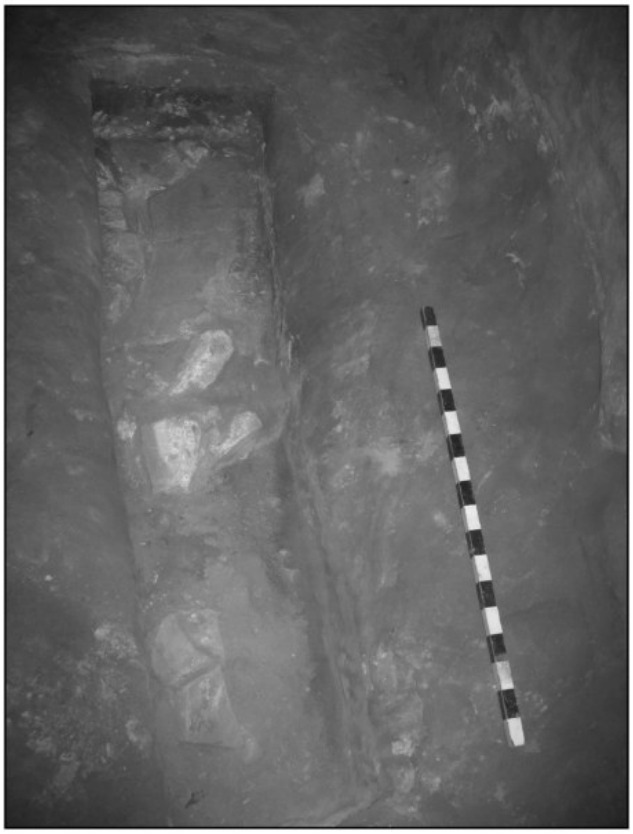
This individual suffered from osteoarthritis, especially in the spine and knee areas. There is mild evidence of osteoarthritis in the scapula, clavicle, innominate, phalanges, talus, tarsals, humerus, radius, ulna, tibia and fibula. Moderate to severe osteoarthritis was found in the femurs, ribs and vertebrae. None of the




*26. Red Ware sherd with black faces (Johnson).*



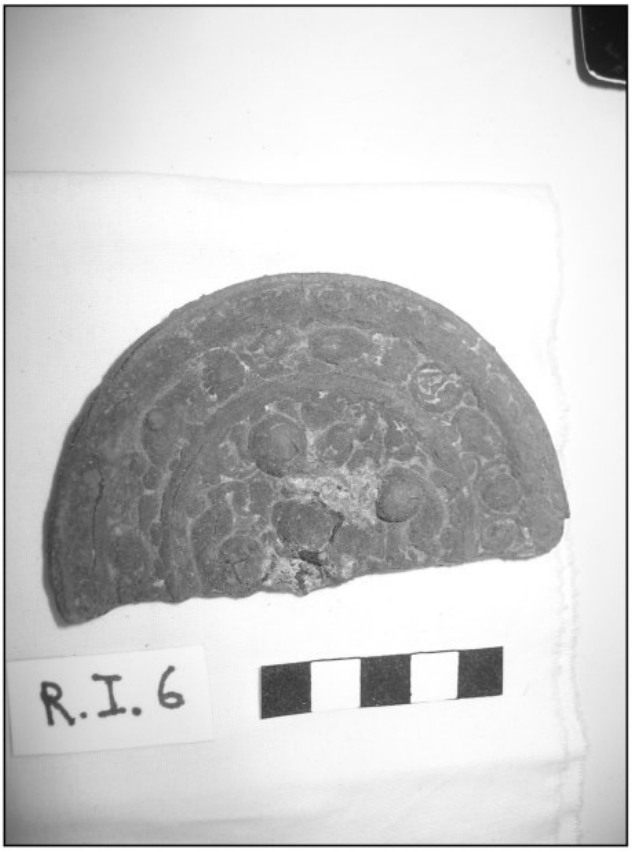
*28. Stone with triangular face (Johnson).*



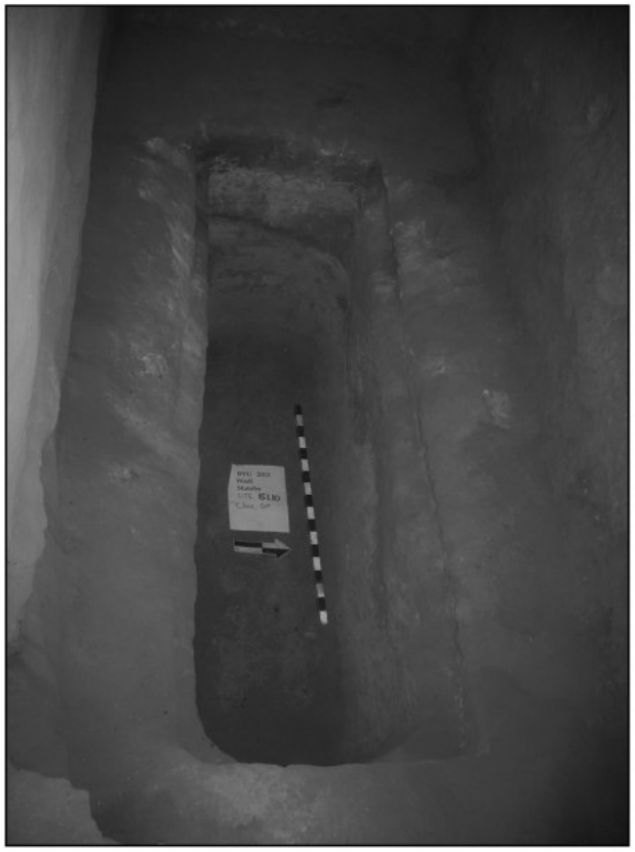
*27. Chamber 158 (Johnson).*



*29. Chamber 15L9 (Johnson).*




*30. Cover stone 15L9 (Johnson).*



*31. Bronze half circle (Johnson).*

vertebrae had fused together, but several of the thoracic vertebrae had severe osteophyte growth and increased porosity. The left knee also had an area of eburnation where the cartilage between the femur and patella had worn away. Overall, most joints were affected by osteoarthritis indicating that this individual led a very active lifestyle. The burial dated to the latter half of the 1st century BC based on the presence of Nabataean dark red or brown fine painted ware sherds in the lower levels.

Chamber and loculus 15L10 was 2.7 m long and 1.27 m wide, with a central square-cut loculus 1.8 m long and 0.67 m wide. The loculus had a 7 cm wide lip on which rested three large cover stones 17 cm below the floor of the chamber. The lower area was again oval in shape down to bedrock at a depth of 75 cm **(Fig. 31)**.

A nearly complete burial of a healthy adolescent female, 15 - 18 years old and about 4' 11" in height, was recovered from this loculus. Recovered osteological material included two femur fragments, 23 vertebrae, a sternum, unfused femur condyles, parts of both the left and right ulnae, both radii, parts of both humeri, a right patella, eight teeth, fragments of the cranium, an illium and ischium, scapula fragments, ribs and numerous bones from the hands and feet. Significant grave goods included a blue glass tessera, a white marine shell bead, a ceramic jar top with red- and black-painted faces, dark red and brown painted Nabataean fine ware bowl and plate fragments, fish vertebrae and other animal bones, a large grey chert nodule, two fossil gastropods, quartz pebbles and 20 small chert flakes of various colors.

Chamber 15L15 is located in the north-east corner near the entrance and was open to the elements because of erosion to the tomb wall on the eastern side. After removal of the dung layer and the black sand with straw, a unique rectangular cut with a double burial was found in the floor of the chamber. The rectangular cut was 2.3 m long, 0.63 m wide and 1.01 m deep, and contained two distinct layers. The upper burial was well preserved but disturbed, with cover stones lying flat over the top with one




*32. Chamber 15L10 (Johnson).*

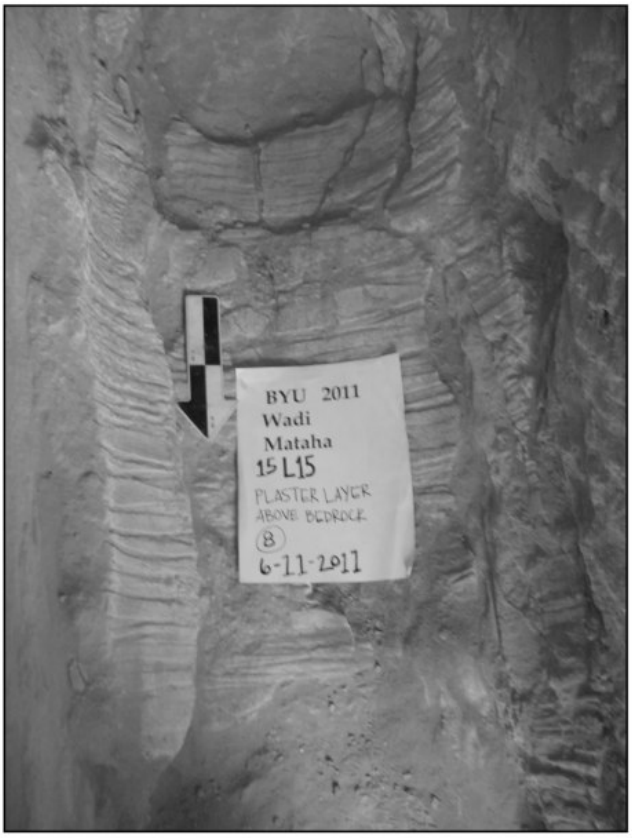
area of broken stones **(Fig. 32)**. It contained the complete skeleton of an adult female with a wide sciatic notch and preauricular suculus, 25 - 35 years of age based on the wear patterns of her molars. Stature was between 5' 0" and 5'3" based on measurements of the humerus, radius, ulna, femur and tibia. The teeth were in excellent condition with no evidence of caries. Evidence of pathologies included a fifth lumbar vertebra fused to the sacrum, extreme lipping and a roughened surface on the thoracic vertebrae indicating osteoarthritis, and three phalanges with extreme wear on the articular margins. A large quantity of broken ceramic material, including Nabataean dark red and brown fine ware plates, unguentaria fragments, a rosette lamp fragment, fine ware cooking pots, cups, jars, bowls and ring bases, indicates a late 1st century date. Below this burial, on top of the cover stones of the second burial, a silver denarius of Trajan **(Fig. 33)** with a figure of Pax on the obverse probably dates the disturbance to around 106 AD.




*33. Silver Denarius of Trajan (Johnson).*

A second undisturbed burial below this was covered with large flat stones wedged into the burial cut and covered by a layer of small rounded and polished stones including a number of quartz pieces. The skeleton was articulated, being laid out on its side with the head facing east and oriented to the south. Molar wear indicates an age of 33 - 45 years of age while the wide sciatic notch, gracile brow ridges and preauricular suculus point to a female who had given birth. No lipping of the vertebrae or unusual bone wear indicates relatively good health. A layer of curved plaster below the skeleton encased it in a plaster coffin **(Fig. 34)**. Two elegant gold earrings **(Fig. 35)** were found near the skull with a simple design of a lope with a central ridge. A number of chert lithics, a fossil sea urchin and fine Nabataean dark red painted wares indicate a late 1st to early 2nd century BC date.

Areas 15a1 and 15a2 are located 3.5 meters above the floor of the tomb and are cut into the east-facing west wall of the chamber. 15a1 is located 1.26 m north of the south wall and is 75 cm wide, 75 cm high and 2.10 m deep. It was filled with fist-sized stones, windblown soil and a number of bird nests. Excavation was carried out using a ladder. Significant cultural material included a large number of lithic cores, rounded cobbles of sandstone, quartz and quartzite, a pyramidal shaped stone, a polished piece of marble, a flat stone mosaic floor tile, coarse ware pottery sherds and wooden objects

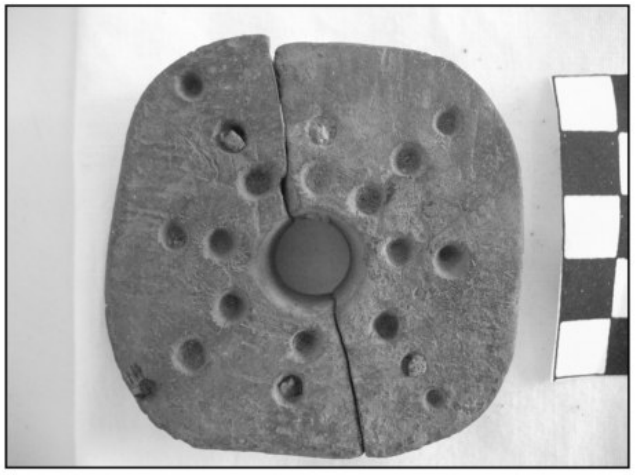



*34. Upper burial 15L15 (Johnson).*




*35. Gold earrings ( Johnson).*

including a carved wooden fruit. Some animal bone and one burnt human femur fragment were also found. 15 a2 is located to the north of 15a1 and is 98 cm wide, 102 cm high and 2.71 m deep. It was originally blocked with four large ashlar blocks painted black, red, black and yellow, and contained a number of stones including lithic cores and large quantity of bird dung. A number of wooden objects were found, including a wooden spindle whorl with a circular



*36. Lower burial in 15L15 (Johnson).*

hole design **(Fig. 36)**. These upper cuts may not have been burial chambers but rather storage areas for significant ritual materials.

**Conclusion**

Site 15, BD 676 is a high status Nabataean tomb with an elaborate façade, a large built platform in front and a water storage facility to the side. It has 15 chambers, nine of which had been excavated by 2014, with seven individual primary burials, a pattern different from other smaller tomb sites in the area that contain multiple secondary burials in each tomb loculus (Johnson 2013). It probably dates from the last half of the 1st century BC to the beginning of the 2nd century BC based on Nabataean and Roman coins as well as Nabataean dark red or brown fine painted wares.

Ritual votive material in the chambers includes large numbers of lithics and stone objects (many with the faces of deities), fine ware pottery sherds, gold jewelry, fossils, carnelian and agate beads, wooden objects (including a spindle whorl) and marine shells. The remaining six chambers and the center of the tomb will be excavated in future seasons at Wadi Mataha.

**Acknowledgements**

We would like to thank the Department of Antiquities of the Hashemite Kingdom of Jordan and its director general Dr Munthar al-Jamhawi for permission for and facilitation of our work in Wadi Mataha, as well as Tahani Salhi from

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# TALL ḤISBĀN 2011 - 12: A PRELIMINARY REPORT

*Robert D. Bates, Jeff Hudon and Øystein LaBianca*

## Introduction

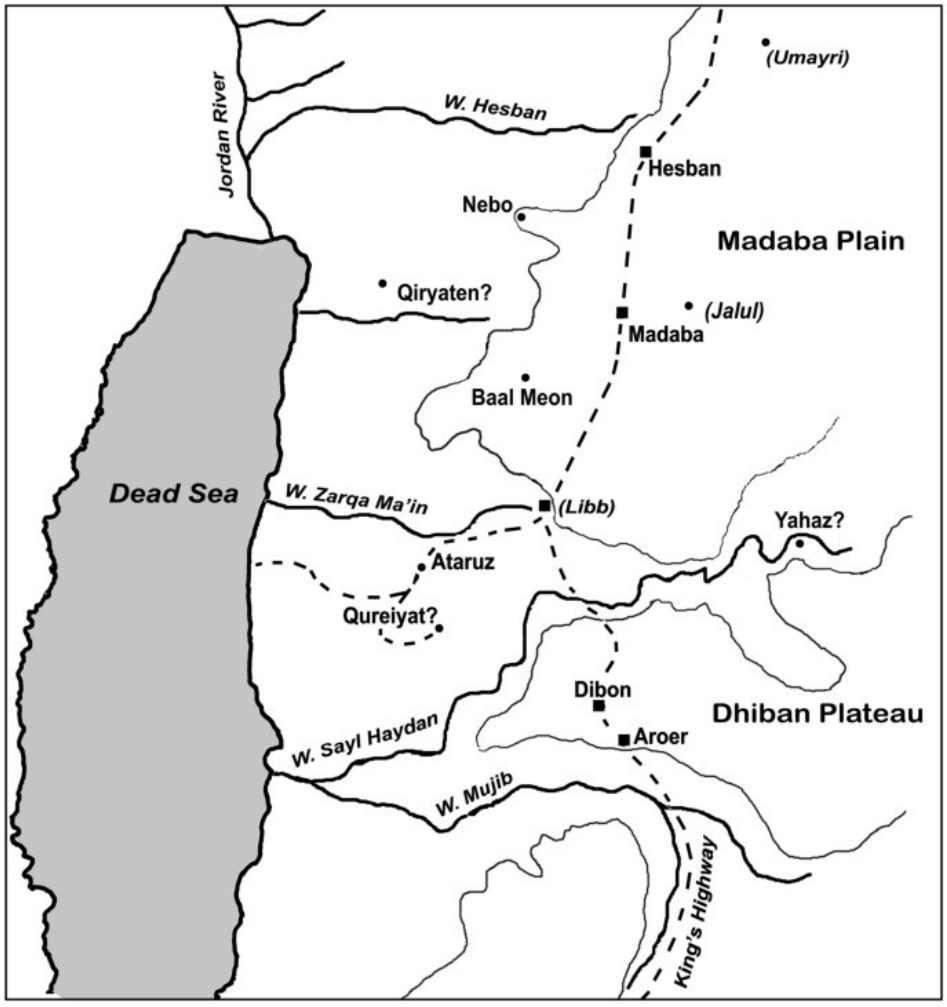
Tall Ḥisbān is a witness to global history and a window on daily life in Jordan through the ages. Since 1968, excavators have discovered traces of multiple civilizations and empires, including a thriving market town from the Assyrian, Babylonian and Persian periods, a large quantity of amphora jars that stored fish sauce in the Greco-Roman period, the foundations of several public buildings from the Roman period, two basilica churches from the Byzantine period, and the private residence and bath (*hammam*) of the Mamluk governor of this part of Jordan during the 14th century AD. Over the course of its nearly 45-year history, the excavations at Ḥisbān have experienced many changes while maintaining the highest standard of excellence in academic research. It has become a model for other excavations in Jordan and has trained numerous professional archaeologists, volunteers and students. Working in conjunction with a consortium of universities as part of the Madaba Plains Project, it continues to develop new ways of exploring the historical and cultural context of Tall Ḥisbān in order to make the site relevant to scholars, visitors and local residents alike.

## History of Excavation

Tall Ḥisbān has been investigated by archaeologists in two phases: the first, known as the Heshbon Expedition, took place from 1968 to 1976. The primary focus of the first phase was the quest for the site's biblical connections - hence the initial name of the expedition which attests to the excavators primary interest in finding a connection between biblical Heshbon and the site of Tall Ḥisbān **(Fig. 1)**.

The founding director of the Heshbon Expedition was Siegfried H. Horn, Professor of Old Testament and the History of Antiquity at the Seventh-Day Adventist Theological Seminary at Andrews University in Michigan, USA. Horn organized three expeditions: the first in 1968, the second in 1971 and the third in 1973. His successor at the SDA Theological Seminary, Lawrence T. Geraty, organized two subsequent seasons: one in 1974 and another in 1976. The chief archaeologist for all five seasons was Roger Boraas of Upsala College in New Jersey. The chief ceramicist was James Sauer, a doctoral student in Ancient Near Eastern Studies at Harvard University. Øystein S. LaBianca served as the 'bone specialist' for the Heshbon Expedition.

The second phase known as the Hisban Cultural Heritage Project - began in 1996 as a 'clean-up operation' with the goal of making the site more accessible to tourists. Starting in 1997, stratigraphic excavations were resumed in order to clarify problems that became apparent during the process of planning and preparing for restoration and presentation of the site's most prominent archaeological features. Most problematic, in this regard, was Tall Hisban's Mediaeval and Early Modern history. A deliberate decision was therefore made in 1998 to make these later periods a major focus of renewed stratigraphic excavation and restoration activity during 2001, 2004, 2007 and 2010. Another major emphasis during this second phase were efforts to engage the local community in helping to restore, protect and develop the site for tourism. To this end the Hisban Cultural Association was formed - a local NGO with which the excavators could partner




*1. Regional map of the Madaba plains and the location of Tall Ḥisbān in relationship to other sites nearby.*

in developing the site for tourism. Thanks to the Nabulsi family, who own several large farm buildings in the nearby village, a location for a future Visitor Center for Tall Ḥisbān has been secured.

