TALL ḤISBĀN 2013 AND 2014 EXCAVATION SEASONS: EXPLORATION OF THE MEDIAEVAL VILLAGE AND LONG-TERM WATER SYSTEMS

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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.

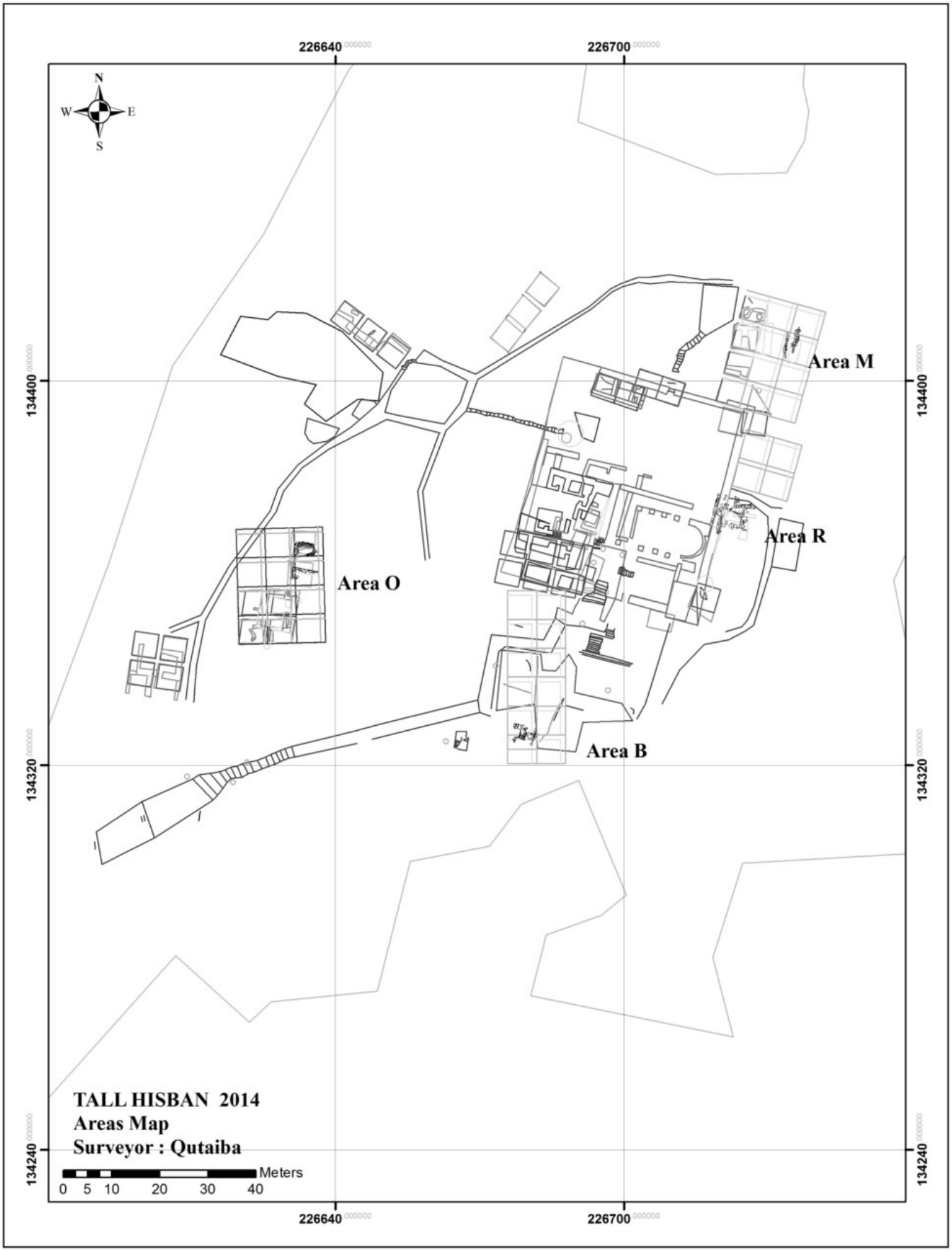
related to the history and development of the mediaeval Islamic settlement, the fortifications of the summit and the extensive water systems that were at the heart of settlement, defense and land use in all periods **(Fig. 2)**. Field O - on the south-western slopes of the *tell* and the saddle below 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)

