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THE DHĪBĀN EXCAVATION AND DEVELOPMENT PROJECT'S 2005 SEASON

Benjamin Porter, Bruce Routledge, Danielle S. Fatkin, William Zimmerle, John Hakes, Johanna Salvant and Warren Schultz

Introduction

The Dhibān Excavation and Development Project (DEDP hereafter) seeks to develop strategies for ensuring the long term sustainability of archaeological research and archaeological landscapes in Jordan by integrating traditional research questions with site development. These two activities converge at Dhibān on the question of local connections to place, in the face of long term and apparently radical changes in the modes and intensity of dwelling, land use and collective identification. Even when apparently abandoned, Dhibān has remained a place of significant human activity. This long term pattern of attachment to place manifest through widely divergent intensities and modes of settlement is a central characteristic of Jordanian history and one of the distinct intellectual insights to be gained from its archaeological record. What follows is a report of the 2005 season undertaken between 24 July and 8 September 2005.

Context and Previous Investigations

Tall Dhibān is located approximately seventy kilometers south of 'Ammān. While devoid of modern settlement, the mound is immediately adjacent to the modern community of Dhibān (Fig. 1). The site is well known, both from the discovery of the Mesha Inscription in 1868 and for the pioneering excavations of the American Schools of Oriental Research from 1950 to 1953 and, again, in 1955 and 1956. Fred Winnett, William Reed and Douglas Tushingham concentrated their soundings in the south-east corner of the site, exposing an Iron Age fortification system, Nabataean temple, Byzantine church, and Early and Middle Islamic dwellings

(Winnett and Reed 1965; Tushingham 1972). William Morton conducted an additional three seasons in 1955, 1956 and 1965, concentrating on Dhibān's acropolis (Field L) and north side (Field H) (Morton 1989). Archaeological excavations at Tall Dhibān ceased for nearly 35 years until Jordan's Department of Antiquities initiated an excavation and restoration program in 2002 (al-Mahameed 2003). In 2004, the DEDP conducted a pilot project to measure Dhibān's potential for new archaeological investigation (Porter *et al.* 2005).

Together, this work suggests Tall Dhibān was settled intermittently from the end of the Early Bronze 1b period (*ca.* 3100BC) until some point late in the Mamluk or early Ottoman era (late fifteenth or early sixteenth century AD).¹ Particularly prominent in these excavations were the later Iron Age (900-600BC), the Nabataean period (140BC-106AD), the Byzantine and Early Islamic Periods (*ca.* 400-800AD), and the Middle Islamic Period (*ca.* 1250-1600AD). This work also showed that architectural elements from these periods were well preserved and accessible by limited excavation. However,



1. Tall Dhibān viewed from the north (Photo: J. Porter).

1. For a recent synthesis of Dhibān's settlement history,

see Porter *et al.* 2007.

the architecture visible on the surface of the site is in relatively poor condition owing to both G. Lancaster-Harding's removal of a significant number of above ground walls and arches in 1949 (Winnett 1964: 11) and to the lack of post-excavation conservation on the part of earlier excavators.

The primary goals of the 2005 season of the Dhibān Excavation and Development Project were to continue the exploration and documentation of the site's ancient remains while pursuing the research objectives developed in the 2004 season (Porter *et al.* 2005: 201, 203).² These included the production of a current topographic map of the site and the documentation of architectural remains on or near the surface, conducting a ground penetrating radar survey of select areas, trial excavations in Field L on the site's acropolis, and assessing the viability of developing Dhibān as a sustainable tourist destination for domestic and international visitors. During the 2005 season, as this report will describe, we sought to complete these goals, concentrating our work on four objectives.

1. Completion of the topographic map and architectural survey of the site, concentrating on the western slope where several buildings are still preserved on the surface.
2. Collect additional data relevant to the drafting of a site development plan.
3. Expansion of excavations in Field L on the site's acropolis and investigation of the construction and post-construction occupational phases of the Middle / Late Islamic building complex.
4. Gather additional data to link project results with earlier excavations at Dhibān, especially William Morton's excavations in Field L.

All objectives were met during this season and are described in greater detail in the following sections.

Topographic Map

A topographic map of the site of Dhibān, ini-

tiated during the 2004 season, was completed by Benjamin Porter and William Zimmerle (**Fig. 2**). This mapping was conducted with a TopCon total station, with the data points uploaded into a CAD program, Vectorworks. This effort has produced a digital map of the site for use with the GIS database began last year using incomplete topographic data. Particular emphasis was placed on recording architectural remains visible on the surface of the site, especially on the western side of the tall, which has thus far been ignored by archaeologists. Our mapping project has made clear that at *ca* twelve hectares, Tall Dhibān is considerably larger than the 2.4 hectare ("five acres") figure cited by earlier surveys as the area of the summit only (e.g. Winnett and Reed 1964: 5). Much of this 'extra' area is accounted for by the lower terraces on the north-west side of the site, where surface investigations and aerial photographs (e.g. Kennedy 2004: Fig. 7.2) show extensive architectural remains. One priority of future field seasons will be to investigate this neglected portion of the tall.

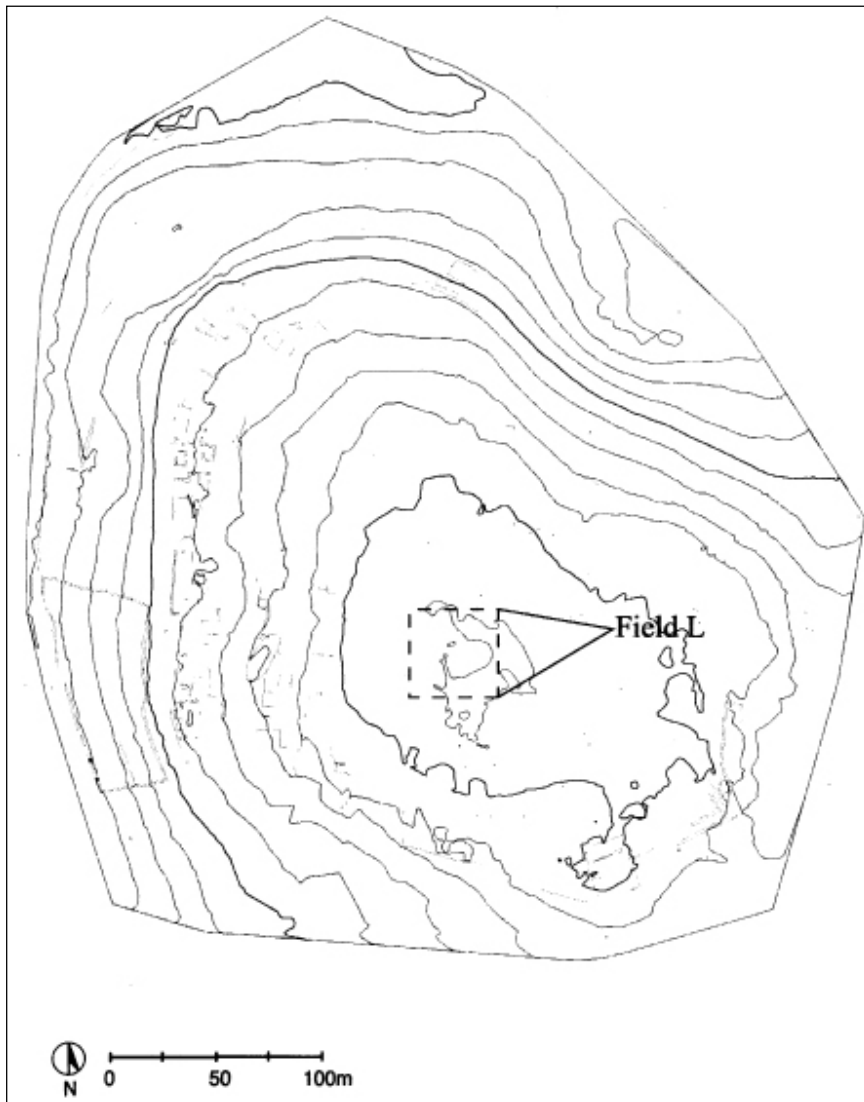
Ground Penetrating Radar Survey Results

Ground penetrating radar (GPR hereafter) is a non-invasive technique useful for imaging features in materials, especially sediments. It operates by transmitting a series of high frequency electromagnetic pulses into the ground using an aerial. The time taken for reception of the reflected signal from subsurface stratigraphy and buried features is measured. The amplitude and polarity of the recorded signal is displayed versus the two way travel time of the signal. Usually the vertical axis is expressed either in the travel time in nanoseconds and the horizontal axis is the distance along the survey line. The vertical axis can be converted to a depth if the radar velocity of the penetrated material is determined or assumed.

In 2004, John Hakes and Bruce Routledge supervised a GPR survey on a portion of Dhibān's acropolis in order to test the viability of using this method to map subsurface architecture at

2. Participants included: Bruce Routledge (U Liverpool), Benjamin Porter (U California, Berkeley), Danielle Steen (Knox College), Zuhair al-Zou'bi (Department of Antiquities), Magda Sibley (U Liverpool), Zakariya Na'imat (Mutah U), Jack Green (Oxford U), Akemi Hori (Badé Institute) and five U of Liverpool stu-

dents: Gemma Fine, Bianca Goh, Alex Huener, John Rowan and Annabel Rowbotham. Essential assistance in Dhibān was provided by Firas al-Kawamlah (now of the Ministry of Social Development in Dhibān) and twenty residents of the Dhibān area were hired to work at the site.



2. Tall Dhibān topographic map detailing Field L on the site's acropolis. Architectural elements visible on the surface are also shown here. Note the abundant surface architecture on the western slope.

the site (**Fig. 3**). In order to examine a sufficient subsurface area, the GPR survey was designed



3. John Hakes and Bruce Routledge conducting the ground penetrating radar survey in 2004 (Photo: J. Porter).

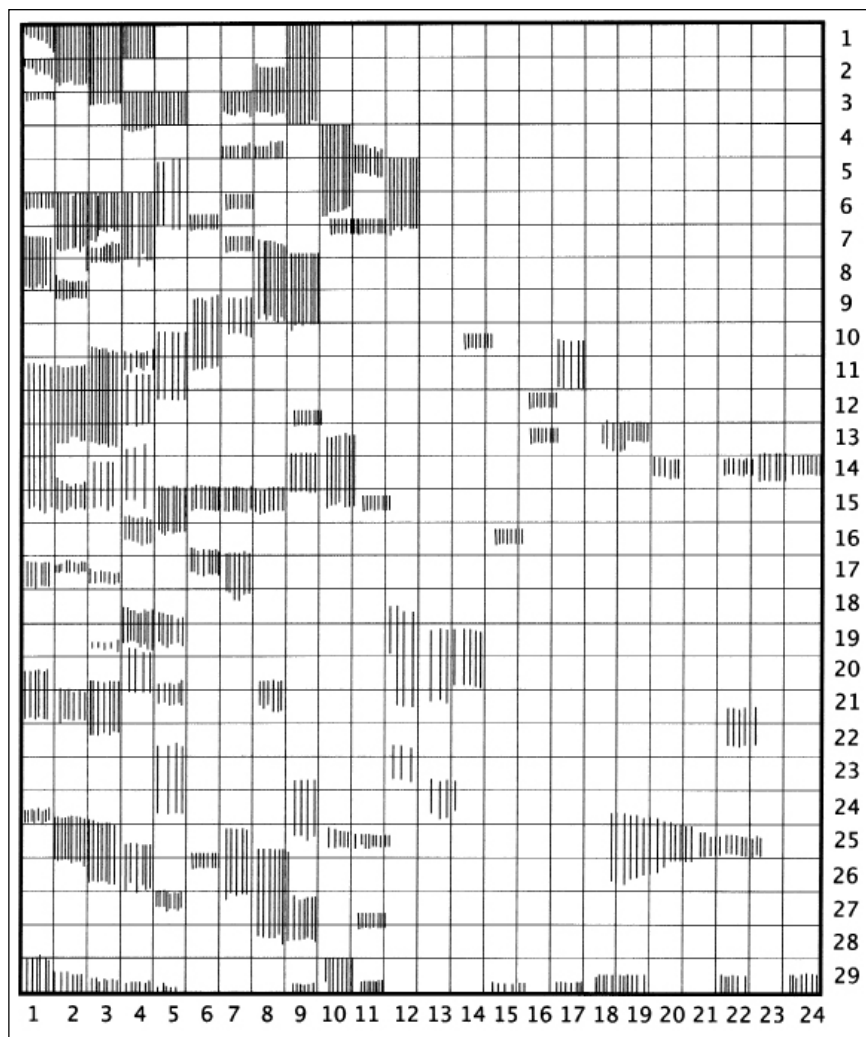
using a grid system, with a traverse line separation of one meter for both of the areas we surveyed. The survey was carried out using two types of GPR equipment: a Noggin 500 MHz system and a Pulse EKKO 100 system fitted with 200 MHz antennas. The Noggin 500 is connected via a data cable to a laptop computer. Data logging software on the computer allows the operator to start and stop recording data, to add comment lines at features of interest and to set the type of ground media in which the survey is being conducted. The Noggin unit is placed on the ground and pulled along the traverse line at a constant speed while the data is logged onto the computer. Distance measured along the traverse is called out to the operator of the computer who

enters the distance covered as a comment in the dataset. It is important to try to keep the traverse speed constant from traverse to traverse to allow correct interpretation of the relationship between features in between adjacent lines.

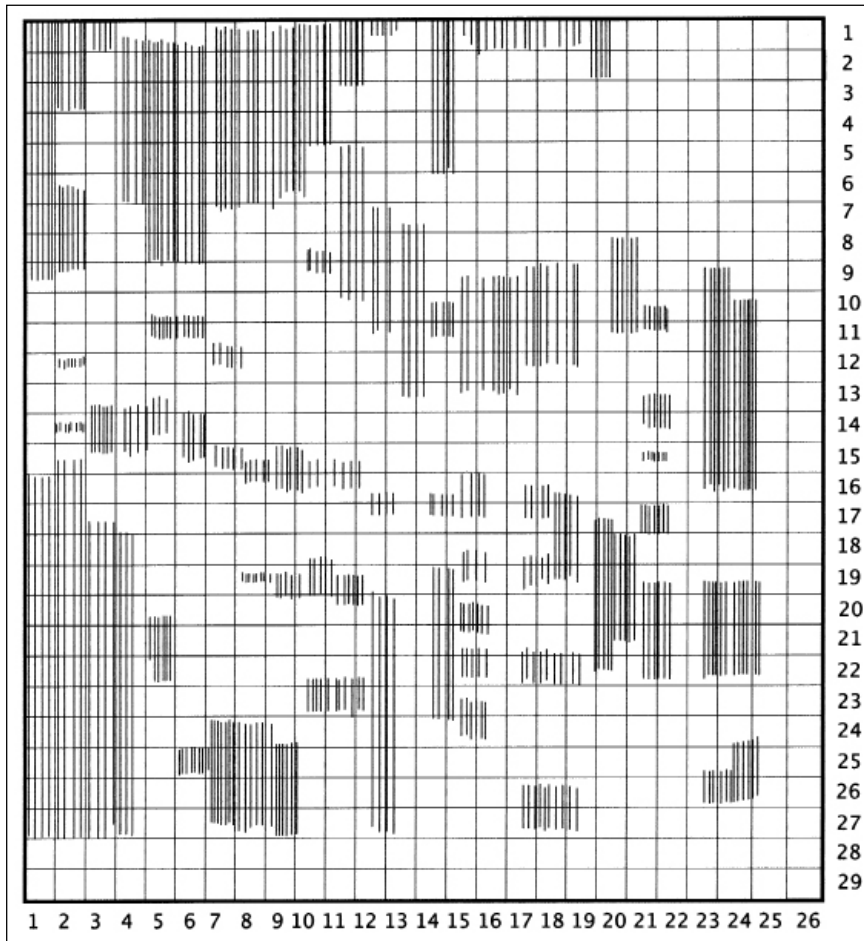
The Pulse EKKO 100 system consists of separate Transmit (TX) and Receive (RX) units connected by fiber optic cables to a control unit and computer. The separation of the TX and RX units can be changed, as can the distance moved by the units for each reading. In this survey, the separation was 0.5 meters and the movement was 0.1 meters between readings. As the survey proceeds a profile is built up on the computer screen and stored on the computer's hard disk when the end of the line is reached.

In 2004, two areas were surveyed: J1 with a total of twenty-four lines, varying in length from twenty-eight meters to sixteen meters ow-

ing to the topography, and J2, a more uniform area where a grid of twenty-four lines twenty-six meters long could be surveyed, although only twenty-three lines were surveyed as the data for line twenty-two was lost. In general, every fourth line was also surveyed with the Pulse EKKO 100 system. This would enable a comparison to be made between the data collected by two systems. Each Noggin traverse line is shown in **Figs. 4 and 5**, and depicts a vertical profile down to a maximum depth of 1.6 meters. Each profile illustrates typical behavior expected when the emitted and received signal is influenced by small scale topography such as stones and uneven ground. Despite this added 'noise', the signals from buried topography should be visible if they are present, depending upon the depth of penetration and attenuation of the signal by the ground. Signal penetration at



4. Ground penetrating radar results for the J1 grid. Vertical black lines indicate the presence of possible non-soil features.



5. Ground penetrating radar results for the J2 grid. Vertical black lines indicate the presence of possible non-soil features.

the chosen frequencies was somewhat low with imaging to less than one meter below the surface. A demonstration of this is in Area J1 - Line 9, where a cistern likely exists. The radar returns from the mouth are evident, but there are no returns from any deeper structure. This was probably due to the material being surveyed having high attenuation and low transmissivity at the frequencies used and the transmitter power. Lower frequencies of fifty or one hundred MHz could have been used, had the aerials and time been available. This would have given greater penetration but less resolution of any target.

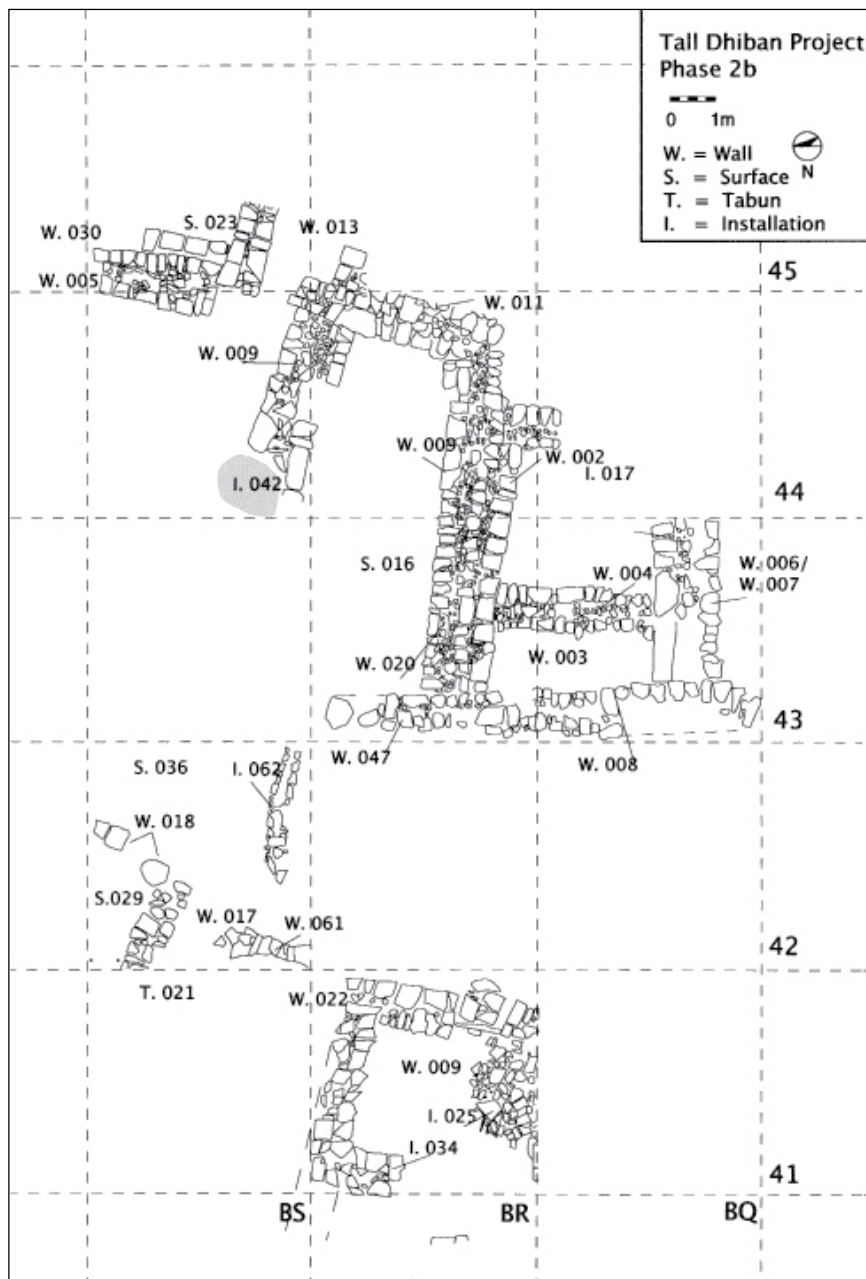
The raw data returns suggest some features are apparent, mainly as what appear to be piles of large stones. The occurrences of these are plotted on J1, lines 1-17 and 18-24, and J2 lines 1-18 and 19-26. The spaces between these areas gave very little data, except some signs of depositional structures in the material.

The use of GPR, along with other geophysical surface surveying techniques (e.g. magnetic

gradiometer and resistance tomography), has strong potential for imaging archaeological features in three dimensions, especially when a combination of techniques is used prior to excavation. Further surveys should investigate the use of lower frequencies and higher transmitter powers to overcome the high attenuation and low transmissivity of local materials to obtain deeper penetration, as well as a Common Mid-Point (CMP) survey to establish the velocities of the material.

Excavations on the Field L Acropolis

In 2005 the project shifted to an open-field excavation strategy, where the alternation of excavated and unexcavated squares provides sections that can be drawn in lieu of balks and then excavated through when bringing adjacent squares into a single phase. The original 6 x 6 meter grid, inclusive of balks, was transformed into a 5 x 5 meter grid with no balks. A comparison of **Fig. 6** in this report with **Fig. 7** in the



6. Map of the Field L acropolis's Phase 2b architecture.

2004 season's report (Porter *et al.* 2005: 206) demonstrates how the grid has been shifted relative to the architecture in order to accommodate this change in strategy.

Excavation activity in 2005 continued in the four squares opened in 2004 (BS42, BS44, BR43, BR41), as well as in two new units (BR44 and BQ43). Excavation and sample collection methods remained those detailed in the project's 2004 report (Porter *et al.* 2005: 204). To summarize preliminary results, two seasons of excavation in Field L suggest that we are investigating

clusters of structures on the east and west sides of the field that are oriented towards an open central courtyard or street, containing cisterns and a drain. Parts of at least two structures have been exposed on the west side of the open central area, while portions of perhaps three structures have been exposed on the east. Whatever the configuration at the time of construction, it is clear that this area underwent several alterations over the course of its occupation, before rockfall and colluvial deposits filled in the structures. These alterations, which include pitting,



7. Field L acropolis's Walls BR41.009 and BR41.022 and Surface BR41.025, looking east.

ephemeral *ṭābūn* and surface formations, as well as wall damage and make-shift repairs, are all expedient and piecemeal in nature. This suggests significant shifts in occupational strategies at Dhibān, perhaps indicating an extended period of economic stress and residential instability prior to the abandonment of the Mamluk-era village. Given the importance of site abandonment to our understanding of the Late Mamluk and Ottoman periods in Jordan, as well as the uncertainty surrounding both the relative and absolute archaeological chronologies of these periods, careful attention to stratigraphic detail in the so-called “post-occupation” or “squatter” phases is absolutely essential for any progress to be made on the basis of archaeological evidence. We have, therefore, prioritized these layers in both our fieldwork and analysis.

The results of our excavations in 2005 generally support the stratigraphic phasing suggested after the 2004 season (Phases 1, 2a, and 2b) (Porter *et al.* 2005: 204). However, the imposition of uniform phasing across units and structures is an artificial convention maintained primarily for the purpose of exposition, as Field L is characterized by intensive and highly variable post-construction alterations. It is particularly important to note that we have not, as yet, established firm stratigraphic links between either excavation or architectural units. Hence, at present, there is only a probable, but not a necessary, equivalence in relative or absolute date between the same phase in two different excavation units.

In general, rockfall — the one consistent deposit across the entire field — has been used to divide Phase 1 (rockfall and above) from Phase 2 (below rockfall to construction of vis-

ible structures). So far, Phase 2 has been divided into Sub-phases 2a and 2b, with 2b representing the first prepared surfaces encountered below rockfall and 2a representing deposits positioned stratigraphically between Phases 2b and 1. As detailed below, Phase 2a activity varies from unit to unit, ranging from the accumulation of debris compatible with post-occupation midden deposits, through active pitting and makeshift wall repair, to the construction and use of installations (e.g. *ṭābūn*, ephemeral surfaces, stone-lined bin or channel). While probable Phase 2b surfaces were reached in four of the six squares excavated in 2005, these floors were not extensively penetrated, meaning that there is still little to be said about the foundation and initial use of the buildings first uncovered in 2004. In at least one case (BR41), it is clear that one or more phases of prepared surfaces exist beneath Phase 2b, meaning that we can expect to find at least a Phase 2c in some units in future seasons.

Phase 1

Much as noted in our previous report, (Porter *et al.* 2005: 207), wherever we commenced excavation, we encountered thick deposits of jumbled rockfall and fill containing artifacts of mixed date, up to the twentieth century AD.

Phase 2 Architecture

In our report on the 2004 season we described a series of walls associated with Late Mamluk occupation layers, suggesting in several places how these might resolve themselves into as yet incompletely exposed architectural units (Porter *et al.* 2005: 205). Work in 2005 has both expanded and complicated this picture.

Beginning with unit BR41, on the far western side of Field L, further excavation of this square has revealed a clear architectural unit (**Fig. 7**). This building is defined by walls BR41.022 on the north, BR41.033 (= BR41.009) and BR41.032 on the east, and wall BR41.013 exposed in the western balk of 2004. The building was entered from the east via a doorway with a paved threshold (BR41.029). The roof of this building was supported by a least one arch spanning the width of the room from north to south, as attested by BR41.034, a springer bonded to wall BR41.022. A possible opposing springer may be visible in the southern section of BR41,

although this will not be clear until unit BQ41 is excavated. This use of a sprung arch seems to contrast with neighboring buildings, where continuously vaulted roofs appear to have been created without the use of arches by simply corbelling stones on the tops of walls. At the same time, excavations by William Morton in 1955 and 1956 immediately east of our Field L also uncovered a building vaulted with sprung arches. Beyond the limits of the revised grid of 2005, the collapse of a portion of the western balk of 2004 revealed that wall BR41.009 was probably part of a doorway leading west. If we are correct in our interpretation of features visible in the section, then excavations in BR41 have thus far exposed one vaulted room, very close to 5 x 5 meters in area, within a multi-room structure.

Further excavation in BS42 revealed only one additional wall (BS42.061) beyond those uncovered in 2004, a short stub in the south-west corner of the square, badly damaged by a Phase 2a pit. A drain and exterior surface also discovered in this unit will be discussed under Phase 2b below.

In units BR43 and BQ43, excavation exposed wall BR43.020 (= BR43.047 = BQ43.008), which ends at an opening or doorway in the extreme north-west corner of BR43. This wall forms the western limit of the barrel vaulted architectural units in the eastern half of Field L. On the southern side of BQ43, east-west wall BQ43.007 essentially runs parallel to walls BR43.009 / 002 and appears to be constructed in a similar manner, namely as two mutually supporting parallel walls arching in opposite directions and joined by a rubble core. BQ43.007 appears to bond with wall BQ43.008 (= BR43.047 = BR43.020), although this relationship requires further investigation. In contrast, the north-south internal cross-wall BQ43.004 (= BR43.003) clearly abuts walls BQ43.007 and BR43.002 at each end.

In unit BR44, the dual wall BR43.009 / 002 (= BR44.009) was exposed for a further five meters east (**Fig. 8**). The south-arching portion of this wall, BR43.002, appears to end to the east at a bonded corner formed with a largely unexcavated north - south wall (BR44.016). The north-arching portion of this wall (BR43.009) continues east on its own for another two meters, before ending in a corner formed with the north



8. Field L acropolis's Walls BR44.009, BR44.011 and BS44.009 looking east.

- south wall BR44.011. Wall BR44.011 runs parallel to, and is embedded in, BR44's eastern section. Excavations on the north side of the square made it clear that BR44.011 formed a corner with wall BS44.009, exposed in 2004, which abuts BR44.011 on the west. The south face of BS44.009 arches south, having once formed a barrel-arch with wall BR43.009 (=BR44.009) on the south. However, BS44.009 only continues for *ca.* 1.20 meters west of this corner before it is clearly interrupted by an episode of destruction and irregular rebuilding. On the north side, BS44.009 is continued by BS44.058, which is a rather poor secondary rebuild that ends abruptly at cistern BS44.0042 (**Fig. 9**). On the south side, BR44.013 designates an area that was seriously compromised and is now barely coherent and difficult to designate as a wall. Further excavation is required in order to understand this sequence of events with any confidence. We can note that this episode of destruction and piecemeal rebuilding predates the rockfall and may



9. Field L acropolis's Walls BS44.009 and BR44.009, looking south.

be associated with the construction or modification of cistern BS44.042. While this cistern remains to be fully investigated, this preliminary evidence suggests that the cistern may have been inserted during one of the latest use phases of this area. The truncation of the arching wall BS44.009 and the poor, even incoherent, construction of BS44.058 and BR44.013 would certainly have affected the integrity of the northern side of the northernmost barrel vaulted building in units BR43 and BR44. Indeed, this room may have been exposed, or very poorly enclosed, on its northern side in the last phase of occupation prior to the rockfall.

Phase 2a and 2b

Unit BS41 illustrates the problem of depositional variability across buildings in Field L, as here the remains of a paved and plastered floor below Phase 1 rockfall and a bone-rich layer of fill (BR41.012 / 019) was encountered. In the 2004 report (Porter *et al.* 2005: 207), this floor (BR41.012 / 016) was assigned to Phase 2a. However, on exposing more of this room in 2005, the discovery of a portion of a substantial cobble pavement (BR41.025) and well-built threshold (BR41.029) showed that, while poorly preserved in parts of the unit, BR41.025 (=BR41.012 / 016) was the first prepared living surface for this building and hence should be assigned to Phase 2b (Fig. 7). Unfortunately, while well preserved in the southern half of the square, the cobbled surface (BR41.025) was poorly preserved and disrupted by rockfall in the northern half (represented by locus BR41.027), which had been exposed in 2004. The remains of a *ṭābūn* (BR41.026) associated with this surface were found built against the eastern side of the springer (BR41.034) bonded to the northern wall of this room (BR41.022). Most of the superstructure of this *ṭābūn* had been destroyed by rockfall, leaving a small deposit of ash, a foundation of supporting stones and some fragments of *ṭābūn* fabric. Along the western edge of the 2005 excavation unit, a narrow probe *ca.* 0.50m in width was started in order to see if the disturbed northern portion of the square (BR41.027) penetrated, or was contemporary with, the cobbled pavement (BR41.025) preserved in the southern portion. This probe would also provide a means of controlling the expo-

sure of deposits beneath the cobbled pavement. Almost immediately, a layer (BR41.028) was discovered running underneath both BR41.027 and BR41.025. At the interface of BR41.027 and BR41.028, beneath a stone that may have been a surviving floor cobble, a hoard of thirty copper coins was discovered (see numismatic section below). The stratigraphic context of this hoard suggests that they were originally placed beneath a portion of the cobbled floor subsequently disrupted by rockfall. Excavation in this probe did not continue further in 2005, but it is clear that relatively uniform, post-construction deposits covering the entire exposed room remain to be excavated beneath cobbled surface BR41.025.

In summary, Phase 2b in BR41 was represented by a *ṭābūn* and a plaster and cobble surface, immediately beneath which was discovered a hoard of copper coins. Phase 2a was represented primarily by a fill layer, rich in animal bones, deposited in between the Phase 2b surface and rockfall.

During 2005, excavation in BS42 was concentrated in the southern half of the square, which had been left unexcavated in 2004. In 2004, excavation ceased with the exposure of one corner of a room (formed by BS42.017 and BS.42.018) whose interior had been largely cut by a pit (BS42.020 / 031). To the east of this room, excavation had stopped on top of what appeared to be an exterior surface (BS42.036), prepared with a lime wash. The room, its surviving interior surface (BS42.029) and the exterior surface (BS42.036) were assigned to Sub-phase 2b, while the pit was assigned to Sub-phase 2a. Excavation in 2005 ceased at the same prepared surface (BS42.058 = BS42.036), bringing the entire square into phase. As noted above, only one wall fragment (BS42.061), cut by a pit (BS42.056), was uncovered in the south-east corner of the square. The absence of any other walls in the southern half of BS42 makes it likely that BS42.058 / 036 were an exterior surface. Embedded in BS42.058 / 036 was a stone-built drain (BS42.062) running east to west along the southern edge of the square, turning and running directly into the southern section *ca.* 2 meters from the western edge of the square. This drain is embedded directly into the lime-wash floor (BS42.58), which seals against the stones that

line this drain. In several places flat capstones survive. The drain itself remains unexcavated, having been discovered on the second to last day of excavation. The drain runs downslope from east to west and measures *ca.* 3 meters in length and *ca.* 0.42 meters in width, with a central channel that ranges from *ca.* 0.18 - 0.22 meters in width. The drain turns south towards the unexcavated square BR42 precisely at the point where a surface depression indicates the probable existence of a cistern.

In summary, Phase 2b in BS42 is represented by the corner of a structure with an interior plastered surface, as well as an exterior prepared surface in which a stone-lined drain has been embedded. Phase 2a is represented by pits cutting into these 2b features, as well as the poorly defined secondary surfaces from which these pits were cut.

During 2005, we focused our excavations in BR43 to the north of wall BR43.009 / 002. In our previous report (Porter *et al.* 2005: 205) we suggested that BR43.016 might be a Phase 2b surface. This did not prove to be the case, as excavations in 2005 showed that this layer (BR43.016 = BR43.034) consisted of further rockfall. In this light, it is uncertain whether BR43.015, deposited over BR43.016 and assigned to Phase 2a as an ephemeral surface (Porter *et al.* 2005: 207), is anything more than a pocket of fill in a very thick deposit of rockfall. Beneath BR43.016 we exposed a stone built installation (BR43.040). This installation consisted of two parallel rows of field stones 0.50 meters apart, irregularly built in one or two courses to a height of *ca.* 0.30 meters and laid on a bed of flat lying stones. The installation runs south to north, perpendicular to and abutting wall BR43.009. It is preserved for 1.20 meters in length and destroyed on its northern end by rockfall. If not for the fact that it abuts directly against wall BR43.009, we would be inclined to interpret this installation as a stone-lined drain, much as was discovered in square BS42. The construction of installation BR43.040 was associated with layers rich in ash and charcoal (BR43.038 / 0.39) to the west, even though these do not appear to be a prepared surface of any sort. Beneath these ash layers, and quite clearly beneath the foundation level of installation BR43.040, was a layer of flat lying stones

(including a boulder mortar, worn through from use) and fill (BR43.044). Excavation stopped when the removal of BR43.044 revealed a compact layer that appears to be a good candidate for a prepared surface (BR43.046).

In summary, we would suggest rather tentatively that our excavations ended on what could be designated a Phase 2b surface, with installation BR43.040 and associated layers constituting Phase 2a activity in the northern portion of square BR43. All of this requires further stratigraphic confirmation.

Square BR44 was opened in 2005 in order to expose the eastern half of the long, barrel vaulted room excavated in BR43. Excavations in this square did not proceed far beyond the clearing of rockfall and the articulation of walls. Excavation ended on a firmer, ashy, deposit (BR44.014) with pockets of charcoal and flat lying pottery, which would seem to represent Phase 2a activity in this square. BR44.014 may also be contemporary with BR43.038 / 039 and installation BR43.04 in the adjacent square BR43, although time prevented further investigation. As noted above in our discussion of architecture, it is clear that wall BS44.009 on the north side of BR44 was truncated and that the jumble represented by BR44.013 was deposited prior to the Phase 1 rockfall. However, the precise phasing of these events (e.g. Phase 2a or 2b) requires further investigation.

Square BQ43 was opened in 2005 to the south of BR43 in order to investigate rooms adjacent to wall BR43.002. As in BR44, work in BQ43 did not progress much beyond the removal of rockfall and articulation of walls, with Phase 2a represented primarily by deep fill layers at present. However, excavations at the interface between units BQ43 and BR43 did clarify an ambiguous feature of wall BR43.003, which had appeared to rest on layer BR43.010 on its west side, but extended much deeper on its east side. It is now clear that part of the western row of this double rowed wall was robbed out along with part of the eastern row of the parallel wall BQ43.008 (=BR43.020 / 047). Wall BR43.003 was then given a makeshift repair, with both the robbing and wall repair occurring in Phase 2a.

Square BS44 was affected by the shifting of our site grid, to the extent that it was extended one meter to the west, while a meter-wide strip

along the eastern balk became part of square BS45. Extending BS44 to the west meant that it now incorporated a cistern (BS44.042), whose opening has always been visible from the surface. In this area, excavation stopped just above the roof of this cistern after removing rockfall and a layer of fill (BS44.045). Sweeping on the last day of fieldwork revealed that the cistern's roof was intentionally constructed with large stone slabs. On the south side of BS44 it became clear that wall BS44.009, uncovered in 2004, was cleanly truncated. BS44.009 runs along the section line between units BS44 and BR44. As noted above, in BR44 the line of the southernmost row of BS44.009 ends in a jumble of stones. In BS44, however, the northernmost row of BS44.009 is continued by a single row wall (BS44.058) that clearly abuts BS44.009 and is constructed in a more haphazard manner. This wall (BS44.058), which we interpret as a rebuild, continues west to the opening of cistern BS44.042. The exact stratigraphic relationship between BS44.058 and BS44.042 is not entirely clear as it appears that BS44.042 remained in use until the recent past, potentially disturbing BS44.058 at the point where the two features meet. At present, we are suggesting that cistern BS44.042 was either excavated or extensively modified during Phase 2a, which also resulted in the truncation of wall BS44.009 and the construction of rebuilt wall BS44.058. This will need to be explored via further excavation next season.

Surface BS44.035 (=BS45.049) and *ṭābūn* BS44.032 (=BS45.047), located just east of threshold BS44.027 were both designated as Phase 2a constructions in our previous report (Porter *et al.* 2005: 207). However, excavations in 2005 indicated that these were the latest in a series of laminated floors in this doorway. *ʿābḥn* BS44.032 (BS45.047) was cut into an earlier thin plastered surface (BS45.057) and constructed as a semi-circle of cobbles (BS45.055) embedded in clay, on which the *ṭābūn* superstructure was constructed. Surface BS44.035 (BS45.049) was

laid over surface BS45.058 and seals against the base of *ṭābūn* BS44.032 (BS45.047). Although this last phase of flooring represents a clear change with the addition of a *ṭābūn*, it appears to be earlier than the modifications associated with cistern BS44.042. We therefore now designate surface BS44.035 (BS45.049) and *ṭābūn* BS44.032 (BS45.047) as Phase 2b constructions. As in square BR41, it seems evident that future excavations will confirm the existence of Phase 2c surfaces on the interior of the doorway exposed in BS44 / 45.

Objects

As in 2004, objects and samples were recovered from Phases 1 and 2 and assigned unique identification numbers. All faunal evidence and a soil sample from each locus were collected for future analysis. Stone, ceramic, glass and metal objects were abundant in all phases. Because this evidence is similar to that which was excavated in 2004 (Porter *et al.* 2005: 207, 211, Figs. 8-9, Tables 1-2), this report will only focus on ceramic vessels and glass bracelets excavated in 2005.

Ceramic Vessel Evidence

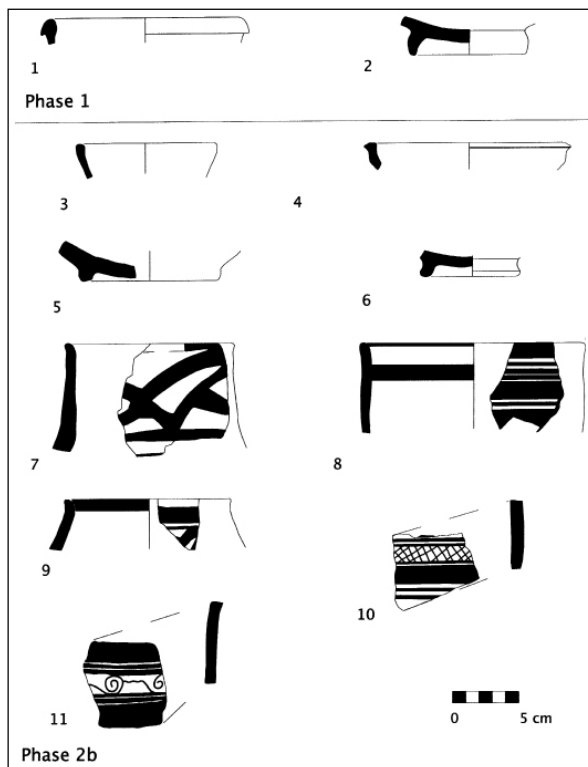
Ceramic vessels are the most common excavated artifact type and a selection is presented here. Almost all loci contained a mixture of vessels dating from the Iron Age, Nabataean, Roman, Byzantine, and Early, Middle and Late Islamic periods. Because they overlap in form and style, the latest ceramic evidence from Phases 1 and 2b are briefly discussed together below, but are separated in the accompanying illustration.³

Diagnostic ceramic vessels spanning the Middle to Late Islamic period transition (for periodization, see Whitcomb 1992: 386) represent the latest materials (i.e. *terminus post quem*) found on or above excavated living surfaces (**Fig. 10, Table 1**).⁴ Solid monochrome (green and yellow) lead-glazed bowls with simple (**Fig. 10.3**), triangular (**Fig. 10.4**), and folded rims (**Fig. 10.1**) were found. Also, various types of

3. See Porter 2005: Figs 8.1-5 for Phase 2a ceramic vessel evidence.

4. Unfortunately, there is no space here for a discussion of vessel characteristics. For parallels from other well stratified and published contexts, see Karak Castle (Brown 1989; Milwright 2008), the Karak Plateau Sur-

vey (Brown 1991), Tilāl Abū Qa'dān and Abū Sarbūt (Franken and Kalsbeek 1975), Khirbat Fāris (Johns *et al.* 1989; McQuitty and Falkner 1993), al-Burj al-Aḥmar (Pringle 1986), al-Himma (Poulsen 1957), Ḥisbān (Sauer 1973 and 1994), and Pella (Walmsley and Smith 1992).



10. Ceramic vessels from Field L acropolis's Phases 2b and 1 (See Table 1 for descriptions).

Table 1: List of ceramic vessels illustrated in Fig. 10 detailing form, provenance, fabric and surface color, manufacture and treatment.

No.	Type	Unit	Locus	Pail	Number	Dm (cm)	Fabric Color			Surface Color		Production	Treatment		
							Exterior	Core	Interior	Exterior	Interior		Type	Color	Ex/in
1	bowl	BQ43	15	121	7	14	7.5YR8/3 (pink)			7.5YR8/3 (pink)	7.5YR8/3 (pink)	wheel	glaze	green	ex/in
2	base	BQ43	15	121	15	unknown	10YR8/3 (very pale brown)	5YR8/4 (pink)	(very pale brown)	10YR8/3 (very pale brown)		wheel	glaze	green	ex/in
3	bowl	BS42	57	128	46	10	2.5YR4/4 (reddish brown)			unknown		wheel	glaze	yellow	ex/in
4	bowl	BS42	57	128	43	14	5YR8/4 (pink)			unknown		wheel	glaze	yellow	ex/in
5	base	BS44	45	123	4	unknown	2.5YR7/6 (light red)			2.5YR7/6 (light red)		wheel	slip	brown	ex
6	base	BS42	57	128	37	unknown	10YR8/4 (very pale brown)			10YR8/4 (very pale brown)		wheel	slip	green	ex/in
7	jar	BR43	45	145	1	12	10YR5/1 (gray)			unknown		hand	paint	red	ex
8	jar	BS43	38	130	2	18	5YR7/6 (reddish yellow)			5YR7/6 (reddish yellow)		hand	paint	black	ex/in
9	jar	BS46	47	144	7	12	5YR7/6 (reddish yellow)	7.5YR7/1 (light gray)	5YR7/6 (reddish yellow)	unknown	7.5YR8/3 (light brown)	hand	slip	white	ex/in
10	sherd	BR41	23	116	22	unknown	5Y4/1 (dark grey)			5YR7/6 (reddish yellow)		hand	paint	red	ex
11	sherd	BS44	45	123	15	unknown	5Y8/3 (pale yellow)			2.5Y8/1 (white)		hand	paint	black	ex

5. This analysis is based on Johanna Salvant's MSc thesis entitled "Glass bracelets excavated from Dhiban, Jordan". This research was performed at the Wolfson Archaeological Science Laboratories at the Institute of Archaeology, University College London under the su-

bases from open vessels bearing green and yellow lead glazes were found (Fig. 10.2, 5 and 6). Finally, jars (Fig. 10.7-9) and body sherds (Fig. 10.10-11) bearing the geometric painted designs indicative of the Middle and Late Islamic period were present. Each of the examples shown here are different from each other in terms of fabric and design, and may reflect a diversity of vessel workshops producing in central Jordan.

Glass Bracelets

The glass materials recovered in the 2005 season in Dhibān include thirty-six bracelet fragments and numerous fragments of windowpane and other objects. The present study focuses on the bracelets, which were first classified typologically to investigate the manufacturing techniques, dating and provenance.⁵ Furthermore, twenty-nine selected fragments were subjected to further microscopic and chemical analyses to identify compositional groups, providing additional information about the dates and areas of production of the raw glass used to manufacture the bracelets. The compositional groups were set against the typological groups and compared

pervision of Marcos Martín-Torres and Thilo Rehren. It was funded by the European Union under a Marie Curie Host Fellowship for Early Stage Researchers Training (MEST-CT-2004-514509).

to publish data on relevant bracelets or glass compositions.

The bracelet fragments are segments of circles with lengths and cross-sections ranging from 1.2 to 7.2 centimetres and from 0.3 to 0.9 centimetres respectively. None of them present a seam in the preserved fragment. They were grouped according to the classification suggested by Spaer (1988, 1992), which is based on the bracelet cross-sections and decorations (**Table 2**), and consists of four main types: monochrome plain (Type A) or decorated by moulding / tooling (Type B), spirally twisted (Type C), or bracelets decorated with coloured glass (Type D).

Among the Type A fragments, twelve very similar fragments appear glossy opaque black and unweathered (A1 - A12) (**Fig. 11.1**), while four fragments appear matt black and corroded (A13 - A16) (**Fig. 11.2**). The remaining Type A fragments (A17 - A22) are of various colours (blue, green and brown). All the Type B fragments present some longitudinal ribbing (**Fig. 11.5**), while all the Type C fragments are monochrome (**Fig. 11.6**). The Type D bracelets show polychrome decorations (specks (D1) (**Fig. 11.3**) or patched patterns (D2 - D3) (**Fig. 11.4**).

Two techniques were used to produce glass bracelets. The seamed technique consists of producing a glass cane, bending it into a ring shape and closing it with a seam, while the seamless technique consists of piercing a mass of molten glass with a metal rod which is then shaped to become a ring by rotating it around the rod (Spaer 1988; Steiner 1995). The circular cross-section of the Type B and C fragments indicates that they were made by the seamed technique (Spaer 1988; Steiner 1995). Conversely, the

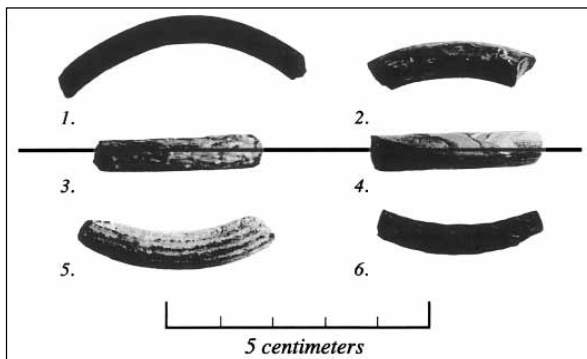
cross-sections of all the Type A and D bracelets (except A19), together with the presence of longitudinal ribbings or cracks (most likely a by-product of the manufacturing technique rather than decoration), indicate the use of the seamless technique (Spaer 2001; Steiner 1995).

The typology of the Type B fragments suggests they are most likely of pre-Islamic date, while the typologies of the fragments A18 - A22, C1 - C7 and D1 indicate that they probably date from the pre-Islamic period onwards. The cross-sections of the fragments A1 - A17 suggest that they could date from the Mamluk Period onwards, and the typologies of D2 - D3 indicate that they are probably Ottoman (Spaer 1992).

All the glass fragments were screened non-invasively using energy dispersive X-ray fluorescence (ED-XRF), providing qualitative information on the composition of the glass surfaces. Small samples of twenty-nine objects, including twenty-one bracelets, were mounted as polished cross-sections and further examined employing optical microscopy and electron probe microanalysis (EPMA). Three main compositional groups were identified among the bracelets from Dhibān, namely natron, plant ash and mixed alkali glasses.

1. Natron Glasses

Three Type A bracelets (A18 - A20) are soda-lime-silica glasses with low magnesia (<0.7%) and potash (<1.4%) concentrations, and can thus be identified as natron glasses (Sayre and Smith 1961). More precisely, they belong to the Levantine I glass group, suggesting a Byzantine date (Freestone *et al.* 2000), which is consistent with the period suggested by the typological study. They were probably manufactured at a number of Levantine glassworking sites, most probably in Palestine (Brill 1988; Fischer and McCray 1999; Freestone *et al.* 2000), using the seamless technique with glass made from Levantine coastal sand (Freestone *et al.* 2000) and Egyptian natron from the Wadi Natrun (Shortland *et al.* 2006). A19 is colored with a minor amount of iron oxide, probably present as an impurity in the raw materials, in the same way as four Levantine I non-bracelet glass fragments analysed. The two other bracelets are coloured respectively by an extraordinary high level of



11. Sample of six different types of excavated glass bracelets: (1) Type A, (2) Type A, (3) Type D, (4) Type D, (5) Type B and (6) Type C (See Table 2 for descriptions).

Table 2: List of sampled glass bracelets detailing type, reference name, cross section, apparent color, real color and corrosion.

Type	Reference name	Cross section	Apparent color	Real color	Corrosion
Type A	Opaque, black, unweathered appearance				
	A1	evenly pointed	Glossy opaque black	T. purple	No
	A2	obliquely pointed		O. black?	
	A3				
	A4	evenly pointed		?	
	A5				
	A6				
	A7				
	A8				
	A9				
	A10				
	A11				
	A12	obliquely pointed?			
	Black corroded appearance				
	A13	evenly pointed	Matt opaque greyish black with iridescence	T. purple	Yes
	A14			T. purple pink	
	A15			T. pinkish brown purple	
	A16			T. brown red with light	
	Colors other than black				
	A17	obliquely pointed?	Pearly light blue	T. copper blue	Yes
	A18	semicircular flattened	Translucent blue		No
	A19	circular?	Translucent aqua		Some
	A20	semicircular flattened	Khaki with some black horizontal lines	Dark reddish brown	Some
	A21	semicircular	Dark blue?	T. lavender blue with red burgundies	Yes
	A22		Drab white/beige	T. emerald green	Yes
Type B	B1	circular	Blue with white weathering	T. yellowish brown	Yes
	B2		Greyish silver	T. purple pink	
	B3		Bluish stone grey	?	
	B4		Bluish light grey/white		

con. Table 2: List of sampled glass bracelets detailing type, reference name, cross section, apparent color, real color and corrosion.

Type	Reference name	Cross section	Apparent color	Real color	Corrosion
Type C	C1	circular	Black with few iridescence	T. emerald green with light	Some
	C2		Dark blue with some white/beige tones	Brownish black	Yes
	C3		Green iridescent	T. peacock blue	
	C4		Black with iridescence	T. brownish purple-pink with light	
	C5		Black with some bluish grey stains	Brown purple with light	
	C6		Grey/black/silver	?	
	C7		Dark grey with some parts silver grey		
Type D	D1	semicircular/semicircular flattened?	Inside light blue/white (weathering) and outside black? Decorations appear beige/grey.	T. brown purple – O. white, yellow, green and red specks decorations	Yes
	D2	obliquely pointed?	Dark green or blue? Decorations yellow, red and white.	T. Peacock blue – patched pattern decorations: O. yellow, red and white	
	D3	semicircular	Dark blue? Decorations yellow, red and white.	T. bluish dark green – patched pattern decorations: O. yellow, red and white.	

iron oxide (A20, with 10.1% Fe_2O_3) or by copper oxide (A18).

2. Plant Ash Glasses

Fifteen bracelet fragments, including all the bracelets of Types B (Fig. 11.5), C (Fig.

11.6) and D (Fig. 11.3-4), and some bracelets of Type A (A13 - A15, A17, A21 - A22) (Fig. 11.2), are also soda-lime-silica glasses, but with higher magnesia (1.7 - 4.2%) and potash (1.6 - 3.5%) contents. These were manufactured using plant ashes as an alkali source (Sayre and

Smith 1961), suggesting these bracelets were produced in the eighth century AD at earliest (Brill 1988; Freestone et al. 2000; Henderson 1995: 997). This is consistent with the dates suggested by the typological study for the Type A, C and D bracelets altogether suggesting an Islamic date for the Type A and C plant ash bracelets and the fragment D1, whilst D2 and D3 are probably Ottoman. There is a contradiction with the Type B bracelets, between the Islamic date suggested by the composition and the Late Byzantine date indicated by the typology. However, little information is available concerning the seventh and eighth centuries AD, and very few bracelets are known from the ninth to thirteenth centuries AD (Spaer 2001), suggesting that some Type B bracelets could have remained in production during the Islamic period, perhaps on a small scale. Our knowledge of the chronology of the transition to plant ash in the Near East is still insufficiently detailed to reach any firm conclusions. Both seamless (Type A and D fragments) and seamed techniques (Type B and C fragments) were used.

The plant ash bracelets display a wide range of compositions. However, ten bracelets, together with two non-bracelet fragments, form a tighter compositional sub-group. Another sub-group, characterized by lower potash and magnesia contents than the other plant ash glasses, consists of three bracelet fragments of Type A (A13 - A15), which are very close compositionally and typologically. They are colored with manganese oxide, resulting in visually black colors that appear purple under the microscope. Bracelet A16, and four other bracelets recovered in the 2004 season, appear very similar to these and probably belong to the same sub-group. Finally, two remaining bracelet fragments (A17 and C2) show very distinctive compositions.

The main colorants encountered in the analysed plant ash bracelets are iron, manganese, copper and cobalt. Lead-tin yellow, tin oxide and copper-red were also used for the plant ash glass decorations of the Type D bracelets.

3. Mixed Alkali Glasses

Three plain, unweathered bracelet fragments (A1 - A3) (**Fig. 11.1**), appearing opaque black but translucent under the microscope, are mixed

alkali glasses with the very high alumina (7.9 - 8.3%) and relatively low lime (4.9 - 5.2%) characteristic of Indian glass (Brill 1987). Therefore, these bracelets were probably imported from India. These were coloured by iron oxide and manufactured by the seamless technique. Nine additional bracelet fragments from the 2005 season (A4 - A12) and seven other bracelets from the previous season are very similar to these, suggesting that they also belong to this group.

The non-bracelet fragments compare well compositionally to both the natron and plant ash glass bracelets. This suggests that no distinction was made in the choice of raw glass to manufacture the glass bracelets and the other objects represented among the fragments studied. However, it seems the use of colorants was more common for the glass bracelets, since very little of the other glass appears to have been intentionally coloured.

The glass bracelets recovered at Dhibān seem to originate from three main sources: (a) bracelets made of mineral-natron glass produced in the Levant during the Byzantine Period, (b) bracelets made of plant ash-based glass, probably produced in the Levant from the Islamic period onwards, and (c) glasses of a mixed alkali composition, probably imported from India. The main colorants were copper, manganese, cobalt and iron, with minor occurrences of lead-tin yellow, tin oxide and copper-red. Both the seamed and the seamless manufacturing techniques are present.

Future analytical work should incorporate the bracelets and other glass objects recovered at Dhibān during previous seasons of fieldwork, in order to further investigate the manufacture and origins of the glass, its spatial distribution across the site, and the relative proportions of the different glasses present, while at the same time contributing additional chronological information. A remaining question is whether the glass was imported in bulk or as manufactured bracelets. The answer to this will require further comparative work with archaeological bracelets and glass compositions from the broader region. This will provide a solid foundation for future archaeological work, which should also explore the social and cultural implications of the relative abundance, and long chronological span, of the Dhibān bracelets.

Dating and Interpretation

In our 2004 report, we hypothesized that Dhibān was likely one of many fourteenth century villages that arose in central Jordan as a result of the Mamluks' desire to increase grain, wool and sugar production. Many of these villages later declined in the fifteenth century, when the region experienced an economic downturn and environmental degradation (Walker 2003, 2004). One goal of the 2005 season was, therefore, to determine whether or not the changes witnessed in the buildings of the Field L acropolis were linked to these broader regional changes documented in the historical record. Making these links between the historical and archaeological record is complicated, however, by the limited disciplinary knowledge of Middle Islamic material culture sequences, which prevents us from assigning precise dates to different architectural phases. As an alternative to ceramic seriation, numismatic evidence and radiocarbon assays — when used together — potentially help establish more secure dates.

Numismatic Evidence

Warren C. Schultz analyzed a portion of the numismatic material ($n = 35$) from the 2005 season during August and September 2007 at the Mādabā Archaeological Museum (**Table 3**). A coin hoard (Objects 118.1-30) was excavated in Unit BR41, at the interface of Loci BR41.027 and BR41.028, beneath a stone that was likely a surviving floor cobble (**Fig. 12**). Although not directly beneath the well preserved portion of the cobble floor (BR41.025) that represents the latest (Phase 2b) surface in the western most building of Field L (see above), this hoard should still provide a *terminus post quem* for this latest phase of the building's use.

These thirty copper coins have the fabric and size consistent with the copper coins (*fls*; pl. *fulūs*) minted in areas of Egypt and greater Syria in the Ayyubid (567 – 648AH/ 1171 – 1250AD) and Mamluk (648 - 923AH / 1250 - 1517AD) periods.⁶ They are not well preserved and identifications, when possible, are made on the basis of trace writing and design. To date, only four definitive identifications have been made, and



12. A coin hoard (Objects 118.1-30) was excavated in Unit BR41, at the interface of Loci BR41.027 and BR41.028, beneath a stone that was likely a surviving floor cobble. This hoard provides a *terminus post quem* for the building's latest use.

all are Ayyubid. Of those Ayyubid coins, three date from the copper issues without mint name of al-Malik al-Kamil Muhammad (615 - 635AH / 1218 – 1237AD) (118.001 (**Fig. 13.1**), 118.020 (**Fig. 13.2**) and 118.026 (**Fig. 13.5**), with one coin struck in Damascus from the reign of al-Malik al-'Aziz 'Uthman (118.005, **Fig. 13.3**)⁷ (589 - 595AH / 1193 – 1198AD). In terms of tentative identifications, one coin (118.027, **Fig. 13.6**) may possibly be from the Zangid dynasty of Syria. Only one of the coins seems to be Mamluk (118.023, **Fig. 13.4**), but has as yet not been identified with a known Mamluk type. The stylistic trace on which this Mamluk identity is based is a six-petalled rosette, which was used on the Syrian coppers of several Mamluk sultans. The earliest appearance of this design on several coin types is during the third reign of al-Nasir Muhammad (709 - 741AH / 1310 – 1341AD). The fabric of these coins does not match the contemporary figural copper coins of northern Syria and the Jazira so those coins are eliminated from consideration. Thus on the basis of this sparse evidence, we are looking at a probable terminal date for the hoard in the era of al-Nasir Muhammad's third reign.

An additional five coins were excavated separately in different units. Of these coins, only BS44.85.001 (*fls*, 1.70gm.) is of similar fabric to the coins found in the hoard described above. Also, BR44.63.001, weighing 10.82gm., is possibly lead (Pb), and appears to be completely

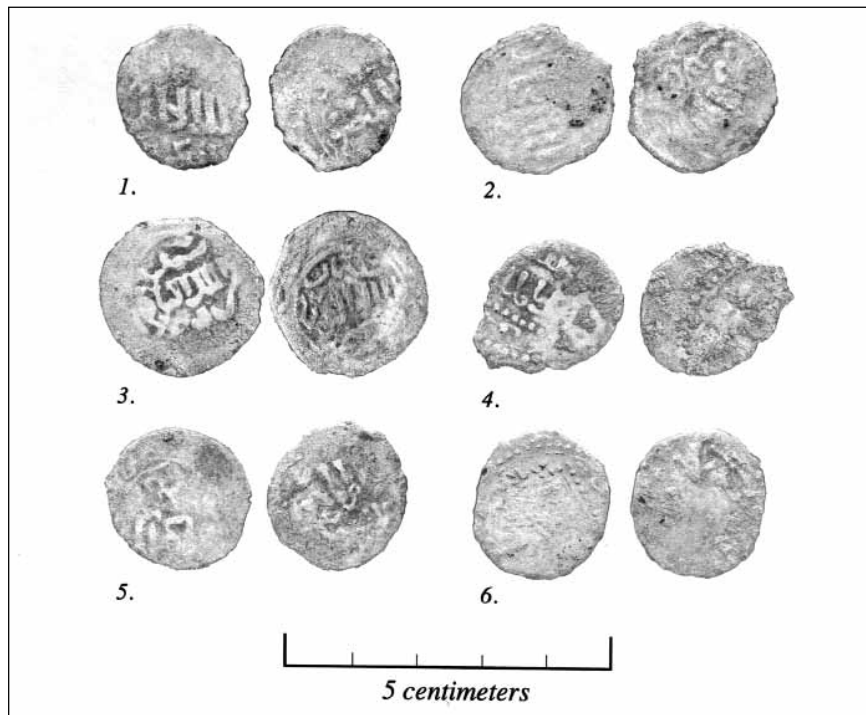
6. The standard work on Ayyubid coins is Balog 1980; for Mamluk coins, see Balog 1964.

7. Warren Schultz would like to thank Mr Hasan al-Zuod

of the National Bank of Jordan Numismatics Museum for his help in identifying this coin.

Table 3: List of numismatic evidence detailing provenance, object number and weight.

Unit	Object No.	Weight (gm)	Comments
BR41	118.001	3.84	Ayyubid, al-Malik al-Kamil, Balog Ayyubids, p. 100, type #416, no mint
	118.002	5.42	illegible
	118.003	3.99	illegible, trace of Isma'il?
	118.004	4.44	Possibly Ayyubid. Note "al-Imam" on bottom line of obverse
	118.005	4.18	Ayyubid, al-Malik al-'Aziz 'Uthman, Balog Ayyubids, p. 113, type #223, struck at Damascus, year 595 AH.
	118.006	5.39	Probable Ayyubid. al-Malik al-'Adil is clearly visible. Does not match calligraphic style in Balog, Ayyubids plates. Note the kufic "dal" of 'Adil, followed by the rectangular "lam." Reverse is effaced.
	118.007	2.64	Possibly Ayyubid, but match not yet found. Note the square-in-circle design on obverse.
	118.008	4.06	Unidentified
	118.009	2.98	Possibly Ayyubid, but match not yet found. Note the two-line inscription of "al-Imam" and (possibly) al-Malik.
	118.010	3.52	Mamluk fabric, but only trace writing legible
	118.011	3.96	Unidentified, trace legends only
	118.012	3.51	illegible
	118.013	3.03	illegible. Traces of dotted circular border
	118.014	3.29	Trace design; "la" on reverse
	118.015	5.77	illegible
	118.016	3.18	Trace border on reverse. Overstrike?
	118.017	4.42	illegible traces only
	118.018	4.68	illegible
	118.019	3.17	Unidentified
	118.020	4.13	Ayyubid, al-Malik al-Kamil, Balog Ayyubids type 418? Reverse is extremely difficult to decipher
	118.021	4.11	Unidentified. "al-Malik" on bottom line of obverse. Reverse is illegible.
	118.022	4.27	Unidentified. Traces of "sultan" on obverse
	118.023	2.99	likely the latter, but upside down. The traces of the rosette on the reverse are the reasons for the Mamluk attribution. Probable overstrike.
	118.024	2.40	Unidentified
	118.025	4.30	Unidentified
	118.026	4.22	Ayyubid. Al-Malik al-Kamil, Balog Ayyubids, p. 159, type 417, no mint
	118.027	3.75	Unidentified, possible Zengid type? Obverse has linear square in linear circle, with both square and circle surrounded by line of dots. Possible "thala(th)" on obverse.
	118.028	4.25	Unidentified
	118.029	4.77	Unidentified
	118.030	4.16	Unidentified
	33.001	n/a	copper, not Islamic
BR43	107.001	n/a	Fals, Islamic, but pre Ayyubid
BR44	83.001	10.82	possibly lead
	85.001	1.70	copper, Mamluk
	86.001	n/a	Low grade silver dirham, pierced. Not Mamluk
LII-III	164.001	n/a	probably pre-Islamic



13. Sample of excavated numismatic evidence: (1) 118.001, (2) 118.020, (3) 118.005, (4) 118.023, (5) 118.026 and (6) 118.027 (See Table 3 for descriptions).

effaced and thus not identifiable. This is unfortunate since there are a group of lead coin-like objects known from the reign of Sultan al-Zahir Barquq (e.g., Balog 1964: type 550, pp. 253-54). The final four coins (BR41.33.001, BS44.86.001, BR43.107.001, L II-III.164.001) appear to date earlier than the Ayyubid or Mamluk periods and require further analysis.

Radiocarbon Assays

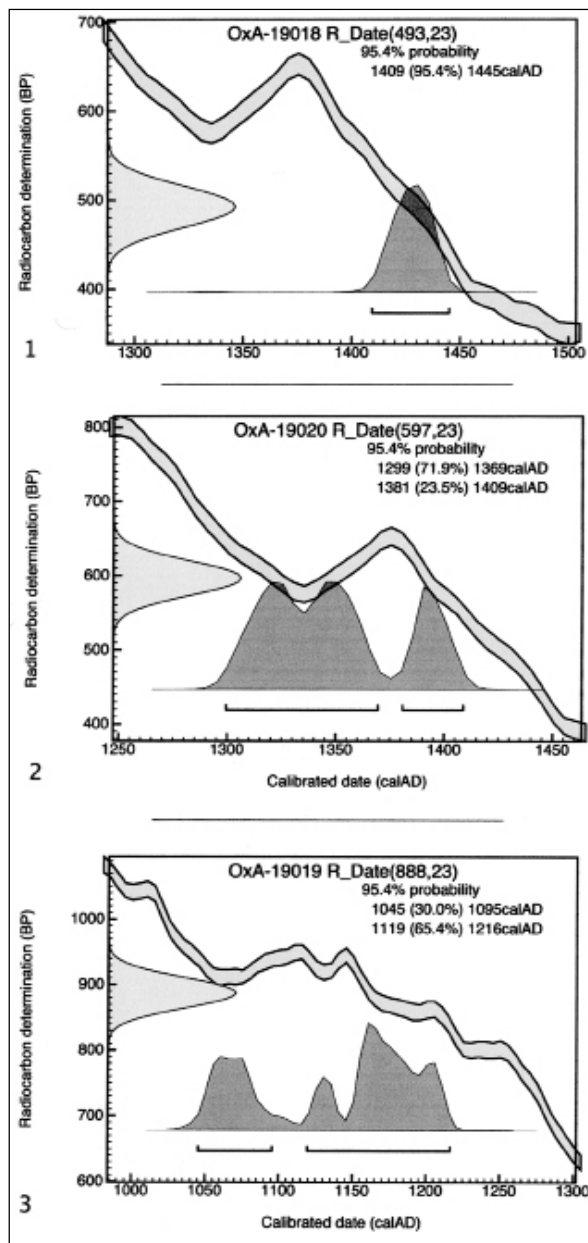
Three radiocarbon dates were acquired from charcoal samples excavated from the Middle Islamic layers in Field L (Fig. 14).⁸ The latest date obtained is from BR43.044, a fill layer that appears to be 'sandwiched' between a Phase 2b surface and Phase 2a ash layers associated with installation BR43.040 (Fig. 14.1). This sample had a very tight calibrated date range of 1409 – 1445AD, with a 95.45% probability. A charcoal sample from the make-up of probable Phase 2b surface BS44.035 (BS45.049) gives a more divided, but clearly earlier, date range of 1299 – 1369AD at 71.9% probability and 1381 – 1409AD at 23.5% probability (Fig. 14.2). The third sample, taken from *tābūn* BR41.026 (Phase

2b) is both the earliest and most dispersed, with date ranges of 1045 – 1095AD at 30% probability and 1119 – 1216AD at 65.4% (Fig. 14.3). This dispersed date range is a by-product of the relatively 'flat' shape of the calibration curve for the eleventh and twelfth centuries AD. An early thirteenth century date would overlap with the latest positively identified coins (reign of al-Malik al-Kamil Muhammad 615 – 635AH / 1218 – 1237AD) from the adjacent hoard (BR41.028.118). However, the possible presence of badly worn fourteenth century AD coins in this same hoard, as well as the lack of any marked difference between the material culture from unit BR41 and units BR43 and BS44 / 45 leads us to credit the early radiocarbon date to the presence of old carbon in locus BR41.026.

Together, the numismatic evidence and radiocarbon assays strengthen our conjecture that the occupational deposits excavated thus far in Field L date to the fourteenth and early fifteenth centuries AD. Extrapolating from these results, we would postulate that the secondary room uses of Phase 2a date primarily to the fifteenth century, as would final abandonment of the Phase 2

8. Radiocarbon assays were run by the Research Laboratory for Archaeology and the History of Art, Oxford University, using an AMS. Calibrations to calendar

years were generated using Oxcal (v.4.05) based on the 'INTCAL04' dataset.



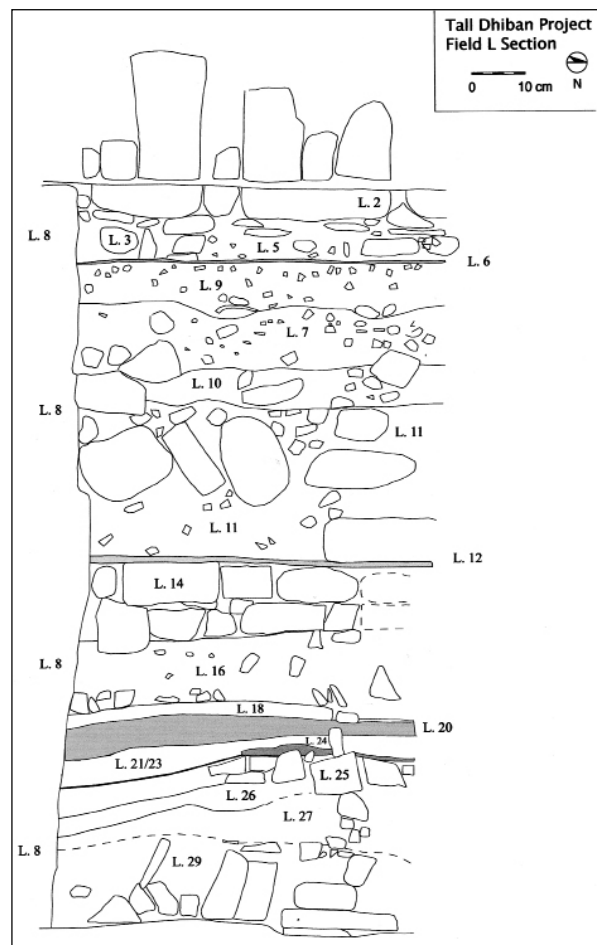
14. Results from three radiocarbon tests of organic materials (OxCal v.4.0.5 Bronk Ramsey (2007); r:5; IntCal04 atmospheric curve (Reimer et al. 2004)).

architecture. We plan to collect more data in future seasons to strengthen this observation. We also plan to gather data that will help establish a date for the construction of the acropolis buildings a date we suspect coincided with Mamluk initiatives to intensify production on the Dhibān Plateau.

Excavations of the Field LII-III Section

A portion of the eroded western section from

William Morton's Field LII - III excavations (1955, 1956, 1965) was cleaned and *in situ* deposits excavated in a 1.25 x 1.25m sounding labeled "L-Section" (Figs. 15 and 16). This allowed us to excavate the entire stratigraphic sequence of Field L in a very small area without great difficulty, checking the accuracy of the earlier project and supplementing the few section drawings that have survived in the Morton excavation archive. Excavations began at the sub-floor levels of the large Mamluk residency excavated by Morton (1989: 244-245), and continued down for 2.70 meters before reaching sterile marl. A total of eighteen directly superimposed loci were excavated. Most of these were associated with a rather poorly built, but well preserved wall (Locus 8), that was founded on sterile marl. Despite very careful observation and excavation, no foundation trenches were identified on the excavated northern side of the wall. Indeed, the initial indications are that de-



15. Field LII - III west section.



16. Field LII - III west section (Photo: B. Routledge).

spite being constructed of stones embedded in chaff-tempered mud with no regular courses or rows, Wall Locus 8 was used from the ninth century BC through to the Byzantine era.

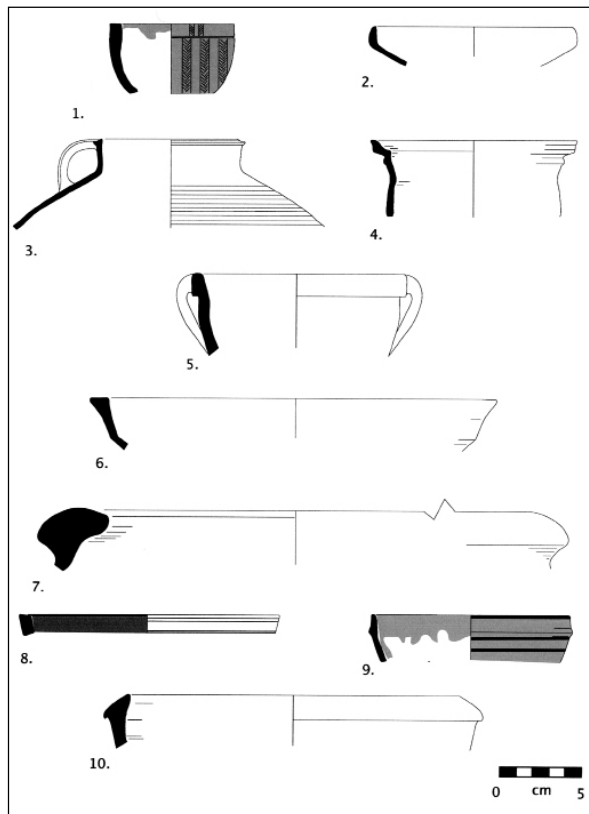
Beneath the flagstone floor (Locus 2) of the Mamluk residency is 0.15 meter of fill layers (Loci 3 and 5) and an earlier plaster floor (Locus 6) that appear to be associated with the lowest courses of the residency's walls. Diagnostic pottery sherds from these loci are very sparse but, on the basis of body sherds, it seems possible that the residency was originally built in the late Byzantine or Early Islamic period. Beneath Locus 6 there is an immediate transition to three consecutive Early Roman layers (Loci 7, 9 and 10) totaling *ca.* 0.50 - 0.55 meter in depth. All three loci are loose fill layers with a high density of pottery, including numerous restorable pieces. Beneath Locus 10, there is again a sharp transition to Iron Age deposits, which make up the remaining two meters of the Field L sequence.

This Iron Age sequence largely matches the five phases laid out for Field L by Routledge (2004: 161-173) on the basis of Morton's excavation archive, and hence appears to be associated with the life of the large public building uncovered by Morton. Locus 11 evidently represents post-occupational wall collapse that occurred within the Iron II period, as it consists of fill and large boulders and overlays a thick, well made plaster floor (Locus 12). This floor is interesting as it laid over a carefully prepared platform of flagstones two courses deep (Loci 13, 14 and 15). A thick fill layer (Locus 16) separates this prepared sub-floor from an earlier plaster floor (Locus 18), which in turn is separated by fill (Loci 20, 21 and 23) from an even earlier plaster floor (Locus 24), also laid over a prepared flagstone sub-floor. In other words, over a depth of *ca.* 0.85 meter we uncovered three successive plaster floors, two of which were laid on prepared flagstone sub-floors. Beneath the earliest flagstone sub-floor is a *ca.* 0.50 meter deposit (Loci 26, 27 and 29) of fill and rubble overlying sterile marl. These fill layers were apparently dumped against the foundations of Wall Locus 8 to support the wall in the absence of foundation trenches.

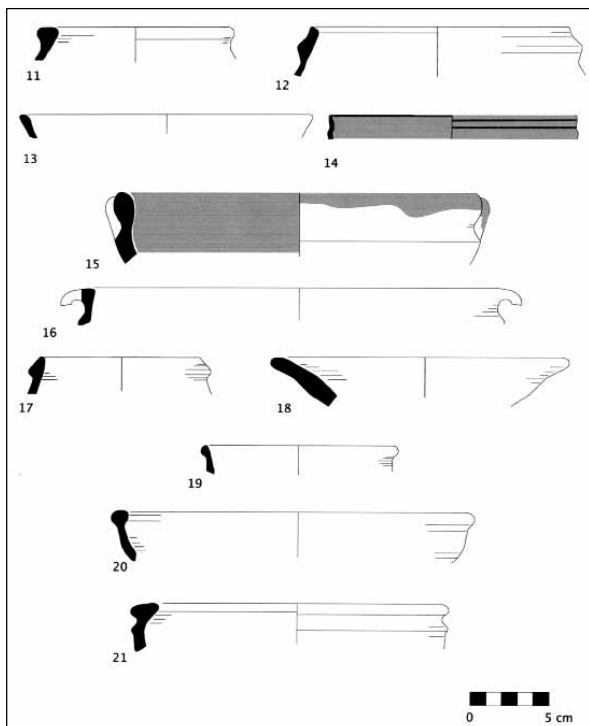
Objects

Ceramics and animal bones were the primary materials recovered from the excavation of the Field LII - III section. Selection of diagnostic sherds are presented in stratigraphic order in **Figs. 17.1 - 17.2**. While no Byzantine - Early Islamic rim sherds were discovered in Loci 3 - 6, an abundance of diagnostic Early Roman sherds were found in Loci 7, 9 and 10. Common forms include bowls with incurved rims (**Fig. 17.1.2**) and cooking pots with thin walls, high necks and triangular rims grooved on the exterior (**Fig. 17.1.3**). Less common forms include what might be a table amphora (**Fig. 17.1.4**) and an unusually shaped *sigillata* imitation with molded relief decoration (**Fig. 17.1.1**). These loci also included painted and unpainted body sherds of Nabataean "egg shell" ware and a molded lamp with radial rim decoration and mottled slip.

The excavated Iron Age loci all seem to date to the Iron IIB period, including the post-occupation deposit Locus 11 (**Fig. 17.1.5-6**). This suggests that Routledge's Iron IIC dating of the



17.1 Ceramic vessels from Field LII - III sounding (See Table 4 for descriptions).



17.2 Ceramic vessels from Field LII - III sounding (See Table 4 for descriptions).

post-occupational Phase 5 from Morton's Field L excavations should be re-examined (Routledge 2004: 164). Despite the presence of Early Bronze II - III and Iron Age I sherds in the loci excavated just above bedrock (Loci 27 and 29), the latest sherds from these loci are clearly Iron IIB in date (**Figs. 17.2.20-21**). This suggests that the earlier pottery was incorporated into fills dumped against Wall 8 to form 'built-up' foundations. Exactly when in the course of Iron IIB this building was constructed, renovated and abandoned is difficult to determine given the small size of our ceramic sample.

Among the outstanding features of the Iron IIB assemblage that we recovered in 2005 was the prominence and high quality of the fine ware sherds. Bowls with fine, well fired, clay bodies decorated with red slip and wheel burnishing are relatively common (**Fig. 17.1.9, 17.2.14-15**), as are bowls decorated with both slip and finely painted black and brown lines (**Fig. 17.1.8**).

Site Development Plan

Dr Magda Sibley and Bianca Goh of the University of Liverpool's School of Architecture collected data for use in the drafting of a site development plan for Dhibān. The site of Dhibān figures prominently both in discussions of Jordan's archaeological heritage and in standard guidebooks to the kingdom, largely owing to the discovery of the Mesha inscription at the site in 1868. Dhibān is also easily accessible by car and prominently located as the last major town on the north side of the Wādī al-Mūjib, hence it is both an important heritage resource for the people of Jordan and a potential destination for foreign visitors interested in this heritage. Furthermore, the neighboring sites of Mādabā, Umm ar-Raṣāṣ and al-Lāhūn, have all been the subject of site development projects, making this southern al-Balqā' a region with an expanding potential for tourism. However, Tall Dhibān itself presents very little in the way of visible archaeological remains that can be readily interpreted by visitors who are not intimately familiar with the archaeological investigations at the site. Hence, there is a pressing need to begin site development, interpretation and conservation planning, in tandem with renewed archaeological excavations at the site. This season, Dr Sibley spent ten days in Dhibān exploring and pho-

Table 4: List of ceramic vessels illustrated in **Figs. 17.1 and 17.2** detailing form, provenance, fabric and surface color, manufacture and treatment.

No.	Type	Unit	Locus	Pail	Number	Dm (cm)	Fabric Color			Surface Color		Production	Treatment		
							Exterior	Core	Interior	Exterior	Interior		Type	Color	Ex/in
1	?	L-Sect	9	28	67	6	10YR8/2 (very pale brown)	10YR5/1 (gray)	10YR8/2 (very pale brown)	10YR8/2 (very pale brown)	10YR8/2 (very pale brown)	mould	relief decor.	na.	ex
2	bowl	L-Sect	7	36	41/56	12	5YR7/3 (pink)	5YR4/1 (dark gray)	5YR7/3 (pink)	5YR7/3 (pinkish white)	5YR7/3 (pink)	wheel	slip	2.5YR4/6 (red)	ex/in
3	cooking pot	L-Sect	7	36	39,67,88,71,72,75,77,81	8	2.5YR4/4 (reddish brown)	2.5YR3/1 (dark reddish gray)	2.5YR4/4 (reddish brown)	2.5YR4/4 (reddish brown)	2.5YR4/4 (reddish brown)	wheel	none		
4	jar	L-Sect	7/10	36/42	44/76,78,79	12	2.5YR6/8 (light red)			2.5YR6/8 (light red)	2.5YR6/8 (light red)	wheel	none		
5	bowl	L-Sect	11	65	61	12	2.5Y8/1 (white)			2.5Y8/1 (white)	2.5Y8/1 (white)	wheel	none		
6	bowl	L-Sect	11	65	64	22	5YR5/4 (reddish brown)			5YR5/4 (reddish brown)	5YR5/4 (reddish brown)	wheel	none		
7	krater	L-Sect	16	99	17	37	10YR8/3 (very pale brown)			10YR8/3 (very pale brown)	10YR8/3 (very pale brown)	wheel	none		
8	bowl	L-Sect	20	139	4	16	7.5YR5/1 (gray)			5YR7/4 (pink)	5YR7/4 (pink)	wheel	slip	10R5/8 (red)	ex/in
9	bowl	L-Sect	20	139	3, 8	12	7.5YR7/3 (pink)			unknown	5YR7/3 (pink)	wheel	paint	5Y2.5/1 (black)	ex/in
10	bowl	L-Sect	21	149	158	20	10YR8/3 (very pale brown)			10YR8/3 (very pale brown)	10YR8/3 (very pale brown)	wheel	slip	10R4/8 (red)	ex/in
11	jar	L-Sect	21	149	161	10	7.5YR7/3 (pink)			7.5YR7/3 (pink)	7.5YR7/3 (pink)	wheel	wheel burnish	n.a.	ex
12	cooking pot	L-Sect	21	149	162	16	2.5Y4/1 (dark gray)			10YR8/2 (very pale brown)	10R6/6 (light red)	wheel	none		
13	bowl	L-Sect	21	149	163	18	5Y4/1 (dark gray)			5YR7/4 (pink)	5YR7/4 (pink)	wheel	none		
14	bowl	L-Sect	21	149	164	16	7.5YR7/3 (pink)			unknown		wheel	slip	10R4/8 (red)	ex/in
15	bowl	L-Sect	23	165	53	22	2.5YR 6/4 (light reddish brown)	5YR5/1 (gray)	2.5YR 6/4 (light reddish brown)	2.5YR 6/4 (light reddish brown)	unknown	wheel	wheel burnish	n.a.	in
16	krater	L-Sect	24	235	1	26	2.5Y8/2 (pale yellow)			2.5Y8/2 (pale yellow)	2.5Y8/2 (pale yellow)	wheel	none		
17	cooking pot	L-Sect	25	184	44	10	5Y2.5/1 (black)			5Y2.5/1 (black)	5YR4/2 (dark reddish brown)	wheel	none		
18	bowl	L-Sect	26	194	18	18	7.5YR7/3 (pink)			10YR8/2 (very pale brown)	10YR8/2 (very pale brown)	wheel	none		
19	bowl	L-Sect	26	194	53	12	2.5YR6/6 (light red)	5Y2.5/1 (black)	2.5YR6/6 (light red)	2.5YR6/6 (light red)	2.5YR6/6 (light red)	wheel	none		
20	bowl	L-Sect	27	206	34	22	2.5YR7/4 (light reddish brown)	10YR8/3 (very pale brown)	2.5YR7/4 (light reddish brown)	2.5YR7/4 (light reddish brown)	2.5YR8/3 (pink)	wheel	none		
21	bowl	L-Sect	29	226	3	18	7.5YR8/3 (pink)	7.5YR7/2 (pinkish gray)	7.5YR7/2 (pinkish gray)	7.5YR8/3 (pink)	7.5YR7/2 (pinkish gray)	wheel	none		

tographing the site, meeting with Department of Antiquities representatives in Mādabā and municipal government officials in Dhibān, as well as visiting other sites in the southern al-Balqā' (both 'developed' and 'undeveloped') in order to place Dhibān in its local contexts from the visitor's perspective. Particular attention was paid to road access, landscaping and pathways in relation to issues of site access and visibility, community impact and ongoing intentional (e.g. vandalism) and unintentional (e.g. animal grazing) damage to the site.

Conclusion

Much progress was made during the 2005 season. Indeed, Dhibān has revealed itself to be an exciting venue where the most pressing questions of Jordan's history can be investigated and hopefully answered. In upcoming seasons, our goals will not only include defining the settlement phase of the Mamluk-era community, but also exploring the Bronze and Iron Ages, as well as the Nabataean, Roman and Byzantine-era settlements.

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THE 2008 EXCAVATIONS AT UDHRUH: INTRODUCTION AND PRELIMINARY REPORT

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Site location

Udhruh lies about 15km east of Petra and approximately 25km north-west of Ma'an (Fig. 1). The ruins of the fortress can be seen on the edge of the modern road between Udhruh and Ma'an. Topographically, the site is located on a gentle slope at the top of Wādī Udhruh and is almost encircled by a series of hills: Tall Juraydah to the north-east, Tall Udhruh (Dubays) to the east, Tall 'Abara (Abu Ar'a) to the south-west and two further hills to the south and south-east respectively.

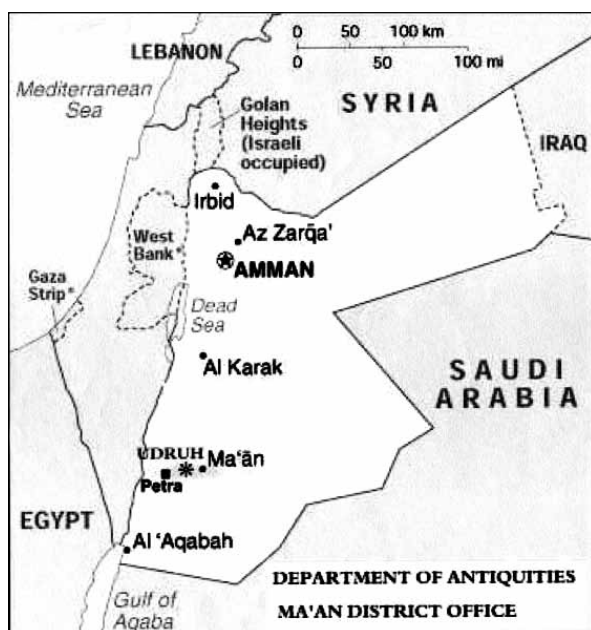
Water Supply

Water was abundant at Udhruh, in the form of a single spring that contributed to the site's prosperity and attracted human settlement throughout time. At present, the spring is dry

and none of its ancient installations are visible on the ground. Only a modern water source and distribution features exist there. The spring of Udhruh was mentioned and described by many explorers as early as the 1820s (Burckhardt 1822: 444). The importance of 'Ayn Udhruh lies not only in its flow and quality, but also in its location very close to — if not within the walls of — a Roman legionary fortress. Doughty (reported in Brünnow and Domaszewski 1904: 462) wrote: "...after fifteen miles is a principal ruined site Utherah; the ancient town built at a strong spring, welling forth in a great water brook". A useful description by a traveller named Wallin is quoted by Brünnow and Domaszewski (1904: 462): "After a march of 5 hours in a NNW direction (from el-Ma'an), we arrived at a spring called Udhruh, whose clear and abundant water is collected in a large pond at the foot of an elevated hill". Hill, again quoted by Brünnow and Domaszewski (1904: 462) confirmed this, saying: "...below this Khan is a stream of clear water issuing from the hillside and falling into a pool a little lower down at the bottom of the valley".