**Jordan Field School**

The 2011 season marked the introduction of the Jordan Field School as a multidisciplinary approach to managing and preserving Tall Ḥisbān as a cultural heritage site. Training and education have always been an important part of the Heshbon Expedition and Hisban Cultural Heritage Project; past projects at Hisban had centered almost exclusively on excavation and the training of field archaeologists and anthropologists. In 1998, the project introduced a new model that involved various stakeholders who were not necessarily archaeologists. The Jordan Field School continues this model with a range of disciplines being offered to students, some of which have not been previously included in the curriculum. The primary focus has shifted from archaeology to cultural heritage preservation and presentation allowing students to be involved in other aspects of learning and creative expression. Courses such as agriculture, architecture, communication, community development, history, landscape design, political science, religion and sociology, as well as archaeology and anthropology, are now a part of the curriculum. Many of these courses are only offered in Jordan because they involve hands-on projects and training that is only possible in the field. In addition, unlike previous expeditions that only returned to Jordan every 2 - 3 years, the Jordan Field School will try to return every spring / summer to continue its research and community projects. Despite the diversity of subjects taught

and methods of research involved in the delivery of the Jordan Field School, what ties the various components together is a common agenda, namely to work closely with local partners and stakeholders toward sustainable development, protection, presentation and the dissemination of the cultural heritage of Jordan and Hisban.

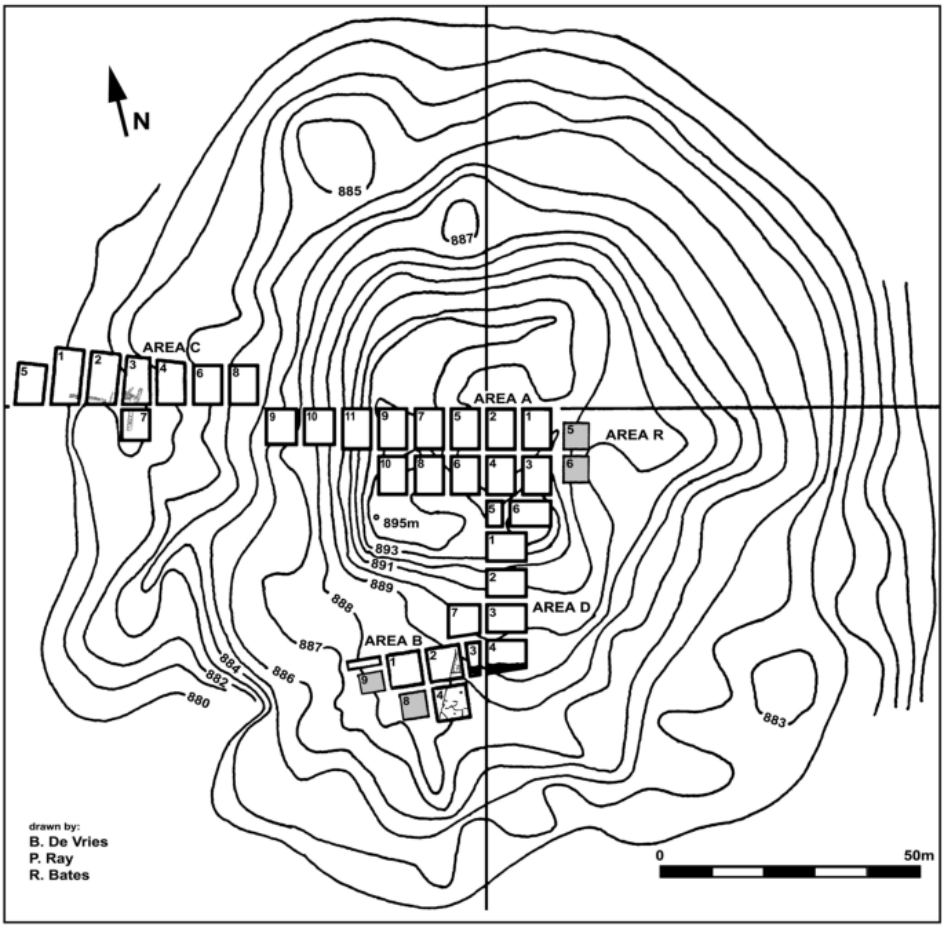
## Excavation

*2011 Season: Reopening the Reservoir Excavation*[1]

In the 1970s several squares (B1-2; B4) were excavated in Area B on the south side of the acropolis **(Fig. 2)** that left a large L-shaped trench. There were many discoveries in this area, including a large Roman platform, an Early Byzantine kiln and an Iron Age reservoir. The reservoir attracted particular attention because of its size. Further excavations showed that it was abandoned by the end of the Iron Age and was gradually filled in during the Hellenistic period. Among the debris found in the fill were several ostraca (inscribed pot sherds) and numerous pottery sherds (Ray 2009: 29-56). The earliest sherds found in the reservoir and below its plaster floor have been recently dated to the Iron Age IC (= Iron Age IIA) period (Ray 2001: 107-108). This date roughly corresponds to the time of Solomon and it has been suggested that this reservoir may have been one of the «pools of Heshbon» mentioned in Song of Solomon 7:4.

Goals and Objectives

The 2011 excavation season was conducted from 12 to 31 May 2011. The main purpose of the 2011 excavation was to return to the south side of the acropolis in order to reinvestigate of the area surrounding the reservoir **(Fig. 3)**.



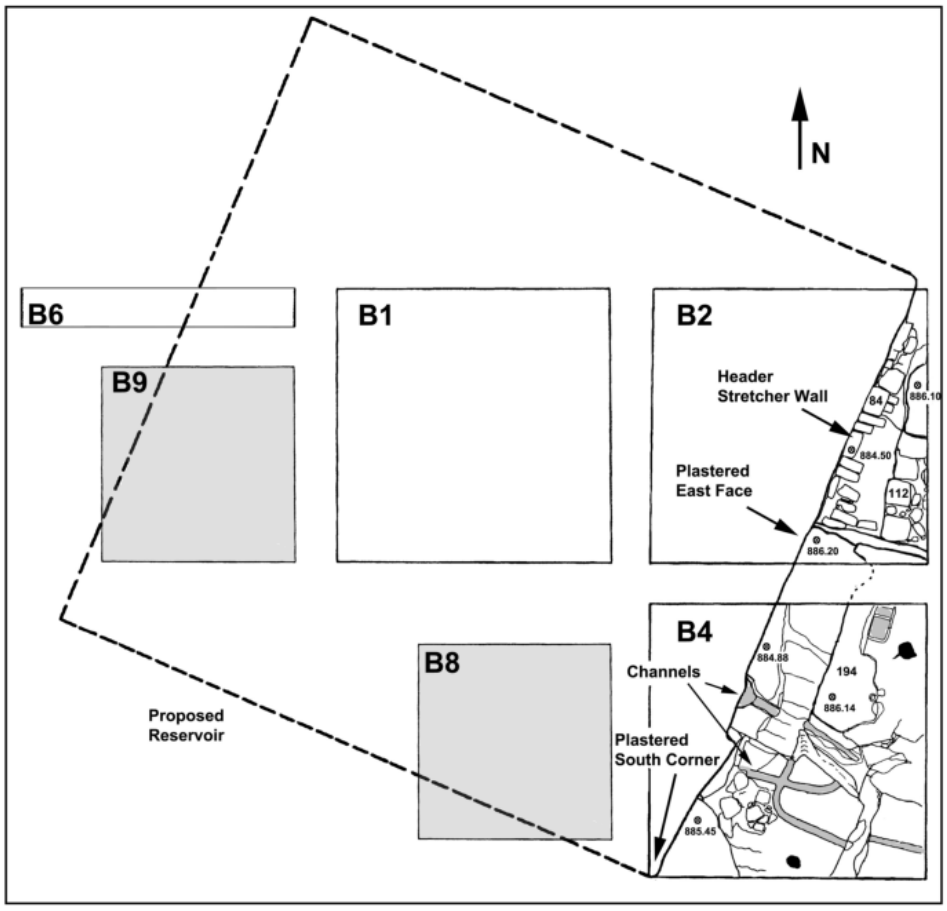

*2. Topographical map of the Tall Ḥisbān acropolis showing Areas A - D and R. New squares highlighted in gray.*

1. The authors would like to thank the participants of the 2011 excavation season, including area supervisor Robert D. Bates (Area B), square supervisors Jennifer Shrestha (B8) and Chris Jenkins (B9), and volunteers Elizabeth Bates, Jessica Bates, Rebecca Bates, Jonathan Thomson, Ruth Wanyko and Mandy Womak.

Many questions still remain regarding the exact size and function of this ancient water system. Some have suggested that the pool may have ranged from as small as 5.1 x 5.1 m in its early phase to as large as 17.5 x 17.5 m in its later stages. An estimate of volume suggests that this reservoir may have held as much as 2.2 million liters of water, well above what was needed for small Iron Age city (Ray 2001: 98-99, 107-108). Indeed, unless a natural water source is found on the site, it is likely that the entire reservoir was filled using seasonal rainfall and water imported from local sources. This process would have taken a significant commitment of resources, including an organized labor force and centralized leadership. However, the question still remains: why did this site need so much water and where did the water come from that filled the reservoir?

The proposed estimate of the size and function of the Hisban reservoir during the Iron Age remains a matter of debate. If this water source was only 3 - 5 m square and 3 - 4 m deep, but was seldom more than half full when it was being used, then it would have been of reasonable size to sustain a small town and its surrounding residents. However, if the reservoir were 16 - 17 m square and 4 - 5 m deep, even if it were only half full whilst in use it would still be the largest known water reservoir in Transjordan built during the Iron Age[2]. Indeed, it would rival most reservoirs built later during the Roman and Byzantine periods in the area.

Unfortunately, the exact size of the reservoir has not been clearly delineated since only one side has actually been uncovered. In Squares B2 and B4, a 17 m long rock face with a smooth, probably worked surface was discovered.




*3. Area B. Square location B8 and B9. Note the plastered east face and south corners of the early Iron Age reservoir including the plastered channels and header stretcher wall.*

2. A similar reservoir dating from the Iron Age II period has been found at Tall Jalul, but further excavation is needed to clarify its actual dimensions (see Gregor, Ray, Younker and Gane 2011: 359-61).

Where the natural stone ends, a header stretcher wall was used to fill in the gap. A thick (5 - 8 cm) layer of plaster was applied to the rock surface and header stretcher wall to make them waterproof. Rock-cut channels with plastered surfaces were made on the top of the rim to direct water into the reservoir or to other parts of the water system. The full length of the east side during the Iron Age was identified by clearly articulated plastered corners at both the north and south ends of this wall **(Figs. 4 - 5)**. In addition, three layers of plaster were found applied to the floor of the reservoir to keep it waterproof (Ray 2001: 100). However, although the east wall of the reservoir was discovered, the north, west and south walls were never found. It has been suggested that the remaining walls of the reservoir may be in the unexcavated areas west of Squares B1 and B4 **(Fig. 3)**.

In an effort to establish the dimensions of the Iron Age reservoir, two new squares were opened in Area B **(Fig. 3)**. Square B8 was located on the south side of Square B1 and the west side of Square B4. Square B9 was located on the west side of Square B1, north-west of B8 and immediately south of B6. It was hoped that positioning Square B8 next to B4 would expose the south side of the reservoir and that positioning Square B9 on the west side of B1 would expose the western side of the reservoir. Owing to the elevation (elev. 887.68) of the two new squares, it was anticipated that it would take several seasons of excavation to bring them into phase with the top of the reservoir (at elev. 884.88) and several additional seasons to bring them down to the bottom of the reservoir (at elev. 882.20).

There were several challenges to excavating Squares B8 and B9, since the east balk of each square formed precipice that dropped between 7 - 9 m into B1-2 and B4. In addition, the original squares were laid out as 8 x 8 m squares with an extension added to B1 in order to further excavate a lime kiln (B1:10) that was discovered (Boraas and Horn 1973: 44-48, **fig. 3A**). Although, B8 was laid out as 6 x 6 m square, much of the north balk had eroded away in the interim between seasons so the balk had to be limited to a section only 0.2 - 0.3 m wide, while the west balk was only 0.6 - 0.7 m wide for the same reason. Unfortunately, the east balk of B9 was removed during the original excavation of Squares B1-2 and B4. In order to accommodate the irregularity a 0.25 m sub-balk which was created to maintain stratigraphic control. Square B9 was treated much like a large probe, with the overall size of the excavation area limited to 3.5 x 5 m following the adjustment **(Fig. 3)**.

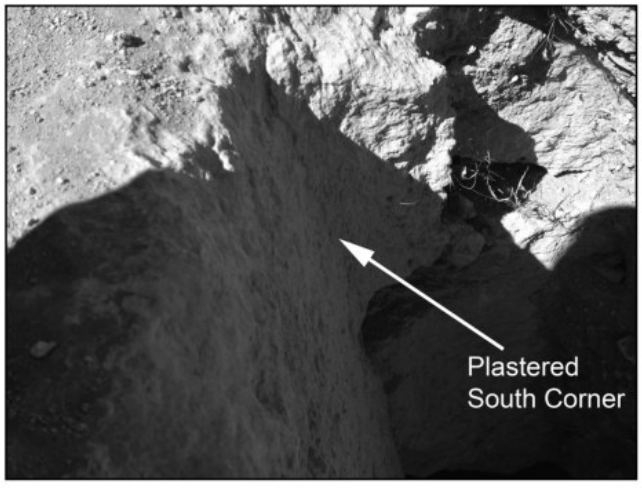
Findings

*Field Phase 3: Middle to Late Islamic*

In Square B8, approximately 1 m of soil was



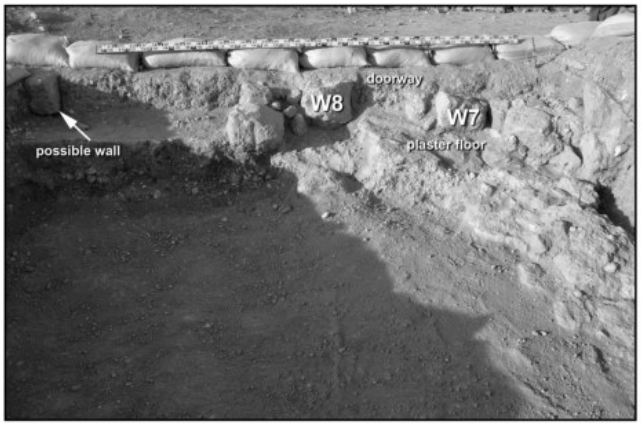

*4. Facing south. Square B8. Note the plastered corner on the south end of the early Iron Age reservoir.*




*5. Facing south. Jennifer Shrestha, Jonathan Thompson and Ruth Waynko take final measurements in Square B8. Note the plastered corner of the early Iron Age reservoir in the north - south excavation trench.*



*6. Facing north. Final photo of Square B8. Note the stone wall in the foreground.*




*7. Facing south. South balk showing Walls 7 and 8, doorway, plaster floor, mud foundation and free standing stone in Square B8.*

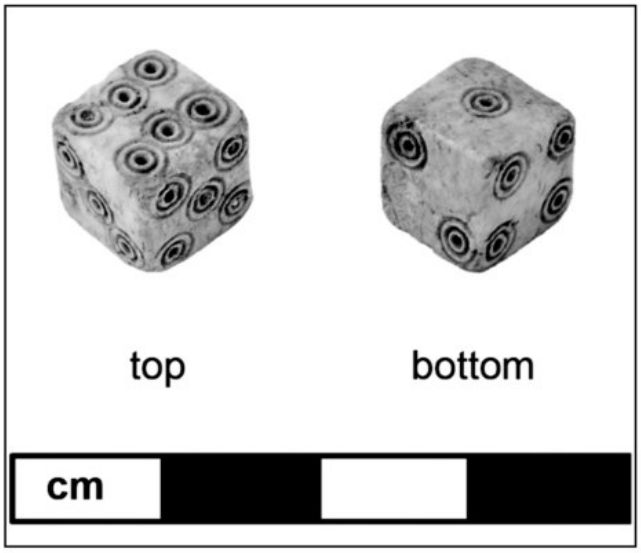
excavated and much of it was fill **(Fig. 6)**. The pottery was a mixture of Middle Islamic glazed and painted wares with some Late Byzantine cooking pots, jars, glass fragments and tesserae. There were remnants of architecture found on the west and south sides of the square. A hard-packed mix of clay and soil extended from the south balk to the north balk on the west side of the square. This may have been used as a foundation for a robbed-out wall. Wall 7 (B8:07) was found in the south-west corner of the square, extending out from the west balk approximately 2 m. The wall consisted of a single course of square-shaped unworked limestone blocks in two parallel rows. An 8 - 10 cm thick plaster floor was found sealing against the wall, which may have been built on top of a plastered floor. The plaster continues from the north side of the wall around the east end to form a passageway **(Fig. 7)**. Although, glass fragments and small tesserae were discovered throughout the square, heavier concentrations were found near the plastered floors and walls on the south side of the square.

A second wall (B8:08) was found in the south balk, east of Wall 7. This wall was also made of two parallel unworked medium sized (0.25 x 0.3 m) limestone blocks with a plastered base and continues into the south balk. The gap between Walls 7 and 8 appears to form a plastered doorway approximately 0.7 m wide. A third stone wall may also emerge from the south-east corner of the square. A single ashlar stone block of unknown size stands parallel to Wall 8 and may form a room approximately 2 m wide. The plaster floor between Walls 7 and 8 does not extend around the wall at and into the area between Wall 8 and the single stone block. Further excavation is needed to determine the relationship between Walls 7 and 8 and the stone ashlar in the south-east corner to determine if they form a building **(Fig. 7)**.

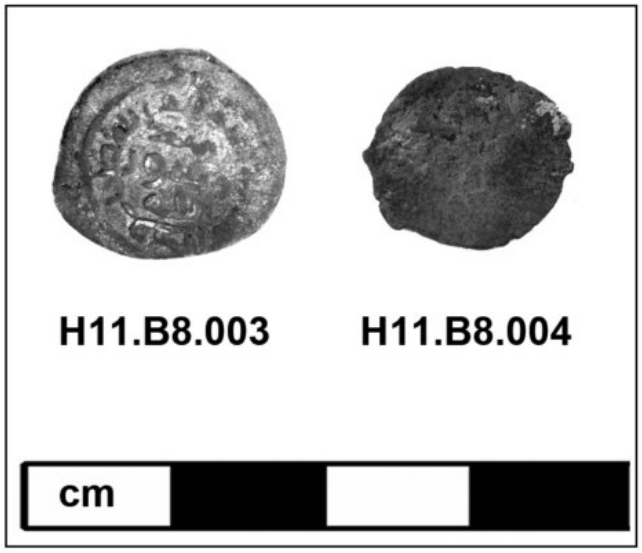
Objects

Four small objects were found in Square B8. Near the north-west corner, a small (1.1 cm2) white cube-shaped die with incised circular patterns was discovered in the sift (H11.B8.002 (**Fig. 8**). The die is made of ivory and the pips consist of two concentric circles with an incised hole in the center (double circle and dot). These incisions give the pips the illusion of being two raised circles. Like conventional dice, each of the opposite faces add up to the number seven where numbers one, two and three are arranged on a vertex in a clockwise or right-handed fashion. The patterns of the other numbers are arranged so the number one is in the center of one face, while the other number runs top left to bottom right as is typical of most dice. Similar gaming pieces have been found throughout the Middle East.