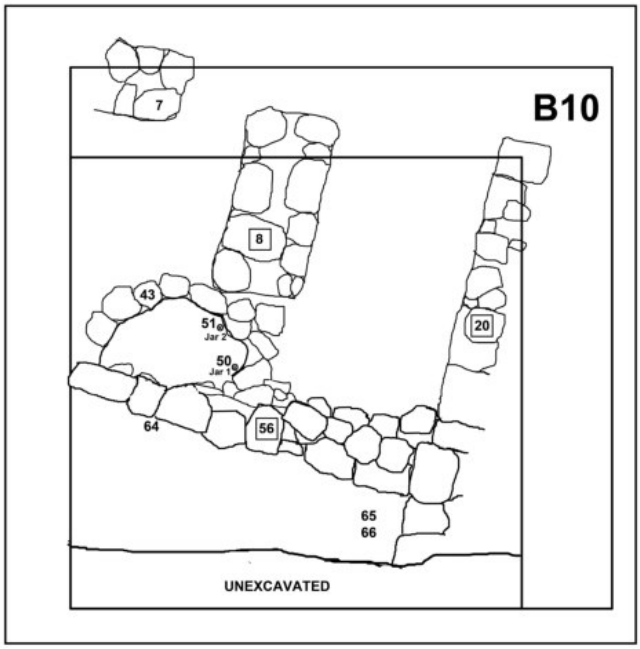
Previous Work and 2013 Season

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.

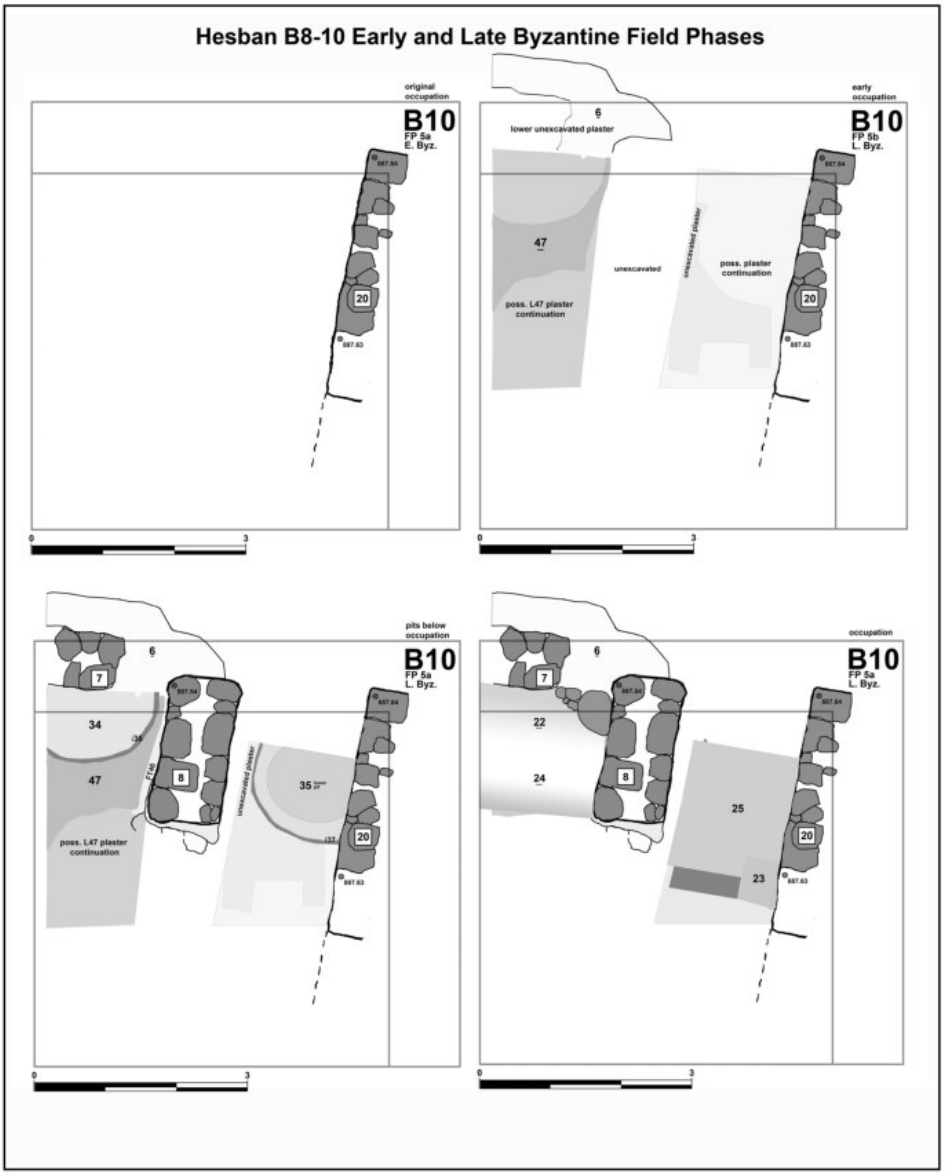
In 2011, as part of the Phase II excavations of Tall Ḥisbān, two new squares (approximately 6 x 6 meters) were opened in Field B (squares B8 and B9) on the western edge of the reservoir trench (Bates, Hudon and LaBianca 2014, n.d.). The purpose of these two squares was to begin the excavation process 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).