Wallin and Hill both confirm the presence of a large reservoir below the spring of Udhruh. Wallin's observations are the more accurate, locating the reservoir "at the foot of an elevated hill" (Brünnow and Domaszewski 1904: 462). This description could refer to one of two hills, Tall Udhruh or Tall Juraydah, with the former being the most likely candidate. Tall Udhruh lies approximately five hundred metres to the east of the spring (Parker 1986: 95).

The presence of a spring was probably the major factor in selecting a site for the fortress. Gregory (1995: 384 and 387) believes that the spring was probably within its walls. Close to



1. Location of Udhruh within Jordan.

where the spring used to rise, in front of the presumed Ottoman fort and within the fortress walls, a circular, walled cistern was found. It has recently been renovated by the Petra Antiquities Office.

Previous Research

Despite the fact that Udhruh was probably a flourishing site from the beginning of the first millennium AD onwards, it is the ruin of the Roman fortress that first draws the visitor's attention. Apart from the Byzantine church and the traditional houses along the eastern side of the fortress, the archaeological remains are located within the perimeter wall of the Roman fortress. The state of preservation and monumentality of the fortress, as well as its evident importance, have led some explorers and scholars to focus on this structure. Valuable data concerning the plan and architecture of the fortress were published by Brünnow and Domszewski (1904: 433-463) in their *Provincia Arabia*. These German scholars visited Udhruh at the end of 1890s, and their three-volume book contains important information about Udhruh quoted from historical sources and notes documented by other travellers, as well as their own work. The site was also mentioned and described by other explorers (e.g. Burckhardt 1822: 444; Doughty 1923: 35-37; Glueck 1935: 76-77). The first large scale and systematic archaeological project at Udhruh was initiated in the 1980s by Alistair Killick of the British Institute at Amman for Archaeology and History. His work, conducted over five seasons, included excavations at Udhruh — both within the fortress and at Tall Udhruh — and surveys of adjacent areas (Killick 1987, 1987b: 173, 1986: 431-432 and 1983: 231-244). Unfortunately, final publication of this comprehensive body of work has not yet been completed. All that has been published are a few journal papers and a tourist handbook (Killick 1987b). Thomas Parker (1986) visited and surveyed the site in 1979 as part of his "Arabian Frontiers" project. S. Gregory (1995) visited the site and described it in her three-volume book "Roman Military Architecture on the Eastern Frontier". The history and archaeology of Udhruh have also been considered by Robert Schick (1994) in a paper discussing settlement patterns in southern

Jordan during the Byzantine and early Islamic periods. More recently, in 2003, the Udhruh region was surveyed and studied by Abu Danah (Abu Danah 2004 and 2006). In 2000 the Ma'an Antiquities Office conducted an excavation within the Byzantine church.

The Accidental Discovery of 2005

At the end of 2005, during the process of clearing heavy stone blocks from the area outside the western gate of the fortress, an eight-line Latin inscription was accidentally discovered. It provides valuable information concerning the date of the fortress, the name of the legion based at Udhruh, and the names of the Roman officials in charge of the region and fortress (Kennedy and Falahat 2008). This inscription should resolve the debate over the site's history and function, which started in the 1970s and has continued unabated since then. It clearly dates the fortress to the beginning of the fourth century AD and confirms that *Legion VI Ferrata* was based at the site (Kennedy and Falahat 2008).

Key Monuments at Udhruh

As mentioned above, the major archaeological feature at Udhruh is the Roman fortress, but there are also other significant monuments. Outside the curtain wall of the fortress and ca. 20m south of the south-western corner tower, a Byzantine church was constructed to serve the community which seems to have lived within the fortress during the Byzantine period. An Ottoman fort was also constructed against the northern side of the Roman fortress. This fort has been partly reconstructed and restored by the Department of Antiquities. The area within the fortress is huge (about 36 *dunum*) and is occupied by massive ruins, the majority of which seem to be well-planned structures or settlement units. Among these features, there is a significant structure near the western gate of the fortress, partly excavated by Killick and identified by him as a *principia*. In the first half of twentieth century, the inhabitants of Udhruh constructed a traditional village outside the fortress and along its eastern side. They utilised the wall of the Roman fortress for the rear walls of their rooms. The house or *dīwān* of Shaykh Ḥamad Bin Jāzī is one of these houses. Construction material, especially stone, was taken from col-

lapsed structures at the site; large blocks from the Roman wall were also re-used to build the traditional houses.

Historical Background

Udhruh is mentioned in historical sources as early as the second century AD, but none of these references refers to Udhruh as a military site. Ptolemy, writing in the second century AD, described it as a town in *Arabia Petraea* (Killick 1983: 110; Gregory 1995: 383). The site is more often attested to in Byzantine and Early Islamic sources. The Byzantine tax edict known as the “Beersheba Edict” lists Udhruh among the towns of *Palestina Tertia*, as does Stephan of Byzantium (Killick 1983: 110; Parker 1986: 95; Mayerson 1986: 141-148). Udhruh was also suspected to be the Augustopolis mentioned by George of Cyprus and Hierocles (reported by Killick 1983: 110; Parker 1986: 95). Recently recovered data from the Petra papyri support earlier suggestions linking Udhruh with Augustopolis (Graf 2001: 229). Two bishops from Augustopolis are supposed to have attended church councils in the fifth and sixth centuries AD (Killick 1983: 110-111; Parker 1986: 95; Koenen 1996: 178; Fiema 2002a: 210). Udhruh is often mentioned in Early Islamic sources, as the inhabitants of the town agreed to pay poll tax to the Prophet Muhammad in AD 630 (Killick 1983: 112; Fiema 2002a: 210).

It is quite clear that there is a significant discrepancy between the historical record and archaeological evidence recovered from Udhruh. The latter undoubtedly indicates that a Roman fortress was constructed at the site, whereas the historical sources refer to Udhruh as a town. This contrast is confirmed by the fact that Udhruh is not listed in the *Notitia Dignitatum* (ND), which names the Roman military units and their locations in the Roman provinces, including *Palestina Tertia* and *Arabia* (see Seeck 1962: 72-74, 80-82 for units listed in the ND; Bowersock 1976: 226-227; Killick 1983: 110; Gregory 1995: 383; Kennedy 2000: 49). This document is dated to approximately the beginning of the fifth century AD (Genequand 2003: 25). Killick (1983: 110) suggests that “the site may be one of the un-located names in the *Dux Palaestinae* listings, or perhaps the site was temporarily abandoned”.

Udhruh became an important place in southern Jordan from the Late Roman period onwards, when a Roman fortress was built there and from which time its importance was clearly established. The town is the second listed in the “Beersheba Edict” and in about AD 630 paid poll tax to the Prophet Muhammad, along with its neighbour al-Jirba (Schick 1994: 149). Udhruh and al-Jirba appear to have been flourishing agricultural towns during the Late Byzantine and into the Early Islamic periods. By that time, the area seems to have had no garrison or security force. Muslim troops camped near Ma‘ān and marched to Mu’tah near Karak to meet the Byzantine army without encountering any resistance (Harding 1967: 51; Cameron 1993b: 188-9). The size of the settlements at the three sites of al-Jirba, Udhruh and Jabal at-Ṭāhūnah reflects a degree of stability and security in that region. It is at precisely this time that settlement in the dry steppe zone was more intensive than in the ash-Sharāh uplands. However, despite the fact that the entire region of Bilād ash-Shām, or the Levant, was under Muslim control from AD 636 onwards, political, administrative and cultural change did not occur immediately (Cameron 1993b: 186-7; Haldon 1995: 379). Historical sources show that Christianity was practiced at Udhruh up to the 10th century AD. Fiema (2002a: 210-11) has reported that “a Sinaite manuscript dated to AH 288 (900/1) had been written by Thomas, an Egyptian monk, for the priest Musa ibn Hakim al-Adhruhi [from Udhruh]”.

The Middle Islamic period witnessed many historical events and socio-political changes in the entire Middle East, including Jordan, the least of which is that many political powers swapped control over Greater Syria or Bilād ash-Shām (Walmsley 2001: 515-559). The same period also saw the imposition of Crusader military and political control, and the establishment of Crusader provinces in the same area. Jordan in general — and southern Jordan in particular — appears to have lost some of its importance under the Abbasid dynasty, which established its capital at Baghdad in the ninth century (Whitcomb 2001: 506-507; Harding 1967: 52). In the tenth century, the region was under the control of the Fatimid dynasty in Egypt. Geographically, according to the Arab geographer

al-Maqdisi, the country was divided into three districts bounded by natural landmarks. The district of al-Urdun was north of Wādī az-Zarqā', the district of al-Balqā' was between Wādī az-Zarqā' and Wādī al-Mūjib (Biblical Arnon), and the district of al-Mūjib. The capital of the latter was Sughar (Zoar), south of the Dead Sea.

The importance of southern Jordan during the course of the eleventh and twelfth centuries, and under the Crusaders, is archaeologically demonstrated by four significant castles constructed at al-Karak (AD 1142), ash-Shawbak (1115) and Petra (two castles, al-Wu'ayrah (1115 / 6) and al-Ḥabis (12th century)) during that period. Al-Maqdisi, a Muslim geographer of the 10th century, lists Ma'ān and Udhrūḥ among the major towns of the district of ash-Sharāḥ (al-Maqdisi 1994: 141). The latter was one of the six regions of Bilād ash-Shām according to al-Maqdisi's division (1994: 141). He described Udhrūḥ thus: "Adhruh is an outlying town on the borders of al-Hijaz and Syria. They keep here the mantle of the Messenger of God - God's peace and blessings be upon him - and a treaty from him written on parchment" (al-Maqdisi 1994: 161). The presence of Ayyubid and Mamluk ceramics at Udhrūḥ and neighbouring sites would indicate the area continued to flourish, despite the fact that the importance of Udhrūḥ itself may have declined during the Crusader period, particularly in relation to castle towns such as ash-Shawbak and Wādī Mūsā (Walmsley 2001: 518-519).

During the Ottoman period, Udhrūḥ appears to have retained some regional importance as a fort was constructed there. It was located in the north-eastern part of the Roman fortress, near the spring. The construction of the fort was probably undertaken to protect the spring and the settlement. Also, the structure was most likely a station on the pilgrimage route (McQuitty 2001: 569). A garrison at Udhrūḥ would have controlled communications with other centres, such as ash-Shawbak, Wādī Mūsā and al-Jirba, and could have also been responsible for collecting taxes.

The Roman Fortress at Udhrūḥ

The fortress of Udhrūḥ is always referred to as one of the biggest Roman military outposts in Jordan (e.g. Kennedy 2000: 168). The gen-

eral outline of the fortress is still fairly well preserved, particularly the perimeter wall, corner towers and interval towers. In plan, the fortress has a trapezoidal shape owing to differences in the length of the curtain wall on each side and a bend in the east side, near the north-east corner. The north and south sides are the longest, at 246 m and 248m respectively, whereas the west and east sides are 177m and 207m in length (Killick 1983: 231-234; Kennedy and Riley 1990: 131; Gregory 1995: 384; Kennedy 2000: 168). The enclosure wall is fairly well preserved on the west and south sides, where it is 3m thick and still stands to about 6m on the west side, after clearance. However, it has been significantly disturbed on the east side, owing to the construction of the modern (traditional) village. The masonry of the curtain wall consists of two faces on each side, with a rubble core of very large, well cut limestone blocks quarried from a huge quarry about 1.5km north-west of the site (Site No. 028: Killick 1983: 234; Gregory 1995: 384).

Projecting interval and corner towers were constructed along the curtain wall. Twenty U-shaped interval towers were placed on the side walls in addition to the four corner towers. The number of towers varies from one side to another, with four towers on the north and south sides, and six towers on the west and east sides (Killick 1983: 231-234; Gregory 1995: 386). The interval towers "project 6 - 7m at right-angles to the curtain walls before terminating in a semi-circle... the total projection is c. 11m for the interval towers" (Gregory 1995: 386). The corner towers are much larger and "project 13 - 15m with straight sides finishing in a semi-circle of c. 22m diameter" (Kennedy 2000: 168). The best preserved corner tower is the south-west corner, which was excavated by Killick (1983: 239). The excavations revealed that four rooms originally occupied the ground floor of this tower (Kennedy 2000: 168; Gregory 1995: 386). The remaining corner towers are not well preserved, especially that at the north-east corner.

Four gates, one in the centre of each side, seem to have given access to the internal area of the fortress. Each gate appears to have consisted of a single arched entrance, 3m wide, and was flanked by two interval towers, closer together at the point where the gateway was constructed.

Excavations at the north gate uncovered “sockets for a double-leaved door and traces of wheel ruts in the threshold” (Gregory, 1995: 387); this gateway was later blocked by a 3m high wall (Kennedy 2000: 168).

Within the enclosure wall, there is little trace of any major buildings as the site was significantly disturbed by later occupation. However, traces of a building near the west side of the fortress have been tentatively identified as part of the *principia* or headquarters (Killick 1983: 236; Parker, 1986: 95; Gregory, 1995: 387). A few column drums and capitals were seen a few metres from this presumed *principia*; similar fallen capitals have been documented outside the *principia* at Palmyra in Syria (Gawlikowski 1984: plan VI). A recently restored cistern was also found near the Ottoman fort. The surface of the remaining area within the curtain wall is covered with debris and stones.

The 2008 Excavation at Udhruh

Since 2005, the Ma‘ān office of the Department of Antiquities has been working to restore some walls of the Roman fortress, and clear rubble and spoil heaps from the area outside the curtain wall. In 2008, al-Hussein Bin Talal University and the Department of Antiquities agreed to conduct a joint project of excavations in Udhruh. The main purpose of the project was to train participating students in archaeological fieldwork. The team consisted of thirteen students and two archaeologists from the Department of Archaeology in al-Hussein Bin Talal University, and eight workers and two archaeologists from Ma‘ān Office. The excavation lasted for eight weeks between 22 June and 6 August 2008.

Location of the Excavations

Just one area was selected for excavation, owing to the limited duration of the project and small size of the team. When selecting the area for excavation, the archaeologists also took available facilities and the fact that the project is aimed at training participating students into account. Thus, the area of excavation was located inside the fortress, alongside and very close to the eastern curtain wall (Fig. 1). It also lies between two interval towers and parallel to a two room traditional house built against the external

face of the curtain wall. It was relatively flat, and clear of stones and other debris. There was also space for a spoil heap close to the excavated area, but outside the area of the site.

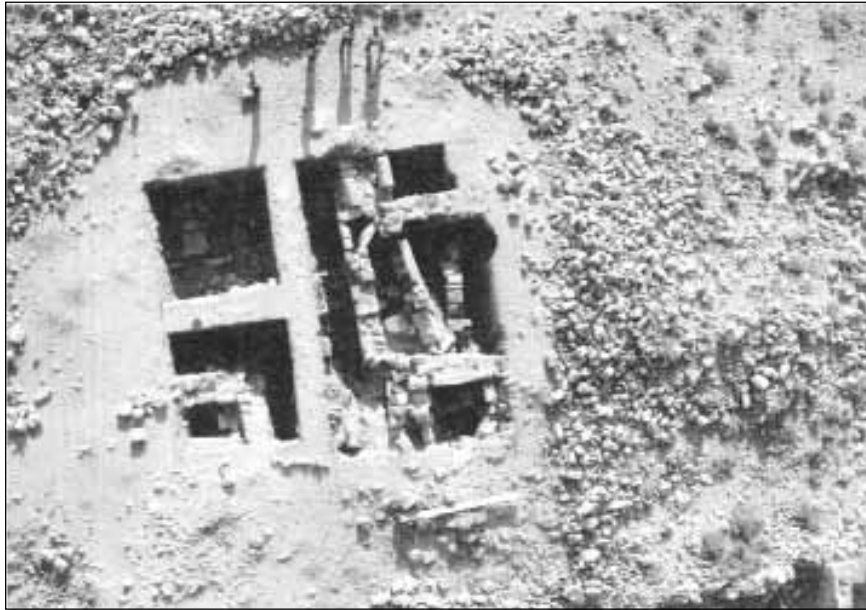
The Archaeological Finds

By the end of the project, five squares had been excavated. Each square measured 4 - 4m. The progress of work necessitated the removal of the baulk between Squares 01 and 02, because its looseness made digging on either side extremely risky. The soil was also very loose in the eastern baulk of Square 01 and northern baulks of Squares 01 and 02, which necessitated the expansion of each square. Square 05 was also expanded from the northern side owing to the continuous collapse of the dump. By the end of the season, Squares 01 and 02 had become a single large excavation area measuring 10 - 8m, while Square 05 measured 4 - 8m (Fig. 2).

The finds from the 2008 excavations at Udhruh are both numerous and useful in gaining an understanding of the site’s history. The most notable are briefly described below.

Architectural Elements

Significant architectural elements were uncovered in four squares: Squares 01, 02, 04 and 05. The architectural elements include walls associated with arch springs, niches and window-like features, arches, and pillars crowned with stone capitals. There is an obvious contrast in the masonry of the walls, notwithstanding the fact that most walls have two faces. While some walls are built of dressed ashlar, undressed stones and sometimes boulders were used to construct other walls. The shape and size of the stones therefore display some variation. Stone blocks seem to have been taken from the walls of the Roman fortress in order to construct — at least in part — some walls. The longest wall (Wall 01) lies in Squares 01 and 02 and runs east - west for about 10m. Two walls (Walls 02 and 03) were built against this wall and extend northwards to intersect another wall (Wall 04) that runs east - west and parallel to Wall 01. Wall 04 was uncovered in the baulk along the northern side of the excavation area (Squares 01 and 02) and seems to extend beyond it. These four walls clearly form a rectangular room, the floor of



2. Aerial photograph of the excavation area.

which was exposed. Juniper posts and plaster-like material were found on the floor, which indicates that these materials were probably used to build the roof.

Walls 02 and 04 are associated with window-like features (**Fig. 3**). These architectural features, despite the fact that they start at the level of the floor, are not high enough to be doors. They were probably large niches used to store domestic materials. A grinding stone was found on the floor near the niches in the north-eastern corner of the room. The existence of a

third window or niche in Wall 03 of this room is also a possibility. There is clear evidence for reuse or, more likely, reconstruction of this room. Approximately 1 m from Wall 01 and parallel to it in Squares 01 and 02, another wall comprising a single row of large blocks was added to the structure. The function of this wall is difficult to understand. Almost in the centre of the room, another wall — associated with an arch — was built within the room, running east - west and touching Walls 02 and 03. However, it is not obvious if this wall and its arch were constructed



3. Apparent room in Square 02.

to support the roof of the assumed room. The orientation of the arch suggests that access to this room was from its southern side, through Wall 01. In the latter wall there seems to have been a door, but this was modified in a later period. Parallel to Wall 01 in Squares 01 and 02, there is a wall in Square 04. Additionally, a wall and associated doorway can be seen right in the north-eastern corner of Square 04. This wall links Wall 01 in Squares 01 and 02 with the parallel wall in Square 04. Thus, the area between the two walls seems to have been a wide corridor or a room that gave access to other rooms in the structure. On either side of the baulk between Squares 01 and 04, floors, hearths and incomplete cooking pots were found at the same level. Moreover, an arch linked the two walls and supported the roof. The arch clearly springs from both walls, i.e. Wall 01 in Squares 01 and 02 and the wall in Square 04. The progress of work in Square 05 led to the discovery of more walls; the most significant is a north - south wall, which runs along the eastern side of the square. The stonework of this wall is distinctive and does not resemble that of the other walls. It is built of dressed stones, using a concrete-like mortar with the gaps between the blocks coated with solid plaster (Fig. 4).

One row of this wall was unearthed in the square, running parallel to the external face of the curtain wall of the Roman fortress. The gap

between the external face of the perimeter wall of the fortress and the edge of this wall is 3m. Excavation within that gap did not reveal the other row of the wall discovered in Square 05. Instead, small stones occupied the space in a near-systematic distribution. This, and the fact that the wall in question is parallel to the external face of the perimeter wall, suggests that this wall may be the internal face or row of the curtain wall of the fortress. Furthermore, it is well known that the width of the perimeter wall of the fortress at Udhruh is 3m. The wall also has upper and lower niches (Fig. 5).

It also became clear that this wall had other walls constructed against it. These walls extend east - west and run right through Squares 01, 02, 05 and 04, forming what seems to be a post-Roman civilian settlement.

Coins

Three coins were found during the 2008 excavations at Udhruh, two in Square 04 and one in Square 01. The three coins are in a very good state of preservation and can be accurately dated. Preliminary readings of these coins show that they all date to the Roman period. However, the fact that they were not found in stratified levels reduces their usefulness in dating associated features. Nevertheless, the existence of these coins is important in gaining an understanding of the history of settlement at Udhruh.



4. Wall in Square 05.



5. Main wall in Square 05.

Pottery

The quantity of pottery varied considerably from one square to another. There were clear contrasts in the typology, ware and decoration of the recovered pottery, and no complete objects were found. In terms of ware, much of the pottery is characterised by coarse and badly fired clay. Various types of decoration could be identified. A large amount of the pottery is glazed and comes in different colours: blue, brown, green and yellow. Some sherds are painted with red and dark brown lines to create geometric patterns, while others have incisions and waves on the slip. Very fine, well fired pottery was also found, particularly in Squares 03 and 05. Most of the excavated hearths and fire places were associated with incomplete pottery vessels, most likely cooking pots, the surfaces of which were coated with soot owing to repeated use. A preliminary reading of the pottery suggests that many historical periods are represented, from the Classical to the Late Islamic periods.

Glass

Small pieces of glass were frequently found in the excavations. The size of the fragments varies considerably and complete objects were not recovered. Most of the glass is decorated and coated with a thin, coloured slip.

Metals

Various metal objects were found in the excavations, including nails, rings and incomplete bracelets.

Conclusion

The 2008 excavations at Udhruh demonstrated that rich archaeological deposits are preserved at the site, reflecting a long history of human settlement. Most of the archaeological remains are located within the perimeter wall of the Roman fortress. Although further work will be required to expose more of the site, the 2008 excavations have yielded important new information, including architectural features, coins, pottery, glass and metals. On the basis of a preliminary analysis of the excavated material, two periods can be distinguished: the Roman and Late Islamic periods. During the latter period, the site appears to have been part of a major settlement cluster in southern Jordan.

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THE SECOND SEASON OF EXCAVATIONS AT UDHRUH PRELIMINARY REPORT

Fawzi Abu Danah, Mansour Shqiarat and Hani Falahat

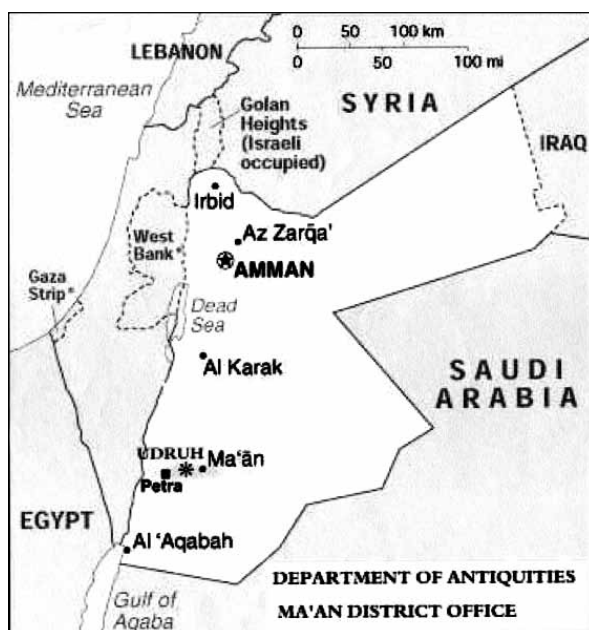
Site Location

Udhruh lies about 15km east of Petra and approximately 25km north-west of Ma'an (Fig. 1). The ruins of the fortress can be seen on the edge of the modern road between Udhruh and Ma'an. Topographically, the site is located on a gentle slope at the top of Wādī Udhruh and is almost encircled by a series of hills: Tall Juraydah to the north-east, Tall Udhruh (Dubays) to the east, Tall Abara (Abu Ar'a) to the south-west and two further hills to the south and south-east respectively.

The 2009 Excavations at Udhruh

Since 2005 the Department of Antiquities, represented by the Ma'an Office, has been carrying out work at Udhruh. This has included restoration of some walls and clearance of the

dump and associated rubble outside the curtain wall of the Roman fortress. In 2008, al-Hussein Bin Talal University and the Department of Antiquities agreed to conduct a joint project of excavations at Udhruh. The main purpose of the project was to train archaeology students at al-Hussein Bin Talal University in excavation techniques. However, it was also anticipated that the excavations would yield important information regarding the site's history. A second season of fieldwork was conducted in 2009. The team consisted of seventeen students and two archaeologists from the Department of Archaeology at al-Hussein Bin Talal University and eight workers, employed by the Department of Antiquities, and two archaeologists, Hani Falahat and Amer Bedour, from the Ma'an Office. The excavation lasted for six weeks between 1 July and 16 August 2009.



1. Location of Udhruh within Jordan.

Location of the 2009 Excavations (Fig. 2)

At the beginning of the season an area, designated Area 2, was chosen for excavation. Towards the end of the project, the team decided to excavate the interval tower adjacent to Area 2 as an open area. The area of excavation was located within the fortress on its eastern side, along and very close to the curtain wall. Five squares, each 4 x 4m, were laid out. To the east, the baulk line was located almost in the middle of the thick curtain wall; at least 1m of the curtain wall was therefore included within the squares. The excavation area was both relatively free of stones and debris, and relatively flat. There was also space for a spoil heap outside the site, yet very close to the excavated area.

The Archaeological Finds

By the end of the project, the five squares and



2. Oblique aerial photograph of the excavation area, taken by D. Kennedy in 2009 (Ref. APAAME_20090930_DLK-0299).

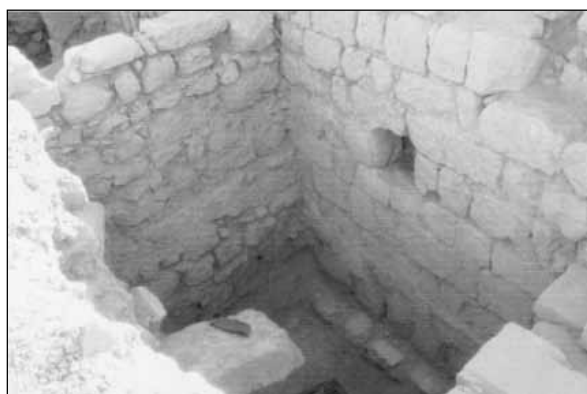
one open area had been excavated. The archaeological finds can be summarised as follows:

Architecture

Architectural elements were recorded in the five squares as well as in the open area. It had been anticipated that the excavations would reveal architectural features, as the five squares were situated along the curtain wall of the fortress and the open area was within a U-shaped interval tower. Each trench also included part of the curtain wall, which has a width of approximately 3m. Considerable parts of the perimeter wall were visible on the surface, especially its external side. At the end of the season, the entire inner side of the curtain wall of the fortress was exposed within the five squares. It is consistent in terms of height, stonework and alignment across all squares but, unlike the external side which is built of large limestone blocks clearly brought from the quarry at Udhrūh, the inner side

of the wall is constructed largely of medium and small limestone blocks most likely taken from the pre-Roman structures at Udhrūh. The style of masonry and size of the stones is quite different. In some places there is good evidence to suggest that the wall had seen some restoration and reconstruction in later periods. These works are quite clear, especially where there are walls built against the Roman wall. However, there is no evidence to suggest that there were two phases of construction for the wall during the Roman period. The wall's masonry is consistent from top to bottom, except in some — typically lower — courses where black stones were used. The presence of these stones is unsurprising given that there is a quarry for them just outside the southern side of the fortress. Stones of the same type and colour were also used in the lower courses of the southern wall of the fortress, including the interval towers. The lowest course in the wall is part of the foundations; it is supported on stones sunk into the ground (**Fig. 3**), which extend along the wall. This method of construction is attested to in each trench of Area 2, as well as the 2008 trenches of Area 1.

The joins between the stones appear to have been originally coated with plaster, but this is not well preserved along the entire wall. Having cleared the topsoil, a few stone alignments started to appear in Squares 03, 04 and 05. These turned out to be shallow and were probably the remains of animal corrals built against the curtain wall in the 18th or the 19th centuries. Some alignments were even located above the uppermost preserved course of the curtain wall of the fortress. The progress of work revealed proper walls, fairly well preserved, which about the pe-



3. The walls and foundation stones in Area 2, Square 05.

rimeter wall and extend westward. They were documented in Squares 01, 02, 03, 04 and 05, but vary in stonework, height, width and function. At the same time, it can be recognised that some of these walls belong to the same period and have a specific function. For example, the two walls in Squares 03 and 04 are parallel and have what seem to be arch springs. The space between the two walls is about 9m. These and the other walls also seem to have undergone some restoration and reconstruction. The function of these walls can be quite confusing, as in Square 05 where three walls within the square abut the curtain wall, but the one in the middle does not run all the way through the west baulk. It just projects for *ca.* 1.5metres from the Roman wall. In Square 03, a stairway was discovered in the north-east corner and is still intact. It clearly leads through a doorway to the upper floor of the interval tower excavated in the open area, giving access to the walkway along the top of the curtain wall between the towers. In a later, post-Roman, period, the door was blocked by a two row wall preserved to a height of almost 2m (**Fig. 4**).

A significant architectural feature documented in both Squares 03 and 04 is a standing stone on a base. In both instances, the standing stone and base are large, dressed limestone elements; the fact that they have almost the same elevation suggests that they may date to the same period. The function of these features cannot be determined at this stage. Additional work to the west is expected to uncover more information. A more interesting architectural element was uncovered in the east baulk, between Squares 01 and 02. It is a small gateway that gives access to the lower floor of the interval tower (**Fig. 5**). The gateway is constructed of very large blocks. It is relatively narrow, to the extent that only one person can go through. The overall impression is that this entrance is contemporary with the perimeter wall of the fortress; there is no good evidence to suggest that it was a later addition to the structure.

Significantly, the area within Square 02, which is accessed by the doorway is paved with rectangular slabs. Right in the north-west corner of the same square and contiguous to the paved floor, a twelve metre deep hole was discovered. The shaft opening was covered with a large



4. Roman staircase in Square 03, blocked by a later wall.



5. Doorway of the interval tower in Square 02.

stone, under which is an arrangement of stones bedded into the ground to form an entrance or 'mouth'. The function of this hole is puzzling and, at this stage, it can be suggested — amongst other hypotheses — that it was part of a drainage system, or perhaps simply a cistern to collect rainwater. The architectural features in the open area around the interval tower are indeed remarkable. The tower's original architecture

consists of a U-shaped projecting tower built against the curtain wall. Its wall has two rows filled in with rubble; both the internal and external rows are constructed of limestone ashlars. Like other interval towers at the site, it had a vaulted roof and there is a possibility it consisted of two floors. In a later period, this interval tower was clearly re-used for industrial purposes. It was divided into two parts, separated by a two row wall. The first part, between the doorway of the tower and the later wall, was used as a lime kiln. The kiln itself was constructed of small stones fixed with mortar, and was almost circular and approximately three metres deep. Immediately below the topsoil was a soft, white layer of lime, which continued down to a considerable depth, almost to the bottom of the kiln. Underneath the lime layer was a layer of ash and charcoal. Towards the bottom of the kiln, the circular wall narrowed; in other words, the diameter at the base is far less than that of the top. The second part of the tower appears to have been used to produce charcoal for the kiln, high temperatures being required for lime production. Excavation in that part of the room exposed a wide layer of ash. The charcoal seems to have been shovelled into the kiln through a small aperture located in the centre of the partition wall (**Fig. 6**).

Pottery and Glass

The quantity of pottery recovered this season is far less than that recovered in 2008. However, the quality and typologies represented are quite different. A preliminary reading was indicative



6. Partition wall in the centre of the interval tower, in the open excavation area. The lime kiln is behind the wall; the aperture in the centre was used to feed the kiln with charcoal.

of the Roman, Byzantine and early Islamic periods. Late Islamic pottery sherds, especially of the Ayyubid - Mamluk period, were also found, especially in Square 01 which is contiguous with Area 1 where the late Islamic period is predominant. Among the significant finds of pottery are four lamps, three of which are in a relatively good state of preservation. Other complete objects were not found, but the restoration of broken pieces produced a number of semi-complete objects. Generally speaking, throughout the excavated squares, small pieces of glass were found in association with pottery, particularly on floors.

Coins

One coin fragment was found in Square 05. It is worn and the depicted figures and symbols can be hardly seen; it would be probably better after cleaning. The provisional reading of this coin in the field suggests that it may be Byzantine and depict the letter M. In the same square, a considerable quantity of marble tiles and slabs were discovered; one of them bears the Greek letter M. Therefore, there is a possibility that the marble stones were brought from the church outside the fortress, near the south-west corner tower.

Personal Objects

A number of personal objects were found in some squares. These include rings, bracelet fragment and some beads.

Other Finds

Among the archaeological finds from Udhruh is a heavy cornet quern made of basalt, mostly complete except for a missing part near the handle on one side. This quern was discovered in Square 02 right above the pavement and very close to the reported hole. Its diameter at the mouth is *ca.* 0.5m and at the bottom *ca.* 0.2m; its base is open. Metal nails, similar to the ones discovered in the 2008 season, were found in some trenches; their length does not exceed 10cm.

Conclusion

The 2009 finds have proved useful in helping us to understand the history of the site, especially in the post-Roman periods. Significant new information was recovered. In the Area 2 exca-

ventions, there is more evidence from the Roman, Byzantine and — probably — early Islamic periods, and less from the late Islamic period. Substantial parts of the curtain wall of the fortress were exposed. The same wall was renovated in later periods, when new buildings were constructed against it. It is also clear that these new units were for domestic use; their walls were associated with stratified floors and hearths. It has also become apparent that the stonework on the two faces of the curtain wall is not the same; large blocks are used on the external side, while smaller blocks are used on the internal. Excava-

tion in the open area, around the interval tower, revealed new information regarding the history of the towers and the longer-term use of the site. This particular tower was converted into a lime kiln. Our overall conclusion is that the post-Roman period inhabitants of Udhruh dealt positively with the remains of the fortress, its curtain wall and towers. They used the space without destruction and for this reason the core of the fortress are reasonably well preserved. More activities and changes are expected to have taken place within its walls.

MADABA PLAINS PROJECT: EXCAVATIONS AT TALL AL-‘UMAYRĪ, 2008

Larry G. Herr and Douglas R. Clark

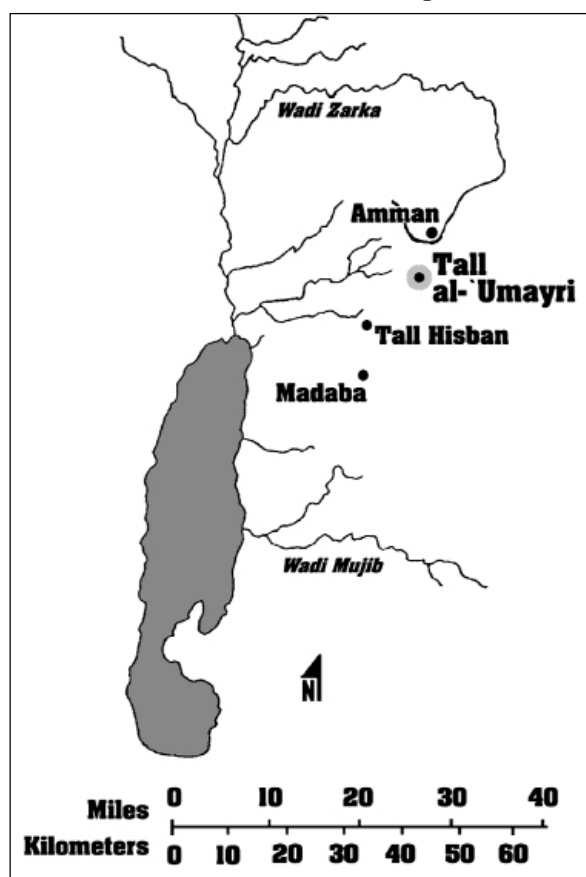
Introduction

A twelfth season of excavation by the Madaba Plains Project at Tall al-‘Umayrī occurred between 25 June and 30 July 2008. It was sponsored by La Sierra University in consortium with Andrews University School of Architecture (Michigan, USA), Canadian University College (Alberta, Canada), Mount Royal College (Alberta, Canada) and Walla Walla University (Washington State, USA). Full reports have already been published for the first five seasons (first season [1984]: Geraty *et al.*, eds. 1989; second season [1987]: Herr *et al.*, eds. 1991; third season [1989]: Herr *et al.*, eds. 1997; fourth season [1992]: Herr *et al.*, eds. 2000; fifth season [1994]: Herr *et al.*, eds. 2002). A sixth full report (1996-1998) is in press and a seventh (2000) is being edited. Preliminary reports have also been published (first season [1984]: Geraty 1985; Geraty *et al.* 1986; 1987; second season [1987]: Geraty *et al.* 1988; 1989; 1990; third season [1989]: Younker *et al.* 1990; Herr *et al.* 1991; LaBianca *et al.* 1995; fourth season [1992]: Younker *et al.* 1993; Herr *et al.* 1994; fifth season [1994]: Younker *et al.* 1996; Herr *et al.* 1996; sixth season [1996]: Younker *et al.* 1997; Herr *et al.* 1997; seventh season [1998]: Herr *et al.* 1999; 2000; eighth season [2000]: Herr, Clark and Trenchard 2001; 2002; ninth season [2002]: Herr and Clark 2003; 2004; tenth season [2004]: Herr and Clark 2005a; 2005b; and eleventh season [2006]: Herr and Clark 2008a; 2008b).

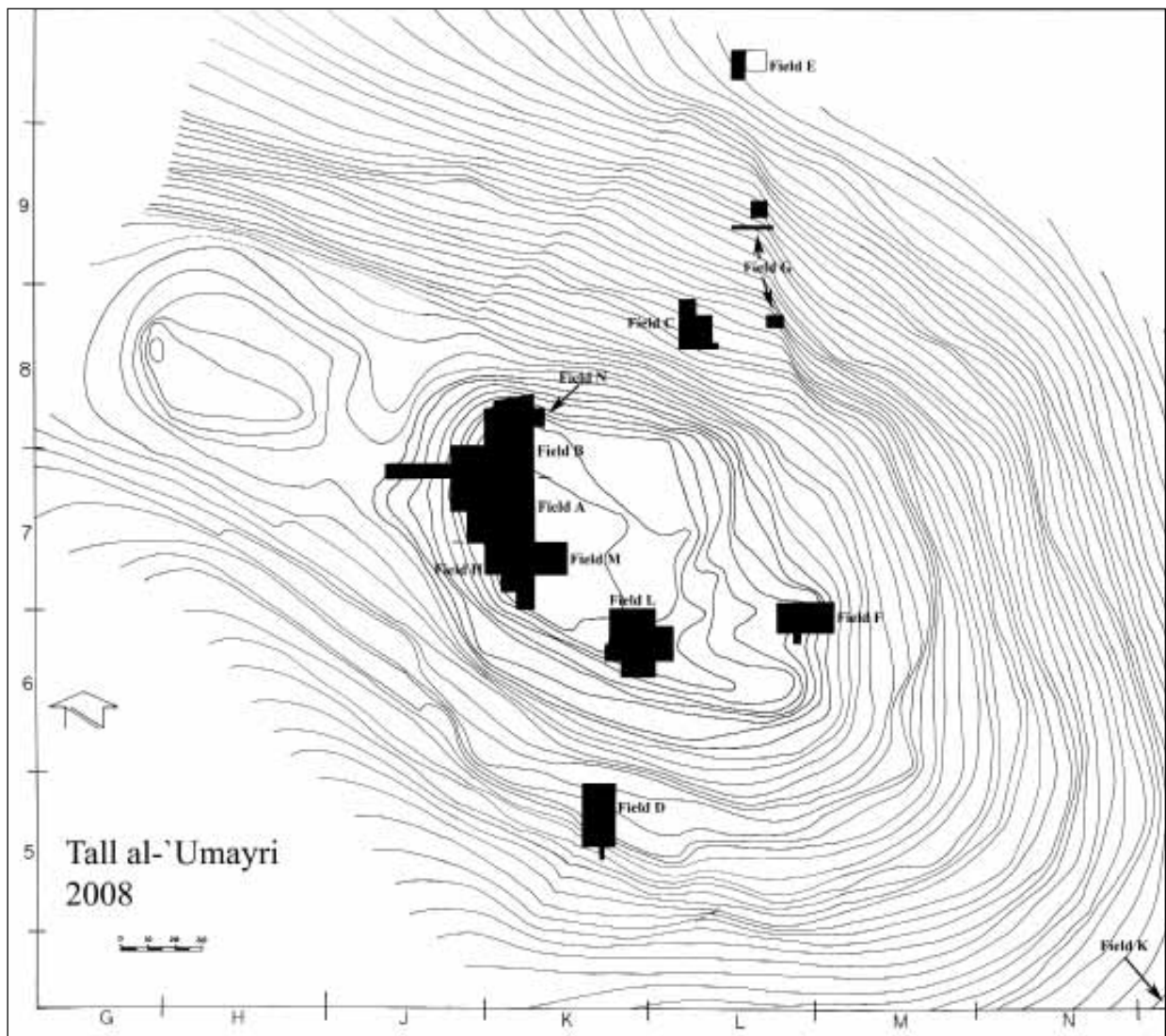
In the 2008 season, a team of 34 Jordanians and 96 foreigners (18 of whom were only present during the first or second half) participated in the fieldwork and camp activities of the interdisciplinary project at al-‘Umayrī, located 12 km south of Amman’s Seventh Circle on the

Queen Alia Airport Highway, at the turnoff for Amman National Park (Fig. 1).

In the first season (1984), four fields of excavation were opened (Fields A, B, C and D) (Figs. 2 - 3). During the second season (1987) three of the four were expanded (Fields A, B and D), one was completed to bedrock (Field C) and two new fields were opened (Fields E and F). In the third season (1989), one field expanded (Field



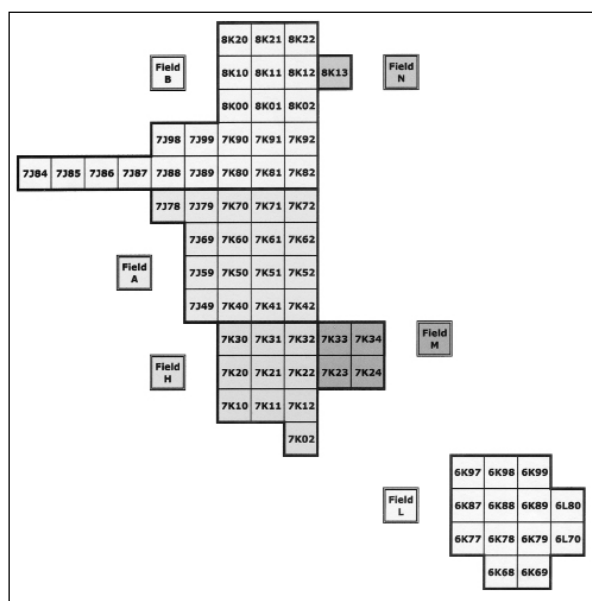
1. Map of the central plateau of Jordan with the major sites of the Madaba Plains Project (unless otherwise noted, all plan and photos are from the Madaba Plains Project – al-‘Umayrī).



2. Tall al-'Umayri: 2008 topographic map with the location of the fields of excavation.

A), three fields re-opened old squares and expanded slightly (Fields B, D and F), another reduced excavation from two squares to one (Field E), and a new field was opened on the northern slope as a series of three soundings (Field G). In the fourth season (1992), three fields deepened previously opened squares (Fields A, D and F), one deepened existing squares while expanding by one square (Field B) and two fields were discontinued (Fields E and G). During the fifth season (1994), one field deepened (Field A), another expanded and deepened (Field B) and one was added (Field H). In the sixth season (1996), three fields expanded (Fields A, B and H). The tomb excavations on the south-eastern

slopes of the *tell*, already begun under the hinterland survey in 1994, became part of the al-'Umayri *tall* excavations as Field K. During the seventh season (1998), two fields deepened their squares (Fields A and B), two expanded (Fields H and K) and a new field was opened on the southern edge of the site (Field L). In the eighth season (2000), we deepened three fields (Fields A, B and H), and expanded and deepened two fields (Fields K and L). During the ninth season (2002), Field A was not worked, while Field B expanded to the north and continued in two other squares; Field H limited itself to the large plastered and cobbled courtyard near the northern extent of the field (next to Field A); in Field



3. Tall al-'Umayri: Schematic grid of squares for Fields A, B, H, L, M and N, without regard to the relationship of Field L with the other fields. Field L should be moved to the right for its correct location; compare with the topographic map (Fig. 2).

L we exposed more of the Hellenistic structure by opening two new squares and re-opening one other. During the tenth season (2004), Field A deepened squares begun during the 1980s; Field B deepened three earlier squares and expanded to the north to intersect the northern edge of the site; Field H deepened earlier squares in its northern part; Field L deepened three previous squares and opened one new square. During the eleventh season (2006), Field A concentrated on removing balks and small areas between walls to deepen the western part of the field to late Iron 1 levels; one square was opened at the south-west corner of the field to examine the possible existence of a gateway. In Field B, excavation concentrated on uncovering floors in the northern part of the remarkably preserved LB building. Excavation in Field H concentrated on bringing the southern part of the open-air sanctuary down to late Iron 1 levels. Field L, on the southern edge of the site, expanded to the east and north with three new squares.

This season (2008), Field A aimed to expose the third LB / Iron 1 house in the southern part of the field by going deeper in most squares. Field B completed the excavation of the LB building and added a square to the east with a new field designation, Field N. Field H went

deeper in four squares, exposing the top of the LB / Iron 1 levels and locating the bottom of the southern portion of the perimeter wall. Field L went lower in three squares and added two more squares to the west. We also added a new field, Field M, east of Field H in our overall goal of connecting Fields H and L. This season also saw the start of our use of high-resolution GPS for the location of fields, squares and architecture. It forced a slight change of orientation to align all our squares with true north and we chose to locate squares on primary grid lines, causing some squares to be smaller in their east - west measurements. In the process we established and cemented into place three permanent benchmarks on the site.

Finally, after 12 seasons, we can begin to talk about stratum numbers for the site. We think, reasonably, that no new significant settlements will be discovered beyond those we have already found. We thus include a stratigraphic chart (Fig. 4).

Field A: The Western House Structures (Robert D. Bates, La Sierra University)

Field A is located at the central western edge of the site (Figs. 2-3). Ten previous seasons (the field was not excavated during the 2002 season) had exposed a large administrative complex from the end of the Iron 2 period, extending into Persian times. Domestic dwellings, perhaps belonging to the officials who worked in the administrative complex, were built to the north and south of the complex. To the north and west, outside the area of this complex, were multiple phases of Iron 1 remains, including very significant structures from the earliest decades of that period (initially we referred to this period as early Iron 1, but have now determined it best to call it LB / Iron 1 to emphasize that there are significant LB features). These were found primarily in Field B to the north in earlier seasons, but also to a lesser extent in the north-western parts of Field A.

This season, we began to expose the top of the destruction layer of the LB / Iron 1 stratum (Stratum 12) in all areas of the field. Not enough has yet been excavated to suggest a coherent plan for the third house from this period that seems to be in this area, just south of two other houses in Field B and the northern part of Field

Stratum	Date	Fields	Finds
	Neolithic	E&W slopes	Flint scatters
	Chalcolithic?	East valley	Sherds on surface
Hiatus	EB 1A		No remains so far
21	EB 1B	K	Dolmen and associated surfaces
20	EB 2	D	Wall fragments above bedrock
19	EB 3	CDG	Houses & streets on terraces on S & N slopes
18	EB 4	D	Ephemeral one-room houses widely separated
17	EB 4	D	Small walls of cobbles, perhaps animal pens
Hiatus	EB 4-MB 2A-B		No remains so far; cemetery east of the airport highway
16	MB 2C	BC	Sherds in Field B rampart; wall frags & floors in Field C
15	MB 2C	BCK	Moat, rampart & wall frags in Field B; wall frags & floors in Field C; cave tomb in Field K
Hiatus?	LB 1		No clear remains so far
14	LB 2	BF	Palace/temple in Field B; terrace wall in Field F
13	LB/Iron 1	B	Sherds in Field B rampart
12	LB/Iron 1	ABFH(L?)	Perimeter wall, gate & houses in Fields A, B & H; walls frags in Field F; large stone walls in Field L?
Hiatus	Iron 1A		Significant typological difference between pottery of Strata 12 and 11
11	Iron 1B	AH	Wall frags above Str 12 destruction in Field A; wall frags in Field H
10	Iron 1B	AH	House with rooms & floors in Field A; lowest courtyard sanctuary in Field H
9	Iron 2A	ABH	Few red-slipped, hand-burnished sherds; poss continuation of courtyard sanctuary in Field H
8	Iron 2B	A	House in Field A with pottery of the late 9th to 8th centuries
7	L Iron 2/Per	ABCEHFL	Administrative complex & houses in Fields A, B, C, F & L; well in Field E; sanctuary in Field H
6	L Iron 2/Per	AH	Major changes to administrative complex in Field A; houses in Field B; sanctuary in Field H
5	Per	AH	Prob domestic wall frags in Field A; poss continuation of sanctuary in Field H; Persian provincial seals
Hiatus	Late Per		No remains so far; poss also very early Hel
4	Hel	HLK	Pits in Field H; farmstead in Field L; tomb with Greek inscription in Field K
3	ER	AB	Ritual pool was prob part of a farmstead or villa
Hiatus?	LR	H	One pot found outside the settlement
2	Byz	F	Farmstead wall fragments and pottery
1	Islamic	ABCDEFHL	A few sherds in topsoil represent agricultural activity: Early Islamic, Middle Islamic, Late Islamic, Modern

4. Tall al-'Umayri: Stratigraphic chart.

A. We were also able to demonstrate the absence of a gate where the Stratum 12 perimeter wall turns into the city. Instead, we discovered the southern extension of the perimeter wall to the south of that curve. We also discovered parts of a house from the Iron 2B period (Stratum 8) that produced significant amounts of broken pottery on the floors of the rooms. This is the first time we have found architectural remains from that period. We re-opened Squares 7J59, 7J69, 7J78, 7J79, 7K40, 7K50, 7K60 and 7K70. Many of the operations were very small and square supervisors hopped from square to square as we tried to bring the excavation of the field into phase.

Stratum 12 (LB / Iron 1 Transition; Field A Phase 13)

In the 1998 season we had discovered that the north - south perimeter wall curved into the city in Square 7J59 on an east - west orientation (Herr et al. 1999: 102). This season we traced the wall as it continued into the city through Squares 7K50 and 7K40, where it seems to have been robbed by the builders of the late Iron 2 administrative basement structures. We thus have no idea how far it originally ran toward the east. As early as the 2002 season we had wondered if a large parallel east - west wall about four me-

ters to the south could be the southern side of an entrance way into the city. We could discern no gate tower structures or piers lining the entrance, but posited a simple entrance between two parallel walls. We further suggested that a large north - south wall at the western edge of Field H, whose founding level had not yet been reached, could be the continuation of the perimeter wall around the southern part of the site.

In 2006 we discovered the end of the monumental southern wall, with one stone measuring 2.4 x 1.2 x 1m. We even discovered the tops of walls that appeared to be small piers jutting into the entry way, dividing it into very shallow chambers. We thus hoped to find more of this gate or entrance during this season's excavations.

Unfortunately, our finds this season seem to have laid any talk of a gate to rest. Extending south of the perimeter wall just after its curve to the east was a large north - south wall that crossed the expected 'entrance way' and passed under the south wall of the expected gate (**Fig. 5**). Indeed, it continued south and became the large north - south wall we had already suggested was the perimeter wall around the south - western part of the town. At least this part of our hypothesis was correct. The extent of the pe-

rimeter wall is thus clear: it stretches south from Field B, curves eastward into the town for about 7 meters where it apparently ended; another north - south wall then was built to defend the south - western portion of the site (**Fig. 6**). The east - west wall we had originally hoped would



5. Tall al-‘Umayri: Field A, Stratum 12: The newly discovered perimeter wall at lower left passes under a later Iron 1 wall.



6. Tall al-‘Umayri: Field A, Stratum 12: A small portion of the stone perimeter wall that protected the south-western portion of the site; at left is the later Iron 1 wall also visible in Figure 5.

be the southern side of the gate area turned out to be a later wall (it was constructed over the south - western perimeter wall). Its precise function is unclear, though we can suggest that it may have been associated with the Iron 1 open courtyard sanctuary found just to the south in Field H.

The northern portions of a third house (House C) were excavated this season immediately south of Houses A and B, found in earlier seasons. The northernmost house in Field B (House B) was the well-known “four-room house” that was fully excavated in 1996 and has been partially reconstructed. The second house (House A) was in both Fields B and A and was fully excavated in 2000. As was true with the other two houses, the new one produced copious amounts of pottery on the floors of two rooms, especially early forms of collared *pithoi*, almost exactly similar in form to those found in the other two houses. We estimate another 12-15 *pithoi* were unearthed this season. But this time, they contained many more potters’ marks on the handles, sometimes on both handles. There was one type of potters’ mark that was most frequent, but two others also were discovered. We are in the process of trying to determine if there is a correspondence between the form of the vessels and the potters’ marks.

The destruction layer was much shallower here than in the other two houses. This one may have had only a ground floor, although later Iron 1 structures were built on top, possibly destroying the upper courses and upper portions of the destruction in this area. In one of the rooms of this house was a small grinding installation with the lower millstone in situ and the upper millstone lying nearby (**Fig. 7**). Other parts of the destruction were found in three other locations in probes, but none of them reached the floors. There is room for only one other house between House A and the curve of the perimeter wall. We thus suggest that all remains from Stratum 12 found this year in Field A belong to House C. We hope to complete excavation of this house next season.

Strata 11 - 10 (Iron 1B; Field A Phases 12 - 11)

Above the destruction of Stratum 12 were small wall fragments discovered in earlier seasons. This season, a few very small wall fragments were added to the list, as were a few thin



7. Tall al-'Umayri: Field A, Stratum 12: Small grinding installation in one of the rooms of House C.

earth layers that seem to go with them. These appeared above the Stratum 12 destruction, but were under the walls of Stratum 10 (as exposed in earlier seasons).

South of the perimeter wall, beyond its eastern curve, the parallel wall previously thought to be the southern side of a gate complex must belong to this stratum, though its function at present is unclear (**Fig. 5**). As suggested above, it may be related to the courtyard sanctuary in Field H.

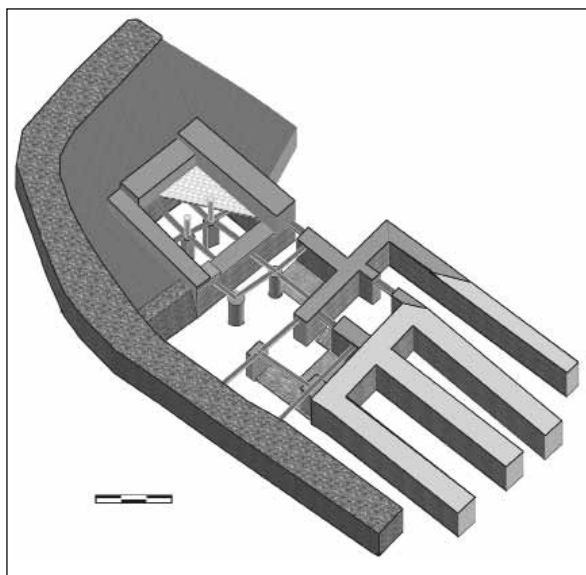
Stratum 8 (Iron 2B; Field A Phase 8B)

Although we began to find earth layers for this phase in 2004 and 2006, this season, for the first time, we established clear stratigraphic evidence for the Iron 2B period at the site. Previously, we had collected only potsherds. This time, in Squares 7K50 and 7K60, we discovered three to four rooms surrounded by stone walls, and cobbled and beaten-earth surfaces covered with pottery (**Fig. 8**). The western wall of the structure is still preserved to a height of almost 1.5m. We had mistakenly ascribed this wall to the Iron 1 period in previous publications. The 2006 excavations also demonstrated that the pillared room further to the west, with no visible entrance, was actually also from this period. Thus, our previous latest Iron 1 phase must now be re-dated to the Iron 2B period (**Fig. 9**).

The pottery from the floors consisted primarily of bowls, with some cooking pots. Relatively few vessels were storage jars. Separating the rooms were stone walls, as well as large solitary stones that must have been bases for wooden pillars. A fragmentary staircase was found at one side of the structure in earlier seasons,



8. Tall al-'Umayri: Field A, Stratum 8: Composite photo (hence the white areas) of the eastern two-thirds of the Iron 2B house, from the west.



9. Tall al-'Umayri: Field A, Stratum 8: Computerized isometric reconstruction of the Iron 2B house by Robert D. Bates.

when we thought it was part of the Ammonite administrative complex of Stratum 7. The eastern portion of the building is not clear because the basement structures of the Stratum 7 Ammonite administrative complex seem to have destroyed it. The northern entrance to the structure, with the door jambs standing over a meter high, may have been the primary entrance to the house, of which the southern limits are not yet well understood. It must have extended to the perimeter wall, after the latter curved into the town, although we did not find a surface there, perhaps owing to its use as a storeroom. The present southern extent of the house cannot be its orig-

inal limit because there is no wall there, only two large pillar bases. Elsewhere in the building there was a wide opening between two stubby piers that led from the north-eastern room into the room to its south. Perhaps it was hung with a blanket or carpet.

Field B: The Late Bronze Age Building (Kent V. Bramlett, University of Toronto)

Field B is located in the north-west acropolis of the *tall*. A new field, Field N, was opened adjacent to and east of Field B with only one square (**Fig. 3**). The excavations of the past twenty years in Field B revealed Middle Bronze Age fortifications along the north-west slope of the *tall*, a Late Bronze Age monumental building, an Iron 1 residential district with two houses exposed and evidence of attempts at re-fortification, and three levels of Iron 2C residential structures.

This season, excavations aimed to complete the exposure of the Late Bronze Age building of Stratum 14, which had been excavated in several previous seasons but still needed further work in several areas. We also sought to answer questions concerning phasing, the function or interpretation of certain walls, and the delineation of certain exterior wall faces and corners. These objectives were all achieved. Excavation resumed in ten squares: 7K91, 8K00, 8K01, 8K02, 8K10, 8K11, 8K12, 8K20, 8K21, 8K22 and, in Field N, the one new square was 8K13. Although we have not yet reached bedrock, excavation in Field B is now complete. Only the massive MB rampart layers lay beneath the LB building.

Stratum 15 (MB 2C; Field B Phase 15)

More of a mud-brick wall that had been excavated 10 years previously somewhat further to the west was discovered under a later wall of the LB / Iron 1 four-room house (Building B; Stratum 12). The date previously assigned, MB 2C, was confirmed.

Stratum 14 (LB 2; Field B Phase 14)

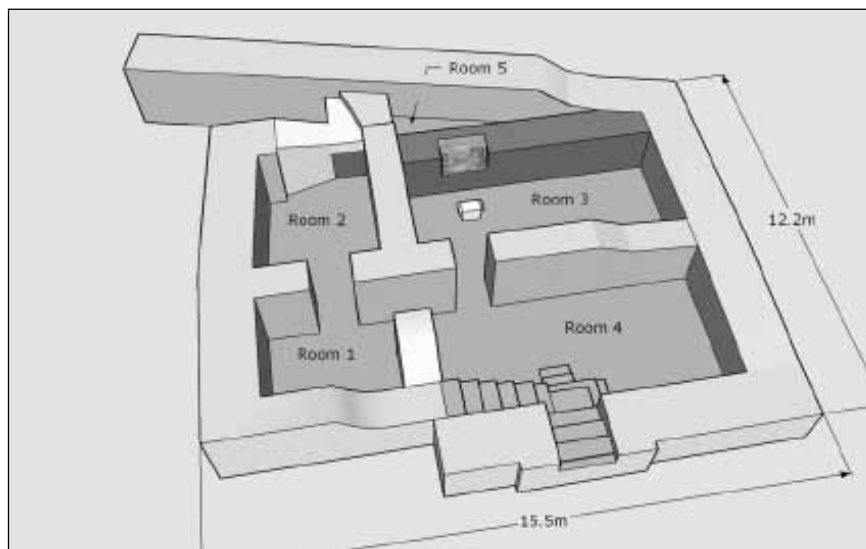
The season's primary objective was to complete excavation of the Late Bronze Age building (**Fig. 10**). The discussion and explanation of findings will proceed clockwise around the building following the sequence of room numbers assigned in the isometric drawing (**Fig. 11**).

The southern wall of Room 1 and the south-east corner of the building had remained obscured by Stratum 7 walls (late Iron 2 / Persian). Excavation and removal of those later remains revealed the full 1.5 m width of the eastern half of the south wall. The southern part of the east wall was actually made of two walls built together, but in different masonry styles.

Work along the west wall of Room 2 clarified what had been a confusing mass of tumbled stones, compacted debris and mud brick where we expected the wall of the room to be. Indeed, the southern portion of a west wall was found bonded to the south wall of the room. However, this season, where it seemed to disappear, we found mud bricks with stones over them. The west wall was thus laid against and over a pre-existing mud brick wall. We were able to prove that the LB builders had cut into older ruins and had incompletely removed these



10. Tall al-‘Umayri: Field B, Stratum 14: Composite photo (hence the white areas) of the LB building after excavation, from the east.



11. Tall al-'Umayri: Field B, Stratum 14: Schematic computerized isometric drawing of the LB building by Kent V. Bramlett.

earlier elements. Instead, they battered the new wall against the old brick wall and continued its construction on top of the old mud brick and consolidated detritus. These bricks predate the construction of the LB building and were thinner than the bricks found in the LB destruction layer. The stone courses of the south end of the west wall were battered against the mud-bricks. Dating evidence was not conclusive for the mud bricks and debris. Probably, the builders cut back into a larger heap of debris at the west end of Room 2 where Wall 14 was built.

This season, final work in Room 3 — the room with the cultic niche and the building's most important room — resolved several questions and altered our understanding of some aspects of the building as a whole. Our excavation of Room 1 in previous seasons had established that there were three discernable phases of use in that room: the original floor, a second surface with traces of use, and a final accumulation of laminations containing ash, dirt, bones and pottery. In the 2006 season, in a narrow strip across the northern part of Room 3 (separated from the rest of the room by an excavation balk) we thought we had missed the later surface and cleared down to the original floor. That was not the case and we can now describe the whole room as a unit. The original floor of the room consisted of plaster and sloped gently to the north. On this floor had accumulated a surface build-up about 7cm thick. When identified last season (2006), we suggested this might

represent a later phase floor, but it is now better interpreted as a product of room use over time. Ashy deposits occurred in the vicinity of the altar and niche and may partially account for the greater depth of build-up in this area. However, the large proportion of Middle Bronze Age ceramics suggests the ancient users spread sanitizing layers of earth excavated from nearby on the *tall*. However, the ceramics removed with its excavation are important (two bases shaped and re-used as offering stands, according to ceramic technologist G. London) and may be combined with the partial bowls and bones removed from the later surface in the 2006 season. Removal of the laminated layers of the surface build-up in Room 3 where it had accumulated against the altar at the base of the niche (Installation 32) showed that the altar had been plastered all the way to the base (Fig. 12). At the base, the plaster smoothed out and sealed onto the floor, showing that it was constructed before the surface build-up began to accumulate. Another surprise was the discovery that the altar was founded on a stone foundation 0.1m thick.

Further refinement in our understanding of the cultic installation wall (the western wall of Room 3) came about inadvertently. Inter-season damage to the facing of the wall on either side of the cultic niche revealed that, from about the elevation of the niche floor down to the room floor, a height of 1m, the wall was constructed of stone with a very thick mud-plaster facing. Removal of the mud-plaster facing revealed the



12. Tall al-‘Umayri: Field B, Stratum 14: LB building, Room 3, with the cultic niche and small plastered altar in front on the original surface of the room; the two stones flanking the meter stick are extraneous.

composite nature of this wall with stones and bricks.

A 1 x 1m probe in the north-west corner of Room 3 revealed layers of ash and Late Bronze Age diagnostic sherds. We wanted to determine the foundation level of the northern wall of the room, which was also the northern perimeter wall of the site. It continued four courses below the original floor of Room 3 and the sections revealed no evidence of a foundation trench. In contrast, the bricks of the cultic installation wall did not extend beneath the surface. The perimeter wall thus seems to predate the cultic installation wall. In previous probes it was shown that the south wall and the interior room dividing walls were laid in shallow foundation trenches in the Stratum 15 (MB 2C) rampart layer. It may be that the apparent similarity of this layer to (1) the rampart and rubbly ‘rampart’ matrix encountered in probes at the south-west corner of Room 2 and in Room 1 below the original floor and (2) to the confirmed Stratum 15 Middle Bronze Age rampart excavated in other parts of Field B is misleading, and that later fills coincidentally resembled the rampart matrix. Regardless of the origin of this layer, it is certain that several pre-existing elements were utilized by the LB builders, *viz.* the western and northern outer walls, the mud brick identified in the west walls of Rooms 2 and 3, and the north wall of Room 5. However, the construction date and function of the earlier structures has not yet been estab-

lished with certainty.

Another objective fully accomplished this season was the excavation of the full length and width of the northern wall of the building (also the perimeter wall of the site), including the north-west corner where it joined, or became, the western perimeter wall. It measured 1.6m wide along its entire length and was sealed on its north (exterior) face by the as yet unexcavated Stratum 12 rampart.

Excavation in Room 4, the entrance into the building, identified a more complicated series of surfaces with two across the entire room, and a third intermediate surface identified only in a limited area against the western wall. The blocking stones that filled the blocked northern door between Rooms 3 and 4 were laid on the earliest surface and the full depth of the later one ran up to them, with no foundation trench evident. Thus, that doorway was blocked before accumulation on the surface began. The north-eastern corner of the room was laid with about three rows of, usually, five mud bricks. The bricks were carefully aligned with intervening mortar. A probe through four of the bricks led to the conclusion that they were laid to cover and level the top of the rampart or building foundation fill. The probe also showed that some earth fill was used in places in addition to the bricks.

Several other features of Room 4 shed light on its possible function. Near the north end of the room, two flat stones were positioned end-

to-end on the floor, seemingly as offering tables. Alternatively, the larger may have been a standing stone which had fallen from its position at some earlier date (**Fig. 13**). The larger of the two was 1.03m long by 0.42 - 0.43m wide and the smaller 0.37m long by 0.31 - 0.33m wide. Beneath the smaller, and supporting it, a vertical stone was buried in a pit. The surface appears to run up to the two stones. If it had been a standing stone erected on a stone platform comprising the small flat stone supported by the buried stone and dedicatory fill, it had fallen at a time coinciding with the impoverishment of the building and its cult apparatus. During the continued use of the building represented by the layers of surface build-up in Rooms 3 and 4, maintenance appears to have been more careless or less well endowed (destruction phase cult vessels were evidently being used in a broken condition) and the fallen stone slab became an offering bench. Behind the larger flat-lying stone, two vessel bases, re-used as little offering tables according to G. London, were found in the surface against the northern wall of the room. Unfired clay figurine fragments were found throughout Room 4 and, adding to its cultic associations, three miniature cult vessels and partial chalices were also found. A mud brick and plaster table measuring about 0.48 x 0.40m stood near the base of the entrance steps. This table was badly damaged in the destruction of the building and its original height could not be determined. Its extant height was 0.13m. A LB juglet was found on this table among broken plaster and brick debris, just above the preserved portion. Lying above the surface near the table was a fallen standing stone



13. Tall al-'Umayri: Field B, Stratum 14: LB building, Room 4, with standing stones and other possible cultic features in the entrance room.

measuring 1.09 m long by 0.380.43m wide and 0.16 - 0.19m thick.

The problem of the eastern walls and the entrance to the building are now quite well understood. Excavation in Square 8K13, Field N provided the accessibility to the east needed to clear the entrance to the building, as well as defining the east faces of the exterior walls north and south of the entrance gate. Excavation there reached the level of the entrance and exposed more of the extensive earthquake damage (**Fig. 14**). The eastern front of the building showed more damage than any other part. The exterior east wall fell eastward, with brick debris preserving the scatter in various degrees of collapse. Mid-level stones slipped further outward than the lowest building stones, but were prevented from falling by debris from higher up that had already collapsed. We did not reach the LBA surface outside the building.

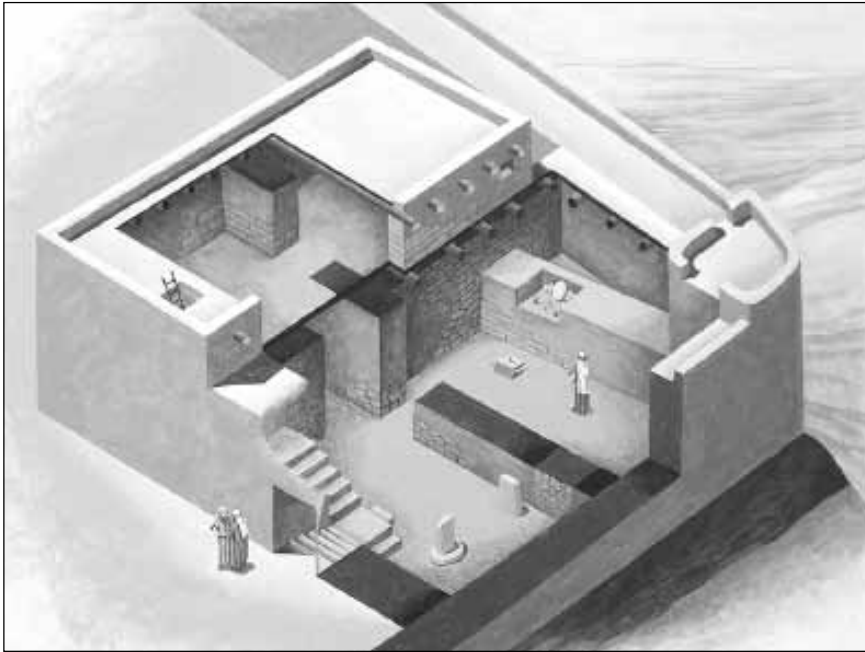
We also now understand the curious use of double walls back-to-back across much of the eastern side of the building. The outer wall was the building wall, against which an inner wall was constructed as support for internal stairs ascending to the second floor over Rooms 1 and 2, and probably to the roof of the structure. Thus the stair wall began at entrance level in Room 4 and continued southward at increasing height across the east end of Room 1 (**Fig. 15**).

Stratum 12 (LB / Iron 1 Transition; Field B Phase 12)

The LB building was surrounded with higher Phase 12 constructions. Building B, the four-room house, occupied the space immediately to



14. Tall al-'Umayri: Field N, Stratum 14: LB building entrance showing earthquake damage to the east wall of the structure at the entrance.



15. Tall al-‘Umayri: Field B, Stratum 14: Painting of the LB building as we reconstruct it, by Rhonda Root.

the south. The northern entrance to this building was laid on top of the Stratum 14 debris. On the western and northern slopes outside the LB building, a glacis ascended high against the outer building walls. Though unexcavated, this rampart layer can logically be identified with the Phase 12 rampart additions documented on the western slope outside Building B.

Excavation in the newly opened Field N produced more Phase 12 walls and associated earth layers. Though the area of exposure is very limited at just 3 x 5 m, two bonded wall fragments possibly date to this phase. Both walls stood to a height of 0.7 m. In the angle formed by the two walls was an associated cobble surface. The structure is tentatively dated by the pottery to this stratum, though small pieces of Stratum 7 pottery were also found. However, evidence of bioturbation was pronounced and frequent. Large rodent holes in the south-west corner were clearly evident, with small pieces of pottery visibly spilling out of them. It thus seems best, on the basis of such evidence as is currently available, to interpret the typically small late Iron 2 / Persian pottery sherds as intrusive and tentatively associate this structure with Stratum 12.

Stratum 7 (Late Iron 2 / Persian; Field B Phase 7)

Several clearance operations removed isolated Stratum 7 deposits and wall fragments to

expose the LB architecture beneath.

1. Most prominently, along the south wall of the LB building next to Room 1.
2. Clearance of an earth layer above the eastern wall of the LB building.
3. Clearance of the remainder of an earth layer that covered the entry steps into the LB building showed no more steps leading down and out of the building beyond its east face, or where it had been prior to its catastrophic collapse.
4. Excavation of another layer where the full width of the LB building's northern wall was still obscured by later material.

Excavation in Field N yielded several Stratum 7 attributions. More elements of an extensive domestic building, the quoin-and-pier house excavated over several seasons in the north-east quadrant of Field B, were uncovered. These included another quoin-and-pier wall, which was built over a layer which may be equated with the famed "Corsican Layer" found across the north of Field B. The "Corsican Layer" (so named because of the battle fought on the eponymous island in 866 AD; the layers comprising it were 8K10:8, 8K11:6, 8K12:6!) represents the post-destruction abandonment layer derived from Phase 7 re-use and additions made to the ruins of the LB building. The later Stratum 7 structure, Building D, partly overlapped and was

stratigraphically above the “Corsican Layer” where it occurred. Another transect quoin wall could be seen in the south balk. Each of these two quoin walls connected, respectively, to the two large piers which were a part of a north - south quoin-and - pier wall.

Strata 1 - 2 (Byzantine and Islamic periods; Field B Phases 1 - 2)

Byzantine and Islamic pottery was evident in small quantities in topsoil layers excavated in Field N.

Field H: Below the Open-Air Courtyard Sanctuary (Monique Vincent, University of Chicago)

Field H is located at the south-western corner of the flat summit of the site (**Figs. 2-3**). Excavations began here in 1994 for the initial purpose of investigating the southern extension of the Ammonite administrative complex in Field A, directly to the north, but instead found a large courtyard sanctuary paved by alternating floors of cobbles and plaster. Its religious interpretation is based on the presence of figurines and model shrines found on the surfaces (Herr and Clark 2003: 290-291). This season we excavated beneath the lowest cobble floor of the late Iron 1 open-air sanctuary in Squares 7K11, 7K12, 7K20, 7K21 and 7K22 to reach the Iron 1 levels encountered last season in Square 7K31. Excavation in all squares stopped at the Iron 1 destruction levels. We also excavated much deeper along the exterior of the southern perimeter wall in Square 7K30, showing that the wall indeed dates to the LB / Iron 1 transitional period, the same date as northern parts of the perimeter wall.

Stratum 12 (LB / Iron 1 transition; Field H Phases 13 - 12)

Earlier excavations in Square 7K30 had uncovered a large, north - south wall at the western edge of the site (Wall 46). We had speculated that it might be the southern extension of the LB / Iron 1 perimeter wall, but small amounts of Iron 2 pottery persisted in most layers on the western, external, side of the wall. The sediment was typical of exterior deposits. On the interior we had already reached what we considered Iron 1 levels. This season we widened the exterior

exposure because the debris, being very rubbly, was too unstable for safe working. While we were unable to reach the bottom of the probable perimeter wall this season, after excavating a further two meters down its western face we did find the bottom of a major, but later, east - west wall - Wall 49 - that may have formed a tower (our earlier hypothesis that this was part of a gate was incorrect) (**Fig. 6**).

It is possible that here in Field H, on the south-western outskirts of al-‘Umayri, we have an extension of the rampart system in Wall 46, similar to the situation in Field B (see Clark in *MPP* 2 and 3). However, so far no hint of a rampart has been discovered. But the size of Wall 46, preserved to a height of nearly three meters so far, and the wall’s strategic location in line with the other section of the perimeter wall in Field B, is a strong case for locating the south-western extension of the LB / Iron 1 settlement, along with its defense system here in 7K30.

Although we cannot make a stratigraphic connection because the sounding against the Phase 13 perimeter wall was on its exterior side, domestic structures within the wall most likely belong to Phase 12 on the basis of their pottery assemblages. We may thus need to combine Phases 13 and 12. Stone walls, a surface and a bin were discovered last season in limited excavations in one square (7K31), but similar finds had already been made in earlier seasons in Square 7K30 and 7K20 immediately inside the perimeter wall.

This season, the tops of walls continuing these structures were discovered to the south in Squares 7K21 and 7K22, under a thick destruction layer. No surfaces have yet been discovered, but a probable oven and ash deposits suggest that one is near. Next season, we anticipate uncovering the floors of at least one large domestic structure in this area.

Stratum 11 (Iron 1B; Field H Phase 11)

Although Stratum 11 became clearer this season, it was still fragmentary in nature and seemed to reflect domestic structures that sometimes incorporated earlier walls. Cobbled and beaten-earth surfaces were also exposed, along with one external surface. The large northern wall of the structure was built, at latest, during this period and may be even earlier.

Stratum 10 (Iron 1B; Field H Phase 10B)

It was in this stratum that the courtyard sanctuary, with its cobbled and plastered floors and central pillar base or, more likely, altar, was first established (see previous reports for photos). This season, we excavated the cobble floor and some of the walls of the courtyard sanctuary to reach earlier Iron 1 levels below. The southern portion of the complex, however, still needed to be exposed. Unfortunately, it appears that later construction projects inside the southern room have so greatly disturbed the stratigraphy that it is difficult to assign any particular deposits or interior structures to this phase. The room's function is therefore uncertain and, with no clear threshold connecting the southern room and courtyard along the length of Wall 48, it is even more difficult to reconstruct their stratigraphic relationship.

Stratum 7 (Late Iron 2 / Persian; Field H Phase 8)

Excavated remains in the southern room of the courtyard sanctuary which date to this phase are the first since Stratum 11 to yield any traces of use. What took place in this southern area during the previous three phases remains a mystery; part of this confusion is the result of construction which took place in this and successive strata. During this period, the occupants divided the large southern room in two, constructing a wall about a third of the way across the room. In the new middle room, sandwiched between smaller rooms to the east and west, a cobble floor was laid. As noted in earlier seasons, this also seems to have been the period during which the old walls defining the southern area were consolidated and had new courses constructed upon them, thereby establishing the integral importance of the southern rooms to the entire courtyard complex. Unfortunately, much of this phase was, in turn, disturbed by construction carried out in the following phase. Only remnants of the one floor and fill deposits testify to its existence in the south. Beaten-earth floors and fill layers were in all these rooms.

Stratum 6 (Late Iron 2 / Persian; Field H Phase 7)

Although most of the architecture that defined the southern three rooms in Stratum 7 continued

in use during this phase, the three rooms were reduced to two as, following several periods of re-use, the dividing wall was now covered by a cobble floor. This season we finished removing one cobble surface, discovering a fragment of the previous stratum's cobble floor immediately beneath.

On the western edge of the field (and of the *tall*), a pit was utilized during this period. Previously, an earth layer had been assigned to an earlier stratum on the basis of Iron 1 pottery from a probe. However, when this and underlying layers were excavated in their entirety, a mixed assemblage of pottery was recovered which included Hellenistic sherds. These loci therefore add further support to hypothesis of a mixed pit on the western side of the field.

Stratum 2 (Byzantine; Field H Phase 2)

Earlier seasons in Field H had noted a stone layer consisting almost entirely of large pebbles beneath topsoil. Very little sediment was mixed in with the stones. This season we excavated more of the layer along the western side of Square 7K30 in order to provide a safe workspace for excavations at the bottom of the square. The layer had been described as a stony build-up on the western side of an agricultural retaining wall, because the *tall* drops down to the valley at this point. Although the part of the layer excavated this season was not nearly as stony as higher up the hill, it was still full of an abnormal quantity of pebbles, heavily worn (topsoil-like) pottery and small pockets of air. The lesser concentration of stone in our excavations this season could be the result of the increased distance from the agricultural terrace wall. The previous interpretation of the layer, not disproved by this season's excavations, had surmised that the deposit of pebbles and potsherds had resulted from a single episode of 'field clearance' dumped over the terrace wall during agricultural activity on top of the *tall*.

A number of interesting artifacts showed up in this layer alongside the stones and worn pottery sherds. These included a particularly nice female figurine, whose head, shoulders and abundance of hair were preserved (Object Number B080011; **Fig. 16**). Another interesting artifact from this locus was a fragment from an anthropomorphic juglet, preserving a complete



16. Tall al-'Umayri, Field H, Stratum 2: Head of a female figurine; although Stratum 2 dates to the Byzantine period, the figurine itself comes from the late Iron 2 / Persian period.

rim with two little eyes or breasts on either side of the spout (Artifact Number A080049). Other artifacts of note included a large needle, a grindstone and a jar stopper. Like the pottery, most of the objects / artifacts probably dated to the late Iron 2 / Persian period. However, these loci are stratigraphically dated to the Byzantine period and are probably associated with a few farm walls found in earlier seasons, near the southwestern corner of the site. Was there another small farmstead here, similar to the one in Field F found in 1987?

Stratum 1 (Islamic; Field H Phase 1)

The portion of this stratum excavated this season is a modern phase, comprising accumulated and eroded topsoil from the top of the entire field. It was full of pottery and artifacts, especially — as is true of every topsoil layer across the *tall* — from the late Iron 2 / Persian periods, which have been turned up by farmers' plows over the years. Excavations this season revealed a few grindstones, jar stoppers and spindle whorls, all domestic in character. No artifacts or pottery were found that could be dated to the Islamic periods, but the stratigraphy was clear.

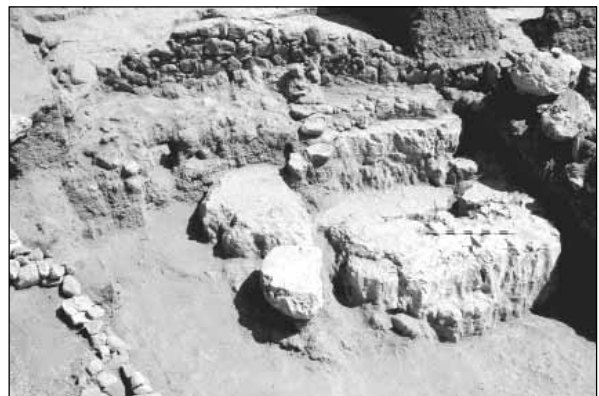
Field K: The Dolmen (Larry G. Herr, Canadian University College; Elzbieta Dubis, Krakow, Poland)

After a gap of eight years, a small team returned to the EB 1B dolmen in Field K on the lower south-eastern slopes of the *tall*, about 100 m north of the modern petrol station, in order

to re-draw previously excavated balks and excavate two balks. All finds were from Stratum 21.

Earlier excavations around the dolmen had uncovered a series of surfaces, with a few small features embedded in them (Herr *et al.* 1999: 109-110). No walls whatsoever had been found in the immediate area before the surfaces petered out. The most interesting of these features was a small stone table or platform, made of a large stone slab surrounded by supporting cobbles (Herr *et al.* 1999: 110), that was embedded into the surface about five meters from the western side of the dolmen. This season, when we removed the balk to the north of the stone table, we discovered four wall fragments that formed part of a probable stone shelter. The walls were very poorly constructed and are unlikely to represent even the humblest of domestic dwellings. More likely the stones were part a small shelter constructed by users of the dolmen during ceremonial activities, perhaps to shelter them from winter storms that would have made feasting at the site uncomfortable (**Fig. 17**). The walls may never have stood more than a meter high.

An east - west wall formed the northern wall of the structure and may have been the primary windbreak. Extending south from that wall were three other short fragments, probably the surviving portions of originally longer walls, which divided the space into two 'rooms'. These may have been open on the south side, which faced the stone table. Along with several surfaces surrounding the structure, which probably reflect ritual circumambulation of the dolmen, the newly discovered feature and previously discovered stone table suggest that ritual feasting also took place.



17. Tall al-'Umayri, Field K, Stratum 21: Wall fragments from a small shelter west of the dolmen.

Field L: The South Central Edge (Larry G. Herr, Canadian University College; David C. Hopkins, Wesley Theological Seminary; Mary Petrina Boyd, University Temple United Methodist Church, Seattle)

Field L is located at the southern edge of the flat top of Tall al-‘Umayrī, roughly in its center (**Fig. 2**). Excavations in this field began in 1998 for the initial purpose of exploring the transition from the top of the site to the southern slope, where several surface architectural features were visible or had appeared in ground-penetrating radar images. This season we opened two new units in Squares 6K87 and 6K97 and deepened Squares 6K89, 6L70 and 6L80 (**Fig. 3**). The goals of these excavations were to ascertain the eastern and western limits of the Hellenistic farmstead, uncover the top of Iron 2 remains and probe to the bottom of at least one of the large walls constructed of massive boulders that had been uncovered in earlier seasons. We found that last season’s assessment that we were nearing the eastern limit of the farmstead seems to be correct. We also found no Hellenistic architectural remains in two squares opened at the western limits of the field, and managed to reach the foundation level of one massive wall.

Stratum (?) 12 (LB / Iron 1 Transition; Field L Phase 7)

In the northern part of the field, earlier seasons had produced the tops of massive stone walls constructed of very large boulders, some approximately two meters long and over a meter wide (**Figs. 18 and 20**). The tops of similar walls have been found in Field H. As we have excavated the fill layers running up to them at a few limited locations in Field L, the latest pottery has been from the Iron 1 period. This season we continued a probe begun in 2006 to reach the bottom of one of these massive walls and achieved our goal. The latest pottery clearly dated to the Iron 1 period.

Because the number of diagnostic potsherds was not high, it was not clear to which part of the period the sherds dated. There were no signs of the massive destruction of Stratum 12, as found in Fields A, B and H in the west and Field F in the east, but those manifestations of the destruction could have been localized. There were also no signs of a clear surface in the admitted-



18. Tall al-‘Umayrī, Field L, Stratum (?) 12: The top of a large wall of massive boulders is visible in the left side of the photo as the dark stone wall under the lighter one; the location of our probe is visible against a connected wall running east at the right side of the photo.

ly limited probe. Similarly, the probe was not deep enough to determine that the stratum below dated to the Late Bronze Age (Stratum 13). We have, therefore, only tentatively ascribed the walls to Stratum 12 and that primarily for one reason: the walls are so huge that they seem to fit better with the major structures of Stratum 12 than with the less impressive, later structures of Strata 11 and 10. If this was the case, we should note that there are two fundamental ways in which the architecture of Stratum 12 is manifest. There are the well preserved, domestic structures in Fields A, B and H, with small to medium boulders in the walls, and there are these structures in parts of Fields H and L that are truly massive. Perhaps they represent structures from a more public part of the settlement. If we are correct, these structures, along with the very impressive fortification system found in Fields A, B and H, would indicate that the site was much more than a simple, small highland village.

Stratum 7 (Late Iron 2 / Persian; Field L Phase 6)

Along the eastern and western edges of the field, in the areas where the remains of the Hellenistic farmstead seem to be dwindling, we discovered late Iron 2 / Persian remains beneath shallow layers and features of the Hellenistic period. Indeed, in one square at the south-east corner of the field (Square 6L70), we discovered nothing but remains from Stratum 7.

The most interesting find was a large, well

preserved *ṭābūn* (oven), constructed of a thin clay wall (ca 3 - 4 cm thick) with large potsherds and stones lining at least the lower exterior part of the structure (**Fig. 19**). Nothing but fill occupied the interior. The *ṭābūn*, located near the south balk of the square, sat upon a beaten-earth surface which stretched north to two large boulders that probably functioned as pillar bases. Part of the floor may have been cobbled, as it was between the two pillar bases (**Fig. 20**). These finds undoubtedly made up the courtyard and northern room of a domestic dwelling. Above these Stratum 7 features were layers of archaeological sediment containing late Iron 2 / Persian pottery that probably represent the post-abandonment phase of the settlement.

On the western edge of the field, the two new squares - open only for two weeks - produced stone walls forming two partial rooms (**Fig. 21**) immediately beneath Byzantine sub-topsoil.



19. Tall al-‘Umayri, Field L, Stratum 7: *Ṭābūn* from a domestic dwelling in the south-eastern corner of the field.



20. Tall al-‘Umayri, Field L, Stratum 7: Two stone pillar bases with a fragment of cobbled surface between them; at right is one of the Stratum (?) 12 large walls with massive stones.



21. Tall al-‘Umayri, Field L, Stratum 7: One of the partial rooms excavated at the western side of the field.

Excavations stopped at a beaten-earth surface in both rooms.

Stratum 4 (Hellenistic; Field L Phases 4-3)

In Field L, excavations are gradually moving beneath and beyond the Hellenistic structures. However, a few Hellenistic features were excavated, especially in the north-eastern part of the field. In the north-eastern square (6L80) were a few wall fragments preserved from the farmstead, most of which was discovered farther west. Evidence for both Hellenistic phases was found here with the discovery of two very fragmentary walls, one built on top of the other. However, the fragmentary nature of the remains was emphasized by the lack of discernable surfaces of any kind. In one other nearby square, balk removal located a filled doorway from this stratum, probably representing the transition from Stratum 4 to 3.

Above the Stratum 7 walls, in the two new squares at the western edge of the field, was a shallow layer with Hellenistic pottery but no other features. We are convinced that we have reached the western extent of the farmstead at this point.