Three dice have been found at Tall Ḥisbān in previous excavations including a small bone




*8. Top and bottom view of a single ivory die found in Square B8. Note the double circle and dot pips giving a raised appearance.*




*9. Islamic coin and metal disk or possible coin.*

cube with dotted circles from Statum 9 (object no. 1441; HAM 73.071), a crudely fashioned limestone die with dark impressions from Stratum 3 (object no. 2415; HAM 76.0292) and a well-made ivory piece with dotted circles also from Stratum[3] (object no. 2653 [Ray 2009:143, 145 and fig. 9.25]). Additional Roman-period examples were found at el-Bahnasa (ancient Oxyrhynkhos [or Oxyrhynchus?]) in Egypt as well as similar examples from the Late Byzantine period at Tel Beth Shean (Mazar 2006: 667, 672-73; no. 101515). Indeed, the double circle - dot concentric incised pattern is frequently found on ivory knife handles and kohl sticks, as well as on castanets and hair pins which date to the Roman and late Byzantine periods (Mazar 2006: 667, 669-71). In addition, similar dice have also been found from the Early - Middle Islamic period[4]. Since there is no typology for gaming piece in the ancient Near East, it is difficult to determine whether the die date to the Late Byzantine or Middle Islamic periods.

Two metal objects were found near the north and west balks. The first was a thin, flat, round copper disk, 1.8 cm in diameter **(Fig. 9a)**. It was badly corroded with no letters or symbols visible. It may have been either a coin or a decorative piece attached to a necklace or garment. The second object is a copper coin, 1.9 cm in diameter, from the Early Islamic period (ca 600 - 800 AD). Commonly known as an Umayyad fals or copper coin, it was minted in the city of Tabariya (Tiberius) on the Sea of Galillee, which was a regional capital at the time **(Fig. 9b)**[5].

Both the obverse and reverse sides of the coin bear an inscription typical of Umayyad coins from the period. One side of the coin declares the oneness of God and the other the role of Muhammed as a prophet. Together these two statements make up the *Kalimat ash-Shahādah,* which is the first and most fundamental declaration of Islamic faith. This statement can be found on many plaques hanging in mosques as well as on the state flags of Saudi Arabia, Somaliland and Afghanistan. It is similar to the motto "In God We Trust" found on modern American currency.

The obverse side consists of three lines within three concentric rings or decorative braids and

3. New York Metropolitan Museum of Art, nos 97.4.123-24, 26.
4.New York Metropolitan Museum of Art, nos 38.40.93-95; 48.101.211b-e.
5.Type 289 in Ilisch and Lutz 1993. Sylloge numorum Arabicorum Tübingen 4a : Bilād aš-Šām ; 1, 4a : Bilād aš-Šām ; 1. Tübingen: Wasmuth.

was struck slightly off center. The three lines form the beginning of the Shahada and read:

Lā ilāh
Illa Allāh
Wah.dahu

(There is no god but God the one)

The inscription on reverse side consists of three single-word lines and a marginal inscription that forms the border that surrounds them. *The circular border inscription identifies the place* where the coin was struck or minted. It reads:

*bism allah d.uriba hadha al-fals bi-T.abariya*
*(In the name of God, this fals was struck in Tabariya)*

The three words within the circular border contain the common epithet for Muhammad:

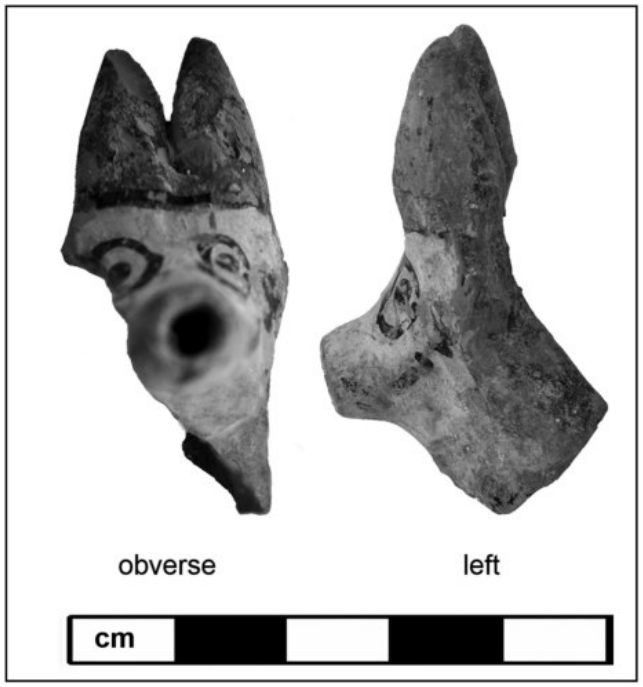
Muh.ammad
Rasūl
Allāh

(Muhammad is the messenger of God)

The obverse side was also struck slightly off-center[6].

The forth object found during the 2011 season was a small terracotta zoomorphic head that was broken diagonally from the right eye to the left side of the neck (H11.B8.001 [**Fig. 10**]). The inside of the head was hollow and connected to a 1 cm hole in the snout. Two black ears or horns (2 cm) protrude from the forehead with a black line painted at their base. The face and neck were painted a pale white or cream color and the back of the neck shows the remains of black paint that may have once extended from the ears or horns down the back of the neck to the body. Two eyes are painted in black, with concentric circles, but the right eye is partially broken. A thin black line runs along the left cheek just below the snout and under the eye, and extents to the back of the neck, probably connecting with the black line at the base of the ears or horns. These features give the general appearance of the popular American greeting card characters Hoops and Yoyo.

Zoomorphic figurines with hollow snouts are found throughout the ancient Near East. This type of vessel is known as a rhyton and has Aegean roots. Typically the head was attached to a hollow, tubular body that roughly reflects the animal's shape. A hole was placed in the middle of the back of the animal and a spout, lip and/ or handle was added. Legs, horns, eyes and tail were usually attached or painted after the body was connected to the head. A white slip was applied and it was decorated with black lines. Liquid (probably water) was poured into the vessel and usually mixed with wine to dilute its contents. The body was then tilted and the liquid contents poured out through the snout. Frequently, these vessels were used for libation, with the contents being poured over sacred objects like altars or into other sacred vessels. Sometimes the contents were poured directly into a recipient's mouth.




*10. Animal figurine with painted eyes, ears, harness, mane and a pouring spout.*

6. The authors would like to thank Warren Shultz of DePaul University, Chicago for examining and translating the Umayyad coin

Early Iron Age Canaanite and Philistine rhytons were found at Ekron and include both bovine and equine zoomorphic examples. Although it is highly unlikely that the zoomorphic head found in Square B8 is as early as the Iron Age given the location of its discovery, it does share many of the same features. For example, like Philistine Bichrome zoomorphic

eyes, a blunted snout, cheek strap and black horns or ears (Ben-Shlomo 2010: 107). However, Philistine zoomorphic rhyton heads extend vertically from the body at a near right-angle to the snout and the horns or ears project out from the sides. The head from Square B8 would have extended from the body at an angle (Ben-Shlomo 2010: fig. 3.56). Canaanite zoomorphic heads are attached at an angle but their bovine snouts are typically longer and lack decoration. Several bovid figurines have been found at Tall Hisban that date to the Late Iron Age, but these fragments do not represent parts of rhytons.

Unlike bovid-shaped rhytons, equid-shaped rhytons are fairly rare. The most complete example of a horse / donkey vessel was found at Ekron. Its body had two filling spouts where miniature vessels would have been attached (Ben-Shlomo 2010: 65). Like the Ḥisbān zoomorphic head, the ears of the Ekron vessel appear to have extended upward, the snout was blunted with a through hole to the body, and the head and neck attached at an angle. Unlike the Hisban head, however, the Ekron vessel was not decorated. Although, equid rhytons were unusual, equid figurines were fairly common, especially during the Iron Age (Ben-Shlomo 2010: 121-125, fig. 3). Examples have been found at Tell es-Saidiyeh and Busayra as well (Pritchard 1985: fig. 169:2; Bienkowski 2002: 381-387). Many equid figurines were fitted with a human figure riding on the back of the horse; these are known as 'horse-and-rider figurines'. Several equid figurines that may have been of the horse-and-rider type were found at Hisban, including head fragments and other body parts (see Table 1). However, most of these figures were solid or partially hollow and were not parts of rhytons. Many of the equid fragments were painted with a chin, cheek or neck strap, or some other type of harness feature, like the one painted on the zoomorphic head found in Square B8.

The zoomorphic head found in Square B8 was most likely part of an equid rhyton or other spouted vessel and, although equid rhytons or other zoomorphic vessels are rare, it should probably date to the Middle Islamic period[7]. The head resembles a horse, donkey or possibly a mule found at Tall al-Umayri that has preliminarily been dated to the same period. Its short neck would have been attached at an angle to a hollow vessel used for libation or drinking. The

**Table 1:** Terracotta bovid and equid figurine fragments from Tall Ḥisbān.

| Object no. | HAM no. | Description | Painted decoration | Location | Date |
|---|---|---|---|---|---|
| 76.2581 | 76.0357 | Bovid head and neck | | B2:137:337 | Ir2/Per |
| 73.unreg | - | Bovid hump | | Unknown | Unknown |
| 2581 | - | Bovid head | | Unknown | Unknown |
| 71.0817 | 71.0273 | Bovid hind quarters? | Criss-crossing stripes | B4:15:47 | Ir2 |
| 1576 | - | Equid head and neck | Neck strap | B1:143:395 | Ir2/Per |
| 71.0651 | 71.0194 | Equid head fragment | Brow strap and harness | B1:78:227 | Ir2/Per |
| 73.1681 | 73.0352 | Equid head fragment | Cheek and nose strap | C2:44:503 | Ir2/Per |
| 73.1595 | 73.0290 | Equid head and neck | | B2:40-48:475 | Ir2/Per |
| 74.1793 | 74.0134 | Equid head and neck | | B4:205:403 | Ir2/Per |
| 76.2781 | - | Zoomorphic spouted head | Head and neck paint | G14:16:36 | Umm |

7. Object B080023, Square M7K24, Locus 002. This object was found in topsoil above a wall and may have been formed in a mold. Its function is undetermined. Further comparisons are needed to determine its function and precise date.

animal′s body probably had fixed legs, a painted tail and other decorations on the back. A filling spout or hole would have been on the animal's back in order to add liquid that was poured out through the snout. This head is very similar to an Umayyad zoomorphic head found in probe G.14 locus 16:36 (76.2781) at Tall Ḥisbān. Both have a blunt, spouted nose that attached at an angle to a vessel and painted eyes. However, only the zoomorphic head found in Square B8 has clearly identifiable equine harnesses painted on the object.

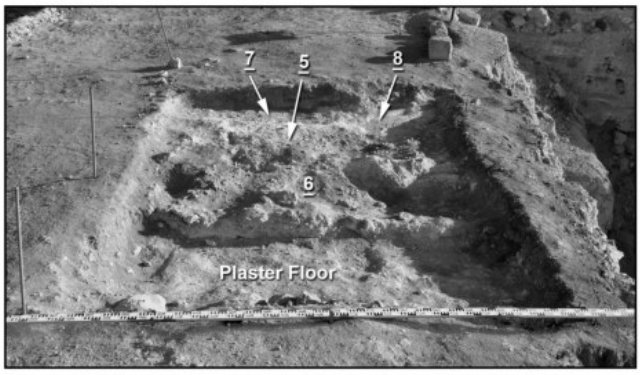
As noted above, Square B9 was opened as a 3.5 x 5 m probe with a 0.2 m sub-balk on the east side **(Fig. 3)**. Approximately 0.25 - 0.35 m of soil was removed exposing an east - west wall and a plaster floor. Wall B9:04 was approximately 0.5 m wide and extended 3.5 m along the south balk. It was made up of small- to medium-sized, unevenly shaped field stones. Although its height was not fully exposed, the balk from the adjacent squares suggests that the wall stood at least 1 m high.

The plaster floor covered the entire probe (17.5 m2) and was laid down in several phases. The first layer (B9:08) consisted of a pale white chalky limestone plaster, approximately 3 - 5 cm thick with a few small limestone chalk inclusions. The surface was hard-packed with a relatively smooth even surface. The second phase (B9:07) was similar in appearance to the first phase but had more inclusions and the surface was more uneven with a slightly pinkish tint. The remaining layers (B9:05 - 6) were thickly laid (8 - 12 cm), with many large chalky limestone and other small inclusions. Some of the plaster had been worn away, with fill dirt being compacted into the gaps to create a more even surface **(Fig. 11)**. Although Mid - Late Islamic-period pottery and glass sherds were found on the plaster surface, it is difficult to determine whether the surface was disturbed by more recent restoration activities.

*2012 Season: Exploring The East Slope of the Acropolis*[8]

The 2012 season excavations at Tall Hisban were conducted from 14 to 31 May by faculty and students from Andrews University and a small group of volunteers. As with the 2011 excavations, this project was associated with the Jordan Field School, a multidisciplinary three-week study tour that functions as a part of the Hisban Cultural Heritage Project, directed by Øystein S. LaBianca as described above. Stanley H. Beikmann planned an overall landscape design for the site, and cleared trails and assembly areas for visitors with the help of other Andrews University students. The Tall Hisban archaeological director, Bethany Walker, read the pottery and Maria Elena Ronza, director of restoration and conservation for the site, provided invaluable logistical support. Nassem Talal Obeidat was our Department of Antiquities representative. Our efforts enjoyed the full support of ACOR, including

logistical support and the loan of a transit level and tripod.




*11. Facing north. Plaster surfaces in Square B9.*

8.The authors would like to thank the participants of the Tall Hisban 2012 excavations, including area supervisor Jeff Hudon from Bethel College, square supervisors Sheryl Beikmann (R5) and Shirley Grall (R6), volunteers Ruth Wankyo, Conrad White and Anastasiia Tishina from Andrews University and Terje Stordalen from the University of Oslo. We would also like to thank the energetic group of 13 young men from the village of Hisban who worked alongside us.

Goals and Objectives

For the past several seasons, an important objective of our project has centered around developing several key features of Tall Hisban in order to present the site as a tourist destination in Jordan and to share the story of Hisban with a much wider audience. In 2012, the project focused on the acropolis and developing visitor trails at the site. The goal of the excavation was to expose additional sections of the perimeter wall along the eastern face of the acropolis in order to confirm stratigraphically the Hellenistic date it had previously been assigned (Mitchel 1992: 17, 38).

Two parallel squares (R5-6) were opened on the steep slope immediately east of a recently constructed educational trail in the newly inaugurated Area R **(Fig. 2)**. It was believed that the western edge of these squares would abut and therefore follow the ancient wall since the exposed south-east and north-east corner 'towers' of the wall clearly indicated that its course ran just opposite the apse of the Byzantine church on Hisban's acropolis. However, the topography and surface of both squares made excavation rather challenging. Unfortunately, earlier (Phase I) excavations may have used Square R5 as a dump since a large number of previously excavated stones, including roughly-worked building stones, ashlars and column fragments, were carefully collected and placed in parallel lines along the eastern half of both squares. This created what was essentially a 'stone garden' **(Fig. 12)**. Subsequently, much effort was expended in moving these architectural stone fragments to alternative locations. Large quantities of tumbled building and field stone, as well as rubble, in both squares led to the conclusion that the area was also used as a dump in antiquity when renovations were made on the acropolis during the Mamluk and perhaps also during the Ottoman period.

Findings

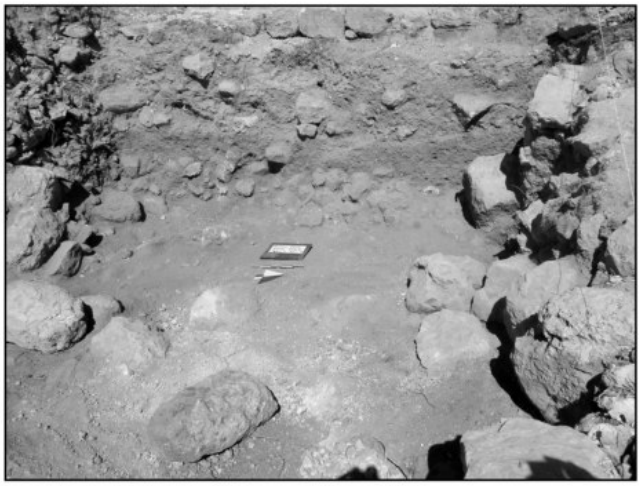
While the quantities, styles and dates of the ceramic material and objects recovered from both squares correspond closely with Hisban's occupational history and do not contribute anything substantially new to our understanding of the site, the material finds are nevertheless an important contribution to our ongoing quest to understand and appreciate the people and cultures that inhabited Tall Hisban in antiquity. The few Iron Age II sherds and jar rims, like the other material found in the squares, probably originated on the acropolis and represent occupational strata that were virtually obliterated by later clearing operations and construction.[9] The bulk of the recovered artifacts came from Square R5.

Owing to the steep topography of Square R5, excavation began along its western edge and progressively encompassed more of the square, expanding towards the east, as excavation continued **(Fig. 13)**. Only at the close of the season did the level of excavation reach ground level along the eastern edge of the square. As the entire slope was fill material, comprised mostly of stone rubble, there was no clear stratification nor any *in situ* architectural features. However, several interesting architectural finds were unearthed, including



*12. Facing south. Area R before excavation; note the steep slope and heavy concentration of stones.*

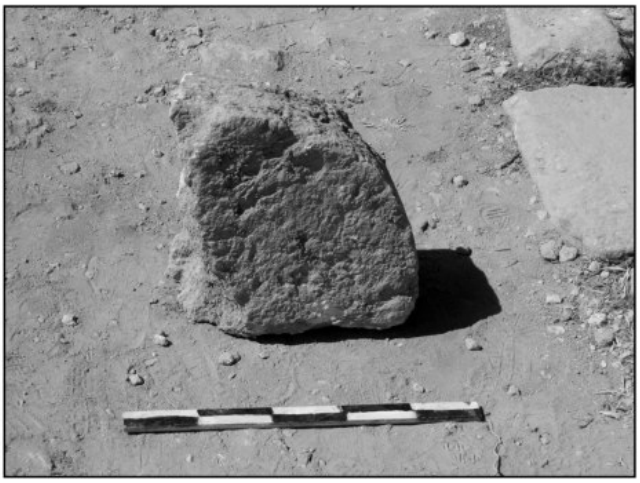
9. Mitchel reports that only one Iron Age locus was excavated in Area A (A.3:56), but Iron Age material was found in mixed loci from various squares on Hisban's acropolis (ibid. pp. 18). Based on the amount of material deposited in the Iron Age reservoir, Herr (cited by Mitchel 1992: 18, 38) suggested that an average accumulation of approximately 2.2 meters of earlier material existed on the summit before the builders of Stratum 15 began their clearance operations.



13. Facing west. Square R5: final Photo.



16. Another possible socket for a gate or door.



14. A possible wall crenellation or tympanum fragment.



15. A possible socket for a gate or door.

a possible wall crenellation or tympanum fragment from a small doorway **(Fig. 14)**. While possibly from the Islamic period, this nicely worked limestone piece probably originated from the Byzantine church or another classical structure that once stood on the acropolis. In addition, two large limestone blocks with offset sockets (or cup marks) were found. The blocks were similar in size but not identical as one was more nicely worked than the other. Their original function is uncertain, but they may have served as threshold sockets for a gate or door hinge **(Figs. 15 and 16)**. Both of these blocks were transferred to the Byzantine church on the acropolis and placed next to a column base alongside the nave.

Only a handful of pre-classical body sherds, with the white grit in the fabric that is characteristic of Iron Age II, were identified. No identifiable sherds from the Hellenistic period and only a few from the late Roman period were found. A good assortment of ribbed Byzantine-period sherds and eastern terra sigillata (North African - rouletted design) ware were retrieved along with Late Byzantine – Umayyad-period palace ware and white-and-gray ware, red and white painted jars, red-on-red ware, white ware, gray ware and Samarra ware from Iraq (Sauer and Herr 2012: 525, 531) were retrieved. Only a few Ayyubid sherds were found, including Raqqa ware jars,

red-on-red painted jars and some Iraqi blue-stained frit wares. The majority of the sherds were from the Mamluk-period occupation of the site, including a concentration of Handmade Geometrically Painted Ware (HMGP) and other Mamluk-period sherds, including glazed cooking pots, sugar pots, molded glazed relief ware, Syrian imported ware, Sgraffito, monochome glazed bowls and elephant-ear cooking pots that were uncovered in Square R5 (Sauer and Herr 2012: 562-63, 577-80). Some non-specific Ottoman-period sherds were also recovered. However, many of the sherds were small in size, exhibiting significant edge wear from migration after breakage, and appeared to have originated from a variety of vessels. Hence, it is rather unlikely that partially restorable forms exist among this assemblage.