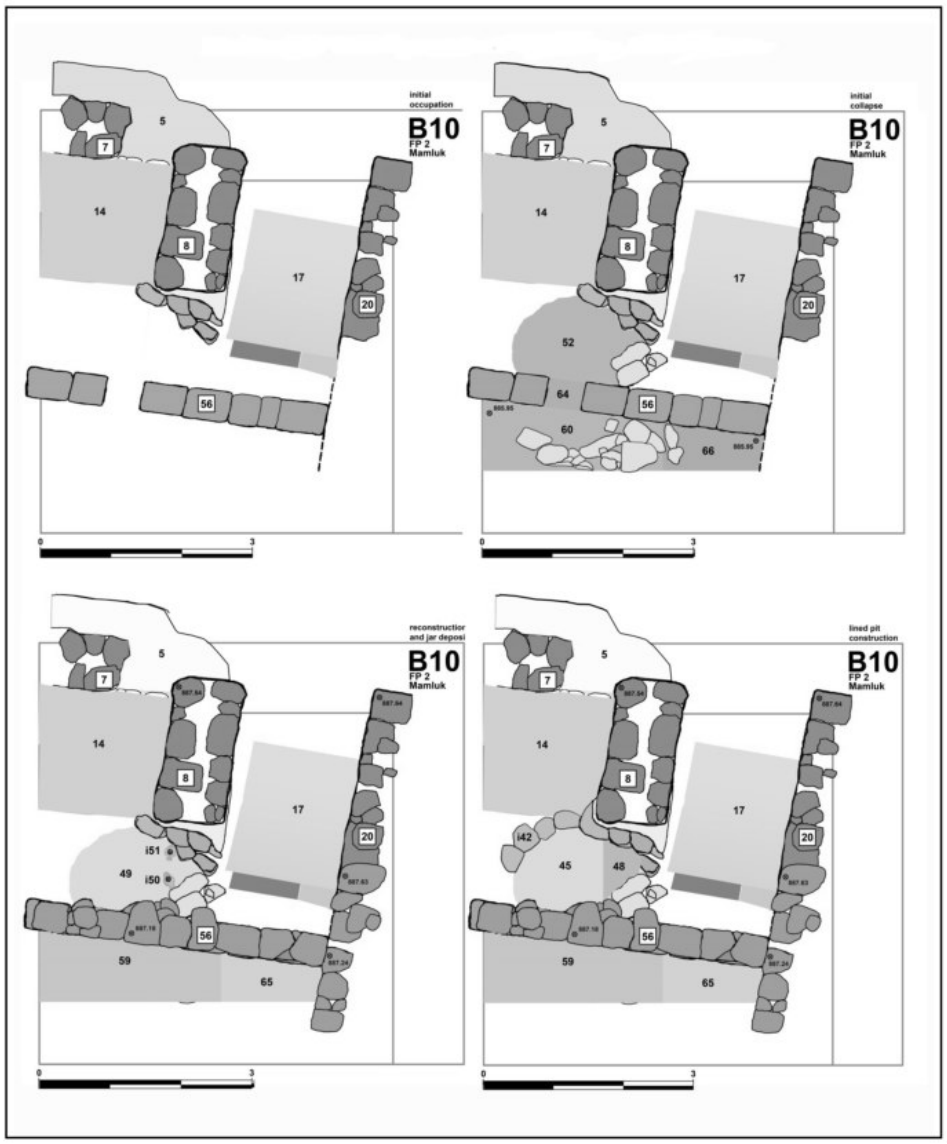
Two pits were cut into the plaster floors of Field Phase 5b. On the west side of the square a 1.2 m semi-circular pit that continues into the west baulk cut into the terra rossa-colored plaster floor (loc. 47) and appears to extend north under loci 6 - 7. The pit (LBYZ pit #1) was excavated approximately 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