Stratum 2 (Byzantine; Field L Phase 2)

A few Byzantine potsherds are almost always present in sub-topsoil layers of every square in Field L, but only one small stone wall was discovered. It was most likely a terrace wall for the Stratum 2 farmstead found during previous seasons in Field F farther to the east.

Stratum 1 (Islamic; Field L Phase 1)

Topsoil contains pottery mostly from the late Iron 2 / Persian period, but a few more recent

vessels are also included, some of which could be Early Islamic. One stone wall appeared on the surface that was probably a field wall, part of the agricultural activity going on at the site during the Islamic periods. Its construction and layout were very similar to other walls found elsewhere around the rim of the site from this time period.

Field M: Structures East of Field H (Aren S. LaBianca, Andrews University)

The new Field M was opened on the summit of Tall al-‘Umayrī during the 2008 season. It was located directly east of Field H, which lies on the south-western edge of the *tall*. The goals for Field M were to find the continuation of the Iron 1 and Iron 2 architecture found in Field H, and to begin to make a connection between Fields H and L, which lie on the southern edge of the site.

Four 5 x 5 m squares with one meter balks between them were opened in a square grid directly east of Field H, creating a 12 meter-square field. The walls in Field M do not line up neatly with magnetic north, but since the walls all follow the same approximate alignment, in this report I will refer to them as being north-south walls or east-west walls. North-south walls in this report have an orientation that is actually closer to 30° NNE by 210° SSW, while east-west walls have an orientation that is closer to 300° WNW by 120° ESE.

Stratum 12 (LB / Iron 1 Transition; Field M Phase 6)

Though we never reached deposits from this phase, we discovered the top two courses of a wall that had the same constructional features and was aligned with a wall from this period found earlier in Field H to the west (Square 7K12). In our field, the wall was 2.4 m long by 0.88 m wide at its widest point. It was constructed purely of limestone using boulder-and-chink construction, with two rubble-filled rows. This wall ran from the middle of the western half of 7K33 into the south-west corner of 7K33 (**Fig. 3**). There is little doubt that the removal of the balk between Fields H and M will show that they are indeed the same wall. Until more of the wall is excavated, its purpose and full context will remain unknown.

Stratum 8 (Iron 2B; Field M Phase 5)

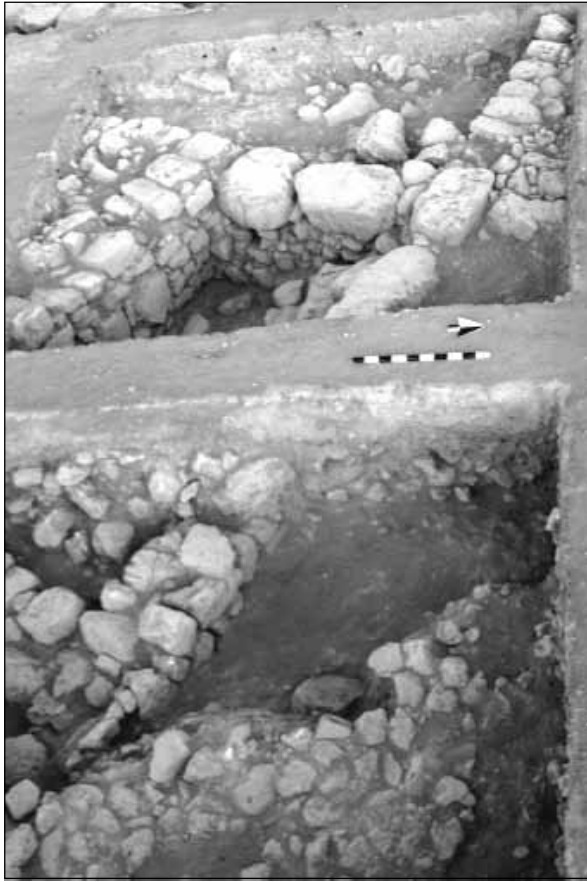
Only one large earth layer and some 800 potsherds could be dated to this stratum. It lay in Square 7K34, situated in the eastern portion of the field towards the center of the *tall*. Even though no architecture was found, the presence of this material with, surprisingly, no late Iron 2 / Persian pottery (except for five very small intrusive pieces, probably derived from bioturbation), suggests that significant Stratum 8 remains may be found in future seasons. It may also suggest that the basement structures of the Ammonite administrative complex found in Field A to the north-west, and the northern squares of Field H to the west, ended before reaching our area. Perhaps the Stratum 12 wall was the separation and significant Stratum 7 layers will be found there.

Stratum 7 (Late Iron 2C / Persian; Field M Phase 4C)

Phase 4C can probably be associated with Stratum 7, though more excavation is required to be certain. It is the earliest phase reached in Squares 7K23 and 24, and the earliest phase of archaeological sediment reached in the whole field with the exception of the Stratum 8 layer in Square 7K34. Interestingly, Stratum 7 does not appear in that square.

Much of the architecture in this phase could well have been re-used from an earlier period. For now, all architecture that we have not fully exposed will be tentatively dated to the earliest fill layer excavated thus far, which run up to that particular wall or installation. All walls in Phase 4C were constructed using unhewn and semi-hewn boulder-and-chink limestone masonry.

During this period, what appears to have been a domestic complex (Building A; **Fig. 22**) was constructed in the southern half of the field. There were several possible rooms in Building A, but only one room (Room A1) had four walls within the squares of Field M. The room (**Fig. 23**) was a rectangular room with a floor space of approximately 4.5 by 2.5 meters. Other rooms were only partially exposed in our excavations, but they seem to have been part of the same domestic complex. Like the walls of the Ammonite administrative complex, none of the walls had foundation trenches, suggesting that they may have been basement structures. How-



22. Tall al-'Umayrī, Field M, Stratum 7: Walls from Building A.



23. Tall al-'Umayrī, Field M, Stratum 7: Building A, Room A1.

ever, not enough of the building or the walls has been excavated with which to reconstruct a clear stratigraphic context. In the south-west corner of Room A1, two possible bins were found, one nested inside the other (Fig. 24). A partly restor-



24. Tall al-'Umayrī, Field M, Stratum 7: Building A, two nested bins in Room A1.

able pot (thought to be *in situ*) dating to the late Iron 2 / Persian period was found inside the inner bin.

Stratum 6 (Late Iron 2C / Persian; Field M Phase 4B)

The complex described in Stratum 7 appears to have been re-used during Stratum 6, but in a slightly different manner. The chronological gap, if any, between the two strata could not be ascertained. What is clear is that during Stratum 6, Room A1 was used as a basement. Not enough excavation was done to show whether or not the other rooms in Building A, described above for Stratum 7, could have been in use in Stratum 6 as well. For this report they have been treated as if they went out of use at the same time as Room A1, namely at the end of Stratum 6. A new, beaten-earth surface was laid directly above the Stratum 7 surface, running up to the walls of the structure.

Stratum 5 (Early Persian; Field M Phase 4A)

At the beginning of this stratum, Building A went out of use and Room A1 with its bins was filled with various earth layers. This fill was brown, silty, moist, loose and pebbly, and attained a depth of 0.29 m.

What appears to have been a temporary, one or two course, boulder-and-chink wall was built during this stratum approximately in the center of Square 7K24. It was built more or less over the top of a pre-existing wall of Stratum 7. There was, however, more than half a meter of earth between the top of the old walls and the bottom of the new ones. The two strata were thus well separated. The wall measured 1.36 m long (east -

west) by 0.81m wide and at no point stood more than 0.41 meters high. It may have been a merely temporary wall, the purpose of which is so far unknown. An extensive cobble and sometimes plaster surface was laid during this phase. It covered most of the eastern half of the field.

Stratum 4 (Hellenistic; Field M Phase 3)

During this phase, three new, most likely temporary, walls were built (**Fig. 25**). They had an approximate average width of 1 m (though they were quite irregular in construction) and, bonded together, they formed a Z-shape. All of these walls, of which two courses survived, were constructed with hard, unhewn limestone boulders using boulder-and-chink construction. All had two rubble-filled rows.

The dating for these walls was mainly stratigraphic. One wall seemed to continue into 7K32, the square in Field H that was directly to the west of 7K33, and had been stratigraphically dated to the Persian / Hellenistic period in an earlier season. Another wall appeared to continue into the east balk of 7K22 (also in Field H). However, that wall had been stratigraphically dated to the Persian period during previous seasons.

Strata 2 - 1 (Byzantine - Islamic; Field M Phase 2)

During Phase 2, no construction took place, but there was an accumulation of topsoil and sub-topsoil layers. All of these layers, with one exception, were made up of firm, dry soil, with pale colors ranging from pinkish-gray in 7K23 to pale browns and yellows in the other squares. Soil texture ranged from loam-silt loam to silty-clay loam. *Tesserae* were found in most of them. Byzantine and Islamic sherds showed up



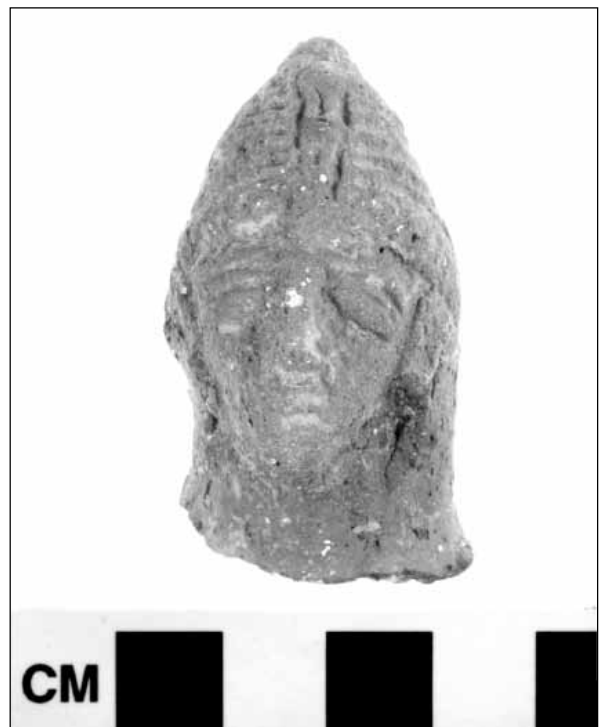
25. Tall al-‘Umayrī, Field M, Stratum 4: Hellenistic walls.

repeatedly. Objects and artifacts included many grindstones and pounders, two uninscribed iconographic seals, a metal arrowhead and three ceramic figurine fragments. The figurines included a horse head (**Fig. 26**), a human head (**Fig. 27**) and an unidentified fragment.

An articulated burial was discovered in this phase in Square 7K33 (see **Fig. 28**). Physical



26. Tall al-‘Umayrī, Field M, Stratum 2: Horse head figurine.



27. Tall al-‘Umayrī, Field M, Stratum 2: Human head figurine.

anthropologist Julie Cormack noted that the body was of a young post-adolescent male. It was laid in a pit grave, with the same earth being used to cover the body.

Stratum 1 (Modern; Field M Phase 1)

Bulldozers were used before excavation began to remove our sift debris from earlier seasons, in order to clear the site for excavation in Field M. In three out of four of the squares, this seems to have been effective. In 7K34, however, a significant amount of sift debris remained, which included fragments of a modern water jug. This stratum went quite deep, reaching almost a meter in some places in 7K34. The debris included unidentified stone objects and grindstones, as well as two pendants.

Al-Umayrī Ostrakon (Object No. B080019)
(Christopher Rollston, Emmanuel School of Religion)

On 10 July 2008, an ostrakon was found in Field L, Square 6L70, Locus 28 (**Fig. 29**). This locus was the earth fill from a very large, well-preserved *ṭābūn*. Four buckets of pottery were recovered from the *ṭābūn* and dated to the late Iron 2 / Persian Period (late 7th century to 6th century BC). A small fragment of a Hellenistic bowl was also found in this locus, but is considered intrusive. The ostrakon weighs *ca* 73 grams. It is *ca* 7.8 cm long, *ca* 7.6 cm wide and *ca* 1.4 cm thick. It is a body sherd from a closed bowl or small krater with a neck.

The inscription consists of one visible line of text, with just three letters preserved. The left side of the line is fully preserved, but the right side (i.e. the beginning of the inscription) is not,



28. Tall al-‘Umayri, Field M, Stratum 2: Ottoman period burial.



29. Tall al-‘Umayrī, Short ostrakon fragment in Ammonite or Aramaic script.

because of breakage in Antiquity after it was written. The ink of this inscription is black, as was normally the case with Iron Age and Persian period ostraca.

The first letter of this ostrakon is a *šin*, although the right side of the letter is not preserved because of the location of the break. Nevertheless, because a sufficient amount of the letter is preserved, the reading *šin* is not in doubt. The second letter is definitely a *lamed*, consisting of a deft single stroke of the pen. The third letter is a very finely formed *mem*, consisting of three strokes: two strokes forming the head and a single downstroke forming the spine of the letter. The sequence of the strokes cannot be determined with certainty. The script is arguably Ammonite, but a plausible case could also be made for Aramaic. Note that the Ammonite script derived from the Aramaic, hence the difficulty in making definitive statements about such a brief and fragmentary ostrakon. The most striking feature of this ostrakon is the stance of the *lamed*: it is the reverse of the normal stance. There could be two explanations for this: (1) It could be a scribal error with regard to stance, perhaps committed by a student, or (2) This could be a rare, but alternate form of the stance. After all, within the later Nabataean and Arabic scripts, this stance is well-attested.

The root of the attested word, or word segment, is apparent: the common root *šlm*. Nevertheless, it is not possible to ascertain whether the preserved portion is the final component of a personal name, there being many that conclude

with this root, or simply a verb, noun or adjective functioning within a broader sentence or clause.

Conclusions and Prospectus

The remarkably well preserved remains of the LB building in Field B were completely unanticipated when we began excavations in 1984. It is however an excellent representation of a Canaanite (sometimes referred to as Amorite in the Bible) structure in the highlands of Jordan, where so few remains from this period have so far been found. The building may have been a temple or a palace with a shrine.

The LB / Iron 1 transitional period was again well represented in Field A. This was perhaps the most important settlement of the site. Certainly, in terms of understanding the Biblical period of the Judges, the discoveries have been very great, including typical house plans and functions (including religious behaviors). More large storage jars or *pithoi* (over 100 in all) have been discovered at al-‘Umayri than at almost all other sites in the Holy Land combined. The lab housing them has recently moved to La Sierra University where they are being restored.

The new discovery of the Iron 2B house in Field A was another important find for the site.

This twelfth season marks the end of Phase 1 of the Tall al-‘Umayri excavations. With the complete excavation of the LB building in Field B, that field is finished. One more season will finish Field A, Field H is beginning to yield more Stratum 12 structures over a wide area of exposure, and Field M is beginning to connect Fields H and L.

Acknowledgements

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supervised the consolidation of architecture exposed during the season. We are also grateful for the help of the Royal Geographic Society in establishing three permanent benchmarks on the site; these will facilitate our use of sophisticated GPS technology in the future. The American Center of Oriental Research in Amman, directed by Barbara Porter and assisted by Chris Tuttle, provided invaluable help. Excavation staff were housed in Muqabalayn at the Amman Training College, an UNWRA vocational college for Palestinians. We give special thanks to its Principal, Dr Khalid Abu al-Hayja, for making our safe and secure stay a genuine pleasure, to Vice Principal Hussam Shahroor, who worked with us on a daily basis, and to our cook Muhammad Ahmaru, for his excellent meals. Vickie Khano of Guiding Star Travel Agency helped with many logistical concerns. The Committee on Archaeological Policy of the American Schools of Oriental Research approved the scientific goals and procedures of the project. Thanks are also due each member of the staff, which was divided into two sections: field excavation and camp logistics. In charge of planning and overall execution of the project were the authors, Co-Directors of the project. Other field staff members appear as authors of sections of this report.

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WĀDĪ ḤAMARASH: A NEW MPPNB SITE IN JORDAN

Adamantios Sampson

Site Setting

Since 2007, a team from the University of the Aegean has been participating in a survey in the aş-Sāfi area (Politis *et al.* 2007), during which three prehistoric sites along the Wādī al-Ḥasā river have been located. Two of them (Wādī Ḥamarash 1 and 2) belong to the PPNB and third one to the Bronze Age.

The site Wādī Ḥamarash 1 is located on an extended plateau north-west of the confluence of the al-Ḥasā and Ḥamarash - Suwayf wadis (Fig. 1). The Neolithic settlement extends over a flat, circular area 80m in diameter, dominating the arid plateau which is bounded by Wādī Ḥamarash - Suwayf to the east, a smaller wadi to the west and steep mountains to the north (Fig. 2). The site is isolated and inaccessible, about an eight-hour walk from the village of at-Tayyiba on the Karak plateau, and about a three-hour

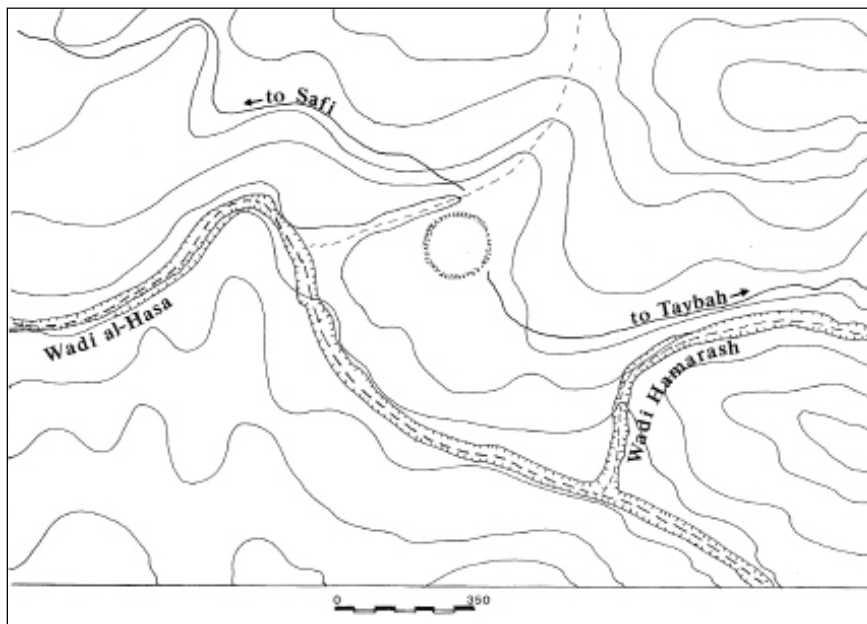
walk from aş-Sāfi.

Excavation

In January 2008, the University of the Aegean started systematic archaeological digging at Wādī Ḥamarash I. Our research lasted three weeks and was carried in two areas, I and II. In 2009 two more areas, III and IV, were opened, while investigation in Areas I and II continued. In total, an area of 950 sq. meters has been excavated (Fig. 3).

Area I

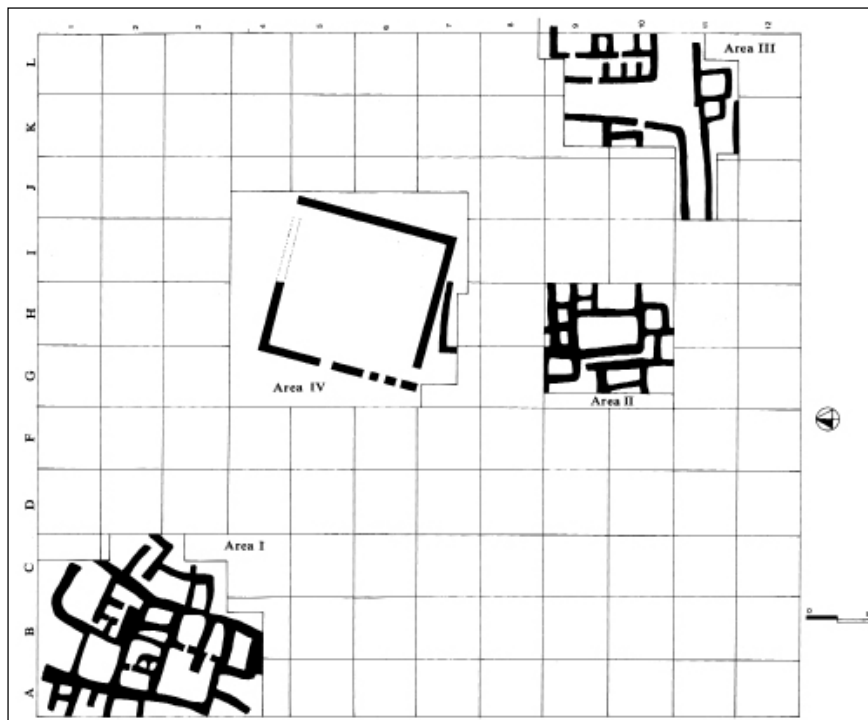
In Area I (Figs. 4 and 5) we excavated various walls, some of which were thick and well built, which is probably indicative of the presence of double-storey buildings. Thinner walls probably served to sub-divide rooms. Locus 1 was a rectangular room, a large portion of which



1. Wādī Ḥamarash: map of the site.



2. The plateau from the north.

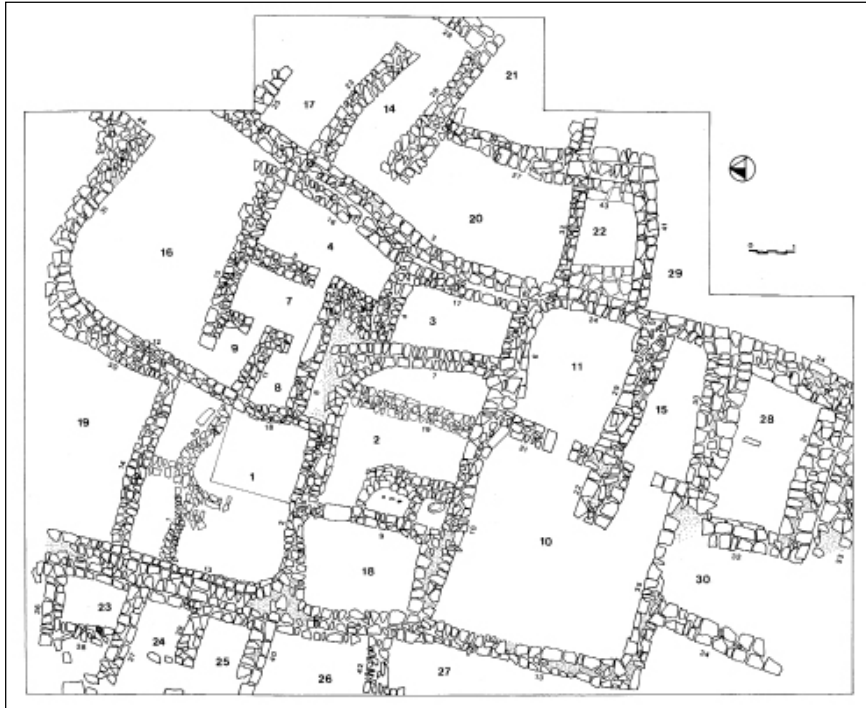


3. Site grid.

was excavated. At a depth of 1.70m there was a buttress wall which may have supported an upper floor, while flint tools and burned deposits continued down to 3.10m (**Fig. 6**). Locus 2 is a square room with rounded corners. A semi-circular, roughly built structure, which continued down to a depth of 0.75m, was exposed in the eastern part of the room. Within the structure two querns were found, one of which was part of the west wall. Three more querns were found at

the north-west part of the structure. The deposits were soft, sandy and easily removed. After careful planning and photography, the roughly built structure, which consisted of a single row of stones, was removed. Probably it was a much later addition, erected after the settlement was abandoned.

In the west wall of the room, at 0.74m depth, an opening appeared, constituting a doorway 0.76m high and 0.50m wide. In the west side



4. Plan of Area I.



5. Area I from the north.

or the room, at 1.20m depth, two semi-circular storage areas appeared, adjoining to the west wall beside the door (**Figs. 7 and 8**). There were minimal traces of fire, suggesting that these features were not used for cooking. The excavation of the room reached a depth of 2.10m, where hard soil -- probably a surface -- was exposed.

In Locus 18 (**Figs. 4 and 8**), which communicates with Locus 2 by means of a narrow door from a depth of 1.00 to 1.40m, flint fragments, eight flat drilled stones, perforated shells, drills,

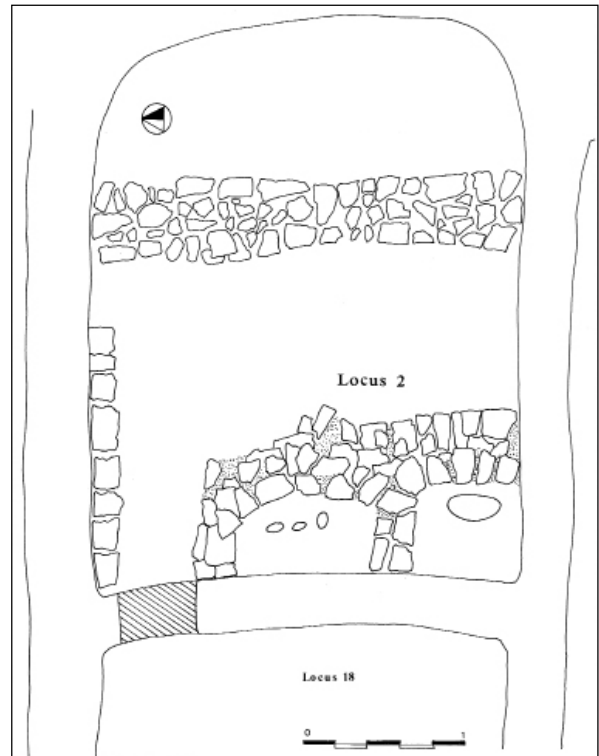
a perforated round sandstone piece, and fragments of querns and grinders were collected. Of interest were two flat limestone stones with round cavities, probably a gaming board (see **Fig. 17**). In the center of Area I, three small storage areas -- Loci 7, 8 and 9 -- are formed (**Fig. 4**), which are interconnected by means of narrow passages. At all three entrances, thresholds were found at the depth of 0.40m indicating that the rooms did not continue any deeper.

Locus 22 is a trapezoid room added on top



6. Area I, Locus 1.

of Wall 24 (**Fig. 9**), which was excavated to a depth of 2.10m where chipped stone tools and burned animal bones were found.

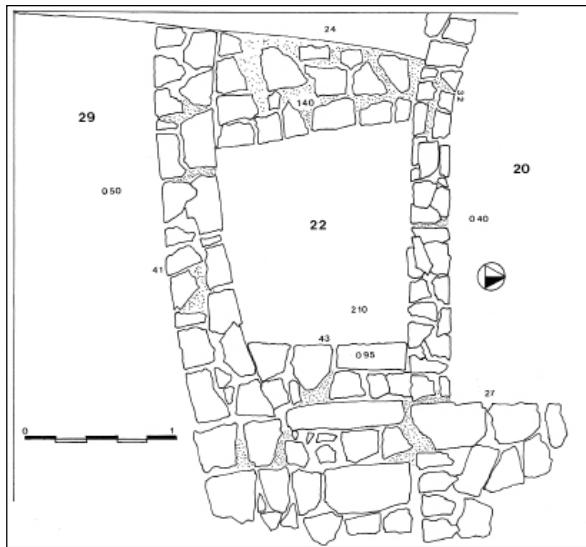


7. Plan of Locus 2.

In 2009 the dig extended into the east part of the area (**Fig. 4**). Wall 23 extended to the east but was interrupted at a length of 2.55m. Wall 26 was also exposed; although it appears to be quite thick, this is in fact the result of another wall having been attached to its side. Wall 26 formed an angle with another wall (Wall 28),



8. Locus 2 from the east.



9. Area I, Locus 22.

which headed north. In this area, excavation stopped at a depth of just 0.45m. numerous querns and grinders were found in all areas.

The new areas discovered in the extension of Area I to the west yielded a large quantity of ground stone objects, such as querns and grinders. This work exposed a number of small rooms, Loci 23-26 (**Fig. 4**), which so far do not seem to communicate with each other. The walls of these rooms were relatively thin, being constructed on top of the main wall, Wall 13, which continues further to the south. The small rooms were dug to 0.50m depth. In the south, Wall 13 forms an angle enclosing a wide area (Locus 10). The west side of this locus was dug down to 0.80m but was not particularly interesting. This locus and two smaller loci, 11 and 15, with which it communicates through narrow doorways, may have constituted a single dwelling. However, further investigation is needed in order to clarify this point.

With further expansion to the south, a small room (Locus 28) with sturdy walls was revealed. It may constitute a separate unit, as there are double walls to the south and north (**Fig. 4**). Excavation in Locus 28 reached a depth of 0.65m; the deposit did not yield any artifacts except for a few blades and some stone vessels. It was characterized by a stone standing upright in the middle of the room.

Area II

In Area II, situated in the south part of the site,

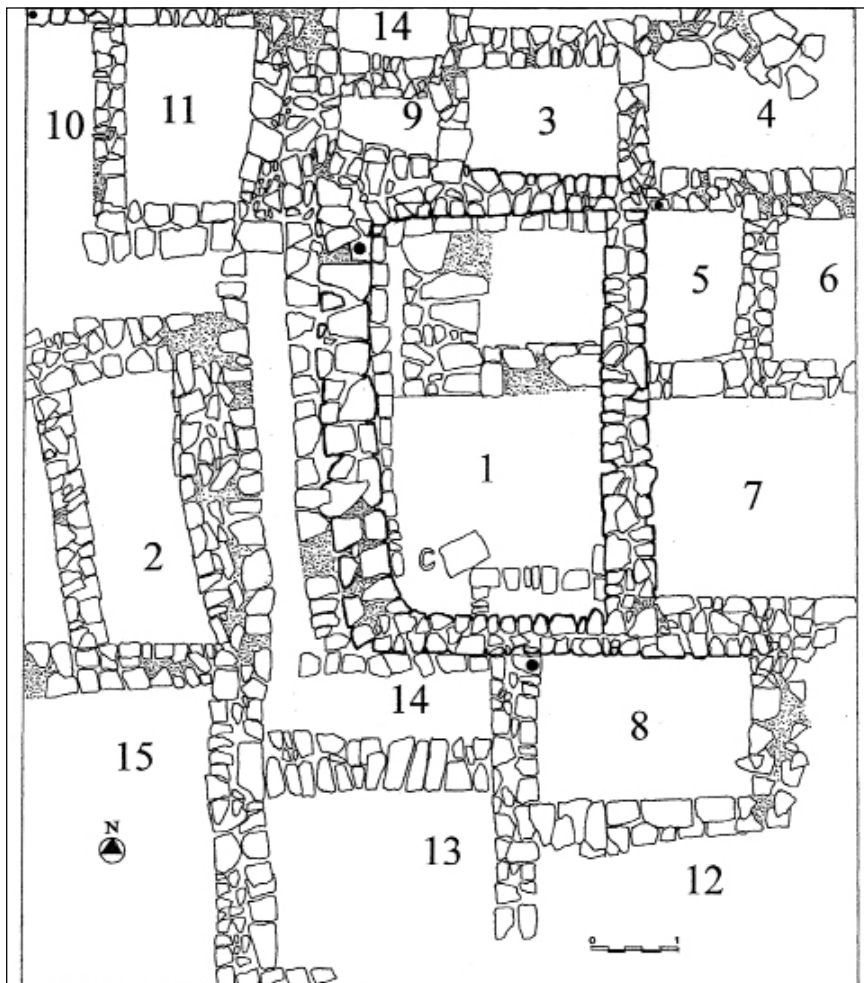
we discovered a building complex dominated by major structure built of large heavy stones (**Fig. 10**). We conducted our research in the north-east side of the building where deposits were intact. The soil was soft and sandy with many stones, presumably fallen from the superstructure of the building. At the depth of 0.60m, a buttress wall appeared at the north side, on which posts supporting the first floor were founded.

At 0.80-1.00m below ground surface, we discovered a stratum of burned soil with chipped stone arrowheads, stone vessels fragments and animal bone. The next stratum consisted of a dark soil, rich in stone artifacts and with traces of burned remains. Fewer artifacts and animal bones were found 1.15m below the ground surface, although an oval bead made of green stone (possibly malachite) was recovered from this deposit. 1.35m below the ground surface, we discovered a 1.30m wide wall made of large, flat stones, possibly belonging to an earlier architectural phase (**Figs. 11 and 12**).

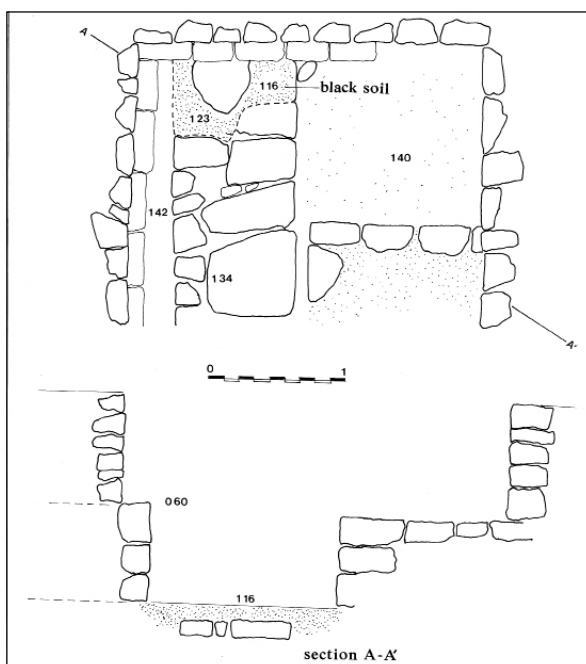
Small rooms have been discovered around this main building. In the north, there are four independent small loci (3, 4, 9, 11 and 14) which we excavated to a depth of 0.30m, recovering many querns, ground stone artifacts and chipped stone blades. Small loci were also found to the east and south. The excavation of Locus 13 just 0.20m below ground surface was very interesting, since we discovered blades, arrowheads and animal bones.

Area III

In Area III, an open area was discovered which may be a courtyard with small storage areas to the east and west, which are interconnected by means of narrow doorways (**Fig. 13**). The layout of these small loci with narrow passageways (Loci 4-10), where many ground stone tools were found, looks different from the 'beehive' -- like building system at al-Bayḍā. A one metre wide passageway, which may be interpreted as a road, leads to the courtyard (Locus 14). At the north-eastern side of Area III, a building with poorly preserved walls was excavated to a depth of 1.90m, while to the south two rectangular loci have walls preserved to a considerable height. At the western side a narrow passageway leads from the 'courtyard' to another structure (Loci 2, 3, 6 and 13).



10. Plan of Area II.



11. Area II: Plan and section of Locus 1.

Area IV

The biggest surprise of the last season's work came during the final days when a 13-metre square building (Area IV) was uncovered in the centre of the settlement. Its construction with carefully chosen flat slab stones differed from that of other buildings on the site. Excavations here continued to a depth of only 30cm, but it is certain that this building is preserved to a great height as was evident from our test-trench on the north side which went down to 1.60m without finding the bottom of the wall. This building has entranceways on three of the corners and three narrow openings on the western side (**Fig. 14**).

Ground Stone Objects and Other Finds

Ground stone implements are widespread in the Pre-ceramic Neolithic in the Near East. In those regions the occurrence of ground stone tools is recorded from the 10th to 8th millennia cal. BC. They are associated with the process-



12. Area II. Locus 1 from the north.



13. Plan of Area III.



14. Openings in the west side of the square building.

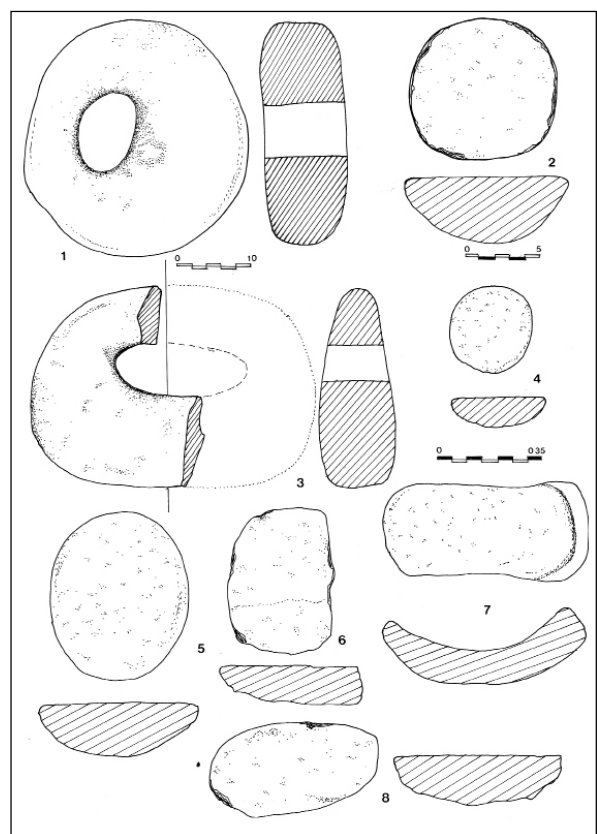
ing of plant foods, especially the seeds of wild grasses and domesticated cereals. As for the typology of passive groundstone, different types have been identified in the Pre-ceramic Neolithic of the Near East.

The usual types are oval or round querns with a flat surface (**Fig. 15.5, 15.6, 15.8**), as well as the unusual concave and oblong millstone with convex base (**Fig. 15.7**). As for the grinders, different types occur.

It is very significant that a large number of stone vessels were also found (**Fig. 16**). There are oval or round bowls, of which the most usual type is a small shallow mortar with thick walls (**Fig. 16.7, 16.8, 16.10**). Rare are the closed-shaped stone vases with very thick walls.

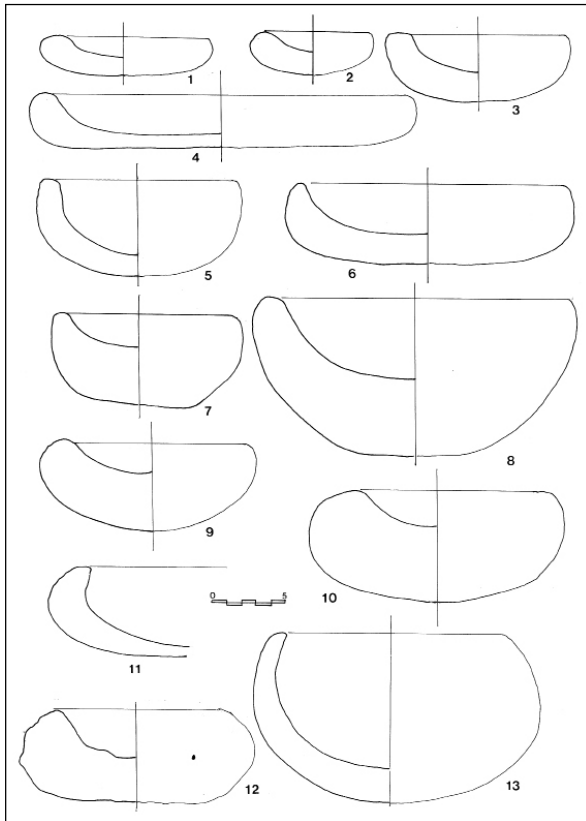
A marble notched stone could be a schematic figurine, or perhaps just a weight. Bilaterally notched stones, interpreted as weights, have been reported from the PPNB settlement at Wādī Abū Ṭulayḥa (Fujii 2007: Fig. 16).

Two slabs of sandstone found in Area I, Locus 18 bear cup marks on their surfaces and may be characterized as gaming boards (**Fig. 17**). Similar items have been found at the PPNA site of Ein Suhun (Kaliszan *et al.* 2002: 16) and at Wādī Abū Ṭulayḥa (Fujii 2007: Fig. 31, 2008: Fig. 30.11). These are, possibly, associated with several stone bowlets also found in Area I. Of undefined usage are small flint bowlets without retouch, which are found in all areas. These un-

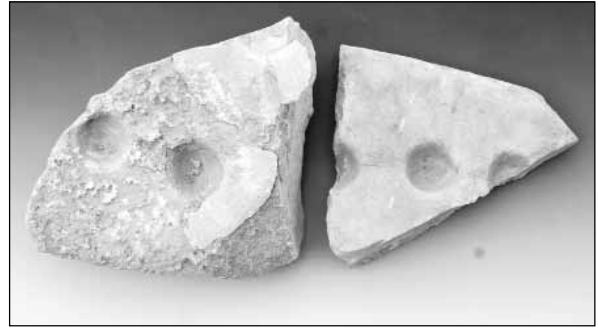


15. Ground stone tools.

usual items have so far only been recorded at Baṣṭa (Nissen *et al.* 1991), Ba'ja (Gebel 1999) and Kfar Hoheresh (Gorring-Morris 1994). At Wādī Ḥamarash these items are not retouched,



16. Stone vessels.



17. Stone gaming boards.

whereas at Baṣṭa and Ba‘ja some do feature re-touch. They could have been slingshots, or perhaps counters used with the abovementioned gaming board. Several limestone discs with a small knob were found in Area I and are similar to objects found at Wādī Abū Ṭulayḥa (Fujii 2008: Fig. 31.6).

Twelve drilled flat stones were found in Area I, Locus 18 (**Fig. 18**), these were presumably soft stone necklace beads, which are known from many PPNB settlements.

Chipped Stone Artifacts

Excavations yielded a large quantity of



18. Drilled flat stones.

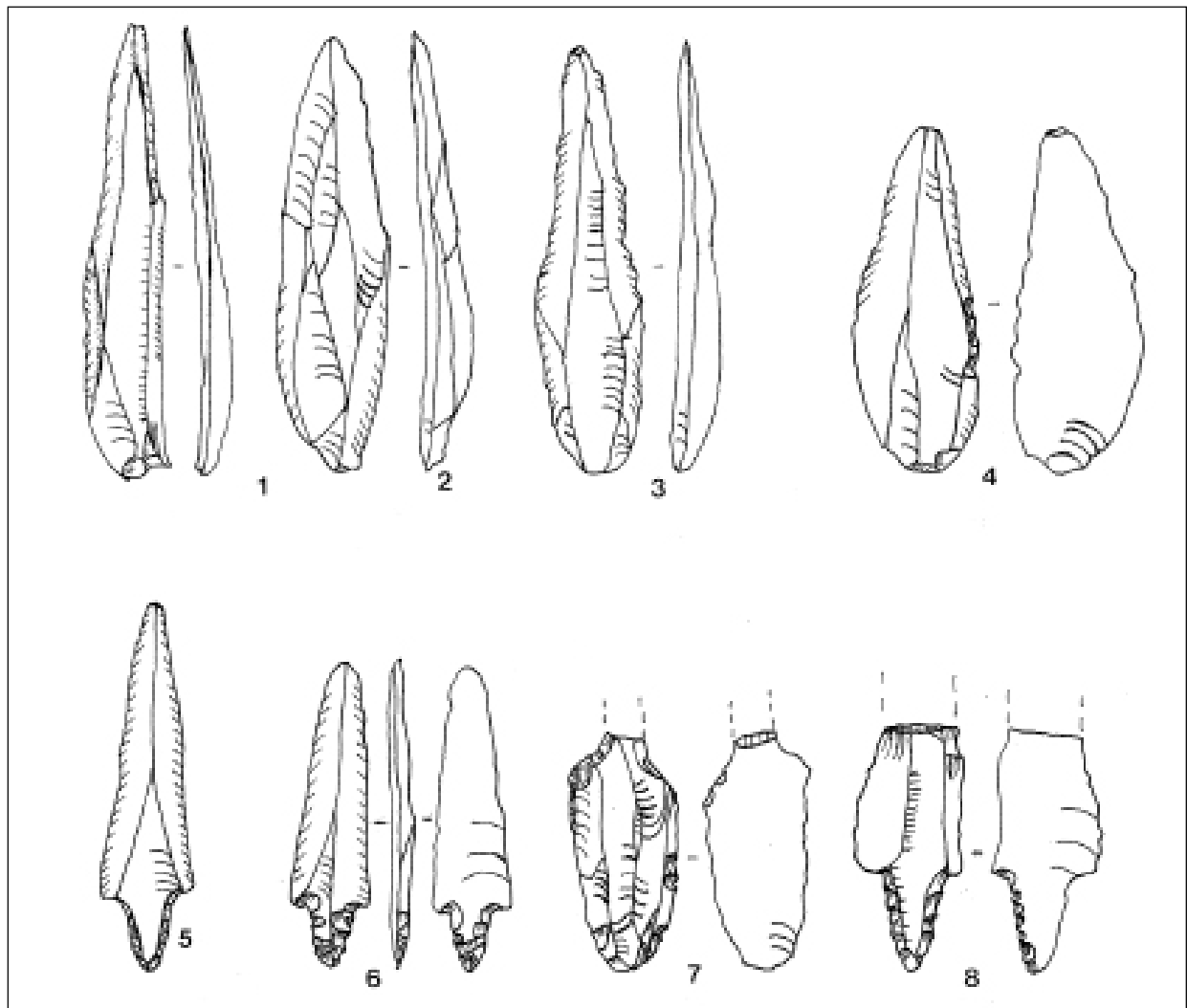
chipped stone artifacts. Although analysis is still in progress, their density on the whole seems rather regular across the site. However, in least in two cases (Area I, Locus 18 and Area II, Locus 13), artifacts were concentrated in specific areas, presumably storerooms or spaces where specialized activities took place. All artifacts recovered so far are made on flint extracted from waveform cores using the pressure blade technique (Fig. 19).

The main tool types in our sample are blades with traces of use-wear, denticulate tools, borers or drills, and projectile points. At Shukarat al-Musay'id arrowheads were the most common category of tool, accounting for 20% of the tools (Kaliszan *et al.* 2002). With the exception of the borers (Fig. 20), many of the tangled artifacts

probably had the same use.

Discussion

The architecture at Wādī Ḥamarash has apparent similarities with the 'peripheral' settlement of Ghweir I in southern Jordan (Simmons and Najjar 2000), where rectangular buildings with large rooms were excavated. Two-storey buildings also occur, 3.60 to 4.00m high, as do the niches and low doorways known from Wādī Ḥamarash. The closest known PPNB settlements to Wādī Ḥamarash are Khirbat al-Ḥammām (Peterson 2007) and Wadi al-Ḥimmah, which are situated in the region of Wādī al-Ḥasā, albeit at a higher altitude. Khirbat al-Ḥammām is a megasite extending over 6 to 7 hectares; limited excavation has been conducted. The second is a



19. Chipped stone artifacts.

smaller site at 450m altitude, with an extent of one hectare, which has sustained heavy destruction from road construction. Although the site has not been excavated, openings in walls exist, as do subterranean channels similar to Basta and as-Sifiyya (Mahasneh and Gebel 1998).

We may assume that there was permanent or semi-permanent occupation at Wādi Ḥamarash, because of the river that flows by the settlement. Since the area is located among deep canyons and steep mountains, we assume that the site's occupants cultivated the plateau around the settlement, taking full advantage of the wadi water.

Wādi Ḥamarash can be characterised as a small PPNB settlement, typical of the early stages of that period. Shukarat al-Musay'id (Kaliszan *et al.* 2002) is also a small site, probably preceding the megasite phenomenon, but the round buildings there are very different to those at Wādi Ḥamarash.

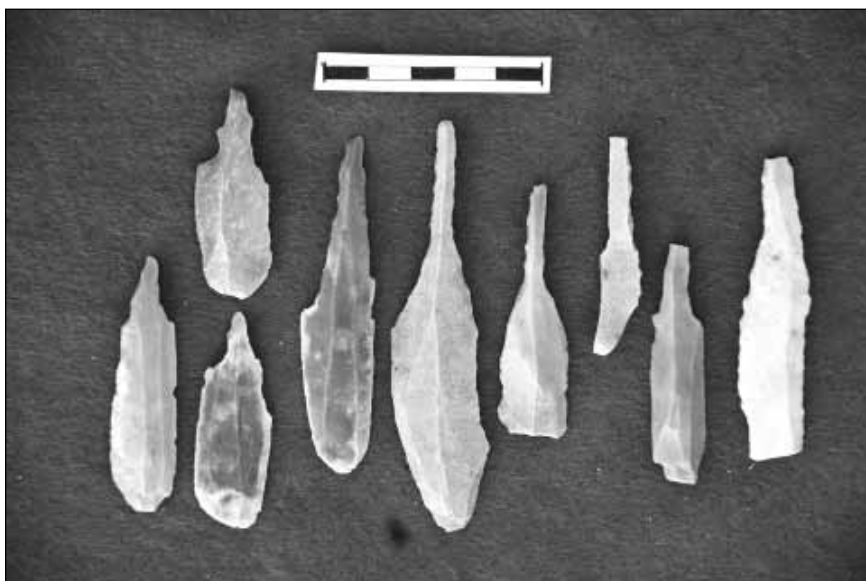
Acknowledgements

The project is grateful to the Director General of Antiquities, Dr Fawwaz al-Khraysheh, and his staff for granting permission to work at the site. Thanks are due to Dr Konstantinos Politis who helped with preparations for the excavation. My thanks also go to the staff members of the project: Photographer Petros Konstantopoulos, architect Photeini Striggari, Georgia Tampakopoulou (chipped stone) and Syrmali Donta (ground stone).

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THE EXCAVATION OF 2010 AT THE WĀDĪ ḤAMARASH-SUWAYF (GHAWR AŞ-ŞĀFĪ)

Adamantios Sampson

The excavation at Wādī Hamarash-Suwayf (31.016 783 Latitude 35. 542 582 Longitude) in Ghawr aş-Şāfī continued during February and March 2010 by the Aegean University, after initial collaboration with the Society for Near Eastern Studies in 2008 and 2009 (Politis 2009; Sampson n.d.). The project was directed by Prof. Adamantios Sampson and the Department of Antiquities of Jordan was represented by Mr. Imad Al Drous.

The excavation focused mainly in the large rectangular building in Area IV (**Figs. 1, 2**) which had been located the previous year (Sampson n.d.). Excavation advanced meticulously by spits of 10cm and the internal space was separated in squares. The building, with external dimensions 10.60 x 9.50m, does not comply with the orientation of the rest of the buildings in the settlement. It constitutes an independent building that does not relate with the dense layout of other buildings in Areas I and II.

The masonry of the external side is exceptional and is constituted of slab stones combined with great consistency (see **Fig. 4**). In the southern part, the foundation wall reaches a depth of 1.65m, while in the northern part, the foundation was revealed at a lesser depth. The weight of the very thick walls was probably the cause of subsidence of the deposits in the western and northern side. Even though it looks as a rectangle or roughly square in shape, there is no absolute symmetry in dimensions (**Figs. 3, 4**). Hundreds of stones fallen from the walls were found both in the interior and the exterior space, indicating the walls were of considerable height. Two main doors with stone thresholds exist in the building, in the western side and in the SW corner, with widths 0.95m and 0.90m respectively. Three narrow openings are found at small

distance from each other in the western side.

In the interior, the walls bear niches of irregular thickness for the reception of wooden poles. Nine similar niches have been preserved, which do not present symmetry. It is characteristic that the niches splay towards the interior in order to retain the wooden poles better (**Fig. 3**). Obviously, the roof must have been wooden, inclined, supported by a lot of stakes so as to cover the wide opening of building that reaches 10m. The floor was found at a relatively shallow depth (0.65-0.75m.) in the southern and western side, while in the northern area, due to the subsidence mentioned, it was found lower. The construction of the floor was intricate and included three phases. Initially there was a substratum of big stones and slabs. Then, small gravel mixed with earth was placed, and finally it was covered with white plaster. Unfortunately, the plaster was preserved in only a few areas, whereas the layer of gravel at a greater extent. In very few cases was the plaster on the walls preserved.

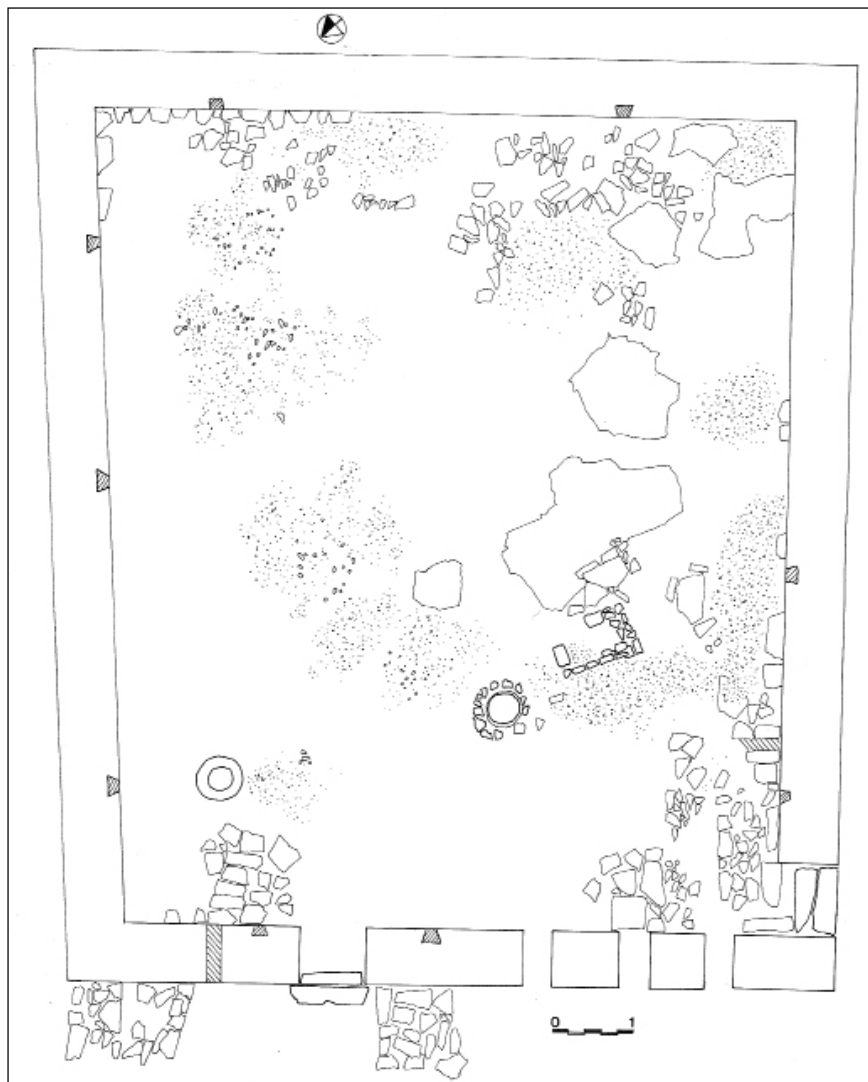
It is also characteristic that in the building few artifacts were found, such as some grinders and parts of blades, and not in the level of the floor. More were found around the building, including big concentrations of blades and ground stone tools, especially near the southern entry. A stone ring made of sandstone (see **Fig. 16: e**) was found in Opening 1 of the western side on the external face. In the northwest corner in Sq. 62, at 0.40m depth, there was a big quern with a diameter of 0.43m, and height 0.40m, which stepped onto the floor. At the same level, two grinders were found as well as an ashy layer. In the same area of the building the plaster of the floor has not been preserved, but the substratum of big slabs was. In a part of the western wall, at floor level, a hole was found with height of



1. Wadi Hamarash: the grid of the site.



2. The rectangular building and cluster of buildings in Area II.



3. Ground plan of the rectangular building.



4. The rectangular building from the southwest.

0.15m and width of 0.18 m that must have had disposal or sewage use.

The only feature inside the building was a rectangular hearth of dimensions 1.00 x 0.80m, in Square 24, that presents an asymmetry with relation to the walls (**Fig. 3**). Near the hearth, (Square 33) a circular pit surrounded with small stones was revealed in the floor level, containing a flint nodule (**Fig. 5**) of roughly spherical shape (diam. 0.43m and height 0.35m). On one side of the stone there was a flat surface with circular dents with diam. 0.17m, and below it there were two similar incised symbols existed resembling the Greek letter Ψ (**Fig. 6**). A similar



5. The flint nodule from the rectangular building.



6. Incised symbols on the flint nodule.

spherical nodule was found outside the building, placed at a small distance from the southern entry. Its dimensions were smaller, with diameter of 0.36m and height of 0.20m (**Fig. 7**).

In general, the floor of the building has suffered considerable destruction after its abandonment due to the shallow depth of overlying deposits. In several spots, pits with concentrations of large stones exist.

Area II

Excavation also proceeded to the area between the symbolic building (Area IV) and Area II, excavated in 2008. A wall with northern orientation begins from Area II, encompassing an extensive area, within which loci 22, 23, 24 were found (**Figs. 8, 9**) that communicate through doors. Obviously, it is a separate property, which must have included also the small loci 3 and 4. All areas were excavated to the depth of 0.30-0.40m and yielded a large number of ground stone tools and chipped artifacts. Extraordinarily elongated is the locus 24 to which lead two doors.

The northern wall, which has a narrow entry from the open area 21, forms a circular corner and is directed easterly towards the symbolic building. This open area is created in front of the southern entry of the symbolic building. In this point an extraordinary configuration of walls creates a bench on which a flint nodule was placed on a big slab (**Figs. 7, 8**).

Another unit consists of loci 16-19, 25, which, upon removal of the first spit, yielded

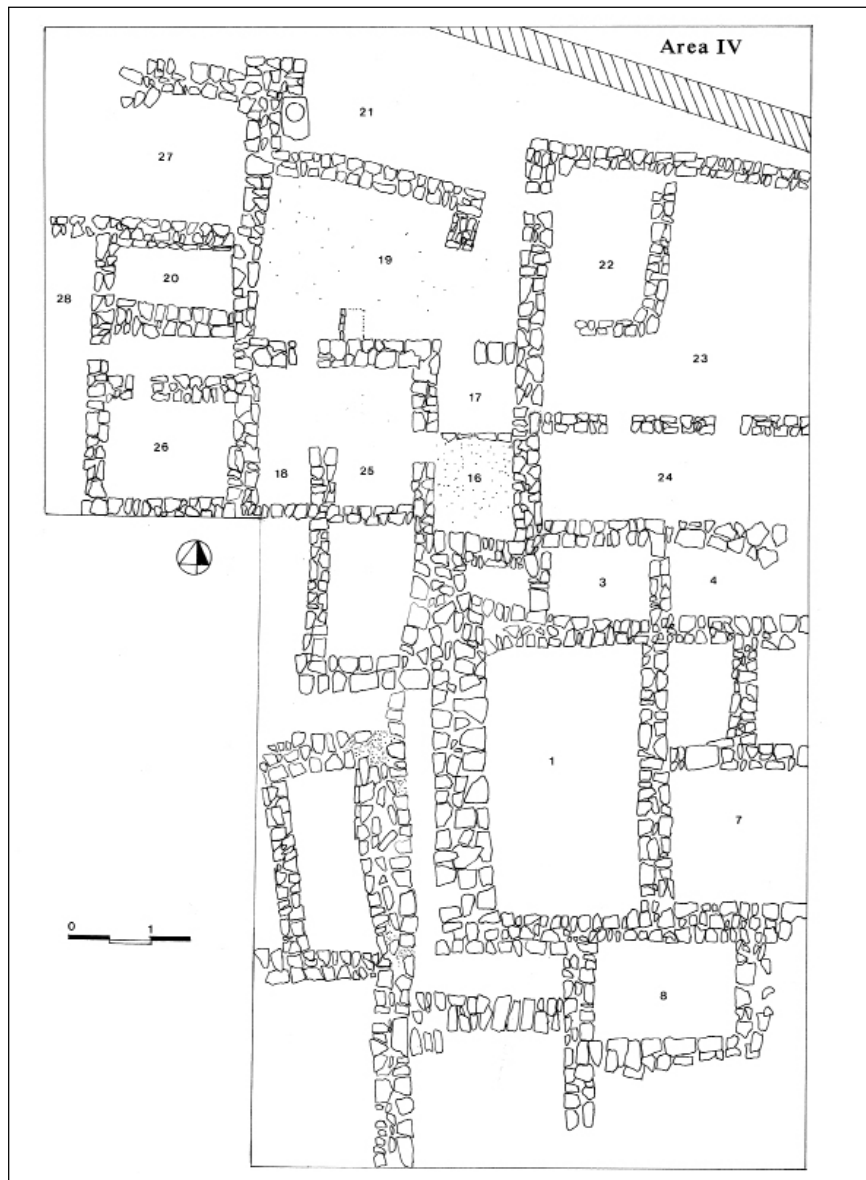
numerous ground stone tools and lithics. The loci communicate through relatively narrow openings. In the small space Locus 16, a floor of slabs with traces of plaster was found at the depth of 0.35m. The most important room was Locus 19, with a trapezoidal ground plan (**Figs. 10, 11**). Two entries lead from Rooms 17 and 18 to its interior, while another entry, not clearly distinguishable, probably provided access to the open area 21 in the entrance of the symbolic building.

Locus 19 constitutes the second area in the settlement in which plaster was found on floor and walls. However, the floor is destroyed in the central part, but it is preserved in a much better state than that at the symbolic building. The lime plaster was better preserved mostly on the floor near the walls and had a beige/grey shade, different from that of the big symbolic building which had a white color. In several areas, blue-green color exists that probably derives from original coloration. In the deposit of the room many ground stone tools were found. At the depth 0.45m, a smoothed discoidal object of flint existed with a small hole in the centre. In the 6th layer, in the centre of the room, an ellipsoid stone object colored with red and yellow was found, similar to that from Locus 20 (see **Fig. 16: a, c**).

On the floor (depth 0.65m) near the north wall, a big oval quern 0.38m long and 0.25m wide was revealed, while next to it, a fragment of a gazelle skull was also found preserving the



7. The other flint nodule near the southern entrance of the rectangular building.



8. Cluster of buildings between the Areas II and IV.

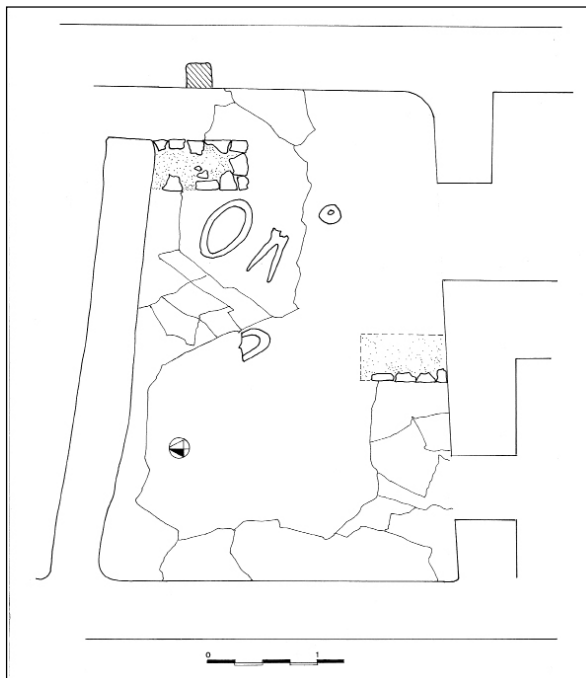
antlers, suggesting a ritual use for this room (Fig. 12). At two points in the room, two rectangular benches existed, of which one was only partly preserved. Near the northern entry, a narrow niche 0.32m high and 0.21m wide existed but it whether communicated with Locus 22 was not clarified.

To the west of the Room 19 another unit includes Loci 20, 26, and 27. Room 20 is roughly square and has been excavated down to the depth 2.20m. In the northern wall two successive buttress walls were found at depths of 0.65 and 0.95m respectively (Figs. 13, 14). The northern and eastern walls extend down to 2.20m, where-

as the southern and western walls are founded much higher. Consequently, Locus 20 had two floors and communicated through narrow openings with the two ground Rooms 26 and 28 (Fig. 14). Locus 27 was excavated partly at a shallow depth and does not appear to communicate with locus 20. In Locus 26, which reached a depth 0.45m, many ground stone tools were found, and finds were abundant Locus 20. At a depth 0.40m two parts of big stone basins were found, as well as smaller containers. At 1.10m depth, an ellipsoid stone with a hole was found, with an incised symbol similar to those found in the flint nodule; also, two oval grinders, part of a



9. Buildings between the Areas II and IV from the west.



10. Locus 19. Ground plan.

stone vessel, and a handful of flint blades were recovered. In the next layer (12) two stone vessels were found, as well as bones of small animals and blades. At -1.40m depth, a stone with phallus form, a grinder, and parts of stone vessels were found.

The Finds

The spherical stone objects were usually found in limestone rocks in different regions of



11. Locus 19 from the west.

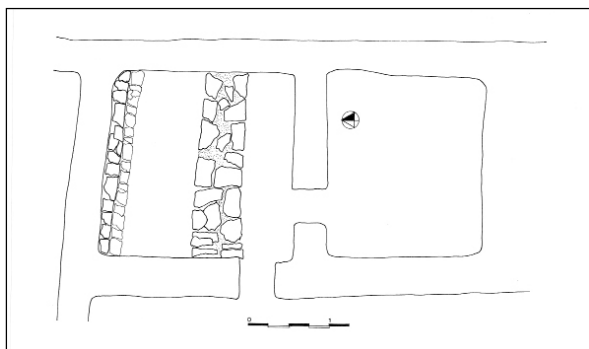


12. Locus 19. Plastered floor.

Jordan, but up to today have not been known in the region of Wādī al-Ḥasā. They also occur in



13. Locus 20.



14. Locus 20. Ground plan.

the eastern desert of the country (Black Desert) in argil sediments (**Fig. 15**). These extraordinary stones obviously attracted the interest of residents of the settlement which transported them there from perhaps a great distance and placed them in a prominent place. According to Gebel (2004: 59) the flint nodules, which usually are not reported in the publications, are connected with sociobiological and metaphorical/symbolic functions. Their collection belongs to a universal possessive behavior and is connected to the “effectance of competence motivation”. Their use could have occupied a range

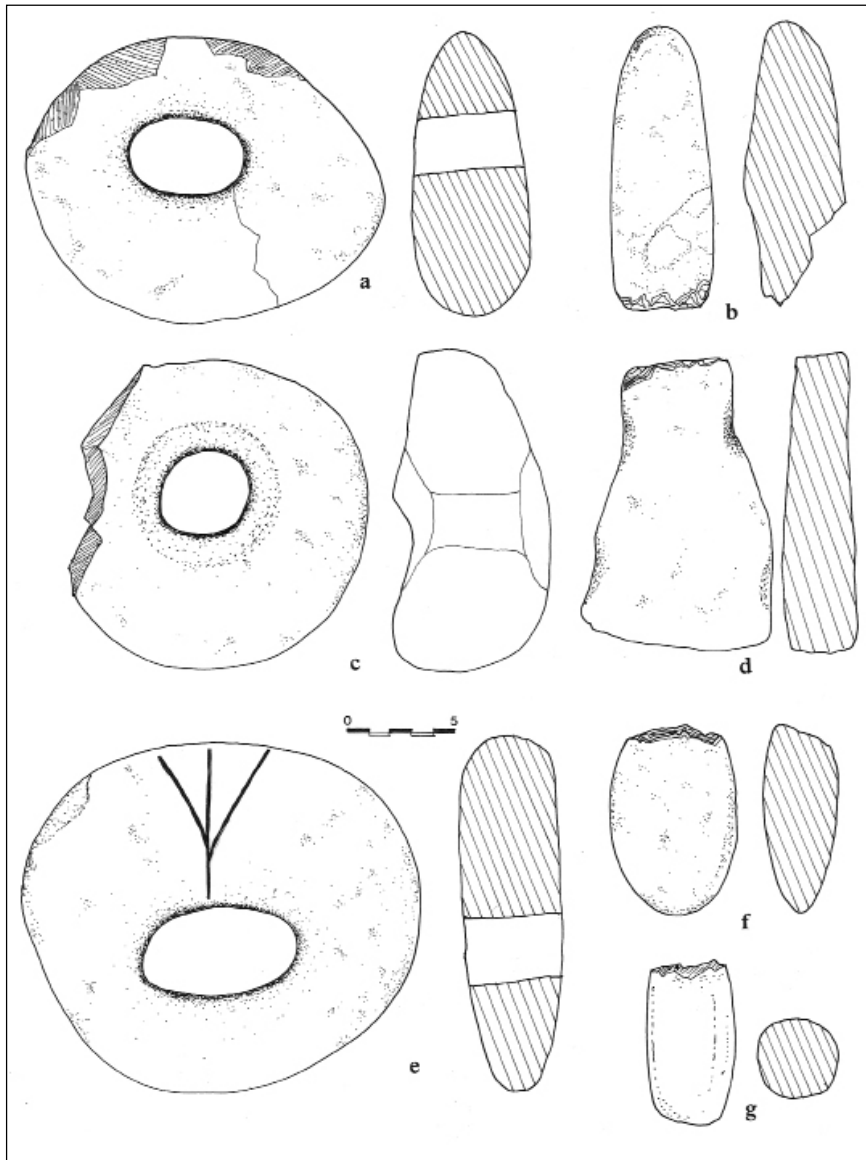


15. Flint nodules in the eastern desert of Jordan.

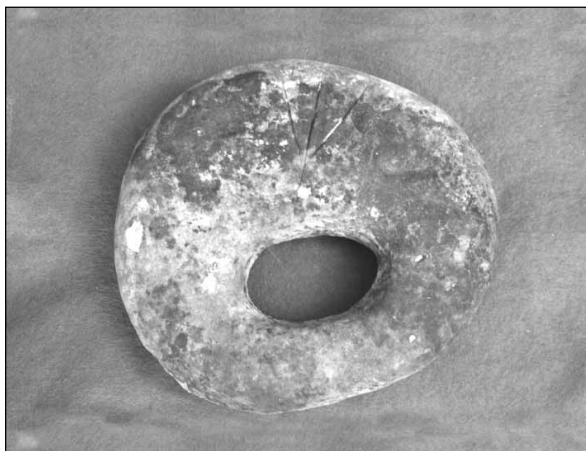
of functions between possessing something attractive/ meaningful/ symbolic/magical and objects used in socially motivated giving/taking/sharing. Furthermore, the incision of two similar symbols on an extraordinary and magical object should have had a greater and particular importance (**Fig. 6**)

Each symbol consists of a straight line with two lines that emerge from this at an angle and could constitute a schematization of human body with upraised arms. Depictions of the human form on clay vessels or in other materials occur in the Neolithic of the Balkans. A human figure with raised hands in Hungary is dated to Bukk phase (Kalicz 1980: Fig. 19). A similar incised symbol occurs on vessels or figurines of the Vinca culture in Serbia and is included in the early Neolithic writing of Balkans (Winn 2009: 56; Pesic 2003: Fig. 5), while similar symbols have been found on ceramics from Troia I (Winn 1981: 248; Haarmann 2008: Fig. 2). In any case, this symbol, to my knowledge, has not been found in the Near East up to today.

A precisely similar symbol was found in Locus 20 on an ellipsoid sandstone object with dimensions 0.10 x 0.16m and thickness of 0.03m (**Figs. 16: e and 17**). Two similar objects without incised symbols were found during this season in Locus 19 (**Fig. 18: a, c**), while in 2008 and 2009 several items were also found in Area I. The use of these objects is for the moment inexplicable; however the presence of the incised symbol on one of them could also characterize the similar objects as items with a symbolic significance. Stone pierced objects have also been found in the as-Sifiyya settlement and are reported as stone weights (Mahasneh 2004), however their size is smaller and the form different. A pierced round stone was found at the level of floor in Locus 19 (**Fig. 18: a**). It is a flint bearing colored shades in successive circles. The intense wear indicates it had been used as a tool for percussion, as if it had a wooden shaft. The axe with a length 0.124m and width 0.048m, found in deep layers of Locus 20 is the unique example, so far, from the settlement (**Fig. 16: b**). In general, these tools do not occur often in the early Neolithic of Jordan. An exception comes from as-Sifiyya, where several similar tools have been found (Mahasneh 2004: Fig. 10).



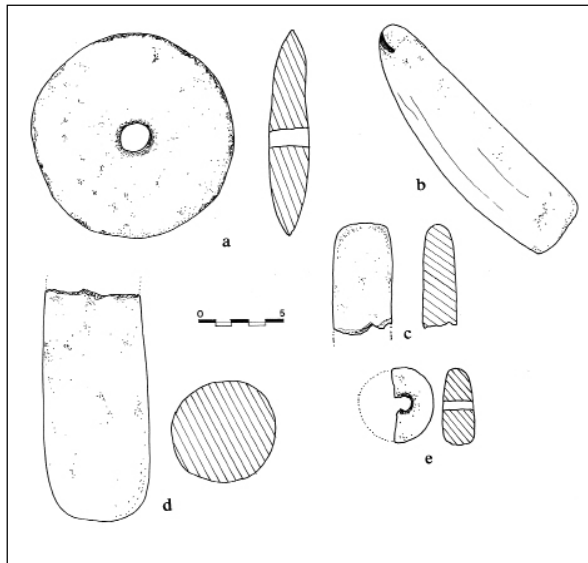
16. Stone objects from Loci 19 and 20.



17. Stone object with incised symbol from Locus 20.

Conclusions

The excavation of the large rectangular building, which is distinguished from the other buildings of the settlement and is found at a prominent place in northernmost part of the site, constitutes something unusual for the PPNB of Jordan. The building differs from the other structures by its size (roughly 100m²), the exceptional masonry, and the existence of lime plaster in the floors and the walls. The lack of domestic finds and even more, the extraordinary spherical nodule with two incised symbols indicates this unusually large building may have had some kind of ritual function. A stone object from another area (Locus 20) with the same in-



18. Stone objects from Loci 19 and 20.

cised symbol bears particular interest. A similar symbol, also engraved on a slab, was collected on the opposite bank of the Wādī al-Ḥasā River on a small plateau situated at lower level from the settlement. It is an area that presents four circular structures of the same period, according to the lithic artifacts.

At the same time, at a small distance from the symbolic building, another room (Locus 19) was investigated, with colored plaster on the floor and walls as well as built benches, which yielded finds with symbolic character. Upon the conclusion of the season's excavations a thick blue plastic tarpaulin was laid on the plastered floors, then back-filled with soil and stones for protection. It is recommended though that care is taken to preserve this rare discovery.

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REPORT ON THE FIRST SEASON OF THE BARQĀ LANDSCAPE SURVEY, SOUTH-WEST JORDAN

Russell B. Adams, James D. Anderson, John P. Grattan, David D. Gibertson, Lynne Rouse, Hannah A. Friedman, Michael M. Homan and Henry Toland

The Barqā Landscape Survey, directed by Russell Adams (McMaster University, Canada) and co-directed by James Anderson (North Island College, Canada), undertook an archaeological survey of the Barqā Region of Faynān District, between 1 and 28 July 2009. The project was supported by a grant from the Social Sciences and Humanities Research Council of Canada, sponsored by McMaster University and affiliated with the Council for British Research in the Levant (CBRL).

Context of the Research

Over the last decade significant progress has been made in understanding the development and spread of early copper technology in ancient Western Asia. A major centre of this research has been in the Faynān region of southern Jordan, the oldest and largest industrial landscape of the ancient world. At Faynān a number of researchers have been actively investigating the technological development of metallurgy and the implications of these developments upon social evolution during later prehistory. The technological investigation into early mining and smelting was begun by Hauptmann, whose Early Metallurgy Project (1985-1993) formed the basis for subsequent investigations (Hauptmann 2000, 2007). The archaeological investigations of early metallurgical production sites was pioneered by Adams, first as the focus of a PhD thesis (1989-1993) (Adams 1999) and later expanded by the applicant as a collaborative project (1997-2002) (Levy and Adams *et al.* 2001).

To date these archaeological investigations have resulted in a small-scale survey focused upon the Wādī Fīdān drainage and extensive excavation of two major and highly visible sites in the same *wadi*. The first site dates to the de-

velopmental phase of metallurgy in the mid-fourth millennium BC (3600-3300 BC), and the second is a large production centre dating to the mid-third millennium BC (2600-2300 BC). The cumulative result of these investigations has been the development of a sequence for the evolution of early metallurgy spanning this period, which suggests a change from small-scale, village-level production (Adams and Genz 1995; Adams 1999), to highly-developed, large-scale, intensive production by the end of this period (Adams 1999, 2002; Levy and Adams *et al.* 2002). Intensive 'industrialized' production emerged at the beginning of the third millennium BC (*ca.* 2900 BC), at a time when other social changes were occurring in the Levant. Previous scholarship has noted a significant increase in the appearance of copper products at this time throughout the eastern Mediterranean, but recent work at Faynān in Jordan provides the first evidence of these processes from the perspective of the copper production sites (Adams 1999, 2002, 2003). At Faynān, the details from the excavations at these two sites have provided answers to many technical questions regarding copper production including the *chaîne opératoire* and the social use of space within these sites, but they still remain isolated sites within the wider region. The relationship of these sites to other local copper production centers and the overall scale and intensity of metal production remains poorly understood.

Despite the quality of the archaeological evidence from the limited excavations in the Faynān region to date, significant underlying questions remain about the organization, scale and intensity of production of copper during the third millennium BC. The overall scale of these activities is hinted at by the preliminary

results of the ancient mining surveys undertaken by Hauptmann (2000, 2007) which revealed extensive mining in the Faynān region during the third millennium BC. There is also evidence of slag deposits throughout the landscape in various locations, at several of the dedicated primary smelting sites that have been investigated at Khirbat Faynān and elsewhere in the region (Hauptmann 2000, 2007). To date, however, we lack a robust quantitative analysis of data which will allow us to determine the overall scale and distribution of production activities during the third millennium BC.

The best preserved and last remaining prehistoric landscape in the Faynān region lies to the south of the Wādī Faynān, in the region of Barqā, an area of approximately 100 square kilometers, along the edge of the 'Arabah rift valley. During the early 1990s Hauptmann's 'Early Metallurgy Project' conducted limited excavations in the Barqā region at the site of Barqā al-Hatiye (another highly visible site). Exposure there of a well preserved building, radiocarbon dated to the earliest phase of intensification of copper production (2900-2700 BC), suggests that the Barqā region will provide further evidence of this transitional phase of copper production (Fritz 1994a, 1994b; Adams 1999, 2003). The results of a very limited and undocumented reconnaissance revealed that the surrounding landscape was densely populated during the third millennium BC and contained numerous structures and features with archaeological finds similar to those found at the third millennium BC site at Khirbat Ḥamrat Ifdān, the largest and best preserved copper production centre in the Old World (Levy and Adams *et al.* 2002). This reconnaissance suggests that numerous metal processing activities took place in the Barqā region at this time, as evidenced by visible building remains, slags and extensive metallurgical production waste. The Barqā region is therefore a key zone for the understanding of copper production at Faynān, and may provide important data towards understanding the context of the intensification of copper production during the third millennium BC.

Theoretical Overview

To date there has been an overemphasis upon looking at the adoption and early spread

of metals in society from the consumption end of the metallurgical cycle, largely through metal objects derived from 'elite' burials. The recent research at Faynān described above has begun to redress this imbalance, with research efforts focused upon the technological advances and intensification of copper production during the third millennium BC — a pivotal time in the advancement of both complexity in the region and in the adoption and spread of metallurgy. A great deal has been learned from surveys of mines, analysis of ancient smelting furnaces and associated ores and slags, and from limited excavations of large visible sites related to copper production. We have been able to 'fingerprint' the ores of the region through isotopic analysis and have begun to trace both copper ores and metal throughout the region and to understand the complex trading networks which developed to distribute these metals (Hauptmann 2000, 2007; Adams 2006). On the basis of this evidence it has been possible for the first time to develop a model for this phase of expansion of copper production, from the copper production zone, and to delineate specific changes in social processes and technologies that accompanied this expansion in the use of metals (Adams 1999, 2002). However, our model building is at best only preliminary, since most evidence to date has come from a limited number of large sites: These isolated excavations provide only a snapshot of events and processes without enough contextual evidence to prove that they are representative of copper production sites and activities across the Faynān landscape during the third millennium BC.

The evidence to date from excavated sites suggests that copper producing activities which had remained small-scale / low intensity operations throughout the fourth millennium BC suddenly and very rapidly changed during the early third millennium BC to large scale / high-intensity operations conducted by specialists. One possible reason for these changes and the resulting re-organization of production activities and scales of production may have been the increasing consumption of copper by emerging elites. Possible models for production range from some form of a hierarchical organization of production such as attached specialization (Costin 1991; Adams 1999, 2002) at one end of

the spectrum to a heterarchical organization at the other (Crumley *et al.* 1995). To date, without the evidence that is available from the less visible sites in the region, the data are insufficient to fully support either of these models. In order to build up an accurate picture of these social and technological changes it is important to have a broad sample of data from production, habitation and other types of sites. The ability to provide this contextual background relies upon the collection of less visible and less easily accessible evidence in the landscape. Therefore, in order to advance our understanding of this phase of metallurgical development it is imperative to be able to understand the distribution of and relationship between all types and sizes of sites related to production and related activities across the landscape. The Barqā Landscape Survey (BLS) has been designed to fill this gap in our knowledge through investigation of the archaeological and environmental evidence for intensification of copper production across the broader landscape.

Objectives

To date, investigation of early metallurgy at Faynān has concentrated on mining and smelting sites (Hauptmann 2000, 2007) and upon limited evidence from only a few large and *highly visible sites* (Adams 1999, 2000, 2002, 2003; Levy and Adams *et al.* 2002). The Barqā Landscape Survey seeks to expand our understanding of the scale and intensity of copper production by documenting the *environmental impact* of copper production in the wider region from a variety of natural and archaeological contexts (cf. Grattan *et al.* 2003a, 2004, 2005, 2007). Our intention is to move the common research paradigm away from hypotheses which focus on site-based problems and solutions, and instead encourage hypotheses which explore critical aspects of human development which can be enlightened by a landscape-based approach (Wilkinson 2003).

Theoretical models for intensification and changes in the technology of copper production suggest that the processes which are observable in the larger production sites should be discernible in the wider landscape, with a number of production centers of similar (or differing) types (Adams 1999, 2002). The Barqā Landscape Survey seeks to test this model of intensification of

production through an analysis of the less archaeologically visible production sites in the region, and to identify the nature and distribution of these sites in the landscape.

In order to arrive at a quantitative means of assessing the scale and intensity of copper production, it is essential to use a method which can provide numerous and demonstrable results of copper smelting and production activities. Archaeological survey and excavation alone is not enough to do this in a cost-effective way over a large area. We therefore propose to undertake an assessment of environmental pollution in areas which we can determine to be of the correct chronological time frame. The degree of pollution, as determined by sampling across the region, can be used to establish the scale and intensity of copper production.

Using a combination of archaeological survey, space-borne multi-spectral analysis, sampling excavations and geochemical mapping we are examining this early industrialization from the production residues and palaeoecological materials preserved across and within the ancient landscape. The geochemical analysis of dated contexts will inform us about the ore bodies being exploited at different periods, the efficiency of the smelting process and the impact of these activities on the environment. These chemical fingerprints will enable us to identify the magnitude and intensity of these activities at different periods and the organization of the landscape in support of them.

Similar research already has been undertaken successfully in the eastern Faynān basin (adjacent to the Barqā region), in order to explore and document the impact of Imperial Roman mining and smelting activities (Grattan *et al.* 2003b; Hunt *et al.* 2004; McClaren *et al.* 2004; Pyatt and Grattan 2002a, 2002b, 2005; Pyatt *et al.* 2000). This prior research has allowed us to develop techniques and methods with which to look at the prehistoric landscape in similar detail, and with equal success.

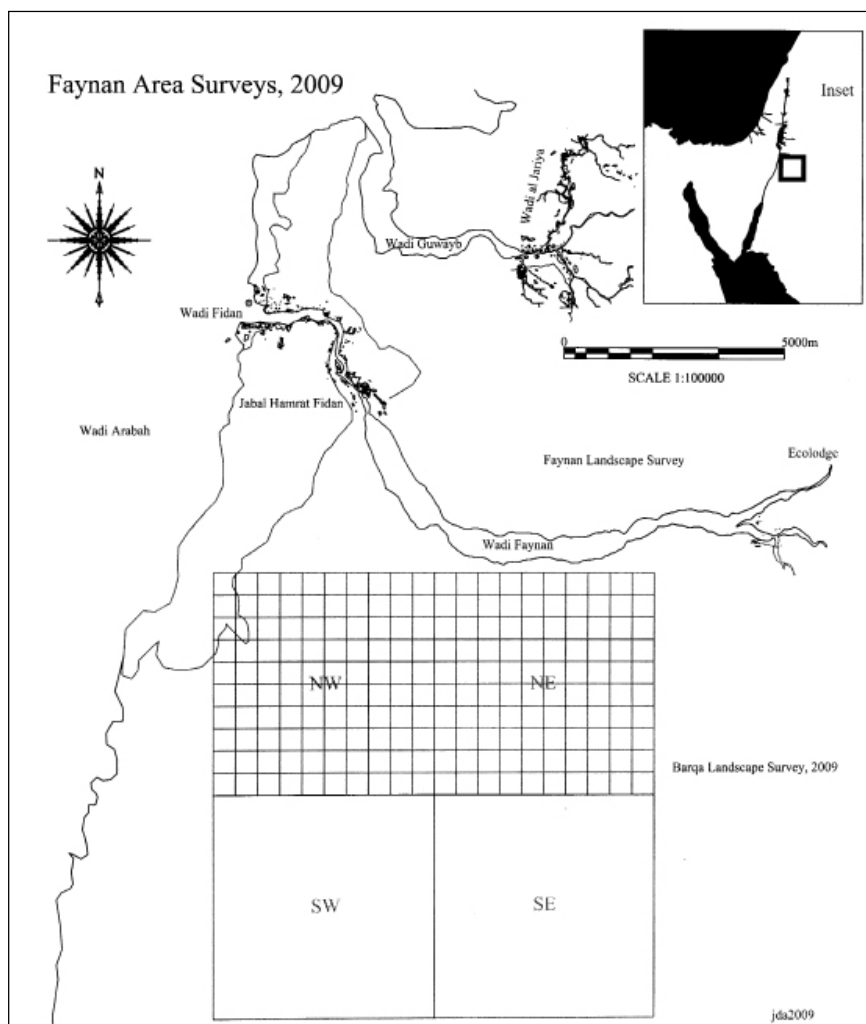
The copper ores of the Faynān region are infused with lead — which is unusual — and, as a result, pollution and health problems stem from the release of lead and other associated suites of very dangerous metals (beryllium, cadmium, chromium, arsenic, nickel, mercury) whilst smelting copper. The Faynān evidence

indicates that these metals accumulate and stay in biological systems causing substantial health problems. To date, geochemical analyses of Holocene sequences in this region suggest a model of increasing environmental degradation from the third millennium BC onwards. Through extensive sampling of a variety of sites and geographic locations identified through the survey and excavations, this project seeks to identify correlations between areas of maximum pollution intensity, metal extraction and smelting, and settlement and industrial patterns. This evidence is important in understanding the patterns of human activity, industry and natural processes in this region over the span of the third millennium BC, and is equally important in understanding continuing problems of environmental pollution up to the present time (Grattan 2003; Grattan *et al.* 2003a, 2005; Pyatt and Grattan 2005).

Geographical Context of the Barqā Landscape Survey and Survey methodology

The Barqā Landscape survey is orientated cardinally (True North) and has the following coordinates (WGS84 spheroid): NW corner: N 3389910.253 E 726438.631; NE corner: N 3389910.253 E 736438.454; SE corner: N 3379910.253 E 736438.454; SW corner: N 3379910.253 E 726438.454. The survey area comprises 100 square kilometers, divided into four quadrants (**Fig. 1**).

An initial control survey was conducted in the NW quadrant to establish highly accurate fixed points across that quadrant of the Barqā Landscape Survey area, against which to spatially reference the archaeological data that would be collected in subsequent phases. The co-ordinates of the first fixed point of the control survey were established with known points

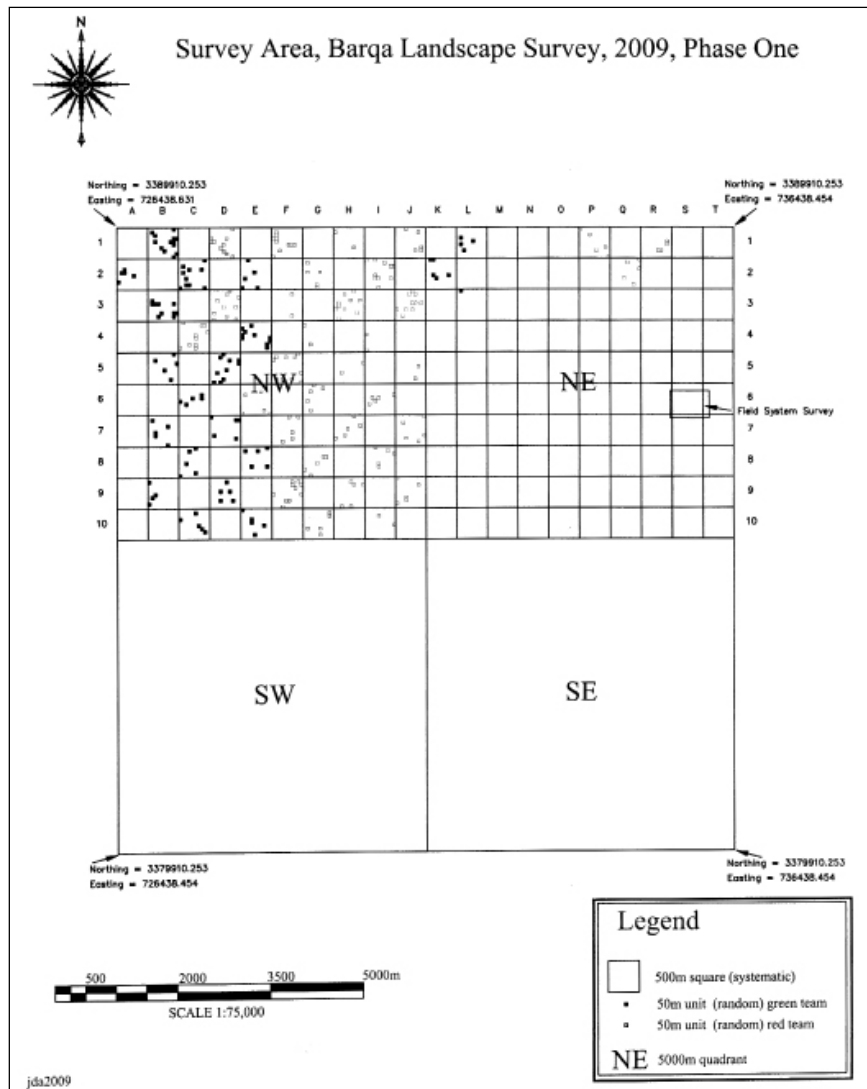


1. Faynān area surveys 2009.

in Google Earth. The corners of four houses in the southernmost area of the town of Qurayqira were given placemarks with geodetic coordinates, and then saved in a kml file. These were then converted into Cartesian co-ordinates and entered into a data collector. Having found the four houses on the ground with the Magellan hand-held GPS, we conducted a four point resection with the total station of the house corners to establish the first control monument, RB 51, in three dimensional space. From RB51, RB 52 on the top of a nearby *jabal* was tied in with the total station. RB54 was then tied in from RB52, and so on until we reached RB63. From there we tied in our original station RB51, and compared the starting and terminal coordinates. As the relative precision of 1:11,000 was ac-

ceptable, we then adjusted the survey control net through a compass rule adjustment.