Square R6 was located south of R05 and east of Area A **(Fig. 17)**. It had a north - south line of stones (Wall R6:03) on the east side of the square, with two faces that gave an indication of a wall, but the excavation did not go deep enough to uncover any additional courses. This wall extended into Square R5 and the final stone of this wall line appeared to be floating. A flimsy course of stones (Wall R6:02 - not illustrated) ran along the surface in a north - south line close to the western edge of Square R6, but contained only one or two courses of stone and may have served as part of a more recent sheepfold or pen. Wall 7 (R6:07) abutted the north end of Wall 3 (R6:03) and ran roughly south-west for about a meter and a half before turning north-west as Wall 8 (R6:08) and then running into the balk. Only a single course was exposed and no floor was uncovered that could be related to this wall. A small, roughly worked rectangular basin (or mortar) was found upside down at the corner **(Fig. 18)**. No stratigraphy was noted in either square as only tumbled stone and mixed fill material were found.

The pottery sherds found in Square R6 dated from the Hellenistic to Mamluk periods, with the majority dating to the latter. Hellenistic-period bowls and handles, Roman-period glass and a number of ribbed Byzantine-period sherds were retrieved. Roof tiles, numerous tesserae and painted plaster fragments from the church were recovered, as were several bottle stoppers of uncertain age. Late Byzantine - Umayyad palace and painted ware, white-and-gray ware and glazed jars were also found.[10] Some Abbasid sherds including a Turban-handle lid, imported Iraqi bowl and Iraqi splashed ware were recovered[11].



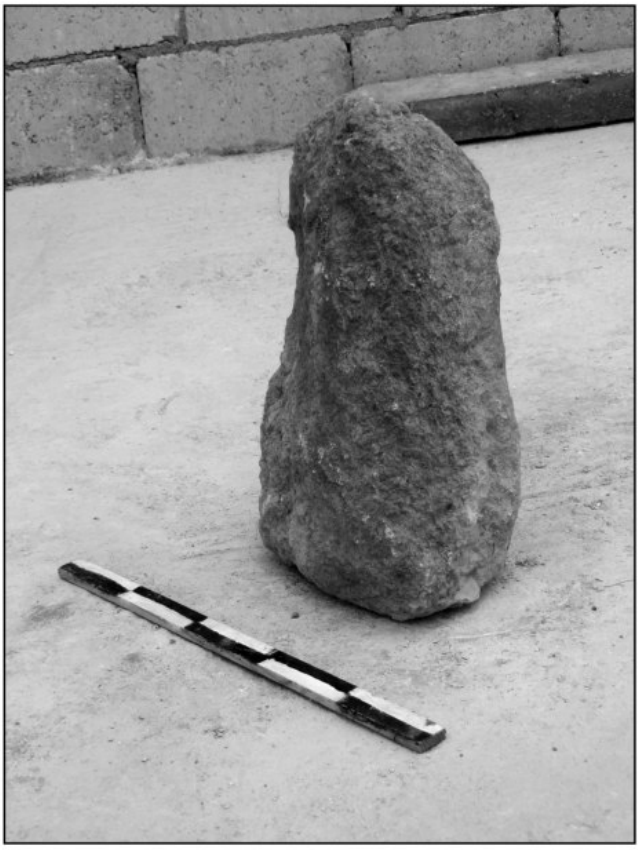

*17. Facing west. Square R6: final photo showing walls R6:03 and 07-08.*



*18. Three stone objects: the basalt massebah, a pounder (pestle) and a small rectangular basin (mortar).*

10. Ibid. 525.

11. Ibid. 531.



*19. A crudely worked basalt object, possibly a massebah.*



*20. Facing north. New pathway along the west side of the acropolis that leads to the west visitors platform.*



*21. Facing south. New pathway along the west side of the acropolis that leads to the west visitors platform. Note the small trees planted along the edge.*

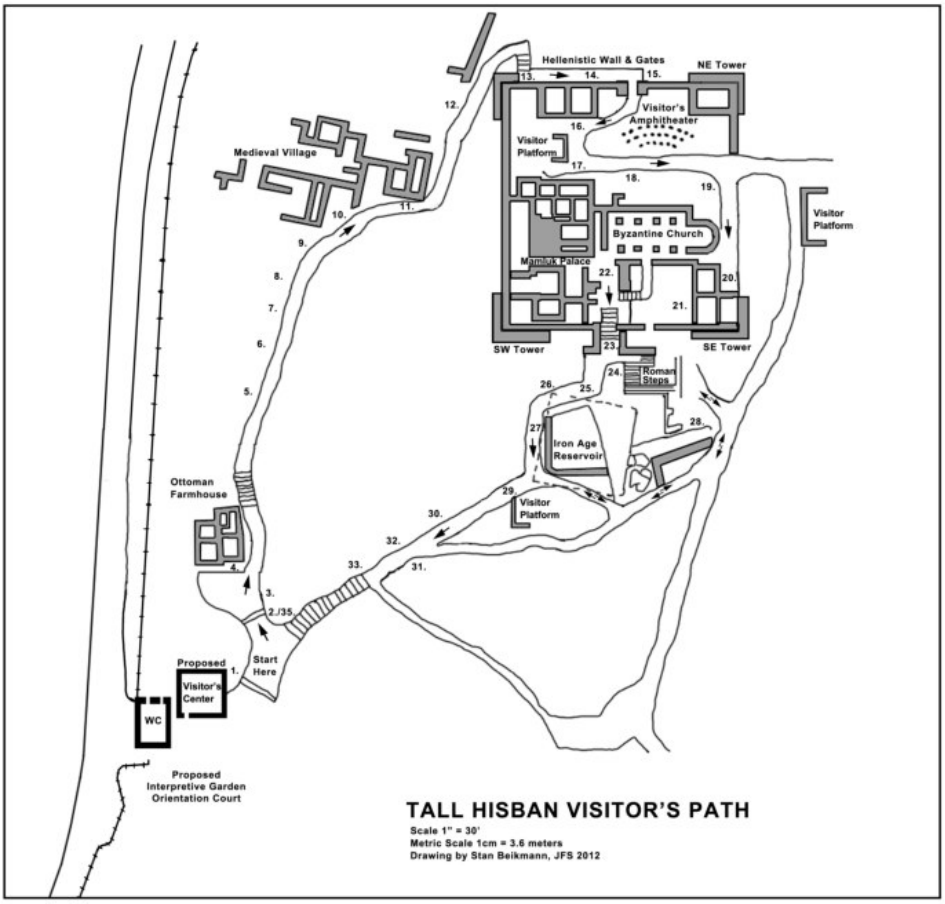
Like Square R5, Square R6 had a wide variety of Mamluk-period glazed and painted wares including HMGP jars, white ware, molded glazed relief ware, slip-painted bowls, blue-and-white Syrian frit ware, Sgraffito and monochrome glazed bowls, together with coarse wares, sugar pots and an elephant-ear cooking pot.[12] Some mono-glazed Ottoman-period jar sherds were also retrieved.

Progress in both squares was slowed considerably by the constant removal of field stones and rubble. In Square R5, siftable soil could only be collected from pockets within and around clusters of stone rubble. In Square R6, soil had to be completely removed from clusters of stone in order to ascertain whether the stones were part of a wall, an installation or simply tumble. Hence, this extra care and caution, although necessary, slowed progress. Unfortunately, the western balks of both squares consisted entirely of earth fill and, consequently, no stone courses were exposed that might relate to the acropolis wall.

Objects

Notable among the excavated objects were early Roman- and Byzantine-period plaster (including painted plaster), numerous tesserae and roof tiles (probably from the Byzantine-period church), lithics, a grinder, green marble, Roman glass, a pedaled rim of a glass juglet, a complete thirteenth-century Ayyubid glass bangle, an Arabic inscription reading "everlasting glory" from a glazed relief Mamluk-period bowl, a crudely worked basalt object that possibly served as a massebah **(Fig. 19)**, a basalt pounder (pestle) **(Fig. 18)**, (as yet) unidentified coins and fragments from a tabun.

12. Ibid., p. 577-80; 562-63.




*22. Proposed plan for the Tall Ḥisbān visitors path showing the 35 proposed stations for new Arabic / English signs along the educational trail by Stan Beikmann that leads up to the acropolis.*

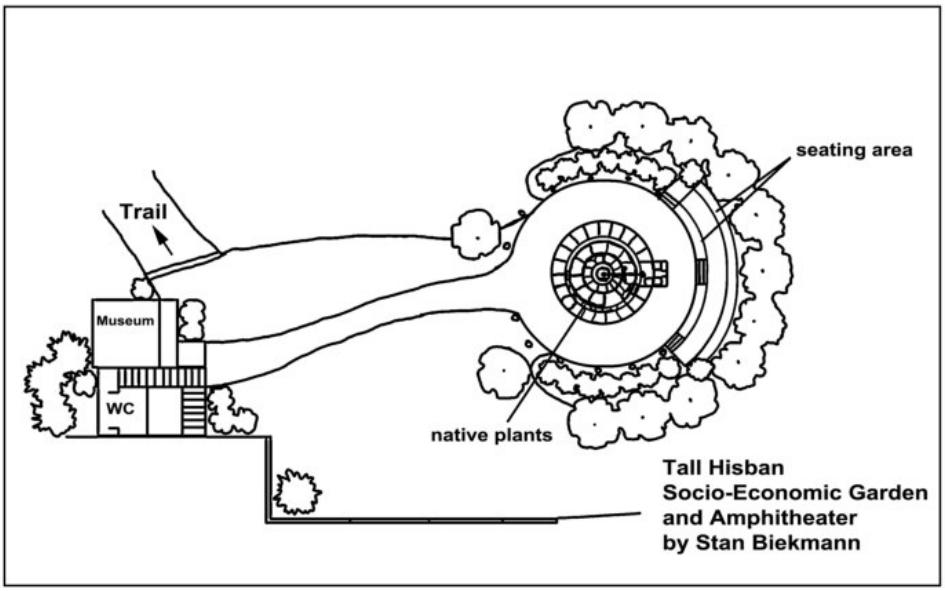
**Conservation and Preservation**

Another goal of the 2011 - 12 seasons was to address some of the safety concerns related to the continued deterioration of the reservoir. Squares B1-2 and 4 were originally excavated in 1968 - 1976. In the process, an area approximately 17 m north - south and 12 m east - west was excavated, leaving behind a nearly 10 m deep, L-shaped hole. Although the balks have held up remarkably well over the years, the crumbling edges and steep sides pose a hazard for the many local and foreign visitors to the site. In addition, the seemingly endless maze of pits and trenches are often difficult for the casual visitor to decipher, even with the assistance of the many signs available on the site. Many of the important features of Tell Hisban›s historical past have become unrecognizable as a result of site deterioration. It was hoped that by re-establishing balks, building new paths and retaining walls, and revisiting the excavation in this area a safer environment could be achieved.

Trails and Signage

During the 2011 - 12 seasons, the trails that lead primarily to the Hisban acropolis were redirected to include other places of interest at the site. In 2011 an area along the west side of the acropolis wall was cleared, leveled and widened. A pathway was extended from the reservoir to the north-west corner of the acropolis to allow easier access to the visitor›s platform **(Figs. 20 - 21)** on the west side. The main trail that leads from the Ottoman-period farmhouse to the Mediaeval village was also connected to this path as well as to the small staircase that goes up to the visitors platform. Additional pathways were added along to the south side of Iron Age reservoir together with expanded viewing areas along its north and west sides.

In 2012, renovations on the trails continued under the direction of Stan Beikmann and students from the Agriculture / Landscape and Design Department at Andrews University in order to




*23. Proposed plan for the 'socio-economic garden' that will be at the entrance of Tall Ḥisbān featuring many native plants by Stan Beikmann.*



*24. Convolvulus dorycnium (splendid bush morning glory) produces a bright pink flower that is drought tolerant. It is one of the many flowering plants native to Tall Hisban that is suitable for arid climates in the United States.*



*25. Astralogus strigosa (blue forget-me-not) has a brilliant blue flower that grows in dry arid climates.*



*26. Salvia sp. (golden sage) produces a bright yellow flower that thrives in hot, dry climates like those found in Jordan and in the western United States.*



*27. Building A in the Nabulsi Complex will become the Hall of Landscape and Agricultural History.*

develop a more cohesive educational trail system **(Fig. 22)**.[13] *Beikmann's* team cleaned, repaired and rerouted several trails and created a small amphitheater on the acropolis overlooking the Byzantine period church. The amphitheater was made from large ashlars and discarded column fragments from the original church to provide a place for on-site lectures. At the close of the season, Beikmann and his students submitted a comprehensive landscape design for a circular 'socio-economic garden' to be established in a natural bowl-shaped depression just inside the entrance to the site **(Fig. 23)**. This site will provide a place for groups to gather before following the educational trail system. Native plants from the region will be included in the garden as well. Construction of this garden is planned for the 2013 season.

In addition, Biekmann and his students began a project to document the indigenous vegetation present at Tall Hisban and study how these plants have adapted their environment. An intensive survey was carried out on the site and over 100 xeriscapic plants were collected, examined, photographed and recorded. Xeriscapic plants require less water for survival than most other plant species and have especially adapted to the arid climate that surrounds Tall Hisban despite grazing pressure, drought and harsh conditons. The team noted the physiological differences of each plant and compared them to plants from wetter climates. Biekmann determined that at least three species of plants were most suitable for transplant to semi-arid landscapes in the United States. These species include: Convolvulus dorycnium (splendid bush morning gloria) **(Fig. 24)**, Astralogus strigosa (blue forget-me-not) **(Fig. 25)** and Salvia sp. (golden sage) **(Fig. 26).** Each plant produces a bright colorful flower but requires little maintenance.

**Conclusions and Future Plans**

The results of these two seasons represent the end of the Phase II excavations at Tall Hisban and reveal a small, but significant, part of Hisban's role as a consistent witness to global history and as a window on local culture and survival over the longue durée. We anticipate that future excavations at the site will continue to reveal and clarify Hisban's significance as a showcase for local traditions as well as for regional and global power. Work will also continue on the trails and signage at the site with the goal of creating a new seating area at the entrance, with a garden featuring many of the native plants identified in the 2012 season. In addition, the long-term goal of involving the local community in the preservation and conservation of the site will continue as future plans involve developing a visitors center in the adjacent Ottoman-period buildings, also known as the Nabulsi Complex **(Fig. 27)**. These buildings will make Tall Hisban a destination for learning about how the past can inform present-day and future planning in Jordan and beyond. To this end, exhibits will be developed and displayed in the Nabulsi heritage buildings at Hisban that highlight how archaeology can illuminate the history of innovations in agriculture and water systems over the centuries and millennia. A special emphasis will be placed on understanding how the past can help us plan for a sustainable future.

13. The authors would like to thank the members of the Agriculture / Landscape and Design team, including director Stan Beikman (Andrews University) and students Bjorn Choo, Aliaksei Mikitsiuk, Slava Silyaev, and Kristen and Jeffrey White.

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# TALL ABU AL-KHARAZ: PRELIMINARY EXCAVATION REPORT OF THE SEVENTEENTH SEASON OF THE SWEDISH JORDAN EXPEDITION, 2014

*Peter M. Fischer and Teresa Bürge*

## Introduction

The main aim of the seventeenth season of Swedish excavations at Tall Abu al-Kharaz (see **Fig. 1** for location) was - as in previous seasons (see e.g. Fischer and Bürge 2014) - to explore the area around the geographical centre of the city on the upper part of the tell in order to complement previously investigated areas around the city's periphery **(Fig. 2)**. Two 10 x 10 m trenches were opened: the first, Trench LXVA-D, is in Grid SS/TT 30, and the second, Trench LXVIA-D, in Grid RR/SS 29/30. During the course of excavation, Trench LXVI was extended to the south as a result of rich find contexts in its southern part (Trench LXVIE [5 x 7.5 m] in Grid SS 30/31; Trench LXVID [8.5 x 5 m] in Grid RR/30). The total extent of Area 12 is 280 m$^2$.

Area 7 in the northern part of the city yielded rich Iron Age contexts in previous seasons (Fischer 2013: 141-248). These included several two-storey, four-room houses which were destroyed by the Neo-Assyrians who brought the flourishing Phase XIV to an end in 732 BC. In order to generate a coherent picture of Iron Age occupation in the northern half of the city, an additional trench, Trench LXVIIA-D, was opened between Areas 7 and 12 in Area 13. This trench is in Grid TT/UU 26 and is 100 m$^2$ in size.

The excavations at Tall Abu AL-Kharaz, once again kindly financed by the Royal Swedish Academy of Letters, History and Antiquities, were carried out with the support of the Department of Antiquities of Jordan in September and October 2014. The 2014 team included Professor P. M. Fischer of the University of Gothenburg (director), T. Bürge (assistant field director), D. Blattner (assistant), H. Ta'ani (foreman; trench supervisor) and M. al-Bataineh (surveyor; draughtsperson). Trench supervisors were Dr S. Chandrasekaran, M. Adelhofer, E. Heiss, S. Lauscher and L. Marstorp. The representative of the Department of Antiquities (and recently appointed Inspector of Pella) was M. esh-Shalabi from whom much practical help was gratefully received. Logistical support was provided by S. Esbeihat (cook), Y. Suleiman Musa (pottery washing) and M. Mohammed Ahmad (transport). Nine loyal local workers with much experience from previous field seasons came from Pella, Mashare'a and Yabis. The Royal Court of Jordan, represented by TRH Prince Raad Ibn Zaid and Princess Majda Raad, and the staff of the Swedish Embassy in Amman, headed by Ambassador Helena Gröndahl Rietz, all of whom showed sincere interest in the project, honoured the expedition with their annual visit.

## Results From the Excavations in Area 12 (Trenches LXVA-D and LXVIA-E [Figs. 3 and 4])[1]

*Post-Iron Age: Islamic / ? Abbasid (8$^{th}$ - 10$^{th}$ centuries AD)*

Several structures belonging to Phases XIV and XIII were affected by a ca 3.5 x 1.5 m pit ('A' in **Fig. 3**). The pit cut down approximately

1.Phase numbers have only been given to settlement periods from the Early Bronze Age (Phase I) to the Iron Age (Phase XV for the latest Iron Age squatter occupation), i.e. in accordance with the final publications (Table1).

**Table 1**: Synopsis of Early Bronze Age to Iron Age occupation phases at Tall Abu al-Kharaz

| Phases | Date (BC) | Periods |
|---|---|---|
| IA-B | 3,150 - 3,050 | EB IB |
| IIA-B | 3,050 - 3,000 | EB II |
| IIIA-B | 3,000 - 2,900 | EB II |
| *Lacuna* | 2,900 - 1,600 | EB III - MB II/III |
| IV/0 | 18th century | MB I |
| IV/1 | *ca* 1,600 | MB III |
| IV/2 | 1,600 - 1,525 | MB / LB |
| V | 1,525 - 1,450 | LB IA |
| VI | 1,450 - 1,400 | LB IB |
| VII | 1,400 - 1,350 | LB IB/C - IC |
| VIII | 1,350 - ? | LB IC - II |
| *Lacuna* | | LB II |
| IX | 1,100 - 1,050 | IA IB |
| X | ? 1,050 - 930 | IA IB / (IIA) |
| XI | 930 - 850 | IA IIA |
| XII | 850 - 800 | IA IIA/B |
| XIII | 800 - 770 | IA IIB |
| XIV | 770 - 732 | IA IIB |
| XV | 732 - 600 | IA IIC |
| | *ca* 4th cent. AD | Roman |
| | *ca* 4th - 7th cent.AD | Byzantine |
| | *ca* 8th - 10th cent.AD | Islamic / Abbasid |

1.5 m from topsoil, causing the destruction of the western ends of W751 (Phase XIV) and W759 (Phase XIII). The disturbance also affected the massive W754 (Phase XIII) further west, which was cut 1 m wide and 1.3 m deep down to its foundation - visible on the western façade of W754 (Fig. 5 upper right). A human skeleton without any funerary offerings was found at the bottom of the cut, lying on a bed of clay **(Fig. 5)**. The cut was backfilled with jumbled stones intermingled with soil. The most recent sherds from the area of the burial are probably Abbasid[2].