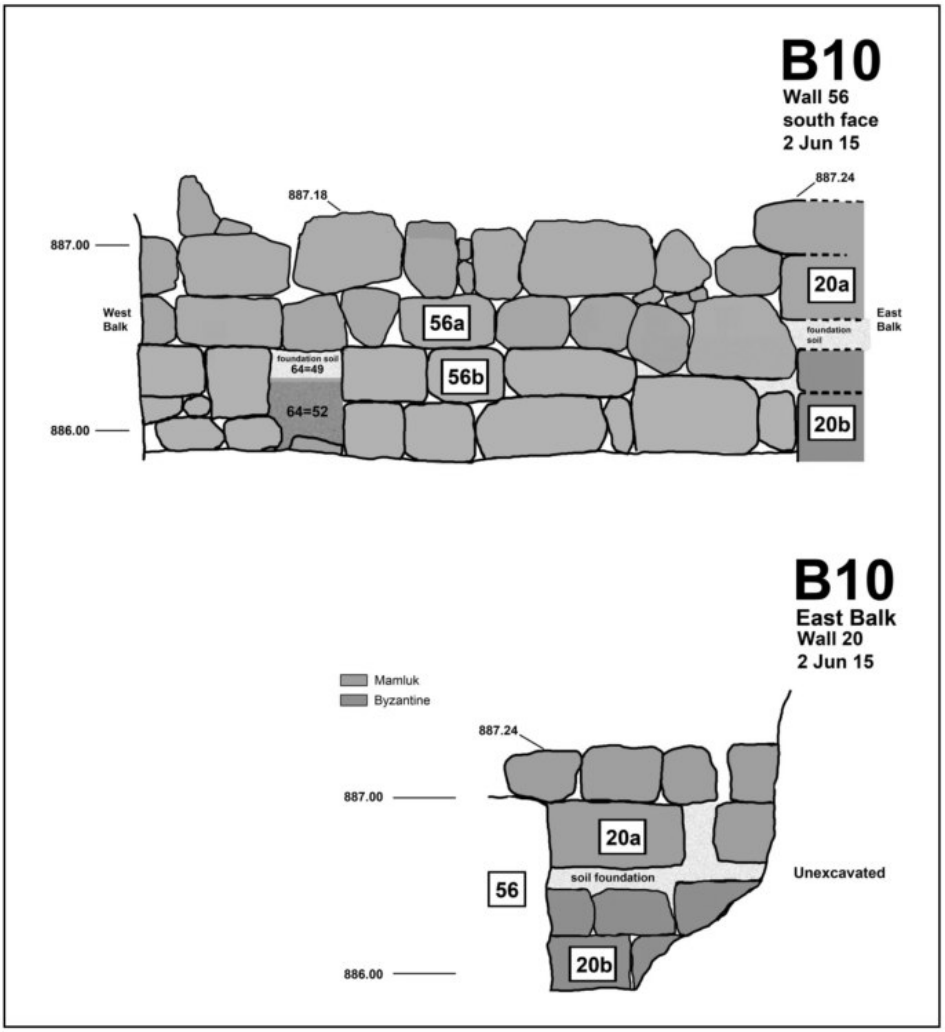
period, the occupation area - which extended across the entire width of square B8 - was divided into two rooms by a wall (8).