The survey work this year was primarily confined to an area of about 5 square kilometres in the NW quadrant of the survey zone (see **Fig. 1**). The project began with a systematic, random and stratified pedestrian survey (see **Fig. 2**) which recorded visible archaeology in the landscape, including architecture, pottery, flint and other artefacts. Each quadrant of the survey zone was divided into 500m squares, and every second of these was allocated for survey. These selected 500m squares were divided into one hundred 50m 'units', which were chosen at random. The number of 'units' to be surveyed in each 500m square was chosen based upon 'Areas of Interest' identified with the aid of Hyperion satellite

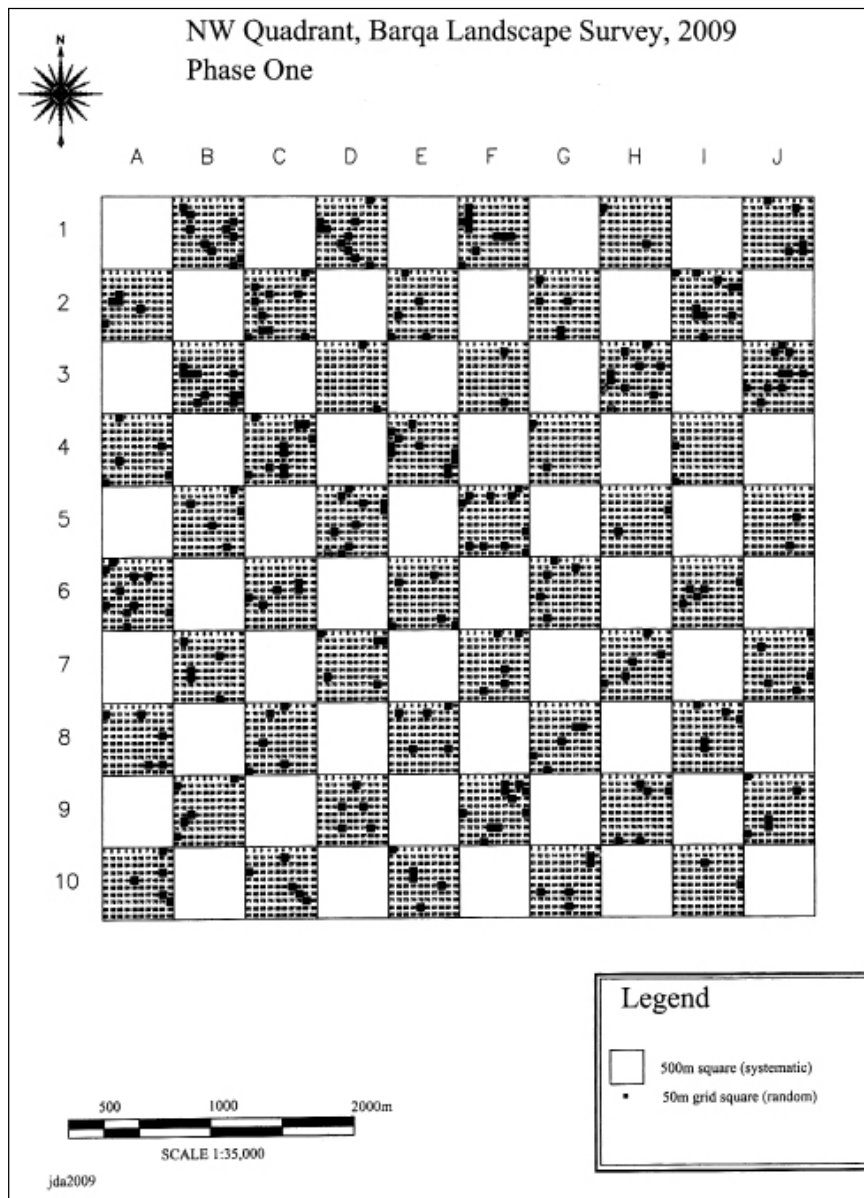


2. Survey area, Barqā Landscape Survey 2009, Phase One.

data and also by geographical landforms. Areas of interest identified by Hyperion satellite data were allocated ten 50m units, areas with large outcroppings of granite / dolomite, or obvious sand dunes were accorded two 50m units, and all others five 50m units (see **Fig. 3**).

The survey was divided into two teams, Red and Green, consisting of about 8 people, led by a survey leader and an assistant. Team Green was accorded the squares in the western half of the NW quadrant, and Team Red the eastern half. Each team used hand-held GPS units which were uploaded daily with the NW and NE corner of each 50m unit to be surveyed. Each team

would find the NW corner of the 50m unit to be surveyed with the aid of the hand-held GPS and, using a compass set due south (accounting for a 3° 56' declination), the team leader would align the team from north to south. The team leader would then orient the team towards the next (NE) waypoint. Each member of the team then would move directly east over the 50m unit, scanning the ground in front and to either side for artefacts lying on the surface. These artefacts would be collected and accorded to the 50m unit, unless they belonged to a specific site (see below). Each team would designate one member to write tags and bag artefacts from the



3. NW quadrant, Barqā Landscape Survey 2009, Phase One.

unit being surveyed.

When a site was identified, the centre point was given a *waypoint*, the dimensions measured with a tape measure, and a photograph taken. All of the artefacts collected from the surface then would be attributed to the identified site.

Once the survey team arrived back at the 'clean' lab, the site waypoints would be downloaded from the handheld GPS receivers and entered into the GIS (see below). The artefacts collected on the survey would be submitted to the 'dirty' lab for processing and analysis.

Once Phase 1 of the survey methodology had been completed, Phase 2 comprised a more intensive survey of areas that had produced the most artefacts and sites in the NW quadrant. The area around the 'Barqā houses' excavated in 1990 and 1993 (Fritz 1994a, 1994b; Flender n.d.) produced the most artefacts, and it was around this area that an intensive (full coverage) survey was undertaken (see **Fig. 4**).

GIS Methodology

The GIS analyses performed during this field campaign were based on a combination of spatial data (survey grids and sampling areas, collection and analysis points, and sites) and tabular data (site records, ceramic analyses, XRF data, etc.). These various data were housed in several specific geodatabases and manipulated via Microsoft Access (see **Fig. 5**).

Spatial data consisted mainly of data generated by the survey teams (see above) using handheld GPS units (Garmin Etrex Vista and Magellan Triton 400) and control data from the total station survey, stored in AutoCAD formats. AutoCAD maps and corresponding data, such as the survey grid and control points prepared during Phase 1 of the survey, were brought into the GIS and transformed into geodatabase formats. During the pedestrian surveys of Phases 2 and 3, GPS waypoints were taken when survey teams located archaeological sites, significant landscape features, modern fields, or when specific non-site collection areas were recorded (for example along the north slope of Barqā hill). All new GPS points were downloaded daily from the handheld units, using MapSource 6.15.6 and Vantage Point 1.60 software packages, and incorporated into the appropriate geodatabase. Sites and collection areas became part of the Survey 2009 geodatabase in

both point (center point) and polygon (boundary) form. Waypoints corresponding to XRF reading locations became part of the pollution study geodatabase, and landscape features became part of a control geodatabase.

In addition to the spatial data, these various databases also house the tabular data generated by this field campaign in Microsoft Access tables. Site record forms were entered daily into a master table designed to store this information. Other information was entered as needed or once analysis had been completed.

By combining the spatial and tabular data in various ways within Access, and then marrying these results back into the visual component of the GIS, we are able to analyze data quickly and comprehensively. The tabular and spatial data were combined by building a series of queries within the geodatabase using Access, joining the quantifiable table data and spatial locations through unique identifier fields such as survey unit or site number. We have also used Access queries to re-combine and select specific categories of data relevant to the research hypotheses. By keeping the unique identifier of each piece of spatial data involved in the joins, the results of each query were easily made visible in the GIS software. We have thus used the analytical power of Access and the visualization power of GIS software to effectively attribute spatial information to tabular data and *vice versa*.

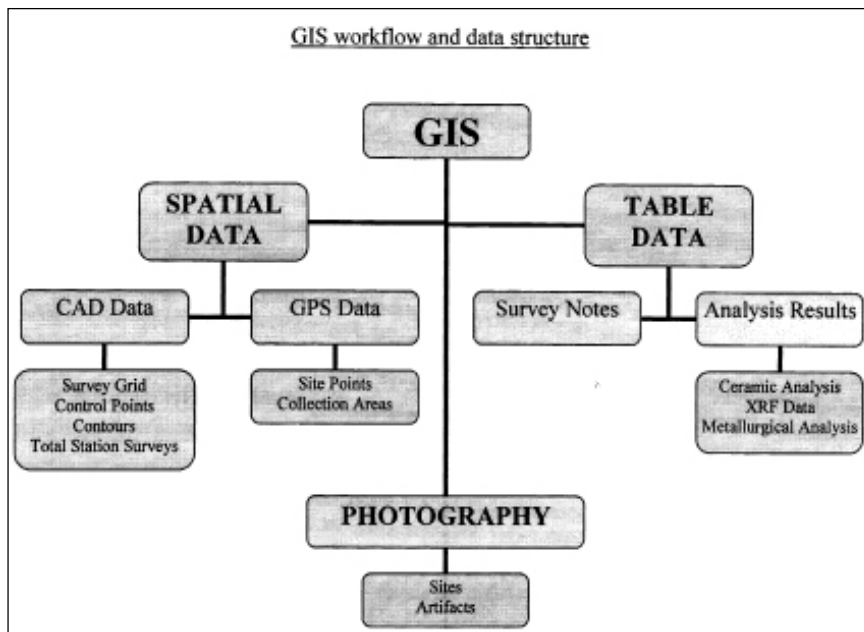
Particularly for the pollution study and XRF data, the ability to visualize results daily within the GIS allowed for in-field testing and modification of research hypotheses. For the pedestrian survey, the use of GIS allowed us to update survey phases to more effectively utilize project time and resources.

Results of Season One of the Barqā Landscape Survey

Environmental Studies

The focus of the environmental research in the 2009 season was to establish baseline parameters whereby phases of chemical enrichment and environmental impact of ore processing activities could be confidently identified. Our research design was based extensively on prior knowledge of the nature of the metals cycling in the local environment, developed over 15 years of research in Jordan (cf. Grattan *et al.* 2003,

4. Barqā House area site survey, Phases One and Two.



5. GIS workflow and data structure.

2005; Pyatt and Grattan 2005). Our research focused primarily on mapping the lateral extent of the metal working signature from known locales such as the Barqā smelting site, and by exploiting vertical sedimentary exposures in the survey area we were able to identify ancient land surfaces and assess their palaeoenvironmental potential. Our research was enhanced by the first archaeological use of a NITON hand held XRF instrument. This allowed us to accurately determine the geochemical content of sediments *in situ*, without the need to excavate or collect samples. In this brief field season we analysed over 1400 samples and were able to develop our research and sampling methodology constantly, informed by the results of our testing and sampling regime.

Baseline Sampling

To establish the pre-metal working geochemical signature, the Faynān Gravels, a Pleistocene fluvial unit exposed in the modern Wādī Faynān and mapped by Hunt *et al.* (2005, 2007), was analysed. These sediments were found to contain mainly strontium, rubidium and iron, which are ubiquitous indicators of natural erosion (Grattan *et al.* 2007) and no detectable concentrations of copper, zinc, manganese, arsenic, lead, antimony or tin, which suggests that where these metals are detected in association with each other in the survey area, they may indicate

metal processing activity and not the fortuitous accident of natural erosion and deposition.

Firepits Exposed in a Pipeline Trench Adjacent to Barqā Hill

A reconnaissance was made of a long trench (Lat 30.595878° Long 35.378344°) dug by the Aqaba Development Authority to carry a new water pipeline. The section exposed within the trench consisted of an upper layer of chert scree, approximately 5cm thick, which sealed wind blown sand exposed to a depth of at least 1m. Within this trench, several firepits were identified within the blown sand between 30-50cm below the surface. No cultural material was found *in situ*, but within the spoil cast up by the excavation of the trench several Neolithic flakes were found. XRF analysis on the windblown sands and the firepits indicated the normal presence of strontium, rubidium and iron, and the absence of any chemical signature indicative of industrial activity. At this point in time, we may infer that the environment was uncontaminated by industrial activity and that ore bearing strata in the region were undisturbed.

Palm Tree Pit

Three palm trees grow in the middle of a very shallow hollow (Lat 30.603808° Long 35.379978°) that is relatively rich in archaeological remains. It is the current topographic

low in the area. The adjacent low angle surfaces also support small ‘cockpit dunes’, with a higher content of silt. The surfaces are crossed by linear dunes of red-brown sands. The hollow had been excavated for unknown purposes by a backhoe, with the spoil left adjacent to the site. The spoil was a grey sediment, perhaps from an anaerobic environment, as might occur at an oasis. Evidence of metal working activity in the past was detected in two palaeosols identified in a water prospection trench dug within a grove of palm trees located 182 meters downslope to the north-west of House 2, Barqā Ridge. Each of the palaeosols was modestly enriched in copper (Fig. 6), which confirms the potential for test pitting and associated pollution studies next season. The concentrations of copper in the palaeosols are similar to the concentrations of copper below 50cm depth (see ‘Barqā settlement gully’ below) and indicate that these may be contemporaneous events.

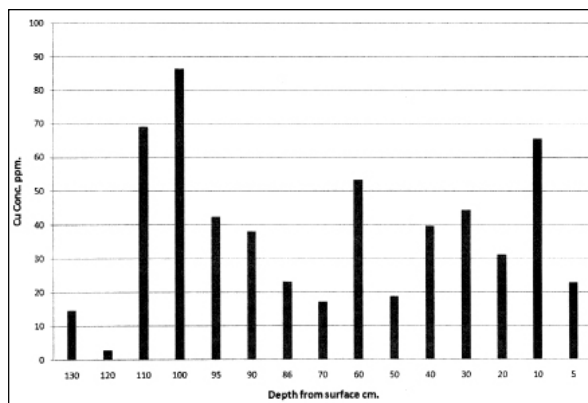
The oasis pool may have occupied this location for much of Antiquity, perhaps filling the topographic low in which it is currently located, and may have been a major focal point for people in the past, as it is now. Many of the low angle surfaces in the vicinity seem to lead down to it. The condition of the modern date palms will provide an indication of the future well-being of the aquifer, which is close to the ground surface hereabouts.

Barqā Settlement Gully

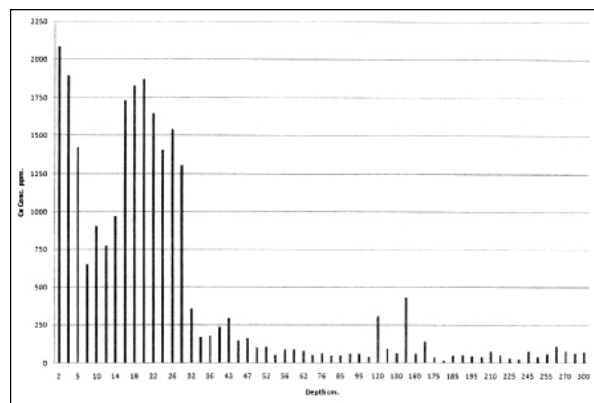
Between the Barqā Smelting Hill and the main settlement site lies a narrow *wadi* (Lat 30.600185° Long 35.381156°). Exposed in the *wadi* is a body of sediment which has been pro-

visionally identified as a flood loam, overtopped by blown sands. Our field observations suggest that this deposit is formed from two major floods in a desertic environment in which there was much silt and sand to be eroded. The later stages of each flood caused the surface of the flood deposit to be reworked. Sand dunes then accumulated over the flood deposits. The dune surface eroded, with an east-flowing stream carving out a linear gully parallel to the ridge of Barqā Smelting Hill and the original sand dune, whilst deflation occurred on the industrial dune surface. Many detailed issues of chronology and palaeoenvironment require further analyses. The surface of the sand dune unit consists of copper ore, copper prills, pottery and crushed slag fragments. The exposure was analysed to determine the history of metal working in this location, specifically whether the obvious metal processing debris visible in the uppermost horizon was the only evidence of metal working.

It is clear from Fig. 7 that a considerable history of copper processing is present. Between 300 and 76cm depth, copper is present at concentrations generally below 125 ppm. This suggests that copper was present and being distributed across this landscape, but that the activity was small scale and probably not in the immediate vicinity. As noted above, these concentrations are similar to those seen in the palaeosols identified in the palm tree pit (see above). From 76 to 32cm depth, it can be seen that the concentration of copper cycling in the environment generally increases until a profound increase in the copper values to well over 1000 ppm at 30cm. Our current interpretation is that this indicates a significant increase in the scale of copper smelt-



6. Depth vs Copper Concentration, PPM Histogram I.



7. Depth vs Copper Concentration, PPM Histogram II.

ing activity and that this activity probably took place close by. It is interesting to note, however, that there is no archaeological evidence for this activity in the sediment; this activity phase is identified only by the geochemical signal. This intense phase of activity appears to reduce somewhat between 14 and 5cm depth, when the 5cm thick surface deposit is encountered. In this deposit, archaeological material, slag, ash, pottery, copper prills and ore are encountered for the first time; these can be attributed to the Early Bronze Age, or roughly the early third millennium BC. In-field analysis of the copper content of sherds lying on this archaeological surface revealed copper values of between 32 and 165 ppm. The metalworking history indicated in this *wadi* gully reveals a hitherto unanticipated depth to the story and confirms the value of palaeoenvironmentally focussed geochemical reconnaissance studies.

Barqā Smelting Hill – Lateral Pollution Dispersal Study

Earlier research by Grattan *et al.*, at Khirbat Faynān (Grattan *et al.* 2007) has identified significant dispersal of pollutants from the copper smelting activity at this site. Guided by this experience, the dispersal of copper from the main smelting site at Barqā hill was investigated. Several transects were walked with analyses of the sediment chemistry being conducted every 50m. Much of the north facing slope of Barqā hill is profoundly contaminated by copper and other heavy metals, such as cadmium, and manganese. In contrast the south facing flanks are uncontaminated, with the exception of two gullies which drain south from the smelting carpet on the summit ridge. To the north of Barqā hill, metal contamination reaches just beyond the ridge where Barqā Houses 1 and 2 lie, but peters out quite quickly beyond these to the topographic low occupied by the palm trees discussed above. To the north-west it was possible to identify the Bronze Age settlement on the basis of its significant metal content, whilst it is worth noting that the adjacent Iron Age settlement is largely uncontaminated. This may confirm suggestions that Barqā was not being used as a smelting or processing site during the Iron Age; it may also indicate that a Bronze Age settlement underlies the Iron Age material.

Summary

These explorations represent the first ever use of a Niton hand held XRF in geoarchaeological research. We have established that the pre-metal working environment was essentially pristine, with no heavy metals cycling. This picture changes profoundly from at least the Early Bronze Age with copper, lead, cadmium, manganese, antimony and nickel released into the environment at this time and continuing to cycle throughout the environment until the present day.

Archaeological Survey Results

Results of the Pedestrian Survey

The pedestrian transects of random 50 x 50m survey units during Phase 1 of the survey helped to define a total of 107 sites, most of which were concentrated in the NW quadrant. The survey teams located a wide variety of site types, including concentrations of flint and pottery, architectural, funerary and industrial sites. The definition of site perimeters was undertaken every time a site was found, and these were mapped using the hand-held GPS units. When, during the survey, no archaeological sites were found or defined, background collections of artefacts were bagged for each 50 x 50m unit. The collections of archaeological materials were therefore logged as “site” or “unit” collections for further processing.

Each archaeological site defined by the survey teams was logged on a site sheet and standardized information was recorded about each site, including: GPS waypoint, site dimensions, site type, wall construction information, types of archaeological materials collected, aspect, slope, position on slope, geomorphology, drainage, preservation, details of photographs taken and a general description of the site with a sketch plan where possible.

Once in the ‘dirty’ lab, archaeological materials were logged into the Master Survey Register. Metallurgical finds were categorized, weighed and counted, and flint and pottery were washed and re-bagged. In the absence this season of a flint specialist, the flint was prepared for storage and processing next season.

The pottery from “sites” was weighed, counted and sorted into diagnostic and non-diagnostic categories and analyzed to provide MNI data by period and pottery form. The “unit” pottery was similarly analyzed to provide background read-

ings of the survey units by period. Information from both “sites” and “units” was entered into a Microsoft Access database, and this tabular information was used by the GIS Analyst to provide visual maps of the distribution of the pottery collections by period (**Figs. 8-11**). The latter was particularly helpful for Phase 2 of the survey, during which an intensive, full coverage survey was undertaken of the region directly north of the Barqā Smelting Hill (**Fig. 4**). The ongoing analysis of the ceramics through the GIS program allowed real-time analysis of the location of archaeological periods in the landscape. Although the primary focus of this research program has been the Bronze Age landscape and pollution intensities associated with it, the pedestrian archaeological survey also recorded a wide range of periods including the Early Bronze Age, Iron Age and Roman periods as well as a pre-Holocene occupation of the Barqā region.

The Early Bronze Age Landscape North of Barqā Smelting Hill

The presence of Early Bronze activities in the Barqā region has been known since the work of Hauptmann and Fritz in 1990, when a prominent hill with evidence of smelting and large amounts of slag was investigated (the Barqā Smelting Hill site), and an adjacent structure on the flint knoll just to the north of this hill was excavated to reveal a well preserved, burnt structure dating to the Early Bronze Age II. Other smaller ‘cuts’ were excavated by the German Mining Museum team in the immediate vicinity, but never published. Barqā House 1 (according to Hauptmann’s site numbering) has been published by Fritz (1994a, 1994b), and later a more detailed analysis has been published by Adams (1999, 2003). The site is unique, not only owing to its prominent location near to the Smelting Hill, but also for its unusual architecture and surrounding wall, and the possibility that it may have served a cultic function.

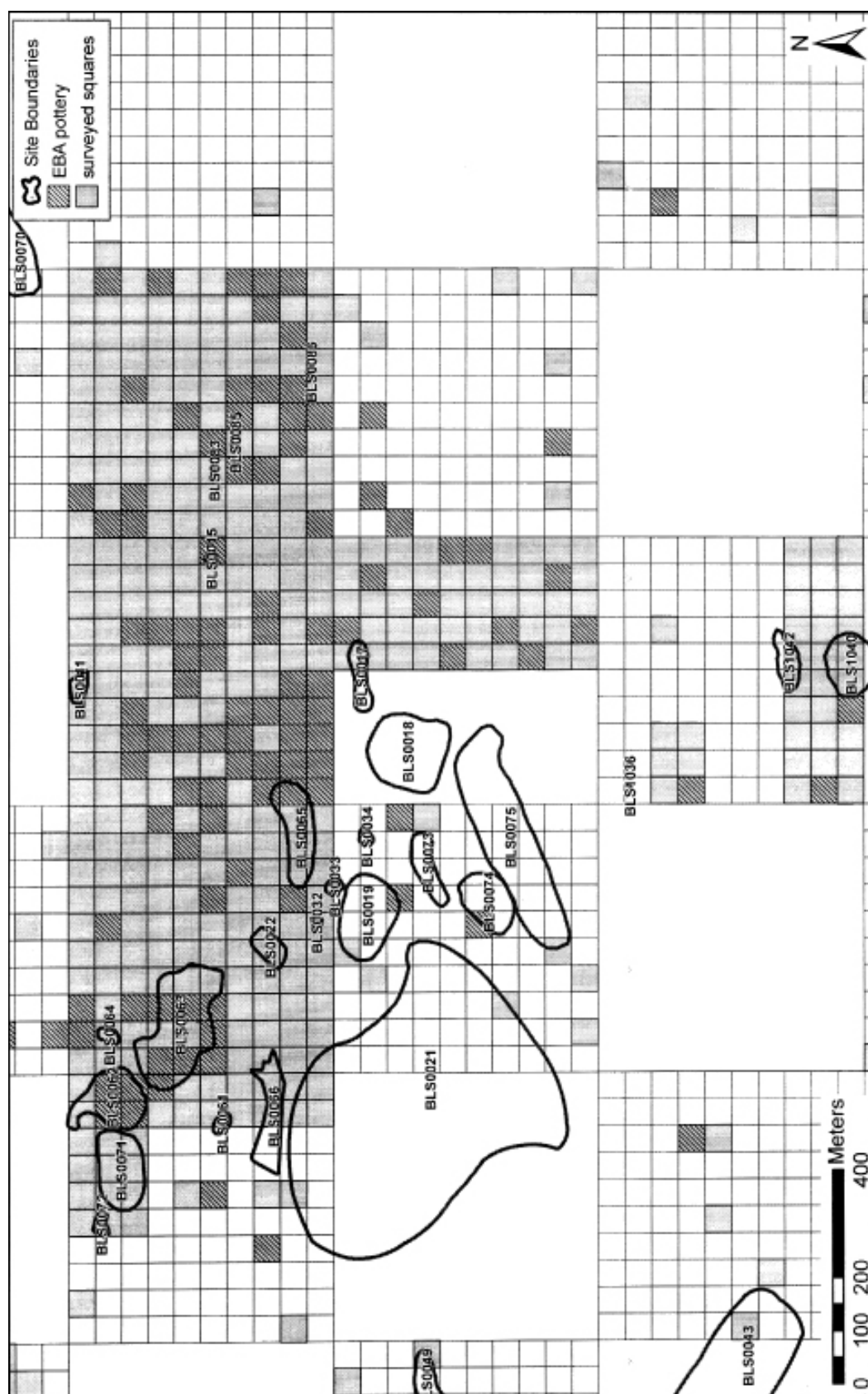
Aside from noting that there was evidence of copper processing in the gully between the Smelting Hill and the Early Bronze Age building, Hauptmann and his team paid comparatively little attention to the surrounding landscape at Barqā. The survey results of the 2009 season of the Barqā Landscape Survey contextualize the

work carried out by Hauptmann and show quite clearly that Barqā House 1 is not an isolated structure, but that there are concentrations of material, especially pottery and archaeometallurgical finds, which attest to a much larger Early Bronze Age landscape north of the Smelting Hill and House 1 (**Fig. 8**). This is confirmed also by the pollution sampling around Barqā, as well as in the gully and the date palm pit (discussed above). One of the interesting aspects of this landscape is that it seems intermittent, but this may in fact be a function of later Iron Age occupations overlying it, as in the case of BLS Site 21 (see below), as well as recent dune activity which seems to be more recent than anticipated.

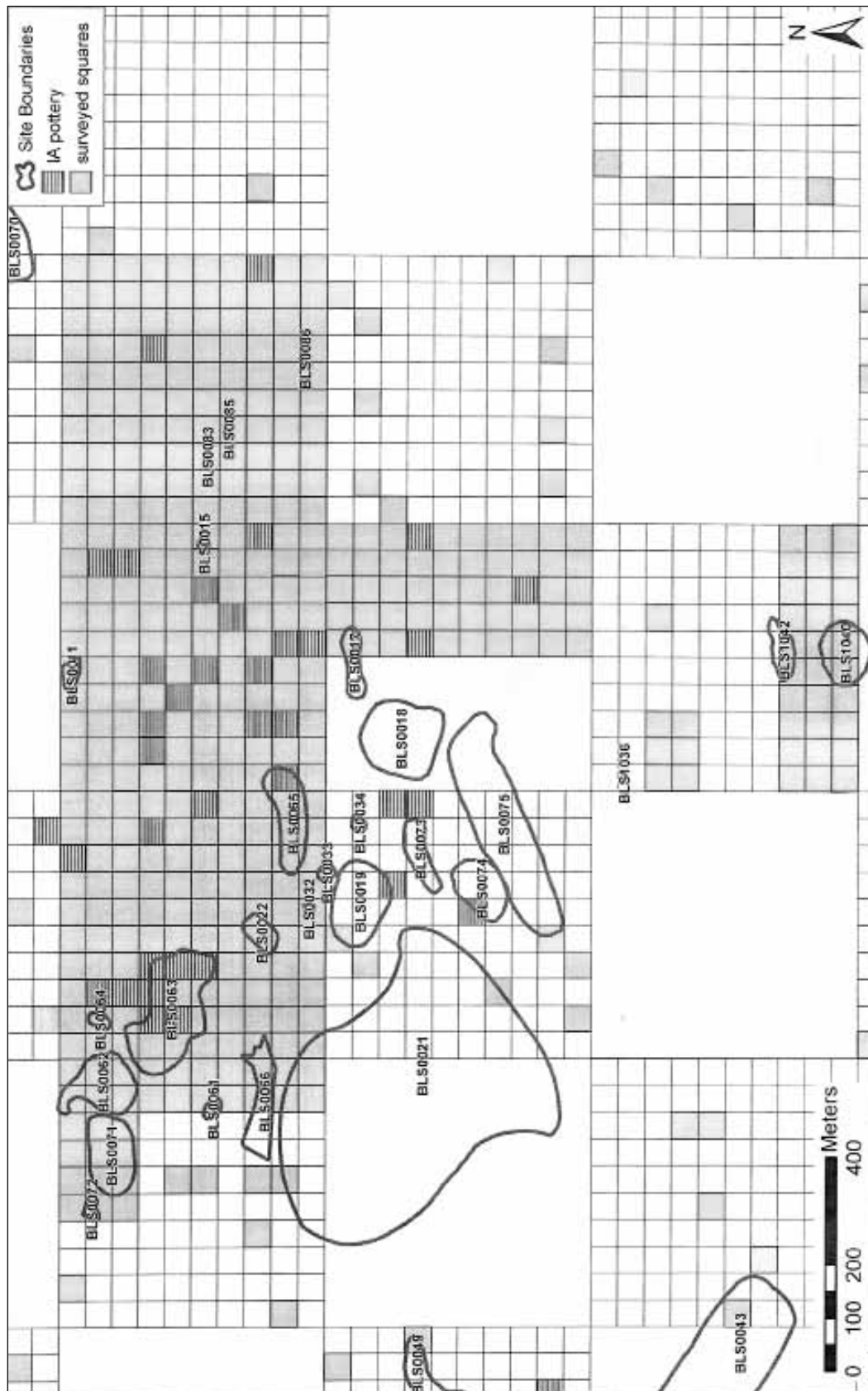
The Iron Age Landscape North of Barqā Smelting Hill

Like the Early Bronze Age, the Iron Age has been known since the 1990 excavations of Hauptmann and Fritz at Barqā House 2. House 2 is a large, multi-room structure, which is likely domestic in nature. The site was notable since the excavations produced both Midianite pottery and one radiocarbon date from the late tenth century BC. Unlike the Bronze Age, however, Hauptmann’s survey recorded a number of other buildings to the west and north-west of House 2. Although these were mapped, they were not surveyed and no collections were made (**Fig. 12**).

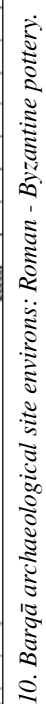
The Barqā Landscape Survey recorded several large sites with significant amounts of Iron Age pottery. The most notable of these was Site 21, which covers an area of approximately 300 x 400m and which has obvious wall lines of buildings, numerous stone-built tombs and a large quantity of diagnostic Iron Age pottery (**Fig. 4**). Mixed in with the Iron Age pottery, however, were concentrations of Early Bronze Age pottery, suggesting that the Iron Age site may overlay an earlier Bronze Age landscape. Site 21 and other evidence of Iron Age ceramics in the vicinity of the other buildings to the north-west of House 2 suggest that this area was densely occupied during the Iron Age (**Fig. 9**). Of interest, however, is the fact that little metallurgical evidence was found in conjunction with the Iron Age ceramics, suggesting perhaps that the Iron Age landscape here was not primarily a metallurgical production zone at that time, as also suggested by the pollution analysis.

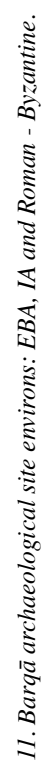


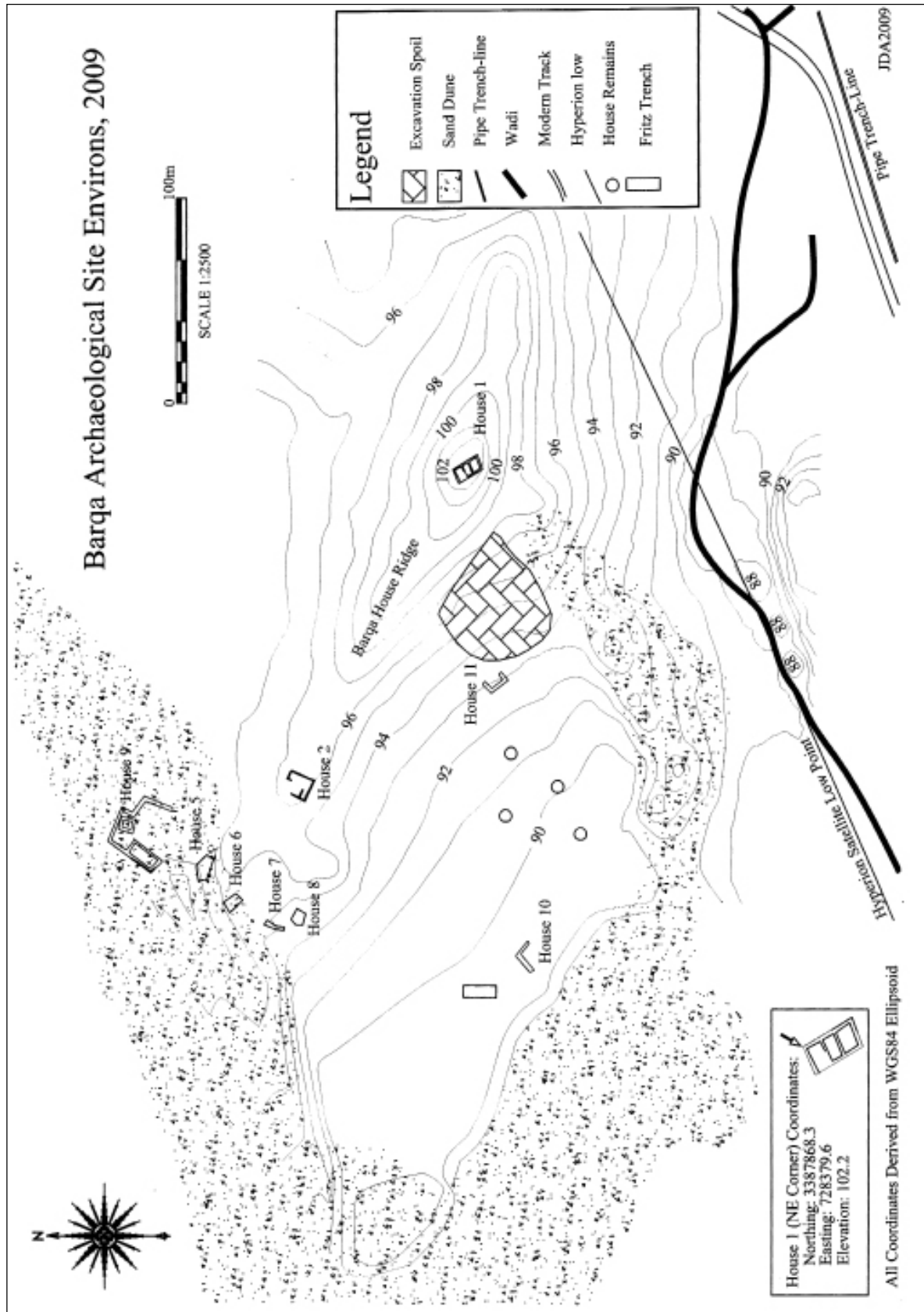
8. Barqā archaeological site environs: EBA pottery.



9. Barqā archaeological site environs: IA pottery.







12. Barqā archaeological site environs 2009.

The Roman Landscape North of Barqā Smelting Hill and Sites 87 and 67 in the NE Quadrant

The survey of the NW quadrant of the survey area yielded significant quantities of Roman / Byzantine pottery, spread over discreet “sites” as well as survey “units” (**Fig. 10**). Although not surprising given the extent of Roman and Byzantine occupation at Faynān, it constitutes further evidence for the extensive nature of Late Antique occupation of the region. The widespread nature of Roman / Byzantine pottery in the Phase 2 total survey coverage area, suggests that this area, much like the Faynān basin further north, was cultivated at this time. The small and extremely fragmented nature of the pottery sherds found throughout this area, perhaps evidence for spreading manure, also supports this supposition.

The largest Roman site found in the survey area was discovered during examination of Google Earth imagery. Overviews of the area highlighted several interesting sites with clustered buildings, stone circles and various other architectural features. Site 87 in the NE quadrant was by far the largest of these and was very obviously a large, complex field system, not unlike that along Wādi Faynān, albeit on a smaller scale (**Fig. 13**). An initial reconnaissance on 1 July revealed large walls and an elaborate hydraulic system; pedestrian survey began in this area on 3 July 2009.

Survey Methodology

The Google Earth imagery was geo-referenced in AutoCAD into the WGS84 reference ellipsoid, and ‘wall systems’ were identified and labelled chronologically, beginning in the north-east and moving to the south-west. The first draft of the wall system was produced in AutoCAD. Using the first generation map as a guide, the field walkers then identified many walls and features not apparent on the Google Earth imagery. The artefacts were labelled according to the field units on the map (**Fig. 13**). The edits made in the field were incorporated into Google Earth as far as was possible.

A total station survey was conducted to incorporate those features identified on the ground and not visible on Google Earth. Using corners of features visible on Google Earth, a 3 point resection established the 3-dimensional co-ordinates of a survey monument. Once done, three

‘intakes’ were tied in, as well as five cross-sections, as well as graveyards and wall features in the south-east corner of the wall system. All of these features were incorporated into Figure 13, and the intakes and cross sections drawn as separate figures (**Fig. 14**).

The Mechanics of the Roman-Period Field System at Site 87

Long, Roman-period walls were constructed to direct water from the adjacent *wadi* through three intakes in the extreme north-east area of the overall wall system (**Fig. 13**). Once into the system, an elaborate system of walls directed the course of water to areas directly in front of ‘field systems’. Although there is much infilling across Intakes 1, 2 and 3, their requisite cross-sections reveal narrow openings that may have been controlled by sluices. Intake 1 permitted water to run in a channel between the wall systems in the southern part of this area, and Cross Section 4 profiles this channel. Intake 2 allowed water through a channel directly to the north of the Intake 1 channel. The field complex is characterized by short walls enclosing, for the most part on four sides, discrete units identified as field terraces. For the purpose of the pedestrian survey, each of these was given its own number in order to record finds in each area, ranging from 1 to 86.

Site 67 Building Complex

A building complex in the north-central part of the wall system appears to be situated just north of a point at which water was directed along two discrete channels, one flowing west and the other south-west. This series of connected buildings and the area immediately around them had by far the largest concentrations of pottery (**Fig. 13**).

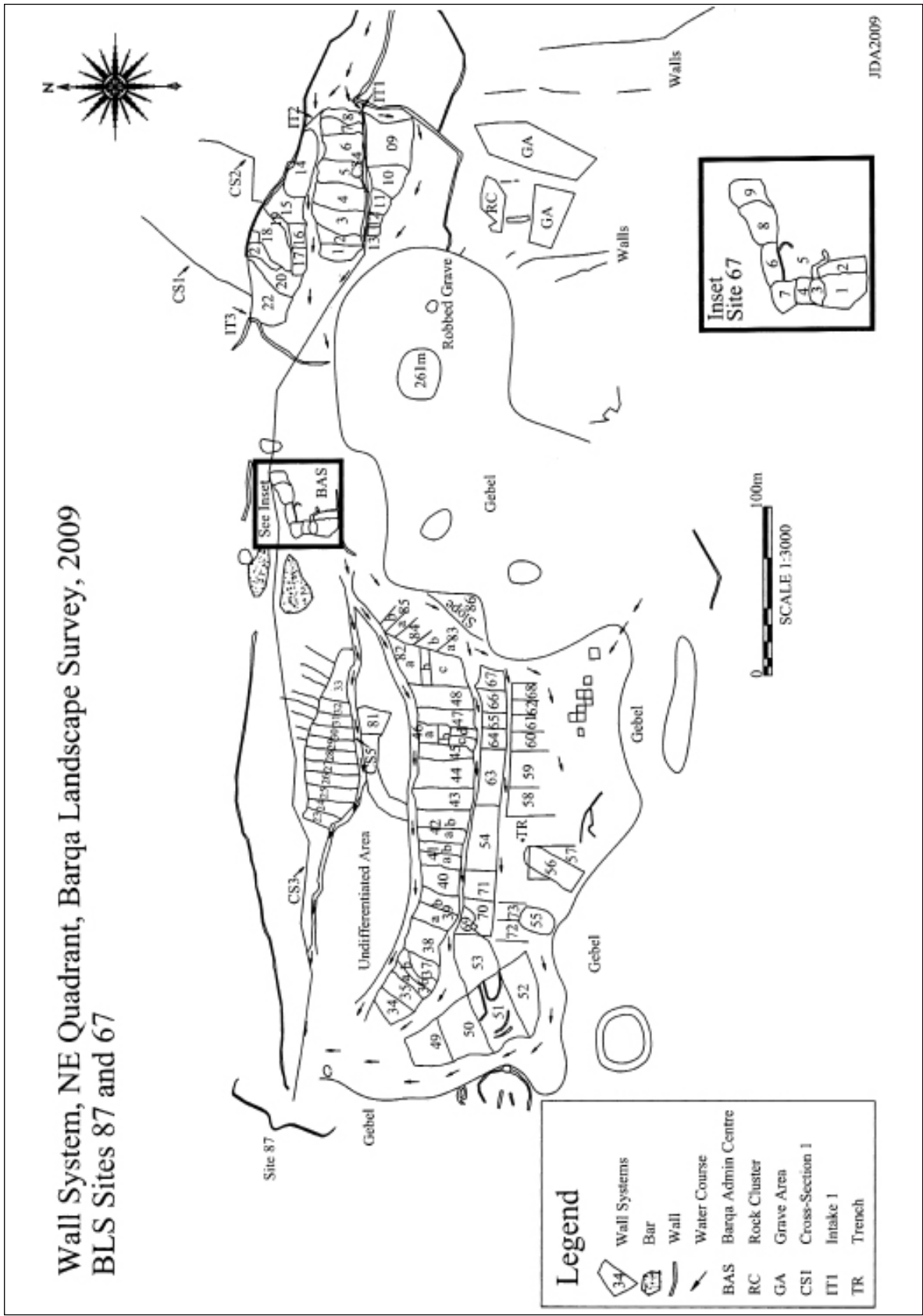
West Aspect Channels

1. North area in west quadrant

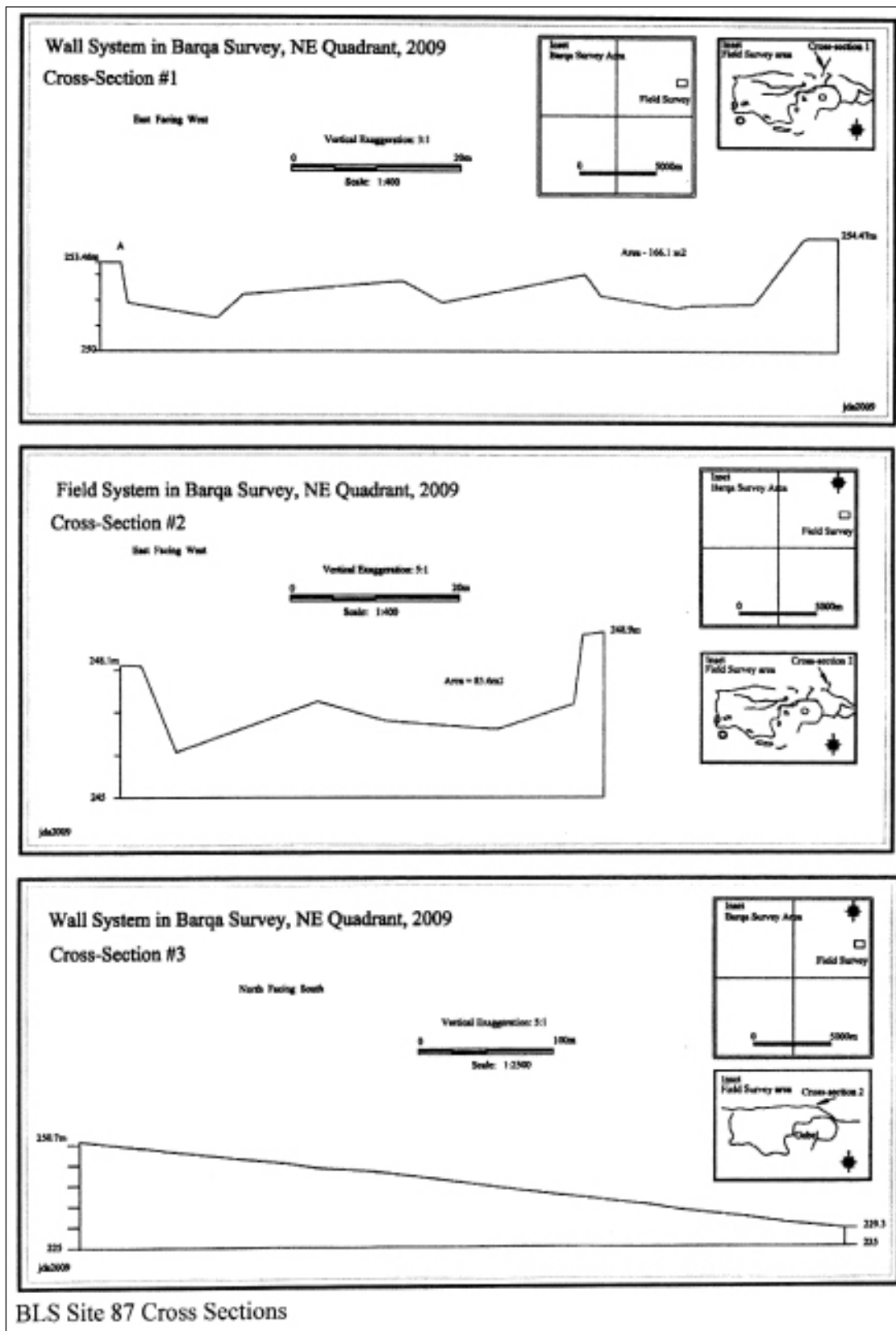
The first channel runs north and splits into a northern and southern channel. The northern channel runs north of Wall System 81 and the southern channel south of Wall System 81. Both of these channels empty into an area at the extreme north-west of the wall system area.

2. South area in west quadrant

The second main channel runs to the south of



13. Wall system, NE quadrant, Barqa Landscape Survey 2009, BLS Sites 87 and 67.



14. BLS Site 87 cross sections.

the BAS building and splits into three channels. From north to south, one channel runs north of Wall System 67, a second runs north of Wall System 68 and a third runs south of Wall System 68. All of these channels coalesce in the extreme north-west area of the wall system.

Cross Sections 1 and 2

These cross sections profile the *wadi* channel immediately north of the NE part of the wall system. There was found to be much infilling of this *wadi* with material ranging from gravel to cobble-sized stones (Fig. 14).

Cross Section 3

This cross section gives a north-facing view of the entire water flow of the wall system area. The drop from east to west is 3.8% and is consistent throughout (Fig. 14).

Summary

An elaborate hydraulic system at this site consisted of long walls directing the course of flowing water from the adjacent *wadi* into 'intakes', which siphoned water through discrete water channels and into 'field systems' delineated by shorter walls. This system was designed not only to exploit a water source, but also to direct it through a system that would maximize its use, perhaps retaining it for future use through a system of dams and perhaps reservoirs.

The Late Pleistocene Landscape North of Barqā Smelting Hill

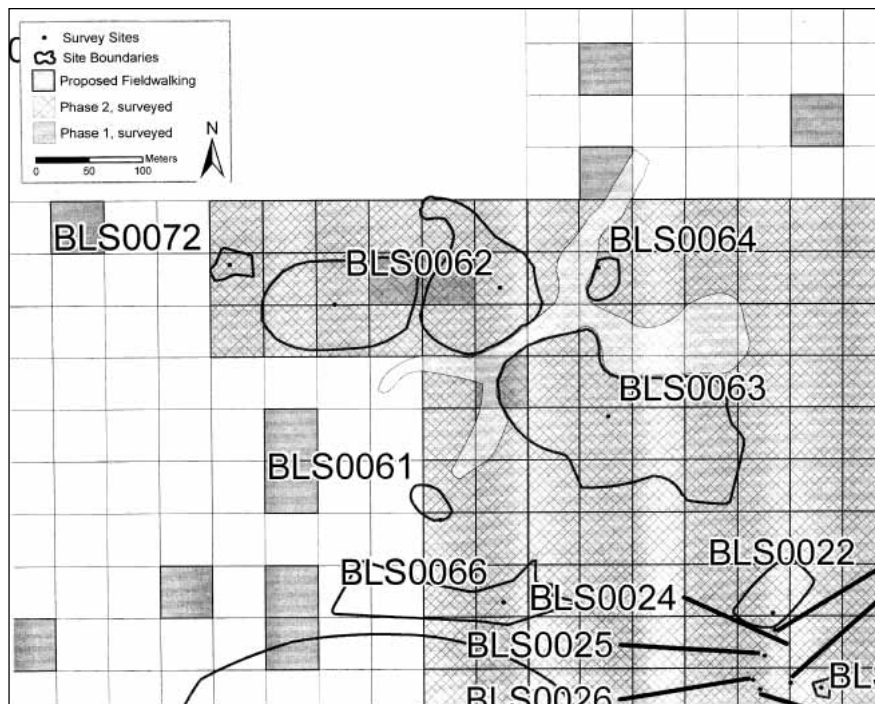
Perhaps the most unexpected outcome of the Barqā survey was the discovery of a series of sites north of the Barqā Smelting Hill which were extremely dense in surface finds of flint tools and debitage. These sites, which include BLS Sites 61, 62, 63 and 66, were all extremely similar in character and, although the flint appears on initial inspection to vary in density of artefacts within and between sites, they all have a wide range of tool types which are, in general terms, comparable (Fig. 15). Team Green spent a significant amount of time defining the boundaries of each site, and the end result appears to be that, for the most part, the 'boundaries' between sites take the form either of large sand dunes, as in the case between Sites 62 and 63, or shallow sand fields, as in the case between Sites

61, 63 and 66. As a result, one possibility is that the sites are connected and partially overlain by later sand dunes and sand fields. If this is the case, the site may be as large as 12-16 hectares, making it one of the largest prehistoric sites in the Wādī 'Arabah. Collections from these sites were examined by two independent experts who both suggested that the sites are likely Early to Middle Epipaleolithic in date (22,000-15,000 BP), a period as yet not known from other surveys in the Faynān district. Certain sites appear to have a significant frequency of microlithic tools, including some which may indicate Natufian occupation, thereby suggesting a long history of occupation at these sites.

In an attempt to counter any bias towards under-recovery of microliths during the pedestrian pickup, it was decided to do a random total collection from the surface of 5 squares in Square D4, Unit 42. The five 1 x 1m squares were scraped clean of surface flint to a depth of 1cm; this was bagged, then subsequently sieved and wet sieved in the 'dirty' lab. These collections yielded a much higher proportion of microliths, which await further analysis in the coming year.

The horizontal distribution of these sites is best explained by the reconstruction of palaeochannels from radar images, which suggest that they occur on what appears to be a gentle slope down to what was likely a permanent, slowly moving stream directly south of the site. This palaeochannel is the same modern drainage in which the date palm pit is located, suggesting that ground water still flows through this area. The reconstruction of the Pleistocene environment will be the subject of future investigations next year, but the working hypothesis is that these Epipaleolithic sites were most likely situated in a lush, savannah-like environment, which had plentiful water, plant and perhaps animal resources. The sites are unlikely to all be contemporary, but likely represent long-term, annual, perhaps seasonal re-use of the site. The very significant amount of debitage is suggestive of intensive tool manufacturing at the site, and the variety between different parts of the site may reflect chronological variation.

Finally, a modern small pit (purpose unknown) in Site 63 yielded a small profile of part of the site, thereby permitting an initial reconstruction of site depth, chronological phasing



15. Pleistocene site locations and Phase 1 and 2 surveys.

and characterization of soil deposits. This is, of course, a fortuitous event, but one which will also necessitate further comparison with other parts of these sites in order to check this year's results.

Analysis of the Indurated Surfaces Beneath the Extensive Flint Scatters of BLS Sites 61, 62, 63 and 66

An extensive carpet of worked flint, preliminarily dated to the Middle Epipalaeolithic was identified (see below). It is clear in the field that modern linear dunes are rolling over this group of sites, but that the flint carpet has protected the archaeological surface and prevented its erosion. The indurated layer is composed of fine sand and silt, which does not appear to have been significantly disturbed by the people working upon it. The indurated layer of sediment below the flint working debris was interpreted as being the contemporary surface and was extensively analysed using the Niton XRF. In all these analyses strontium, rubidium and iron were identified, but no chemical signature for metalworking could be identified.

As described above, a pre-existing pit (Waypoint 743) cut into the ground surface within the area of Site 63 provided an opportunity to examine the topography and lithostratigraphy in detail.

Topography of the Location

There are three components:

1. A low angle surface, dipping SW at $\sim 7-8^\circ$ for at least 200-300m, which leads down to the topographically low level that is the location of the palm trees. This surface is littered with primary and secondary flakes made of chert, creating a carpet of debitage. There is at least 1 small blade per 5 cm²; many areas have a much denser coverage. Occasionally, there is some pottery attributed to the Bronze Age. No smelting slag was found. Nowadays, sand blows across this surface, sometimes forming a very thin sheet, but it does not settle.
2. Small cockpit dunes supporting one shrub of saltbush every 10-20m. These are variable in shape (a mixture of 'egg-shaped' and 'cone-shaped'), and typically 2-3m long and 1m wide. The sand on the top edges of these small features is mobile.
3. Linear dunes in excess of 100m length, typically much longer, 10-20m wide and 5-10m high. Google Earth imagery shows that these linear dunes are more or less parallel. The sand on the dune surfaces is mobile.

The topographic relationships between these landforms show that the low angle surface is oldest, and that it was subsequently covered by the linear sand dunes and cockpit dunes. The

age relationships between the small cockpit dunes and the linear dunes are unclear, but the linear dunes appear to be fed with sand in much greater quantities and from further afield than the cockpit dunes, which appear to be made up of silt and fine sand eroded from the low angle surface.

Two lithostratigraphic units, here termed lithofacies, were visible in a small exposure left by an earlier pit. These indicated the nature and stratigraphic relationships of the cockpit dune and the low angle surface.

Lithostratigraphy

Cockpit dune lithofacies

Description: 0-50cm, thinner towards edge of dune. Fine sand and silt, fairly well sorted; these form couplets of *laminae* that are more silt-rich and better-sorted fine sands, each 1-3mm thick. The silt-rich material can be slightly indurated. Twenty six such couplets outcropped in the exposure. These are sometimes flat-bedded in the centre of the dune, but increase in dip to $\sim 35^\circ$ on the steeper slope of the dune before gradually decreasing slope to $\sim 0^\circ$ at the edge of the dune, where its thickness thins to zero. The strike of these couplets varies around the dune. The colour of the dune has not been determined by reference to a formal guide. In the prevailing light at the exposure, the colour appeared grey-yellow. The lithofacies was penetrated by saltbush roots, 1 root of 0.5cm width per 100cm² of exposure; there was no other evidence of bioturbation, or of any other biological or archaeological remains. The base of the lithofacies was always sharp, undulating over 1-5cm. Parts of the dune surface are eroding. The topography is described above. The assumption is that these cockpit dunes are relatively young and transient features in the landscape, but the only currently available evidence for this is that they overlay the materials in the lithofacies below.

Interpretation: these are small dunes accumulating around saltbush, the fine sand and silt deriving from adjacent surfaces.

Pit Lithofacies

Description: thickness greater than 20cm. There are two visible components.

Upper component: Pit Silt Layer, 1-3mm thick. Well sorted silt or very fine sand forming

a distinctive layer throughout the exposure. This layer also appears to be the surface of the low-angle surface that led towards the palm trees. It appeared grey in the prevailing light, was perhaps indurated, and was harder and protruded slightly from the exposed face. The upper surface of this layer was visible beneath the cockpit dune lithofacies, where it was sharp. The base of this layer was also sharp and undulated gently over 1-3cm, parallel to the upper surface. The relationships between this layer and the many flint artefacts present suggest to these observers that it either was, or was stratigraphically very close to, the stratigraphic source of many of those artefacts. The exposure revealed no evidence of bioturbation, nor of desiccation cracks or other disturbance.

Interpretation of upper component: a layer of silt that was deposited by the wind across the site. Duration: likely to have been brief. Age relationship: older than the base of overlying cockpit dune.

Lower component: Pit Sands, thickness >20cm. Sand with two fractions: sorted fine sand, which appeared yellow in the prevailing light, and a smaller component of coarser sand, 1+ mm with light coloured fragments and darker grains. Overall, it appeared to be a pale red / brown, possibly from weathering or rubification. Weak, poorly developed lamination sometimes locally present; individual laminae ~ 1 mm. Overall, in the exposure the stratum appeared relatively homogeneous, perhaps even structureless in places. Lower boundary unseen. No evidence seen in exposure of bioturbation, desiccation, pits or reworking; no charcoal was found. Very characteristic was a layer of flint artefacts, ranging in size from 2mm to 2cm, that formed a layer 3-4cm beneath the ground surface. These were flat-bedded and displayed no evidence of disturbance or reworking. Occasional saltbush roots penetrated this layer, situated beneath the cockpit dune. The layer is older than the Cockpit Dune lithofacies and equivalent in age to the two (?) layers of flint artefacts (surface / near surface, and ~ 3 -4cm beneath surface) that appeared in this exposure.

Interpretation of lower component: upper surface of a sand sheet that led gently down to the level of the palm trees, upon which people worked flint on at least two occasions, without

materially disturbing the aggrading sand surface. Subsequently, these sands weathered slightly.

Summary

The earliest observed deposit was the upper surface of a sand sheet that led gently down to the level of the palm trees, upon which people worked flint on at least two occasions, without materially disturbing the aggrading sand surface; during this time sand blew across the site. Subsequently, a thin layer of silt blew over the site; again this accumulation was associated with people. The landscape included dunes and windblown deposits; presumably it was arid, but it is not clear how arid. Subsequently, these sands weathered slightly.

At a currently unknown point in time, linear dunes accumulated across parts of this low angle plain, upon which occasional pottery fragments were dropped in Bronze Age and Roman times. Subsequently, fine grained materials, seemingly richer in silt, collected episodically to form the cockpit dunes around salt bushes.

Finally, it should be noted that this site, and other adjacent Pleistocene sites, require micromorphological study, OSL dating of the dunes, sedimentological study and radiometric dating, as well as other detailed studies. As these sites may represent key events and locations within the regional environment, a reconstruction of the ancient landscape is a priority for the second season of the Barqā Landscape Survey.

Barqā Landscape Survey: Summary and Plans for the Second Season

The first season of the project has been particularly successful, resulting in the collection of a large sample of data from both the pedestrian archaeological survey and the pollution analysis. The project is now in a position to benefit from this season's results and to continue with the detailed pollution analysis planned for the second season. Several unexpected outcomes, such as the discovery of large numbers of Iron Age sites, as well as the Late Pleistocene sites and flint scatters, will require minor adjustments to next season's plans since both of these are important enough to investigate further.

The second season will therefore broaden its approach to look at: (1) long-term environmen-

tal changes, (2) Holocene landform changes and (3) the extent and characterization of both the Bronze and Iron Age landscapes north of the Barqā Smelting Hill. Also planned for the forthcoming season is a detailed analysis of the prehistoric flint recovered during the survey and a detailed analysis of the Roman / Byzantine pottery by an appropriate specialist.

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A TWELFTH CENTURY FAUNAL ASSEMBLAGE FROM AL-WU'AYRA IN THE SOUTHERN HIGHLANDS OF JORDAN

Robin M. Brown and Kevin Rielly

Introduction

An investigation of fortified, medieval sites in the southern highlands of Jordan resulted in preliminary excavations at the fortress of al-Wu'ayra and the castles of ash-Shawbak and al-Karak, which were carried out in 1986 and 1987 (Brown 1987, 1988b, 1989a). Among the surviving Crusader facilities in Jordan, al-Wu'ayra is one of the most substantial and it provides an excellent resource for examining the Frankish presence in the Jabal ash-Sharāh mountains. Although the defensive architecture eventually suffered extensive damage, the site is relatively well-preserved because it was not heavily rebuilt during the post-Crusader centuries. This stands in contrast to the original twelfth century Frankish castles at ash-Shawbak and al-Karak where the implementation of major reconstructions, additions, and modifications continued from the thirteenth into the early twentieth century, and where recent restoration activities have been conducted. The significant stratigraphic and ceramic sequences that resulted from the 1987 excavations at al-Wu'ayra include the Phase I (A+B) and Phase II remains from Square 4 that are associated with Crusader (1115/16 to 1189) and Ayyubid (1189 to 1263) period occupations, as reported elsewhere (Brown 1987; 1988a; 1989b).

This paper describes the Phase I (A+B) faunal assemblage from al-Wu'ayra and the insights it offers with respect to food consumption practices among the occupants of the Frankish fortress (faunal elements from Phase II are excluded from the discussion as they were very few). The broader purpose of this study is to contribute to the recently growing corpus of environmental data from medieval or "Middle Islamic" sites in southern Jordan that were occupied during or

through the twelfth to the sixteenth century. In this respect we hope to encourage further exploration and discussion of the roles of animals in the context of fortified and non-fortified settlements, and their relationship to land use practices and other aspects of the rural economy. Also in support of this effort are the recent publication of the faunal remains from the 1986 excavations at ash-Shawbak (Brown and Rielly 2010) and a forthcoming study of the animal bones from the 1987 excavations at al-Karak (Brown and Rielly in preparation). Additional comparative collections that are especially pertinent to the present study include the faunal material from the 1993 season of Italian excavations at al-Wu'ayra (Mazza and Corbino 2007a: 55 ff) and from the 2002 season of international investigations in the Wādī Farasa at Petra (Schmid and Studer 2003: 483-87, 2007: 51-55). Medieval faunal material was also gathered during the 1997-2000 Jordanian excavations at Khirbat an-Nawāfla, which was the principal settlement of the Wādī Mūsā valley during this period ('Amr *et al.* 2000: 244; 'Amr 2006: 25). The 2005 and 2006 Italian excavations at ash-Shawbak castle produced important faunal material as well (Mazza and Corbino 2005: 53-58, 2007b: 75-79, 2007a: 58-61). Together, these data provide a broad outline of species representation and diversity in the southern highlands during this period, while also shedding light on general patterns of animal usage.

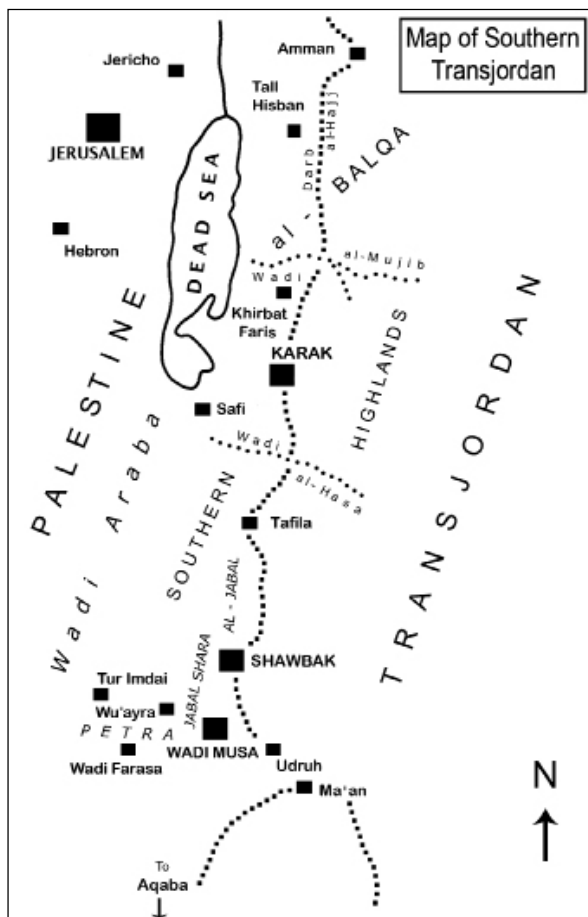
Al-Wu'ayra in the Jabal ash-Sharāh: Environmental Summary

Al-Wu'ayra fortress is situated on a remote, rock plateau immediately northwest of Wādī Mūsā and along the outer rim of the Petra basin. The site takes its name from its surround-

ings, a rugged field of bare, sandstone knolls named al-Wu'ayra (derived from *wa'r*, meaning rock debris or rugged, inaccessible terrain), which lies north of the Bāb as-Sīq entrance to Petra and east of Jabal al-Khubtha. The substantial ruins of the Crusader fortress stand in the midst of this formation. The site's steep plateau is encircled by deep *wadi* channels that reinforced its defensive capacity. The Franks further enhanced the inaccessibility of the summit by hewing the east rock face to create a sheer, vertical wall. Al-Wu'ayra and the neighboring Wādī Mūsā valley and Petra basin (Fig. 1) are part of the Jabal ash-Sharāh range, where a semi-arid Mediterranean climate prevails and the mean annual rainfall range is 150-200 mm (Kürschner 1986: 49, map 1; Hashemite Kingdom of Jordan 1986: 14). While the immediate environment of al-Wu'ayra is a harsh, rocky landscape, the hillslopes to the north and northeast of the site once

featured an evergreen oak forest that extended as far as the ash-Shawbak area. Today very little of this woodland remains and these slopes primarily support Mediterranean, non-forest, shrub growth or *garigue* (al-Eisawi 1985: 52-54; Kürschner 1986: 52-53), which is characteristic of degraded forest lands. During the medieval centuries, the forest areas in proximity to al-Wu'ayra would have provided a habitat for numerous plants and game animals, while the *wadi* channels below the fortress would have hosted seasonal foliage and offered narrow beds for *wadi*-bottom agriculture. Additional cultivated areas certainly existed along the *wadis* winding into and through the Petra basin, while scattered tracts of dry-farmed grain would have been situated in pockets of shoulder and flat lands. However, the most extensive gardens and orchards were spread throughout the nearby Wādī Mūsā valley (see below).

The extent to which the region may have experienced climate changes sufficient to have significantly altered food production strategies between the twelfth century and the Modern era is undetermined, although broad climatic cycles have been proposed for southern Transjordan (Koucky 1987: 18-25). Faunal researchers at Tall Ḥisbān in al-Balqā' district observed an apparent increase in goats at the expense of sheep in deposits dating from the thirteenth through the fifteenth century (Strata 2-4; Driesch and Boessneck 1995: 72). This trend may indicate the onset of a hotter, dryer climate and a shift from pasturage to weeds during the Ayyubid and Mamluk periods (ibid.), for goats are better adapted than sheep to hot and dry environments, as well as to areas with poor forage (Redding 1984: 223; 1981: 78). With respect to the later centuries, dendrochronological analyses show frequent, episodic drought cycles from the seventeenth through the twentieth centuries (Touchan *et al.* 1999: 301, fig. 6). These findings appear to correlate with environmental data from Ṭūr Imḍayy, a site located five kilometers northwest of Petra, which indicate a period of relatively moist and cool climate from the mid-seventeenth through the early eighteenth century (Simms and Russell 1997: 464-66). The present, semi-arid vegetation that covers the southern highlands is the result of deforestation over a period of centuries, which was caused by



1. Map of southern Jordan with selected archaeological sites occupied during the medieval and / or Ottoman periods

an expansion of cultivated land and overgrazing by sheep and goats. By the twentieth century this trend, coupled with soil erosion resulting from insufficient ground cover, had produced a degraded landscape that was detrimental for local agriculture (Willimott *et al.* 1964: 55-67).

The Crusader Presence in the Southern Highlands: Historical Summary

Following the establishment of the Latin Kingdom of Jerusalem in 1099, Baldwin I led Frankish military expeditions across the Jordan Valley rift and into Wādī Mūsā and Petra in 1100 and 1106/1107, on the latter occasion to eliminate the threat posed by the arrival of Seljukid troops from Damascus (Foucher of Chartres 1969: 146-47; Ibn al-Qalanisi 1932: 81-82). A major campaign followed in 1115/1116 to build the principal Frankish castle of Montréal on the site of ash-Shawbak and to establish a chain of smaller, fortified garrisons throughout the region that reached as far south as the Red Sea; while these sites are named, their present identifications are still a matter of discussion (e.g. Deschamps 1939: 36-39; Hammond 1970: 11; Milwright 2006: 9, fn. 43). This defensive network established the territorial basis of Oultrejourdain and protected Crusader Palestine by buffering its eastern frontier and controlling the Transjordan communication route that linked Syria with Egypt and Arabia. Oultrejourdain soon became an important source of revenue based on agricultural production and duties levied on trade caravans crossing southern Transjordan (see Mayer 1987: 201-202). In 1142, the largest of the Crusader castles in Oultrejourdain was constructed at al-Karak, which was known to the Franks as both Crac and Petra Deserti (William of Tyre 1976 [2]: 127, 499).

The Wādī Mūsā and Petra region was crucial to the Crusader strategy in southern Transjordan and substantial Frankish military installations were established at the prominent fortress known today as al-Wu'ayra and the smaller fort at al-Ḥabīs, within Petra (Vannini and Vanni Desideri 1995: 512-13; Vannini 2007: 15-21; see also Schmid 2006: 51-59). The former appears

in Frankish documents as the castellum or castrum at Vallis Moysis / Moysi (li Vaux Moïse) and as al-Wa'r in Arab chronicles (see Pringle 1997: 105; Hammond 1970: 32). Construction at al-Wu'ayra was probably initiated during one of several Crusader campaigns into the area between the years 1108 and 1127, yet William of Tyre's first mention of the Frankish fortress at Wādī Mūsā appears later, in his chronicle of events having taken place in 1144 (1976 [2]: 144-45).¹

Despite its cordon of fortifications, Frankish Transjordan was subjected to insurrection and penetration. In 1127, Baldwin II led a punitive expedition, destroying settlement in the Wādī Mūsā valley and scattering the population (Ibn al-Qalanisi 1932: 182). In 1144, infiltrating Syrian troops seized al-Wu'ayra for a brief period and massacred its Frankish inhabitants; possession of the fortress was restored when Frankish relief forces threatened to destroy the olive groves of Wādī Mūsā (William of Tyre 1976 [2]: 144-45). In 1158, the fortress successfully withstood an Egyptian siege (see Hammond 1970: 35). Finally, Ṣalāḥ ad-Dīn ibn Ayyūb's army brought Crusader occupation at al-Wu'ayra to an end in 1188 with the fall of Transjordan shortly after the catastrophic Frankish loss at the battle of Ḥiṭṭīn the year before (Hammond 1970: 32). Post-Crusader remains at al-Wu'ayra indicate that Ayyubid forces moved to secure Petra following their victory (Brown 1987: 270 ff; Vannini and Tonghini 1997: 377, fig. 8; see also Milwright 2006: 10).

The Rural Economy of al-Wu'ayra and Wādī Mūsā

Al-Wu'ayra's strategic significance was grounded in its geographic position, natural defenses, extensive fortifications, and water system, yet the success of the fortress depended on adequate and sustained access to agricultural foodstuffs and livestock products. Although a small portion of the castle area may have been dedicated to cultivation and/or pasture where pockets of soil were available (see Vannini and Vanni Desideri 2005: 518), the majority of al-

1. Vannini and Tonghini suggest that al-Wu'ayra was constructed between 1107 and 1116 (1997: 376, fn 17), a view shared by Hammond (1970: 35; see also Deschamps 1939: 9; Kennedy 1994: 25). Others favor a

later construction date, ca. 1127 or even later, as a consequence of Baldwin II's forceful raid on Wādī Mūsā (Mayer 1990: 99, 130; Tibble 1989: 82-83; see also Pringle 2001: 681).

Wu‘ayra’s food supplies would have come from the agricultural and pastoral environments of the Wādī Mūsā valley and neighboring areas such as the Petra basin and Baydā. As such, the fortress residents would have had access to fresh orchard and vine crops, dried fruits, olive oil, wine, legumes, grains, dairy products, and livestock, as well as woodland game animals found in the Jabal ash-Sharāh. Additionally, preserved fish was secured through overland trade (see below). However, the extent to which al-Wu‘ayra’s Frankish population availed itself of the variety of local products, remains a question.

Recent research led by Khairieh ‘Amr has shed much light on the rich medieval economy of the Wādī Mūsā valley, which certainly provided revenues for the Frankish domain in addition to sustaining the fortress with foodstuffs. Archaeological investigations have shown that this fertile valley was continuously occupied from the tenth century (and earlier) through the end of the Ottoman period, while apparently reaching its greatest florescence between the twelfth and the fifteenth centuries (‘Amr 2006: 18 ff). Among the agricultural villages that thrived in the Wādī Mūsā valley prior to, during, and after the Crusader period was the former Nabataean town of Gaia (‘Amr 2006: 9, fig. 6, 18, 22-24). The valley’s principal settlement, however, was at the site of present-day Khirbat an-Nawāfla, which appears as al-‘Udmā in a thirteenth century text, but was apparently later known as al-‘Udmal (Amr *et al.* 2000: 246; Zayadine 1985: 168-70).

The well-watered villages of Wādī Mūsā engaged in a robust agricultural economy specializing in the production of olives and olive oil, as documented by archaeological remains (see ‘Amr 2006: 21-24) as well as historical texts. Foucher of Chartres, who accompanied the initial Frankish expedition to Transjordan in the year 1100, described the Wādī Mūsā basin as “... a valley very rich in the fruits of the earth”, which he viewed as standing in stark contrast to the surrounding environment, for “... the land outside that valley was desert and uncultivated” (1969: 146-47). Referring to Baldwin III’s foray into Wādī Mūsā in 1144, William of Tyre described the valley as “... covered with luxuriant olive groves which shaded the surface of the land like a dense forest” (1976 [2]: 145). In the post-Crusader era, the geographer Yaqut

(d. 1225) also credited Wādī Mūsā for its abundance of olive trees (see Marmardji 1951: 204). A few centuries later, a 1596 edition of the Ottoman tax registers (*daftar-il-Mufaṣṣal*) indicates that the community at Wādī Mūsā (also known as Ribḥiyya) had a population of forty male heads of household and produced wheat, barley, and vine and fruit crops, in addition to maintaining livestock (Hütteroth and Abdulfattah 1977: 173). The absence of olive trees in this inventory is surprising and perhaps an oversight. Today the terraces of Khirbat an-Nawāfla support vegetable crops and orchards of olive, walnut, pomegranate, apricot, and mulberry (Amr *et al.* 2000: 233).

Status, Consumption, and Death at al-Wu‘ayra: Archaeological Indicators

It has been suggested that al-Wu‘ayra may have been a royal castle during the Crusader era (Tibble 1989: 82-83). This is an intriguing notion, but one that archaeology cannot confirm or refute at present. Nevertheless, there is evidence for rank and/or social differentiation among the fortress population, as would be expected in a military setting. Within the heavily defended upper citadel, large residences stand between the church and the stables; clearly, some occupants were authorized to use these facilities. One of the houses is exceptional for its reinforced strength and elaborate finishings, including archways and capitals (see Vannini and Vanni Desideri 2005: 521). This possibly multi-storied block probably housed the military commander, or perhaps an elite, entitled family. Another provocative aspect of the site is the cemetery located adjacent to the fortress chapel, in which twenty graves were excavated in 1997 (see Tonghini 2000: 587). The burials, which are unique in the archaeology of Crusader-era Jordan, indicate the presence of families at the site, for they included remains of fifteen infants and young children, apparently of European descent (Rose 2008; Rose *et al.* 1998). Reserved for a select few, the graves indicate distinctions of social rank as well as a priority on the internment of children next to the chapel. Most likely, the fortress residents who were entitled to raise families and bury their children within the chapel grounds over the course of the Frankish occupation were of commanding rank,

royal standing, or both. The primary cemetery for the community at al-Wu'ayra must have been located elsewhere.

Essential to this discussion is Jerome Rose's valuable osteological analysis of the burial assemblage, which concludes that both light-skinned European parentage and European dietary preferences among the child-bearing women of the fortress population contributed to problem pregnancies and the vulnerability of young children to scurvy and other life-endangering deficiencies (Rose 2008; Rose *et al.* 1998). Specifically, a failure to take advantage of some nutritious, local foods may have led to deficiencies in vitamin C, iron, and folic acid (Rose 2008; Rose *et al.* 1998). Thus the challenges to survival experienced by at least some of the population at al-Wu'ayra were specifically linked to European ancestry and food consumption habits. As described above, the Wādī Mūsā environment provided a rich array of foods. Ironically, the European women at al-Wu'ayra, whose apparently exceptional status enabled them to bury their children in the limited space next to the chapel, probably had ample access to whatever foods the region had to offer. Yet they appear to have chosen a limited diet that ultimately contributed to infant and child mortalities.

The History of Exploration at al-Wu'ayra

A few of the early travellers who visited al-Wu'ayra toward the close of the Ottoman era conducted brief field studies. At the turn of the twentieth century, Savignac published notes and a sketch plan of the outer fortification walls (1903: 116, fig. 1), and several years later Musil produced his observations, accompanied by a more detailed plan of the architectural remains (1907: 58-70, fig. 27). Langendorf and Zimmermann studied the chapel in 1962 and concluded that its striking similarity with the chapel at ash-Shawbak castle, which is dated to 1115/1116, indicated that al-Wu'ayra fortress was constructed at the same time (1964: 140 ff).² The initial excavations at al-Wu'ayra were directed by Robin M. Brown in 1987 with the assistance

of architect Colin H. Brooker and Department of Antiquities representative Suleiman Farajat (Brown 1987, 1988a). The site was subsequently investigated by an Italian team from the University of Florence led by Guido Vannini; the results of these campaigns (1988-1998) are presented in several publications.³ This work has been particularly important in defining the large scope of the fortress environment, which includes multiple rings of defensive works, an inner citadel standing on an elevated platform, and a village area to the southwest of the citadel. The chapel burying ground with its numerous child graves (see above) is also significant, as shown above. In 1998 an additional review of the fortress architecture was undertaken by German specialists Thomas Biller, Daniel Burger, and Hans-Heinrich Häffner (Biller *et al.* 1999: 39-45).

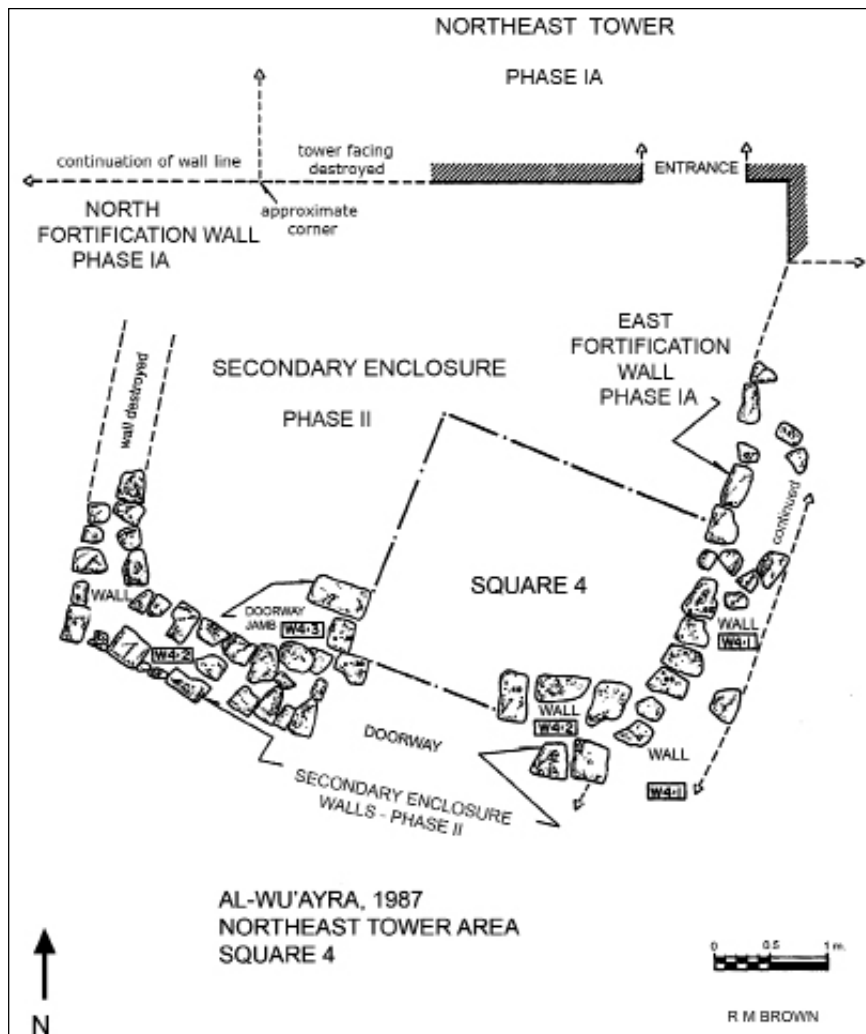
The 1987 Excavations: Stratigraphic Summary for Square 4

The initial archaeological campaign at al-Wu'ayra in 1987 consisted of several soundings within the fortress. The faunal assemblage reported here was gathered during the excavation of Square 4 (**Fig. 2**). Situated in front of the northeast tower, this excavation unit revealed two phases of Frankish occupation. Phase IA, which consisted of substantial, sequential debris accumulation overlying bedrock, dates to the construction and early occupation of the fortress during the first half of the twelfth century. The following Phase IB began with a distinct surface level, but like the preceding phase it consisted largely of debris accumulation. Phase IB most likely dates from the mid-twelfth century to the end of the Frankish occupation with the 1188 capitulation of the fortress to the forces of Ṣalāḥ ad-Dīn. The latest occupation in Square 4 belongs to Phase II, which was distinguished by the construction of a secondary enclosure (with an interior floor surface) in front of the entrance to the tower. This phase consists of a brief Ayyubid period habitation during the last decade of the twelfth century, which may have extended into the early thirteenth century. Phases IA, IB,

2. Additional references to early explorers at al-Wu'ayra are provided by Brünnow and Domaszewski (1904: 415-18) and Pringle (1997: 105-106).

3. Citations include Vannini and Vanni Desideri (1995),

Vannini and Tonghini (1997), Ruschi and Vannini (2001), Tonghini and Vanni Desideri (2001), and Vannini (2007: 10-21).



2. Plan of square 4, from the 1987 excavations, with the northeast tower (constructed in phase IA) and secondary enclosure (constructed in phase II).

and II, documented in Square 4 in 1987, correlate with Phases I, II, and IIIa/IV identified during the later Italian campaigns at the site (see Vannini and Tonghini 1997: 376, fig. 8).

Material remains were relatively abundant in Phases IA and IB, but sparse in Phase II where there was also less debris accumulation. The ceramic assemblage from each phase was dominated by rudimentary, handmade pottery types that were produced by local craft-practitioners who probably worked at the castle or in Wādī Mūsā. Among the remains of these rudimentary ceramics was a group of twelfth century sherds painted in a distinctive linear-style displaying dots, lines, and wavy or crossed lines (Brown 1987: 277 ff). Similar pottery has been documented at other sites of this period, including Khirbat an-Nawāfla (Amr *et al.* 2000: 243-44) and ash-Shawbak (Brown 1988b: 232). In

the later debris from Phase IB, fragments from handmade vessels painted with geometric designs (of a tradition widely documented in post-Crusader deposits throughout the region) were more frequent, and occurring with them were a few monochrome-glazed wares (Brown 1987: 279 ff; 1988a: 57 ff).

Introduction to the Faunal Analysis

The faunal data from al-Wu'ayra, shown in **Tables 1-5**, contribute to an emerging archaeological perspective on land use strategies and consumption trends in southern Transjordan during the twelfth century. However, faunal data are inevitably complex and challenging with respect to interpretation, particularly in the absence of a site-wide assemblage. On-site consumption practices are influenced by a range of factors such as consumer demographics, meat

Table 1: Species representation by total fragment counts (TF) per phase.

Species Representation by Phase					
Species	IA	IB	IA+IB		II
<i>Identified Species (IS)</i>	N	N	N	% IS	N
Sheep/Goat (undifferentiated)	93	21	114	24.8	
Sheep (<i>Ovis orientalis f. aries</i>)	29	5	34	7.4	1
Goat (<i>Capra algagrus f. hircus</i>)	16	3	19	4.1	
Gazelle (<i>Gazella</i> sp.)	3	1	4	0.9	
Pig (Suidae)	44	11	55	12.0	
Cattle (<i>Bos primigenius f. taurus</i>)	39	15	54	11.8	
Equid (Equidae)	2		2	0.4	
Chicken (<i>Gallus gallus f. domestica</i>)	33	7	40	8.7	
Chukar Partridge (<i>Alectoris chukar</i>)	6		6	1.3	
Egyptian Vulture (<i>Neophron percnopterus</i>)	2		2	0.4	1
Parrotfish (Scaridae)	105	17	122	26.6	
Longnosed Parrotfish (<i>Hipposcarus harrid</i>)	2		2	0.4	
Grouper (Serranidae)	2	2	4	0.9	
Wrasse (Labridae)	1		1	0.2	
Sub-totals per phase	377	82	459		2
Sub-total Identified Species for all phases: 461					
<i>Unidentified Species (US)</i>	N	N	N	% US	N
Sheep-sized	238	85	323	47.4	6
Cattle-sized	37	11	48	7.0	
Cattle/Sheep-sized (undifferentiated)	41	12	53	7.8	1
Bird	6	2	8	1.2	
Fish	231	18	249	36.6	1
Sub-totals per phase	553	128	681		8
Sub-total Unidentified Species for all phases: 689					
Grand Totals per phase	930	210	1140		10
Grand Total for all phases: 1150					
<i>Notes:</i> N = number of bones per species. Latin names from Driesch and Boessneck (1995: 68-69).					

preferences, and access to animal products through production, exchange, or direct control over resources. Once deposited, on-site faunal distributions are subject to sample bias as a result of disturbances, including taphonomic distortions. Furthermore, as the objectives of the 1987 excavations were limited, the assemblage was gathered by hand, and therefore smaller species and smaller elements of larger species are

potentially underrepresented. While such factors need to be acknowledged, the assemblage provides valuable information, nevertheless.

Al-Wu'ayra was constructed principally to house a Frankish military garrison, and the majority of food-consumers within this population were probably single or unaccompanied males. Yet the ancillary village standing adjacent to the upper citadel would have accommodated craft-

Table 2: Large mammal representation by total fragment counts (TF) and epiphysis only / minimum number of elements (EO/MNE).

Large Mammal Representation						
Large Mammals	Phase					
	IA		IB		IA+IB	
<i>TF Counts by Species</i>	N	%	N	%	N	%
Sheep/Goat	138	61.1	29	51.8	167	59.2
Pig	44	19.5	11	19.6	55	19.5
Cattle	39	17.3	15	26.8	54	19.1
Equid	2	.8			2	0.7
Gazelle	3	1.3	1	1.8	4	1.4
Totals by Phase	226		56		282	
<i>EO/MNE Counts by Species</i>	N	%	N	%	N	%
Sheep/Goat	76	68.5	12	40.0	88	62.4
Pig	16	14.4	6	20.0	22	15.6
Cattle	15	13.5	11	36.7	26	18.4
Equid	2	1.8			2	1.4
Gazelle	2	1.8	1	3.3	3	2.1
Totals by Phase	111		30		141	
<i>Notes: N = number of bones based on TF or EO/MNE counts.</i>						

Table 3: Estimated proportions of cattle, sheep / goat, and pig meat yields (MY) for Phases IA + IB using epiphyses only / minimum number of elements (EO/MNE) counts.