The skeleton lay on its back / slightly on its right side in an outstretched position with its head facing south-east, i.e. approximately towards Mecca. It came as a surprise that the upper parts of the pharynx / larynx were preserved owing to mummification or partial ossification *intra vitam*. The left arm was bent whereas the lower-positioned right arm lay outstretched under the body. Only the two femurs could be exposed whilst the remainder of the legs lay below the deeply backfilled disturbance within the area of W754. Preliminary osteological analyses point to a roughly 30-year-old individual with mainly female characteristics. This interpretation is based on the following observations: (1) non-pronounced nuchal crest, (2) the mastoid process (which is quite pronounced, however), (3) sharp supraorbital margin, (4) flat supraorbital ridge, (5) shape of the orbitas (not very conclusive) and mandible, and (6) small teeth together with indications from post-cranial bones. Most of the teeth are preserved without severe caries. The recession of marginal bone (periodontitis) is moderate[3]. Age, around 30 years, was mainly estimated by tooth wear and the closure of sutures. There are three clearly visible perforations of the cranial bone, but only on the right side (see arrows in **Fig. 5**). Assessment of the cause of death (disease vs trauma, or possibly a combination of the two) requires additional investigation including radiological examination. There seem to have been specific motives to 'hide' the corpse under a massive ancient wall.

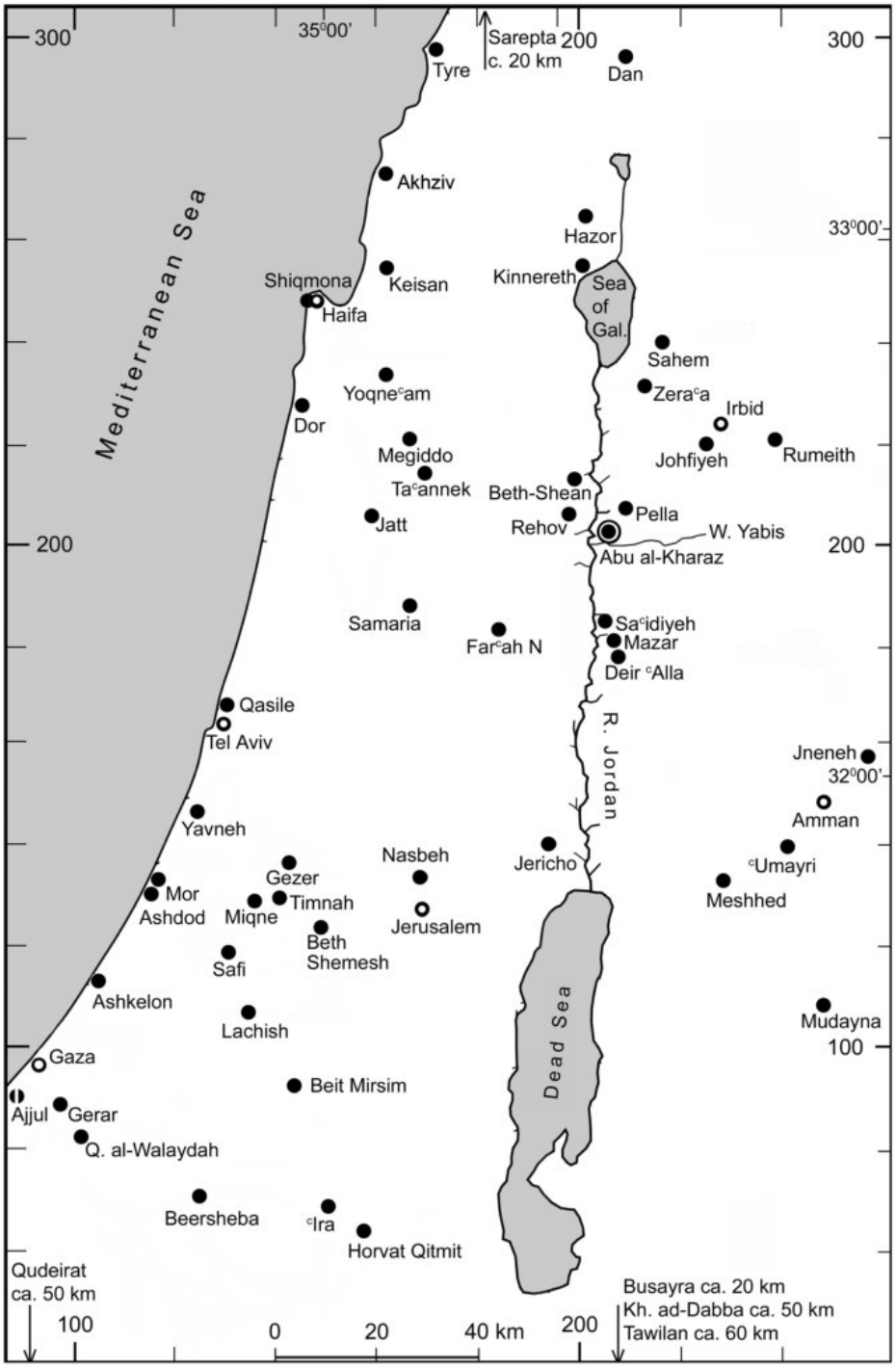
*Iron Age*

Phase XV (732 - 600 BC)

Phase XV, which is interpreted as a phase during which squatters lived at Tall Abu al-Kharaz after the major catastrophe of the Neo-Assyrian invasion which brought Phase XIV

2.There were only a few sherds in the fill around the skeleton, some of which may well belong to Byzantine / Umayyad periods.

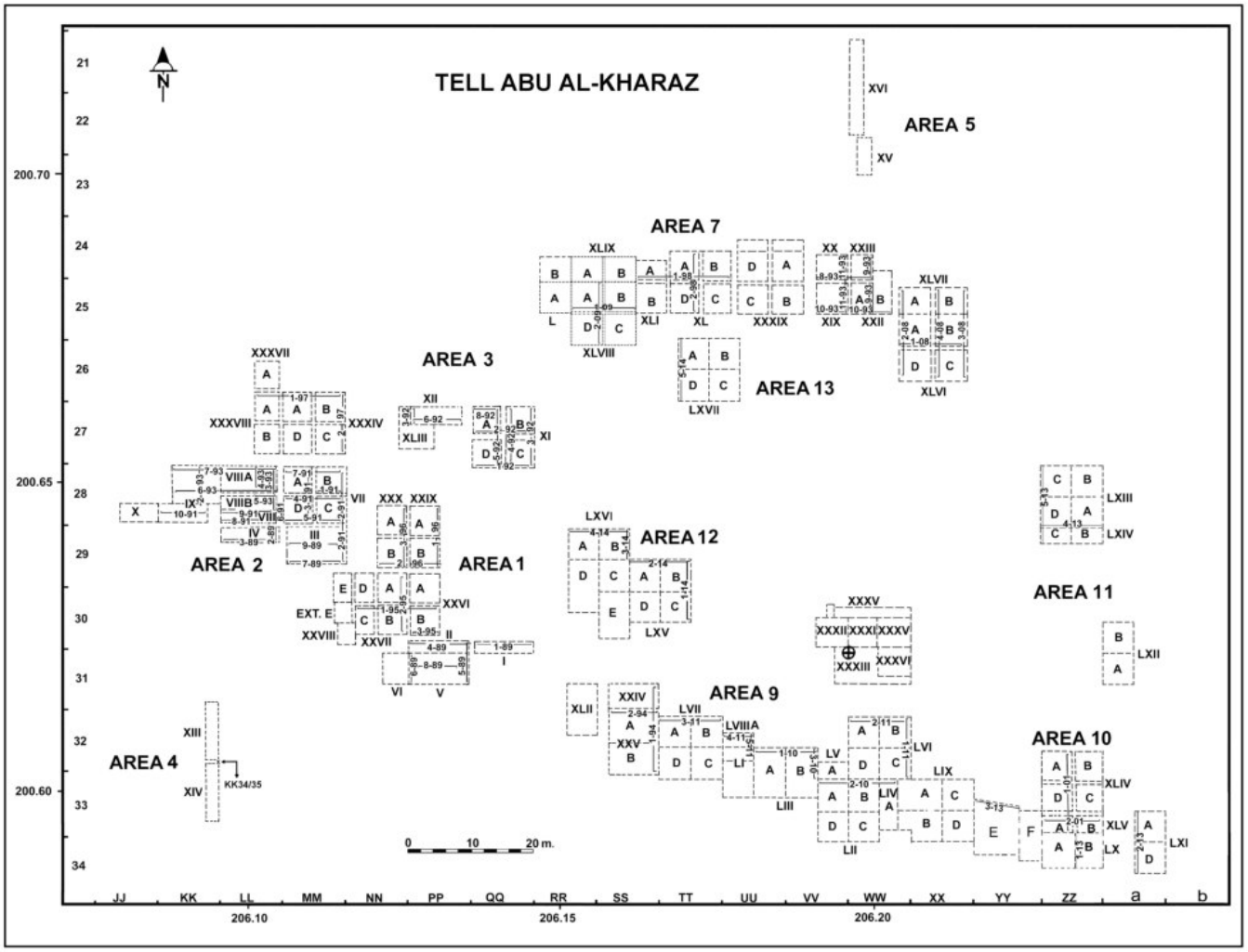
3.Observe that future X-ray examination will be necessary to confirm the diagnosis (cf. Fischer 1986).




*1. Selected Iron Age sites in the southern Levant.*

to an end in 732 BC (Fischer 2013: *inter alia* 501), is essentially on the surface or just below colluvial soil. The majority, or even all, of the stone structures that were utilised during this phase are of earlier date. To the west is an obviously open space delineated by three walls. Two ovens are preserved in this space. A complete storage jar **(Fig. 6:4)** was found next to the ovens.

The massive W754 with its 1.6 m gate should be ascribed to Phase XIII (see below and 'B' in **Fig. 3**). Together with W753 and W752, likewise reused, they created a large open space. There are no finds of specific interest from this area owing to its superficial position. To the east of the reused W754 are at least two spaces. Not much is left of the northern space owing its proximity to the surface, but the southern space




*2. Tall Abu al-Kharaz: overview of excavation areas, trenches and sections.*

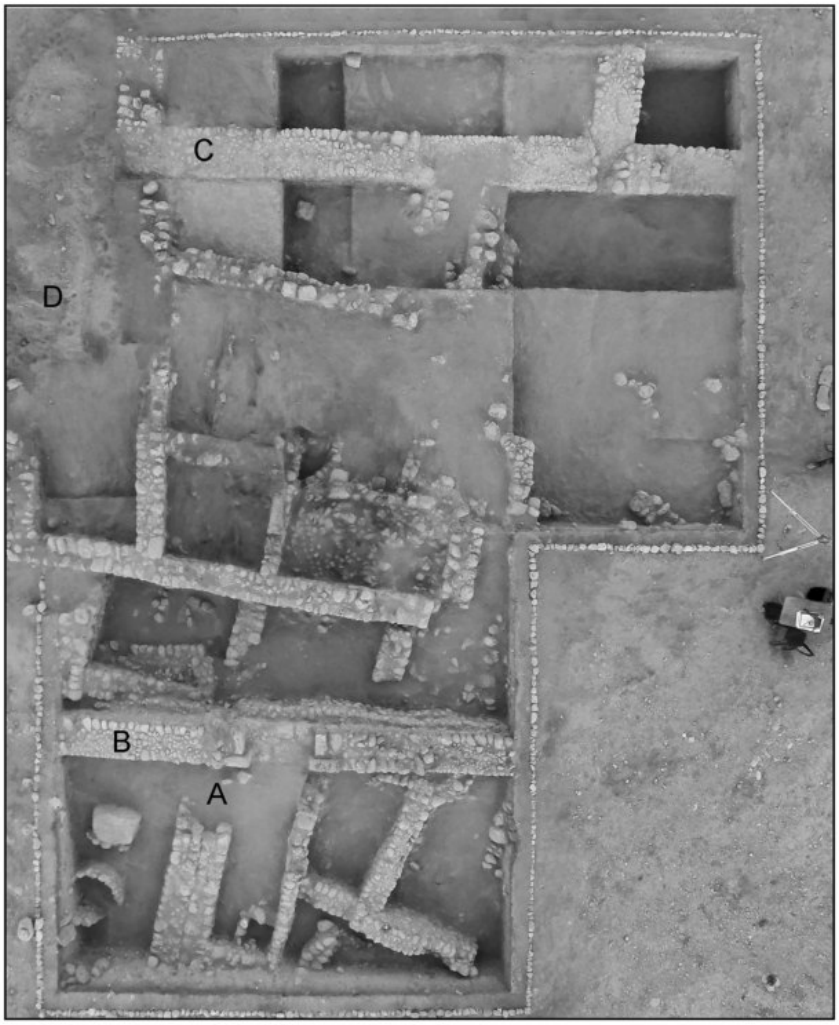
yielded the remains of a pavement and a stone bench. Several finds derive from the south-eastern area: a red-slipped bowl **(Fig. 6:1)**, two jugs, an intact black juglet **(Fig. 6:2)**, three cooking pots (see one in **Fig. 6:3**), a small stone grinder and a bronze bracelet.

A spool-shaped stone weight, possibly used as a loom weight, was found at the transition from colluvial soil to L1.

Phase XIV (770 - 732 BC)

This is the best-preserved phase in the area, although it suffered from a major destruction: layers of ash, burned pottery, carbonised organic remains and blackened walls are everywhere. There are numerous spaces bounded by stone walls around 1 m in height **(Fig. 7)**. The walls were either built in this phase or were reused. There are five spaces in the eastern part of the exposed area, a 'passage' in the central part, five spaces - both roofed and open - belonging to one compound in the western part, and the remains of another compound in the northern part.

There is a large pit (L23), measuring at least 2.5 x 1 m, west of W757 and north of W756, while another pit is along the eastern façade of W757 (L46). Floors associated with these walls were not preserved north of W758 and the pottery from this area is - in addition to Iron Age II sherds - mainly from the early Iron Age, Late Bronze Age and Early Bronze Age. The space south of W758, north of W759 and west of W760 is approximately 1.5 m wide and at least 4.6 m long (L10). A small stone-lined pit




*3. Area 12 looking west: 'A' shows the area of the burial which disturbed two walls; 'B' and 'C' show the massive (reused) Phase XIII walls W754 (with a gate to the east) and W768 to the west; 'D' is a looters' pit.*

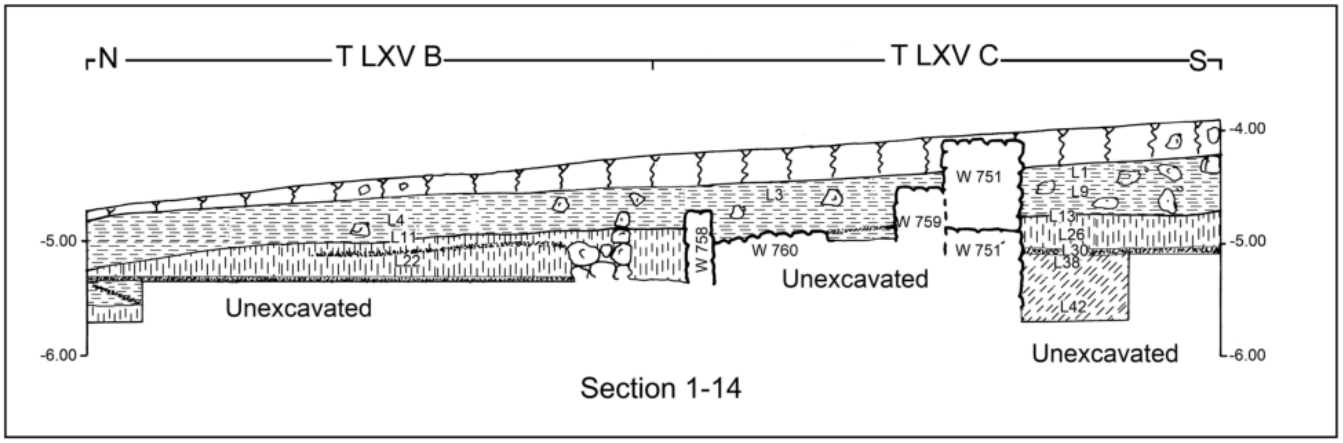
(L36; ca 0.9 x 0.9 m) was built against the north-eastern corner of this space.

The area south of W751 contained an incense cup. A stone-lined silo (L27) was in the southernmost part of the exposed area. It contained a carinated bowl manufactured in the Neo-Assyrian style.

The 'passage' between W752 and W754 - both walls are reused from older phases (see below) - can only tentatively be ascribed to Phase XIV. Next to W752 there was a circular ash hearth 1.2 m in diameter (L19). Finds from this space include a cooking pot, an incense cup (L8-1 [**Fig. 8:3**]), a jug which resembles Phoenician vessels (N1484), and a bronze nail or pin (N1482).

There are two compounds in the western part of the exposed area. Of the northern compound, only the southernmost corner, enclosed by W766 and W767, could be excavated. It was partly stone-paved in the south-east. The area north of it (L48; L62) contained several doughnut-shaped loom weights of unfired clay, a circular stone weight and a bronze kohl stick which is tentatively ascribed to Phase XIV because of its find level (N1489). Another feature is a kind of grinding installation made of two large, mainly flat slabs of basalt that are slightly curved at the end. A fragment of a glass flask was found west of the pavement in a test trench (L53; L60). The western part of this building is not preserved owing to erosion.

Five walled spaces of the southern compound were excavated; the total size of the building as exposed is approximately 10 x 10 m (outer




*4. Section 1-14: east section of Trenches LXVB and C.*

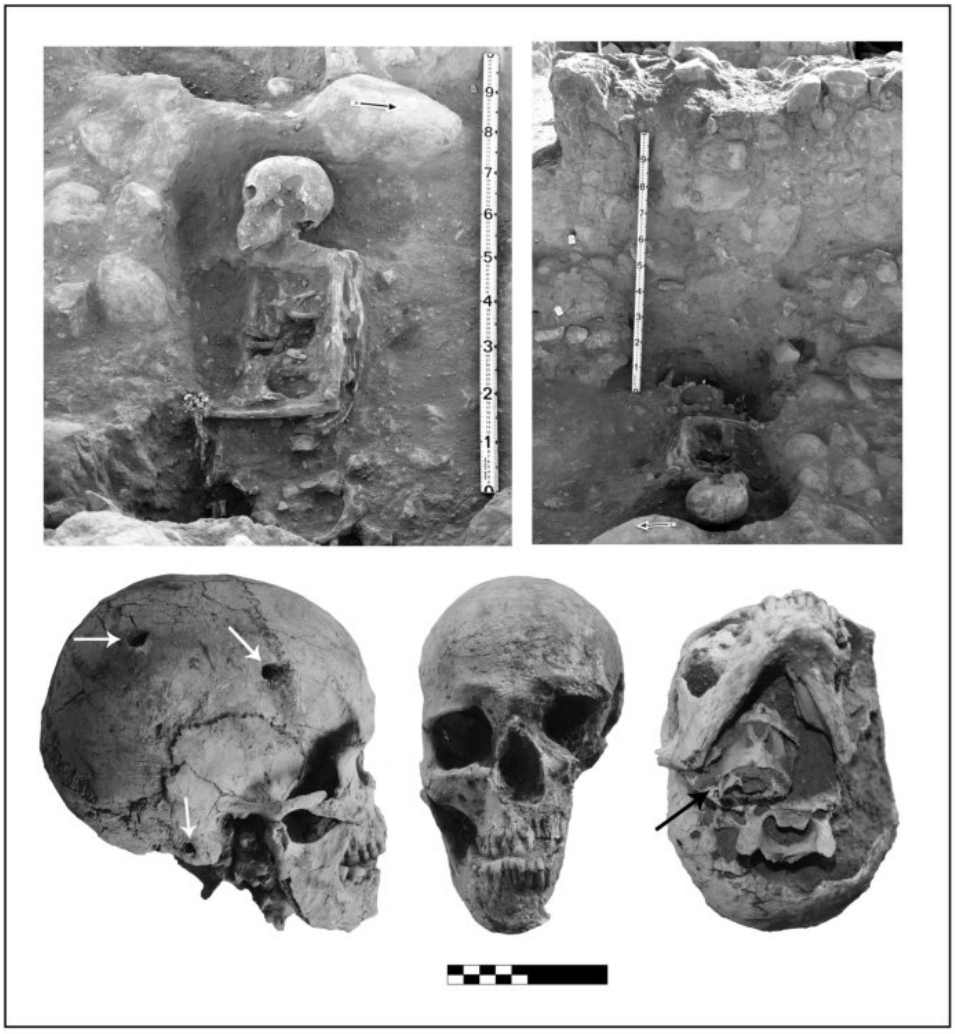
dimensions). The north-eastern room of this compound is enclosed by W755, W752, W772 and W771. The eastern part is stone-paved and contained two complete juglets (N1493, L47-2 [**Fig. 8:4-5**]) and an iron arrowhead. A circular pivot stone was reused and incorporated into the stone pavement. West of the stone pavement is an earth floor (dimensions 3.8 x 3.5 m), its level being approximately 0.3 m lower than the stone pavement. Two 0.3 x 0.2 m stone slabs west of the pavement functioned as steps. The earth floor is subdivided by a 0.4 m wide partition wall. The area north of the partition did not contain any finds of interest owing to its superficial position. South of the partition wall was a deposit of 67 doughnut-shaped loom weights of unfired clay. A bone shuttle and small bone tube were found close to the loom weights. A conical object of unfired clay deriving from the same spot might also be related to textile production. A thin-walled bowl, certainly imported (L47-1 [**Fig. 8:2**]), was found on top of the loom weights. Its position points to a second storey of the building. Other finds from this room include another thin-walled bowl with horizontal incisions (L47-5 [**Fig. 8:1**]), two storage jars (L47-8 [**Fig. 9:3**]; L47-9), two cooking pots (L47-3 [**Fig. 10:2**]; L47-10), a lamp, a limestone spindle whorl (N1492) and a stone weight / pivot stone. In the southern part a cistern was exposed; this belongs to an earlier phase and was backfilled in order to build W772.