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

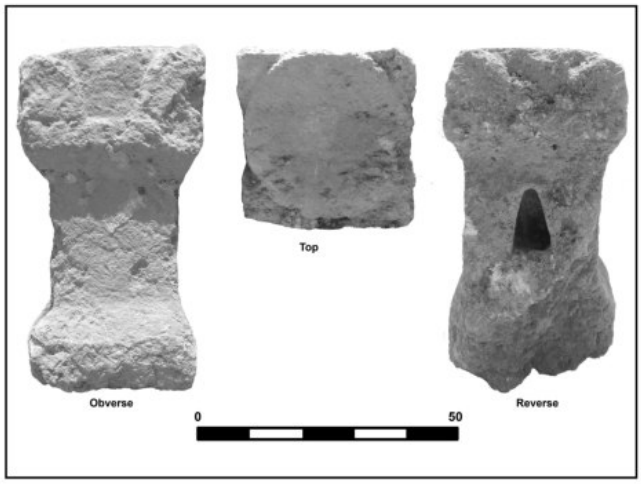
12 . General stratigraphy of Field B.

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

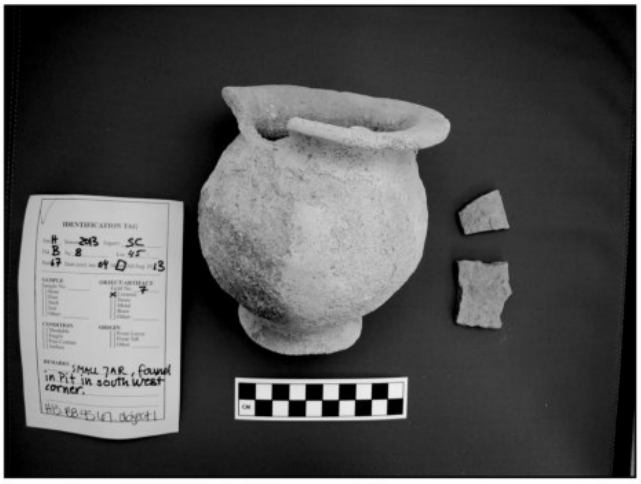
15. Imported Mamluk jars buried in B10 wall collapse.

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.