Estimated Meat Yields for Cattle, Sheep/Goat and Pig		
Major Domesticates	MY	%
Cattle	16250	63.7
Sheep/Goat	7040	27.6
Pig	2200	8.7
Total MY	25490	
<i>Notes: MY = meat yield (in kg) calculated by EO/MNE (from figures in Table 2) x the estimated carcass weight. Percentage MY (%) = total MY x 100. Estimated carcass weights: 80 kg for sheep/goat, 625 kg for cattle, 100 kg for pig (Grigson 1995).</i>		

practitioners and other occupational specialists, including service providers, whose work was to aide in the functioning of the fortress. This relatively small population probably consisted of family-units from among the local Christian population. As noted above, it is possible that

a royal family lived on the site at times as well (see Tibble 1989: 83). The presence of at least several, if not more, European wives is indicated by the Frankish child-burials next to the chapel (Rose 2008), which demonstrate that European-descended nuclear families were in residence, although perhaps not more than one or two at any given time. As such, the food-consuming population at al-Wu'ayra included both sexes, various age groups, and some family units (probably of both local and European Christians), in addition to a cadre of adult males who were probably unaccompanied, at least for the most part. Some individuals, and possibly families, were distinguished by military rank and social class, factors that may have also influenced patterns of food access and choice.

The organization of food preparation would have been a major, daily activity at al-Wu'ayra as the acquisition of meats and other foods was essential to meet immediate consumption needs and promote the ongoing work of preparing and maintaining ample storage supplies. It is likely that slaughtering and butchering facilities existed on-site, as well as multiple kitchen and dining areas serving the garrison, its leadership and associated families, and the small village

Table 4: Sheep / goat epiphyses fusion data for Phases IA + IB.

Sheep/Goat Epiphysis Fusion Data by Age Group															
Early Juvenile				Intermediate Sub-Adult				Early and Intermediate Aggregated				Late Adult			
F	%	UF	%	F	%	UF	%	F	%	UF	%	F	%	UF	%
21	95.5	1	4.5	3	50.0	3	50.0	24	85.7	4	14.3	12	50.0	12	50.0
<p><i>Notes:</i> Skeletal parts in the fusion groups are listed below (fusion ages are from Schmid 1972: 75). Early epiphysis fusion group includes: scapula P, humerus D, radius P, and pelvis A (fusing at 3 to 6 months of age). Intermediate epiphysis fusion group includes: tibia D, metacarpus D, and metatarsus D (fusing at 16 to 24 months of age). Late epiphysis fusion group includes: humerus P, ulna P, radius D, femur P and D, and tibia P (fusing at 36 to 42 months of age). Abbreviations: P = proximal, D = distal, A = acetabulum, F = fused epiphyses; UF = unfused epiphyses; F %= proportion fused.</p>															

Table 5: Sheep / goat skeletal part representation for Phases IA + IB by total fragment counts (TF) and epiphysis only / minimum number of elements (EO/MNE).

Sheep/Goat Skeletal Part Representation		
TF Counts by Skeletal Group		
	N	%
Head (H) - skull, mandible (<i>EF: N=4, %=18.2</i>)	29	20.6
Upper limb (UL) - scapula, humerus, pelvis, & femur (<i>EF: N=8, %=36.4</i>)	70	49.6
Lower limb (LL) - radius, ulna, & tibia (<i>EF: N=6, %=27.2</i>)	36	25.5
Metapodials (MP) - metacarpus & metatarsus (<i>EF: N=4, %=18.2</i>)	6	4.3
Total	141	
EO/MNE Counts by Skeletal Group		
	N	%
Head (H) - skull, mandible (<i>EF: N=4, %=18.2</i>)	7	13.2
Upper limb (UL) - scapula, humerus, pelvis, & femur (<i>EF: N=8, %=36.4</i>)	26	49.1
Lower limb (LL) - radius, ulna, & tibia (<i>EF: N=6, %=27.2</i>)	16	30.2
Metapodials (MP) - metacarpus & metatarsus (<i>EF: N=4, %=18.2</i>)	4	7.5
Total	53	
<p><i>Notes:</i> N= number of bones per skeletal group. Figures for expected frequency (EF) of parts refer to the number of bones found in a skeleton limited here, as described under the general headings of Head, Upper Limb etc, to the major 22 parts (dividing the skull into left and right halves). For example, as there are 2 metacarpals and 2 metatarsals, the number of metapodials (MP) is 4, which is 18.2 percent of 22.</p>		

population. Waste dumping may have been restricted to certain areas, and dumping locations may have differed for butcher's waste, kitchen waste, and dining waste. On a site-wide basis, activities linked to animal processing practices and meal service would have influenced the distribution of faunal remains substantially. As Square 4 was located close to the entrance to the northeast tower, the faunal sample probably reflects casual remains left by Frankish soldiers who ate meals in and around this post, discarding some food waste and broken pottery vessels on the spot.

Analytical Methods

The relative abundance of species in this assemblage is measured by total fragment counts (TF), referring to the raw number of bones, and epiphyses only counts/minimum number of elements (EO/MNE) following Grant (1975, 1984). With respect to the principal domesticates of sheep/goat, cattle, and pig, their predicted relative meat contributions are based on species size. Thus the estimated proportional meat yields of these major contributors to the meat diet were calculated by multiplying the EO/MNE figures for sheep/goat, cattle, and pig by their estimated carcass weights. However, meat yields calculated by this method offer mere approximations of the contribution of each species to the meat diet, and should be treated as such. Evidence for exploitation strategies involving major animal and bird domesticates is based on patterns of epiphysis fusion and mandibular tooth eruption and toothwear (Grant 1975, 1982; Schmid 1972: 75; see also Payne 1973: 293). The epiphyses fusion method (using EO/MNE counts) categorizes epiphyses into groups according to the age at which they are expected to fuse. These data produce distributions showing the age of death for sheep/goat. Skeletal representation data derive from both TF counts and EO/MNE counts. Skeletal parts, including skull, maxilla, mandible, atlas, axis, and sacrum, are quantified by the

MNE method, which tabulates non-repeatable characteristics and is the basis for determining the minimum number of individuals (MNI) represented.⁴ The EO/MNE method reduces potential species and skeletal representation biases associated with TF counts, particularly with respect to the major mammalian domesticates, but the resulting figures tend to be small, which limits their reliability for comparative purposes.

Bone characteristics were recorded with respect to species, skeletal part, sex, age, size, and modifications due to burning, gnawing, butchery, working, and pathology. Bone measurements are based on Driesch (1976). Measurable bones are whole limb bones (bird and mammal domesticates) and those with an epiphysis fused in the Intermediate or Late stage and/or mandibles with an adult third molar in wear. Identification of very young animals is based on tooth wear patterns and the smallness and porosity of limb bones (following Amorosi 1989). Sexual distinctions are determined by certain teeth, such as pig canines, horn cores from sheep and goat, pelvis from cattle and sheep, and spurs and medullary bones from chicken (after Grigson 1982: 8; Prummel and Frisch 1986: 576; Driver 1982).

Quantity, Distribution, and State of the Faunal Assemblage

The great majority of the 1,150 elements in the faunal assemblage from Square 4 was retrieved from deposits belonging to Phase I (IA+IB combined), as shown in **Table 1**. Phase II deposits provided only 10 fragments (with 2 identifiable to species) and these elements are excluded from further discussion in this paper. The Phase I (A+B) bones, which include 459 elements identifiable to species, are very well preserved, showing no damage from scavengers. Relatively few gnawed bones are expected because this process typically results in total destruction or extreme fragmentation, yet a complete absence of gnawing may indicate

4. Counts for the maxilla and mandible are based on the representation of particular teeth, while vertebrae counts are based on the presence of articular surfaces. The skull is quantified by counts of key areas including the orbit, horn core, occipital and temporal condyles, occipital crest, and zygomatic arch. The final count for skull is taken from the best represented of these key

areas, including the maxilla. The expected frequencies (EF) of the various skeletal parts are taken into account by multiplying the number of vertebrae (atlas and axis) by 2, and then dividing the first and second phalanges by 2 (by 4 in the case of pig) and pig indeterminate metapodials by 8.

relatively rapid burial of the faunal remains. The assemblage is in good condition, but displays a moderately high level of fragmentation with 75 (or 28.1 percent) of the 267 Phase I (A+B) sheep-sized limb bones with articular ends exhibiting fragmentation. This could indicate redeposition (the movement of bone waste dumps) or other post-depositional disturbances, including recovery breakages (butchered specimens and the effects of butchering on skeletal distributions are treated below).

Species Representation

The species representation data in **Tables 1 and 2** demonstrate the clear numerical dominance of the ovicaprids at al-Wu'ayra during the Phase I (A+B) Frankish occupation. Of the identified species and species groups listed in **Table 1**, sheep and goat are the most abundant according to TF counts (167 bone elements representing 36.4 percent of identified species elements), followed by parrotfish, pig, and cattle. Among the major domesticates, a similar pattern of abundance is shown by the EO/MNE data in **Table 2**, which indicate a greater representation of sheep/goat, and lesser representations of pig and cattle, when compared with the TF results. The relative contributions of each of these species to the meat diet of the fortress occupants are indicated by their respective meat yields based on weight. Standard adult meat yields for the major domesticates are: 625 kg for cattle; 80 kg for sheep and goat; and 100 kg for pig (see Grigson 1995: 248, fig. 4). These figures are derived from modern adult domesticates and while they do not account for variances based on age, sex, or breed, calculations using these standard yields offer approximate indications of the relative quantities of meat provided by these groups of food animals. The parrotfish are assumed to have weighed 3 kg on average (based on comparison to specimens of known size and weight), yet this figure refers to dead-weight, rather than meat yield, and therefore overestimates their contribution. It should be mentioned that the meat yield estimations for this sample (see below) are offered with the assumption that

all of the animals and fish represented in the collection were ultimately used for their meat.

Estimated meat yields for this sample are calculated in two ways. According to MNI figures, meat yields and proportional representations for the most abundant species are: 3 cattle at 1,875 kg (70 percent); 6 sheep/goat at 480 kg (17.9 percent); 3 pig at 300 kg (11.2 percent); and 8 parrotfish at 24 kg (0.9 percent).⁵ The second method provides a larger comparative base by applying EO/MNE percentages (listed in **Table 2**) to the calculations for the estimated meat yields among the major domesticates, with the results shown in **Table 3** (parrotfish are not relevant to the EO/MNE analysis). The results from both methods suggest a dominance of beef in the diet followed by mutton and then pork.⁶ Cattle are represented solely by adult animals as demonstrated by 9 fused Early epiphyses, 1 fused Intermediate epiphysis, and 1 fused and 3 unfused Late epiphyses. This suggests that beef may have provided an even greater relative contribution, for the sheep/goat and pig assemblages include significant proportions of sub-adults with lesser meat yields than the adults (see below).

The estimated meat weights based on the MNI figures (cited above) indicate that parrotfish provided a minor supplement to a meat diet that was largely dependent on major domesticates. Most of the parrotfish remains could not be assigned to particular species, however, a few bones may belong to the long-nosed parrotfish. These bones indicate a standard body length (as measured from the tip of the snout to the base of the caudal fin) of 50-60 cm. While this length is consistent with long-nosed parrotfish, other species fall within this size range as well (Randall 1983: 9, 128). The assemblage also includes 1 possible wrasse and 1 grouper, the latter represented by 2 or more individuals (each at least 5 kg in weight and 70 cm in length). All of the parrotfish specimens that are archaeologically documented in the Levant originated in the Red Sea (see Neer *et al.* 2004: 105; see also Lepiksaar 1995: 192-93). Grouper and wrasse are native to both the Red Sea and the Mediterranean

5. The MNI figure for parrotfish is based on a minimum count of the dentaries and premaxillae.

6. Estimated meat yields based on the faunal assemblage

from Phase I at ash-Shawbak show a similar distribution (Brown and Rielly 2010: table 6) and these remains also date to the twelfth century.

Sea (Randall 1983: 44 ff, 109 ff; Golani *et al.* 2006: 136 ff, 181 ff), but these specimens from al-Wu'ayra were likely to have been traded into the southern highlands from the Red Sea. The parrotfish and the grouper provide high quality meat; the former are available throughout the year, but most plentiful in quantity and species diversity during the summer months.

Among the other species in the assemblage, domesticated chicken is relatively well-attested. Game animals, however, are represented only by gazelle and chukar partridge. Considering the local terrain, the former was probably mountain gazelle (*Gazella gazella*; see Harrison and Bates 1991: 194). The chukar partridge prefers stony habitats and rocky slopes with thin vegetation, as well as high mountains and semi-desert areas where some agriculture is practiced (Hollom *et al.* 1988: 73). Non-food animals in the sample include equid, which is represented by 2 bones that appear too large for donkey, thus suggesting either horse or mule.⁷ Another non-food animal is the Egyptian vulture, which presently migrates into the Jordan rift valley in spring and autumn (Andrews 1995: 62; Disi 1987: 52). As a scavenging bird, the vulture is commonly found close to habitation sites and has been observed from Tall Ḥisbān (Boessneck 1995: 134-35; Alomia 1978: 295).

Animal Production and Processing

At al-Wu'ayra, sheep/goat provided ante-mortem products such as milk, wool, and hair, in addition to meat. The relative importance of these secondary products is suggested by the sheep/goat age distributions in **Table 4**, which indicate that relatively few juvenile animals were slaughtered, and that some sheep/goat were culled as sub-adults during their second year (according to the presence of unfused Intermediate epiphyses). Similarly, the aggregated data for the Early and Intermediate fusion group show that the proportion of unfused epiphyses is only 14.3 percent. Adult survival through ages three to three and one-half years, or beyond, is shown in the Late fusion group where half the specimens (50 percent) are fused. This same overall age distribution is apparent

among the smaller group of ovicaprid bone elements that are identified as specifically belonging to either sheep or goat (see **Table 1**). Research on age/kill-off profiles for sheep/goat has demonstrated that a greater proportion of adult animals (especially old adults) is consistent with a greater economic priority on secondary products (Payne 1973: 282-84).

The topography at al-Wu'ayra indicates that limited areas within the site may have been used for cultivation or pasturage (see Vannini and Vanni Desideri 1995: 512-13). This is a compelling observation as security concerns are likely to have encouraged the garrison to keep and breed at least some stock within the fortress. Hints of on-site stock are found within the faunal assemblage as well. Specifically, a small quantity of bones belonging to very young lambs or kids could represent infant mortalities. Similarly, chicken and pig are well-represented, and both of these species can be farmed in relatively confined spaces. One chicken bone from a very young bird may indicate an infant mortality. The remaining chicken are adult (of the 19 articular ends, 17 are fused), indicating a general priority on egg production. The fortress residents may have taken similar advantage of the chukar partridge, for this non-domesticated game bird is easily bred in captivity as a provider of meat. Age indicators for pig (18 epiphyses and 4 mandibles) show a concentration of juveniles (aged up to one year) and an absence of adults (aged one and one-half years to two years, or more). This high proportion of youngsters is typical of intensive pig farming, which could have been maintained with a small number of adult breeders. Pig at al-Wu'ayra was valued primarily for its meat, and piglets may have been produced in sties within the fortress or supplied by local livestock farmers, then slaughtered on-site.

Aside from the potential for small, on-site livestock reserves, most of the major domesticated animals (sheep, goat, and cattle) probably arrived at al-Wu'ayra on foot, where they were slaughtered and butchered. This is indicated by the wide range of skeletal parts retrieved for each of these species, a pattern that would not occur if the meat arrived as dressed carcasses

7. The 2 equid bones belong to one or two adults over three and one-half years of age. These meat-rich bones were recovered from an area with food waste, but nei-

ther shows butchery marks and it is unlikely that these animals were consumed.

or selected joints. Slaughtering methods are not evident from the remains, but butchery marks on a large proportion of bones, mainly belonging to sheep/goat, demonstrate how the carcasses were divided. One cattle phalange was cut near the proximal end (a result of skinning), while a small number of sheep/goat lower leg bones display dressing cuts through the carpal and tarsal joints in order to separate the meat-rich parts of the carcass. The sheep/goat butchery marks indicate a fairly consistent subdivision of the carcass along the vertebral column, showing that these carcasses were either split and then sectioned, or vice versa. A number of vertebrae were split down the middle and most were chopped again in the same plane, just to one side of the bone (to remove the transverse process). Butchery of the rest of the carcass was less consistent, showing: cuts through, or adjacent to, the articular surfaces of bones in the shoulder, elbow, pelvic, and knee joints; cuts through the midshaft of the same bones; and defleshing cuts, as indicated by knife marks. While there is no clear consistency regarding the production of limb joints, the number of specimens with jointing marks suggests that meat was generally cooked on the bone. The cattle and pig bones display jointing cuts within the meat-rich areas of the skeleton as well. Knife marks to a distal tibia of a chicken also resulted from dressing procedures. Butchery of fish can leave cut marks on the posterior head bones and the shoulder bones, particularly the cleithrum. The absence of butchery marks on the fish bones in this assemblage suggests expert filleting or cooking with the skeleton relatively intact.

Despite the presence of a wide range of sheep/goat skeletal parts, metapodials (foot bones) are poorly represented. This is demonstrated in **Table 5**, which compares the abundance of retrieved skeletal parts with their expected abundance based on a predicted death assemblage, as if the entire carcass had been deposited on-site. According to the EO/MNE data, metapodials represent only 7.5 percent of the assemblage, in contrast to the expected frequency (EF) of 18.2 percent. This suggests that the deposited bones consisted largely of kitchen waste (from the dressed or meat-rich part of the carcass). If sheep/goat arrived at the fortress on foot, butcher's waste (from initial carcass preparation) may

have been discarded elsewhere on or near the site, perhaps in an area adjacent to the slaughtering facility and routinely used for dumping.

Discussion of Animal Resources and Representations at al-Wu'ayra

The establishment of Frankish military garrisons at various locations in the southern highlands certainly had a profound and complex socio-economic impact on the existing communities of the region. One broad question that emerges from this study is the extent to which the Crusader presence, and the dietary preferences of this population, may have influenced local economic practices in the Wādī Mūsā and Petra region. Hopefully, more environmental data will become available and provide inspiration for ongoing research on this topic. For now, a few preliminary comments may be offered on the basis of the faunal assemblage from al-Wu'ayra.

The data suggest that the twelfth century, Crusader-era residents of the fortress at al-Wu'ayra experienced a diversified meat diet. Sheep and goat are well-represented and were clearly an important aspect of the meat diet. This would be expected at any settlement in the region during this period, particularly as the ovicaprids are well-adapted to the southern highland environment. Furthermore, the sheep and goat economy may have prioritized *ante-mortem* commodities such as dairy products, wool, hair, and hides. The representation of cattle is also notable and this species may have contributed heavily to meat resources. Pig was clearly desirable among the population at al-Wu'ayra as well. To the extent that the Frankish settlement maintained a relatively high demand for beef and pork, local production of these animals may have increased.

The Wādī Mūsā valley was environmentally well-suited to the rearing of domestic cattle, and these draft animals would have facilitated local crop production by providing traction and manure, in addition to producing milk for dairy products (see Prawer 1980: 180). For purposes of comparison, it may be noted that cattle are well-represented at some sites in Crusader-era Palestine, such as Suba (27.3 percent in Phase B) and Tall Qaimun (37.2 percent in Stratum IIIa-b), relative to other major domesticates, as shown in **Table 6**. In these instances, the major-

ity of cattle at Suba and half the cattle at Tall Qaimun were slaughtered as sub-adults (Croft 2000: 177; Horwitz and Dahan 1996: 247), suggesting a Frankish preference for high quality beef in these communities.

Pig was clearly a factor in the diet at al-Wu'ayra, although it may have provided a relatively low meat contribution, as suggested by the estimated meat yields (see **Table 3**). The presence of pig demonstrates both an immediate supply of these animals and a specifically European preference for pork. It appears likely that at least some pigs were locally farmed outside of the fortress, probably by breeders from among the Christian population of Wādī Mūsā or another neighboring village. It is possible that some of the pig bones belong to wild boar, none are clearly identifiable as such. While domestic pig and wild boar are not suited to all southern Levantine habitats (see Toplyn 2006: 486-87), pig remains are documented at sites in a variety of environmental settings. **Table 6** shows the proportional representations of pig, relative to sheep/goat and cattle, as they occur in archaeological contexts ranging from the elev-

enth through the fifteenth century (according to total fragment counts). The highest proportions of pig shown in **Table 6** are from Crusader-era deposits at al-Burj al-Aḥmar (62.0 percent in Phases B+C), Suba (34.8 percent in Phase B), and al-Wu'ayra (19.9 percent in Phase IA+B).

The meat diet at al-Wu'ayra was supplemented by chicken, game, and fish. The relatively abundant chicken bones show a good representation of adults, which were undoubtedly valued for eggs and eventually meat. The scant representation of game species at al-Wu'ayra (see **Table 1**) is not unique. A pattern of poor representation of game species is also documented at Crusader sites in Frankish Palestine including Suba (Croft 2000: 186-87, table 4), al-Burj al-Aḥmar (Cartledge 1986: 177, table 12), and Tall Qaimun (Horwitz and Dahan 1996: 247, table XXII.1), and appears to stand in contrast to the fondness for hunting in western European culture at this time. However, the lack of remains of hunted animals in these assemblages could indicate a scarcity of game in the region due to a number of factors, such as over-exploitation, a heavy reliance on a steady supply of domesti-

Table 6: Comparative representation of sheep / goat, cattle, and pig at eleventh to fifteenth century sites in the southern Levant.

Comparative Representation of Sheep/Goat, Cattle and Pig										
Site Name	Stratum/Phase	Period	Date	Sheep/Goat		Cattle		Pig		Total
				N	%	N	%	N	%	
Tall al-Husn (Pella)	Area XXIX	Abbasid-Fatimid	8th-11th c	711	84.5	125	14.9	5	0.6	841
Tall Qaimun	Stratum IVa-b	Fatimid	9th-11th c	264	46.2	295	51.6	13	2.2	572
Wadi al-Farasa (Petra)	Cistern	Crusader or Ayyubid	11th-13th c	317	99.7	1	0.3	0	0	318
Suba	Phase B	Crusader	12th c	252	37.8	182	27.3	232	34.8	666
al-Wu'ayra	Phase IA+B	Crusader	12th c	167	60.5	54	19.6	55	19.9	276
al-Burj al-Ahmar	Phase B+C	Crusader	12th-13th c	24	30.4	6	7.6	49	62.0	79
Tall Qaimun	Stratum IIIa-b	Crusader	12th-13th c	196	57.8	126	37.2	17	5.0	339
ash-Shawbak	Phase I [1986]	Ayyubid	12th-13th c	82	80.4	13	12.7	7	6.9	102
Tall Hisban	Stratum 4	Ayyubid	12th-13th c	71	88.8	9	11.2	0	0	80
ash-Shawbak	Area 6000c [2005]	Ayyubid-Mamluk	12th-14th c	248	75.8	61	18.7	18	5.5	327
Khirbat Sumaqa	Cistern 266	Crusader-Mamluk	12th-15th c	138	68.3	47	23.3	17	8.4	202
Tall Hisban	Strata 2-3	Mamluk	13th-15th c	6901	84.6	1117	13.7	139	1.7	8157
ash-Shawbak	Phase III [1986]	Mamluk	13th-15th c	99	98.0	2	2.0	0	0	101
al-Karak	Phase I	Mamluk	13th-15th c	146	89.0	18	11.0	0	0	164
Suba	Phase C	Ayyubid-Mamluk	13th-16th c	391	74.3	98	18.6	37	7.0	526

Notes: N = total fragment counts (TF). Calculations are based on reported data.
 Citations: al-Burj al-Ahmar (Cartledge 1986: 177, table 13); Khirbat Sumaqa (Horwitz 1999: 378, table 1); al-Karak (Brown and Rielly in preparation); ash-Shawbak (for 1986 see Brown and Rielly 2010; for 2005 see Mazza and Corbino 2007b: 75, fig. 51); Suba (Croft 2000: 186, table 1); Tall Hisban (Driesch and Boessneck 1995: 72, table 5.9); Tall al-Husn (Rielly 1993: 220, table 2); Tall Qaimun (Horwitz and Dahan 1996: 247, table XXII.1); Wadi al-Farasa (Schmid and Studer 2003: 485, fig. 32); al-Wu'ayra (see above, Table 1).

cated food-animals, or a preference for processing and consuming of game animals at or near kill sites, as an alternative to transporting the carcasses.

Marine fish are well represented at al-Wu'ayra, accounting for 33.2 percent of the total faunal assemblage (calculated from **Table 1**), and at other sites in the southern highlands, as shown in **Table 7**. The identifiable specimens from al-Wu'ayra (**Table 1**) are almost exclusively parrotfish (Scaridae) that originated in the Red Sea coastal areas, and these were probably procured by traders at the entrepot of 'Aqaba. Preservation would have been necessary in order to transport fish over the distance between 'Aqaba and the Jabal ash-Sharāh highlands (see Neer *et al.* 2004: 102; Hamilton-Dyer 1994: 275). Skeletal evidence from this assemblage shows that fish, which were probably dried or salted, arrived at al-Wu'ayra as whole specimens. Similarly, the fish assemblage at Wādī Farasa in the Petra basin is also dominated by parrotfish that were imported as whole specimens (Schmid and Studer 2003: 485-87, 2007:

51-55). Red Sea parrotfish are documented at Khirbat an-Nawāfla in the Wādī Mūsā valley ('Amr *et al.* 2000: 244; 'Amr 2006: 25, fig. 32) and in Ayyubid and Mamluk contexts at ash-Shawbak (Brown and Rielly 2010: table 3; Mazza and Corbino 2005: 53 ff, 2007b: 75 ff). Fish are represented in the Mamluk phase at al-Karak, but unfortunately these few remains are not identifiable to species (Brown and Rielly in preparation). At Tall Ḥisbān the Mamluk era assemblage of marine fish includes specimens of four species (see **Table 7**), yet parrotfish dominate this corpus as well (see Driesch and Boessneck 1995: 98). Consistent with the findings from al-Wu'ayra and Wādī Farasa, parrotfish arrived at Tall Ḥisbān as whole specimens, which the investigators suggest had been dried or smoked (Driesch and Boessneck 1995: 102; Lepiksaar 1995: 195-96). While freshwater fish are documented at Tall Ḥisbān in the Mamluk period (Chichlidae, Clariidae, and Cyprinidae), marine specimens account for nearly all fish remains found in the southern highlands to date. The broad geographic distribution of saltwater

Table 7: Comparative representation of marine fish at medieval sites in the southern highlands of Jordan.

Comparative Representations of Marine Fish			
Site and Context	Date	N	Number of Fish per Species
Wadi al-Farasa [2002], Rubbish Pit (Schmid and Studer 2003: 485, fig. 32)	11th-13th c	359	249 parrotfish (Scaridae); 1 wrasse (Labridae); 141 unidentified
al-Wu'ayra [1987], Square 4, Phase IA+B (see above, Table 1)	12th c	378	124 parrotfish (Scaridae); 4 grouper (Serranidae); 1 wrasse (Labridae); 249 unidentified
al-Wu'ayra [1993], UT 83 (Mazza and Corbino 2007a: 57, fig. 52)	12th c	58	58 parrotfish (Scaridae); ? unidentified (undisclosed)
ash-Shawbak [1986], Palace Area, Phase I (Brown and Rielly 2010, table 3)	12th c	18	3 parrotfish (Scaridae); 15 unidentified
ash-Shawbak [2006], Area 1000 (Mazza and Corbino 2007a: 59, fig. 55)	12th c	4	3 parrotfish (Scaridae); 1 wrasse (Labridae); ? unidentified (undisclosed)
ash-Shawbak [2005], Area 6000c (Mazza and Corbino 2007b: 75, fig. 51)	12th-14th c	106	106 parrotfish (Scaridae); ? unidentified (undisclosed)
ash-Shawbak [1986], Palace Area, Phase III (Brown and Rielly 2010, table 3)	13th-14th c	13	5 parrotfish (Scaridae); 8 unidentified
Tall Hisban [1968-1978], Strata 2-3 (Driesch and Boessneck 1995: 98, table 5.22)	13th-15th c	146	4 grey mullet (Mugilidae); 84 parrotfish (Scaridae); 1 drum/croaker (Sciaenidae); 1 sea bream (Sparidae); ? unidentified (undisclosed)
al-Karak [1987], Palace Area, Phase I (Brown and Rielly in preparation)	14th-15th c	4	4 unidentified
Notes: N = total number of fish by total fragment counts (TF) based on reported data. Figures for al-Wu'ayra [1993] and ash-Shawbak [2006] are close approximations based on bar charts.			

fish not only illustrates their popularity throughout the region from the twelfth century through the fifteenth century, but also describes a trading network that channelled a flow of goods from the shores of the Red Sea up through the southern highlands, at least as far as the al-Balqā' region. This archaeologically demonstrated overland trade in food commodities is further confirmed by the thirteenth century geographer and historian Ibn Sa'īd al-Maghribī (d. 1274 or 1286), who described the ash-Shawbak and al-Karak communities as receiving dried fish in exchange for their agricultural products (cited in al-Bakhit 1992: 35).

The faunal assemblage from the medieval military outpost in Wādī Farasa provides a particularly interesting comparison with the assemblage from al-Wu'ayra. The Wādī Farasa excavations uncovered a cistern containing animal bones and fragments of ceramic vessels dating in the range of the eleventh to the thirteenth century (Schmid and Studer 2003: 483-87, 2007: 46-49). The faunal elements exhibit a nearly exclusive reliance on sheep/goat and fish. Dependence on an off-site slaughtering facility and an emphasis on storable, prepared meats are indicated by the fact that over three-quarters of the Wādī Farasa elements are meat-rich bones of sheep/goat or parrotfish (Schmid and Studer 2003: 487, 2007: 51-52). This stands in contrast to the sheep/goat data from al-Wu'ayra, which indicate on-site slaughtering facilities (see above) and further raise the possibility that al-Wu'ayra supplied the population at Wādī Farasa with prepared, storable joints of meat, if in fact these sites were occupied concurrently. The parrotfish at Wādī Farasa account for over one-third of the total fragment count for identified species, and virtually all of the identifiable fish bones belong to parrotfish (Schmid and Studer 2003: 484-86, fig. 32, 2007: 51-55; Schmid 2006: 58, 59, fig. 33). Although the al-Wu'ayra and Wādī Farasa assemblages are similar in their robust collections of fish remains, they are also sharply divergent in that the latter assemblage is notable for a near absence of cattle (represented by a single bone) and a complete absence of pig. The ceramics remains indicate that the Wādī Farasa site may have been occupied during the Crusader era, at the same time as al-Wu'ayra and al-Ḥabīs, and as part of the same defensive network. Further-

more, a Christian presence in the vicinity is indicated by dislocated, medieval gravestones with Christian funerary iconography that had been dumped in debris at the site (Schmid and Studer 2007: 49-50). Nevertheless, the absence of pig in the faunal assemblage is striking when compared with the assemblage from the nearby fortress at al-Wu'ayra. As such, it remains possible that the outpost in Wādī Farasa belonged to the succeeding Ayyubid forces that held control over Petra after 1188. In either event, the Wādī Farasa outpost may have defended another installation located at a higher elevation (see Schmid and Studer 2007: 51, 55). It has been suggested that a Crusader-built fort once stood above Wādī Farasa, on the summit of Jabal al-Madhbaḥ (Vannini and Vanni Desideri 2005: 512), but there is no evidence to support this notion. While the medieval defensive works and faunal assemblage from Wādī Farasa raise intriguing questions, they also provide a unique perspective on what may be another twelfth century occupation in the area of Petra and Wādī Mūsā.

Summary

The faunal data from al-Wu'ayra show that the food supply for the Frankish fortress depended on both local resources and trade networks. In addition to preparing daily meals on-site, fortress occupants had to prepare and warehouse storable food supplies in order to reduce their vulnerability during times of disruption or siege, when access to local markets would have been diminished or lost. The garrison's strategy for long-term and emergency supplies included stores of dried fish, preserved joints of meat, and probably a small number of animals domiciled on the premises, possibly chicken, chukar partridge, sheep/goat, or even pig. On-site slaughtering and butchering facilities would have provided the meats needed for immediate consumption, as well as storable joints, some of which may have been distributed to the garrison at al-Ḥabīs or other Crusader posts in the Petra region. Both the al-Wu'ayra and Wādī Farasa assemblages show a strong priority on storable foods, as would be expected at military installations and outposts. Yet the differences between the two assemblages, particularly with respect to the dearth of cattle and lack of pig at Wādī Farasa are noteworthy.

The food economy of the garrison at al-Wu'ayra would have been closely tied to the production regime in the Wādī Mūsā valley to ensure adequate meat supplies and access to grains, fruits, and olives, in addition to craft products, raw materials, and labor. Overall, the Frankish presence at al-Wu'ayra, and throughout the surrounding region, probably had a strong influence on systems of food production and distribution, as well as a significant impact on trade and marketing practices. These socio-economic aspects of the Crusader period deserve further investigation, and future studies of faunal collections from sites in the Jabal ash-Sharāh will undoubtedly contribute to a much fuller perspective on land use and food consumption patterns in southern Transjordan during the twelfth century.

A Note on the University of Florence Faunal Assemblage from al-Wu'ayra

An analysis of the faunal data from the 1993 season of excavations conducted by the University of Florence in the ancillary village at al-Wu'ayra has been prepared by faunal specialists Paul Mazza and Chiara Corbino (2007a: 55 ff). The assemblage excavated in Area UT 83, within the village settlement to the southwest of the upper citadel, includes 369 identifiable elements and is dominated by sheep/goat remains. Most of these animals were slaughtered as juveniles or subadults, indicating an emphasis on meat consumption. This finding differs from the sheep/goat age profile from the Square 4, Phase I (A+B) assemblage (see above), which was retrieved from the far opposite side of the site, next to the northeast tower. Given these differing contexts and the distance between the excavation units, the contrasts between the two samples are hardly surprising and contribute to a broader perspective on faunal distributions at the site. Also represented in the UT 83 assemblage (in order from largest to smallest total fragment counts) are parrotfish (Scaridae), small galliformes (probably a variety of partridge), and pig (domestic and/or wild boar). A few fragments of cattle and chicken are present as well. The authors note both the lack of species diversity in this assemblage, and the general absence of game, with the exception of the small galliformes and possibly some or all of the pig remains

(Mazza, corbino: 2007a: 55-56). In general, the Square 4, Phase I (A+B) assemblage from al-Wu'ayra is quite similar to that of UT 83, but the former also includes gazelle, equid, Egyptian vulture, and marine fish identified as grouper and wrasse.

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THE BĪR MADHKŪR PROJECT: A PRELIMINARY REPORT ON THE 2008 SEASON

Andrew M. Smith II

Introduction

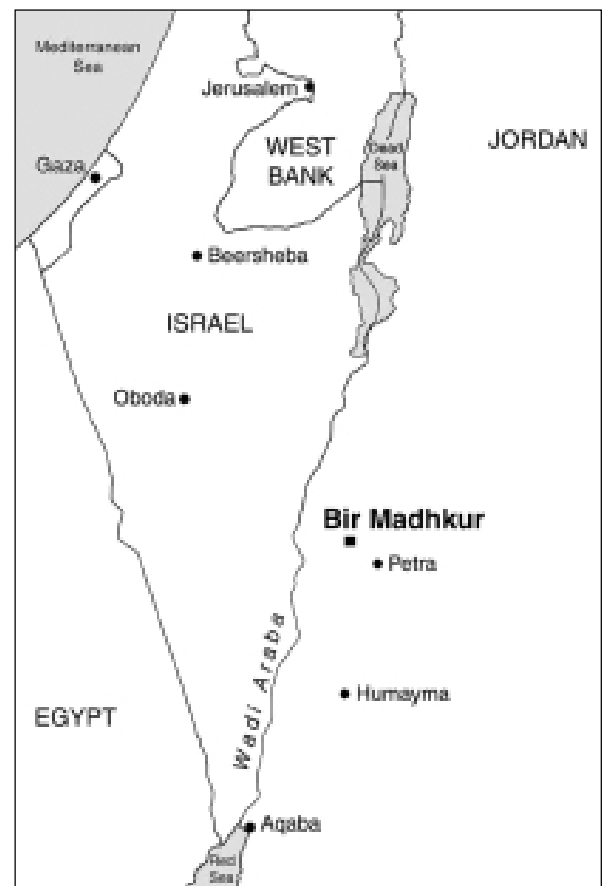
This preliminary report summarizes key results of the 2008 season of the Bir Madhkur Project, conducted from 16 June to 20 July. The project is sponsored by the George Washington University and is affiliated with the American Schools of Oriental Research (ASOR) through its Committee on Archaeological Policy. Financial support for the project was provided by the Royal Geographical Society of Great Britain, an ASOR Harris Grant and Dowling College. The project operates under a permit granted by the Department of Antiquities, and the author wishes to thank Dr Fawwaz al-Khraysheh for his generous support.

During the 2008 season, the field team included Andrew M. Smith II as director and photographer, five field supervisors, 20 students and up to 13 local workmen. The Department of Antiquities representative was Mohammed Zahran of the Safi office. Field supervisors included Miranda Angus as assistant to the surveyor, Robert Darby, Ben Dolinka (pottery consultant), Brooklynne Fothergill (faunal analyst), Elizabeth Osinga and Jennifer Ramsay (archaeobotanist). Student staff included Melissa Bailey, Nikki Bose, William Caccese, Janise Dupuis, Jennie Erikson, Jessie George, Emily Grace, Marita Johnson, Eric Kingsbury, Tu Phuong Le, Bevan Lee, Lisa Mak, Isaiah Moose, Greg Oke, Janet Stewart, Petra Vaiglova, Lindsay Vine, Jeremy Withers and Maggie Woo.

Overview of the Project

The Bir Madhkur Project is a multi-disciplinary field project in southern Jordan designed to showcase the ancient site of Bir Madhkur as a central component in a broader examination of the historical geography of Wādī ‘Arabah

through archaeological and ethnographic research. Wādī ‘Arabah is part of the Great Rift Valley that extends *ca* 160 kilometers north from the Gulf of ‘Aqaba to the Dead Sea. Bir Madhkur lies in the foothills of Wādī ‘Arabah (Fig. 1) and was one of the first major way-stations along the ancient Incense Road that crossed the Araba valley west of Petra. Prominent archaeological remains at Bir Madhkur include a Roman / Byzantine fort or *castellum*, which measures just over 30 × 30m, a (presumed) bath building,



1. Map of the region showing location of Bir Madhkur.

a civilian settlement west of the fort, cemeteries, and numerous other structures in outlying areas, especially on the ridge that separates the fort from the local spring (**Fig. 2**). Bīr Madhkūr was occupied primarily in the Nabataean, Roman and Byzantine periods.

While Bīr Madhkūr would have served as a prominent way-station on an important east - west route across Wādī ‘Arabah throughout its history, the regional significance of the site increased under the Romans, when it served as a regional, administrative hub where soldiers watched over and monitored the movements of a mixed population of farmers, pastoralists and transient merchants. One key goal of this project is to pursue a deeper understanding of how these human communities (indigenous and otherwise) defined themselves in relation to their environment and to one another. Another key goal, more generally, is to illuminate the long

settlement history of Bīr Madhkūr and of the central Wādī ‘Arabah, inclusive of the activities of present day bedouin.

Historical Sources

Two sources are important for identifying Bīr Madhkūr in Antiquity. One is the Beersheba Edict (Alt 1921), a fragmentary inscription that records the taxes imposed on various communities in Wādī ‘Arabah and the surrounding areas in the Byzantine period. The other is the *Notitia Dignitatum* (*Not. Dign. Or.*), an Early Byzantine military register that records troop deployments throughout the Roman Empire (Seeck 1876). It is most likely, as Albrecht Alt (1935) first suggested, that Bīr Madhkūr should be identified with the ancient site of Moa, a place-name that also appears in the mosaic map discovered in Mādabā (Avi-Yonah 1954; Donner 1992). According to the Beersheba Edict, Moa had a tax



2. Satellite view of Bīr Madhkūr showing main features and excavation areas. The main features at the Roman fort (Area A), the bath (Area B) and the domestic complex (Area C) were targeted for excavation, as were Area D, a structure south of the fort, and Area H, a regional farmhouse.

burden of at least 15 gold coins, so the ancient settlement must have been of some regional importance. On the other hand, others have proposed identifying Bir Madhkūr with *Calamona* of the *Notitia*, the base of a mounted cavalry unit (*cohors prima equitata*: *Not. Dign. Or.* 34.43; Rothenberg 1971: 217), which is not improbable given that the Roman / Byzantine fort at the site is a *quadriburgium*, a fort-type which most likely housed a mounted cavalry unit. In the end, unfortunately, the evidence is inconclusive, and certainty will be attained only when an inscription is found that specifically identifies the ancient site.

Previous Research

The history of exploration at Bir Madhkūr and its regional landscape is brief. There seem to be no accounts of visits to the site among those explorers who journeyed through Wādī ‘Arabah before the 20th century (Smith 2005a). The earliest accounts are those of Fritz Frank (1934) and Nelson Glueck (1935), who conducted sweeping archaeological explorations of the ‘Arabah in the 1930s. Both Frank and Glueck remained at Bir Madhkūr overnight, and their observations and descriptions of the ruins are fundamental to our understanding of the site prior to the development of the 1970s. Later explorations of Bir Madhkūr were purposive and brief (e.g. King *et al.* 1987). These include a short visit to the site by the author in 1994 (Smith *et al.* 1997), conducted as part of the Southeast Araba Archaeological Survey, the regional survey component of the Roman Aqaba Project (Parker 2003).

In 1997, the author directed the Bir Madhkūr Excavation and Survey Project, which focused on: (1) sampling some burials at Bir Madhkūr in order to assess the site’s feasibility for bio-archaeological research (Perry 2007), and (2) conducting a purposive reconnaissance survey of unexplored regions of the central ‘Arabah with the settlement at Bir Madhkūr as a focal point. The results of this survey, which continued in 2003, validated the need to continue fieldwork at the site and in the territory around the site (Smith 2005a). In addition to important new evidence of agricultural activity, two new caravanserais were discovered and documentation began of an extensive network of pathways

and roadways that interconnected an array of archaeological sites demonstrative of pastoral and agricultural activity in the region (Smith 2005b). For a region often described as desolate, these results indicated that a more comprehensive investigation of Bir Madhkūr and the central Wādī ‘Arabah would be fruitful, which in turn prompted the design and implementation of the Bir Madhkūr Project.

Principal Research Questions

As noted, the Bir Madhkūr Project is a multidisciplinary field project in Jordan that examines the historical geography of Wādī ‘Arabah through archaeological and ethnographic research. The principal research questions that guide the project are as follows:

1. What were the relationships between and among native and non-native inhabitants of Wādī ‘Arabah in the Classical periods, in particular relations between pastoralists, agriculturalists, soldiers and merchants, and how were these relationships structured and maintained?
2. What was the role of Bir Madhkūr as a hub of local administration and a nexus for regional and international trade networks? In other words, what was the nature and extent of local and long-distance trade that passed through the site and region, how was this trade organized and monitored, and what were the main routes that connected Bir Madhkūr to local, regional and international networks of communication and exchange?
3. From Antiquity to the present, what impact did human settlement activity have on the environment and, conversely, what impact did the environment have in shaping the history of human settlement at the site?

Research Design

The project research design, structured so as to answer these questions, consists of three components: (1) a regional, archaeological and environmental survey of the central Wādī ‘Arabah with Bir Madhkūr as a focal point, (2) excavation of areas within Bir Madhkūr and of associated sites near the ancient settlement (e.g. farmhouses and campsites) that will provide artifactual material for analysis, and (3) an ethnographic study of the bedouin population of the

central Wādi ‘Arabah.

During the 2008 season, the focus was mainly on the second component of the project, with excavations at Bir Madhkūr focusing on the Roman fort, the bath / caravanserai complex, an ancillary structure just south of the fort, and a farmhouse in the immediate vicinity. The project also began intensively mapping the site of Bir Madhkūr itself, as well as conducting some limited survey, where the focus was on documenting and mapping the agricultural field systems west of the site in the area of the farmhouse under investigation. What follows is a preliminary review of the salient results of this field-work.

The Excavations

The ancient site of Bir Madhkūr extends over an area of less than 3 hectares (less than 7.5 acres). Because the site is relatively small, and because the architectural remains, for the most part, are visible on the surface, excavation areas (A - H) were easily defined (**Fig. 2**). As noted above, Area A denotes the Roman fort, Area B the apparent bath and Area C the domestic complex. Areas D - H define ancillary structures or areas of prominent remains around the main features of the site. In 2008, Areas A, B, D and H (farmhouse) were targeted for excavation.

Area A

The fort at Bir Madhkūr (Area A), which measures just over 30 x 30m, is a late Roman *quadriburgium*, with four corner towers and an open courtyard surrounded by rooms adjacent to the curtain wall. Nearby parallels include the forts at ‘En Hazeva and Yotvata in the western ‘Arabah, and Gharandal to the south (Davies and Magness 2006, 2007 and 2008; Cohen 1994 and 1996; Smith 1997). The extant remains of the fort at Bir Madhkūr are heavily disturbed, probably due to severe earthquakes in Antiquity. In most areas, mounded areas of stone debris are the only indication of extant remains, although some sections of the curtain wall are visible. It appears that all of the walls of the fort were constructed of worked limestone blocks set two courses wide. Modern activities have also damaged the fort, as the large well installed along the north wall clearly indicates. In fact, most of the north wall is in an exceedingly ruined state,

due to the installation of the well (perhaps in the Ottoman period) as well as more recent robber activity. Heaps of stone debris and soil that rise more than 2 m above the floor level of the inner courtyard of the fort characterize the north-east sector of the monument. The east wall and north-east corner tower are also poorly preserved. The south wall and the southern corner towers, however, are better preserved. The west wall of the fort is severely damaged due to clandestine excavations along its outer face.

The excavations in Area A were designed (1) to provide some dating evidence for the construction of the fort, and (2) to determine the plan of the fort, in particular the location of the gateway. While the ruined fort, as it exists today, is a Late Roman / Early Byzantine construction, the project set out to determine whether the existing fort overlies an earlier Nabataean structure. Accordingly, and based on the assumption that the actual gate into the fort was probably along the damaged portion of the north wall (only the intact, undamaged south wall was ruled out), the excavation strategy in Area A was to open two trenches along the north wall of the fort in order to reveal the presumed gateway, as well as to expose the foundation level of the curtain wall.

Trench A.1 (5 x 5m) was laid out at the edge of the tumble pile that demarcated the apparent exterior of the north wall. The eastern extent terminated a few meters west of the well. The remainder of the trench encompassed at least part of one of the interior rooms (or perhaps part of the gatehouse). The excavation of Trench A.1 focused on the northernmost section of the trench. This uncovered the curtain wall, the outer face of which was built of large rectangular limestone boulders that were, for the most part, semi-hewn, but occasionally roughly hewn, and arranged in a pattern of irregular headers and stretchers with chinking stones. The inner face was apparently much narrower and comprised of smaller boulders, but excavation on the interior was limited and further work is required to elucidate more fully the inner face of the curtain wall. Between the inner and outer rows of architectural elements, there was a fill of cobbles of varying size mixed with mortar. Interestingly, there is evidence from Trench A.1 to suggest that the fort was white-plastered on its exterior (**Fig. 3**). Pottery from Trench A.1 ranged in date



3. Trench A.1 showing the north wall of the fort and the wall foundation.

from Nabataean to Byzantine.

Trench A.2 (5 x 5m) was laid out immediately adjacent to Trench A.1 to the east, once it became clear that the gateway would not be revealed in Trench A.1. Only a 2 x 5m probe area located in the western sector of Trench A.2 was excavated, because of the proximity of the well inside the fort. Excavation of Trench A.2 uncovered a small portal gate 0.79 m wide (**Fig. 4**). Similar portal gates have been revealed at Yotvata (Davies and Magness 2006, 2007, 2008) and Qaşr Bshir (Clark 1989), both of which are contemporary to the fort at Bir Madhkūr. Of interest is the fact that the portal gate at Bir Madhkūr opens directly onto the well outside the structure, which may be ancient but is still in use.

Ceramics uncovered from the excavations in Area A provide a tentative and relative dating for the occupation of the fort, although it should be stressed that most of the evidence is all extramural. The latest pottery recovered from Trench A.1 above the foundations dates from the ear-



4. Trench A.2. showing portal gate along north wall of the fort.

ly fifth century AD, while the majority of the sherds recovered date to the Early Byzantine period. A probe in Trench A.1 (**Fig. 3**) underneath the foundation level along the exterior curtain wall revealed all early (i.e. Nabataean and Early Roman) material; no coins were recovered. It would appear, then, at least from the limited exposure that was achieved, that the fort was built upon a fresh foundation, perhaps after any pre-existing Nabataean structure had been leveled and cleared away.

Area B

Several trenches were opened in Area B, the large (presumed) bath complex that is *ca.* 50m south-east of the fort, in order to provide evidence that the complex is indeed a Roman bath, as suggested by the presence of a substantial ash deposit south of the structure and numerous hypocaust bricks littering the surface of the area. The key objective was to locate identifiable features related to the bath suites, as well as to clarify the architectural relationship between the proposed bath and the attached structure to the north, which may be a caravanserai. The most readily identifiable rooms of the bath, presumably, would be those of the heated sections of the structure: the *praefurnium*, *caldarium* and *tepidarium*. It was hypothesized that the location of the *praefurnium*, or that of the *caldarium*, would be to the south of the complex, based on the presence of the ash deposit and the hypocaust brick fragments that litter the surface. Trench B.1 (5 x 5m) was thus opened in the south-west corner of the complex, and B.2 (5 x 5m) and B.3 (5 x 5m) were subsequently opened in adjacent areas.

Trench B.1 uncovered two rooms along the primary western wall of the complex, the south-west corner room and the north room (**Fig. 5**), which were separated by an east-west cross-wall. Excavation within the south-west corner room produced no identifiable architectural features related to the bath-suites. For example, no direct evidence for the hypocaust system or *praefurnium* was found, other than secondary deposits of various hypocaust tiles and *tubuli*. Rather, the archaeological evidence gathered from this room suggests successive phases of occupation / use that would be expected from a living quarter. Unfortunately, the function of the



5. Overview of Trench B.1.

south-west corner room with respect to the overall complex remains unclear. The north room uncovered in Trench B.1, on the other hand, revealed significant architectural features that can plausibly be associated with a bath complex. A small plastered stone wall, for example, was found running parallel to the large, exterior walls of the room from which it was separated by a channel, which would suggest some sort of hydraulic function for the room (**Fig. 6**). The floor of the room, built directly atop a sterile layer of alluvial fill, was also plastered. It may be that this room functioned as a latrine, although this interpretation is tentative. There is a possible parallel at 'En Hazeva across Wādi 'Arabah to the north-west (see Hoss 2005, Cat. #59). Pottery from Trench B.1 was mostly Roman and Byzantine.

Trench B.2 was partially excavated to find some relation between the features of the presumed bath complex with the larger, attached structure to the north: the possible caravanserai. A doorway was uncovered that opens to the west. How this area and corridor relates to the



6. Trench B.1 showing the apparent latrine installation.

areas excavated to the south-west remain to be determined, as does any relationship with the structure to the north. Most of the pottery from this trench dates to the Roman and Byzantine periods, most of which is African Red Slip ware (Hayes form 67).

Trench B.3 was opened immediately to the north of Trench B.1, and excavations focused on a 2.5 x 2.5 m probe along the east edge of the trench. The probe revealed the remains of either another room or perhaps a corridor extending to the east in the area of Trench B.2. Material from the probe included a one coin and a significant amount of ceramic material, the latest of which dates to the Late Roman / Early Byzantine period; this included Egyptian Nile mud ware and African Red Slip wares. At the bottom of the probe was a poorly preserved remnant of a stone floor surface that seems once to have extended across the entire 2.5 x 2.5m excavation area. Pottery from beneath suggests a late third to early fourth century AD date for its installation.

Based on a preliminary analysis of the data from the area excavated, it appears that the structure does indeed represent a bath complex. Although none of the bath suites themselves were uncovered, the discovery of numerous hypocaust brick fragments and *tubuli*, as well as water pipe fragments, during the course of excavation provides indirect evidence for the presence of a bath. Also, the discovery of a possible latrine, a typical feature of Roman baths, provides further support for a bath being located nearby. Moreover, the construction of the bath complex appears contemporary with that of the fort, because there was no evidence for any earlier, underlying structures. The earlier materials in and around the complex are therefore probably residual and the earlier settlement awaits discovery.

Area D

Area D demarcates the large rectangular structure just south of the fort (Area A) and west of the bath complex (Area B). On the basis of remains visible on the surface, the building appears to be divided into four or six large rooms and measures 18 x 10m. There is a two course wide, north-south, central wall, constructed of roughly cut stone 0.80 m thick, as well as what

appears to be smaller dividing walls aligned east-west. There is no obvious entrance to the structure, although it may be along the west wall.

Four 5 x 5m trenches (D.1 - 4) were opened in Area D in order to ascertain the date and function of the structure in relation to the main features of the site. The excavation focused on uncovering the rooms along the south side. Two distinct rooms were identified, referred to here as the south-west and south-east rooms.

Finds from the south-west room included two intact pottery vessels, a cooking pot and a small bowl with a string-cut base, which were unearthed in Trench D.2. These have been dated to the Early Byzantine period. Trench D.2 itself was excavated down to a beaten earth floor; the soil layers removed included a significant number of ash deposits. Finds from the south-east room included an intact Byzantine lamp, numerous lamp fragments, and pottery and amphora fragments; the latter included Egyptian Nile mud ware and African Red Slip wares. Accordingly, the material culture recovered from the trenches (D.1 - 4) that spanned the south-east and south-west rooms of the structure, though not abundant, is sufficient to suggest that the structure may have served some function related to trade and communication. Also, it seems that the structure is contemporary with the occupation of the fort.

Area H

Two 5 x 5 m trenches (H.1 - 2) were opened in Area H, a farmhouse (9.70 m N - S x 4.70 m E - W) in the agricultural area west of Bir Madhkūr (**Fig. 7**). The goal of the excavation



7. Overview of the farmhouse (Area H) with Trench H.1 in the foreground.

was to recover material evidence to determine the function of the structure (that is, to ascertain for certain that this structure was indeed a farmhouse), as well as to uncover evidence that might permit a better understanding of agricultural activities in the area.

Before opening Trench H.1, an interior wall dividing the room was clearly visible, so the excavation was targeted to illuminate the function of the interior rooms in relation to the entire structure. Most of the fill inside the room from Trench H.1 consisted of stone tumble and accumulated sediments, and probably represents a single phase of abandonment and alluvial deposition. Also, there was very little material culture recovered in any of the soil layers. After thorough sifting, small quantities of pottery, including some amphora fragments, and few metal fragments were uncovered. Several of the soil layers, however, did produce ash and charcoal, in addition to plaster flecks. Of particular interest is the door blockage that was revealed in east wall, where a re-used Nabataean block was found in the northern wall of the door (**Fig. 8**). There were also small indications of plaster flecks in the soil of the door blockage. Based on the evidence from Trench H.1, it remains unclear exactly what the function of the room was, although the finds seem to suggest that the room served perhaps as a storage area.

Because the material culture from Trench H.1 was inconclusive with respect to confirming the function of the structure as a farmhouse, Trench H.2 was opened in the room to the north with a 3.5 x 1.5m probe along the east wall. The soil matrix from the probe in Trench H.2 was similar to that of Trench H.1 to the south. From



8. Entrance into the south room of the farmhouse — note the re-used Nabataean block on the left side of the entrance.

the probe, two intact pottery vessels, a mortar fragment and a pestle were recovered in a soil locus overlying the remnants of a plaster floor (Fig. 9). This evidence, in addition to ephemeral traces of a threshing floor discovered to the north-east of Area H, provides strong support for the function of the structure in Area H as a farmhouse. The earliest phase of occupation of the farmhouse most likely dates to the Late Roman or Byzantine period, based on the dates of the intact vessels that were found just above the floor level in Trench H.2.

Khirbat Umm Qanṭara

Khirbat Umm Qanṭara is a caravanserai along an ancient route that crossed Wādī ‘Arabah (Smith 2005a). The main structure measures 22m NW x 30m SE. Its walls are two courses wide (0.52 m), with rubble fill. One inner room, 4 m wide, is set along the north-west side of the structure. The gate into the structure is located along the south-east wall. Its entrance is 3 m wide and there are small rooms on either side of the entrance. Just to the south is a large ash mound, which may be evidence of a dump, and east of the caravanserai is a small well or cistern (ca. 5 x 5m) fed by a water channel constructed of cut, limestone blocks. Pottery from the site dates primarily to the Early Roman / Nabataean period, with some Late Roman period sherds.

A 2.5 x 2m probe was opened at Khirbat Umm Qanṭara to examine the ancient cistern (Fig. 10). The main goal was expose the floor of the cistern in order to ascertain its depth, which in turn would allow the volume to be calculated. The probe was opened in the south-east corner of the cistern, where a water channel approaches the cistern from the north-east and connects to

what appear to be steps. The probe also touched upon a robber pit that had been excavated into the cistern to a depth of 0.67 m; backfill from this pit formed a mound in the north-west corner of the probe. Unfortunately, although work within the cistern progressed for two days, the excavation was cut short by the Jordanian military. This happened at the end of the second day of full excavation, although we had secured all of the necessary permissions to work there. In the end, we were unable to reach the floor of the cistern, although some of the architecture was exposed on the surface. We can, therefore, calculate a minimum capacity for the cistern. Because we excavated down to a depth of 1.59 meters, we can conclude that the water capacity of the cistern was at least forty cubic meters.

Khirbat Sufaysif

Khirbat Sufaysif is a caravanserai just east of Jabal at-Ṭayyiba (Smith 2005a). The main structure measures 21m NS x 26m EW. Several robber pits have been excavated sporadically around the site, and its eastern side has eroded into a shallow *wadi* (in fact, several meters of the alluvial fan have been removed). The walls of the structure are constructed of cut limestone blocks, set two courses (0.46 m) wide with rubble fill. There are inner rooms surrounding an open courtyard. Beyond the north wall there is a thick ash mound. Also, there are other outlying structures visible in the area beyond the fort. Pottery collected at Khirbat Sufaysif is predominantly Nabataean and Early Roman, with some Late Roman pottery as well. The site was clearly significant as a way-station in the region.

No trenches were opened at Khirbat Sufaysif, but the site was revisited in order to as-



9. Trench H.2 showing two intact vessels discovered in situ.



10. Buried reservoir at Khirbat Umm Qanṭara.

sess the damage caused by the ongoing erosion and to monitor robber activity, which has increased. The project began mapping the site, which should provide an important benchmark for assessing how the site's condition evolves. In future seasons, the project hopes to return to Khirbat Sufaysif to begin excavation and conservation of the damaged areas of the site.

The Central 'Arabah Archaeological Survey

The focus of the 2008 season was on the excavations at Bir Madhkūr, so no intensive survey was conducted of the central 'Arabah with the intent of documenting new sites; this will be the focus of the 2009 field season. The survey, however, did begin intensive mapping of the agricultural systems to the west of Bir Madhkūr in the vicinity of Area H. This involved detailed mapping of the terraces, field walls and other agricultural installations.

Conclusions

Much analysis remains to be done of the finds from the 2008 season of the project, but some preliminary observations can be made about the history of Bir Madhkūr in light of the current evidence. First of all, there is substantial evidence of regional activity in the Nabataean and Early Roman periods, for the most part relating to trade and communication. Khirbat Sufaysif and Khirbat Umm Qanṭara, for example, both lay on an important route across the Wādī 'Arabah, most likely the famed Incense Road itself. There is also substantial evidence (mainly pottery) from the Nabataean and Early Roman periods at Bir Madhkūr, but the early settlement itself was not revealed in any of the excavation trenches.

The Late Roman period is one of increased activity at Bir Madhkūr, as the importation in the third century of some African Red Slip wares and amphorae would seem to attest. Regionally, most of the agricultural activity appears to be Late Roman in date, with evidence of continuity into the Early Byzantine period. This includes the occupation of the farmhouse (Area H). Further investigation of the agricultural systems in the area, however, in addition to examining other regional farmhouses, is necessary to learn about how these systems were utilized and what sort of crops were being cultivated. It will also

be important to compare this activity with evidence from the Negev, where the date for intensive agricultural activity has been set much later (Avni 1996; Rubin 1996). It would also be important to investigate further the extent to which these agricultural systems, particularly the water harvesting techniques, compare with Nabataean practices as recorded elsewhere (Oleson 1995, 2001, 2003).

The fourth century clearly marks change in the nature of occupation at Bir Madhkūr, with the construction of the fort and the billeting there of what was probably a mounted cavalry unit (*cohors prima equitata*). What this represented was a rise in the regional significance of Bir Madhkūr as an administrative center, no doubt overseeing (perhaps even expanding upon) the vast agricultural systems in the central 'Arabah. In this same period, the bath complex itself was apparently constructed. Also, trade through the site did not stop, as the continued importation of African Red Slip wares attest, although traffic may have diminished somewhat. Of interest in this context is the apparent decline in activity at some of the regional caravanserais such as Khirbat Sufaysif and Khirbat Umm Qanṭara.

There is little evidence from the Late Byzantine or Islamic periods. Some Mamluk pottery was found on the surface near Area H, but it was clearly not associated with the farmhouse. Also, a small quantity of Late Byzantine pottery was recovered in each of the excavation areas (A, B and D) at the main site. Further investigation is needed to understand more fully the later stages of occupation at Bir Madhkūr.

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THE BROWN UNIVERSITY PETRA ARCHAEOLOGICAL PROJECT: REPORT ON THE 2009 EXPLORATION SEASON IN THE “UPPER MARKET”

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Introduction and Research Parameters

In summer 2009, the Joukowsky Institute for Archaeology and the Ancient World (JIAAW) at Brown University launched a new initiative, the Brown University Petra Archaeological Project (BUPAP). The project's initial season was undertaken in collaboration with the Brown University Petra Great Temple project.¹

The projected research goals of BUPAP are multiple in nature, but can be summarized by an emphasis on diachronic, integrated, and regional perspectives on Petra and its environs. The project intends to explore all phases of Petra's prehistory and history, with special attention to, the sometimes neglected, more recent eras. An integrated approach will ensure not only that individual sectors of the city are considered in connection with other zones, but also that the urban center be placed in a wider regional context of human settlement and movement. To that end, we hope to propose two closely related dimensions to BUPAP's work: regional survey in the Wādī as-Sulaysil to the city center's north (Petra Archaeology Wādī as-Sulaysil, or PAWS), and exploration of the area known in the city center as the “Upper Market” (Petra Upper Market Archaeology, or PUMA).

Our efforts in BUPAP's first season focused on the latter project, with fieldwork conducted in the “Upper Market” during an eight-day period in July 2009. This work involved the opening of a single test trench by the authors, with the assistance of several Bedouin workmen. The surveying was conducted by Fawaz Isaqat. The remainder of this article explains the choice of

the “Upper Market” as a focus for attention, and presents the results of this limited, but intriguing, campaign.

PUMA and the “Upper Market”

An elevated terrace extends along the south side of the colonnaded street in Petra, between the east end of the street and the “Temenos Gate” terminus to the west. Situated on this terrace, from east to west, are the areas known as the “Upper Market,” the “Middle Market,” the Garden and Pool Complex (formerly the “Lower Market”), and the Great Temple precinct (formerly the “Southern Temple”). The orientation for all of these areas aligns them on a perpendicular axis to the colonnaded street. The northern portion of this terrace is largely an artificial construction (Kanellopoulos 2002a: 304; Bedal 2003: 45; Joukowsky 2007).

The “Upper Market” (UM) is a fairly level area that forms an approximate square at the east end of this south terrace. The UM is bounded on the north by a large east-west retaining wall and a set of monumental stairs that once led to the colonnaded street. These stairs and several associated shops were excavated in 1997 as part of the American Center of Oriental Research (ACOR) “Roman Street Project” (RSP), under the direction of Zbigniew Fiema (Fiema 1998). It has also been proposed that a propylaeon existed at the top of these stairs, which gave entry into the UM from the contemporary colonnaded street; the remaining traces of this structure include the Ionic column base surmounted by several drums that can still be seen *in situ* in

1. The JIAAW would like to express its gratitude to Dr. Martha Sharp Joukowsky, the Brown University Petra Great Temple project director, and Dr. Fawwaz al-Khraysheh, Director-General of the Department of An-

tiquities, for allowing the PUMA project to commence through this collaboration. Future projects in the BUPAP initiative will be under the direction of Dr. Susan E. Alcock, Director of the JIAAW at Brown University.

the UM at the top of the stairs (Kanellopoulos 2002a: 299-301). The UM is bordered on its east and south sides by nearly vertical, rupestral walls quarried from bedrock outcrops.² During at least one phase of the UM's history, these cliffs were faced with a masonry wall that was approximately 11.5m in height (Kanellopoulos 2002a: 304); part of this wall remains standing at the west end of the south edge of the precinct. Both the nature and location of the west boundary for the UM remain uncertain; to the west of the UM lies the so-called "Middle Market", but the exact nature of the transition between these two areas remains at present unknown. Given the uncertainty regarding this west boundary, the area of the UM is currently estimated to be ca. 70m east-west by ca. 75m north-south (Kanellopoulos 2002a: 304).

The first literary description of what became known as the "Upper Market" appears to derive from a visit to Petra by the Stephen Olin party in early April 1840. The rarity of this source merits quoting the passage here in full:

"We pitched our tents on a level area, the largest, probably, in the ancient city, and elevated fifteen or twenty feet above the southern embankment of the river. It is situated in the angle of a perpendicular rock nearly twenty feet in height, which has been faced by art, so as to form, as far as it extends, two sides of a square" (Olin 1843, II: 17).

No further definite mentions of the UM area have yet been found in other 19th century travel accounts. The next reference appears in the foundational volumes by R. Brünnow and A. von Domaszewski recording their survey work in the region between 1897-1898. They do not provide any description or discussion of the UM, but one of the features they record on their plan appears to be the extant remnant of the facing wall, visible on the cliffs bordering the south edge of the area (Brünnow and von Domaszewski 1904, I: #411 *Bauwerk*: 317 and 320).

The next German exploration mission, led

by Walter Bachmann, Carl Watzinger, and Theodor Wiegand (in 1916-1917), was the first to scientifically record many of the remaining non-rupestral architectural features still visible in the ancient city center. It was this work that assigned names to the areas on the south terrace, including the "Upper Market". This mission provided the first measurements, plans, and architectural descriptions of both the UM and the RSP areas (Bachmann *et al.* 1921: 37-45), and these would remain essentially definitive in subsequent literature until the excavations led by Zbigniew Fiema (1998) and the architectural studies conducted by Chrysanthos Kanellopoulos (2001, 2002a).

The work of Kanellopoulos has produced the most data at present to inform us about the UM. His examinations of the architectural elements recovered from the RSP project, and those that remain *in situ* at the north edge of the UM, demonstrate a high probability for the existence of a propylaeon that was contemporary with the installation of the stairs and colonnaded street in the early second century AD (Kanellopoulos 2002a: 299-303). Kanellopoulos also found that the configuration of extant wall sections along the north side suggests that the propylaeon was flanked east and west by a small, contemporary, interior colonnade. In addition, he noted a row of beam sockets carved into the face of the rock wall along the east boundary, and suggested that these may have been intended to support roofing beams for another section of the interior colonnade. These two sources of evidence lead him to hypothesize the existence of a square colonnade inside the UM (**Fig. 1**),³ although direct evidence is lacking at present from the south and west sides (Kanellopoulos 2001: 19-22, 2002a: 303-306; Kanellopoulos and Akasheh 2001).

Despite the advances made by Kanellopoulos in furthering our architectural understanding of the UM, particularly during the period of annexation, many questions about this central area in the city center remain to be answered. Just a few

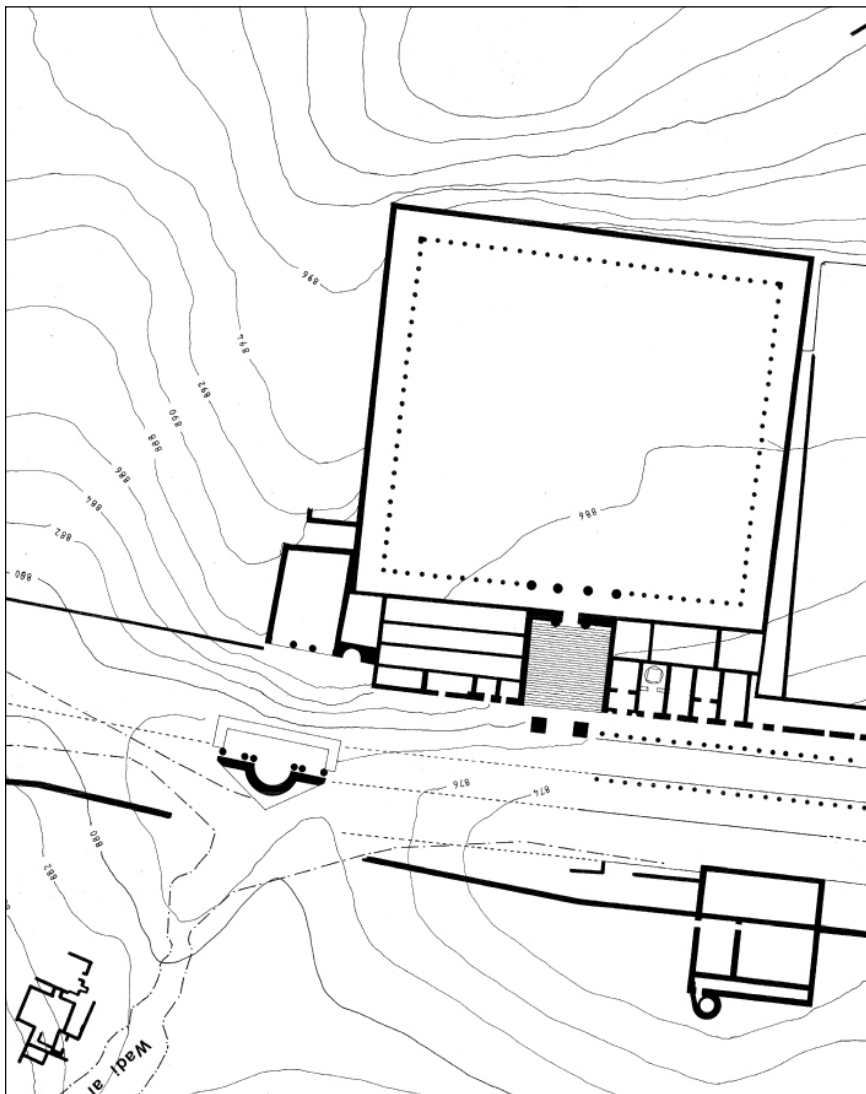
2. It has been suggested that the quarrying of these escarpments may have yielded some of the raw materials used for the constructions and modifications made in the city center during the second century AD. This may have included the creation or modification of the UM itself (Bedal 2001 and 2003; Kanellopoulos 2001 and 2002a). This is one of the many questions that the PUMA project hopes to help elucidate in future seasons.

3. Originally published in Kanellopoulos 2002a. The image is based on the survey data collected by the Petra Map Project, conducted jointly by the Hashemite University and the American Center of Oriental Research (ACOR), under the direction of Dr. Talal Akasheh. This is an enhanced detail from the Petra City Center map previously published in Kanellopoulos and Akasheh 2001 and Kanellopoulos 2002b.

of these questions include: Did the area exist during the period of the Nabataean kingdom? If so, how did its configuration differ from the hypothesized reconstruction for the annexation period? What features might the UM have housed and what purposes might the area have served during the Nabataean, Roman, and subsequent periods? And even more importantly, what was the relationship, if any, between the UM and the other structures/precincts on the artificial, elevated southern terrace? And how did the UM area relate to the more general surrounding city environs?⁴

The PUMA Project

Brown University's Petra "Upper Market" Archaeology (PUMA) Project was conceived as an attempt to try and answer some of the many questions that remain regarding this important area. The short 2009 field season was conducted in order to gather initial data for use in developing a research strategy for future seasons. The specific goals defined for the test trench were: (1) to determine the depth of soil deposits, (2) to see if a paved floor may have existed, (3) to explore the possibility for the existence of the hypothesized western colonnade, and (4) to try



1. A hypothetical reconstruction of the "Upper Market" showing the proposed upper tetrastyle of the propylaeon and interior colonnade. The bottom of the image is north (C. Kanellopoulos).

4. This question needs to be emphasized in particular due to the discovery by Kanellopoulos of a unifying characteristic for the constructions on the southern terrace and elsewhere in the city center. He has demonstrated that the Roman *pes* was the measuring unit employed

in the building of the UM staircase, propylaeon, and hypothesized interior colonnade, the Garden and Pool Complex, and the Great Temple, as well as the Small Temple and the later Petra Church (Kanellopoulos 2003).

and locate the west boundary of the precinct. We were also interested in the contemporary and ethnohistorical reuse of this particular part of the Petra city center. Observation of the area's taphonomy (notably a collection of small stone piles) suggested that it was used, in relatively recent times, for agricultural purposes; this was confirmed by members of the local community.

A single 5 x 5m exploratory trench was laid out in the theorized northwest corner of the UM, the surface elevation of which is approximately 906 masl at this point. The north edge of the trench bordered the interior face of the east-west wall that serves as the north border of the UM, which was interpreted by Kanellopoulos as possibly having supported a stylobate for columns in the proposed propylaeon (2002a: 304-306). The east edge was located 21.7m west of the Ionic base of the *in situ* propylaeon column at the top of the UM stairway. The west edge was defined by the interior face of a partially-visible, north-south wall that appeared to bond with the east-west wall of the north boundary to form a corner (**Fig. 2**). Surface finds were then collected and examined before commencing the excavation.

The trench was initially divided into two

north-south sections, and excavation began in the eastern half. All of the removed soil from this section was screened in an attempt to obtain an accurate sampling of the material culture extant in the topsoil deposit. The work was stopped in this half of the trench when remnants of extant floor pavers were uncovered. The west half of the trench was then excavated to the same level, with approximately one-fourth of the soil being screened to augment the sampling of artifacts recovered from the eastern half of the trench.

The depth of the trench varied, as the soil deposit had a gradual slope from south to north (approximately 0.37m at south to 0.04m at north). The removed soil derived from a single matrix. The deposit was tightly compacted and consisted of a mixture of granular sizes, including silt, sand, pebbles and cobble-sized stones. The soil had a generally fine texture and was fairly uniform in color (5 YR 6/3 Light Reddish Brown). The deposit appears to have been formed by a combination of aeolian and fluvial processes, which is consistent with other topsoil strata examined elsewhere on the southern terrace.

All of the extant floor pavers uncovered are broken. They are rectangular sandstone slabs,



2. Top Plan of the 2009 PUMA test trench (M.L. Berenfeld; T. Sandiford).

with average dimensions of .80 x .40 x .04m. Based on the arrangement of the two best-preserved examples in the trench (**Fig. 3**), it appears that the pavers were laid in a configuration of alternating squares consisting of four slabs each (2 lengthwise by 2 widthwise). As no traces of mortar bedding were detected, neither *in situ* nor in the overlying soil matrix, it would also appear that the floor was dry laid.

A second architectural feature uncovered in this season is a north-south wall extending along the west edge of the trench (**Fig. 4**). Excavation in the initial trench exposed a shallow portion of the east face of this wall and demonstrated that it bonds with the east-west wall along the north edge of the UM. In order to determine the dimensions of the wall, the test trench was extended an additional 2.5m to the west. This uncovered the complete top surface along a 5m stretch of the north-south wall. The exposed portion of the wall was built using hewn, undressed sandstone blocks of various sizes. The wall appears to have been built using a casemate-like construction technique. The outer faces (E and W) were laid using an irregular header-stretcher arrangement, and the center was then filled using a mixture of rubble and some placed, hewn blocks. The width of the top surface of the wall is almost exactly 1m. The preserved height of the wall was not determined during the short field season, but this will be investigated by future excavations.

A shallow sondage was excavated in the trench extension to the west of the north-south wall, opposite where it bonds to the east-west wall along the north edge. This work confirmed

that the two walls bond at this point, and provided information about the apparent construction technique employed in constructing the north-south wall. This season's excavations did not reveal information to confirm that this wall served as either the west boundary of the UM precinct or for the west portion of the hypothesized interior colonnade. Of particular interest was the fact that the soil matrix in the sondage was notably different from the topsoil removed from the initial trench, east of the north-south wall. The soil fill in the probe lay in the range of 5YR 6/6–6/8 (Reddish Yellow), consisted primarily of silt and sand granular sizes, and was noticeably less compacted.

Also of interest is the fact that the probe (unlike our initial test trench) yielded no material culture, with the exception of a single pottery sherd (**Fig. 5**). Deriving from the rim of a vessel, the sherd is made of a Pinkish White fabric (10YR 8/2). The rim has three irregularly-spaced, impressed notches preserved along the top surface, which are most evident when



3. Shattered sandstone floor pavers found in situ (I.B. Straughn).



4. Top surface of the north-south wall (I.B. Straughn).



5. Unusual rim sherd with hand-made "rouletted" pattern (I.B. Straughn).

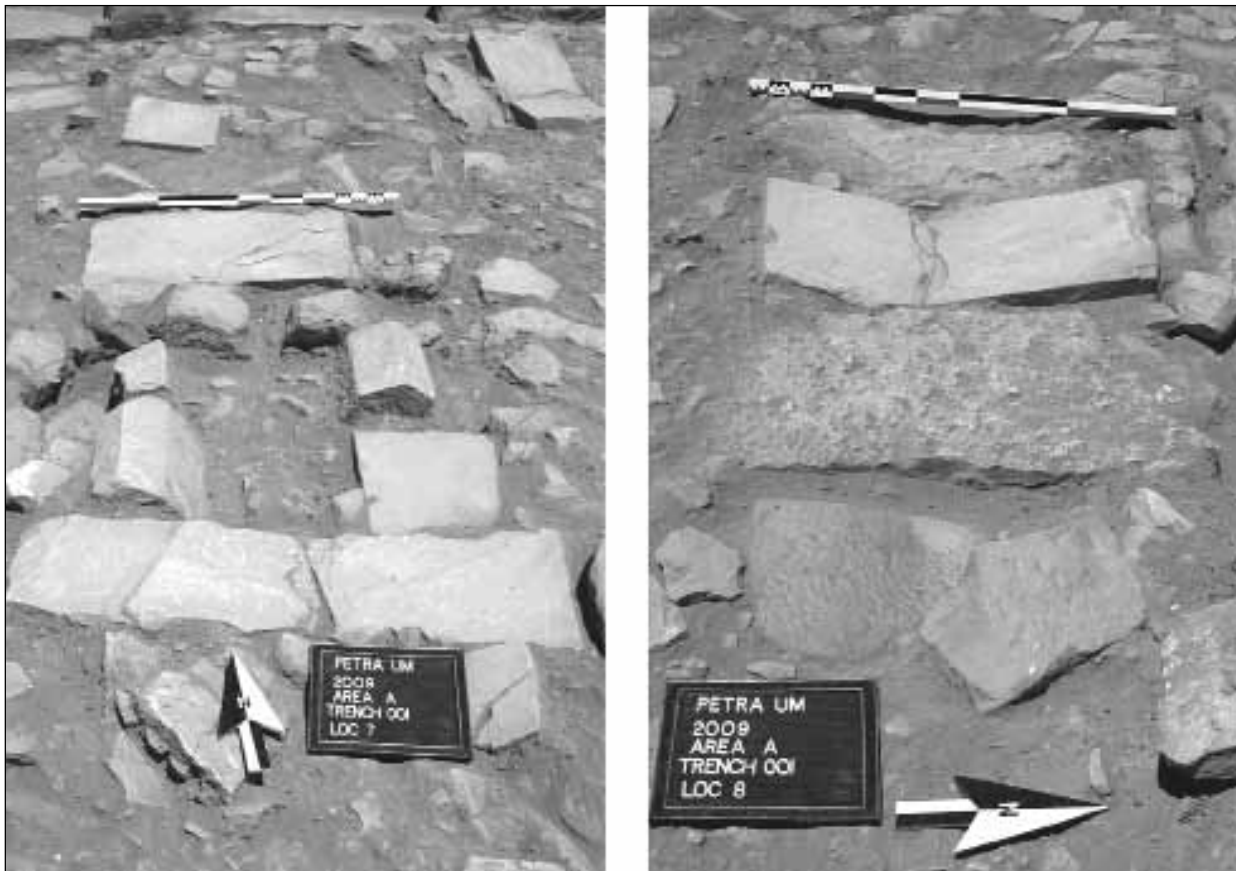
viewed from the interior side. The exterior of the vessel is decorated with hand-made incisions that appear to imitate a roulette pattern; the pattern consists of a series of diagonal lines which are sectioned into four registers by five horizontal incisions. Indications of directionality in the diagonal lines suggest they were made with downward strokes while the vessel was stationary; in contrast, the evenness and regularity

of the horizontal incisions seems to indicate that these were made as the vessel was turned on a wheel. At present the sherd has not been identified and no parallels have yet been found.

During the final stages of cleaning and documentation, some patterning was discerned amongst the stones embedded in the trench. These features have been tentatively identified as possible burials that were inserted into the UM area at a later period (**Fig. 6**). The apparent use of covering slabs (and possibly constructed cists) for the potential burials appears to present an initial similarity to those found in Byzantine cemeteries elsewhere in Jordan (Humbert and Desreumaux 1998: 259 ff.) This possibility will be investigated with the assistance of a physical anthropologist during our projected next season.

Artifactual Material

The surface collection, excavation, and screening of the topsoil deposit yielded a range of material culture remains. In addition to the artifacts presented in this preliminary report, small

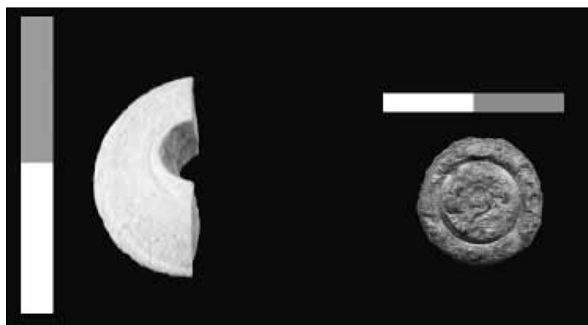


6. The two possible burials found in the UM test trench (I.B. Straughn).

quantities of metal, bone, shell, stone, glass and stucco were also collected; these materials have not yet been examined by specialists and no preliminary discussion can be presented at this time. A number of the special finds recovered during this season, however, can and should be commented upon. Two of these objects are shown here (**Fig. 7**): half of a disk-shaped bead made of an unidentified bluish material that was found during screening, and the decorated head of a copper alloy fixture, which was excavated in proximity to one of the possible burials. Two fragments of coroplastic objects were also discovered in the screening: a fragment from an animal figurine that shows a section of harnessing and an ibex horn, which could derive from either a figurine or a zoomorphic vessel (Tuttle 2009).

A significant number of roof tile fragments were also recovered, most of which were plain and unremarkable. A few of the tile fragments, however, are particularly notable: two of the tiles show swipes, which may have been made by fingers during the molding process and one has a large lump of mortar adhering to its underside. Little can be said about roof tiles from Petra at present, as no systematic and comprehensive study of their typology or chronology has yet been undertaken (Warry 2006).

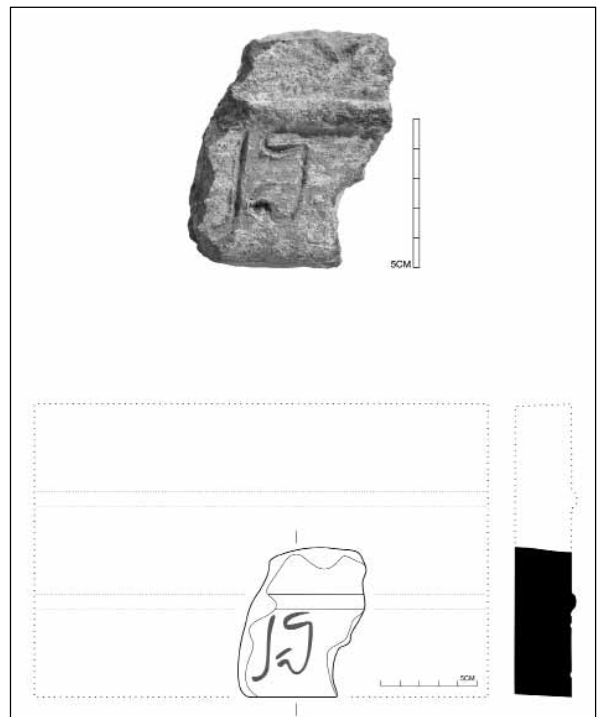
One of the roof tiles, recovered from the screening process, represents a rare find in Petra. This fragment preserves two letters of a Nabataean inscription (**Fig. 8**). Initially thought by the excavation team to be unique, we now



7. Blue bead (I.B. Straughn) and copper alloy fixture head (C.A. Tuttle).

know that at least two unpublished Nabataean-inscribed roof tiles were previously recovered in the excavation of the Temple of the Winged Lions.⁵ The PUMA roof tile was briefly examined by Dr. Fawzi Zayadine during the preparation of this preliminary report. He has identified the two letters (from right to left) as a *mim* (two strokes) and a *lām*, and suggests that they may represent part of the word *malik*, or 'king'. If this is the case, it is possible that this roof tile was produced for use on a structure that was specific to the monarchy, and that the word *malik* was inscribed as a tallying device. It is also possible that the word may have been part of a phrase (e.g., *mālik* [name]) or even a specific name (e.g., Malichus?). At the moment, however, all of these interpretations must remain speculative. An effort is underway to locate the unpublished Winged Lions roof tiles so that all three artifacts can be properly studied by epigraphers.

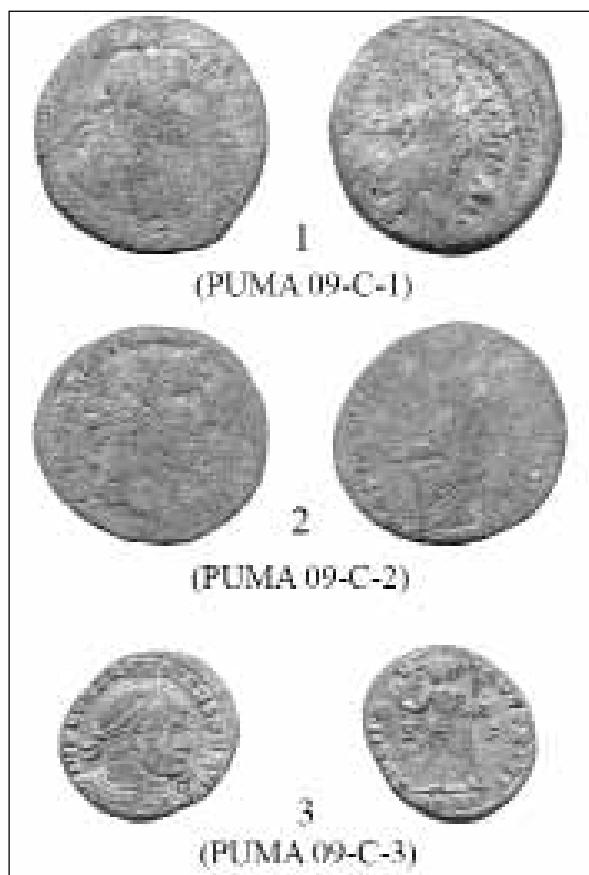
Three coins were retrieved from the screening of the excavated soils (**Fig. 9**). All of the



8. Inscribed roof tile: the reconstructed size of the tile is hypothetical (Q. Tweissi).

5. This discovery was made by Tali Erickson-Gini and Christopher A. Tuttle during their recent review of the artifact registries from the excavation archives of the American Expedition to Petra (AEP) directed by the late Dr. Philip C. Hammond. The work on the AEP ar-

chives is part of the Petra Temple of the Winged Lions Cultural Resource Management Initiative, a joint project of the Department of Antiquities of Jordan and the American Center of Oriental Research.



9. Coins from the 2009 PUMA trench (C.A. Tuttle).

coins were cleaned in a laboratory and then scans of them were read by a specialist.⁶ The first two coins (**Fig. 9: 1-2**) are issues minted at Petra that probably depict the emperor Hadrian on the obverse (Spijkerman 1978: 220–21, No. 4). The third coin (**Fig. 9: 3**) is an issue depicting Constantine I that was minted at Arles early in 316AD (RIC 7: 241, No. 89).