There are two trapezoid spaces to the south. The eastern space is enclosed by W772, W752, W775 and mudbrick wall W778. It could be reached through an entrance in the eastern part of W772. The room contained a bichrome decorated juglet (N1494 [**Fig. 8:8**]), a monochrome decorated juglet (L61-1 [**Fig. 8:7**]), a globular jug with red decoration (L61-3 [**Fig. 8:9**]) and fragments of another jug with linear decoration (L61-5). All four vessels resemble Cypriote and Phoenician pottery[4]. Other finds are two bowls (L61-6, -7), a chalice (L61-2) and another, undecorated, juglet (L61-4 [**Fig. 8:6**]).

The room to the west is bordered by W772 (the western part of which is not preserved owing to its proximity to the surface), W778, W775 and W771. This room contained a storage jar (L67-3), a loom weight of unfired clay, a clay spindle whorl (N1496) and a polishing stone.

The room to the south, bounded by W775, W752, W784 (and W771?), was heavily disturbed by a looters' pit ('D' in **Fig. 3**). Only the northern and eastern parts, along W775 and W752, were undisturbed. However, several complete finds were recovered: a jar with a perforated rounded base (L68-2 [**Fig. 9:4**]), a decanter (L71-1 [**Fig. 9:2**]), a cup / bowl of limestone (L71-2) and a large storage jar (L71-3). Of special interest is

4.This has been partly confirmed by V. Karageorghis who wrote on 14 Oct 2014 that the two juglets imitate Cypriote shapes of the second half of the 8th century BCE, perhaps Black-on-Red II (iv). This accords very well with our dating of Phase XIV.



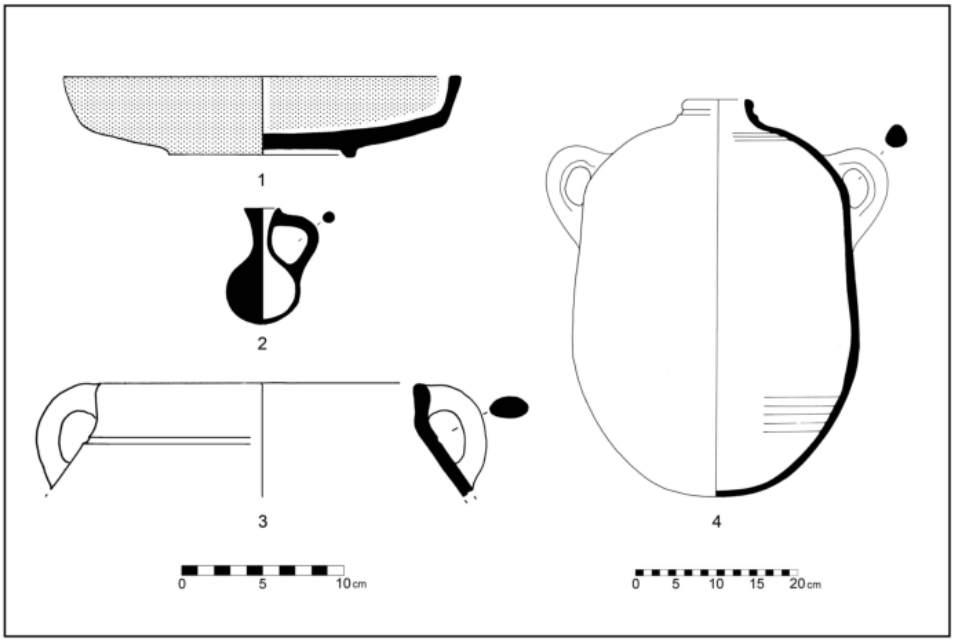
*5. Remains of 30-year-old female from Area 12: white arrows point to three cranial bone perforations; black arrow shows the rarely preserved pharynx / larynx.*

a three-handled, very hard-fired jug with a false spout (L68-1 [**Fig. 9:1**]) found in the eastern part of the room. Antlers of a (?) fallow deer (cf. Fischer 2013: 473) were found just north of it. There is an outdoor area south of this room, where two cooking pots (L69-1, -2 [**Fig. 10:3**]) were found.

The eastern parts of two additional rooms were exposed in the west, bounded by W770 and W771. The northern one is stone paved, while the southern one has a beaten earth floor. The latter contained a krater (L52 lower-1)[5], a cooking pot (L52 upper-2 [**Fig. 10:1**]) and a small jug with two strainers of a shape that is unique at Tall Abu al-Kharaz (L52upper-1 [**Fig. 8:10**]): one strainer is integrated into the neck and the other is part of the spout on the belly. The vessel has a red slip, is burnished and has black linear decoration.

The function of the Phase XIV structures is domestic. The finds from the north-westernmost exposed structure hint at weaving activities and food production. The largely exposed building to the south has a rectangular layout, which does not correspond with the four-room houses in Area 7 (Fischer 2013: 489, fig. 449 and text). Most rooms were used for storage, weaving and spinning, cooking and food processing. The assemblage of the four imported vessels and the absence of large storage vessels or cooking pots in the central-eastern room are striking and hint at a 'representational' function for the room.

5. L52 was divided into an upper and a lower layer. The upper layer is close to colluvial soil but certainly belongs to Phase XIV.




*6. Selected finds from Area 12, Phase XV.*

Phase XIII (800 - 770 BC)

The predominant structures are two massive stone walls which run, approximately 12 m apart, almost exactly north - south. The western W768 is 1.2 m ('C' in **Fig. 3**) wide, while the eastern W754 is 0.8 m wide ('B' in **Fig. 3**). From W768 two (only superficially exposed) perpendicular walls of the same size run towards the west. They are roughly 10 m apart. The eastern W754 includes a gate, approximately 1.6 m wide. The gate, which most likely had a wooden door, is built of large ashlar blocks. The threshold of the gate also functioned as a step up to the higher area to the east, viz. the summit of the upper plateau. All these structures were definitely visible to the settlers of Phases XIV and XV and were consequently integrated into their structures (see above).

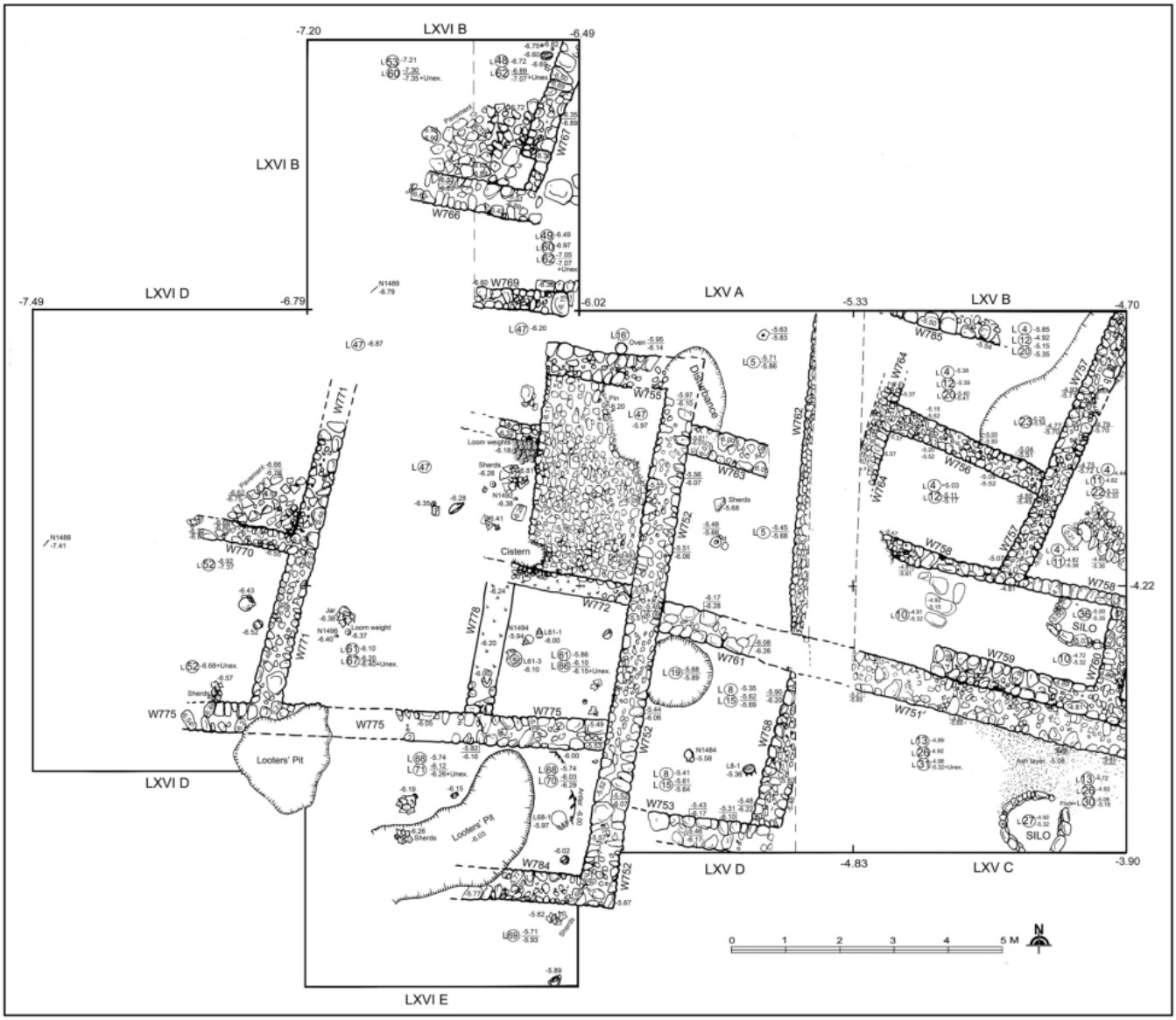
Most finds from this phase are from the area east of W768 and include three bowls, an incense cup, three kraters, a complete jug with red decoration (N1491 [**Fig. 11:1**]), another jug, a juglet, four cooking pots, a lamp and a grinding stone. Two carinated bowls (one in **Fig. 11:2**), a rounded bowl, a black juglet, a jar with red decoration (**Fig. 11:3**), a hole-mouth jar, a cooking pot and a 'pattern needle' of bone (N1488) were found in the area west of W768.

The function of these structures was certainly not domestic. The space between these four walls, 12 m and 10 m respectively, is too wide to be covered by a roof which would have needed additional support of which no traces were found. Therefore we suggest a military function: these walls were used as an inner defensive line for when the outer defences, i.e. the city wall along the edge of the upper plateau, had been overrun by an enemy.

Phase X (1,050 - 930 BC) or Phase IX (1,100 - 1,050 BC)

Remains of Phases XII and XI were not found, most probably because of intense building activity in Phases XIII and XIV. There is, nevertheless, good evidence for Early Iron Age occupation, viz. either Phase X or Phase IX (**Fig. 12**; cf. reports on Iron Age I occupation in Fischer 2012; Fischer and Bürge 2013), which is based on several complete ceramic containers that could belong to either of these phases. Most structures were built in the Late Bronze Age (see below), were reused in the Early Iron Age and were then partly covered by later structures. Only W753 and W788 in the south may have been built in the Early Iron Age.

West of W758 and W762 and north of W753, below a ca 0.3 m thick destruction layer of mudbrick, stone, carbonised wood and ash (L14;



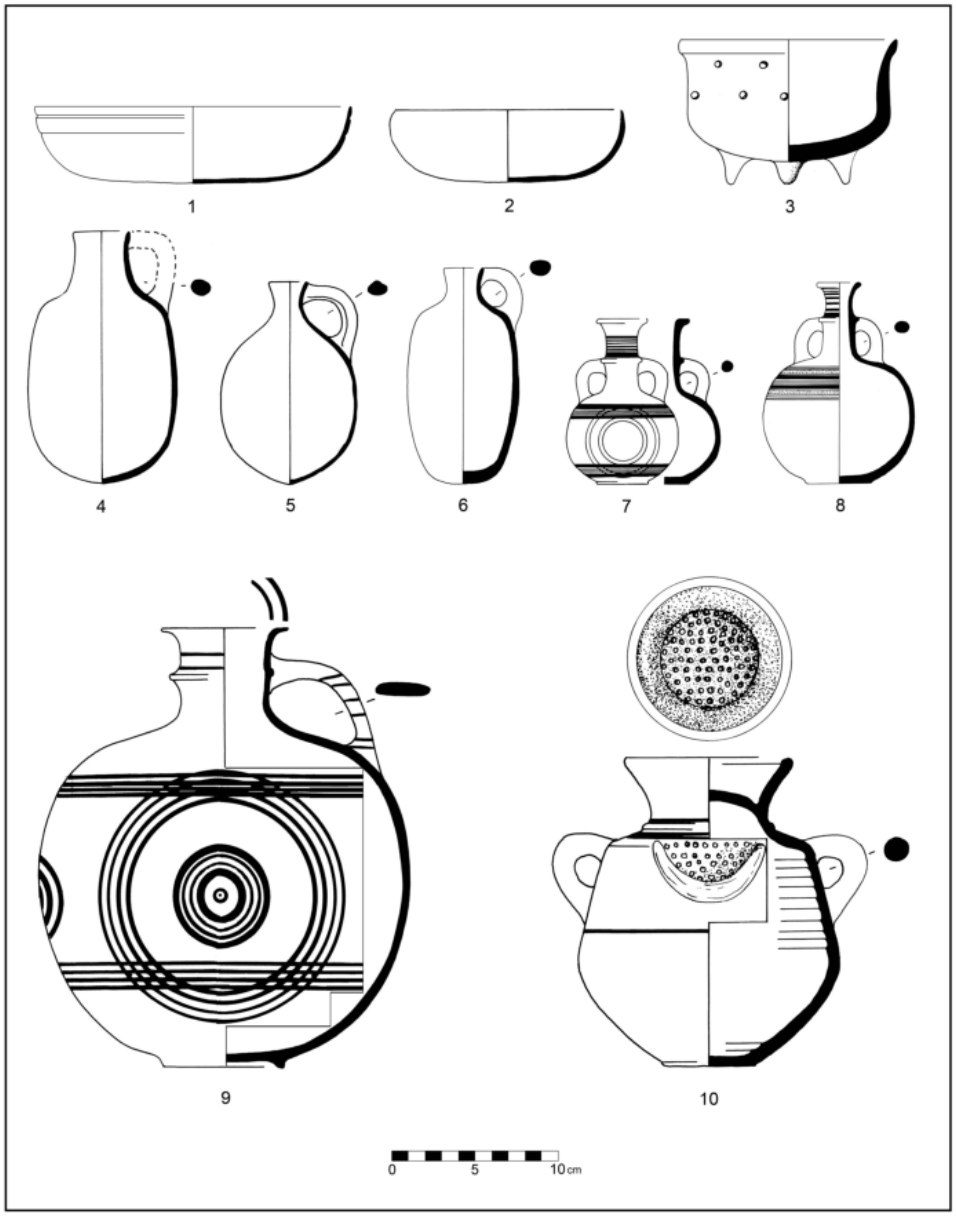

*7. Plan of Area 12, Phase XIV.*

L17), a beaten earth floor appeared (L25; L28; L35; L37), covered by a layer of fine ash. A small rectangular container of unfired clay was exposed in the south-western part and an oven (L29) surrounded by a stone bench was next to W758. Several complete objects were found on the floor: a one-handled jug (L25-2 [**Fig. 11:5**]) which on the basis of soot marks appears to have been used for cooking, a stone spindle whorl (N1485) and a stone weight (N1486). A grinding stone was found next to the jug. It was either part of a larger grinding installation - four more grinding stone fragments were found next to it - or was reused in a working space together with the other grinding stones. Two storage jars (L37-1, -2 [one in **Fig. 11:4**]) were partly buried in the ground in the south-western corner of the space. A large number of unfired pottery fragments from the southern part (L28) hint at local pottery production.

*Late Bronze Age (1,525 - ? 1,350)*

A number of previously described walls were originally built in two phases during the Late Bronze Age. The structures belonging to the older phase are W785, W763, W764, W756, W757, W758 (?), W759, W760 and W761 / W751. In a later phase W762 was built, which cut W763, W754 and W761 / W751 **(Fig. 12)**.

The large amount of Late Bronze Age and




*8. Selected bowls, juglets and jugs from Area 12, Phase XIV.*

Early Bronze Age pottery found in two test trenches west of W762 (L40; L41) and a lack of Iron Age remains confirmed the attribution of these structures to the Late Bronze Age (cf. Fischer 2006).

*Early Bronze Age (ca 3,000 BC)*

A deep sounding in Trench LXVD exposed a wall belonging to the Early Bronze Age. The associated locus contained Grain Wash and Band Slip Wares, which could be ascribed to any of Phases I - III (cf. Fischer 2008) but are most likely Phases I or II.