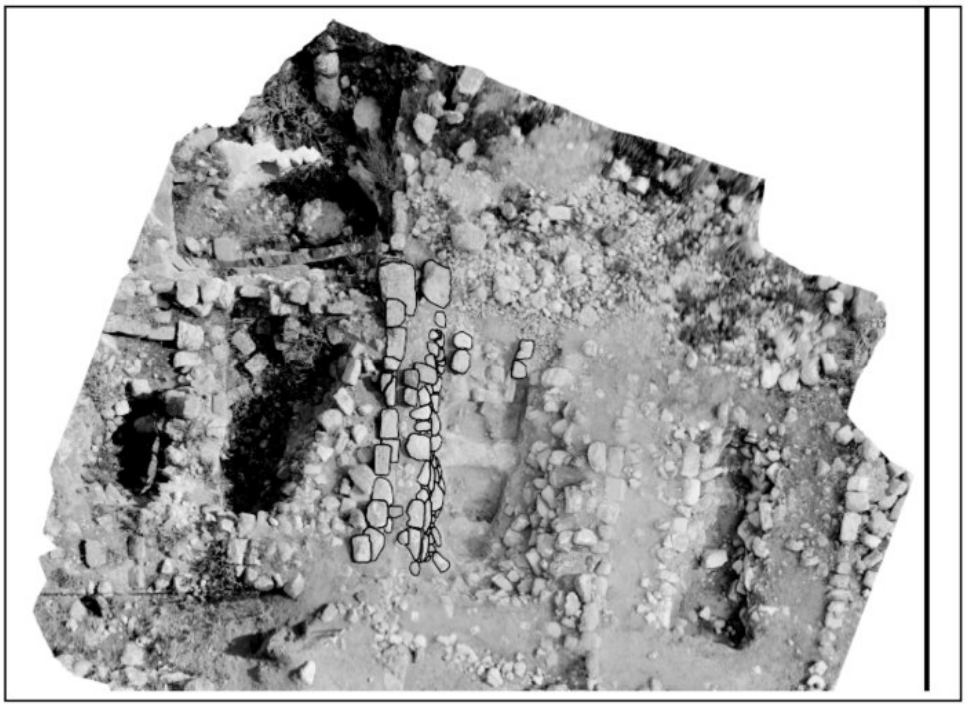


16. Handmade jar of Mamluk period buried in B10 wall collapse.

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.

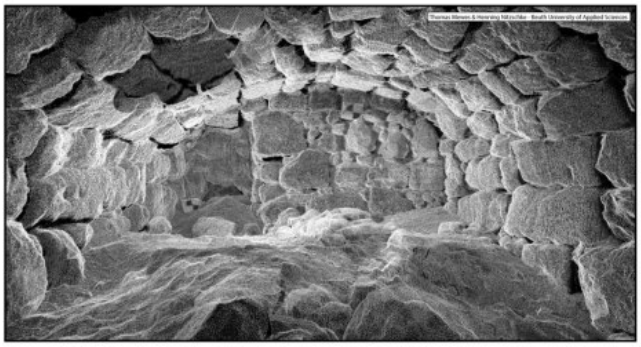
One of the greatest anomalies of this water system is the vast covered cistern, created from a modified cave, just beyond the south-west base of the *tall* in Field G **(Fig. 22)**. Dubbed the 'Abu Nur Cave' by the excavation team, mapping and dating the extensive complex of rooms, tunnels, cisterns 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.

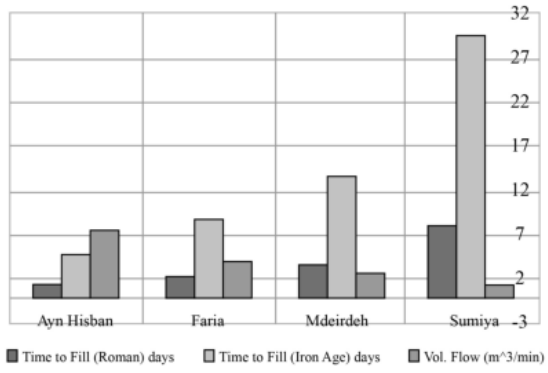
The theory that there was a qanat feeding Tall Ḥisbān is gravely weakened by the fact that the reservoirs (and cisterns) of Tall Ḥisbān are at a level substantially higher than the valley below. Though a spring like 'Ayn Ḥisbān would be at a higher level, the fundamental problem is that the supply water 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)

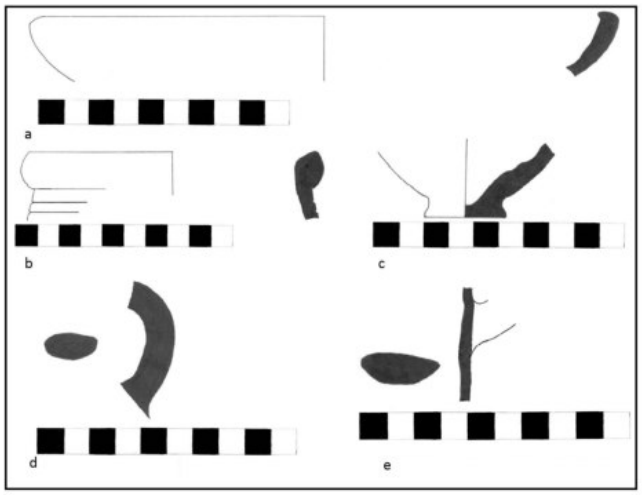
Processing a backlog of coins from previous seasons began in 2014, when a Mamluk numismatist, Warren Schultz, joined the team for fieldwork. While the results of the re-reading of earlier *Heshbon Expedition* coins appear in **(Fig. 37)**, the readings of those recovered in 2014 appear below. The context 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