A substantial amount of pottery was recovered from the excavation. The post-season analysis of the sherds was undertaken by Dr. Tali Erickson-Gini. She reports the following information about the most significant, diagnostic forms:

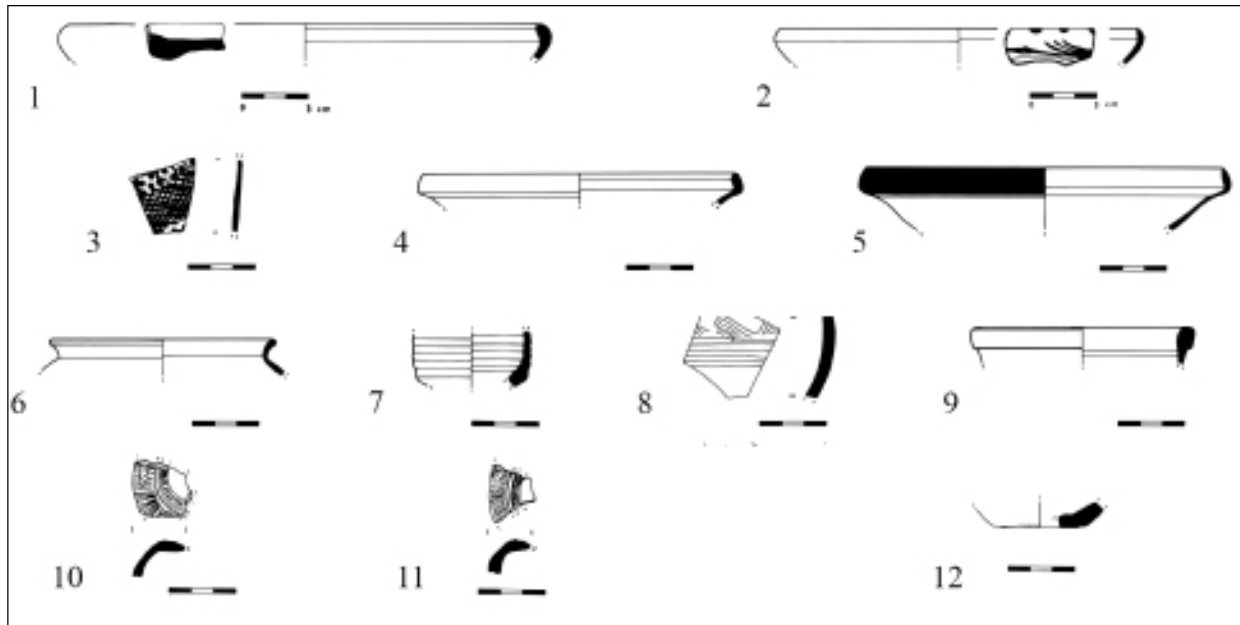
The ceramics appear to be a mixture of sherds of various dates: the larger part of the assemblage can be described as Late Roman,

from the second–third centuries AD (**Fig. 11: 1-16**), a smaller portion can be dated to the first century AD and particularly the late first and early second centuries AD (**Fig. 10: 2-12**). The assemblage also contains one Hellenistic bowl sherd (**Fig. 10: 1**), an Early Byzantine jar (**Fig. 12: 1**), and a few fragments of Early Byzantine moulded oil lamps (**Fig. 12: 2-6**). Judging by the fabrics and surface treatment, nearly all the vessels and objects in the assemblage appear to have been produced in Petra itself. A few miscellaneous objects of an undetermined date include two vessels probably used as planting pots (*ollae peroratae*) (**Fig. 13: 1-2**), part of a figurine (**Fig. 13: 3**) and a piece of a roof tile (**Fig. 13: 4**).

The ceramic vessels and objects presented here are classed in four categories: Hellenistic and Early Roman (i.e., pre-annexation), Late Roman (i.e., post-annexation through the third century AD), Early Byzantine (fourth century AD and particularly 363AD), and an undetermined date (i.e., possibly from the first through fourth centuries AD). Generally, it is difficult and probably unrealistic to assign a precise date for most of the vessels and objects; some that appear toward the end of the first century AD probably continue to some extent into the first half of the second century AD. A strong argument can be made for the occurrence of a destructive earthquake in the years before the Roman annexation of Nabataea in 106AD.⁷ Multiple lines of evidence of this event have been discovered in Petra and surrounding region, the ‘Arabah and the Negev (Erickson-Gini 2010: 47). In all probability, the event damaged monumental structures in Petra, prompting the apparent renovations that took place during in the early second century in the immediate area of the Upper Market (Fiema 1998; Kanellopoulos 2001 and 2002a), in the Garden Pool Complex (Phase II) and the Great Temple (Bedal 2001: 39; Joukowsky 2007). The earthquake was apparently responsible for the disruption of the well-documented pottery sequence discovered in the az-

6. We would like to thank Naif Zaban and the ACOR Conservation Cooperative for cleaning the coins, and Donald T. Ariel for reading the scans and providing the citations for parallels. The minting of these coins at Petra is certain, but the identification of Hadrian is somewhat tentative, given that the coins were not read

firsthand.
7. Compare Russell 1985, who lists a posited earthquake for the period “110-115AD” Data gathered by various projects undertaken since the appearance of this article may now suggest that this proposed tectonic event occurred as early as 98AD.



10. Vessels of the Hellenistic and Early Roman Period (M. Qassem).

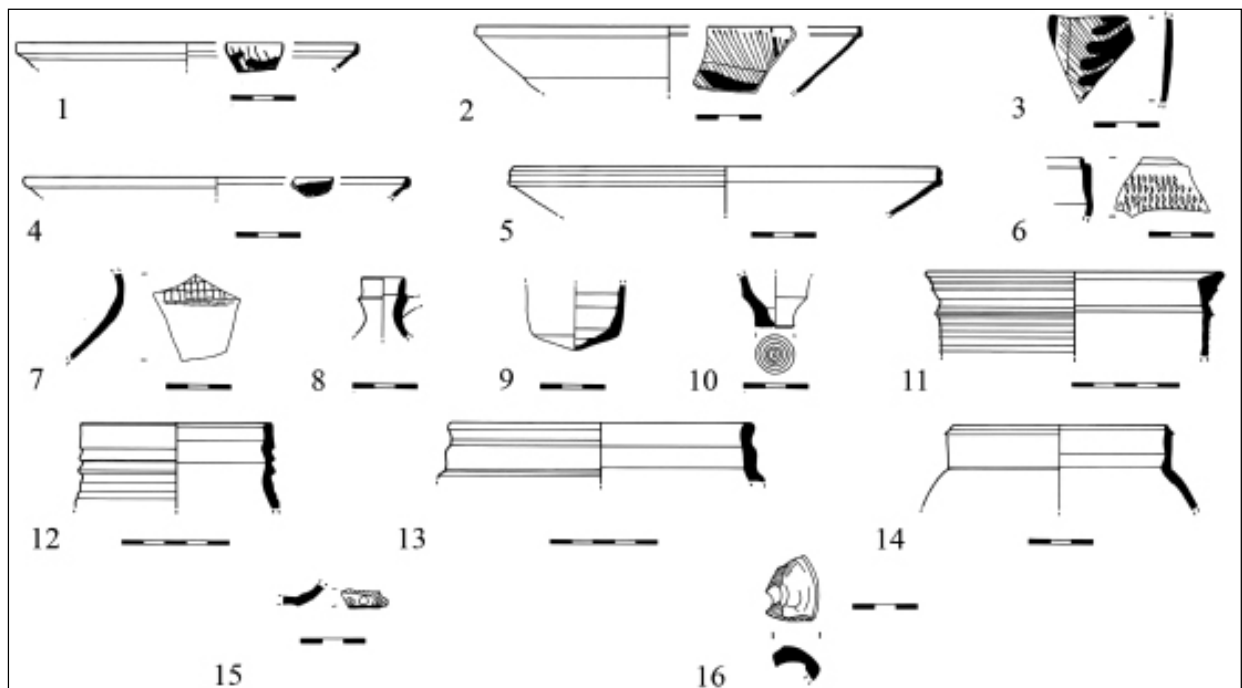
Zanṭūr area at Petra (Stucky *et al.* 1994: 284). However, more detailed research is required in order to determine whether particular types of vessels went out of production at this time or if they continued a few more decades into the first half of the second century AD. Preliminary research suggests the latter possibility. The assemblage from the 2009 excavation of the Upper Market has been evaluated using parallels from recent publications of Late Roman assemblages from the Negev, which were discovered in contexts dating later in the second century and early third century AD. Comparable vessels discovered in Petra have often been dated closer to the start of the second century AD due to the ambiguity resulting from the apparent natural disaster referred to above.

Of the vessels categorized as Late Roman, a number of particularly important diagnostic vessels deserve special mention. These include a type of large, globular jug with a distinctive ledge-rim, wide neck and wide, combed handle (Fig. 11: 11) and a type of elongated unguentarium with smooth sides (Fig. 11: 8). The ledge-rim, globular jug has been found in association with assemblages dated to the later second and early third centuries AD, particularly in contexts that suggest a sudden abandonment that could be the result of the spread of an epidemic sometime in the first half of the third century.

The elongated unguentarium regularly appears in contexts dated to the first half of the second century AD.

The presence of planting pots (*ollae perforatae*) matches their appearance in assemblages uncovered further west in the Petra Garden Pool Complex and the Great Temple. A pot with a perforated wall (Fig. 13: 2) corresponds to Macaulay-Lewis' Type B, which was found in the nearby excavation of the Garden Pool Complex. No precise date can yet be assigned to these vessels but on the basis of architectural parallels, the Garden Pool Complex probably dates to the Early Roman period, that is the last half of the first century BC and the first century AD (Macaulay-Lewis 2006: 164). The use of similar planting pots is indicated in the peristyle garden of Herod's palace at Jericho (Gleason 1993: 159-161). A second type of vessel in the PUMA assemblage that may have been used as a planting pot (Fig. 13: 1), has a perforated base comparable to a number of such vessels discovered in later contexts in the Great Temple; however, a similar example was also found in the Garden Pool Complex (Macaulay-Lewis 2006: 163).

Fragments of oil lamps from all three periods were discovered. These include the ubiquitous Nabataean radial oil lamp, corresponding to Grawehr's Type Negev E.1 (Fig. 10: 10-12), which he dates to the first century AD (although



11. Vessels of the Late Roman Period (M. Qassem).

this type may extend into the second century AD), small fragments of Late Roman types (Fig. 11: 15-16) and several sherds of the ubiquitous Early Byzantine lamp (Grawehr's Type L) with raised radial lines and a knobbed handle set in a square frame (Fig. 12: 2-6). The Early Byzantine radial lamp is a primary diagnostic vessel associated with destruction layers of the well-documented 363AD earthquake.

In conclusion, it can be observed that the 2009 excavation in the area of the Petra Upper Market produced ceramic sherds dating primarily to the first through third centuries AD. The paucity of later material (with the exception of parts of Early Byzantine oil lamps generally found in assemblages sealed in earthquake debris from 363AD), suggests that the area may have had limited use after the Roman period. It is difficult to determine the nature of the earlier deposits until further work is carried out in the Upper Market area. The presence of planting pots might suggest some form of continuity with the function of the Garden Pool Complex area. Bedal's excavations in the Garden Pool Complex have revealed that its structures were renovated and continued to function in the post-annexation era (Bedal 2001: 39). A similar pattern of construction, renovation and continuity

in the Late Roman period in the Upper Market area may be revealed in future excavations. The substantial number of sherds of the Late Roman period in the 2009 excavations may have been deposited during the latest occupation of the area. This supposition is supported by the coins recovered in the same locus, which date primarily to the Late Roman period. While one coin of the fourth century AD was uncovered, no Nabataean coins from the pre-annexation period were found in the deposit.

Descriptions of Pottery

Hellenistic and Early Roman (Fig. 10)

1. PUM.09-2/9 Incurved bowl, red 2.5YR5/8, surface: traces of dark reddish gray slip on exterior rim 5YR4/2; comparisons: Hellenistic period – Moyat 'Awad (Erickson-Gini, f.c., Fig. 3.2: 7-8, az-Zanṭūr, Gruppe 2 (Schmid 2000: Abb. 20).
2. PUM.09-2/2 NPFW bowl, red 2.5YR6/8, red deco 2.5YR 4/8; comparisons: az-Zanṭūr, Schmid's 2b (Schmid 2000: Abb. 84-85); PNR Tomb 1 (Bikai and Perry 2001: Fig. 4:1).
3. PUM.09-2/1 NPFW bowl, red 2.5YR6/8, red deco 2.5YR4/8; comparisons: az-Zanṭūr, Schmid's 3a (Schmid 2000: Abb. 89); PNR

- Tomb 1 (Bikai and Perry 2001: Fig. 4:2, 5-6); Masada, Camp F (Magness 2002: Fig. 12.1).
4. PUM.09-2/6 bowl, red 2.5YR5/8, minute white inclusions; comparisons: Early and Late Roman periods – az-Zantūr, Schmid's Gruppe 6 (Schmid 2000: Abb. 48), Oboda (Erickson-Gini 2010: Fig. 2:15); Mampsis (Negev and Sivan 1977: Fig. 8:53).
 5. PUM.09-3/5 bowl, red 2.5YR5/8, minute white inclusions, surface: light brown slip on exterior rim 7.5YR6/3; comparisons: Early and Late Roman periods, az-Zantūr (Schmid 2000: Abb. 52), Oboda (Erickson-Gini 2010: Fig. 2:16).
 6. PUM.09-2/8 unguentarium, yellowish red 5YR5/8; comparisons: Petra, Johnson's Form V (Johnson 1990: Fig. 2:V); (AEP 1974: No.70; Area II.2, SU 91).
 7. PUM.09-2/4 small jar, red 2.5YR6/8, surface: pink slip 5YR8/4; comparisons: az-Zantūr (Schmid 2000: Abb. 251), adh-Dhariḥ (Villeneuve 1990: Pl. II:2).
 8. PUM.09-3/2 strainer jar, light brown 7.5YR6/4, surface: pale yellow slip 2.5Y8/3 with brown discolorations; comparisons: Early Roman period into second century AD – adh-Dhariḥ (Villeneuve 1990: Pl. VIII:2).
 9. PUM.09-2/5 ESA jug, light red 10R6/6, surface: matte red burnish 10R4/6; Hayes ESA Form 104a (Hayes 1985: Tav. IX: 5).
 10. PUM.09-B2 lamp, strong brown 7.5YR4/6; comparisons: az-Zantūr, Grawehr's Type E.1 (Grawehr 2006: 298-304), adh-Dhariḥ (Villeneuve 1990: Pl. VIII:4).
 11. PUM.09-4/6 lamp, pinkish gray 5YR6/2; comparisons: same as above.
 12. PUM.09-4/1 lamp base, reddish brown 5YR6/4, minute white inclusions and possible traces of a potter's mark; comparisons: az-Zantūr, Grawehr's Type E.1 (Grawehr 2006: 298, nos. 142, 144).
- Late Roman (Fig. 11)**
1. PUM.09-4/4 NPFW bowl, red 2.5YR5/8, dark red deco 2.5YR3/6; comparisons: Early and Late Roman periods - az-Zantūr, Schmid's Dekorgruppe 3b (Schmid 2000: Abb. 91); Oboda (Erickson-Gini 2010: Fig. 2:2).
 2. PUM.09-1/9 NPFW bowl, red 2.5YR5/8, dark red deco 2.5YR3/6; comparisons: same as above.
 3. PUM.09-1/10 NPFW bowl, light red 2.5YR6/8; red deco 2.5YR3/6; comparisons: same as above.
 4. PUM.09-4/3 NPFW bowl, red 2.5YR6/8, dark reddish gray deco 5YR4/2; comparisons: Oboda (Erickson-Gini 2010: Fig. 2:1), az-Zantūr, Schmid's Dekorgruppe 3c (Abb. 93); PNR Tomb 2 (Bikai and Perry 2001: Fig. 9: 4-6); adh-Dhariḥ (Villeneuve 1990: Pl. III.3).
 5. PUM.09-4/2 bowl, red 2.5YR5/8, occasional small white inclusions; comparisons: Moyat 'Awad (Erickson-Gini f.c., Fig. 3.12:4); az-Zantūr, Schmid's Gruppe 7 (Schmid 2000 Abb. 54-56); Sbaita – Shivta (Crowfoot 1936: Pl. III: 2); Mampsis (Erickson-Gini 1999: Fig. 2.1.2-5); PNR Tomb 2 (Bikai and Perry 2001: Fig. 9: 4-6).
 6. PUM.09-1/13 rouletted ware bowl, red 2.5YR5/8; comparisons: Oboda (Erickson-Gini 2010: Fig. 2:10) az-Zantūr, Schmid's Gruppe 9 (Schmid 2000: Abb 61-65); PNR Tomb 2 (Bikai and Perry 2001: Fig. 8:1).
 7. PUM.09-1/12 rouletted ware bowl, red 2.5YR5/8; numerous white inclusions, surface: pink wash on rouletting 5YR7/3; comparisons: Moyat 'Awad (Erickson-Gini f.c., Fig. 3.13: 11).
 8. PUM.09-3/1 unguentarium, light brown core 7.5YR6/3, surface: yellowish red slip 5YR5/6; comparisons: Petra, Johnson's Type IX (Johnson 1990: Fig. 3:IX); (AEP 1974: no. 46; 1976: nos. 216-220); Mampsis (Erickson-Gini 2010: Fig. 2:37); adh-Dhariḥ (Villeneuve 1990: Pl. VIII:2).
 9. PUM.09-4/7 juglet, red 2.5YR5/8, surface: very pale brown slip 10YR8/2; comparisons: Early and Late Roman - Moyat 'Awad (Erickson-Gini f.c.: Fig. 3.18:6); az-Zantūr (Schmid 2000: Abb. 323-325); PNR Tomb 2 (Bikai and Perry 2001: Fig. 9:17).
 10. PUM.09-2/7 juglet or cup, pinkish gray core 7.5YR6/2, surface: light reddish brown exterior 5YR6/4, string cut base; comparisons: adh-Dhariḥ (Villeneuve 1990: Pl. II:3).
 11. PUM.09-1/1 ledge-rim globular jug, red 2.5YR5/8, surface: pale slip on exterior rim 2.5YR8/3; comparisons: Oboda (Erickson-Gini 2010: Fig. 2:43); PNR Tomb 2 (Bikai and Perry 2001: Fig. 8:14); adh-Dhariḥ (Vil-

leneuve 1990: Pl. VII:3).

12. PUM.09-1/3 ridged-neck storage jar, red 2.5YR5/8; numerous white and gray inclusions, surface: pale brown 10YR8/3; comparisons: Oboda (Erickson-Gini 2010: Fig. 2:52); al-‘Aqaba (Dolinka 2003: 128, nos. 20-21).
13. PUM.09-1/4 storage jar, yellowish red 5YR5/8, numerous white and dark gray inclusions, surface: reddish brown 5YR5/4; comparisons: Moyat ‘Awad (Erickson-Gini f.c. Figs. 3.25:9-10).
14. PUM.09-4/5 cooking or serving pot, red 2.5YR5/8, fine ware quality, surface: pink slip 5YR8/3; comparisons: Oboda (Erickson-Gini 2010: Fig. 2:60); az-Zanṭūr (Stucky *et al.* 1994: Fig. 16:B).
15. PUM.09-1/11 lamp, light reddish brown 5YR6/4, light brown core; comparisons: az-Zanṭūr, Grawehr’s J.2 Type 2, Variante g (Grawehr 2006: 327, no. 371) – (dated to 180-210/260AD)
16. PUM.09-1/6 lamp, red 2.5YR5/8, surface: worn dark slip 2.5YR4/8.

Early Byzantine Period (Fig. 12)

1. PUM.09-5/1 jar, yellowish red 5YR5/8, occasional small to medium white inclusions, charred inside and out; comparisons: az-Zurāba (‘Amr 2004: Fig. 2).
2. PUM.09-1/16 lamp, brown 7.5YR5/4; comparisons: az-Zanṭūr, Grawehr’s Type L (Grawehr 2006: 348, 518).

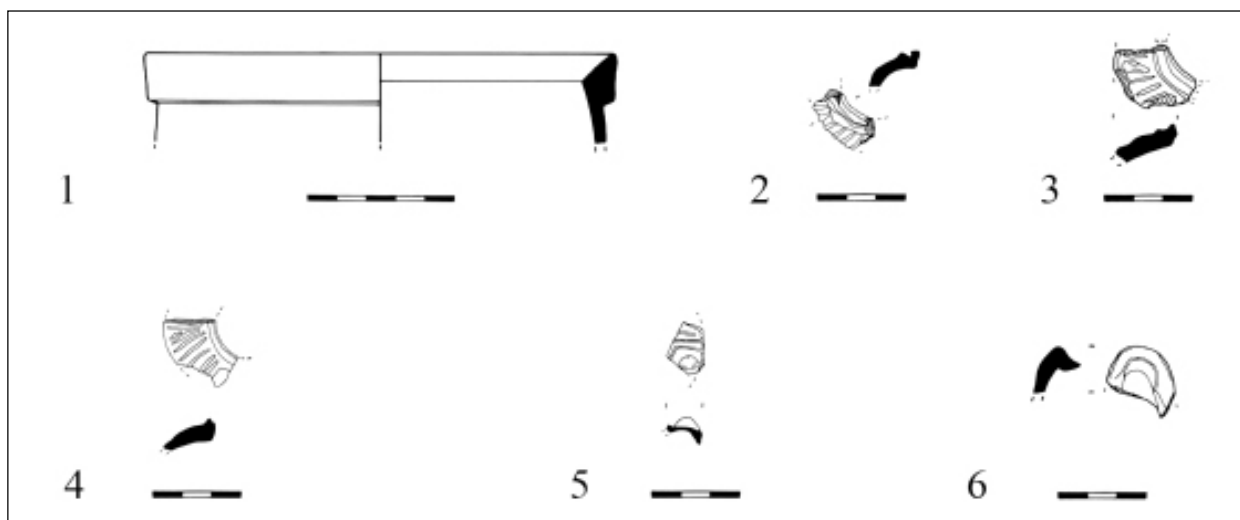
3. PUM.09-3/4 lamp, yellowish red 5YR5/6, occasional large white inclusions; comparisons: az-Zanṭūr, Grawehr’s Type L (Grawehr 2006: 343, no. 485).
4. PUM.09-1/15 lamp, reddish yellow 5YR6/6; comparisons: az-Zanṭūr, Grawehr’s Type L (Grawehr 2006: 384, no. 520).
5. PUM.09-1/14 lamp, grayish brown 10YR5/2; comparisons: same as above.
6. PUM.09-3/3 lamp nozzle, brown 7.5YR4/4, traces of black soot; comparisons: az-Zanṭūr, Grawehr’s Type L (Grawehr 2006: 340-349).

Miscellaneous of Undetermined Date (Fig. 13)

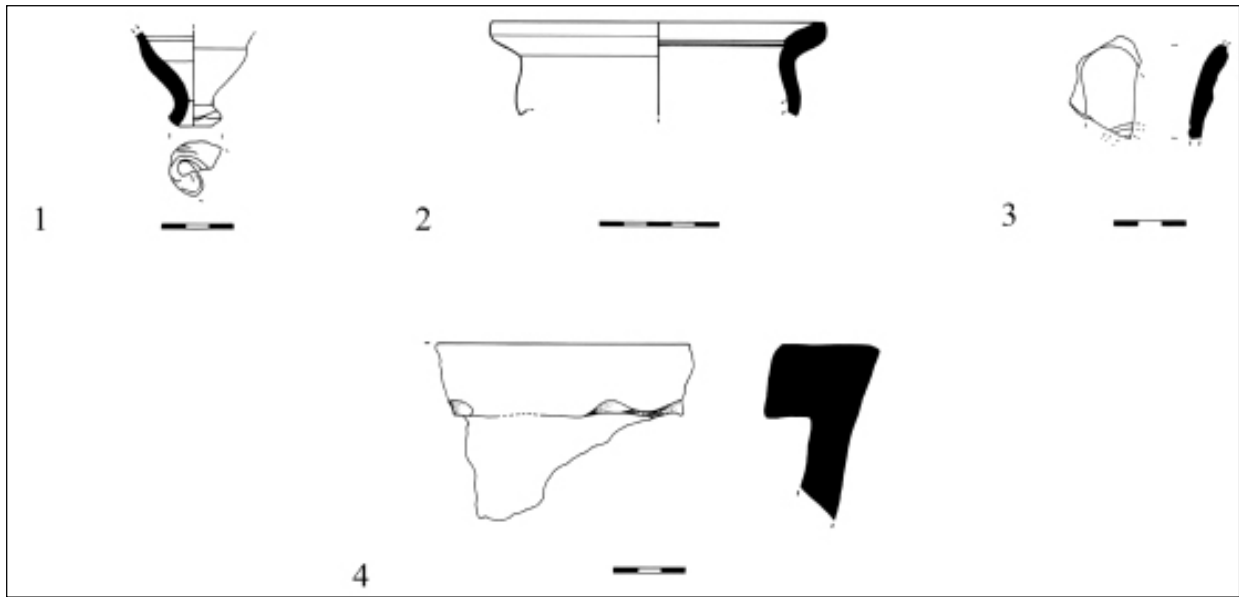
1. PUM.09-2/3 planting pot or juglet, red 2.5YR6/8, minute white inclusions, perforated string cut base; comparisons: Petra, Macaulay-Lewis’s Type A (Macaulay-Lewis 2006: Fig. 1:Pot 2, Pot 6).
2. PUM.09-1/2 planting pot, red 2.5YR5/8, light brown core, minute dark gray inclusions, surface: traces of pale slip on exterior and also interior rim 2.5Y8/3; comparisons: Petra, Macaulay-Lewis’s Type B (Macaulay-Lewis 2006: Fig. 3).
3. PUM.09-4/5 figurine, light red 2.5YR6/8.
4. PUM.09-4/8 roof tile, red 2.5YR5/8, dark gray core, numerous medium white inclusions, surface: very pale brown 10YR8/2.

Conclusions and Future Research

Our work in this initial field season was focused in nature and limited in duration. Yet our



12. Vessels of the Early Byzantine Period (M. Qassem).



13. Miscellaneous Objects of Undetermined Date (M. Qassem).

single test trench yielded some tantalizing results, and confirmed our interest in this particular sector of the Petra city center. We hope to continue work — employing geophysical exploration, architectural mapping and additional excavation — to further clarify the changing nature and functions of this space over time, as well to establish the space's role when integrated within a wider civic context. Future work by BUPAP in the “Upper Market” will look to contribute new data and analyses that span not only issues of architectural practice and urban planning but also the transformations in how this city was conceived and lived in by its inhabitants across its multiple periods of occupation.

It is also hoped that future seasons will soon see the inception of BUPAP's other projected research activity, regional work in the environs of Petra, at Wādi as-Sulaysil to the north, and the further expansion of our efforts to treat the world wonder of Petra in a diachronic, integrated and regional fashion.

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AYLA AT THE MILLENNIUM: ARCHAEOLOGY AND HISTORY

Donald Whitcomb

“The city of Ayla is a great city on the shore of the salt sea and in it gather the pilgrims of Syria, Egypt, and the Maghreb. There are numerous merchants and common people” (al-Yaqubi 340).

Structure and Chronology

The archaeological project of the University of Chicago and Department of Antiquities of Jordan pursued the discovery of the early Islamic town in ‘Aqaba from 1986 until 1995. These excavations produced the formal plan of Ayla, a foundation which presents important evidence for the earliest “Islamic city”. One hypothesis is that this foundation was under the Caliph ‘Uthmān ibn ‘Affān (ca. 650AD), and this urban center might contain the earliest mosque, palace, and other elements.¹ The second historical episode with structural implications for Ayla was the 748 earthquake;² apparent evidence of this event ushered in a period of prosperity and trade under Abbasid influence (reconstruction and connections in ceramics, ie, storage jars are local, Iraqi blue-green, Far Eastern stoneware). This seems the civilized apogee witnessed and described by al-Maqdisi in the late 10th century, historically known as the late Abbasid or Fatimid period.

The structure and character of the mature city in its latest period of decline has not been discussed in detail. Yet this remains the last chapter in the cyclical history of the city, the logical outcome of a foundation with the beginnings of Is-

lam, the sophisticated prosperity of the Caliphal empire of the Abbasids, and the complexities of a changing world of the medieval world of the Fatimids and other dynasties. Archaeological data gives evidence of these social stresses, symbolized in the odd juxtaposition of a lustre bowl of a man with a turban and humble tupperware, a handmade product imitating products of the Chalcolithic era, some four millennia earlier. This was an untidy period when causes may be evoked from historical records: the sacking of the town in 1024 by the Banu Jarrah, the extraordinary violence of the 1068 earthquake, and attack of Crusaders in 1116. An archaeological perspective allows a more nuanced documentation for the experience of Ayla, and by extension the nature of cities and their populations during these times.

Archaeological Sequences

One may begin with a chart of the periodizations of the history and archaeology from the perspective of the Ayla excavations. The archaeological periods seemed to fall into Early Islamic 1, Early Islamic 2, and Middle Islamic 1 at the time of the excavations; the historical periods differed in a random fashion (**Fig. 1**). More recently it appears to the author that the seventh century and the eleventh centuries should be considered archaeological transitions and the intervening centuries labeled Early Islamic 1, 2, and 3. This provides a very good fit with the presumed dating of the archaeological

1. Walmsley 2007: 94-95; most scholars are more comfortable with an Umayyad, and preferably Marwanid, date for this urban beginning in keeping with traditional interpretations.
2. One is reluctant to rely on earthquakes excessively as a chronological mechanism in archaeology. Neverthe-

less, the quakes of 748 and especially 1068 (for which the epicenter was at the head of the gulf of Aqaba) were particularly affective for the stratigraphy. A recent citation to the earthquake of 873 at Ayla may be more questionable (see al-Tarazi and Korjenkov 2007)

	Archaeological periods	Revised	AQABA phases	Historical Period	dates
700	Early Islamic 1	7th c. trans.	A	Rāshidūn	632 - 661
		early Islamic 1	B	Umayyad	661 - 750
800				early 'Abbāsīd	750 - 868
900	Early Islamic 2	early Islamic 2	C	Ṭūlūnīd	868 - 905
		early Islamic 3	D	middle 'Abbāsīd	905 - 969
1000				late 'Abbāsīd	969 - 1116
1100	Middle Islamic 1	11th c. trans.	E	Fāṭimid	

1. Archaeological phases in the Ayla excavations, compared to historical and archaeological periodizations.

phases on the site of Ayla. The chart also indicates a cultural lag of perhaps fifty years of material culture after significant historical change. Finally it might be noted that this city was both founded in a period of transition and ceased during an even longer period of transition, or perhaps better, decline. The purpose of this paper is to attempt a preliminary understanding of this penultimate phenomenon through a brief description of select architectural features, following each not as it was excavated but as the strata were deposited.

1. The Square Tower

This was tower 19 on the sea wall (Area K, L8b), which flanked Sea Gate of Ayla to the southeast. This tower presented an anomaly and, as such, demanded to be investigated; it was completely excavated in 1989 (Whitcomb 1995). The original U-shape tower was found near the water-table (Whitcomb 2006; **Fig. 2**). This tower was replaced by a square building using the original walls, which may have been damaged by the 748 earthquake. The interior had a plaster floor and was subdivided into a series of bins; this was replaced by a second floor and bins. Likewise the doorway showed two construction phases of continued use as a shop above the beach facing the sea during the Abbasid period (phase C).

The decline of this structure was in two phases the first characterized some fallen debris and

dark brown occupation materials (phase D). The final collapse of this structure was a massive stone fall from the city wall (**Fig. 3**) accompanied by ca. 1.5-2m of late Abbasid or Fatimid



2. The square tower, showing the original U-shaped tower, door through the city wall, and water table.



3. The square tower, showing fallen stone debris in upper levels (with Hugh Barnes).

depositions (phase E), including a Fatimid dirham (L8b-3, RN 464). One storage jar with vertical lines of an impressed Kufic inscription (identical with a jar from Area C; RN 87-1564) may be suggested to imitate Chinese painted jar inscriptions. An 11th century date is reinforced by the presence of Qingbai ceramics.

The square tower was one of a series of shops along the beach front. A first interpretation as concession stands for Abbasid tourists yielded to a more serious attention to sea-borne commerce commonly associated with the Fatimid revival of Red Sea trade. The Sea Gate which is wider than other gates may be expected to have led directly to warehouses (still to be uncovered).

2. The Central Pavilion

The central building for the entire city was discovered and completely excavated in 1987 (Area A, G10-G11; Whitcomb 1988). Further excavation on the southeast exterior revealed jambs and the arch of a tetrapylon (confirmed with a partial arch in the wall of the south west iwan; **Fig. 4**). The entire building was reinterpreted using the walls (but filling the arches) and laying new floors. The layers associated with these floors had earliest glazes and Mahesh wares, giving a ca. 750 date, also consistent with the 748 earthquake.

The new building would seem typical of a residential structure: entered from a formal stairway and door into a bent axis, past a corner

lavatory, into a central yard with its own well; on the south east was a formal iwan with frescoes and two side chambers; and on the north-east was a kitchen, storeroom, and stairway to the roof (**Fig. 5**). One suspects this was kept clean and functioning for a considerable period of time (perhaps much of phase C).

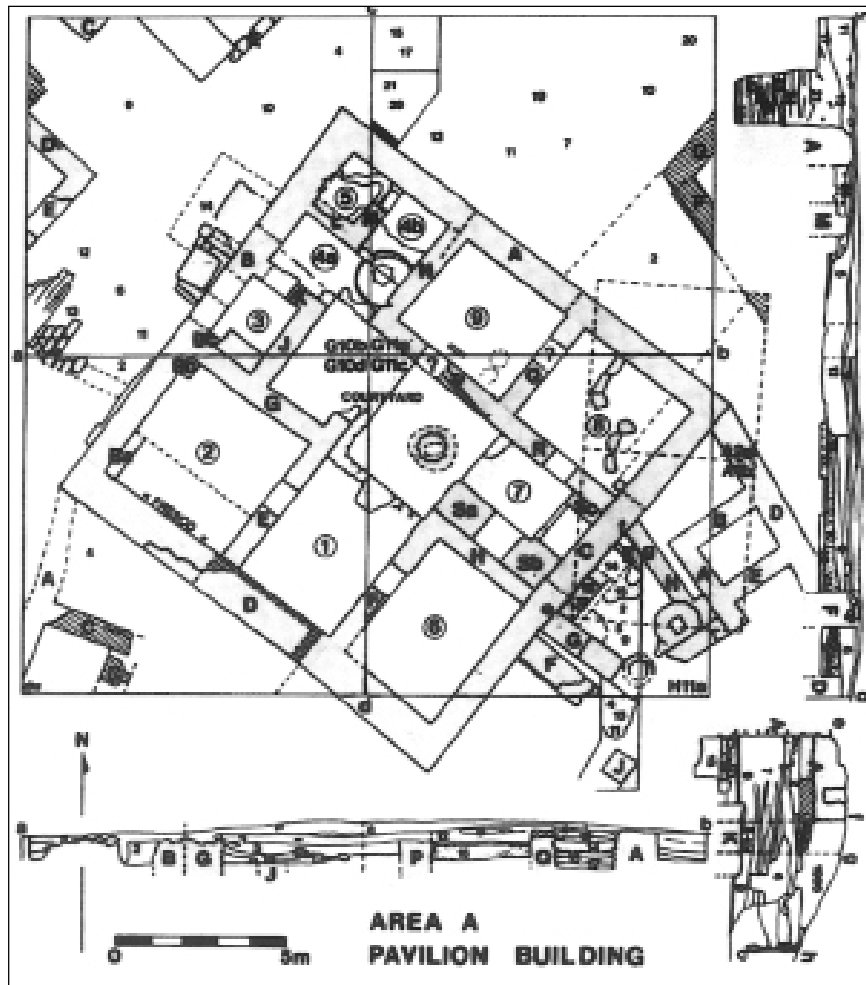
The artifacts indicate destruction through burning, though relative lack of objects *in situ* does not suggest sudden violence (**Fig. 6**). Indeed, there seem to be secondary depositions before and during the disintegration of the mud brick upper walls (and vaulting?). The occupation on the floor antecedent to ash deposition is more difficult to determine but should fall within the 10th century and probably the latter half (phase D). While these depositions have some Abbasid materials, the presence of Fatimid storage jars and “tupperware” (Whitcomb 1988, fig. 5a-i)³ suggest that



4. The southeast wall of the Central Pavilion, showing original arch and late blockage.

3. These hand-made wares, very common during the last period, have prompted much discussion. The simple forms of bowls, cups, and small jars seem to be modular and can nest in sets (prompting the nickname). Many were made with little or no vegetal temper and have been repaired; often impressions of reed matting

are found on the base. A number of pieces, particularly small bowls, have irregular decorations in red paint and may represent the beginnings of painted geometric tradition, a recognized characteristic of the following Ayyubid-Mamluk era (**Fig. 16**).



5. Plan of the Central Pavilion building.



6. The Central Pavilion building, from the north corner looking south.

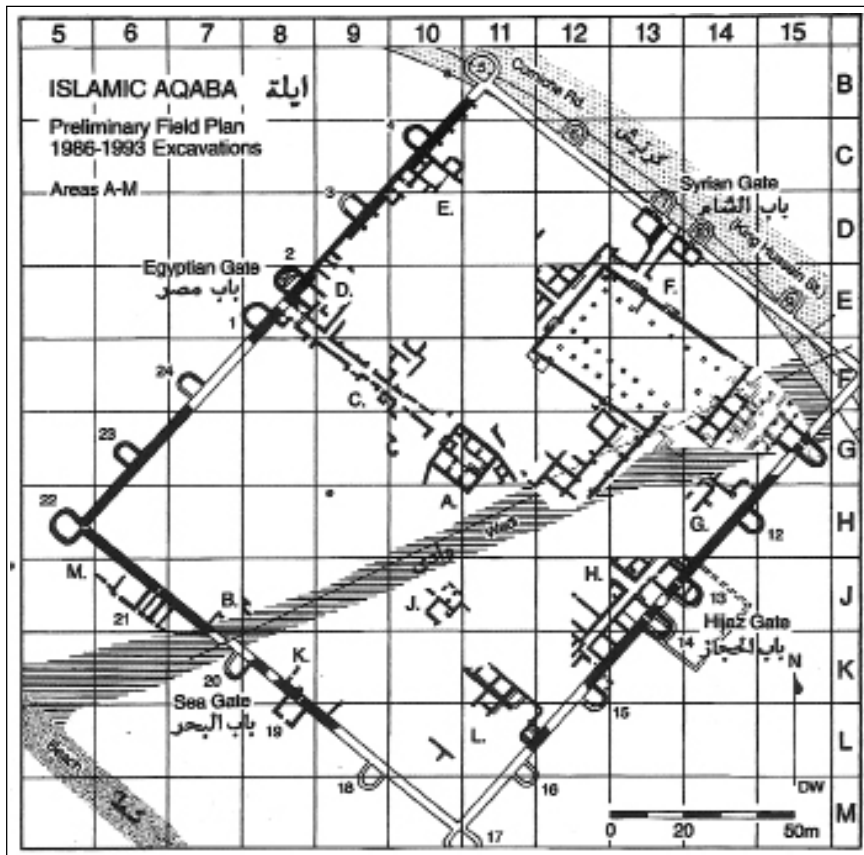
deposition ended near the beginning of the 12th century that is during phase E transition.

3. The Egyptian Street

The original plan of the town seems to have stipulated main, axial streets, running from the

gates to the crossing through the tetrapylon (Fig. 7). As we shall see in the Egyptian gate, the foundation street was some 3+ meters in width (Area C, E8d, E9c, F9b, F9d, F10c, G10b; Whitcomb 1995). A deep test was excavated in F9d, over four meters deep to the original street level (Fig. 8). It was clear from the excavation that subsequent re-buildings of adjacent structures tended to encroach upon the width of the street; and as the street tended to become increasingly narrow as time passed, its alignment was likewise less measured and more crooked (Fig. 9). As might be expected, a street is kept relatively clean and is not a prime location for datable artifacts.

Nevertheless the latest building phase may be characterized by the street façades and their attached structures. These latest walls, which came just to the surface of the ground, were a patchwork of granite cobbles with limestone



7. General plan of the Ayla excavations, 1986-1993.

facing only the door and window openings. This façade opened onto passages and a large courtyard entirely constructed of mudbrick. Within the courtyard were several bread ovens (*tābūn*)

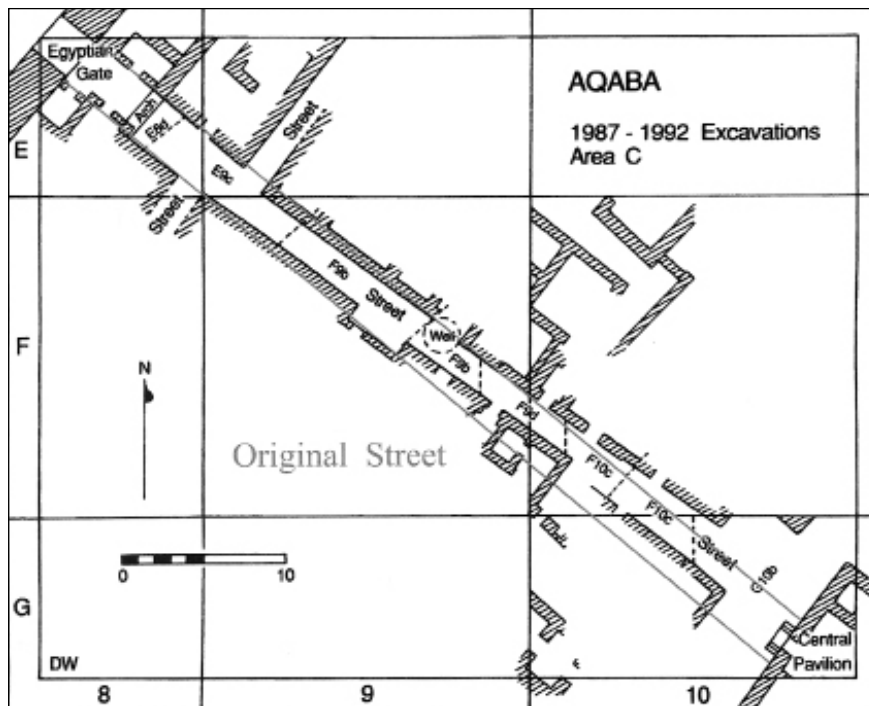


8. Section across the Egyptian Street (F9d), showing stone façades of buildings.

placed near the walls. A large flat stone was nearby, apparently used for making the bread; upon turning it over, this proved to be a tenth century tombstone. Naturally most of the ceramics were cooking vessels but among the other refuse were a number of Qingbai sherds of the 11th century.

4. The Egyptian Gate and Inner Arch

The arch crossing the Egyptian Street was semi-circular and apparently identical to the original arch of the Egyptian Gate (see below). The two arches seem to have formed a vestibule between the gate and the town proper, though its precise form is now obscured with later walls. Both to the southeast (Area C, E8d-31-35, excavated in 1989) and to the northwest (Area D; E8d-6-24, excavated in 1987) one have walls constructed of alternating layers (each of two to four courses) of limestone and basalt stones. This decorative use of stones, known as *ablaq*, is most typical of Ayyubid and later architecture (and thus stratigraphically impossible); an alternative derivation might be from Byzantine architecture (with courses of stone and baked



9. Plan of the Egyptian Street, showing the original alignment between the Egyptian Gate and Central Pavilion.



10. Northwest face of inner arch, showing *ablaq* walls of shops in the earlier vestibule.



11. Building with *ablaq* and blocked doorway, east of inner arch (E8d, E9c).

brick).⁴ The decorative walls narrowed the street filling the vestibule with a series of shops (**Fig. 10**) and, beyond the arch, a large building with benches (*mastaba*) on either side of a doorway (**Fig. 11**). On both sides of the inner arch, the latest street level, upon which there was fallen stone and refuse, was usually 1.75m below surface and contained 11th century materials (phase E; Whitcomb 1995: fig. 3).

The Egyptian Gate began as a formal structure; the northwest entry into the city was a

grand affair, over 3m in width with carefully carved voussoirs in its rounded arch (**Fig. 12**). Architectural alterations to this city gate may be balanced with a stratigraphic sequence (Area A; E8a-4-38). Soon after its completion, the width of the gate was deemed excessive and cut in half; a rounded column was placed in the center and the north side blocked. A series of walls were placed against the flanking towers, forming small rooms or shops on either side of the narrowed, exterior street (not unlike

4. An even more interesting speculation might be a derivation from al-Ablaq, the name of a pre-Islamic castle near Tayma, some 400km to the southeast. Whether

Byzantine or Hijazi in inspiration, one must accept an early use of *ablaq* decoration at Ayla.



12. Exterior of the Egyptian Gate, showing original wide gate with arch, early blockage of half with column, complete blocking preceding insertion of narrow doorway and pointed arch.



13. The Ayat al-Kursi inscription, originally above the Egyptian Gate, showing cursive repairs to Kufic original.



14. The Syrian Street looking northeast toward modern Corniche (city wall lies beneath modern pipes).

the interior shops described above, but without decoration).

Abbasid artifacts were antecedent to a definitive break in this early gate sequence. New walls formed reconstructed shops and, more importantly, complete blockage of the gate with rubble formed the foundation for a redesigned gate. This must represent the destruction of an earthquake, presumably that of 1068 to judge from subsequent artifacts. This destruction must have brought down the wall above the gate and the blocks of the Ayat al-Kursi (**Fig. 13**).⁵ The rooms between the towers were replaced, but the gate itself was reconstructed as a narrow doorway with pointed arch (partially reus-

ing very old voussoirs). This last gate gradually filled to a higher threshold with a basalt pipe of drain running through it⁶. These latest layers (E8a-9-20) are marked with Fatimid materials of the late 10th and 11th centuries.

5. The Syrian Street

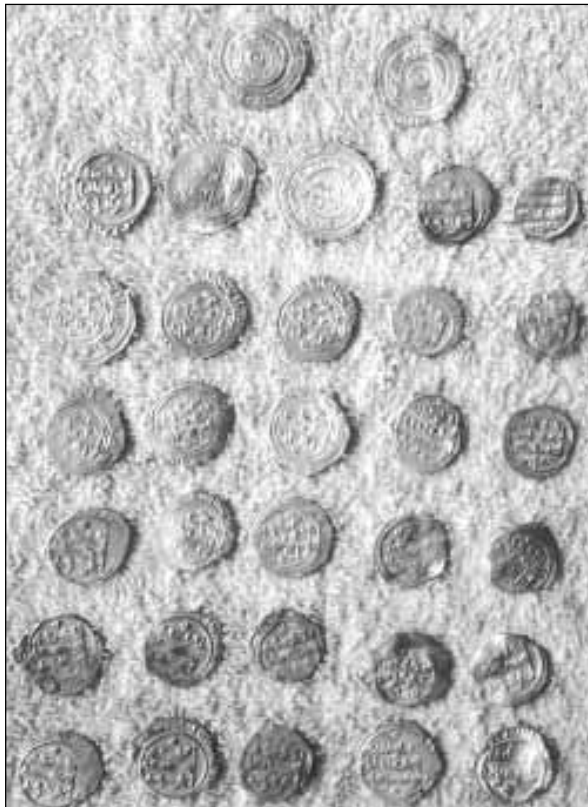
In 1992 an effort was made to investigate the Syrian Gate (Area F; D13; Whitcomb 1993). This was complicated by the fact that the Corniche sidewalk and roadway passed over the gate and towers (and a water pipe was laid onto the wall itself; **Fig. 14**). Nevertheless the inner face of the gate and entry into tower 7 were exposed. Most of the excavations concentrated on

5. This inscription must date to the original construction with its early Kufic lettering; it seems to have suffered earlier *in situ* damage from cracked stones and re-carving of block J (**Fig. 13**) surface with a more cursive script after spalling of the original.

6. The excavations of the Sea Gate in 1988 (Area K, K8c, K8d) revealed a remarkably similar architectural and stratigraphic history of replacement by narrowed gates over time.

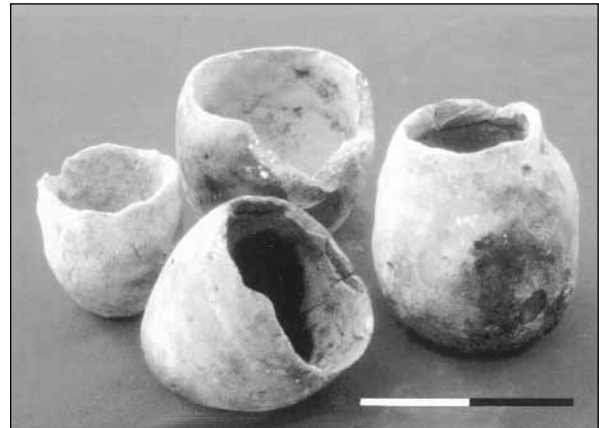
the latest phase of the flanking rooms of the Syrian street, connecting the gate to the northeast entry into the mosque (Whitcomb 1994a). As seen above in the Egyptian Gate, by the Fatimid period (phase E), this street had narrowed and a drain passed through the Syrian gate. Less than 20cm from the surface in this upper street the Ayla hoard was found; this was a purse of 32 coins minted at Sijilmasa in north Africa (now located in southern Morocco; Whitcomb 1994b).

The twenty-nine of these dinars minted at Sijilmasa (**Fig. 15**) were uncirculated, all die-linked and attributed to Khazrunid vassals of the Spanish Umayyads (976-1055).⁷ Three Fatimid coins seem to have been added in Qayrawan, Tunisia (all datable from 970 to 1004); these additional coins would seem to have been necessary to create a purse of 30 dinar value (possibly sealed by an exchange in Qayrawan). The purse might have been lost by a pilgrim from Morocco



15. The Ayla hoard found in the Syrian Street, with 29 coins from Sijilmasa and three from Qayrawan.

7. These coins are discussed in a numismatic study by Choukri Heddouchi, *The Medieval Coins of Sijilmasa, Morocco: A History of the Mint and its Minting*



16. Examples of common, handmade vessels, called "tupperware".

on his way to Mecca; but the find-spot in the middle of a main street might suggest deposition at night. One might construct an historical narrative to account for this discovery: that the purse was hidden during the attack on the Maghrebi (north African) pilgrimage of the year 1024; this attack by the Banu Jarrah, who were in revolt against the Fatimids, is said to have acquired slaves and 3000 dinars. This narrative might account for this curious discovery, but its broader implication is the continuing connection of Ayla with the commercial (if not pilgrim) interactions across the Islamic world, even during its (relative) decline.

Summary

The archaeology of Ayla ('Aqaba) has been studied for its foundation and prosperity, that is, its role in the history of urbanism in the Middle East. After less than four hundred years this complex of institutions, the population force in political and economic life of the head of the Gulf, declined and ceased. Archaeological excavation has an irony in beginning at the ending, and therefore that most elusive phase in its cultural history lies just beneath its present surface. This was composed of destruction debris associated with large amounts of trash accumulation within the first 1-1.5m. Virtually all-Chinese sherds have been found in this phase in Ayla (**Fig. 17**), coinciding with the much vaunted

Techniques. M.A. thesis, Middle Tennessee State University, 1998.



17. Examples of Chinese porcelains, especially Qingbai and Sung incised wares.

opening of the Red Sea to Indian Ocean and Far Eastern trade under the Fatimids. Chinese and Fatimid luxury wares (e.g., lustre; **Fig. 18**) are in sharp contrast with the declining quality of life (an economic contradiction explored in Whitcomb 2001, 510).

What is the role of Ayla for the archeology of Jordan? Ayla was debated as a having a mixed identity in Maqdisi's presentation: did this port belong to Egypt, the Hijaz or Bilād ash-Shām? Could regional interactions in its final phase be expressed as diverse social identifications, that is, with the Fatimids, Seljuqs or Bedouin tribes? Regional contributions during the preceding Abbasid prosperity were probably similar but less dramatic in comparison to the disfunctional pressures of this transitional period. Both documentary and archaeological evidence agree to



18. "The Man with a Turban," a lustre-ware sherd from Fatimid Egypt.

the anomaly of commercial expansion and social collapse during this period. Morony's recent study of Arabia in the 11th century notes that "drought and famine in the Hijaz caused emigration and the cancellation of Hajj caravans" (n.d.). At the same time, al-Idrisi calls Ayla a small town and center of bedouin trade that was soon abandoned (al-Wohaibi 1973: 49, 51). More generalized regional social problems and disruption of occupational patterns may be directly reflected in the breakdown in the sanitation system of this town.

Walmsley has demonstrated the new archaeological interest and evidence being brought to bear on the Fatimid period in Jordan (2001). He cites the results from Ayla in parallel with those from the citadel in 'Ammān. In both cases, the implications remain to be fully analyzed. Indeed, the half-century both before and after the millennium show dramatic developments in urban organization. Damgaard has recently shown, in his new excavations at Ayla, the presence of a wide, subsidiary street maintaining the original grid of the city (n.d., 6). This may be balanced with the "massive urban dislocation" apparently attributable to the 1068 earthquake (Walmsley 2001: 524). Clearly the archaeology of Ayla reflects the complex events of the latest period, one, which held both prosperity and decline as minor fortunes typical of most historical periods. The common tendency of archaeologists to seek the beginnings (or "origins") and most famous epochs may lead to neglect of interesting transitions which may be of more value to broad historical understandings. These are their true contributions of archaeology to the medieval history of Jordan.

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THE QUARRY ORIGINS OF NINE ROMAN MARBLE SCULPTURES FROM 'AMMĀN/PHILADELPHIA AND GADARA/UMM QAYS

Elise A. Friedland and Robert H. Tykot

Introduction

Because there is no native source of marble anywhere in the Near East, all marble artifacts discovered in the region were imported from such marble-rich provinces as Turkey, Greece, and Italy. Over the past thirty years, scientists focusing on archaeometry have developed a multi-method approach involving chemical and petrographic tests for determining the quarry origins of marble artifacts. While extensive work has been conducted on architectural, funerary, and sculptural marbles discovered in Israel (Pearl 1989; Fischer 1998, 2002; Friedland 1999) and recently, a comprehensive research program to analyze the origins of marble sarcophagi and statuary discovered in Syria has been undertaken (Wielgosz 2000, 2001; Wielgosz *et al.* 2002), only a few studies have been conducted on marble artifacts from Roman period Jordan, and those have focused on architectural marble (Al-Bashaireh 2003). Because marble architectural elements and sarcophagi are known to have been quarried and shipped differently than marble sculptures, it is important to study all classes of marble artifacts discovered in a region. Understanding quarry origins can significantly enhance our understanding of trade routes, the economics of the use of marble, the goals of the patrons of these expensive, imported artifacts, and the role of Roman Arabia in the broader imperial marble trade. This study is the first in a series, designed to document and interpret the quarry origins of the three-dimensional marble statuary that was imported and installed in the public, monumental architectural of urban centers in Roman Arabia.

Sculptures Studied

Because previous studies had focused on

sourcing the sculptural remains from one hall of the East Baths at Gerasa/Jarash, this study was designed to broaden our knowledge of the quarry origins from the urban monuments of other major centers in Roman Jordan. The decision about which pieces to sample was also affected by logistical matters, such as which pieces were displayed or stored so that surfaces aesthetically- and scientifically-appropriate for sampling were accessible.

Samples were taken from all of the three-dimensional marble statuary associated with two major monuments in Philadelphia/'Ammān: the Roman Theater and the Great Temple. In addition, one piece possibly associated with the Agora in Amman was sampled. For preliminary comparative purposes, two pieces from Gadara/Umm Qays, the colossal Tyche from the West Theater and a statue of a Togate Man (exact findspot unknown), were also sampled. Before discussing the analytical methods employed, the results, and the interpretation of the data, I provide here a brief introduction to the pieces sampled and their archaeological contexts, especially because our understanding of the results should be rooted in use of these marble statues within the broader urban landscape of Arabia.

The large theater of Philadelphia/'Ammān was built into the side of the hill to the south of the Roman Forum, probably during the middle of the 2nd century AD (Hadidi 1970: 61-67; El Fakharani 1975; Segal 1995: 82-85; Retzlaff 2001: 47-48). The structure has been cleared, excavated, and restored from 1957 onward. An architrave of the *scaenae frons* bears an inscription that reads, "To...Titus Aelius Hadrianus Antoninus Caesar Augustus, Himself and His Entire House" (El Fakharani 1975: 400-403; Stemmer 1978: 25; Vermeule 1978: 104; Gergel

2004: 400). This inscription associates the date of renovation and decoration of the stage building with Antoninus Pius, though it does not provide a secure date for the construction of the theater itself or for the individual statues discovered within its ruins. Five statues were uncovered in the excavations of the theater (though their exact findspots are unknown): the torso and upper legs of a larger-than-life-size cuirassed Roman emperor (**Fig. 1**); the body of a larger-than-life-size draped female (**Fig. 2**); a larger-than-life-size torso of an Asklepios of the Florence Type (**Fig. 3**); the body of a miniature Athena Hephaisteia

(**Fig. 4**); and the base of a miniature Hermes, including the body of a sheep and the lower right leg and foot and the left foot of Hermes (**Fig. 5**).

The over-life-size statue of a cuirassed emperor (**Fig. 1**) stands 1.18 m tall, preserving the torso and upper legs of one of the Antonine emperors (El Fakharani 1975: 399-400; Stemmer 1978: 25, II 4a; Vermeule 1978: 104-105; Weber 2002: 509-510; Gergel 2004: 400). Though there is not enough evidence to determine whether the statue represented Hadrian or Antoninus Pius, the composition of the breastplate and the motifs on the lappets are best associated



1. Cuirassed Roman Emperor, late Hadrianic/early Trajanic period (125-150 AD), marble, Roman Theater, Amman (exact findspot unknown). Photograph by author; courtesy of the Department of Antiquities of Jordan.



2. Draped female, late Hadrianic/early Antonine period (125-175 AD), marble, Roman Theater, Amman (exact findspot unknown). Photograph by author; courtesy of the Department of Antiquities of Jordan.



3. *Asklepios of the Florence Type, Antonine period (150-200 AD), marble, Roman Theater, Amman (exact findspot unknown). Photograph by author; courtesy of the Department of Antiquities of Jordan.*

with eastern, Hadrianic breastplate types (Gergel 2004: 400). At the center of the breastplate Athena stands atop a nursing she-wolf and is flanked by a serpent (proper right) and an owl (proper left). The goddess is being crowned by two flanking Nike figures. Figures decorating the lappets (*pteryges*) include a head of Zeus-Ammon (center), heraldic eagles (on either side of center), and (moving outward on the proper right) a head of Medusa, an elephant protome, and two crossed shields (the figures on the lappets on the proper left are too damaged to read). The piece has been dated stylistically to the late Hadrianic or immediately post-Hadrianic period (Weber 2002: 510; Gergel 2004). In light of the inscription on the architrave of the *scaenae frons* (noted above), this piece was likely to have been part of a dynastic sculptural program that was installed in the niches of the *scaenae frons* to “honor Hadrian as the father of the current ruling family” (Gergel 2004: 400).

Also from the Theater in Amman and of comparable scale to the over-life-size statue of a cuirassed emperor is an over-life-size statue of a draped female (**Fig. 2**), which stands 1.46 m tall and preserves the torso, most of the legs, and portions of both arms of the figure (El Fakharani



4. *Athena Hephaisteia, 150-200 AD, marble, Roman Theater, Amman (exact findspot unknown). Photograph by author; courtesy of the Department of Antiquities of Jordan.*

1975: 400; Vermeule 1978: 104; Weber 2002: 510). The woman wears a tunic, pallium, and is heavily draped in a mantel. Though the figure’s identity is not knowable, the piece is likely to have represented one of the female members of the imperial family from the Trajanic, Hadrianic, or Antonine periods (El Fakharani 1975: 400; Vermeule 1978: 104). The piece is dated stylistically to the second or third quarter of the second century AD (late Hadrianic or early Antonine periods).

In addition to these two over-life-size portraits, three mythological figures were recovered from the theater. An over-life-size torso of



5. Base of a statue of Hermes, 150-200 AD, marble, Roman Theater, Amman (exact findspot unknown). Photograph by author; courtesy of the Department of Antiquities of Jordan.

Asklepios of the Florence type (**Fig. 3**) stands .76 m tall and preserves the torso from the base of the neck to just below the navel as well as the figure's left arm (Weber 2002: 505-506). The god wears a mantel that is pulled diagonally across the back, flows over the left shoulder and down the left side of the body, and crosses the front of the torso horizontally over the navel. Where the body is exposed, the musculature is modeled naturalistically. The piece has been dated stylistically to the second half of the second century AD (Antonine period) and has been identified as a replica of the cult statue of the Pergamene Asklepieion (Weber 2002: 505-506).

A small-scale statuette of Athena Hephaistea (**Fig. 4**: J.6384; El Fakharani 1975: 398-399; Weber 2002: 505) found in the Roman Theater stands 1.08 m tall and preserves the draped body of the standing goddess from the neck down (minus the arms from just above the elbows) as well as most of her base and a portion of her shield, which served as a support. The small scale of the piece sets it apart from the two over-life-size portrait statues and the over-life-size statue of Asklepios, and El Fakharani proposed that the piece, because of this distinction in scale and because of its subject matter, was meant to be displayed in the rectangular *exedra* that may have served as a miniature temple at the top center of the theater's auditorium, though there is no way to determine the statue's original display location within the theater (El Fakharani 1975: 398-399). The piece has been dated stylistically

to the second half of the second century AD (the middle imperial period) (Weber 2002: 505).

Finally, the base of a statuette of Hermes was also discovered in the Roman Theater (**Fig. 5**: J.8064; Weber 2002: 507). The oval base preserves only the right lower leg and both nude feet of the god as well as the tree trunk support and the body of his accompanying sheep (though its front right leg is broken away leaving only the hoof attached to the base). The now-missing head and neck of the sheep were made of a separate block of marble and pieced to the statuette, as shown by the large, square socket preserved in center of the neck. The piece measures .40 m at its highest-preserved point and .48 m at its greatest-preserved width. The statuette has been dated stylistically to the second half of the second century AD (Antonine period) (Weber 2002: 507).

Two other pieces associated with major architectural monuments of Philadelphia-Amman were also sampled: first, a larger-than-life-size statue of Herakles (probably a Farnese type) that was discovered in a river bed near the Philadelphia Hotel (demolished in 1987) and that may have originally been associated with the adjacent Agora (Weber 2002: 509); second, the elbow of a colossal statue discovered on the citadel and associated with the so-called Great Temple (Weber 2002: 511-512; Kanellopoulos 1994: 101-103). The Herakles Farnese (**Fig. 6**) stands 1.45m high and preserves the torso, left upper arm, and upper thighs of the god. The surface of the piece is extremely eroded and damaged due to its deposition in the river bed. The statue has been dated stylistically to the second or the third century AD (Weber 2002: 509). The colossal right elbow (**Fig. 7**) was found in excavations in the immediate area of the Great Temple on the Citadel of Amman (Weber 2002: 511-512; Kanellopoulos 1994: 101-103). The fragment preserves portions of the right upper and lower arm of a colossal statue (maximum diameter of upper arm: .78 m; maximum diameter of lower arm: .65 m). Two veins are depicted on the forearm. In addition, a large rectangular socket (.32 x .32 x .36 m deep) is carved into the side of the upper arm and was meant to attach this piece to the main portion of the statue. This socket may indicate that the colossal statue had limbs of marble, but was made of other mate-



6. *Herakles (probably Farnese Type), 2nd or 3rd century AD, marble, found in a river bed near now-demolished Philadelphia Hotel, Amman. Photograph by author; courtesy of the Department of Antiquities of Jordan.*



7. *Colossal elbow, 3rd century AD?, marble, immediate area of the Great Temple, Amman. Photograph by author; courtesy of the Department of Antiquities of Jordan.*

rial; alternately, it could be evidence of repairs in antiquity. The exact identity of the original piece remains unclear; some scholars have argued that the veins indicate that the piece depicted a male deity, while others argue that the slender, elongated nature of the fingers suggest a

female deity. One scholar has also noted that the location of the socket dictates that the right hand must have been raised in order to accommodate dowelling for the right forearm (Kanellopoulos 1994: 101-102). Based on scale, craftsmanship, and style, the elbow has been associated with another fragment of a colossal left fist, also reported to have been found in the same area around the Great Temple of Amman. The fragment of an elbow has been dated stylistically to the late Roman period, perhaps the third century AD (Weber 2002: 512).

To provide some comparative data regarding the marble provenience of statuary from another major urban center, two statues from Gadara/Umm Qays were sampled. The colossal seated statue of Tyche (**Fig. 8**), found in the orchestra of the West Theater, is approximately 22.45 m tall and 8.35 m wide on its back (Weber 2002: 397-398). The goddess wears a thin chiton, tied under her breast and buttoned on the shoulders, and has a heavier himation draped across the lower abdomen and lap, which spills over the left side of her body and hangs down onto the throne. She sits on a throne with back- and arm-rests, holding a cornucopia in her left arm, which she has leaned against her left shoulder. Her feet are shod in sandals and rest on a footstool, with the left foot extended forward and flat and the right foot pulled back, nearly even with the front leg of the throne, and her right heel pulled up, off of the footstool. Long strands of hair fall down both sides of the goddesses neck onto her shoulders, stopping just above her breasts. The backrest of the throne was lightened by carving out two rows, containing two square compartments each, from its backside; the statue was further lightened by hollowing out and removing marble from the area beneath the seat of the goddess. The statue has been dated to the second quarter of the second century AD based on style and arrangement of the drapery (Weber 2002: 398).

A fragment of a togate man (**Fig. 9**), also from Gadara/Umm Qays, discovered on the decumanus maximus on the north sidewalk near the Nymphaeum, preserves only a portion of the torso of the original statue, which once carried a portrait head of a private man (Weber 2002: 408-409). The preserved fragment of the originally life-size piece is approximately .81m high, .45m



8. *Seated Tyche, 125-150 AD, marble, Orchestra of the West Theater, Gadara/Umm Qays. Photograph by author; courtesy of the Department of Antiquities of Jordan.*

wide, and .31m deep. The piece may be dated to the late Flavian or early Trajanic period (last quarter of the first century AD), based on the nature and arrangement of its toga, from which the sinus and umbo are still well-preserved.

Analytical Methods

The quarry origins of the marble of a particular sculpture may be suggested by a variety of scientific methods. Beginning in the 1970s,



9. *Fragment of a togate man, 75-100 AD, marble, Decumanus Maximus near Nymphaeum, Gadara/Umm Qays. Photograph by author; courtesy of the Department of Antiquities of Jordan.*

isotopic analysis was developed as a viable scientific method for distinguishing marble types (Craig and Craig 1972; Manfra *et al.*; Herz and Wenner 1978; Coleman and Walker 1979; Herz and Wenner 1981; Herz 1987; Herz and Waelkens 1988; and Herz 1990). Because different marbles from different quarries have distinctive mixtures of oxygen and carbon isotopes due to their varying geological histories, the marble from each quarry may have its own unique “isotopic signature”. Isotopic analysis entails removing a pencil-point-sized amount of marble from an artifact and treating it with acid to produce carbon dioxide gas, which is then analyzed by mass spectrometry, which measures the ratios between oxygen-16 and oxygen-18, and between carbon-12 and carbon-13. The results, expressed as deviations (δ) in parts per thousand (per mil, ‰) from the VPDB isotopic standard, are plotted against each other. In theory, because each quarry has a unique “isotopic signature”, marbles from the same quarry tend to cluster together to form an “isotopic thumbprint” for each quarry. By analyzing marble samples collected from ancient quarry sites and compiling the results in databases, scientists have established standard “isotopic thumbprints” for many of the known ancient quarries. A Classical Marble Data Base was compiled by Dr. Norman Herz at the University of Georgia (Herz 1987), while Susan Walker of the British Museum also created the British Museum Database. Today, other scientists, many associated with the Association for the Study of Marbles and Other Stones in Antiquity, maintain updated and expanded versions of

these databases (see Gorgoni *et al.* 2002).

However, isotopic analysis has several limitations and thus does not offer a definitive solution to the question of the geological origins of white marbles. Most importantly, the “isotopic thumbprints” of different quarries often overlap, thus making it impossible to determine in which quarry a particular sample originated based on isotopic analyses alone (Germann *et al.* 1980: 99; Moens *et al.* 1990: 113), especially without also considering color, visual appearance, and the time period involved. Therefore, more recently, a multi-method approach has been developed that utilizes isotopic analysis in consort with other mineralogical and chemical studies such as petrographic analysis, and elemental analysis or X-ray diffraction to determine level of dolomitic content (Gorgoni *et al.* 2002; Lazzarini *et al.* 2002; Pentia *et al.* 2002). The samples taken from the nine sculptures discovered at Philadelphia/Amman and Gadara/Umm Qays were analyzed by the Laboratory for Archaeo-

logical Science at the University of South Florida for maximum grain size (MGS) using a Jens optical microscope equipped with cross-polarized lenses; by X-ray fluorescence spectroscopy using a Bruker III-V portable XRF instrument with a vacuum generator attachment, specifically for testing the presence of magnesium; and by stable isotope ratio analysis using a Finnigan-MAT Delta Plus equipped with a Kiel III gas generating device using 100% phosphoric acid at 90° C. The precision of the isotope data is about $\pm 0.1\%$.

Results and Interpretation

The XRF analysis indicated that none of the marble samples tested contained significant amounts of magnesium, thus eliminating possible dolomite marble sources. The results of the isotopic analyses and maximum grain size measurements are listed in **Table 1** and shown in figure 10. In general, the results demonstrate that the marble for the statues that were once

Table 1: Results of Chemical and Petrographic Analyses of Nine Marble Statues from Philadelphia/Amman and Gadara/Umm Qays.

Statue	Findspot	USF #	d18O	d13C	Isotopic Matches	MGS	Probable
Cuirassed Emperor	Roman Theater, Amman	10790	2.6	-6.3	Naxos; Pentelikon; Prokonnesos (Marmara)-2; Djebel Ichkeul (Tunisia); Doliana 1?	1.0	Pentelikon
Draped Female	Roman Theater, Amman	10791	4.0	-1.5	Prokonnesos (Marmara)-1; Thasos, Cape Vathy; Denizli-1	3.0	Prokonnesos (Marmara)-1
Asklepios	Roman Theater, Amman	10792	3.5	-3.6	Paros-1; Prokonnesos (Marmara)-1; Thasos, Cape Vathy	2.5	Prokonnesos (Marmara)-1
Athena	Roman Theater, Amman	10794	2.3	-3.7	Aphrodisias; Carrara?; Dokimeion (Afyon); Naxos; Paros-2; Pentelikon?; Prokonnesos (Marmara)-1; Mani?; Mylasa; Uşak; Heracleia	2.0	Aphrodisias; Naxos; Paros-2; Prokonnesos (Marmara)-1; Mylasa; Uşak; Heracleia
Herakles	Roman Theater, Amman	10793	0.7	-4.6	Aphrodisias; Dokimeion (Afyon); Naxos; Paros-4; Mani?; Ephesos 2	1.0	Aphrodisias; Dokimeion (Afyon)
Hermes/ Good Shepherd	Roman Theater, Amman	10795	1.1	-3.8	Aphrodisias; Dokimeion (Afyon); Naxos; Paros-2; Prokonnesos (Marmara)-1?; Ephesos 2; Mylasa	2.0	Aphrodisias; Paros-2; Prokonnesos (Marmara)-1?; Ephesos 2; Mylasa
Elbow of Colossal Statue	Temple on Citadel, Amman	10796	1.9	-4.0	Aphrodisias; Carrara?; Dokimeion (Afyon); Naxos; Paros-2; Pentelikon?; Prokonnesos (Marmara)-1?; Mylasa; Uşak; Heracleia	2.0	Aphrodisias; Paros-2; Prokonnesos (Marmara)-1?; Mylasa; Uşak; Heracleia
Torso of a Togate Man	Colonnaded Street, Gadara/ Umm Qays	10797	3.4	-2.1	Prokonnesos (Marmara)-1; Thasos; Cape Vathy; Mani?; Denizli-1	2.0	Prokonnesos (Marmara)-1; Denizli-1
Tyche	Orchestra, West Theater, Gadara/Umm Qays	10798	2.2	-3.5	Aphrodisias; Carrara?; Dokimeion (Afyon); Naxos; Paros-2; Pentelikon?; Prokonnesos (Marmara)-1; Mani?; Mylasa; Uşak; Heracleia	2.5	Aphrodisias; Paros-2; Prokonnesos (Marmara)-1; Mylasa; Uşak; Heracleia

displayed in several of the major monuments of Philadelphia/Amman and Gadara/Umm Qays originated in well-known quarries of Roman period Greece (Pentelikon and perhaps Naxos and Paros-2) and Turkey (possible quarries include Aphrodisias, Denizli, Dokimeion (Afyon), Ephesos, Mylasa; Prokonnesos (Marmara), Uşak; and Heracleia). Notably, none of the statues sampled and tested were made of marble from Italy. Therefore, this small study provides further specific data for connections between Roman Arabia and the provinces of Roman Greece and Turkey and continues to fill a void on the map of the broader imperial marble trade.

Marble for the nine pieces from Philadelphia/Amman and Gadara/Umm Qays came from some of the same quarries that supplied marble for a group of eleven statues from the North Hall of the East Baths at Gerasa: though in several cases it is not possible to determine a single quarry source, possible quarry sources for several of the pieces from Philadelphia/Amman, Gadara/Umm Qays, and Gerasa are Prokonnesos (Marmara), Denizli, Afyon, Ephesos, and Pentelikon (Friedland 2003: 417). However, seven of the eleven statues from the North Hall of the East Baths at Gerasa were carved of marble from Thassos/Cape Vathy (which is not represented in the probable quarry sources for the pieces sampled and reported here), so for the statue group displayed in at least one of the major monuments in Gerasa, the well-known, northern Greek quarries of Thassos seem to have been a more prominent supplier of marble. In general, though, the quarry origins for the nine pieces reported here are comparable with those determined for marble statuary from Roman period Syria (Wielgosz 2000, Wielgosz 2001; Wielgosz *et al.* 2002) and Palaestina (Pearl 1989; Pearl and Magaritz 1991; Fischer 1998, 2002), provinces which are both known to have imported marble statuary from Greece and Turkey as opposed to Italy. This small data set from Jordan (which hopefully will be augmented by future phases of this marble sourcing project) therefore expands our basis for understanding the trade networks between the major quarries of Greece and Turkey and the various regions of the Roman Near East.

The specific quarry origins for each piece are also important, because scholars have long tried

to identify the origins of the marble of some of these statues with the naked eye. For example, while El Fakharani identified the marble of the statue of a Cuirassed Emperor as coming from “Carrara” (1975: 399), Vermeule stated that he believed that the piece was made from “Greek marble, probably of a good mainland grade” (1978: 105); indeed, our chemical and petrographic tests reveal that the Cuirassed Emperor was made from marble quarried at Mt. Pentelikon. Similarly, El Fakharani states that the Athena Hephaisiteia was made from marble from Mt. Pentelikon (1975: 398), however our scientific analyses associate the marble of this statue with the island quarry of Paros-2 or with any of five common quarries in Asia Minor (Aphrodisias; Prokonnesos (Marmara)-1; Mylasa; Uşak; or Heracleia).

In addition, the results provide further data for considering the logistics of the production, import, and display of specific marble statues in Arabia. First, El Fakharani (and others following him) have proposed that, because of their similar scale and workmanship on their backs, the statue of a Cuirassed Emperor and the statue of a Draped Female were initially part of a pair or a group, perhaps installed in two of the niches that flank the central opening in the *scanae frons* (1975: 400; Vermeule 1978: 104; Gergel 2004: 400). While these two pieces certainly may have been displayed together (even side-by-side) as part of a sculptural program, it is interesting to note that they are carved of marble from two different quarries: the Cuirassed Emperor is made of marble quarried on Mt. Pentelikon, Greece, while the Draped Female is carved of marble from Prokonnesos (Marmara)-1 in Asia Minor. If the portraits were, in fact, originally meant to be displayed together (and not reused and combined after initial installations in other monuments), this difference in quarry origins reveals interesting scenarios for the logistics of commissioning, producing, and importing statuary to the marble-bereft region of Arabia: the patron was not concerned that the pair be made of the same marble, nor did the patron “order” the “group” from a single marble quarry (he or she could have ordered it from a marble yard, where blocks of marble suitable for over-life-size statuary were waiting to be carved).

Second, the quarry sources reveal interesting

information regarding the production of statues destined for this region. For example, the scientific tests support earlier stylistic analyses of the two pieces (published long before this quarry sourcing study was undertaken) that associated the Cuirassed Emperor with an Eastern, Greek sculptural workshop (Gergel 2004; Weber 2002: 510) and the Draped Female with a workshop in Asia Minor (Weber 2002: 510). In fact, if some scholars' claims that sculptors tended to work marble from their own regions are correct (Rockwell 1990: 221; Rockwell 1993: 2-5), then it could be that these pieces were carved by different sculptors and were not commissioned from one artist. Of course, this diversity of marble sources is seen not just in this pair of the Cuirassed Emperor and the Draped Female, but in all five of the statues recovered from the Theater, so that the same conclusions hold true for the sculptural embellishment of the entire monument: clearly there was no need for the statuary to come from the same quarry source, and the five statues discovered in the Roman Theater were not originally "ordered" from a single quarry or associated sculptural workshop as a group, though they may have been erected and displayed together.

This study is also interesting in that it samples two truly colossal pieces, the Elbow of a Colossal Statue from the Temple of Herakles on the Citadel in Amman and the Tyche from the Orchestra of the West Theater in Gadara/Umm Qays. Though this may be entirely coincidental, both pieces are associated with the same list of possible quarries: Paros-2 or five possible quarries in Turkey, Aphrodisias, Prokonnesos (Marmara)-1, Mylasa, Uşak, Heracleia.

Conclusions

Though finds of marble statuary in marble-poor regions such as Roman Arabia demonstrate that some patrons went to considerable expense and trouble to ship all scales (colossal to miniature) of statuary far inland to adorn Graeco-Roman building types, this study has provided specific data about quarry origins (or possible quarry origins) for nine statues from several major monuments in Philadelphia/Amman (the Roman Theater and the Great Temple) and Gadara/Umm Qays (the Western Theater and the Colonnaded Street). With this specific data at hand,

future studies will first and foremost continue to sample and source marble statues erected in public, urban contexts in Roman Jordan, but also focus on refining our understanding of trade networks and road systems that facilitated the transport of marble artifacts from the ports cities on the Levantine coast inland to such sites as Philadelphia/Amman, Gadara/Umm Qays, Gerasa/Jarash, and Petra.

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THE 2009 ‘AYN GHARANDAL SURVEY AND PRESERVATION PROJECT

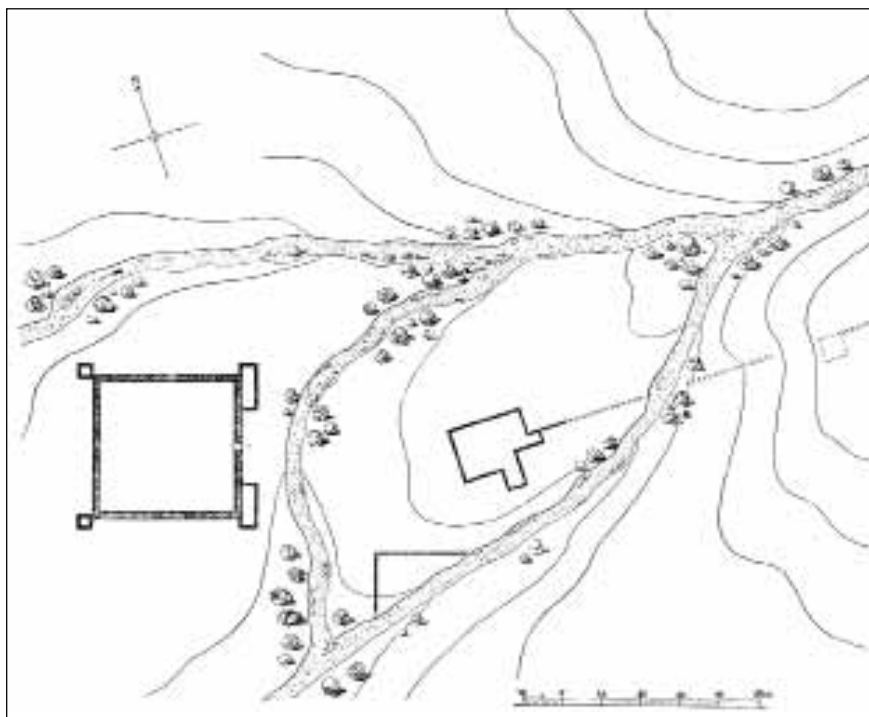
Robert Darby, Erin Darby, and Andi Shelton

Introduction

The 2009 season marked the initial investigation of ‘Ayn Gharandal by the ‘Ayn Gharandal Archaeological Project.¹ The site lies ca. 100km N of the Gulf of ‘Aqaba, ca. 40km SW of Petra, and ca. 200.0m W of the mouth of Wādī Gharandal on the eastern edge of the Wādī ‘Arabah. The ruins rest alongside the modern paved road running E from the nearby Dead Sea highway. The presence of an artesian spring in

the mouth of the wadi presumably served as the reason for human occupation at the site.

‘Ayn Gharandal and its surroundings were visited by many of the early twentieth century explorers to the region (Frank 1934: 231-32; Glueck 1935: 39-40). Alois Musil was the first to record the ruins of a Roman *castellum* at ‘Ayn Gharandal in 1902 (Musil 1907: 193-97; **Fig. 1**). Musil’s description of the site also includes at least two additional structures near the fort, as



1. Musil’s plan of ‘Ayn Gharandal (Musil 1907: 196, fig. 142).

1. The 2009 ‘Ayn Gharandal Survey and Preservation Project was funded by a Samuel H. Kress Foundation Fellowship awarded by the American Center of Oriental Research in Amman. The survey was conducted at ‘Ayn Gharandal from August 3rd to the 9th, 2009 by Robert Darby, Erin Darby, and Jim Bucko. We would like to extend our sincerest gratitude to Dr. Fawwaz Al-Khraysheh, Director General of the Department of

Antiquities of Jordan, Dr. Barbara Porter, Director of ACOR, Dr. Chris Tuttle, Associate Director of ACOR, and Dr. Bethany Walker for their continual support and assistance. We would also like to thank Dr. Sawsan Alfakhry, Director of Aqaba Antiquities, and Khalil Hamdan, Aktham Oweidi, and Rula Qussous of the Jordanian Department of Antiquities in Amman for all their help with the project.

well as miscellaneous walls, towers, and a basin in the vicinity of the spring. Many of these structures do not appear in his drawing. Unfortunately, Musil's plan of 'Ayn Gharandal remains the only recording of the site's ruins. T.E. Lawrence also passed through 'Ayn Gharandal in 1914 as part of the Palestine (Wilderness of Zin) Survey. Lawrence notes the presence of two structures at the site and references Musil's work (Woolley and Lawrence 1915: 14-15).

'Ayn Gharandal has received moderate attention from archaeologists in recent years (Raikes 1985: 101; King *et al.* 1989: 207; Smith *et al.* 1997: 59-60; Henry *et al.* 2001: 1-19; Gibson 2007). The site, however, has not been the primary focus of their work. Rather, it has been included as part of larger regional surveys. Pottery collected from the surface in these surveys (King *et al.* 1989: 212-13; Smith *et al.* 1997: 59-60) suggests the site was occupied from the Nabataean through Roman/Byzantine periods. While these recent projects have produced important results for the site's regional context, little new information has emerged about the site and its structures.

It has long been believed that the name Gharandal is derived from *Arieldela* listed in the *Notitia Dignitatum* (Or. 34.44) as the location of the *Cohors II Galatarum* (Musil 1907: 195, n. 20). The name also appears in the Beer Sheva Edicts as *Ariddela* (frag.V, line 5). Alternately, Walmsley has argued that Gharandal in the southern Ghor is a more likely candidate for *Ariddela* (Walmsley 1998: 433-41). A total lack of any evidence from 'Ayn Gharandal confirming its identification leaves the ancient name of the place and the unit garrisoned there a matter of scholarly speculation. Moreover, the occupational history of the site during the pre-Roman and post-Byzantine periods remains unclear.

Overview of Goals and Procedure for the 2009 Season

The goals of the 2009 'Ayn Gharandal Survey and Preservation Project were as follows:

- Record all visible architectural remains, produce a preliminary state plan, and generate 3-D models of the site;
- Collect and record all material culture from the surface;
- Establish a permanent and expandable (200

m²) site grid for future excavation;

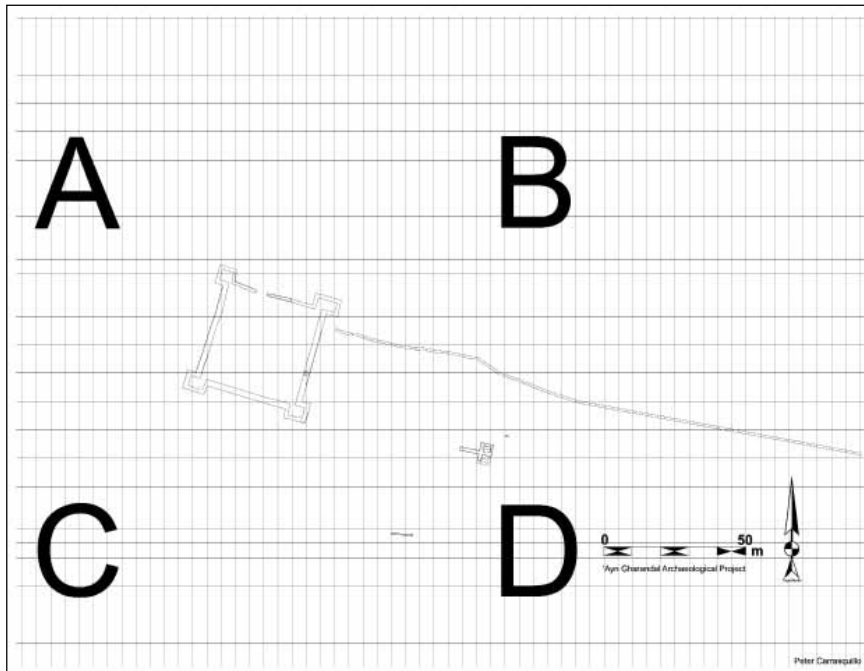
- Preserve the threatened remains already exposed by illicit digging.

A new plan of the site was generated in the 2009 season that includes a bathhouse, a fort, an aqueduct system, and one possible domestic structure. The remains were surveyed and programmed into AutoCad by James Bucko (independent researcher); and subsequent plans and 3-D models were generated from this data by Peter Carasquillo (North Carolina State University).

Additionally, all surface materials found in and around the main structures were collected for analysis. The fort and the possible domestic structure were surveyed by area, while the bathhouse was divided into 5.0m x 5.0m squares. The resulting materials were given to the excavators under permanent loan from the Jordanian Department of Antiquities and were shipped to North Carolina where they were analyzed by Andi Shelton (independent researcher).

A 200.00m² site grid was established, with a temporary bench mark (TBM) located along the E wall of the fort. The entire site was divided into 5.0m x 5.0 m squares, with the TBM at the center, thus creating four quadrants. The N grid line was oriented on geographic or true north rather than magnetic north. The NW quadrant is entitled quadrant A, the NE is quadrant B, the SE is quadrant C, and the SW is quadrant D. Within each quadrant the squares are numbered according to row and then by column. Square names include the quadrant, the row, and the column, as in Quadrant D, Row 2, Column 1, or D:2/1. The grid can be expanded in any direction from the center point, providing flexibility for subsequent excavation and survey seasons. Areas are named after the main structures and include the squares in which those structures are found as well as the squares in the structures' general vicinity (**Fig. 2**).

Finally, photographs taken and sent to the DoA in 2007 (Gibson 2007) and subsequent visits to the site by the authors revealed that two rooms of a Roman bathhouse had been looted. Sand presumably from inside the structure was piled around the rooms and contained many visible bricks and *tubuli* (**Fig. 3**). The looting also exposed at least four walls of one room in the bathhouse. Every wall was covered with plas-



2. Site plan with grid quadrants.



3. Bathhouse with mound of looters' debris.

ter and at least two contained springers and voussoirs for a barrel vault (**Fig. 4**). In order to protect the standing architecture and the *in situ* plaster, the entire structure was backfilled.

AREA DESCRIPTIONS

I. Bathhouse

Located in D:5/13, D:6/11, D:6/12, D:6/13, D:6/14, D:7/12, D:7/13, and D:7/14.

Architectural Remains

In the two looted rooms of the bathhouse the

interior faces of several walls were visible (**Fig. 5**). These include some portion of the N, S, E, and W walls from the Northern Room and the N and W walls of the Southern Room. After concluding the surface survey of material around the bathhouse, the very tops of the visible walls were cleaned in order to ascertain the external faces of these walls. Several of the walls still exhibited remains of concrete for the vaulting of the structure, including the central wall between the Northern and Southern rooms, the W walls of both rooms, and the E wall of the Northern



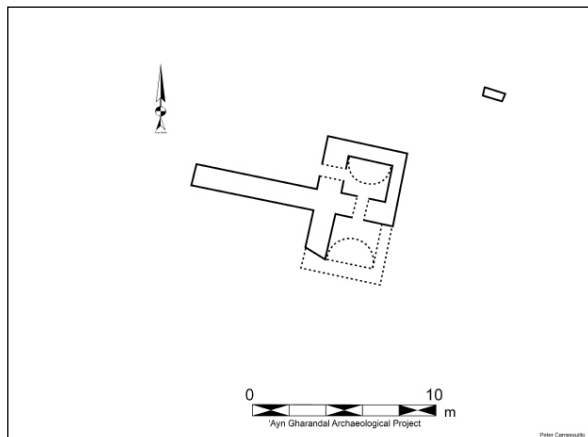
4. Overview of the Northern room of the bathhouse.



5. Overview of the bathhouse.

Room. Although much of the structure remained buried in the surrounding dunes, it was possible to create a plan of the two exposed rooms (**Fig. 6**).