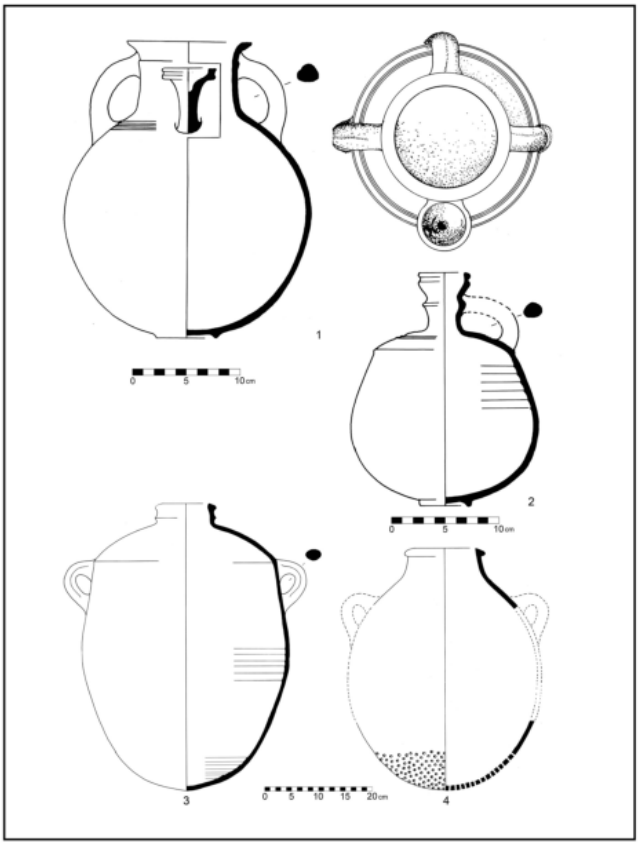
**Results from the Excavations in Area 13 (Trenches LXVIIA-D [Figs. 13 and 14])**

*Iron Age*

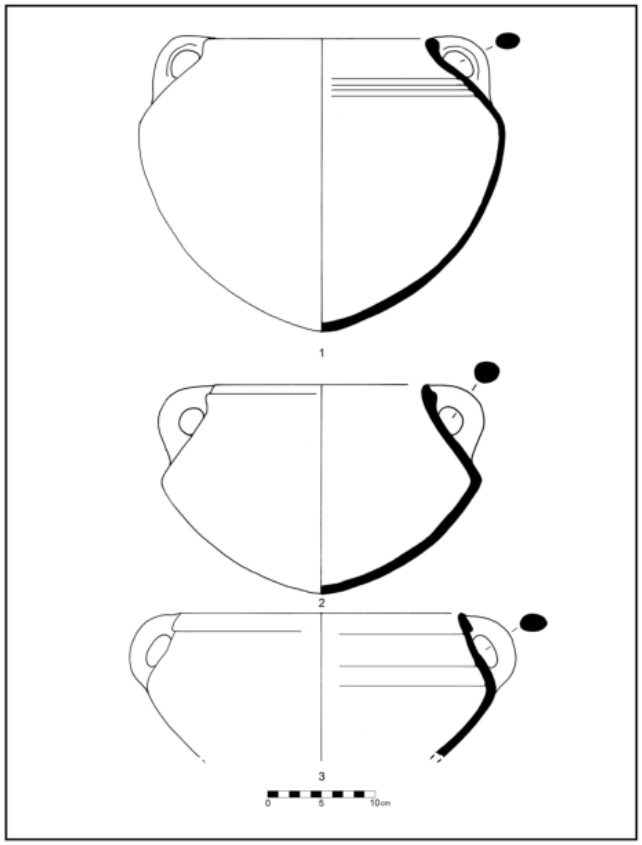
The phasing of the excavated area of only 100 m² is tentative. Additional excavations of a larger area are necessary to integrate the three phases within the Tall Abu al-Kharaz sequence correctly.

Phase XV (732 - 600 BC)

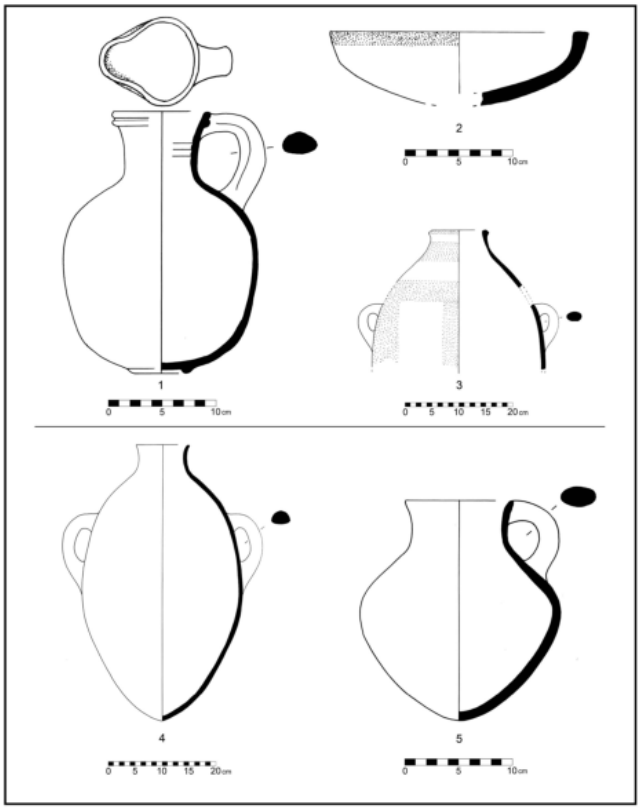
The settlers of this phase reused the well-built stone structure of the previous phase. There is a passage with a door socket in the older W781 (cf. **Fig. 15**). From this entrance, an outdoor area to the south could be reached where an oven,



*9. Selected jugs and jars from Area 12, Phase XIV.*



*10. Selected cooking pots from Area 12, Phase XIV.*



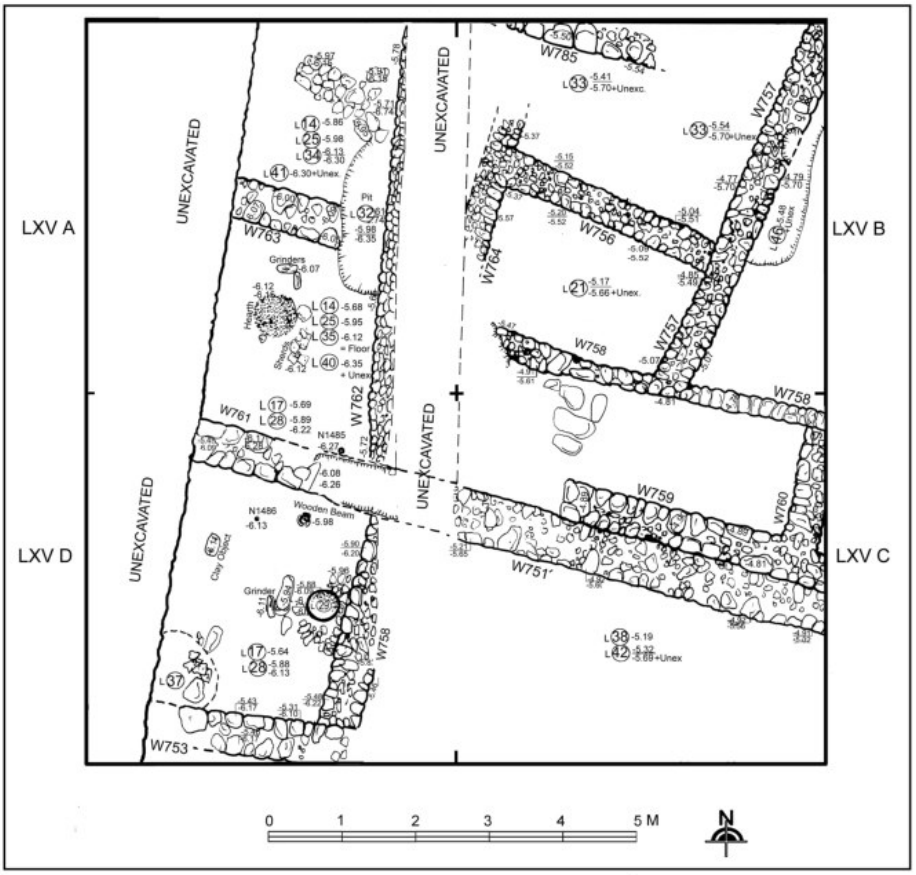
*11. Selected finds from Area 12: (1-3) Phase XIII (1-3); (4-5) Phases IX / X.*

approximately 0.65 m in diameter, was found.

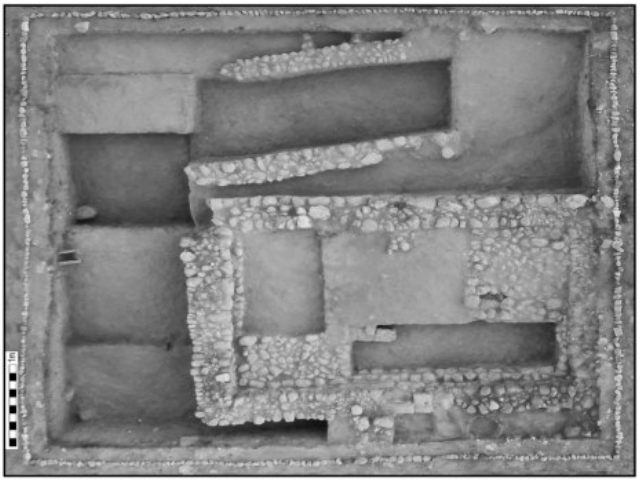
Phase XIV (770 - 732 BC)

A well-built rectangular stone structure, 7.2 x 6 m, belongs to this phase (W780; W777; W787; W781 [**Fig. 15**]). The interior space has stone pavements in the north-eastern and south-western corners, while the remainder has a clay floor. The regularity of the paved areas points to an intentional arrangement of the stones, possibly to create two work places. It is most likely that the space was roofed. However, there are no traces of flat stone slabs upon which wooden posts could have been placed to support a roof. The interior space did not contain any finds of interest. The north-western corner is disturbed by a looters' pit.

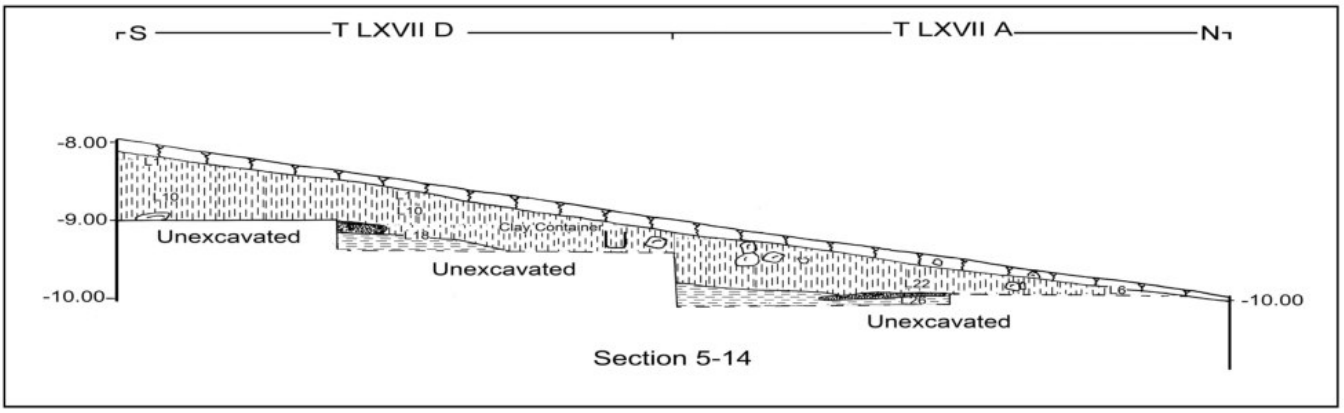
Finds outside and north of this structure are tentatively ascribed to this phase: a krater with a false spout (L8-1 [**Fig. 16:1**]), a red-slipped and burnished jug (L7-1 [**Fig. 16:3**]) and another jug (L7-2 [**Fig. 16:2**]). West of the structure is an




*12. Plan of Area 12, Phase X / IX.*



*13. Area 13.*




*14. Section 5-14: west section of Trenches LXVIIA and D.*

empty container made of reused ceramic plates.

Phase XIII (800 - 770 BC)

There are the remains of a rectangular structure (W782 with mudbrick superstructure W776; W783 [**Fig. 17**]). It is approximately 7 x 3 m in size (as preserved). The north-western and eastern parts are disturbed and large portions of the walls are missing. The space, clearly domestic in nature, contained numerous ceramic vessels and a unique object of iron and (probably) lead **(Fig. 18)**. The tapering object is approximately 25 cm long with an outer diameter of 7 cm. There was a small lid, still in situ on the open side whereas the other side is closed. Other finds include a bowl (L12-2), a cup (L12-1 [**Fig. 16:5**]), a large krater (L11-1 [**Fig. 16:6**]), a juglet (N1495 [**Fig. 16:7**]), a faience bead (N1498) and an iron arrowhead. A discoid spindle whorl of clay (N1497) was found in the north-eastern part of the exposed area. A 'T-rim' bowl with trumpet handle (L22-1 [**Fig. 16:4**]) and the leg of a tripod bowl of clay (L26-1 [**Fig. 16:8**]) derive from south of the structure.

**Conclusions**

The main objectives of the 2014 excavation season at Tall Abu al-Kharaz were achieved. They included investigation of the area around the geographical centre of the city (Area 12) and extension of Area 7 to the south (Area 13). In accord with the overarching aims of the project, preference was given to further investigation of the Iron Age sequence, i.e. the period from the 12th to 7th centuries BC that corresponds with local Phases IX - XV.

The 30-year-old female, dated to Byzantine - Abbasid times, was buried under Iron Age stone structures weighing many tons. A forensic expert is currently analysing the remains in order to extract additional information.

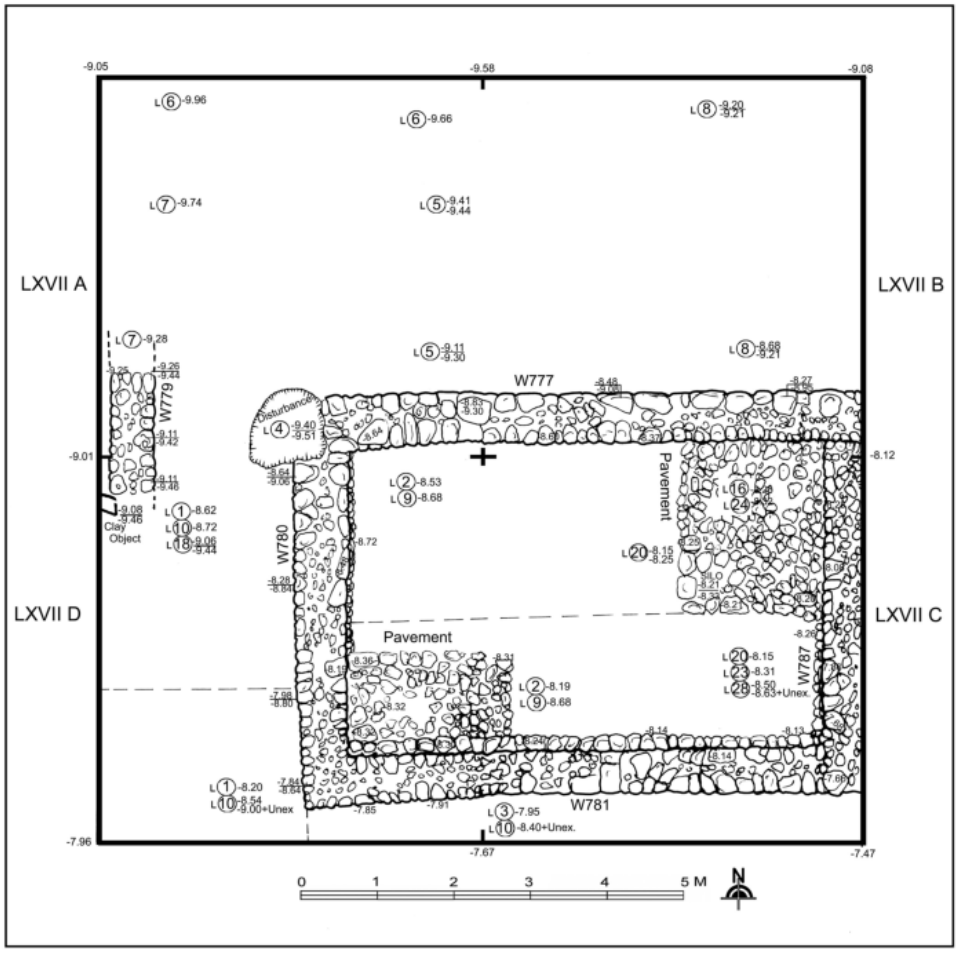
Phase XV, once again, highlights the squatter character of this late Iron Age society: the older structures were reused for dwellings and only a few new structures appeared. The situation in the preceding Phase XIV was totally different, in that the remains of a thriving society were exposed. The Phase XIV occupants were in contact with the eastern Mediterranean, Phoenician and Neo-Assyrian cultural spheres, as can be seen in the pottery which was either imported or at least locally copied. The thick fabric of our small 'Cypro-Geometric' juglets (**Fig. 8:7-8**) and their bichrome decoration in the 'wrong' colours excludes the possibility that they were Cypro-Geometric III imports from Cyprus, although they display a high level of craftsmanship. We agree with V. Karageorghis (ref. above) that they imitate Cypriote shapes of the second half of the 8*th* century BC, perhaps Black-on-Red II. In this respect, the Cypriote dates are in exact accord with the well established Phase XIV chronology at Tall Abu al-Kharaz (Fischer 2013: 516).

Most spaces from Phase XIV were used for textile production (including spinning, weaving and pattern sewing), storage, food processing and the preparation of meals. In addition to the remains of caprines and cattle, which dominate, the presence of almost complete fallow deer antlers in Phase XIV fits well with our previous zooarchaeological investigations. The find spot of the 2014 antlers suggests they were kept as a trophy and / or stored for later use in the production of tools.

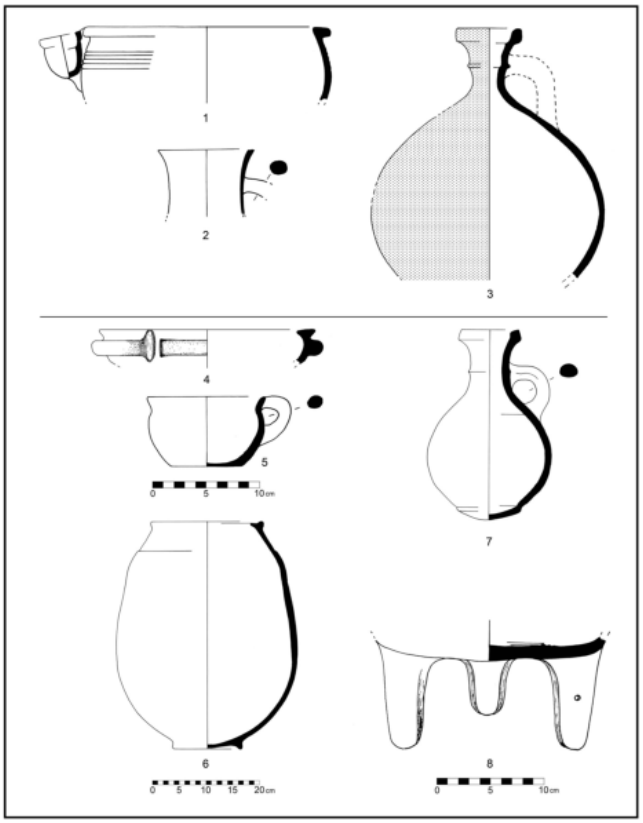
As already observed in previous seasons, Phase XIV came to a violent end, most likely caused by the Neo-Assyrian invasion of Transjordan by King Tiglat Pileser III (Fischer 2013: 459, 515-516). A destruction layer consisting of secondarily fired mudbrick, carbonised wood, ash and fallen stone covered the entire area. Walls and stone pavements were blackened and pottery and other finds, such as loom weights, showed traces of a heavy conflagration.

The function of the Phase XIII structures (800 - 770 BC) was certainly not domestic. We suggest that they had a military function, being used as an inner defensive line when the outer defences, i.e. the city wall along the edge of the upper plateau, had been overrun by an enemy.