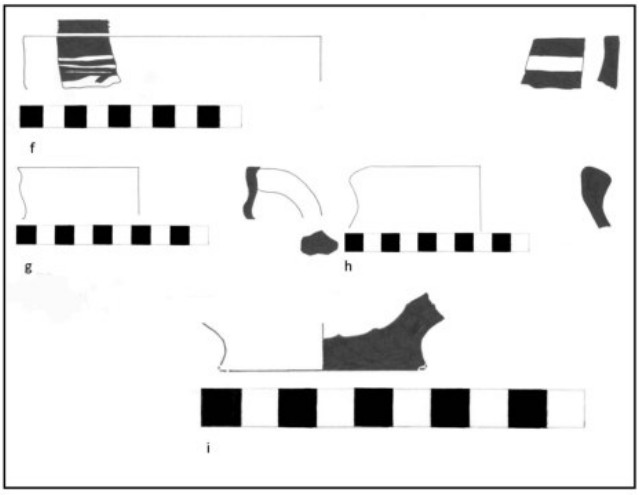
WCS #	Diameter (m)	Weight (g)	Illustration#	Item number. *Comments*
A	30	13.74	Hisban2014Aa&b	H – 14 – O – 11 – 4/L – 10N. *Byzantine folles, Æ, pierced, Justinian, probably Antioch (but mint mark is effaced).*
B	15	4.27	Hisban2014Ba&b	H – 14 – O – 9 – 14/E – 41. *Probable Umayyad Æ, mint and type not 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

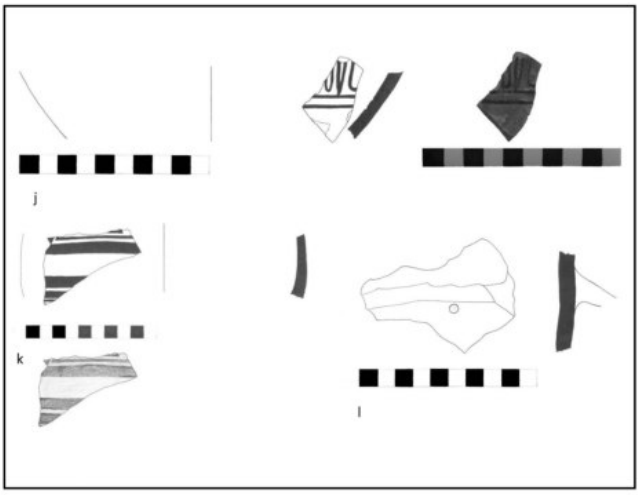
26. Chart 1: Pottery readings for Plate 1 (Courtesy Bethany Walker).



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

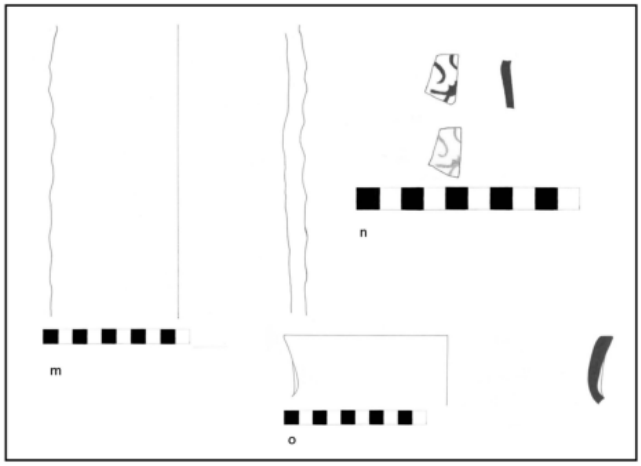
28. Chart 2: Pottery readings for Plate 2 (Courtesy Bethany Walker).