The Southern Room was badly disturbed. The only well-preserved wall was the N wall, shared with the S wall of the Northern Room. The face of this N wall contained thick plaster, and three courses of roughly cut stones were



6. Plan of the bathhouse.

visible. The W wall also contained plaster but was poorly preserved and still largely buried. Although only one course of the W wall was visible, at least one voussoir was identified, proving that the Southern Room was barrel vaulted. Finally, the E wall of the Southern Room was almost entirely robbed out; and the S wall was totally absent (**Fig. 7**).

In the Northern Room the walls were better preserved, though they varied in quality. The N and S walls of the room were constructed of undressed stones and chink stones, and both walls were missing any outer finished layer of plaster. The S wall, which was shared with the N wall of the Southern Room, contained concrete and rubble, extending half way across the wall on its eastern side. At the time of the survey, only two courses of stones were visible in the sand, though earlier photographs taken in February, 2009 show a doorway leading to the Southern Room (**Fig. 8**).



7. The Southern room of the bathhouse.



8. Doorway in S wall of Northern room of the bathhouse (photo courtesy of Niemi, T. and Rucker, J.).

The W wall of the Northern Room was barely visible, but a row of springers was identified just above the surface. The SW corner of this wall remained intact, but the NW corner was disturbed and partially collapsed. Earlier photographs show a doorway in the W wall, currently covered with wind-blown sand (Gibson 2007).

Finally, the E wall was the best preserved with at least two stone courses visible. Its plaster was in fine condition with many layers, including a finished outer veneer. Two voussoirs on the S end of the wall exhibited diagonal tooling marks and preserved the remains of bonding cement (**Fig. 9**). In the NE corner another voussoir was placed vertically (rather than horizontally). The plaster and overarching voussoir in the NE corner impeded an exact measurement for this interior corner of the room.

In the process of cleaning the looters' deposit, an undisturbed wall was discovered running E-W from the central wall between the two rooms. The evidence for this wall includes its SE corner with the Southern Room as well as stones to the W of the bathhouse following the central wall's orientation. The corner with the Southern Room preserved at least one layer of plaster. If this E-W wall represents another room/courtyard, it probably lies adjacent to the Northern Room, as suggested by the previous photographs recording a doorway in the W wall of the Northern Room.

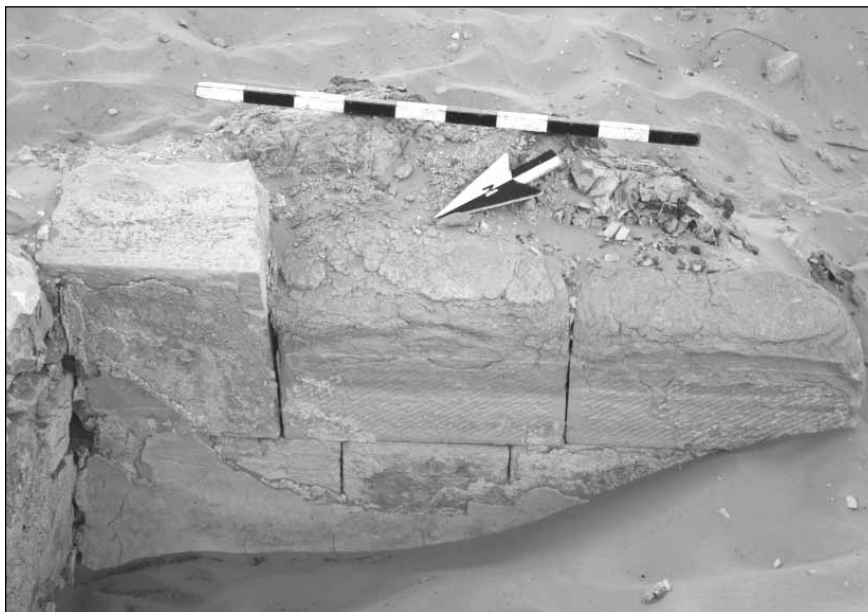
Object Distribution

Because the bathhouse was looted, the surface around the visible walls was divided into 5.0m x 5.0m squares in an attempt to reconstruct the looters' activities as well as the relationship between the looters' debris and the actual deposition of objects in the bathhouse prior to disturbance. As expected, different squares produced different distribution patterns (**Figs. 10, 11**).

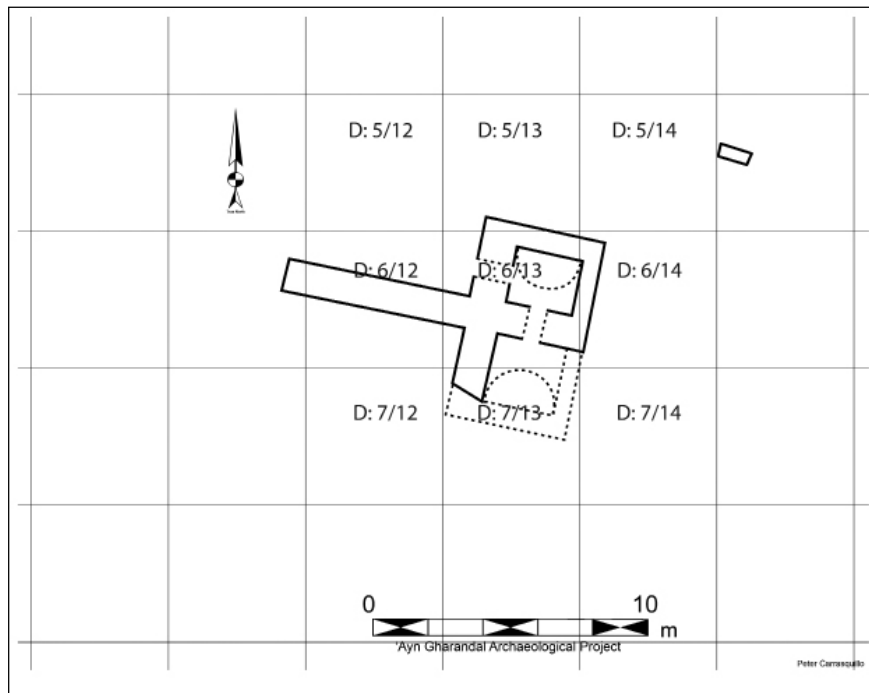
The largest number of hypocaust bricks came from Square D:5/14, directly to the NE of the Northern Room of the bathhouse. While bricks were found in other areas, it was very clear that the looters pushed most of the debris from the bath into the area N of this room. Further, the three largest concentrations of *tubuli* were found in squares adjacent to the N and E walls of the Northern Room (D:5/13, D:5/14, and D:6/14). This suggests the *tubuli* were intact in the walls prior to their disturbance by the modern looters, a hypothesis that is further supported by the number of tube fragments with plaster and concrete adhering to the surface.

In general, the finds associated with the bathhouse were significantly more modest on the W side (D:5/12, D:6/12, D:7/12), which may indicate the W side of the structure was not disturbed by looting. This supposition is further supported by the layers of hardpacked earth underlying the thin layer of loose sand created by the looters.

Additionally, only a few objects were found



9. Detail of in situ voussoirs in the E wall of the Northern room of the bathhouse.



10. Area of the bathhouse with associated grid squares.

Square	Potsherd	Tubuli	Brick/Tile	Other
D:5/14	9	89	172	
D:6/14	3	117	48	
D:7/14	1	2	0	
D:5/13	0	124	15	
D:6/13	2	30	17	Painted plaster fragment
D:7/13	0	24	6	
D:5/12	14	1	3	
D:6/12	8	10	0	
D:7/12	0	0	0	
TOTAL	37	397	261	1

*Table data reflects objects counted in the field before ceramic analysis.

11. Bathhouse object distribution table.

in the southern row of squares (D:7/12, D:7/13, D:7/14). One explanation is that the Southern Room was disturbed prior to the recent looting by seasonal flooding from the wadi. Moreover, both N-S walls of the Southern Room (which is located primarily to the north of D:7/13) were disturbed, particularly on the eastern side.

The small number of pottery finds coming from this 15.0 m x 15.0 m area must be compared with the large number of sherds from the fort area and 62 sherds in the 15.0 x 10.0 m area of the possible domestic structure. This deposition may indicate that only minimal pottery originally remained on the floors of either exposed room. If pottery had been present, it would have consti-

tuted complete vessels of interest to the looters; however, the general lack of potsherds suggests that little was preserved.

Finally, the large number of burnt hypocaust bricks, floor tiles, and *tubuli* fragments indicate that the Northern Room or both rooms were related to the heating system of the bath—either the *caldarium* or *tepidarium*. Furthermore, in all four corners of the Northern Room small amounts of ash were visible due to chimney flues from this heating system. The bricks and floor tiles also prove that the looters disturbed the Northern Room to considerable depth, ripping through the floor and pulling up the sub-floor material.

II. Fort

Located in A:1/8, A:2/8, A:2/7, A:3/7, A:4/7, A:5/7, A:5/6, A:6/6, A:7/6 A:7/5, A:6/5, A:6/4, A:6/3, A:6/2, A:6/1, A:5/1, B:5/1, B:5/2, B:4/2, B:4/1, B:3/2, B:3/1, B:2/1, B:1/1, D:1/1, D:2/1, D:3/1, C:4/1, C:3/1, C:2/1, C:1/1, C:3/2, C:3/3, C:2/3, C:2/4, C:2/5, C:2/6, C:1/6, C:1/7, and C:1/8.

Architectural Remains

Only small segments of the fort walls were visible, though certain key sections of walls were identified, including two corner towers (NW and SE). Because the ruins of the fort lie buried in deep sand, it was not possible to take exact measurements for the fort walls. Based on the mounded sand and the few visible wall segments, the fort measured ca. 38.0 m x 38.0 m, which is consistent with Kennedy's 2004 assessment of the site (Kennedy 2004: 210).

Evidence for the fort's corner towers includes built construction visible in the SE and NW corners, as well as mounded debris on all four corners of the fort. Musil's odd reconstruction of the fort, with two rectangular towers on the NE and SE, appears to be entirely conjectural. Rather, the remains of the SE tower walls indicate the presence of a square tower; and the debris in the NE corner of the fort does not show any irregularity. The plan of the fort appears to follow the standard Late Roman *quadriburgium* design

with four square projecting corner towers (**Fig. 12**). Lastly, a possible gate was recorded along the N wall of the fort (**Fig. 13**). Musil locates the gate on the E, which cannot be substantiated.

Object Distribution

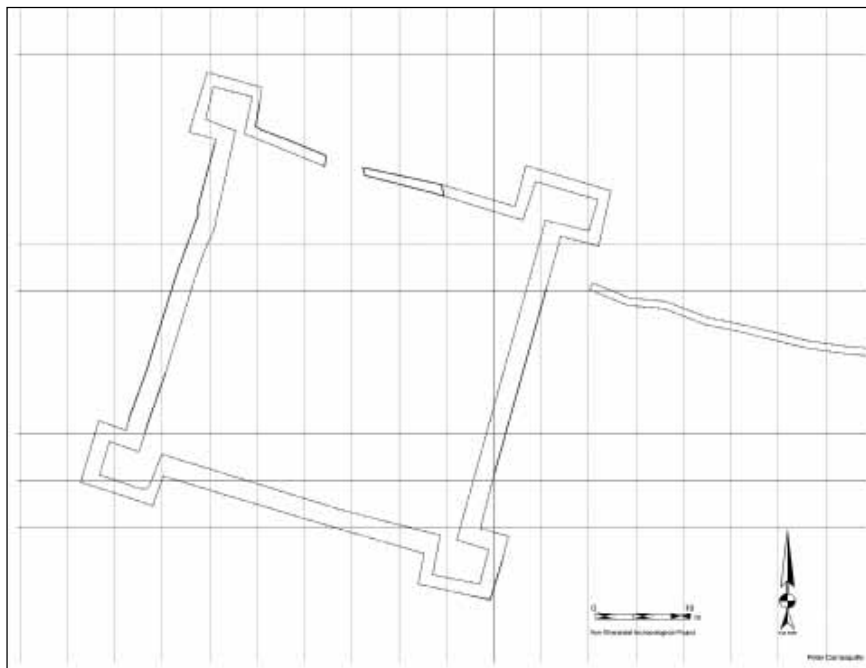
The sherds collected from the fort represent many different vessel types, sizes, and fabrics. The surveyed area was dictated by the visible mounds around the fort walls and corner towers and totaled approximately 40.0 m x 40.0 m. Most of the pottery was found on the tops of the walls and the sloping debris outside the walls, while relatively few sherds were found in the sloping sand and debris inside the walls, with little to none in the center of the fort. The paucity of finds in the center may be due to deep sand accumulation.

III. Possible Domestic Structure

Located in D:12/6, D:12/7, and D:12/8.

Architectural Remains

One wall of a structure was detected S of the modern road. This wall line may be part of a domestic structure. Although the visible wall sits at the same elevation as the modern road, the depth of the bedrock indicates much of the structure may still be extant. Of further interest, this structure does not appear to follow the same



12. Plan of the castellum.

directional orientation as the fort or bathhouse but lies on a different axis.

The E-W wall measures 7.54 m in length and ca. 0.67 m in width (**Fig. 14**). This wall line is comprised of fairly rough or uncut rocks and stones. According to Musil's plan, this is the E-W wall of a large structure SE of the fort.

Object Distribution

More pottery was recovered in this small flat area than in the entire area of the bathhouse, despite the bath's larger size and deeper soil deposition, full of recently looted remains. The pottery collected reflects a broad range of shapes, sizes, and fabrics, including fragments of at least one oil lamp.

IV. Aqueduct

Architectural Remains

A line of mounds running E from the fort to Wādi Gharandal was recorded (**Fig. 15**). Musil's plan shows a conjectural line of stones extending from the wadi to a large structure, now identified as the bathhouse. He erroneously believed this to be a defensive wall guarding the spring (Musil 1907: 196). This feature bears the markings of an elevated aqueduct system, based upon the regular spacing between piers and its apparent origin at the source of the spring. The total length of the aqueduct is ca. 190.3 m, and it is ca. 0.78 m wide. The aqueduct line is broken in one place, and in another area a separate structure appears to adjoin the aqueduct to its S.



13. Possible gate in the N wall of the castellum facing south.



14. Wall of possible domestic structure.



15. Line of the aqueduct running E towards Wādī Gharandal.

It is possible that the adjacent structure that was observed is part of the bathhouse, but that is unclear at present. Moreover, Musil did not show the “defensive wall,” i.e. the aqueduct, continuing past the bathhouse into the NE end of the fort, which is now clear in the new plan. No pottery was collected from this area.

Ceramic Analysis

During the 2009 'Ayn Gharandal survey season 1,344 ceramic sherds were collected, including pottery (668), lamps (3), *tubuli* (410), and bricks (263). The ceramics were analyzed according to survey area. Based primarily on fabric, the sherds were categorized into broad chronological groups (Fig. 16). Diagnostic sherds were analyzed further to determine more specific dating, form, and production origin.

Sample Catalogue

The following is a sample of pottery collected from the area of the fort during the 2009

survey (Fig. 17). This material, along with additional material from other areas of the site, will be published more fully in future reports.

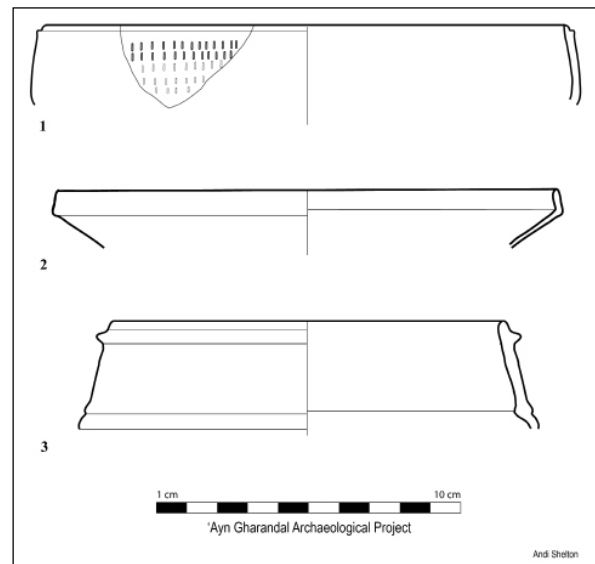
Figure 17.1. Bowl with rouletting. Notched rim. Thin white slip on exterior. D. 17 cm. Fabric: 2.5YR6.6; Exterior: 2.5YR5/6; Interior: 2.5YR6/6.

Figure 17.2. Semi-fine ware carinated bowl. D. 16 cm. Fabric 2.5YR5/1; Exterior 2.5YR6/1; Interior: 2.5YR5/1.

Figure 17.3. Jar/Cooking pot with triangular rim. Red slip on exterior. D. 14 cm. Fabric: 2.5YR6.6; Exterior: 10YR5/6; Interior: 2.5YR6/6.

Ceramic Analysis

The majority of the pottery sherds consisted



17. Selection of pottery collected from the area of the castellum.

Chronological Frequency							
AREA	Nabataean	Nabataean/ Early Roman	Roman	Late Roman/Early Byzantine	Byzantine	Unknown	Total Sherds by Area
Bath	0	3	10	20	4	2	39
Fort	3	45	235	216	48	23	570
Domestic? Structure	0	6	22	17	13	4	62
Total Sherds by Period*	3	54	267	253	65	29	671

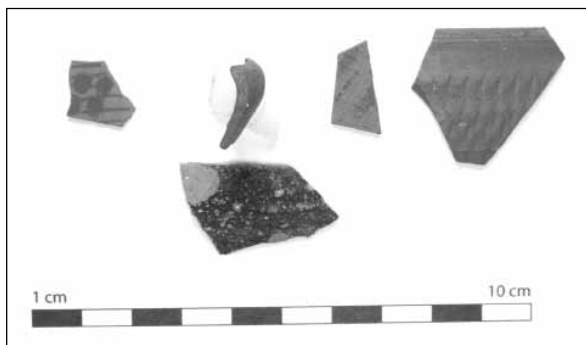
* Chronology follows Kennedy 1981: 8-9.

16. 'Ayn Gharandal pottery chronology chart.

of coarse ware dating from the Early Roman (ER) –Early Byzantine (EB) periods (second through fourth/fifth centuries A.D.). Most of these sherds were extremely small, weather-worn body fragments, thus rendering further identification and specific dating difficult. Most sherds appear to come from coarse table wares or small-medium storage vessels, with a dearth of cooking wares and large storage vessels. The small amount of fine wares recovered, mostly from the Fort, date to the Late Nabataean-Early Roman periods (**Fig. 18**). It is interesting to note the absence of Late Byzantine/Early Islamic pottery.

While most of the pottery appears to have been produced in or around the Petra region, a fair quantity of sherds, 23 total, consist of ‘Aqaba ware, originating from ancient Aila on the Red Sea. One imported amphora sherd found in the possible domestic structure is most probably a Peacock and Williams Class 45 amphora, which is fairly common in the Eastern Mediterranean. Another 8 sherds remain unidentified and are probably imported. Only 4 handmade sherds were identified. In sum, the surface pottery collected in the 2009 season indicates occupation at ‘Ayn Gharandal peaked during the Early Roman through Byzantine periods, at which time the site was supplied primarily with ceramics from the major regional production centers.

The bath area yielded a large quantity of *tubuli*, both round water pipes and rectangular chimney flues (**Figs. 19, 20**). Although no exact parallel for the water pipes has been identified thus far, they appear most similar to fourth century pipes found elsewhere in the region. The pottery from the bathhouse dates predominantly to the Late Roman/Early Byzantine period.



18. A sampling of Late Nabataean/Early Roman fine ware from the castellum.

A large number of unstamped hypocaust bricks were recovered from the bathhouse. The vast majority of bricks were *bessales* (ca. 18.7 cm x 18.7 cm with a thickness of 2.7 cm). However, fragments of larger bricks, probably *sesquipedales* and *bipedales*, were also recovered. The heavy ash and soot deposits found on many of the *bessales* indicate their use as *pilae* to support the elevated floor, which was built using the larger bricks.

Site Synthesis

The results of the 2009 ‘Ayn Gharandal survey have contributed significantly to our understanding of both the site’s architecture and its rich historical past (**Fig. 21**). First, the past season has confirmed the presence of a previously unknown bathhouse at the site. In contrast, Musil originally identified only one of the three structures recorded on his plan. The largest structure is correctly labeled as a Roman fort; but Musil’s second structure, to the E of the fort,



19. Water pipe fragments from the bathhouse.



20. Chimney flue fragments from the bathhouse.

lacked any identification. More recently, the building has mistakenly been labeled as a reservoir (Kennedy and Riley 1990: 208; Kennedy 2004: 210). When the new plan is compared with Musil's, the external walls of the Northern and Southern Rooms, as well as the W wall of the bathhouse, all appear to correlate with the unidentified structure E of the fort, suggesting they are the same building. Further, Musil's drawing preserves at least three more major walls of the structure that are not currently visible. If Musil's drawing is accurate, the bathhouse is considerably larger than is presently visible and may be well-preserved in several locations.

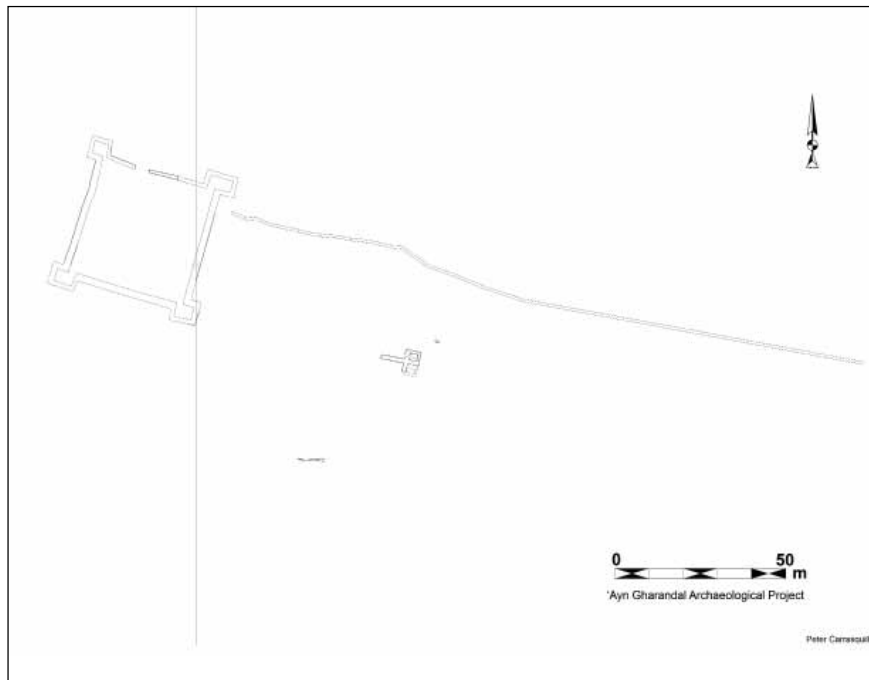
The recent season also corrects other details on Musil's plan. Renewed investigation shows that the fort towers appear to follow the standard *quadriburgium* pattern, and the gate may be located in the fort's N wall. Further, Musil did not recognize that the E fort wall connects to an aqueduct system that appears to have served both the fort and its bathhouse. Finally, the second unidentified structure, which Musil recorded SE of the fort, may be domestic. This interpretation is based on the pottery collected around its now buried walls; however, this identification remains tenuous.

Finally, Musil orients the bathhouse due N in contrast to the fort, which he orients to the NE. The new plan shows that the bathhouse is clear-

ly oriented in alignment with the fort towards (cardinal or magnetic) north, as is the case in a number of other Roman army camps and bathhouses throughout the region (R. Darby forthcoming dissertation). The fort and bathhouse at 'Ayn Gharandal parallel other Late Roman sites in the region in both design and geographic location, controlling the scarce water resources along an important N-S trade route through the Wādī 'Arabah. The construction of the road and the numerous military installations along it including, Bersabee, Chermela, Thamara ('En Hazeva), Zoara, and Arieldela (Gharandal), are attributed in the *Onomasticon* of Eusebius to the transfer of the *Legio X Fretensis* from Jerusalem to Aila at the beginning of the fourth century A.D. (*On.* 11, 42, 50, 118, 129; Erickson-Gini 2007: 91; Millar 1996: 188). In a broader historical context, the Roman military presence at 'Ayn Gharandal during Late Antiquity appears directly related to the reorganization and redeployment of the legions of *Arabia* and *Palaestina* to the eastern frontier under Diocletian and the Tetrarchs in ca. 300 A.D. (Parker 2006: 541-62; Erickson-Gini 2007: 98; Kennedy and Falahat 2009: 150-69).

Future Excavation and Preservation

In the 2009 season the 'Ayn Gharandal Archaeological Project completed a new site plan,



21. 'Ayn Gharandal site plan.

created an expandable site grid, collected surface materials, preserved the endangered remains of the bathhouse, and generated a hypothetical 3-D model of its ruins (**Fig. 22**). In 2010, test excavations will be conducted in the fort, the bathhouse, and the possible domestic structure in order to establish the levels of soil and occupational deposition, clarify architectural features, and recover the first stratified remains from the site. The project will also clear the looters trenches in the bathhouse to further record its architectural remains and aid in developing a long-term conservation strategy before backfilling the structure.

Future seasons will collect sherds from the areas surrounding the aqueduct, the area W of the fort, and the area S of the modern road. The project will also map structures on the periphery of the site--a possible tower on the mountain ridge to the SE, an ancient roadway to the SE, and at least two structures at the mouth of the wadi. Excavations in upcoming seasons at 'Ayn Gharandal will continue first in the areas investigated during the 2010 season before expanding into adjacent squares.

Preservation will remain an integral aspect of the project's goals. Two factors immediately affect Gharandal. First, the site's proximity to the Dead Sea highway makes it an excellent candidate for tourism, as well as potential looting. Second, the future completion of any canal between the Dead Sea and the Red Sea and the resulting construction, tourism, and business

influx to the area make it essential to identify all the remains at 'Ayn Gharandal and to protect and preserve them. Because the site has already been looted at least once, looters know of its whereabouts, regardless of the amount of visible structures. For that reason, backfilling is a temporary solution to the preservation and looting problem. A more effective long-term solution is full excavation and site preservation so that the antiquities are systematically recovered and delivered to the Department of Antiquities for further research and museum display.

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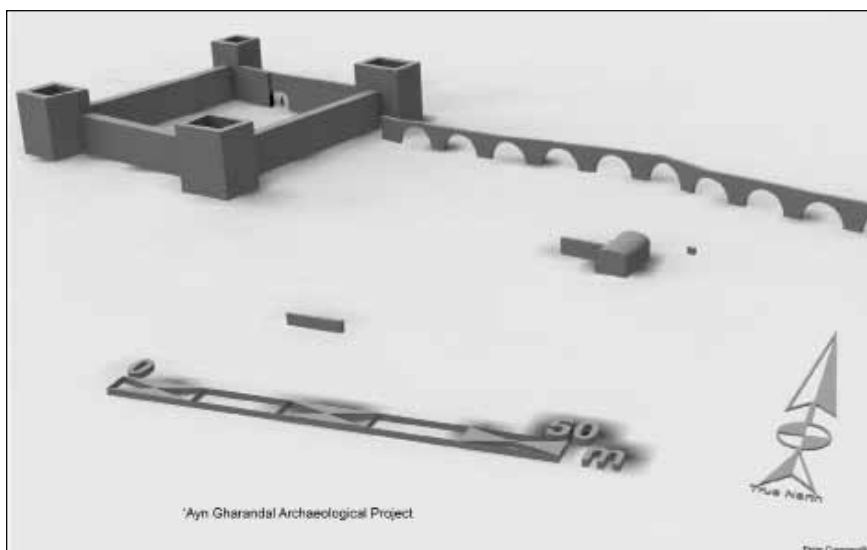
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22. Hypothetical 3-D digital model of 'Ayn Gharandal.

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ARCHAEOLOGISTS DOCUMENT RUINS AND PEOPLE AT UMM AL-JIMĀL IN JANUARY 2010

Bert de Vries

During January 2010 twenty four archaeologists held a multifaceted field season at Umm al-Jimāl. The goal was to complete a site presentation begun in January 2009 - to make the site accessible and inviting to the people of Umm al-Jimāl, the people of Jordan and the people of the world, with or without actual travel to the site (De Vries *et al.* 2009).

As diverse as the potential audience, the team members came from Calvin College (Grand Rapids Michigan), Open Hand Studios (Chicago Illinois), the Department of Antiquities (Jordan) and the village of Umm al-Jimāl itself.

The central goals of this multifaceted approach are summed up as follows:

1. Umm al-Jimāl Virtual Museum and Umm al-Jimāl in Reality (Museum-on-the-ground). The Virtual Museum, located on the Internet, includes a virtual walking tour which matches an actual walking tour at the site itself. A museum installation design was prepared for the Museum Visitor Center, which is about to be completed by the Department of Antiquities. This Museum-on-the-ground is being matched by the Virtual Museum on the Internet. To see the initial stages of this virtual installation please visit the project web site www.ummeljimal.org.
2. The Cultural Heritage of Umm al-Jimāl village and the Hauran: Documentation included study of the relationship between the ancient site and the modern community. This included recording of remains of twentieth century inhabitation of Byzantine Umm al-Jimāl – Druze remodeling of ancient buildings and Mesa’eid remainders of tent sites among the ruins. In addition the traditional culture of Umm al-Jimāl village and the Southern Hauran was documented through interviews and

the filming of traditional preparations and arts, like bread making and Rababeh playing. This cultural heritage is to be preserved in two ways: First, plans were developed for the creation of a cultural heritage center to be operated by the community and the municipality of Umm al-Jimāl. Second, a reference manual for teachers was written for the Ministry of Education to enable teachers in Jordan’s school to use Umm al-Jimāl as a case for teaching Jordanian pupils both their archaeological and their traditional heritage.

3. Visual documentation: The team used an array of cameras to take high definition still photographs and videos documenting both the archaeological site and the heritage of the modern residents.

To achieve these goals the project staff was divided into six teams, each with their own areas of specialized expertise:

The Video Production team, led by Jeff DeKock and Kori Francis, documented the entire site in film and still photography and filmed numerous interviews with experts and local heritage interviewees (**Fig. 1**). It is producing five short films to be used in a projection room in the new site museum as well as on the Umm al-Jimāl website. For viewing these films go to www.ummeljimal.org/media.html.

The Virtual Museum and Site Development team, led by Paul Christians, created a visual tour of the site using elaborate photography techniques, developed the script and signage for such a tour, and has developed the plans for the installation of the site museum and walking tour on the ground with staff from the Department of Antiquities. Visit the Virtual Museum at www.ummeljimal.org/museum.html.

The Virtual Reconstruction team led by



1. Kori Francis filming interview (6 January 2010. Photo by Bert de Vries).

Jacob Speelman continued photogrammetric field documentation for the three dimensional portrayal of two buildings, the Umayyad House, which is to serve as the new Museum Visitor Center (**Fig. 2**), and House XVIII, famous for its double windows. This work is the initial step in the virtual reconstruction of the Byzantine town in a digital three dimensional image.

The Modern Cultural Heritage team led by Sally de Vries and Muaffaq Hazza documented the tent and house occupation of the ancient site during the past century. To study the linkage between ancient and modern Umm al-Jimāl nu-

merous members of the community were interviewed to document their remembered heritage. Agreement was reached with local community leaders and the mayor of the Municipality, Saleh Fallah, for the creation and installation of a Cultural Heritage Center to serve the local community, students from area schools and tourists, both Jordanian and international (**Fig. 3**).

The Educational Curriculum team led by Bert de Vries developed a multi-disciplined strategy for the teaching of archaeology to Jordanian students (**Fig. 4**) in the primary and secondary schools in partnership with the Ministry of Education. Under advice of ministry's curricular specialists the team is writing a teachers' reference manual with lesson plans in the subjects of civics, history, art and archaeology, and geology. An Arabic translation of this text will be published as a Ministry of Education teacher's manual. A similar manual suitable for American and European students is also in preparation.

As a component of the site presentation program the OHS team and municipality conducted a feasibility study for the restoration of the ancient water system and its adaptation for use to satisfy irrigation and animal watering needs of the modern community (**Fig. 5**).

The overriding emphasis of this documentation season was the strengthening of the relationship between the Umm al-Jimāl community, its historical and archaeological heritage and the Umm al-Jimāl Project (**Fig. 6**). This is the culmi-



2. Site Museum: Department of Antiquities of Jordan crew reconstructing Umayyad House 119 as Museum – Visitor Center (11 October 2008. Photo by Bert de Vries).



3. Large three-room Bedouin tent site between Houses 42 and 46, west of the Barracks; looking south (9 January 2009. Photo by Sally de Vries).

nation of a process begun during the excavation phase of the Umm al-Jimāl Project (Cheyney 2009) and became a major emphasis of the field-



5. Beginning of ancient Umm al-Jimāl water supply channel at its diversion point on the Wādī az-Za'atari approximately 5km NE of Umm al-Jimāl. The channel, still functional, is in foreground, the wadi in the background. (15 January 2010. Photo by Bert de Vries).



4. The future of Umm al-Jimāl: School children in al-Hirri neighborhood (7 January 2010. Photo by Bert de Vries).

work strategy in 2009 (De Vries *et al.* 2009). An analysis of this relationship, “Presenting Umm al-Jimal as a Heritage Site: Interconnecting Ancient and Modern Communities,” was presented at the Eleventh International Conference on the History and Archaeology of Jordan (Paris, June 8 2010), to be published in *Studies in the History and Archaeology of Jordan XI*.

Credits

The field work was funded by Calvin College and the Norwegian Research Council (through



6. *Archaeology and community: Team members and local residents working to protect a domestic crushed-olive fuel supply from impending rainstorm (13 January 2010. Photo by Bert de Vries).*

the University of Bergen Global Moments in the Levant grant), and received strong support from its project partners, the Department of Antiquities of Jordan and Open Hand Studios.

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THE OLDEST COMPONENTS: THE PALEOLITHIC AT UMM AL-JIMĀL

Benjamin Hoksbergen

Introduction

I had learned much, prior to my arrival in 1996, about the classical architecture and archaeology of Umm al-Jimāl, but I was surprised to find upon my first visit that the Romans were not the first people to set up residence at the confluence of Wādī az-Za‘atārī and Wādī Abū al-Kū‘. All about the surface of the ground in the Roman village area and the surrounding hilltops were scattered numerous chert artifacts. Unfamiliar with Old World lithic technology, I did not recognize the significance of this scattered assemblage of stone tools and debitage until I returned in 1998, this time as supervisor of the field work in the Area R, the Roman-era village (al-Hirri, SE of Byzantine Umm al-Jimāl). This time, armed with two years of experience in lithic analysis with a North American Cultural Resource Management firm, I set about sampling the lithics, and documented for the first time, the oldest components at Umm al-Jimāl.

Methodology

As part of the investigations of Area R, as the Roman village site was designated, an intensive survey of the area was orchestrated in order to define the limits of the village deposits, map the area, and assess the distribution of diagnostic artifacts that might indicate the breadth of time the village was occupied. The field school students who assisted with the survey were instructed to collect all chert artifacts along with any ceramics or metal objects that comprised the classical assemblage. A datum was established to the southwest of Area R, and a baseline was extended from here straight east 500m just beyond the main scatter of rubble. Transects were placed every 25m along this baseline. Each transect extended around 550m northward across Area R

up to a row of modern houses which had been constructed in the last decade along the modern highway that passes between the Roman village and the standing ruins of the Byzantine and early Islamic town. In all, an area of roughly 277,500 sq. m was surveyed. All potsherds, metal items, and non-basalt stones were collected in a 3m wide lane along each transect. All collected material was bagged in 25-meter increments along the south-north transects in order to get a rough idea of artifact distribution. A total of 17 transects were completed resulting in slightly over a 0.4% sample of all surface material in the area.

One of the most significant results of the survey was the first systematic collection and mapping of prehistoric components at Umm al-Jimāl. Upon initial analysis, it became evident that the lithics represented the entire range of Paleolithic periods. All lithic artifacts were superficially analyzed according to artifact type and were placed in the following categories: Shatter, flake, Levallois flake, blade, bladelet, random core, Levallois core, bladelet core, bifacial handaxe, scraper, and burin (see Appendix A for definitions). Each artifact was catalogued by type, provenience, date collected, color, and raw material. Since little work has been done on identifying lithic raw material sources in the area, raw material was catalogued according to its basic type (eg. chert, quartzite, limestone, etc.).

Research Goals and Theoretical Framework

The initial goals of the survey and analysis of the lithic assemblage were simply to identify the cultural affiliation of the lithic component and assess its significance for research into the culture history of Umm al-Jimāl. The potential for deeper theoretical implications, however, were

quickly recognized.

The lithic artifacts recovered in the survey reflect the entire range of Paleolithic technologies in the Levant. When compared to the more thoroughly investigated Paleolithic sites in Jordan, the assemblage is small, but the significance lies in the site's position on the landscape. Umm al-Jimāl is perched approximately 5km east of the western edge of al-Ḥarra, the Black Desert; named for the basalt bed rock which was formed as massive lava flows during the upper Tertiary and Quaternary ages. The Black Desert stretches in a broad swath between 50 and 150km wide across eastern Jordan. The basalt represents six major phases of lava flow from the Jabal Druze, a small range of extinct volcanoes in southern Syria (Bender 1974: 107) which loom 50km to the northeast of Umm al-Jimāl. The youngest flows comprise the bedrock at Umm al-Jimāl and date as recently as 65,000 BP. (de Vries 1998: 91).

This basalt, which ranges from 150-300m in thickness (de Vries 1998: 91), covers a plateau of carbonate rocks of Mesozoic age (Bender 1974). No Paleolithic tools manufactured from local basalt were recovered at Umm al-Jimāl. Identifying such tools would be difficult since the classical methods of rough dressing of basalt building stone involved percussion shaping resulting in a preponderance of basalt "flakes" scattered throughout Area R. The local basalt tends to be fairly grainy and porous, however, and it seems unlikely that it would have been utilized for chipped stone tools. Chert-bearing Eocene-Paleocene limestone, which outcrops around 35km to the south and 20km to the northwest of Umm al-Jimāl, represent the closest natural deposits of suitable lithic raw material available to the Paleolithic visitors to the area. Since all chert artifacts found at Umm al-Jimāl must be transported at least 20km from the nearest source of raw material, the lithic assemblage from Area R can provide insights into the curation of tools and mobility of people throughout the Paleolithic.

The concept of curation has been examined widely in recent years in order to explore patterns of behavior among prehistoric hunter-gatherers. Mobility is a factor in the lifeways of hunter-gatherer groups whether extant or prehistoric (Kelly 1992). The level of mobility

then is a major variable in technology. Hunter-gatherer groups that move about the landscape frequently must have a technology that allows for this type of lifestyle. The technological responses to such high levels of mobility can come in two basic forms. On one hand, the technology can be expedient. In this type of technological organization, raw materials for tools are abundant enough on the landscape that when a tool is needed, the raw material can be expeditiously procured, and the tool can be manufactured, used, and discarded on the spot. The other response is curation. Technology organized in this way emphasizes portability. Tools are produced that are light enough to carry for long distances, have multiple functions, and have long use lives (Odell 1996).

The Levantine hunter-gatherers of the Paleolithic exercised a certain level of mobility as indicated by the presence of chert tools at Umm al-Jimāl, at least 20km from their source. Undoubtedly, then, they faced constraints on their technology as a result, and organized their technology with mobility in mind. By analyzing the types of tools represented in the Umm al-Jimāl assemblage, we can identify diachronic changes in technological organization in response to mobility.

The Paleolithic Chronology at Umm al-Jimāl

Only a few artifact types can be traced to individual periods in prehistory, and often times there is considerable overlap as certain tools were used in decreasing frequency while use of other tool types slowly increased. Most Old World prehistoric traditions are identified by the *frequencies* of different artifact types instead of the mere presence of certain tools or technologies. Nonetheless, there are a few technologies that are in a general sense widely considered to be *fossiles directeurs* of specific periods, even though they may show up in reduced numbers in earlier or later periods. Only artifacts representative of these more-or-less diagnostic technologies were used in constructing the Paleolithic chronology at Umm al-Jimāl.

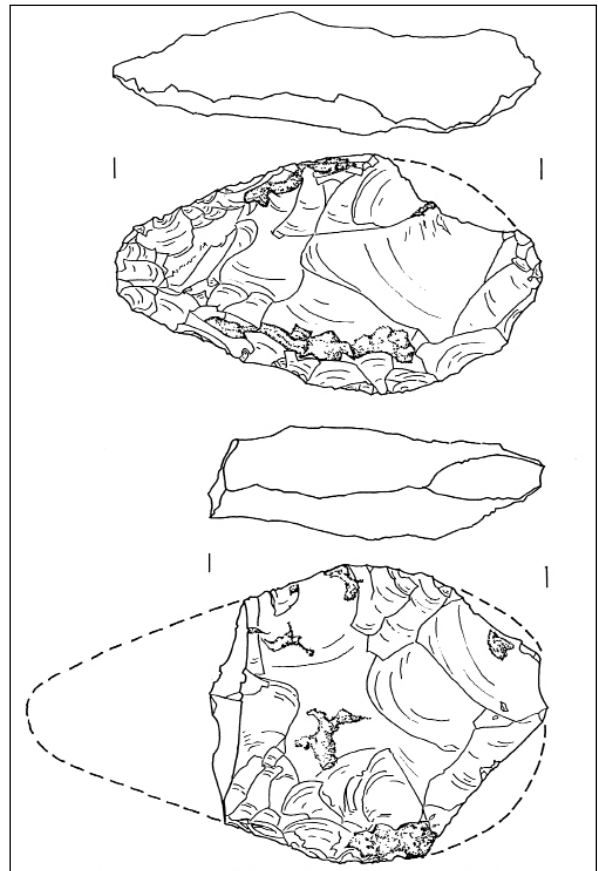
Lower Paleolithic

The Lower Paleolithic comprises the earliest evidence for prehistoric humans in the Levant. While stone technology had begun with the Old-

owan complex in east Africa by nearly 2.4 million years ago (Johanson and Edgar 1996: 250), evidence for stone tool use by humans in the Levant does not show up until at least 700 millennia later. Only one site of this antiquity has been thoroughly investigated in the Levant. This site, called 'Ubeidiya, is located in the Jordan Valley just south of the Sea of Galilee. The site consists of nearly 150m of lake and river deposits with over 60 individual cultural horizons ranging from a Levantine variety of Oldowan technology to a local variant of the Abbbevillian complex, which is characterized by crude bifacial handaxes (Goren-Inbar 1995: 103-106). The strata have been dated by their associated faunal remains and other methods to between 1.2 and 1.4 mya (Goren-Inbar 1995: 97; Johanson and Edgar 1996: 46).

'Ubeidiya represents the earliest forays by human ancestors out of Africa. These people are widely accepted to have been *Homo erectus* (Copeland 1998: 5), although no fossils directly attributable to this species have been recovered in the Levant. *Homo erectus* fossils in East Asia and southeast Europe, however, indicate that they must have passed through the Levantine corridor (Bar-Yosef 1987). A new date on *Homo erectus* bones from Java, as well as recent discoveries at the site of Dmanisi in eastern Georgia, indicate that this initial exodus took place over 1.8 mya (Johanson and Edgar 1996: 46). The Dmanisi remains probably represent the earliest hominids that passed through the Levant. These have been recently classified based on skeletal morphology as *Homo ergaster* (www.dmanisi.org), the African ancestor of *Homo erectus*.

By around 350,000 years ago, stone technology in the Levant had been refined into the Achuelean techno-complex dominated by well-made bifacial handaxes, cleavers, and picks. It is this technology which is first represented at Umm al-Jimāl where two such handaxes were recovered (**Fig. 1**). Both are distinctly ovoid and are manufactured from the same type of heavily patinated pale yellowish brown (10YR 6/2) chert with pale brown (5YR 5/2) horizontal bands and patches of chalky very pale brown (10YR 8/3) to reddish yellow (7.5YR 7/6) cortex. One handaxe measures 125.1 mm in length with a maximum width of 72 mm, although more recent flaking of



1. Lower Paleolithic artifacts recovered from Area R. Acheulean handaxes.

the handaxe near the thick end, as indicated by non-patinated flake scars, has removed a portion of the widest part of the artifact. The other handaxe has been broken roughly in half in more recent times based on the differential patina on the break. The original specimen probably measured around 159 mm in length and was 87.7 mm wide.

The handaxe was probably a fairly versatile tool. Use wear studies have indicated that handaxes were used for a broad range of activities including cutting, chopping, crushing, and digging (Keely 1980). Handaxes may have also functioned as cores for the removal of sharp irregular flakes which could have served as efficient tools for more precise cutting (Kelly 1988: 719). In this way, Acheulean handaxes were efficient curated tools. They were fairly light and compact, had multiple uses, and could be resharpened through bifacial retouched if they became dull or damaged. Both bifaces were probably discarded in Area R by their Lower

Paleolithic owners. The smaller of the two has fairly steep edges characterized by multiple step fractures. This probably indicates that the handaxe had served as a core on several occasions for the removal of sharp cutting flakes. When the edges of the biface became too steep to remove flakes of sufficient size, the handaxe was discarded. Multiple uses of this specimen are hinted at by the edge damage. In particular, a long flake extending down one face from the pointed end of the tool resembles an impact fracture, probably produced during some sort of heavy chopping activity.

The cause for disposal of the other handaxe is more difficult to determine. The breaking in half of this specimen seems to have taken place well after its initial discard based on the differential patina. Large flake scars at the wide end, however, seem to have resulted from flaking during the tool's original use life. These flake scars disrupt the regular outline of the tool and probably rendered it inefficient for chopping activity along that edge.

The dates of the Lower Paleolithic component at Umm al-Jimāl are difficult to determine since both diagnostic artifacts were recovered from surface contexts which were heavily disturbed beginning in classical times. If the bedrock in the area can in fact be dated to 65,000 BP, this would provide a *terminus post quem* for the earliest use of the site by humans, but this does not seem to be the case since the Acheulean techno-complex only lasted until about 128,000 BP in the Levant (Goren-Inbar 1995: 93).

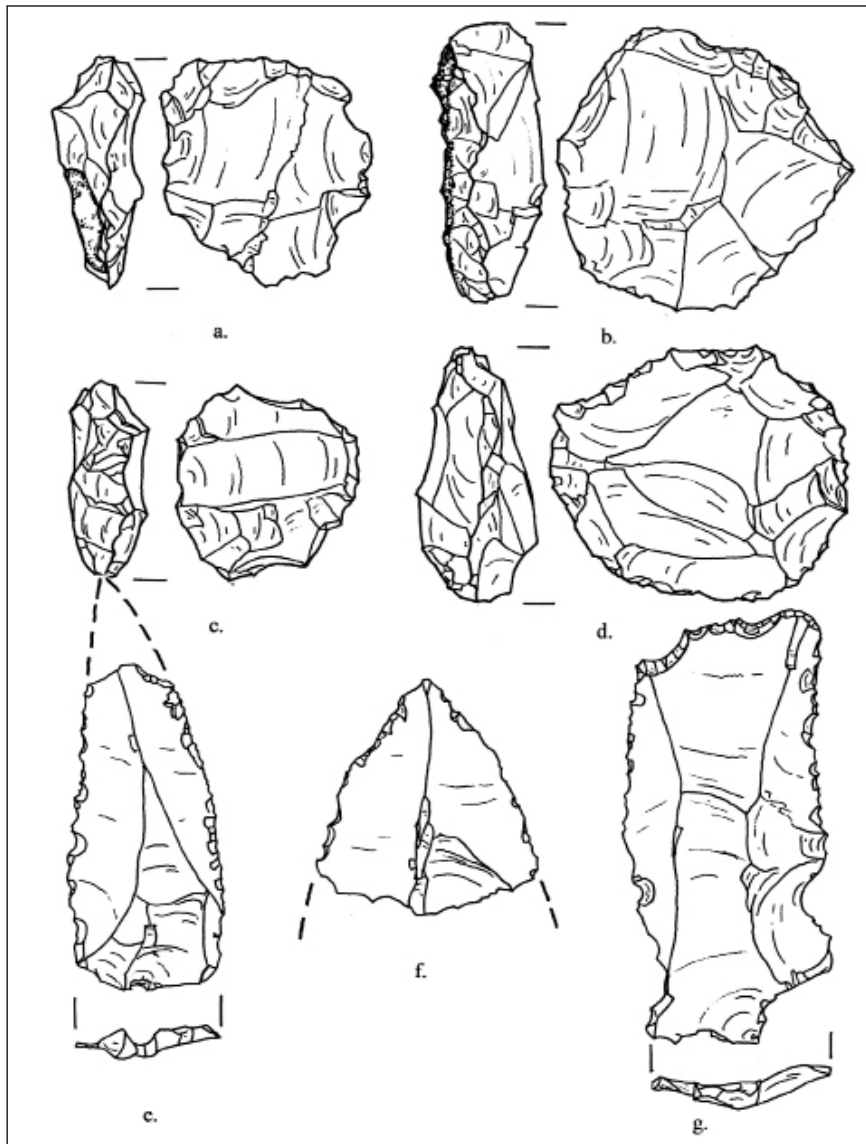
Recent work in the vicinity of Jāwā near the center of the basalt plateau has demonstrated that cave speleothems were in an active state of development at certain times throughout the Pleistocene (Frumkin *et al.* 2008). Since relatively wet conditions are required for water to permeate bedrock cracks and deposit sufficient calcite to form flow stone in caves, this indicates periods of wetter conditions during the Paleolithic. Three periods of speleothem growth were documented dating to 250,000-240,000 BP, 230,000-220,000 BP, and 80,000-70,000 BP. The former two wet periods occurred during the Lower Paleolithic and suggest that human migrations into the Huaran may have occurred during these intervals when water and resulting plant and animal resources would have been

more plentiful. The latter date occurred toward the later part of the Middle Paleolithic which is also represented at Umm al-Jimāl.

Middle Paleolithic

The Middle Paleolithic is characterized by the Mousterian techno-complex, which is represented by artifacts produced through the Levallois technique. In Europe, this technology is associated with *Homo neanderthalensis*. Neandertal remains have been well-documented throughout the Levant. This group is similar in skeletal morphology to the classic European Neandertals, and their material culture is very similar. In addition to Neandertals, some of the earliest true *Homo sapiens* (Johanson and Edgar 1995: 239) -- occasionally referred to as "Proto-Cro-Magnon" -- are also found in the region (Bar-Yosef 1995: 114). Both populations utilized the Levallois technique which persisted from around 200,000 to 40,000 years ago, thus overlapping for several millennia with earlier Lower Paleolithic traditions (Johanson and Edgar 1996: 256).

The Middle Paleolithic artifacts from Umm al-Jimāl consist of considerable evidence for use of the Levallois technique. Seven cores are demonstrably prepared as radial Levallois cores. These are made from a variety of cherts including dark yellowish brown (10YR 4/2) varieties and a yellowish gray (5Y 8/1) chert with moderate red (5Y 5/4) horizontal bands. Most of the cores are so heavily patinated that determination of the original color of the chert is impossible. The cores can be grouped into two categories by size (**Fig. 2**). The large category ranges from 50 to 59.4 mm in diameter (mean 50.92 mm) and between 62 and 97.4g in weight (mean 75.53g). The smaller category ranges from 29.5 to 45.3 mm in diameter and from 17.2 to 29.1g in weight with a mean diameter of 36.16 mm and a mean weight of 22.23g. Despite the range of sizes, all of the cores seem to have been used to exhaustion. The largest core seems to have been unintentionally broken in half during use, ending its use life. The next two smaller cores could have still produced small flakes, but these would have been of insufficient size to be used to any great extent. The small class of cores represents the fullest extent of possible reduction using the Levallois technique. When compared to Leval-



2. Middle Paleolithic artifacts from Area R. Small radial Levallois cores (a,c), larger radial Levallois cores (b,d), Levallois points (e,f), heavily-utilized Levallois flake (g).

lois cores from other sites in the Levant, these cores are anomalously small (Nancy Coinman, personal communication April 2001). This may indicate that Umm al-Jimāl was near the limits of penetration by Middle Paleolithic people up the wadi into the Black Desert. Indeed, Middle Paleolithic sites are few and far between in al-Ḥarra (Betts 1998). Elsewhere in the Levant, the Middle Paleolithic archaeological record seems to reflect a settlement pattern consisting of semi-sedentary base camps surrounded by special purpose logistical sites (Potter 1993). Umm al-Jimāl may represent one such logistical site at the outer margins of a Middle Paleolithic collecting radius.

The Middle Paleolithic component at Umm al-Jimāl is also represented by a handful of Levallois flakes and points. The assemblage probably includes many more than were classified, but millennia of weathering and trampling has eroded or broken the diagnostic faceted platforms that herald the Levallois technique. Seven tools have been identified with faceted platforms. These include two Levallois points, four utilized Levallois flakes, and one Levallois flake retouched into a side-scraper. The cherts used for the tools are similar to those represented by the cores. All of the tools bear evidence of being heavily curated, including retouch along the edges.

Upper Paleolithic

By around 45,000 years ago (Gilead 1995: 129), new lithic technologies dominated by the production of long parallel-sided blades were emerging. This marks the beginning of the Upper Paleolithic period. Only a scattered handful of human remains dating to this time have been found in the Levant, but based on finds in Europe, Neandertals may have persisted into this period, living side by side with anatomically-modern humans employing similar adaptive strategies (Gilead 1995). Much of the evidence for the Upper Paleolithic in Jordan comes from sites along the shores of dry Pleistocene lakes and marshes such as those of the Wādī al-Ḥasā area east of the Dead Sea (Coinman 1998).

Upper Paleolithic assemblages in the Levant have been divided into two basic types based on the frequencies of different artifact types. On the one hand, the Ahmarian is characterized by well-made blades which were retouched into a variety of tools including backed cutting implements and long narrow projectile points (Coinman 1998: 40). This technology is thought to have evolved from local Mousterian traditions (Gilead 1995: 130).

The other technology is referred to as the Levantine Aurignacian, based on its similarity to the Upper Paleolithic Aurignacian tradition of Europe. Indeed, it has been proposed that the Levantine Aurignacian was a result of an influx of European Upper Paleolithic people into the Levant around 40,000 years ago (Gilead 1998: 130). The Levantine Aurignacian differs from the Ahmarian in the greater frequency of scrapers and burins in the former (Coinman 1998: 40), possibly reflecting a greater emphasis on hide and bone working.

It is tempting to attribute each of the two different Upper Paleolithic traditions in the Levant to different hominids given the probable coexistence of Neandertals and anatomically modern humans there, but archaeologists have been loathe to do so. Rarely are explanations that simple. The very existence of two separate traditions is not without question, and the lack of good radiometric dates from this time complicates the problem (Coinman 1998: 56).

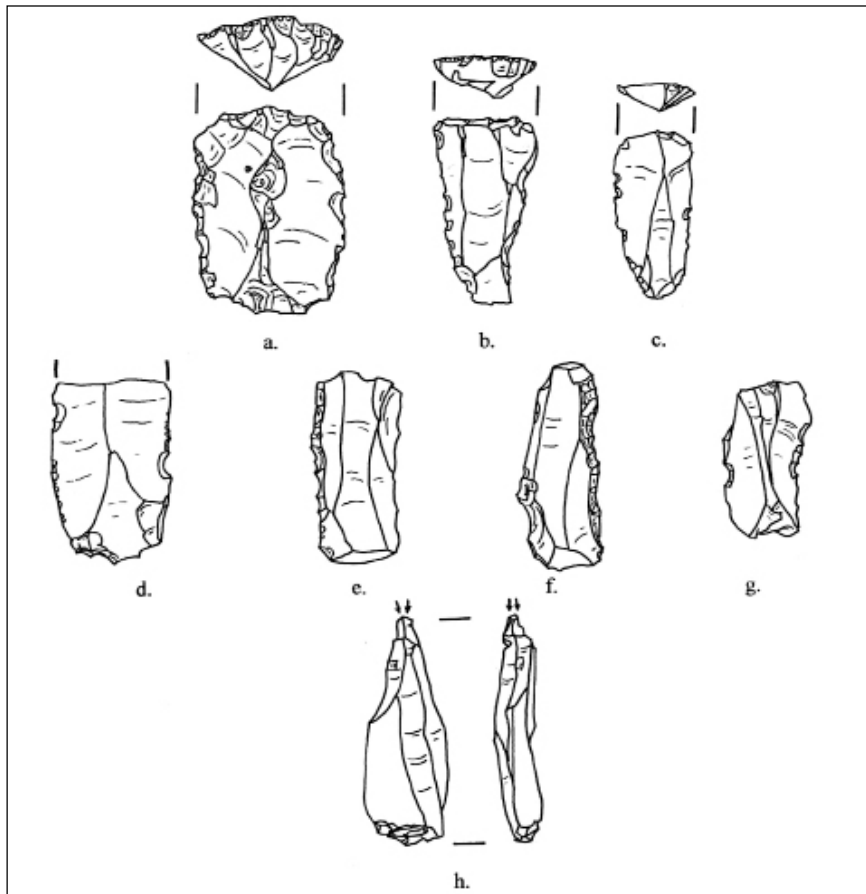
The Upper Paleolithic at Umm al-Jimāl is represented by a number of blades and blade fragment as well as scrapers of various types.

Only one artifact can potentially be assigned to one of the two traditions, namely a nosed endscraper, a tool commonly associated with Aurignacian tool kits (Coinman 1998: 40). This artifact is manufactured from coarse opaque chert with pale yellowish brown (10YR 6/2) and very pale orange (10Yr 8/2) bands and exhibits steep scalar retouch. The blades also exhibit heavy use-wear and retouch. At least 26 blades and blade fragments were recovered. These were manufactured from a broad variety of cherts including light yellowish brown (10YR 6/4), dusky brown (5YR 2/2), and pale brown (5YR 5/2) varieties. Three endscrapers manufactured from blades were also recovered. Only one of these, however, exhibits extensive retouch (Fig. 3). One polyhedral burin can also be included with the Upper Paleolithic component (Figure 3). The burin is manufactured from pale brown (5YR 5/2) chert with grayish orange pink (5YR 7/2) mottles. The working edge has been rounded off with use, probably prompting the discard of the tool. Curiously, no blade cores were recovered. Although relying on negative evidence is a faux pas, this may indicate that blade cores were too large to be efficiently transported on long collecting forays. Upper Paleolithic hunter-gatherers may have instead tooled up with a supply of ready-made blades at their base camp prior to mobile excursions. These blades could in turn be manufactured into a variety of tools as the need arose.

Epipaleolithic

The size of blades decreased through time, culminating in the bladelet technologies that dominated the Epipaleolithic period beginning around 20,000 BP. and lasting until around 10,000 years ago (Goring-Morris 1995: 141). Anatomically modern *Homo sapiens* had emerged by this time as the only living hominids. Widespread variation of lithic assemblages during this period has led to the identification of numerous Epipaleolithic cultural complexes in the Levant (Byrd 1998). In the desert of northern Jordan, only one of these dominated throughout much of the Epipaleolithic.

The Geometric Kebaran techno-complex is characterized by a high frequency of geometric microliths, retouched fragments of bladelets which were reworked into various shapes in-

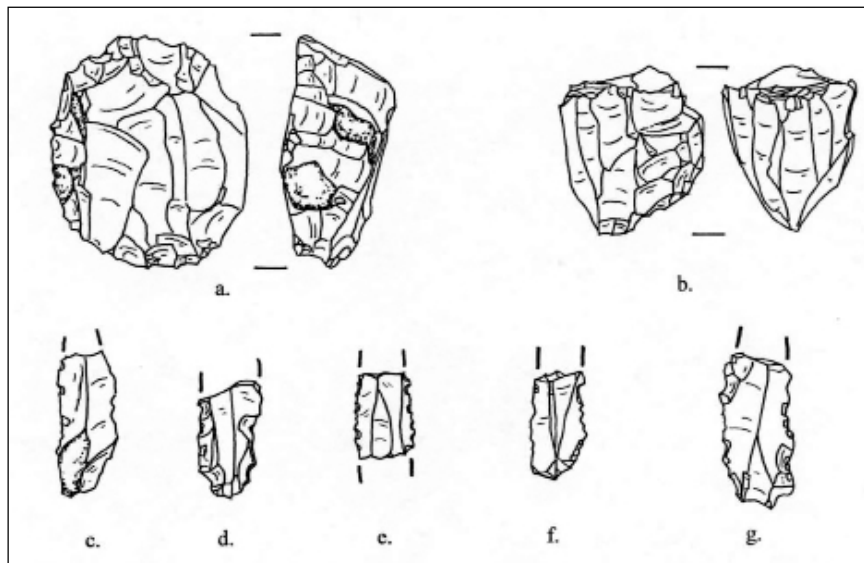


3. Upper Paleolithic artifacts recovered from Area R. Endscrapers on blades (a-c), large blade proximal fragment (d), retouched blade (e), utilized blades (f,g), polyhedral burin (h).

cluding triangles, trapezoids, rectangles, and lunates, presumably to be hafted into bone or wood in the manufacture of composite tools. Geometric Kebaran sites have a wide distribution over Israel, Jordan, Syria, and Lebanon. These sites often include evidence of non-standardized flimsy dwellings with hearths and stone storage features. Only two burials have been found that can be attributed to this culture, and both yielded grave goods consisting of stone grinding tools (Goring-Morris 1995: 156). Geometric Kebaran sites in al-Ḥarra consist of a handful of small campsites near reliable seasonal water supplies (Betts 1998: 6). These are usually composed of sparse scatters of lithics, including backed and truncated bladelets and occasionally cores and knapping debris (Betts 1998: 11). This is precisely the nature of the Epipaleolithic component at Umm al-Jimāl. Bladelet technology persisted into the Late Epipaleolithic with the Natufian culture, which holds the distinction of being the first semi-sedentary farmers in the Near East (Valla 1995).

Twenty-one bladelets and bladelet fragments were recovered in the survey of Area R (**Fig. 4**). They are manufactured from many of the aforementioned cherts and generally exhibit far less patina than the lithics from previous periods. All are fragmented to a certain extent, and some may have been intentionally truncated. Only five of the bladelets exhibit any significant retouch, and all of these have heavy patina and probably represent earlier blades which have been worked down to widths less than 12mm. However, all of the bladelets do exhibit use wear; on many, the wear is extensive.

Of greater interest than the bladelets are three exhausted bladelet cores that were recovered just to the southeast of the Roman village. The largest of the three is composed of hacky white (10YR 8/1) chert with gray (10YR 5/1) mottles. It has a single platform and weighs 70g. The second largest (**Fig. 4**) is an opposed platform core manufactured from grayish red (5R 4/2) chert with a moderate orange pink (5YR 8/4) patina and weighs 37.2g. The smallest (**Fig.**



4. Epipaleolithic artifacts recovered from Area R. Opposed platform bladelet core (a), bi-polar bladelet core (b), utilized bladelets (c-g).

4) is a dainty bipolar bladelet core made from high quality pale yellowish brown (10YR 6/2) to grayish red (10R 4/2) chert. It weighs only 22.1g. and has a heavily step-fractured lip. Also of interest is a core trimming element from a bladelet core manufactured from the same raw material as the smallest of the three cores. A few of the bladelets are composed from this same material as well as the reddish chert of the second smallest core.

The Epipaleolithic component represents resurgence in the curation of cores, probably facilitated by their small size. Raw material seems to have been carefully conserved, and only discarded once the cores were exhausted and the bladelets were broken or became too nicked or dulled from use to be efficient tools.

Conclusion

The Epipaleolithic did not represent the last use of lithic technologies at Umm al-Jimāl. However, unlike the center of the basalt plateau to the east where occupants of the Chalcolithic-Bronze Age city of Jāwā developed advanced rainwater diversion and collection systems by the 4th millennium BC (Helms 1981), the area around Umm al-Jimāl seems to have been largely unoccupied until the Early Roman period when advances in engineering allowed for exploitation of runoff for maintaining a permanent water supply (de Vries 1998: 93). Prior to this, mobile groups passing through would be forced to depend on water seasonally pooled in

wadi systems (Betts 1998: 2). While there is evidence for periods of greater humidity throughout the Paleolithic (Henry 1982: 42; Frumkin *et al.* 2008), the wadis of the Black Desert may never have been perennial streams. Once human groups in the area became sedentary, the scant water supply at Umm al-Jimāl could not support a permanent settlement.

Upon the return of humans to Umm al-Jimāl after a hiatus of nearly ten millennia, the working of siliceous stone resumed on the site, thanks to Roman tinder flint use. Roughly worked chunks of raw chert were encountered in small amounts during excavation of Roman refuse deposits among the classical walls of Area R. Undoubtedly, some Paleolithic tools were gathered and exploited for this purpose. Flake scars cut through the patina on many of the specimens indicating reworking at a far later time than that of the original discard of the artifacts. The lack of fresh flake scars on most of the specimens, however, makes it unlikely that all of the artifacts were brought to the site by later occupants.

Various occupants of al-Ḥarra never gave up the mobile lifestyle. Neolithic groups ranged throughout the area exploiting gazelle herds with the help of an extensive system of massive walled traps (“kites”) (Betts 1998: 6). These Paleo-Bedouin of the seventh through fifth millennia BC were the likely ancestors of the Safaitic Bedouin who roamed the deserts of Jordan during the Roman occupation of Umm al-Jimāl (Helms 1982). A certain amount of

stone tool use may have persisted among these mobile peoples throughout this time and even to the modern day. The modern Bedouin occupants of Umm al-Jimāl will occasionally still strike sharp flakes off any available chunk of flint when an expedient cutting tool is needed. This was demonstrated to me by Umm al-Jimāl resident Muaffaq Haza in 1998 when he readily picked up a chunk of flint in the ruins and struck flakes from it stating that local shepherds used this technique if they needed an expedient knife. In this way, the Paleolithic foragers of the remote past solved the transport-cost quandary for their descendants, for the tools they left behind provided the generations of the future with ample locally available raw material for their own stone tool industries.

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APPENDIX A

Shatter: angular and blocky lithic debris that results from non-intentional breakage during the lithic reduction process. Shatter does not exhibit a bulb of percussion or distinct striking platform.

Flake: debitage, complete specimens of which exhibit a bulb of percussion and a striking platform.

Levallois flake: a distinct type of flake produced in the Levallois reduction process in which flakes are struck from a bifacially-worked core resulting in flakes with numerous multidirectional flake scars on the dorsal surface and heavily faceted platforms representing the prepared edge of the bifacial core.

Blade: a type of flake that is distinguished by being at least twice as long as it is wide.

Bladelet: small blades which are less than 12 mm in width.

Random core: a piece of stone from which flakes were removed without any observable pattern.

Levallois core: a distinctive type of core which was prepared bifacially in order to facilitate the removal of flakes of a desired shape. Some of these cores were prepared radially in order to remove flakes with a roughly circular

B. Hoksbergen: The Paleolithic at Umm al-Jimāl

outline and numerous flake scars on the dorsal surface which converge near the center of the dorsal surface resulting in the thickest part of the flake there. Others were worked unidirectionally with the goal of forming flake scars which converged at one end of the surface of the core. Flakes struck from a core prepared in such a way would be triangular in shape and could be retouched to form Levallois points which could be used as rough tips for spears.

Bladelet core: a core from which bladelets were removed, typically through indirect percussion or pressure flaking. Bladelet cores can have a single platform or multiple.

Bifacial handaxe: a bifacially-worked implement that is typically egg-shaped in outline.

Scraper: retouched unifacial tool with a steep working edge which was probably used for dressing hides or other such activities. Scrapers are generally classified as either endscrapers or side-scrapers depending on which edge of the flake was retouched.

Burin: tool exhibiting one or more narrow chisel-like edges made by either snapping a flake or by removing a spall with a head-on strike at the edge of a flake. Burins formed by the removal of two adjacent spalls are called dihedral burins while those formed by the removal of multiple spalls are polyhedral. The chisel edge of a burin is effective in scoring bone or antler.

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KHIRBAT AS-SAMRĀ CEMETERY: SITE E SEASON 2009

Abdalla J. Nabulsi

The ninth season of the systematic excavations at Khirbat as-Samrā ancient cemetery was carried out during the 2009 summer in the area of Site E. One of the objectives was to mark the northern cemetery boundary, which was expected to intercept the site's NE corner, as suggested by aerial photograph analysis. This report documents some observations that were made during the excavation.

The Excavation at Site E

The 45 days of excavations at this site began on the 27th July 2009¹. The site is cornered between Site A in the west and A2 in the south. The area was divided by a 5 x 5m grid into 20 squares (4 columns and 5 rows), and excavated by the standard method described in previous *ADAJ* (2007-2009) reports. A total of 67 tombs were excavated and only 3 were intact. The tombs were nearly evenly distributed over the site (3.35 tombs/25m²) and revealed no complex arrangements. All were vertical shaft tombs with slab-cist burial chamber of Type- ii organized in semi-parallel lines (classifications in Nabulsi *et al.* 2009). Since tombs were found in all excavated squares, the cemetery's northern boundary must be set further north of Site E. Its north-south width at this level exceeds 150m.

A rough-cut rectangular basalt stone (registry no. KS-1538) was the first of the covering slabs of the intact Tomb-477. The stone has a crude cross "scratched" on its relative clean inner side facing the head the deceased. This was the third such observation. A small natural stones of semi-triangular shape and about 31 x 18 x 9cm in size with crude engraved cross (KS-1537) was found

near the surface of the same tomb. This might suggest that not all anepigraphic cross-engraved stones were reused tombstones but genuine covering slabs. It is very probable that KS-1537 was the original tombstone of Tomb-477. Furthermore, field observations in previous excavations had revealed that inscribed tombstones without engraved crosses were always found in the lower, eastern half of the covering-slabs layer.

Human skeletal remains were salvaged from 65 tombs. The material varied from few teeth to near complete, but mostly fragmentary, skeletons.

Objects and Tomb Offerings

A significant number objects were retrieved during the excavation in Site E. Some can be associated with the burying process of the deceased, such as iron nails, remains of wood and cloth from coffins. Objects that might be described as tomb offerings included diverse iron and bronze jewellery (rings, bracelets, pendants and amulets), glass beads, ivory hairpins, a bronze buckle, bronze coins, two golden earrings, fragments from different glass vessels and one incomplete pottery lamp. All iron and bronze objects were fragmentary and strong corroded.

Different tombs yielded cross-shape objects that date Site E to the Christian Byzantine period. Most such offerings were pendants, three bronze and one silver (**Fig. 1**). Objects from the intact Tomb-477 included a bronze cross (KS-1558), 52 x 30mm, alongside an iron rod (KS-1559), 91mm long and 21mm diameter. The bronze cross could be a buckle, though its pres-

1. Excavated with Dr. Ch. Eger, University München, Dr. P. Schönrock-Nabulsi, Ratzeburg, Mr. D. Daum, Ha-

nover, and the DoA representative Mr. Abdelkader Husan, Mafraq office.



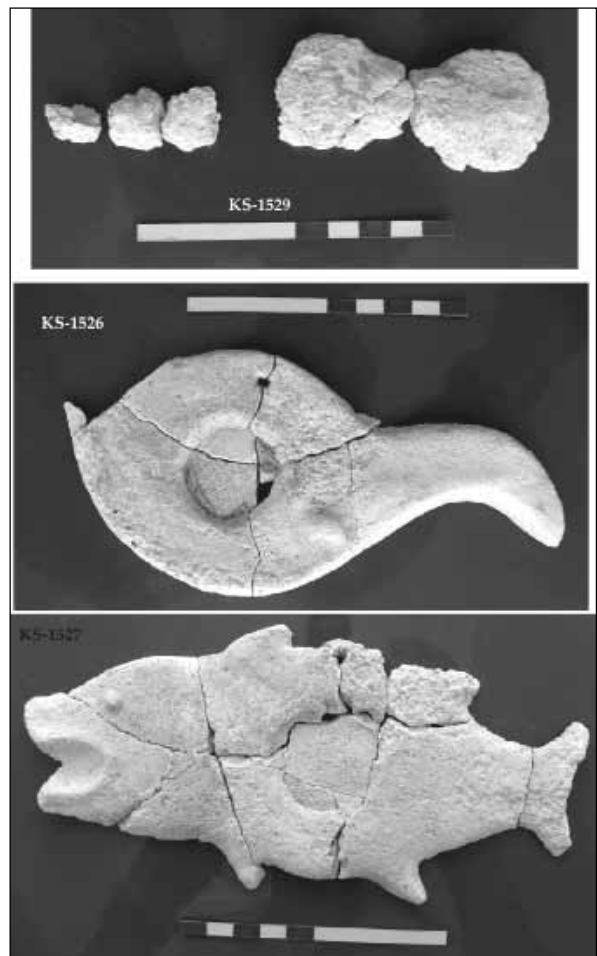
1. Cross-shaped objects. a bronze (KS-1515) and a broken silver (KS-1534) pendant. Possible bronze buckle (KS-1559) and iron rod (KS-1558).

ence and association with the iron rod (dagger!) in an infant burial remains unclear.

Three plaster figurines were also among the objects found. They were fragmentary, white with no trace of paint (**Fig. 2**). Both the largely incomplete plaster doll KS-1529, and the camel type mirror frame KS-1526, with a missing head and a rounded (3cm diameter) depression for the missing mirror in the middle, have parallel cases from Site B (Nabulsi 2000). The almost complete reconstructed mirror frame KS-1527 (205 x 102 x 10mm) has a fish or dolphin shape with a semi-quadratic (ca. 3 x 3cm) mirror depression in the middle. Both mirror frames, KS-1526 and KS-1527, had a small middle-top perforation that allowed them to be hanged up, fixed or dangling.

The plaster figurines are probably the most noticeable type of objects found in Khirbat as-Samrā cemetery. Elsewhere in Jordan, singular cases were reported from similar dated tombs or cemeteries in Pella (Smith 1969), Umm al-Jimāl (Brashler 1995) and Faynān (Findlater *et al.* 1998). The relative abundance and diverse forms of the figurines from Khirbat as-Samrā is probably related to the large number of excavated tombs, 494 so far. The restriction of this type of objects to primarily Byzantine (Christian) tombs might suggest cultural or traditional background. Martin-Kilcher (2000) had made some suggestions on the inclusion of mirrors and dolls in Roman and early Christian burials in Europe. Since fish and dolphins are

considered to be Christian symbols (Bettenson 1970), the plaster frame KS-1527 could have a



2. The plaster figurines from Site E: doll type, camel and fish (or dolphin) mirror frames.

religious connection. Yet, it remains questionable to extend roman rituals in Europe to the local ancient population at Khirbat as-Samrā. Furthermore, there is sufficient evidence that at many of the plaster objects were used during lifetime and their use was not restricted to funerary practices.

The homogenous Site E has more similarities with the 50m distant (SE) Site B rather than with the adjacent Sites A, A2 as well as A1 and dates to the Byzantine seventh century AD.

Acknowledgement

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THE INTERNATIONAL WĀDĪ FARASA PROJECT (IWFP): PRELIMINARY REPORT ON THE 2009 SEASON

Stephan G. Schmid

Introduction and Acknowledgments

The field season 2009 of the International Wādī Farasa Project (IWFP) lasted from July 26th to August 20th. The IWFP 2009 was funded by the German Research Foundation (DFG) through the German-French project “Early Petra” directed by Michel Mouton (Paris) and Stephan G. Schmid (Berlin), the cluster of excellence “Topoi” (Berlin), Humboldt-University (Berlin) and the Association for the Understanding of Ancient Cultures (AUAC, Basel). We would like to thank the director general of the Department of Antiquities, Dr. Fawwaz Al-Khraysheh, for his support and for granting the working permit as well as Dr. Eimad Hijazeen, commissioner of the Petra Park Authority for the kind logistic support. We would also like to thank the German Institute (DEI) at ‘Ammān as well as IFPO ‘Ammān for lodging the team during its stay at ‘Ammān.

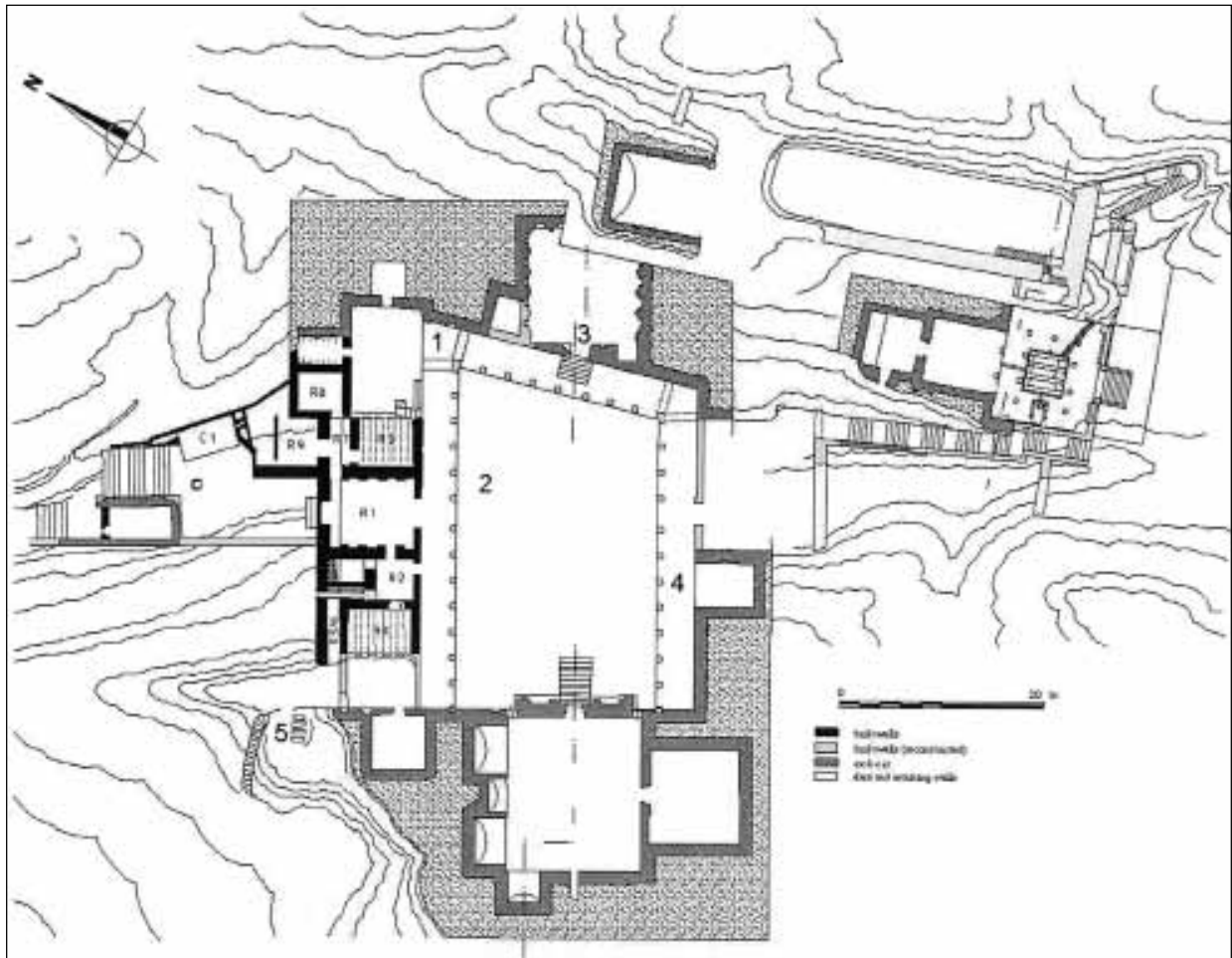
The following persons participated in the 2009 season of the IWFP. As archaeologists: Stephan G. Schmid (director), André Barmasse, MA (Basel), Laurent Gorgerat, MA (Basel), Christoph Schneider, MA (Basel), Marco Dehner, BA (Berlin), Maxie M. Haufe (Berlin) and Will Kennedy (Berlin); as geographers: Brian Beckers, MA (Berlin) and Nils Rhensius, BA (Berlin); as archaeozoologist: Dr. Jacqueline Studer (Geneva); as photographer: Antonia Weisse (Berlin). Representative of the Department of Antiquities was Talal Hamed al-Amarin, MA, whose help and advice were very much appreciated. Eighteen workmen and one tea woman from the Bdool tribe were employed. During the teams sojourn at Nazzal’s Camp, Ali Khalaf al-Bdool was a very efficient and helpful camp manager.

Following the results of the previous cam-

paigns of the project (cf. Schmid 2009 for the results of the previous season as well as for further bibliographical references; see also the preliminary reports of the consecutive seasons on www.auac.ch/iwfp and in the previous volumes of *ADAJ*), the following trenches and soundings were opened (cf. **Fig. 1**): In the northern portico, underneath the rocky plateau on the NE side of the complex, the last two squares within the portico were excavated (no. 1 on **Fig. 1**). One square was opened in the area of the courtyard of the complex, adjacent to the one already accomplished in 2001 (no. 2 on **Fig. 1**). The small sounding that was put down within the southernmost entrance to the huge *triclinium* of the complex in 2007 was enlarged and reached the main entrance of the *triclinium* in 2009 (no. 3 on **Fig. 1**). For the first time since the beginning of the project in 2000, an attempt was made to reach the Nabataean floor levels within the southern portico, more specifically in the area of the rock-cut room in the central area of the southern portico (no. 4 on **Fig. 1**). And finally, six remaining pit tombs on the western outcrop of the complex were excavated (no. 5 on **Fig. 1**), completing the excavation of the previous 11 pit tombs in 2005 (cf. Schmid and Barmasse 2006; Schmid *et al.* 2008).

NE-Corner of Complex

In the area of the NE-corner of the complex, corresponding to the last two 5m² squares within the N-portico, work started already in 2006. However, during the campaigns of 2006 and 2007 rather important constructions of the medieval period were excavated on that spot (Schmid 2007B; Schmid 2009; for a concise overview on the Medieval pottery from Wādī Farasa East see now Sinibaldi 2009). Surprisingly, the medieval

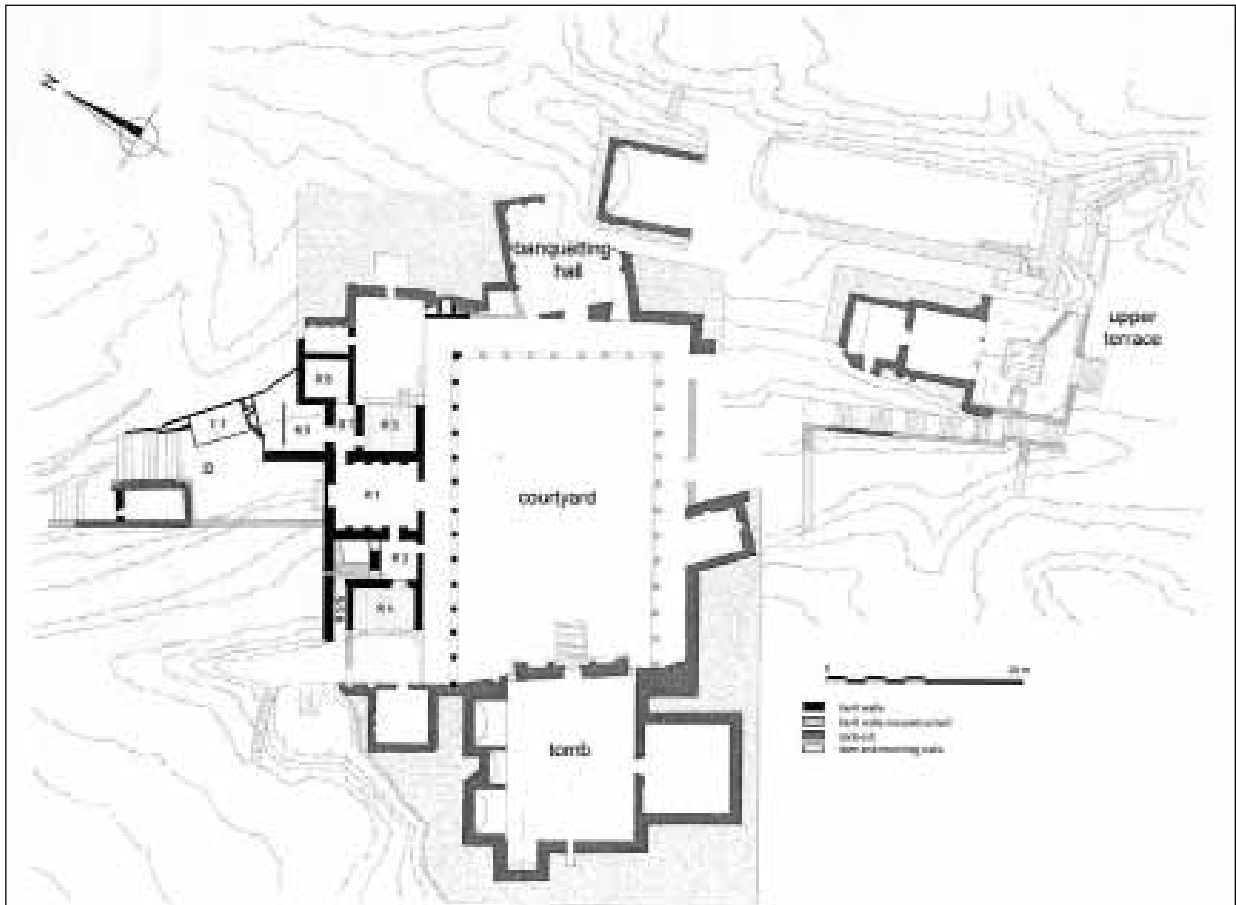


1. Wādī Farasa East, old general plan of the Soldier Tomb's complex (M. Dehner after Bachmann and Watzinger and Wiegand 1921).

structures started to appear on a rather high level at first sight and therefore were connected to the rocky outcrop on the NE-corner of the complex. The NE-corner used to be the base for the second floor of the entrance building in the Nabataean period. During our 2009 season, the explanation for these observations was found, together with the NE-angle of the courtyard, an event we were looking for since our first season in 2000. Quite an important number of information regarding the construction and structure of the Nabataean complex was ever since expected from that area.

The first remains of collapsed architecture first appeared on a level considerably higher than on previous occasions (**Fig. 3**). It soon became clear that it was partly due to the fact that the angle formed by the northern and eastern portico of the complex was built in shape

of a massive heart shaped column (centre right on **Fig. 3**). When the freestanding architecture of the complex collapsed during the earthquake of AD 363, the corner as well as the surrounding “normal” columns fell into the space formed between the row of columns and the rock originally being the back wall of the portico and the support for the upper floor of the complex. On several occasions we could observe that the main direction into which columns and other architectural remains fell seems to be from East to West (cf. also below on the S-portico). Since the column drums, capitals etc. from the angle were literally “trapped” in the corner of the complex, the collapsed remains are conserved at a considerably higher level than elsewhere what, in turn, also explains the higher level of the medieval constructions (cf. above).



2. Wādī Farasa East, new general plan of the Soldier Tomb's complex (M. Dehner).



3. Angle of N- and E-porticoes with architectural remains (Schmid).

Heart-shaped angular columns are quite well known from the region, especially from Herodian architecture, but also from some Nabataean examples. Heart-shaped columns in angles of peristyles can already be found in the palace of Demetrias (Thessaly, Greece) in a building phase that is dated around 200 BC. (Marzollf

1996: especially 158-160; for a concise treaty of heart-shaped columns see Coulton 1966: especially 137-141). From then on this particular detail spreads out rather widely, as may be underlined by analogous structures from the "Palazzo delle colonne" in Ptolemais in the Cyrenaica in modern Libya (Pesce 1950: pls. I. XI). It is generally believed that this element was taken over from Asia Minor and was especially successful in Ptolemaic architecture (Lauter 1986: 255) and it would be from there on that it found its way into Judaea, where it was especially prominent within building attributed to Herod the Great (Lichtenberger 1999; Schmid 2002B). It is, therefore, not surprising that it is attested on other monuments, surely not related to Herod, such as the so-called complex of Absalom and Josaphat, the monolith of Zacharias and the "pillar" of Absalom, all funeral monuments at Jerusalem (on these and similar monuments see Bonato 1999). The nearest, although not nec-

essarily the closest parallel to the heart-shaped column from the Soldier Tomb complex can be found in front of the so-called Turkmaniya-Tomb, where a similar courtyard can be reconstructed (on this see Schmid 2007A). However, the angular column of the Turkmaniya-Tomb is considerably smaller than the newly discovered one from the Soldier Tomb complex. The basis form of our heart-shaped column is rectangular, measuring 60cm x 60cm, with an additional half-column of 30cm radius added on two sides.

One of the main problems with the reconstruction of the Soldier Tomb complex in previous years used to be precisely this angle between the northern and eastern porticoes of the courtyard. This is due to the initial reconstruction of the complex as proposed by the Deutsch-Türkische Denkmalschutzkommando in 1921 (Bachmann, Watzinger and Wiegand 1921). There, the eastern portico does not form 90° angle with its lateral counterparts from the northern and southern sides, but follows an oblique track (**Fig. 1**). Since the discovery in 2004 that the porticoes initially were covered by arches (Schmid 2005), this reconstruction became problematic, since the pressure of the arches would have caused major static problems when hitting the angular column in any other than a right angle. Suspicions that the initial plan of the Denkmalschutzkommando probably needed verification and modification were confirmed, when it became clear that the heart-shaped column from the angle of the N- and E-porticos indicated a perfectly right angle, as does the *stylobat* upon which it is built (**Fig. 4**). Since the Denkmalschutzkommando did not carry out excavations, the plan published in 1921 had to work with the appearing rock, which of course did not form many right angles.