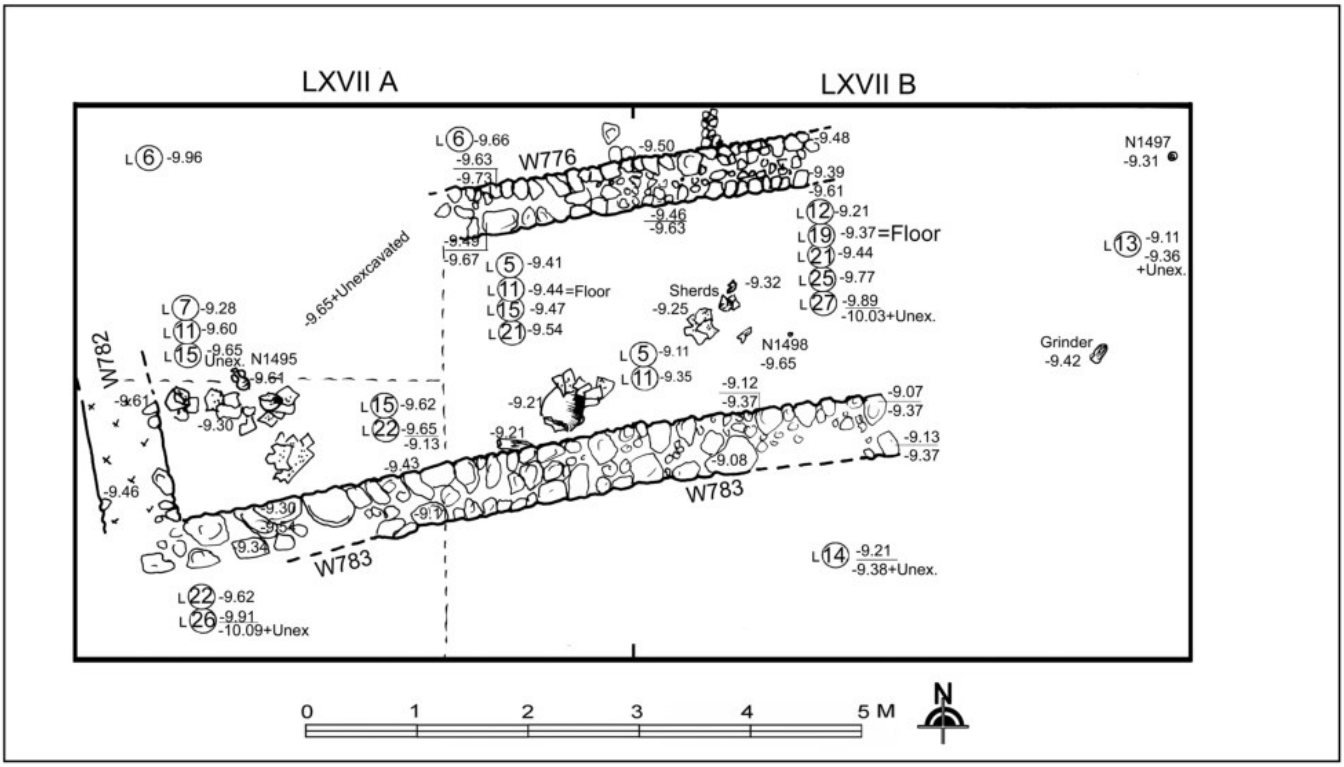
Early Iron Age remains from Phases IX or X (1,100 - 930 BC) are relatively scarce in these



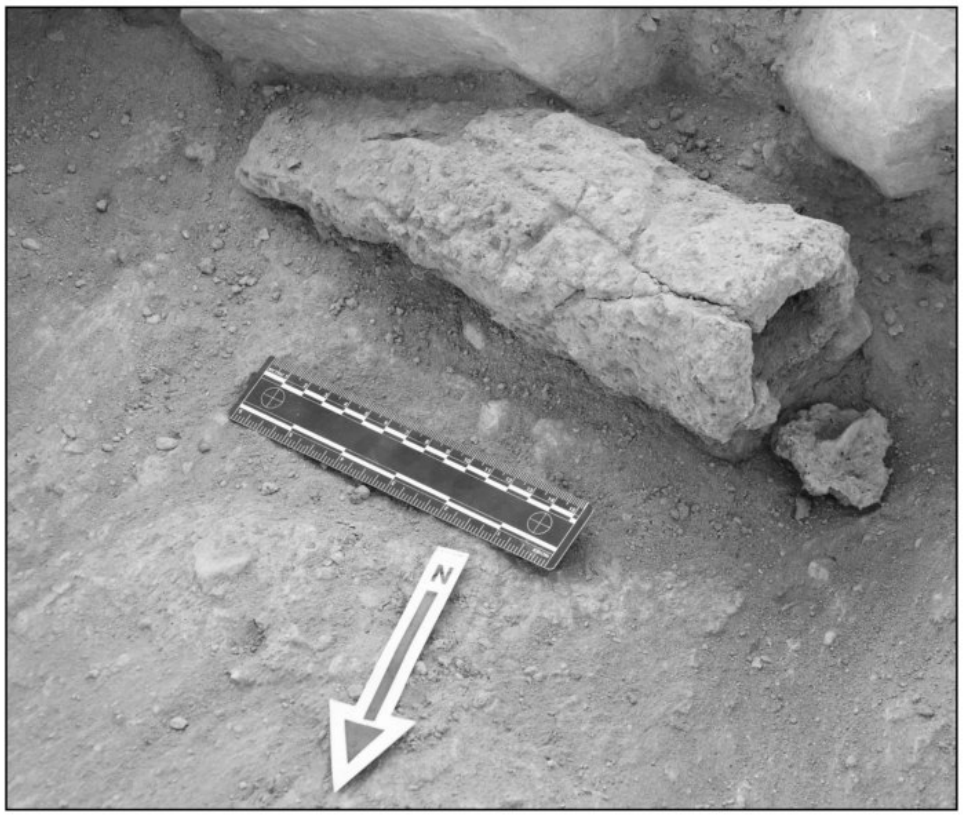

15. Plan of Area 13, Phase XIV.




16. Selected finds from Area 13: (1-3) Phase XIV; (4-8) Phase XIII.




*17. Plan of Area 13, Phase XIII.*




*18. In situ iron / lead object: Area 13, Phase XIII.*

areas - although we were able to excavate several complete containers that were mainly for storage - because of intense building activity in the later Iron Age. We found evidence of local pottery production in these phases.

Structures from the Late and Early Bronzes are abundant and were reused by the Iron Age occupants of the site.

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# PRELIMINARY REPORT ON THE 2014 and 2015 SEASONS OF THE MADABA PLAINS PROJECT: TALL JALŪL EXCAVATIONS 2014 AND 2015

*Paul Gregor, Constance Gane, Helena Gregor, Randal Younker and Paul Ray*

## Introduction

Andrews University conducted archaeological excavation at Tall Jalūl during the summer of 2014 and 2015. While 2014 season of excavation took place between June 1 and June 20; 2015 season took place between May 10 and June 4. Both seasons of excavation were directed by Paul Gregor. Constance Gane served as co-director whith Helena Gregor as Field archaeologist, all of the Institute of Archaeology, Andrews University. Around 25 faculty, students and volunteers joined the more than 20 Jordanian workers during the excavations of both seasons[1].

Excavations at the site of Tall Jalūl began in 1992, with excavations in the Jalūl Islamic Village beginning in 2008. For background information on Tall Jalūl, the Jalūl Islamic Village, and the history of the excavations at the site, see Gane *et al*. 2010; Gregor 2009; Gregor et al. 2012; Gregor and Gregor 2009, 2010; Herr et al. 1994, 1996, 1997; Younker *et al*. 1993, 1996, 1997, 2007; and 2009; Younker, Gane and Shqour 2007; Younker and Merling 2000; and Younker and Shqour 2008.

## Results of the 2014 and 2015 Seasons at Tall Jalūl (Field W)

Field W was carefully laid out on the southeastern ridge of the large depression on the southeastern side of the tell **(Fig. 1)**. Work started here during the 2010 season when four squares were opened in order to find the continuation of the water channel from Field G, anticipating that it would run straight to the depression where the remains of a water system were expected to be found. The excavation of these squares brought the desired results and the continuation of the channel was revealed. However, it turned out that the channel does not connect to the water system, but rather passes the depression on its eastern ridge, going further north. By the end of the season, almost 30 + m of the water channel were unearthed, but some sections of the channel were destroyed by later stone robbers.

By the end of 2015, five seasons of excavation in Field W were completed with 14 squares excavated **(Fig. 2)**. During the 2014 season major cleanup was conducted. A large amount of rain

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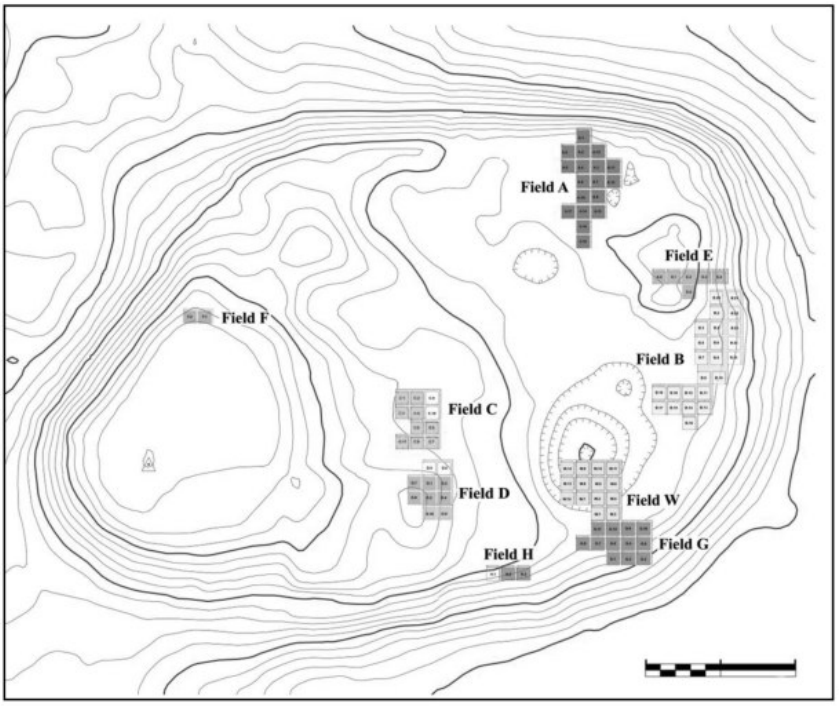
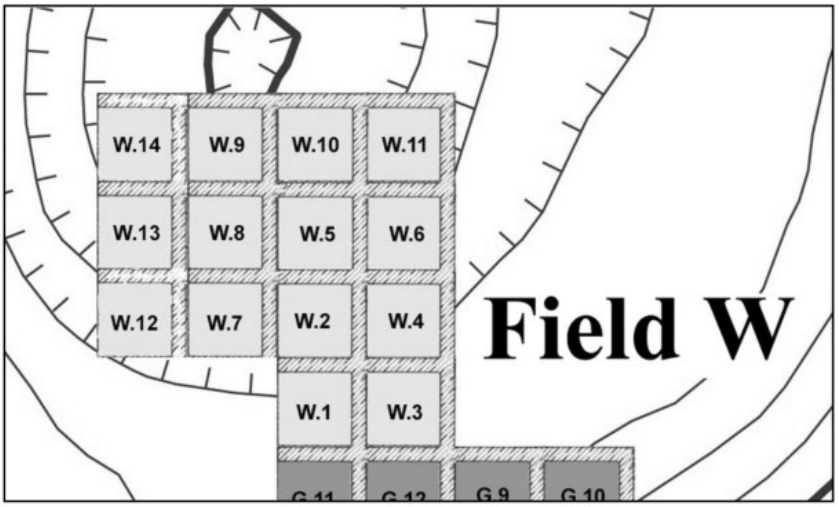
1. We wish to thank Dr. Monther Jamhawi, Director General, and his staff, including Mr Jehad Haroun at the Department of Antiquities of Jordan for their support of the project during those two seasons. We would also like to thank Barbara Porter and Chris Tuttle of the America Center of Oriental research (ACOR) for their usual assistance. Finally, we appreciate the help of Adnan Rafaiah and Issa Syrianni, of the Department of Antiquities of Jordan, who served as our department representatives in 2014 and 2015 respectively.

Staff for the 2014 season included director Paul Gregor, co-director Constance Gane, Field Archaeologist Helena Gregor. Jacob Moody served as object registrar and oversaw GPS readings on the tell during the 2014 season, while during the 2015 season the object register was Constance Gane and GPS readings were overseen by Scottie Baker. Helena Gregor served as the pottery registrar for both seasons.

Square supervisors for Field W included Christine Chitwood and Jacob Moody during the 2014 season of excavation, while Scottie Baker, Edmond Seneque, Ricardo Scarfullery, Michael Orellana and Jeff Hudon were square supervisors during 2015 season. Volunteers for both seasons included Luiz Assis, Scottie Baker, Ricardo Scarfullery, Da Costa Eraldo, Claudya and Jose Berrientos, Emily Cancel, Toni-Ann Ross, Daniel Ulvocsky, Criss Jenkins and Amanda Whitlow.




*1. Jalūl Topographic Map.*




*2. Jalūl Topographic Map Field W.*

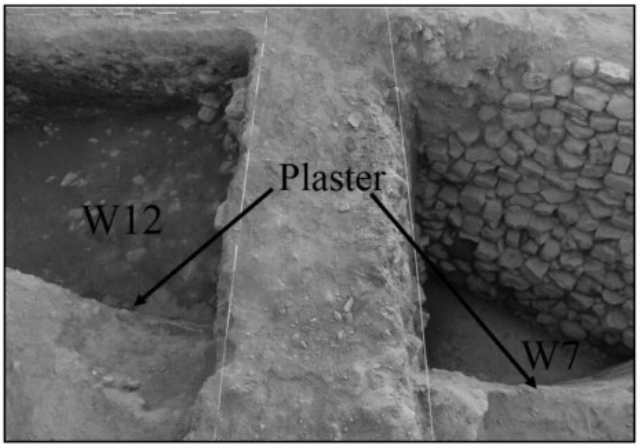
during winter periods caused most of the balks to collapse. That season additional squares were not opened but after cleanup, work continued in two squares (W.9 and W.10) which were opened during previous season (2012). Both squares are located in the middle of the water reservoir and were composed of post 7th century B.C. fill accumulation which wasdeposited after the reservoir went out of use and was abandoned. Apart from 7th century B.C. pottery sherds, not much was found in those fills representing the abandonment phase.

**Occupational Phase 1 (10th century B.C.)**

This occupations phase is represented by the reservoir walls and its plastered floors which were probably constructed during the 10th century B.C. Date of the reservoir's construction was established during 2011 season and confirmed during 2012 season. The floor of the reservoir sits on bedrock made of lime plaster. During its life span of four centuries the floor was plastered at least four times **(Fig. 3)**. The plaster was hardened by adding crashed flint stone to its lime composition. It is also probable that the




3. Layers of Plaster on the Bottom of Reservoir.

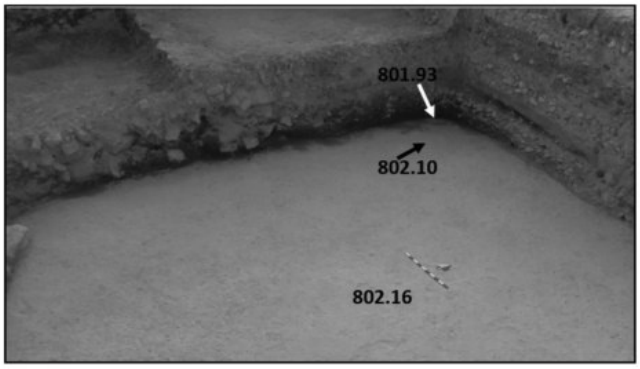



4. Plaster on Reservoir Wall.

wall of the reservoir was elevated throughout the same time, adding to reservoir's capacity.

Southernmost section of the reservoir wall was discovered in Squares W.7:22 and W.12:14. The upper section of the wall was removed during different periods in history and only plaster remains are visible **(Fig. 4)**. In order to preserve the plaster, excavation on the wall and the outside section of the reservoir was not continued. However excavation proceeded on the inside of the reservoir. The excavation in Square W.7 was completed and the floor of the reservoir (W.7:27) was reached. A number of pottery sherds, consisting of bow and jar fragments, were found on the floor dating to the last part of the 7th century B.C. One typical Ammonite ware sherd belonging to the same period was also found together with a fragment of Assyrian imported ware.

The floor of the reservoir was also reached in Squares W.9:14 and W.10:13, excavated during the 2014 season, and also in Square W.8:15, with a similar pottery assemblage, indicating that the reservoir went out of use during the 7th century BC. The deepest section of the reservoir was found in Square W.9. Its northwestern corner has sudden dip of 20 cm within one meter, indicating that approach to the stairs for the reservoir might be located on its western side **(Fig. 5)**. Based on preliminary estimates the reservoir is approximately 20 meters wide, 30 meters long and 3 meters deep. If so it could have contained




5. Floor of Reservoir.

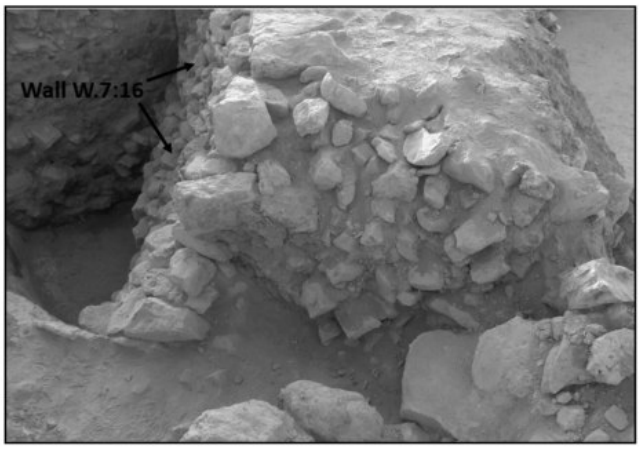
about 1800 cubic meters of water, which equals to almost half a million gallons, making it one of the largest opened air reservoirs constructed during 10th century BC in the entire region.

**Occupational Phase 2 (7th century B.C.)**

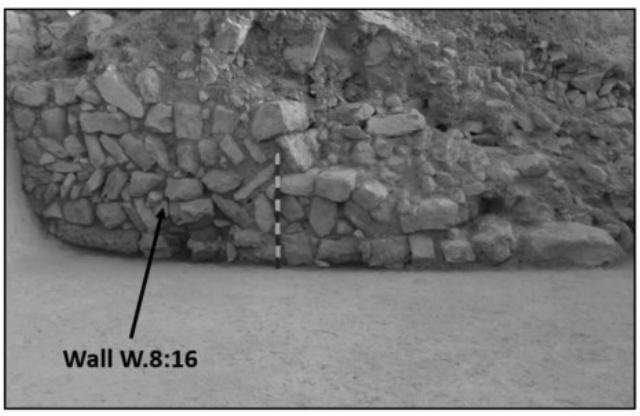
During the 2012 season a peculiar wall was revealed in W.7:16. That season excavation in this square was not completed and the wall's nature and function were not known at that time. This season excavation revealed the full scope of this wall even though its function is not completely clear, since it was built inside the reservoir at an angle (like a revetment wall). Excavation in Square W.8, which is located north of W.7, was also completed during this season where another wall, parallel to W.7:16, was revealed in Square W.8:16. It seems that both walls (W.7:16 and W.8:16) were built at the same time and belong to the same structure. The walls were not built against each other but to keep soil mixed with

rocks between them. The structure is about 5 meter wide at the base and it peaks at the top (like a dam). While the wall found in W.7 was built under 45 degrees, the wall in W.8 was strait **(Figs. 6 and 7)**. W.8:16 was constructed from large partially hewn boulders, while W.7:16 was constructed of smaller stones. The structure was built on the floor of the southern section of the reservoir and is attached to the reservoir's wall **(Fig. 8)**. Since the excavation in Square W.12 is not finished, it is not clear whether this structure runs from wall to wall of the reservoir.

There seems to be another wall also laid on the reservoir's floor found in Square W.10:12 which looked like stairs **(Fig. 9)**. It was built with a few large boulders with smaller chink stones but its function is not entirely certain. Once eastern balk of Square W.10 is removed its function will hopefully be much clearer. Both structures seemed to be constructed during the same time which was most likely toward the end of reservoir's existence (end of 7th century BC). It may be that the source of the water supply of the reservoir was diminishing and the inhabitants needed to partition the reservoir, or it may be that after the reservoir went out of use a ramp was built as a path which connected both sides of the reservoir. Future excavation will hopefully bring more light to the function of this structure. After this occupational phase, the reservoir was not used any longer and was filled with debris, a process which continued for many centuries. It was filled with material containing pottery from all periods dating from Persian to Late Islamic periods (Mamluk). Most valuable objects this season were found on the surface among which there was one iconographic seal in very good condition **(Fig. 10)**.




*6. Southern Wall of the Structure.*




*7. Northern Wall of the Structure.*



*8. Wall of the Structure Leaning on Reservoir Wall.*



*9. Stair Like Structure Built on the Reservoir's Floor.*



*10. Seal.*

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