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	?

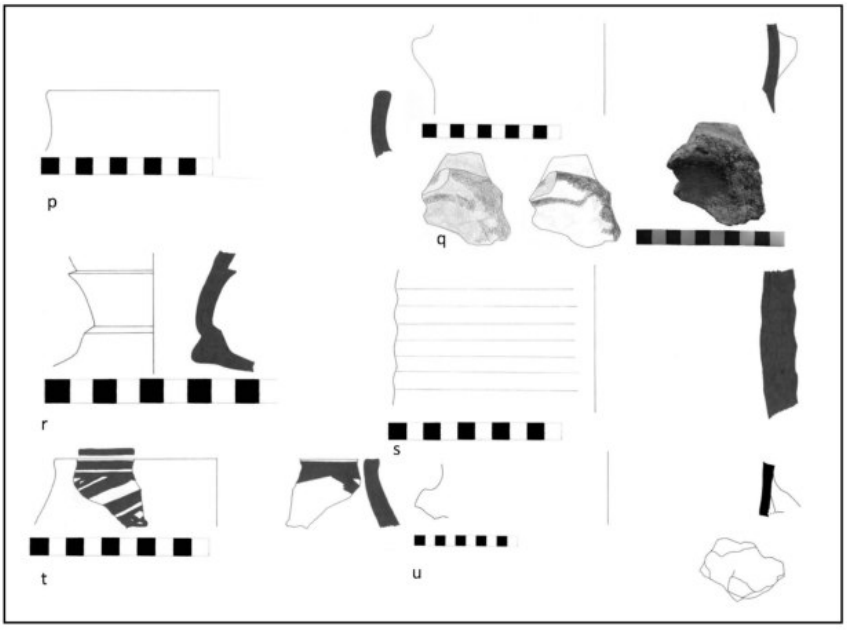
30. Chart 3: Pottery readings for Plate 3 (Courtesy Bethany Walker).



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

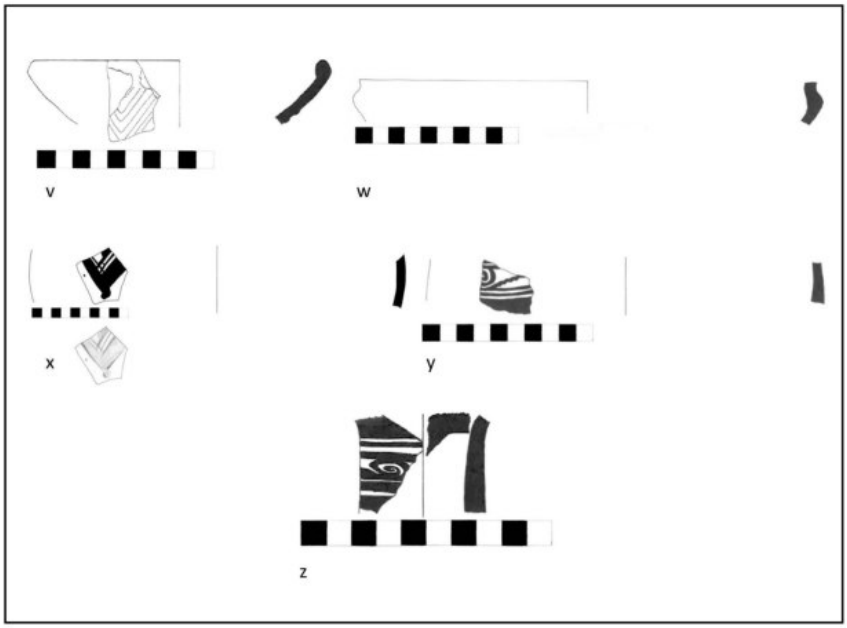
32. Chart 4: Pottery readings for Plate 4 (Courtesy Bethany Walker).



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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