4. Heart-shaped angular column and stylobat (Schmid).

Therefore, the German scholars proposed an oblique E-portico (**Fig. 1**). However, the sounding in the very corner of the complex showed that the Nabataean builders had constructed a substantial wall in front of the rock in order to outbalance the irregularities of the rock (on top of **Fig. 3**). This wall stretched also eastwards in front of the huge triclinium BD 235, at least until the main entrance, from where on the rock is very regular and the built wall probably was not needed anymore.

When measuring these new elements as well as those parts of the rock that must have belonged to the initial construction with a total station and putting them into a new plan, it became apparent that the Denkmalschutzkommando must have simplified some elements of the initial plan in order to obtain what they thought to be a coherent picture of the area. The corrected preliminary version of 2009 (**Fig. 2**) shows that, as a matter of fact, the East-portico is in an almost perfect right angle compared to the North- and South-porticoes. On the contrary, the huge triclinium BD 235 is not, as proposed by the Denkmalschutzkommando, cut out of the rock in a right angle to the courtyard, but considerably turned out of the main axis of the complex.

Within the substantial wall, a small water basin measuring about 1m² was incorporated (top centre on **Fig. 3**). This water basin – or a similar structure – was already suspected since 2000 when some initial observations and thoughts about the water management system of the Soldier Tomb complex were realised (Schmid 2001; on the water management of Wādī Farasa in a wider frame see Schmid 2008). Since the rock carved remains of what must have been a clay pipe pasted with mortar onto the still visible rock carvings indicated the existence of a water installation on that spot. The discovery of the basin was thus not really a surprise. According to the finds of several ashlar with integrated space for a water pipe, the last meters of that water channel leading vertically into the basin were built upon the substantial wall in front of the rock mentioned above. The basin itself was plastered with the typical Nabataean hydraulic mortar using small pieces of pottery in order to improve its hydraulic qualities. On the bottom inside the basin as well as in front of it rather substantial amounts of pottery and glass were found. As

on other occasions, for instance in *loci* related to the small rock-cut *triclinium* on the western rock-plateau of the complex (on this see Schmid 2009), the total absence of fine ware pottery is striking. Cooking pots, *amphorae* and jugs of coarse ware pottery were by far the most prominent finds. An explanation of this phenomenon can probably be found in the chronology of these finds. As indicated by the shapes of the pottery and by the important number of so-called Petraean-Early-Byzantine lamps (Grawehr 2006: 340-349), these *loci* must belong to the latest period of use of the complex, shortly before the devastating earthquake of AD 363. This chronology and the rather important presence of glass fragments could indicate that during the late Roman period the most important category of fine ware, that is drinking cups, were replaced by glass cups and beakers (on this see some reflections in Keller 2006: 127-130, 176-179).

The water basin is so far the first clearly recognisable point of access to water within the entire complex of the Soldier Tomb and is immediately next to the rock-cut room, which was partially excavated in 2006. Since the only structural remains within the excavated part of that rock-cut room were a *ṭābūn*, we proposed to interpret it as a kitchen (Schmid 2007B: 143-144). The pottery types found around the *ṭābūn* correspond to the ones mentioned above and coming from the water basin. Therefore, the *ṭābūn* also belongs to the late Roman period. Although there were no indications as for the use of the rock-cut room during Nabataean times, its position next to the water basin on the one hand and the neighbourhood of the huge *triclinium* could indicate a similar function in order to prepare food and drinks for the people feasting in the banqueting hall BD 235, an activity that surely would justify the presence of a comfortable water supply.

In the area of the N-corner, the floor slabs were posed on a small bed of samaga directly upon the carefully cut rock, as indicated by fine lines on the rock. The lines obviously corresponding to the dimensions of the different rows of slabs (Figs. 5, 6). As observed on several previous occasions, most of the slabs already were missing when the architecture of the complex collapsed in AD 363. During this year's campaign some further elements came to light that



5. N-portico from W (Schmid).



6. Rock cuttings for floor slabs in N-portico (Schmid).

can sharpen the picture of the last years of our complex. From the rock-cut room a layer of fat, gray ashes is spreading out into the N-portico, surely corresponding to the successive cleaning of the *ṭābūn*'s ashes. Where the floor slabs still were in situ, the ashy layer is directly posited on the slabs. However, where the slabs already were missing, the ashes lay directly on the rock. The collapsed architectural members fell upon

the ash as well as a next layer composed of sandy earth (**Fig. 7**). In other words, despite partial plundering of the complex, it was still in use – at least partially – since the *ṭābūn* obviously was still functioning.

Courtyard

In order to continue the cleaning of the important surface of the courtyard, a 5m square adjacent to the one excavated in 2001 (Schmid 2002A) was opened. Here too, the floor slabs themselves were missing but their foundation layer consisting of smaller fragments of slabs and stones filled with samaga – clay containing earth – was discovered (**Fig. 8**). Within the samaga, a substantial amount of Nabataean pottery was found, including several fragments of at least three painted cups (**Figs. 9, 10**). All of



7. Bedrock, ashy layer and architectural remains in N-portico (Schmid).

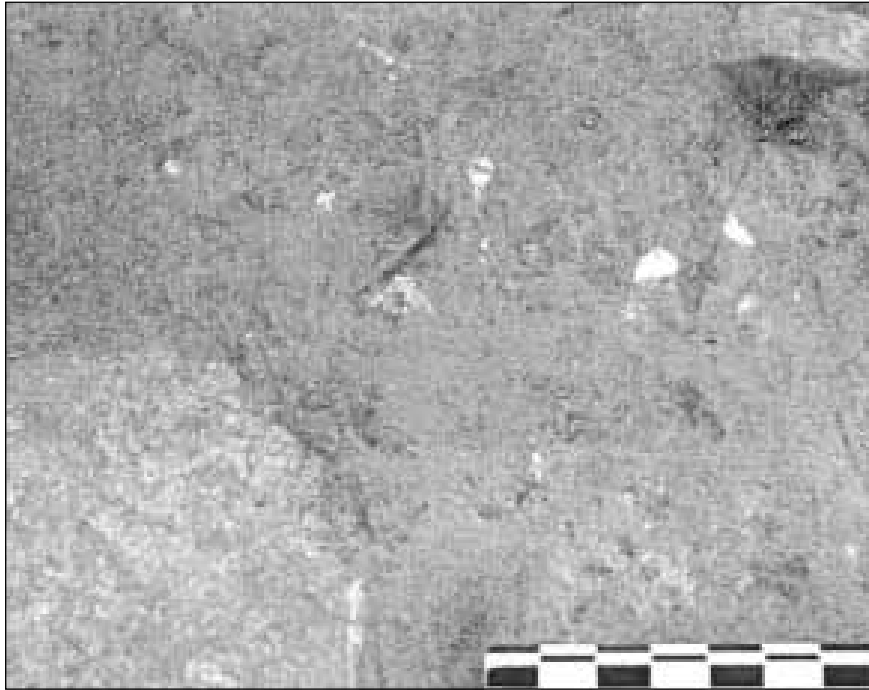


8. Sounding in the courtyard with foundations for floor slabs (Schmid).

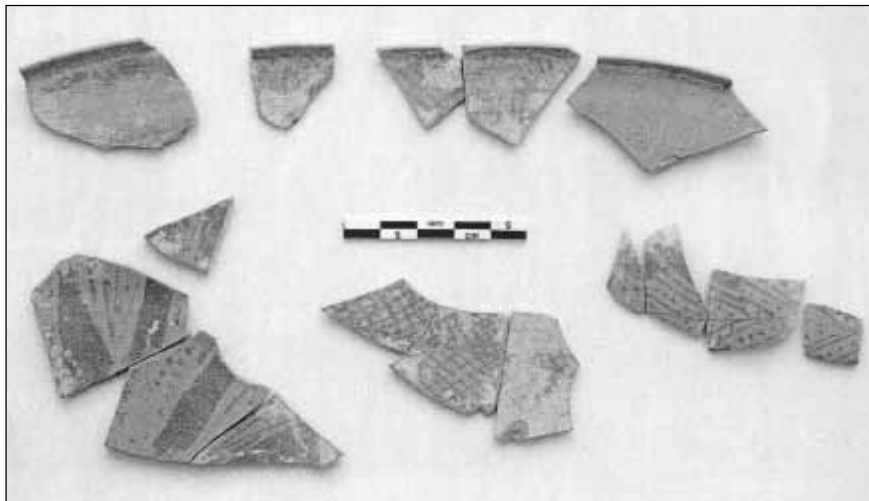
the pottery belongs to phase 3a of Nabataean pottery (according to Schmid 2000), dating from AD 20 to AD 70/80 and, therefore, confirming the *terminus ad* or *post quem* for the construction of the complex we had from previous comparable soundings.

Entrance to the Huge Triclinium

As in 2007, the entrance area to the huge *triclinium* BD 235 of the Soldier Tomb complex was again the objective of investigations in 2009. Although the area of the *triclinium* was cleaned in the 1930s by the then Department of Antiquities of Transjordan (Horsfield 1938: 40 with notes 5, 7, Horsfield 1939: 93), important information as for the different phases of use of the structure were obtained. Already in 2007 we observed that the easternmost of the three entrances to the *triclinium* was blocked by a careful setting of stones perfectly corresponding to the outer rock-cut wall of the *triclinium*. In front of the rock-cut outer wall of the *triclinium*, a massive, podium-like structure was observed. In order to gain a better understanding of that structure, the sounding was enlarged including one half of the central main entrance to the *triclinium*. The structure in front of the *triclinium* does indeed continue until the main entrance, where it forms an angle and an outer doorway, as is clearly visible on Figures 11 and 12. When the podium-like structure was erected the main entrance to the *triclinium* had two successive doorways and thresholds. The structure is built



9. Samaga with pottery indicated by flesh (Schmid).



10. Nabataean painted pottery from samaga in courtyard (Schmid).

from massive stones and although the somewhat careless construction it is extremely massive, mainly due to the abundant use of hydraulic mortar. Contrary to the hydraulic mortar from the small basin in the N-portico (cf. above), the hydraulic mortar from the *triclinium* area made abundant use of charcoal and ashes resulting in a clearly distinguishable gray colour (**Fig. 11**). As had been widely observed on other occasions, this characteristic hydraulic mortar is not used in the Petra area before roughly AD 100 (Graf, Schmid and Ronza 2007). The same succession of clearly distinguishable two phases was observed on the floor of the main entrance



11. Central and lateral entrance to huge triclinium (Schmid).

(Fig. 12). Initially, rows of oblique floor slabs were covering the entrance area. In a later phase the level in front of the threshold was raised and the second (= outer threshold) was introduced as mentioned above. The new floor slabs are posed in a 45° angle in relation to the earlier ones. As was revealed by a small sounding, the slabs of the second phase are bedded into exactly the same grayish hydraulic mortar, which contains charcoal. Therefore, the new floor slabs, the introduction of two successive doors and the massive podium in front of the *triclinium* BD 235 as well as the blocking of the lateral doorways are contemporary and do not occur before circa AD 100.

Compared with similar observations made elsewhere, i.e. changes occurring to the complex of the Soldier Tomb around AD 100, we can deduce that some major changes happened in that period. Of course, one is tempted to think about the Roman annexation in AD 106 that could have resulted – within others – in a new ownership of the complex. In the case of the entrance area to the huge *triclinium* BD 235, the motifs of the changes described above may go beyond simple fashion related to a new owner. The massive construction, the double doorway and especially the abundant use of hydraulic mortar could well suggest a reaction to problems related to flash floods penetrating the complex during the rain seasons. Therefore, the podium-like structure and the double doorways are to be understood as an attempt to prevent water from flooding the rock-cut room.

When installing the double doorway around AD 100, the original threshold of the Nabataean period must have been replaced as indicated by a



12. Inner and outer doorway to huge *triclinium* with floor-slabs (Schmid).

small stretch with a secondary fill behind the inner threshold of the second phase. As a matter of fact, this stretch does exactly correspond to the rock-cut traces of the lintel approximately three and a half meters higher (Fig. 13). The fill from the small stretch corresponding to the original threshold was excavated and it contained Nabataean pottery belonging to phase 3a (according to Schmid 2000) and, therefore, providing a *terminus post quem* in the late first century AD for the second phase with the two doorways.

Southern Portico and Rock-Cut Room

With the results from the northern corner of the complex and, more specifically with the localisation of the angular column in form of a heart and the corresponding *stylobat*, we found the physical proof for the existence of the eastern portico in front of the *triclinium* BD 235 as well as its exact position and orientation (cf. above). Although there cannot be any reasonable doubt about the existence of the southern portico, physical proof and indications for its



13. Reconstruction of initial Nabataean doorway (Schmid).

precise location and orientation can so far only be given indirectly. In 2001 we put down a small sounding at the presumed emplacement of the rock-cuttings for the first half-column east of the façade of the Soldier Tomb (Schmid 2002A). On this occasion, the badly eroded remains of what must have corresponded to the parallel rock-cuttings from the northern portico west of the façade were discovered. Opposite the façade, that is east of the *triclinium* BD 235, a rock-cutting closely resembling the departing point of an arch – with some modern alterations – was always visible. Therefore, we decided to put down a sounding situated on the virtual line between the presumed rock-cuttings of the first half column of the S-portico and the corresponding last arch on the side of the *triclinium* BD 235. This sounding was put down in front of the rock-cut room in the middle of the S-portico and incorporated half of it (Figs. 14-18). Very soon, massive walls built in front of the rock-cut room started to appear, closely corresponding to the numerous medieval structures from the area of the Soldier Tomb complex, i.e. a careless building technique making extensive reuse of Nabataean architectural elements. The chronology of these structures was confirmed by substantial amounts of hand made pottery, well known from the previously excavated medieval structures from the area (the medieval pottery from the IWFPP is studied by Micaela Sinibaldi, MA). The rectangular walls in front of the rock-cut room form a

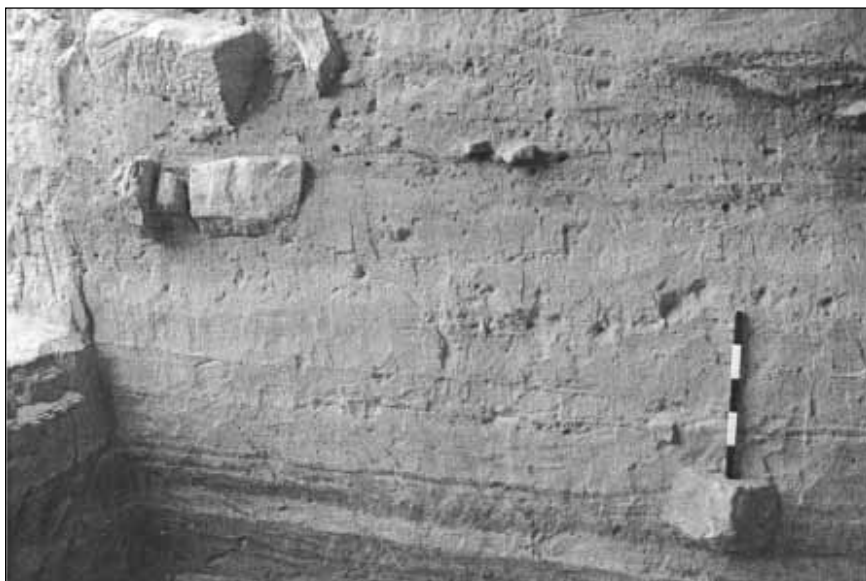


14. Medieval remains within the S-portico (Schmid).



15. Medieval steps leading towards rock cut room (Schmid).

kind of entrance to the cave (Fig. 14) including a few steps leading downwards into it (Fig. 15), which indicates that the medieval level inside the cave was on a lower level than in front of it.



16. Stratigraphic sequence in the rock cut room (Schmid).



17. Rock cut room with banquets (Schmid).

A series of holes cut into the rock on top of the front of the cave must have corresponded with the walls where the beams for roofing this kind of *antae*-room to the cave must have been fixed. Immediately in front of the cave and its entrance structure, a huge circular structure measuring approximately 2.2m outer diameter started to appear (bottom right on **Fig. 14**). The massive and fine ashy layer inside the round structure in-

dicates its function as *tābūn* or oven.

Following these medieval structures is a massive sequence of very fine sandy layers, which are the result of a long series of subsequent alluvia. These layers correspond to many years of flash floods carrying important quantities of sand with them that created a fill of about three meters in height (**Fig. 16**). Inside the cave, these alluvia directly started upon the rock-cut floor level. On the sides of the rock-cut room, small banquets were cut out of the rock. The small depth of these banquets, about 50cm was difficult to explain at first sight. However, it was believed that they were originally enlarged by at least one course of stones, as indicated by a few remaining stones visible on Figure 17. This would make them rather comfortable *klinei*, i.e. spaces for reclining banqueters as in the huge *triclinium* BD 235.

In front of the cave, the rock was mostly visible (**Fig. 18**). However, on a better conserved spot, we again found a confirmation for the sophisticated use of bedrock by the Nabataeans, i.e. the built architecture was not directly put on the rock but on an intermediate layer of small flat stones and samaga, exactly as in areas of porticoes and courtyards that were freely built without bedrock as foundation. Even though the foundation stones as well as the original floor slabs were missing in this area, the stretch of the former *stylobat* for the South-portico could be identified. As visible on **Fig. 18**, a stretch of the bedrock measuring exactly 68cm in width was cut away in a different way. The 68cm perfectly correspond to the width of the *stylobat* from the N-portico and the rock-cuttings indicate that ashlar were put on them, forming the *stylobat*



18. S-portico with bedrock, foundations for floor slabs and column drum (Schmid).

in the same way as in the N-portico. Furthermore, the stretch of the *stylobat* lies exactly on the virtual line between the rock cutting for the first arch on the E-wall and the cuttings for the half column on the W-wall (cf. **Fig. 2**). Last but not least, one column drum and two damaged capitals from the S-portico were found in that trench (**Fig. 18**).

Therefore, the results from the different trenches in the N- and S-porticoes now allow drawing a more or less exact picture of the main features of the complex of the Soldier Tomb. The courtyard with its porticoes was constructed as an almost exact rectangle – with some alterations due to irregularities in the rock on the W-side where the façade of the Soldier Tomb is situated. The dimensions of the courtyard are 33m x 20.8m, while the N-portico is 3.3 m wide, the E-portico 3.7m and the S-portico 2.9m.

As in the case of the courtyard and the huge triclinium BD 235, it seems as if the Denkmalschutzkommando simplified the relationship between the rock cut room in the S-portico and the courtyard. On the initial plan of 1921 the rock cut room is opening in a perfect right angle towards the portico and the courtyard (**Fig. 1**). In reality however, it is considerably oblique (**Fig. 2**).

Shaft Graves on Western Outcrop

Following the results of the 2005 excavation of 11 pit graves on the western rocky outcrop of the complex (Schmid and Barmasse 2006;

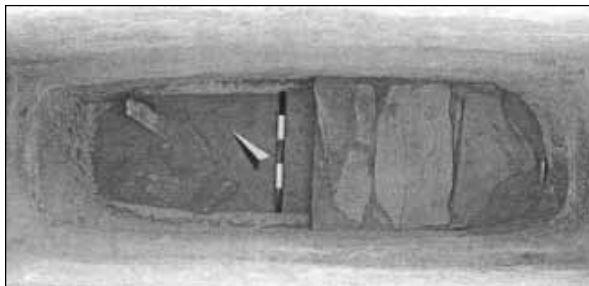
Schmid *et al.* 2008), we decided to excavate the remaining six comparable structures. Contrary to the previously excavated tombs that were covered by a small layer of sand, the new ones were always visible and were mentioned by the 19th and early 20th century visitors and scholars. Therefore, we had little hope to find undisturbed burials. Indeed, all tombs were previously robbed. Nevertheless, on several occasions enough material remained in order to allow observations as for the chronology of the burials and the funerary practices. Pit graves numbers 12 to 15 are situated within a circular structure opening towards the rocky area that initially formed the upper floor of the huge entrance building to the Soldier Tomb complex (**Fig. 19**). This circular structure must have been an outdoor *stibadium*, i.e. a banqueting installation under the open sky. The construction of four rock-cut pit tombs in the middle of such an installation as well as two more just behind it surely changed the function of the *stibadium* that most likely was out of use when the tombs were constructed. It would therefore, be interesting to obtain precise information as for the date of these tombs, since this would also allow dating the change in function of the initial structure.

The best candidate for that purpose turned out to be pit grave 16. Although disturbed and robbed, some valuable information was obtained. The rock-cut grave shows two shoulders initially thought for posing covering slabs on

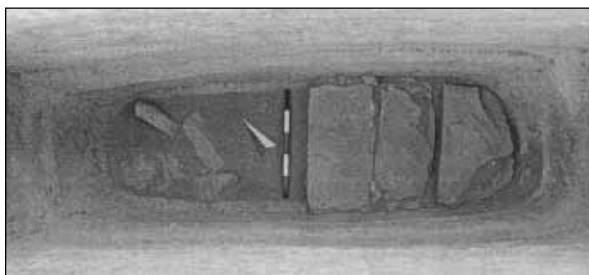


19. Rocky outcrop on western angle of complex with pit graves in circular structure (Schmid).

them. We therefore have to reckon two or three burials within this grave, depending on whether the space above the first shoulder was also used for a burial. While the covering slabs from the first shoulder had completely disappeared, three slabs on the second shoulder were still *in situ* (**Fig. 20**). Contrary to our expectations, another series of similar slabs were found beneath these slabs (**Fig. 21**). Between the two slabs a layer of charcoal-containing mortar was found that also held several potsherds. These were identified as Nabataean cooking pots and fine ware of the first and early second century AD. In other words, the first burial of pit grave 16 did not occur before the early second century AD. This corresponds quite well to the chronological information that was obtained from the pit graves 1 to 11 in 2005 that seemed to date from the late first and early second century AD. As for the rock-cut *stibadium*, we would conclude that it went out of use in the early second century AD and must, therefore, pre-date this period. Again, it seems as if quite substantial changes affected the Soldier Tomb complex in the early second century AD, as already pointed out above in the case of the entrance to the *triclinium* BD 235. The parallels between the different similar observations within Wādī Farasa East can also be stretched by another point. The mortar that was used in order to fix the covering slabs in pit grave 16 is exactly the same charcoal-containing hydrau-



20. Pit grave 16 with upper covering slabs (Schmid).



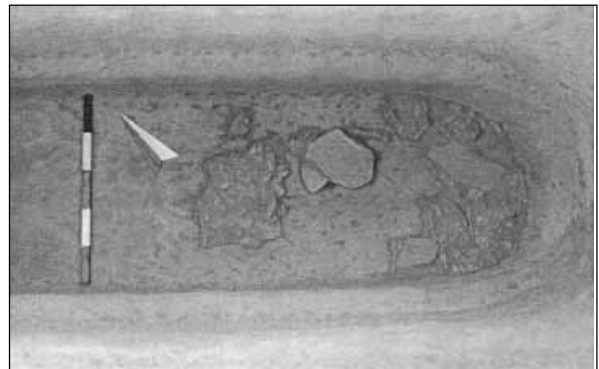
21. Pit grave 16 with lower covering slabs (Schmid).

lic mortar that was used in other pit graves of the small necropolis and also for the construction of the massive structure in front of the huge *triclinium* BD 235 (cf. above). Since we know that this type of mortar was not introduced in Petra before roughly AD 100, we again obtain a chronological confirmation as for the construction of the pit graves. The lowest level within pit grave 16 did contain some human bones that were found in small heaps, probably the result of the plundering (**Fig. 22**). As observed on several occasions in 2005, the human bones were also mixed with the same mortar that was used for sealing the covering slabs (some reflections on this phenomenon in Schmid *et al.* 2008).

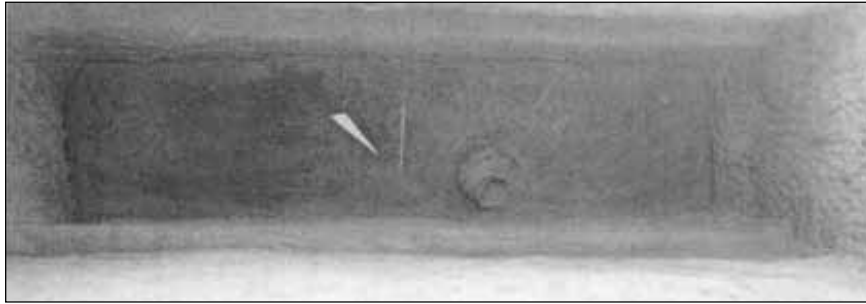
Four of the other five pit graves presented similar situations as did pit grave 16, although they were more seriously damaged by the tomb robbers. Pit grave 15 was the only one to present a different situation. As pit grave 7, excavated in 2005, it apparently was used as a rubbish dump in the medieval period. From top to bottom all layers did contain substantial amounts of pottery belonging to the 11th to 13th century AD (**Fig. 23**). Towards the bottom of the grave, two completely preserved pots were found (**Figs. 24, 25**), one of them still conserving its lid.

Restoration

In a continuous effort to improve the site for the visitors, even if excavation is continuing for several more seasons, we again focussed on the restoration of the huge staircase (R8 on **Fig. 2**). In Nabataean times, the rock was not directly used but stone slabs were put on the rock in order to form steps. However, beside the first one, all of these steps had disappeared in later times. We started restoring the first steps of the stair-



22. Pit grave 16 with remains of human bones and mortar (Schmid).



23. Pit grave 15 with Medieval pottery (Schmid).



24. Medieval pottery from pit grave 15 (Schmid).



25. Medieval pottery from pit grave 15 (Schmid).

case several years ago and continued this year adding two more massive steps of stones, fixing them with lime mortar imitating the Nabataean technique of mixing small pottery fragments into the mortar in order to improve its hydraulic quality (**Fig. 26**).

Another attempt of restoration was made in the case of the small water basin found in the N-



26. Restoration in staircase (Schmid).

corner of the complex (cf. above). Here, besides potsherds, ashes were also added to the mortar (**Fig. 27**).

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27. Restoration of small water basin (Schmid).

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PRELIMINARY REPORT ON THE FIFTH SEASON (2009) OF EXCAVATIONS AT KHIRBAT AL-BATRĀWĪ (UPPER WĀDĪ AZ-ZARQĀ'), BY THE UNIVERSITY OF ROME "LA SAPIENZA"

Lorenzo Nigro and Maura Sala

Introduction

The fifth season of archaeological exploration (excavation and restoration) at the Early Bronze Age (EBA) site of Khirbat al-Batrāwī¹ was undertaken by the University of Rome "La Sapienza"² during May and June 2009³. The excavations were supported by Rome "La Sapienza" University, the Italian Ministry of Foreign

Affairs, and the Italian Ministry of University and Scientific Research⁴.

The site of Khirbat al-Batrāwī (**Fig. 1**), a major fortified town of the EB II-III, is located on the periphery of the modern city of Zarqā'. In antiquity it was a strategically located central town in the upper Wādī az-Zarqā', at the crossroads of routes connecting the desert and the steppe



1. General view of the site of Khirbat al-Batrāwī with the EB II-III lines of fortifications on the northern slope of the hill and the EB II restored city-gate at the end of season 2009, from north.

1. Lat. 32°05' N, Long. 36°04' E; *JADIS* site n. 2516.011, p. 2.172 (Nigro 2006: 233-35, fig. 1; Nigro ed. 2006: 16-22, maps 1-6, plan I).
2. The Rome "La Sapienza" team during the fifth (2009) season included: L. Nigro, Director; M. Sala, Supervisor of Area B South and B North; M. D'Andrea, E. Casadei and S. Massi (Area B North); I. Salimbeni (Supervisor of House B2), and D. Ghigi (Area B South-East); A. Massafra, P. Vitolo and M. Zingarello (Area B South). The representative of the Department of Antiquities, and the Inspector, Romil Ghayib who gave logistical support for the expedition.
3. The expedition wishes to express its deepest thanks to Dr Fawwaz al-Khraysheh, General Director of Depart-

- ment of Antiquities of Jordan, for his invaluable support, as well as to the Academic Authorities of Rome "La Sapienza" University, the Rector, Prof. Luigi Frati, the Dean of the Faculty of Humanistic Sciences, Prof. Roberto Nicolai and the Director of the Department of Historical, Archaeological and Anthropological Sciences of Antiquity, Prof. Gilda Bartoloni, who strongly supported our work of the expedition.
4. The authors would also like to thank the Italian ambassador to Jordan, H.E. Francesco Franson, Dr Stefano Stucci, and the Italian Ministry of Foreign Affairs – General Directorate for Cultural Promotion and Cooperation, Office V.

to the Jordan Valley (Nigro 2009, 2010). Previous fieldwork has identified the EB II-III Main City Wall, which encompassed the whole town, and the EB II City Gate. Other major building works identified in previous seasons include the EB III Northern Defensive Works, displaced on at least three lines, the EB IIIB dwelling quarter inside the Main City Wall, the EB II-III Temple on the easternmost terrace and several domestic units and installations of the EB IVB village, which occupied the hill after the abandonment of the EB III city.

During the fifth season⁵, excavations and restorations were focused on three areas, Area B North and Area B South, located in the middle of the northern side of the tell, outside and inside the EB II-III Main City Wall respectively, and Area F on the easternmost terrace of the Khirbat.

Aims of the Fifth Season (2009)

The aims of the fifth season were to:

- Excavate Area B North and Area B South, the northern EB II-III triple line of fortifications with annexed defensive bastions and towers and the EB IIIB northern quarter, including houses and public buildings;
- Complete the excavations and restoration of the EB II-III Broad-Room Temple in Area F on the eastern-most terrace of the tell.
- In order to achieve these goals the following operations were carried out:
- Continuation of excavations towards the west and the north of the imposing EB II-III triple fortification line in Area B North (§ 4);
- Restoration of the western stretch of the EB II-III Main City Wall and in particular in the region of Pit P.819 in Area B North (§ 4);
- Excavation of House B2 and its associated courtyard L.936; excavation in the northern and western sectors of Building B1; excavation of Building B3 west of the laneway

L.1050; and excavation of the street L.1060 along the inner side of the Main City Wall (§ 5);

- Completion of excavation and restoration of the Broad-Room Temple in Area F (§ 6).

Stratigraphic Phasing of Area B North and Area B South

Excavations in Area B North helped to refine the stratigraphic and architectural sequences of the impressive series of EBA fortification works. Excavations in Area B South enabled clarification of the stratigraphy and layout of the EB IIIB domestic and public buildings (ca 2500-2300 BC) erected inside the EB II-III Main City Wall during the EB IIIB, and the stratigraphic and constructional phases of the EB IVB village built over them in the last centuries of the 3rd millennium BC.

Area B North: THE EB II-III Fortification System

Further excavation to the north and west of the EB II-III fortification system was undertaken in 2009 (**Fig. 2**). The exposure of the EB IIIA Outer Wall W.155 and the curvilinear outwork W.185 continued, and excavation of the Scarp Wall W.165 was extended to its western-most extremity where it abutted against the outer face of the Outer Wall. Deposits associated with these features clearly related to the use and destruction of each of the major features encountered, thus providing a more detailed stratigraphic sequence for the area.

The stratigraphy of Area B North

Excavations in Area B North provided a thorough insight into the stratigraphic sequence of the impressive series of the EBA fortification works (and related deposits) on the northern slope of the site, further clarifying the morphology and construction phases of the succeeding

5. In the previous seasons (Nigro 2006; 2007; 2008; 2010; Nigro ed. 2006; 2008; Nigro and Sala 2009) the main chronological, topographical and architectural points of the site were fixed (Nigro 2006: 233-36; Nigro 2007: 346-47, tab. 1; Nigro ed. 2006: 9-36, fig. 1.2; 2008: 7-8) and seven areas were opened. These were Area A on the Acropolis (Nigro 2006: 236-40; Nigro 2007: 347-49; Nigro ed. 2006: 63-102, plan II; 2008: 9-63), Area B North and Area B South on the northern slope (Nigro 2006: 240-46; Nigro 2007: 349-54; Ni-

gro ed. 2006: 153-96, plans III-IV; 2008: 65-240, plans I-II; Nigro and Sala 2009: § 4), Area C and D in the north-western and south-western corners, respectively (Nigro ed. 2006: 25-27, figs. 1.27-1.31; Nigro 2007: 355-57; Nigro ed. 2006: 32-33, figs. 1.38-1.41; 2008: 241-44), Area E on the southern side (Nigro 2007: 357-58; Nigro ed. 2008: 245-68) and Area F on the easternmost terrace of the khirbat (Nigro 2007: 358-59; Nigro ed. 2006: 22, fig. 1.25; 2008: 269-316, plans III-IV; Nigro and Sala 2009: § 5).

Table 1: Architectural and stratigraphic phasing of Khirbat al- Batrāwī.

Archaeological Period	Absolute Chronology	Site Period	Area B North		Area B South	
			Phases	Structures	Phases	Structures
EB I	3400-3000 BC	Batrāwī I	-	-	-	-
EB II	3000-2700 BC	Batrāwī II (fortified town)	Phase 5b-a	Main city wall; City gate L.160; Street L.144b	-	-
EB IIIA	2700-2500 BC	Batrāwī IIIa (fortified town)	Phase 4b-a	Main city wall; staircases W.181 and W.1067; blocking wall W.157; street L.144a/L.809a; outer wall W.155; outwork W.185	Phase 4	Street L.148+L.458
EB IIIB	2500-2300 BC	Batrāwī IIIb (fortified town)	Phase 3c-b	Main city wall; staircases W.181 and W.1067; outer wall W.155; scarp wall W.165; bastion W.825; protruding wall W.177	Phase 3d-a	Building B1; house B2; installation W.135; courtyard L.936; oven T.413; building B1; building B3; lane L.1050; street L.133+L.424+L.1060
EB IVA	2300-2200 BC	Batrāwī IVa (abandonment)	Phase 3a	-	-	-
EB IVB	2200-2000 BC	Batrāwī IVb (rural village)	Phase 2d-a	Embankment W.811; retaining wall W.815	Phase 2g-e	Domestic structures and installations; child burials D.1020 and D.1026
					Phase 2d-a	Houses and domestic installations
Later Periods	2000 BC-1950 AD	Batrāwī V	-	-	-	-
Recent use	1950-2009 AD	Batrāwī VI	Phase 1	-	Phase 1	-



2. The EB II-III lines of Batrāwī fortifications, from east; from left to right: EB II-III Main City-Wall W.101+W.103+W.163, EB IIIA-B Outer Wall W.155 and EB IIIB Scarp-Wall W.165. In the left foreground, the EB IIIB quarter of dwellings and public buildings erected inside the Main City-Wall.

double (EB IIIA) and triple (EB IIIB) lines of defences and their annexed structures⁶.

Five stratigraphic phases were distinguished, from the uppermost layer of topsoil (Phase 1) to the earliest phase (Phase 5), representing the foundation of the Main City Wall and its first use during the EB II period (2900-2700 BC).

Phase 1 (topsoil) represents the long period of abandonment following the end of occupation of the site around 2000 BC. During this period a layer of silt, up to 30cm thick, accumulated over the remains of the EBA fortification works.

Phase 2, directly below topsoil, represents a partial reuse of the EB II-III collapsed fortification system, consisting of a stone embankment (W.811) which was built to regularise the slope of the Khirbat and to support the EB IVB village erected on the top of it (§ 4.2).

Phase 3 corresponds to the latest reconstruction and use of the EB II-III Main City Wall and the associated outer lines of defence, that is, the final urban occupation of the fortified town of al-Batrāwī (EB IIIB, 2500-2300 BC). It is comprised of three sub phases of activity. Sub-phase 3a, the definitive abandonment and collapse of the EBA fortification system, including the associated pit P.819 which destroyed much of it. Sub-phase 3b, a violent destruction, comprising layers of ash, charcoal and fragments of reddish-yellow mud bricks. This sub phase marks the end of occupation of the 3rd-millennium BC city as excavated between the Main City Wall and the Outer Wall W.155 (F.814), and between Outer Wall W.155 and Scarp Wall W.165 (F.816), and north of the Scarp Wall (F.818). Sub-phase 3c, the latest reconstruction and use of the Batrāwī fortification system, with the Main City Wall and the Outer Wall W.155 kept in use from the previous phase, and the Scarp Wall W.165 with protruding wall W.177 added in this phase.

Phase 4 is represented by groups of stratigraphic units and structures belonging to the EB IIIA reconstruction and use of the fortification system. Two different sub phases were distinguished: Sub-phase 4a, represented by a

significant destruction layer excavated between the Main City Wall and the Outer Wall W.155, and northwards outside the Scarp Wall W.165 beneath the EB IIIB layers. Sub-phase 4b, represented the remodelling of the Main City Wall, including the blocking up of the collapsed EB II City Gate, the erection of Outer Wall W.155 with the annexed curvilinear outwork W.185, and the repair of the street running in between the Main City Wall and the Outer Wall (Nigro 2007: 349-51; Nigro ed. 2008, 73-74).

Phase 5 represents the earliest phase of the city and includes the later sub-phase 5a represented by the collapse of the EB II Main City Wall and City Gate and sub-phase 5b (not excavated in 2009), the earlier erection of the Main City Wall and City Gate L.160 in the Early Bronze II.

The Outer Embankment of Period Batrāwī IVb (EB IVB)

In squares BnII3 + BmII4 + BnII4 + BmII5, the Outer Embankment (W.811), which supported and possibly protected EB IVB dwellings in Area B South⁷ was further exposed and documented. It was roughly 9m wide and had a supporting structure at its base (W.815) and a somewhat stepped outer face of medium-sized stones, well preserved in the lower outer courses, which regularised the underlying the EB III collapsed structures of the Outer Wall W.155 and Scarp-Wall W.165. Further to the east (east of wall W.177), in square BoII3 + BoII4 + BpII4, the lower part of the Embankment was not preserved, possibly due to the presence of the underlying, partly destroyed curvilinear outwork W.185.

The Period Batrāwī IIIB (EB IIIB) Triple Line Fortification

A considerable part of the 2009 excavations in Area B North was devoted to the EB IIIB triple line of fortifications (Nigro ed. 2008: 100-2)⁸, which in the western-most newly excavated squares (BmII4 + BnII4) neatly turned to the

6. For the overall stratigraphic sequences of Area B North, see Nigro ed. 2008: 66-76; Nigro and Sala 2009: § 4.1.

7. Nigro ed. 2008: 102-3; Nigro and Sala 2009: § 4.2.

8. In 2009 the excavated area was extended towards the west and the north, including squares BmII4 (eastern half) + BmII5 (eastern half) to the west; BnII3 + BnII4

(northern half) + BoII3 + BoII4 (northern half) + BpII4 to the north. Excavation was carried out in the open area, including all baulks, in order to prosecute the exploration of the northern slope of the hill with its series of fortification works.

north-west (**Fig. 3**).

The Scarp Wall W.165 was exposed from east (BoII4) to west (BmII4 + BnII4), showing up to six superimposed courses of large stones still preserved *in situ*. In correspondence with the turn towards the north-west was found an inner edge of the structure, which ended against the Outer Wall W.155 with a Round Bastion (W.825) that narrowed from 3.1m diameter at the base, to ca 2.5m in diameter at its top. Like the Scarp Wall W.165, the Bastion W.825 also had a battering face (**Fig. 4**). Further west, another massive stone structure (W.177) was found protruding from the Scarp Wall in BoII4 and which in BoII3 reached a width of 2.1 m, after which it

turned westwards and ran parallel to the north-west orientated stretch of the Outer Wall W.155 for a distance of around 3.8m. In this stretch the Outer Wall W.155 also shows evidence of a battering face, with large stone blocks at its base. In the space between the Outer Wall W.155 and wall W.177 a destruction layer up to 0.70m thick (F.818) was excavated, from which an EB IIIB ceramic repertoire was collected (**Figs. 5-6**), as well as three pottery spindle whorls and a Canaan blade.

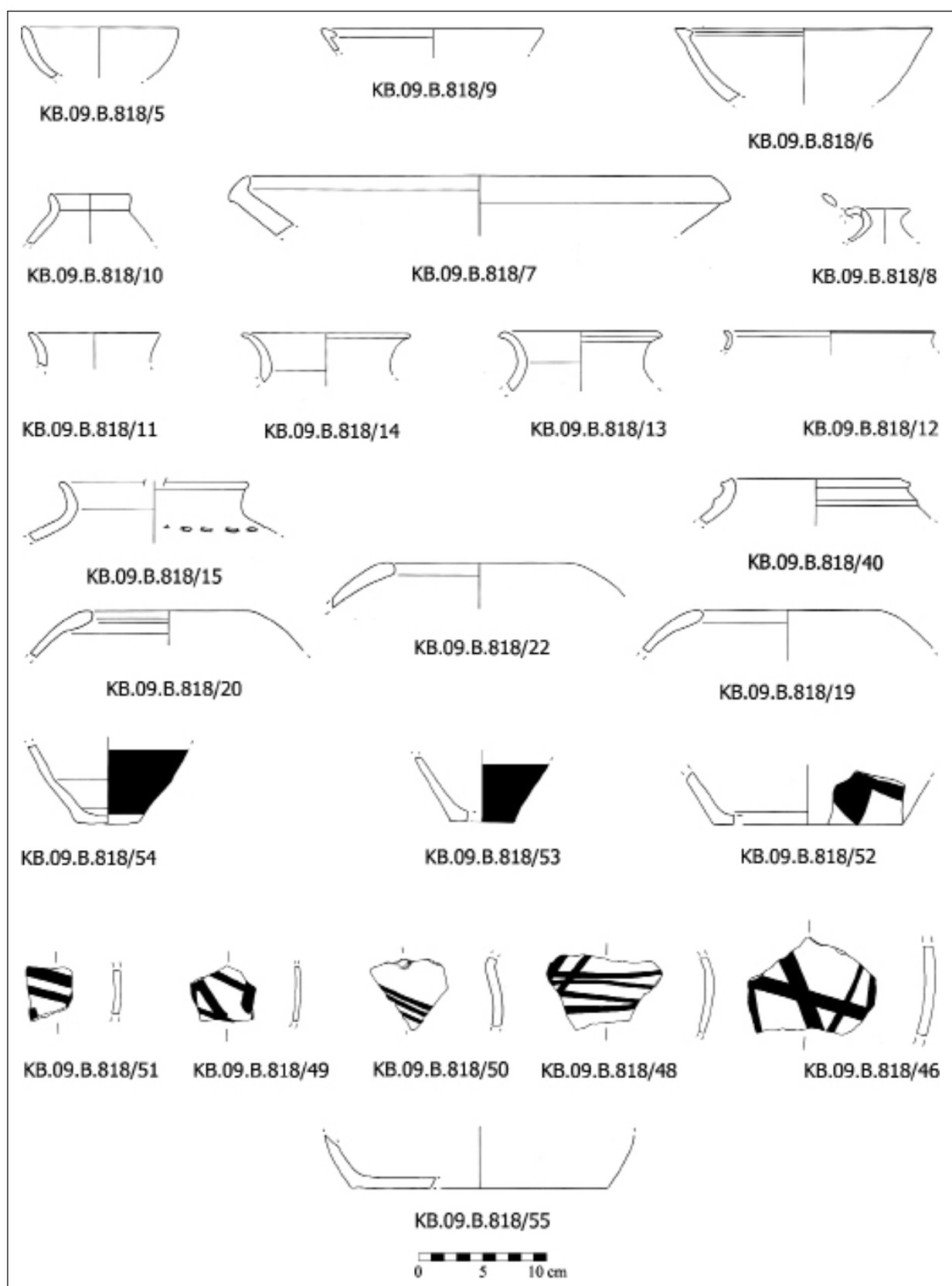
The same EB IIIB destruction layer was also reached between the Main City Wall and the Outer Wall in the eastern half of squares BmII4 + BmII5, where it consisted of a stratum



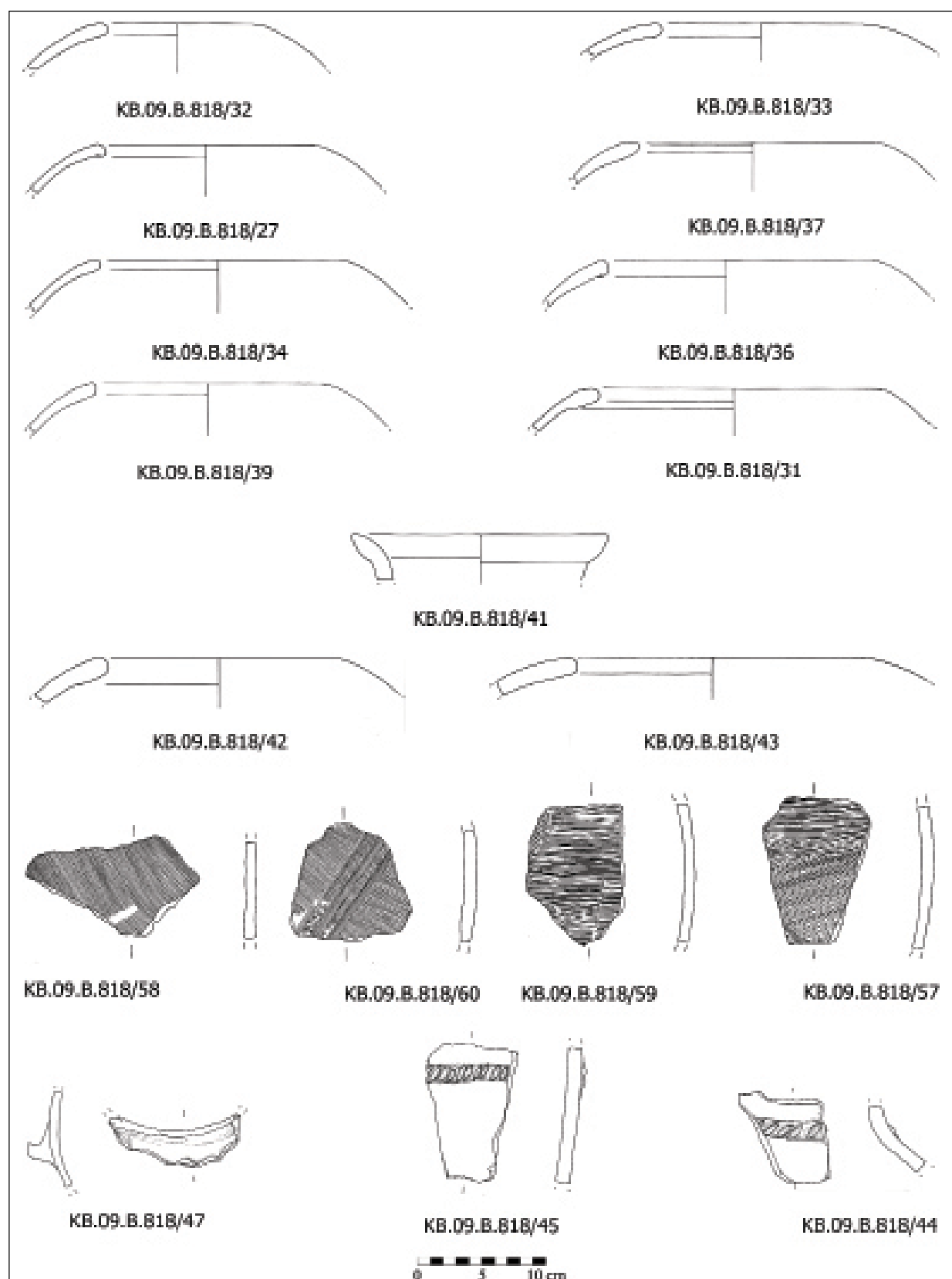
3. The EB IIIB triple line of Batrāwī fortifications, from west: to the left, EB IIIB Scarp-Wall W.165 with protruding wall W.177; in the middle, EB IIIA-B Outer Wall W.155, gradually turning northwards; to the right, EB II-III Main City-Wall W.101+W.103+W.163.



4. EB IIIB protruding wall W.177, and EB IIIB Scarp-Wall W.165 ending against the outer face of the of EB IIIA-B Outer Wall W.155 with semicircular Bastion W.825, from north-west.



5. EB IIIB pottery sherds from destruction layer F.818.



6. EB IIIB pottery sherds from destruction layer F.818.

of greyish-brown ashy soil with scattered stones and charcoals (F.814). It was also detected on top of the Scarp Wall leaning on the outer face of the Outer Wall (F.816).

Doubling the Fortification Line: Reconstruction of the Main City Wall and Outer Wall W.155 in Period Batrāwī IIIa (EB IIIA)

Seven superimposed courses of stone blocks belonging to the EB IIIA Outer Wall W.155 (preserved up to 2 m in height) were exposed towards the west in squares BnII4 + BmII4 (eastern half) + BmII3 (eastern half). Here the exposed area turned sharply northwards followed by a stretch that gradually curved towards the west (**Fig. 3**).

An EB IIIA layer of a dark ash, with broken yellowish mud bricks and limestone (F.820), was reached north of the Outer Wall underneath the EB IIIB destruction layer (F.818) in square BnII3 + BnII4 + BoII4. Some sherds of Khirbat Kerak Ware, including a hemispherical bowl (with inverted red-black lustrous slip) an in turned rim bowl, a crater and a jug (**Fig. 7**) were discovered in association with this stretch of the wall.

The curvilinear outwork W.185 was excavated inside in squares BpII4 + BoII3 + BoII4, exposing another portion of it to the north (**Fig. 8**). The overall inner diameter of this structure was around 10m, while the wall thickness varied from 1.5m to 2.0m. Excavations have revealed up to four superimposed courses of stones of this feature preserved to the south. The EB IIIA layer of collapse inside the round tower was also exposed (F.823). This comprised fallen blocks in a dark ashy soil overlain by the EB IIIB destruction layer (F.822) which was a compact stratum of grey earth with sparse stones and rare pottery.

Restoration of the EB II-III Main City Wall

The western stretch of the Main City Wall was restored with a mortar which replicated ancient building materials. The breach opened by pit P.819 was also repaired for the sake of

preservation of the whole structure. Stones were fixed with mortar both on the outer and inner face of the wall, including the staircase W.1067. The upper surface was protected so to create a cap which facilitates rainwater defluxion. The actual length of the wall so far restored has reached around 50m.

Area B South: the EB IVB Village and the EB IIIB Building B1, House B2 and Building B3

Excavations in Area B South, just south of the EB II-III Main City Wall and the street running inside it, brought to light a series of dwellings and installations belonging to the EB IVB (Batrāwī IVb) rural village, which stood upon the ruins of the EB II-III city. Underneath this were houses and buildings of the EB IIIB (Batrāwī IIIB) city (**Fig. 9**). Excavation was carried out in three different sectors, expanding the area towards the east, the south-west and the west⁹.

The Stratigraphy of Area B South

The 2009 season of excavations in Area B South helped to define and articulate the stratigraphic sequence established during seasons 2006-2007¹⁰. The sequence of phases were refined, from topsoil (Phase 1), through the different phases of the EB IVB village (Phases 2a-g) and the phases of the EB IIIB buildings (Phases 3a-d), down to the EB IIIA layers associated with the street running parallel to the Main City Wall (Phases 4a-b) which leans against the wall (W.157) blocking the EB II city-gate¹¹.

Phase 1 (topsoil) was the long period of abandonment of the site, represented by an accumulation of dust, interspersed with small stones.

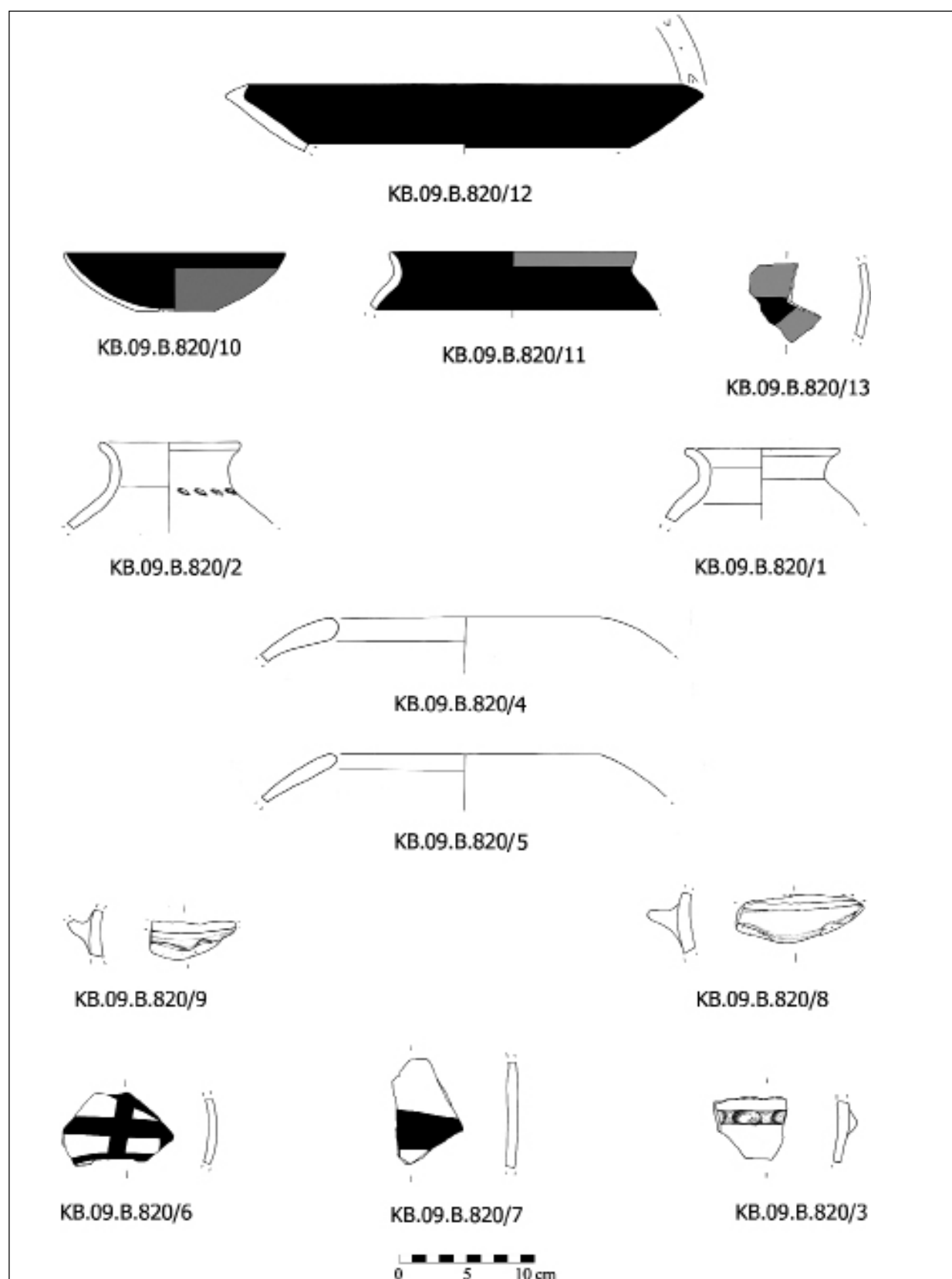
Beneath this, Phase 2 was comprised of seven different sub phases (2a-2g), including two major construction phases (2c and 2f) dating to the EB IVB and corresponding to the Batrāwī IVb village (Nigro ed. 2006: 77, note 36). The later domestic units belonging to the final settlement on the Khirbat are represented by sub phases 2a-d, while the earliest settlement stage,

9. Excavations in Area B South, which started from square BpII7 (eastern half) + BqII7 (southern half) + BqII8 in the first season (Nigro ed. 2006: 153, 167-74, 179-84), and enlarged to squares BoII6 (SW quadrant) + BoII7 + BpII7 + BqII7 (southern half) + BpII8, BqII8 + BrII8 + BrII9 (northern half) in season 2006

(Nigro ed. 2008, 127, 148-76), were resumed in 2009 in squares BnII6+ BoII6 + BnII7 + BoII7 + BpII7 + BrII7 (SW quadrant) + BoII8 + BqII8 + BpII8 + BrII8.

10. Nigro ed. 2008: 127-47.

11. Nigro ed. 2008: 73, 90-91, figs. 3.14-3.15, 3.38.



7. EB IIIA pottery sherds from destruction layer F.820.



8. *EB IIIA Curvilinear Outwork W.185, from east.*



9. *General view of dwellings and buildings in Area B South, erected in the Early Bronze IIIB (2500-2300 BC) inside the EB II-III Main City-Wall, from east.*

with less substantial structures and installations, marking the re-occupation of the site after the fierce destruction which brought to an end the Batrāwī II-III city are represented by sub phases 2e-f. This initial stage was further preceded in some places by occasional use of the EB IIIB buildings (sub phase 2g), which were still standing at the time the site was re-occupied by small groups of farmers¹².

Directly beneath this was Phase 3, represented by a series of sub phases all dating to the EB IIIB. Sub-phase 3a was the final abandonment of the EB IIIB city; Sub-phase 3b was a layer of destruction with evident traces of a violent conflagration which destroyed the whole EB IIIB settlement. Sub-phase 3c was the use of House B2 during EB IIIB, while sub-phase 3d repre-

sents the erection of buildings and houses at the beginning of Period Batrāwī IIIb.

The Dwelling Quarter of the Period Batrāwī IVb (Early Bronze IVB) Village

Two EB IVB (2200-2000 BC) occupational phases were distinguished in Area B South. The earlier was a kind of camp-site representing the re-occupation of the tell in the last centuries of the 3rd millennium BC (currently recorded only in this area of the Khirbat), while the later occupation phase represents the gradual transformation of the settlement into a rural village.

The earliest occupation phase (sub-phases 2f-e) in square BrII8 consists of floors with limestone scales, posts holes, stone-lined circular bins and shallow benches (**Fig. 10**). In the central sector (square BoII8) there was a circular silo and, not far away from it, two infant burials (**Fig. 11**)¹³. Each burial was signalled by a small

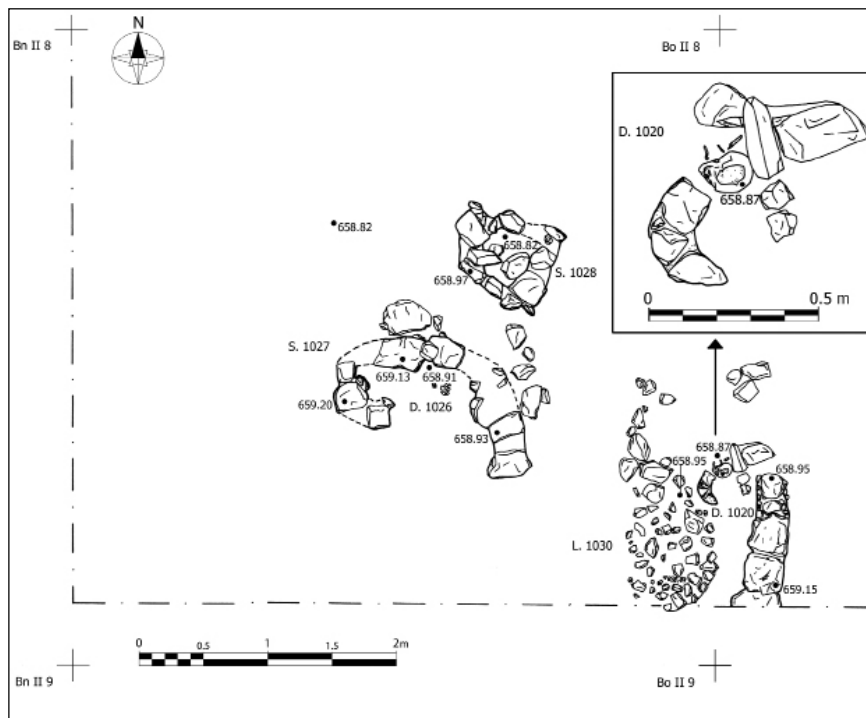


10. *EB IVB (2200-200 BC) stone-lined circular bins.*

12. Nigro 2009: 670-72.

13. Human remains were studied by Dr Mary Anne Ta-

furi, Rome "La Sapienza" University, which I kindly thank for the information.



11. Plan of EB IVB (2200-200 BC) child burials D.1020 and D.1026.

stela or vertical stone¹⁴. The northern most burial, D.1026, was a stone-lined cist of oval shape, in which the skeleton of a child of perinatal age (38 weeks) was buried. Approximately one meter to the south-west, the second burial (D.1020) consisted of a stone cist, leaning on a small north-south wall, within which the skeleton of a child of an approximate age of 1 year was deposited (**Fig. 12**). Two flint blades were associated with this burial. In square BnII6, a stone wall or platform (W.1021) and a square block 1m west of it were uncovered, perhaps to

be used as working installations.

The upper phase (sub-phases 2 d-a) of Batrāwī IVb occupation represents the establishment of a rural village with a series of rectangular dwellings, curvilinear installations, and working areas. In BrII8 a major east-west structure (W.407) was the eastern continuation of wall W.117 (Nigro ed. 2006: 170-73, figs. 4.24, 4.26). Against the southern face of the wall, at its eastern end, there was a bench upon which two mortars were placed. Beside this was a work table with a pestle (**Fig. 13**). In the south-eastern



12. EB IVB (2200-200 BC) child burial D.1020, excavated in square BoII8.



13. EB IVB (2200-200 BC) House L.910, with working table and pestle beside bench B.904, from south-west.

14. A cist burial was excavated in 2006 some meters to

the north-east: Nigro ed. 2008: 174-75, figs. 4.82-4.84.

quadrant of the square, a rectangular installation (L.908) made of limestone was also unearthed.

In the central sector, in squares BnII6 + BnII7 + BoII7 + BoII8, large rectangular compounds and dwellings were uncovered. The work area L.450, which was paved with flagstones (Nigro ed. 2008: 168-169, figs. 4.73-4.75) continued to the south with a solid wall made up of stone headers (W.445) delimitating a rectangular room (L.480). Near the corner of the square BnII8, wall W.445 joined with an east-west structure (W.1059) that belonged to another large square compound (6m x 5m), extending to the north-west in squares BnII6 + BnII7. This was subdivided into two rectangular east-west orientated spaces (L.1062 and L.1010) which opened to the north (L.490). In the south-western sector of L.480, a circular stone-lined silo (S.1056) was identified, while south of W.1061, the north-western corner of a rectangular installation (L.1064) was uncovered. In square BoII8, a wall comprising two rows of stones delimited an open courtyard where a circular silo (S.1008), a rectangular platform paved with flat stones (L.1009), and an oval-shaped feature (W.1011) were erected.

Both occupational phases provided a wide range of ceramic materials (**Fig. 14**) and several objects and tools, including flint blades, stone pestles, basalt grinders, pottery disks (stoppers), spindle whorls, as well as numerous animal bones. All related material belonged to the middle and final stages of the Batrāwī IVb Period (EB IVB, 2200-2000 BC).

The EB IIIB Dwellings and Public Buildings inside the Main City Wall

The exploration of the EB IIIB city was carried on in the 5th season (2009) both east and west of Building B1 (**Fig. 9**). In BrII8, the northern half of a rectangular house stretching north-south was excavated. The House (B2) was delimited by solid stone walls on the northern, eastern and western side. In the middle of the western side there was the entrance (**Fig. 15**). A plastered semicircular storage bin was built against the western face of the this wall (partially excavated in 2006: Nigro ed. 2006: 181-84, figs. 4.39-4.42). Inside it was a copper pivot and two pottery disks (**Fig. 16**). In the middle of the room was a round stone which served as pillar

base. Another flat stone was uncovered against the southern face of the northern wall of the house, perhaps used to support a vertical post or as a bench. In the north-western corner of the room there was a round bench.

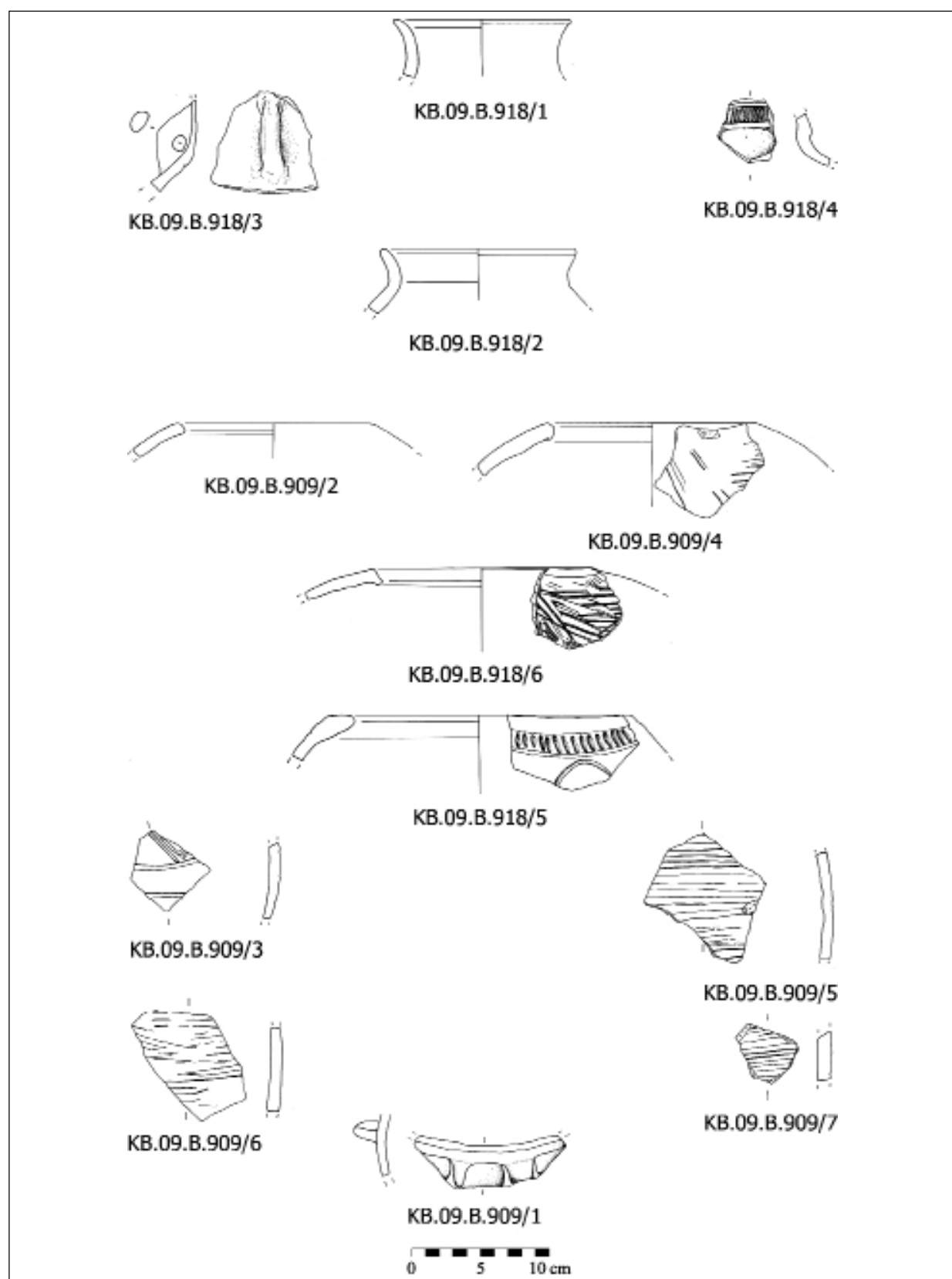
This domestic unit, which was destroyed by a fierce fire (several complete mud bricks from the superstructure were also retrieved) produced a spindle whorl made of animal bone, a bone needle, and two flint blades (**Fig. 16**), as well as distinctive EB IIIB pottery sherds. Building B1 was further explored in squares BoII8 + BoII7 (**Fig. 17**). South of L.430 a second rectangular room (L.1046) was excavated, which was wider than the first and had a thinner wall on its western side. The door (L.1066) connecting the two rooms was located in the middle of wall W.391.

West of Building B1, a lane (L.1050) was uncovered separating the former from a second structure, of which only the northern and western side walls (W.1033 and W.1043 measuring 0.8m - 0.9m thick) have so far been excavated. The northern wall (W.1033) was exposed to 7.5m of its length (**Fig. 18**). Along its inner face, a row of pithoi (**Fig. 19**) was found *in situ*, still completely preserved and submerged in a 1 m thick destruction layer (**Fig. 20**) which had accumulated in what seemed to be a large rectangular room (L.1040). Such substantive storage vessels hint at public storage activities carried out within this building.

The street running inside the Main City Wall was further excavated to the west in square BnII6, just north of wall W.1033. At the western end, inset into the southern inner face of the Main City Wall was a second staircase (W.1067), mirroring the Staircase W.181 (**Fig. 18**). The inset area in which the two staircases were built measured 7m wide and 0.4m deep.

Area F: Restoration of the Broad-Room Temple

Restoration and reconstruction of the Broad-Room Temple in Area F (Nigro 2007: 359; Nigro ed. 2008: 276-93) was completed during the 2009 season (**Fig. 21**). A special effort was devoted to the distinction of the EB II phase (phase 4, Temple F1) from the EB III phase (phase 3, Temple F2). The original building (Temple F1; Nigro ed. 2008: 276-81) was a broad-room elongated structure, with a major entrance ori-



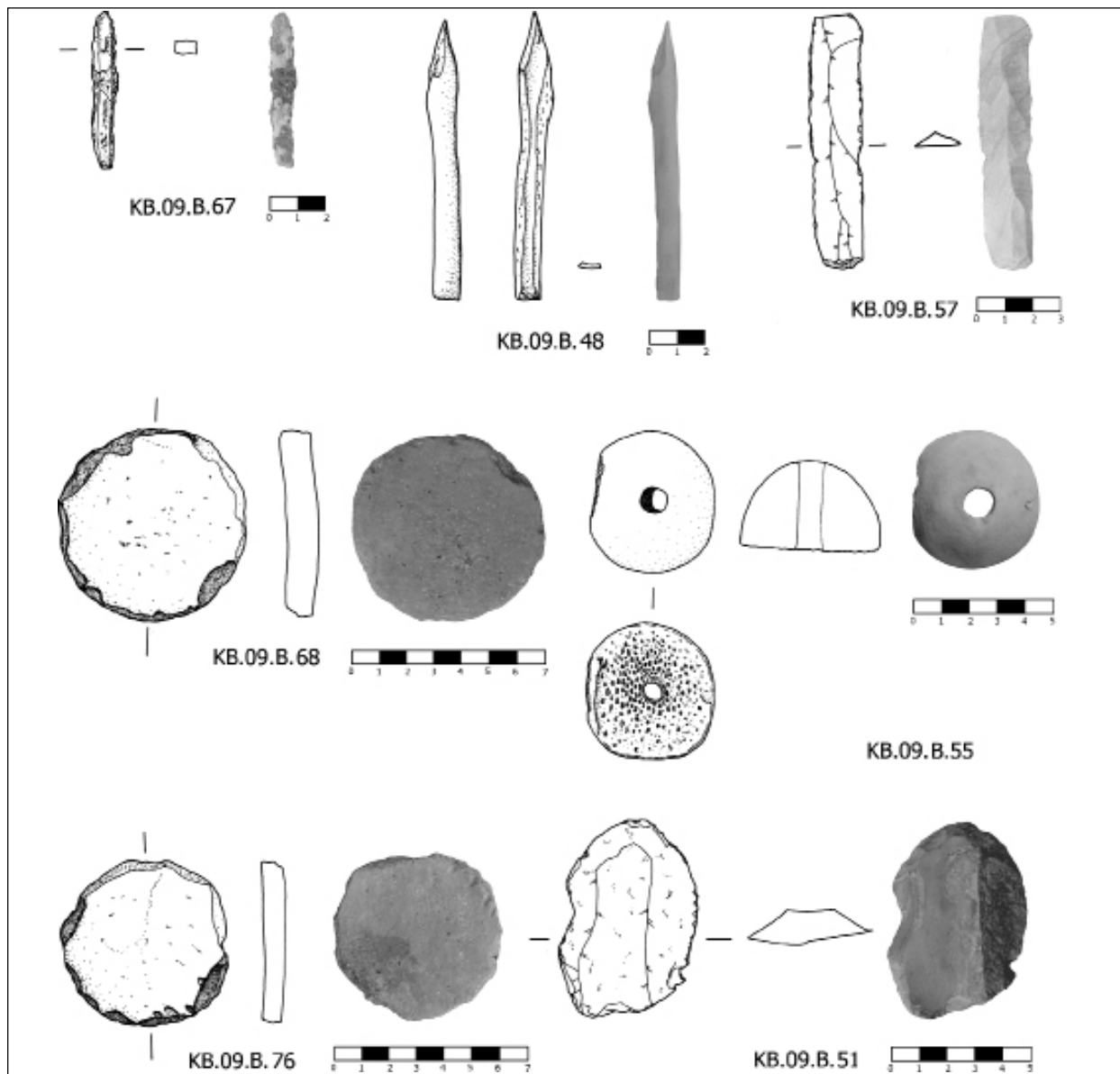
14. EB IVB (2200-200 BC) pottery sherds from Batrāwī IV village.



15. EB IIIB (2500-2300 BC) House B2, from north-west.



17. EB IIIB (2500-2300 BC) Building B1 with semi-circular oven T.413, from north-east.



16. EB IIIB small finds from destruction layers related to House B2.



18. General view of the row of EB IIIB (2500-2300 BC) buildings and street L.1060 parallel to the EB II-III Main City-Wall, from west; note the two facing staircases (W.181 and W.1067) in the inner side of the Main City-Wall.

entated south and centred on a niche inside the cella. The entrance opened onto a courtyard, where a circular platform (S.510) with a central cup-mark stood, flanked by a base, possibly for a freestanding betyl (Nigro ed. 2008: 283-84). After the earthquake, which destroyed the EB II city and caused the collapse of the central stretch of the temple façade, the sacred building was largely reconstructed with a new protruding front wall (a pillar or an altar stood at the centre of the façade). The cella was completely refurbished (Nigro ed. 2008: 285-89) moving the cult focus on to the western short side. Thus, the temple achieved a bent-axis plan in spite of its original broad-room layout.

The restoration of the Temple makes a significant contribution to the repertoire of Jordanian pre-classical architecture and should be compared with the renowned sacred building of similar plan discovered in Bāb adh-Dhrā', which also accompanied by a semicircular raised platform (Rast-Schaub 2003: 157-66, 321-35; Sala 2008: 179-86, 283-90).



19. EB IIIB (2500-2300 BC) pithoi retrieved in Building B3.

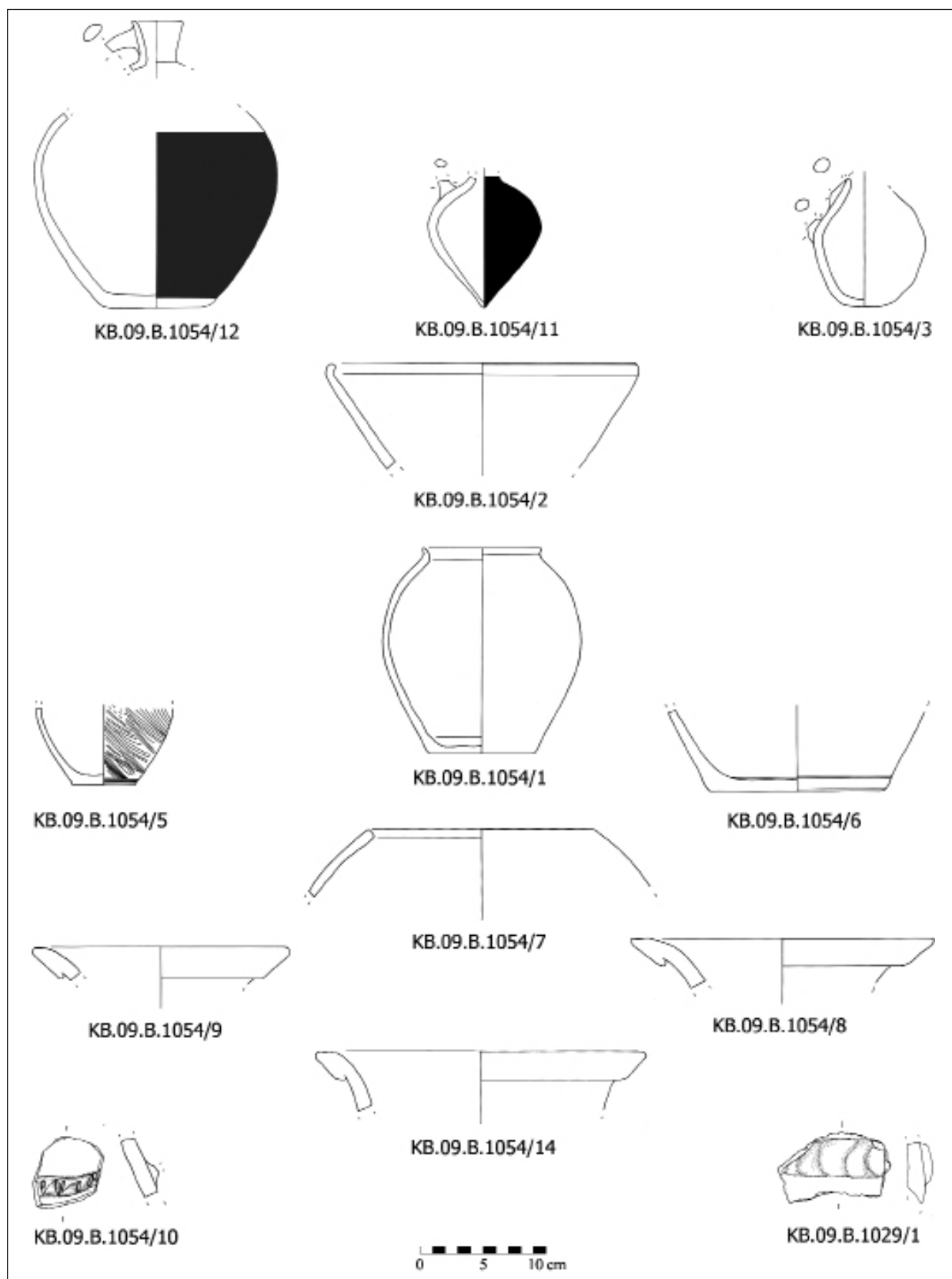
Conclusions

The 2009 season of excavations and restorations at Khirbat al-Batrāwī shed new light on the EB II-III city, which controlled the Upper Wādī az-Zarqā' (Nigro 2009) at the end of the 3rd millennium BC. The Triple Line Fortification on the northern side of the tell, which reached an overall width of around 20m (Fig. 2), was further investigated revealing a Round Bastion W.825. Inside the Main City Wall, in Area B South, the discovery of a further portion of Building B1, the excavation of House B2, and the identification of Building B3, with a series of *pithoi* fully preserved *in situ*, showed the urban layout and the richness of the city at its *floruit* during the third quarter of the 3rd millennium BC. The Broad-Room Temple erected on the easternmost terrace was fully restored, so that it was possible to reconstruct its architectural and functional development between EB II and EB III.

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20. EB IIIB (2500-2300 BC) vessels from destruction layer F.1054 inside Building B3.



21. General view of restored EB II-III Broad-Room Temple in Area F, from west.

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THE INTERNATIONAL AŞLAḤ PROJECT (IAP) 2010: PRELIMINARY REPORT ON THE FIRST SEASON

Laurent Gorgerat and Robert Wenning

Introduction and Acknowledgments

The first field season of the International Aşlah Project (IAP) lasted from 18th of March to 8th of April 2010. The IAP was initiated and organized by Prof. Dr Stephan G. Schmid, Co-director of the French-German research project 'Early Petra', which is sponsored by the German Research Association (DFG), the Excellence Cluster TOPOI at the Humboldt University Berlin, and the Association for the Understanding of Ancient Cultures (AUAC). IAP 2010 was directed by Prof. Dr Robert Wenning on behalf of Muenster University. Laurent Gorgerat of the Antikenmuseum Basel was field director.

We would like to thank the Director General of the Department of Antiquities, Dr Fawwaz al-Khraysheh, for his support and for granting the working permit (Permit No. 2010/12). We would also like to thank IFPO 'Amman, especially its director Dr Jacques Seigne, and GPI 'Amman, especially its director Dr Jutta Haeser for accommodating the team during its stay in 'Amman. In Petra we were kindly supported by Dr Emad Hijazeen, Commissioner of the Petra Archaeological Park & Cultural Heritage and Tahani Salhi, Director of Cultural Resources.

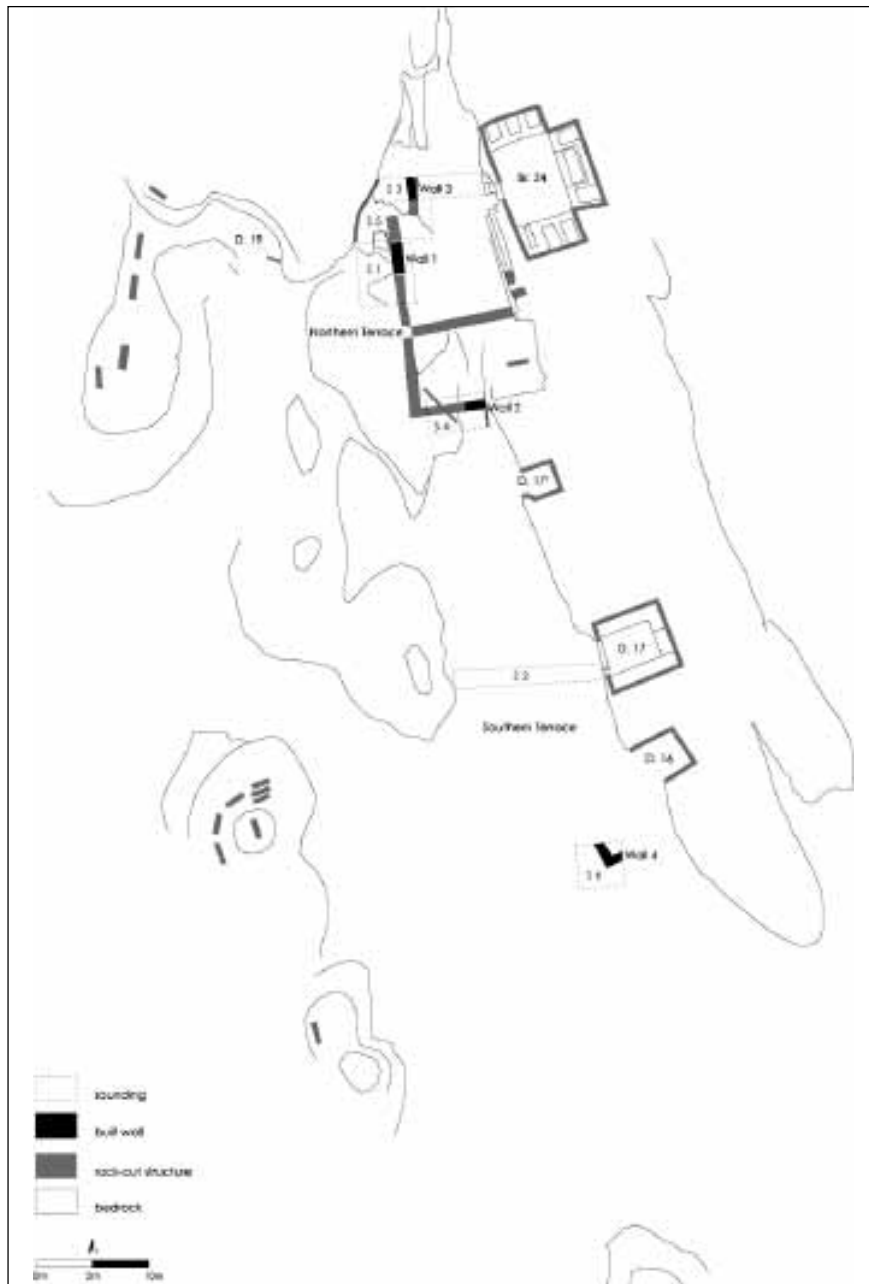
The team from Germany consisted of the following archaeologists and students: Karin Petrovsky, Marco Dehner, Thomas Kabs (all from Berlin), and Wiltrud Wenning (Muenster). Up to nine Bdool workmen were employed. The Department of Antiquities representative was Mohammad Abdel Aziz al-Marahleh, whose help and advice was most welcomed. During the team's sojourn at Nazzal's Camp, Ali Khalaf al-Bdool was our camp manager and Suleiman Mohammad al-Bdool and his wife Aziza were our cooks.

The Geographical Situation

The Aşlah-triclinium-complex is situated on a rocky plateau of the Bāb as-Siq area directly opposite of the entrance into the Siq lying high above the path along the Wādī Mūsā, which leads into the Siq (**Fig. 1**). A small, but long stretched rock oriented north-south formed the boundary of the complex to the east and a much higher rock closed the area in the north (**Fig. 2**). Between the two rocks a path leads to the large rocky area of ar-Ramla in the north. The southern part of the long stretched rock looks more or less semicircular in shape if seen from the west (Wenning 2004: 44-45), which could have been of some significance. We defined the area in front of the triclinium as the Southern Terrace, while the area in front of the tomb Br. 24 was called the Northern Terrace.

At the Southern Terrace, the triclinium of Aşlah (D. 17), two small lateral chambers (D. 16, 17') and a row of niches (D. 15) are cut into the rock, while the eastern face and the top of the rock remained without installations. The façade faces the large plateau in front of the rock and is orientated towards the entrance of the Siq. From the Siq entrance itself only the upper part of the rock is visible. Nevertheless, this orientation seems to be intended. The rock façade itself is divided into irregular layers, which are either curved in shape or drop down diagonally. No artificial smoothing of the rock nor channels protect the façade or the triclinium against rainwater, but it probably did not cause as much damage as on steeper rock cliffs.

The rocks and the plateaus of the Aşlah-triclinium-complex are part of the massive and white weathered Disi sandstone of the Lower Ordovician with the rounded hillocks, typical for the eastern parts of Petra (Rababeh 2005: 33-



1. Bāb as-Siq. General plan of the Aşlah triclinium-complex (M. Dehner, L. Gorgerat).



2. Bāb as-Siq. The Aşlah-triclinium-complex from the west (L. Gorgerat).

39). The smoothed surface seems to be dense in material and is of a greyish white colour. Below the hard surface, however, the stone can be quite friable.

In the northern part of the rock Tomb Br. 24 is cut. On the rock face in front of the tomb traces of an architectural structure are still visible. The structure occupied the larger part of the plateau on the Northern Terrace and its construction was facilitated by deep right-angles cut into the rock. In a shallow rocky depression to the west of the plateau a cistern (D. 19) is situated.

The western border of the Aşlah-triclinium-complex is formed by several low hillocks with a total of 53 rock-cut pit graves and shaft graves (D. 21). They are orientated towards the path running along the Wādī Mūsā into the Siq and are clearly visible from the road. It is also possible that they had a relationship with the triclinium-complex. The plateau slopes to the south towards the path, where two aqueducts from the 'Ayn Mūsā can be seen somewhat higher at the slope.

Southern Terrace (The Triclinium of Aşlah D. 17)

Previous Analysis

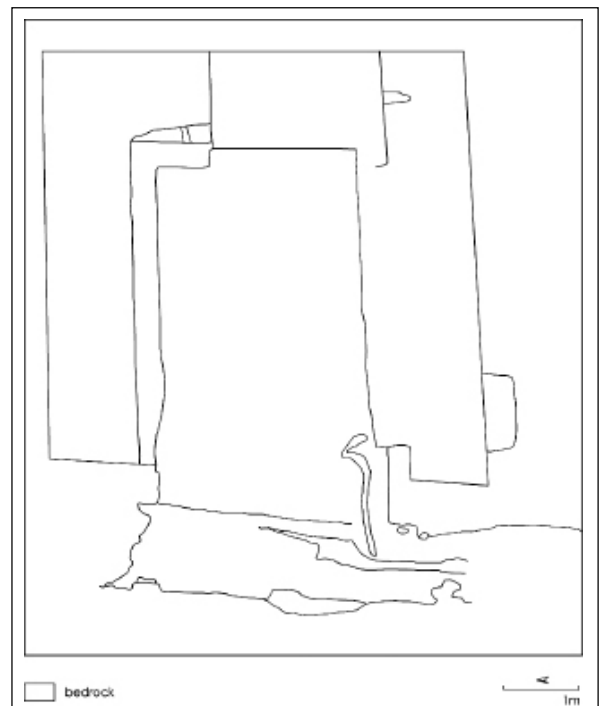
Brünnow-von Domaszewski were the first to list the monuments of the Aşlah-triclinium-complex in 1904 (Brünnow-von Domaszewski 1904: 199, 203 nos. 19-28 with map pl. III; cf. Markoe 2003: fig. 142 for a more precise map from 1999), followed by Dalman in 1908 (Dalman 1908: 107 nos. 15-21 and 1912: 40). In 1990/91 Zayadine and Farajat cleaned the triclinium and studied the complex (Zayadine-Farajat 1991: 275). Furthermore, Merklein attempted some interpretation of the area in 1995 (Merklein 1995: 109-115, but cf. Kühn 2005: 70-73). In 1997, Merklein and Wenning studied the complex again as part of their "Petra Niches Project (PNP)" (cf. the sketch in Kühn 2005: fig. 8). The first thorough study of the Aşlah-triclinium-complex, however, is currently done by the IAP. Wenning (forthcoming) gave a paper on the historiography of the complex at the 11th International Conference on the History and Archaeology of Jordan in Paris 2010.

After the cleaning of the triclinium by Fawzi Zayadine and Suleiman Farajat in 1990/91, it took not much effort to clean the room once

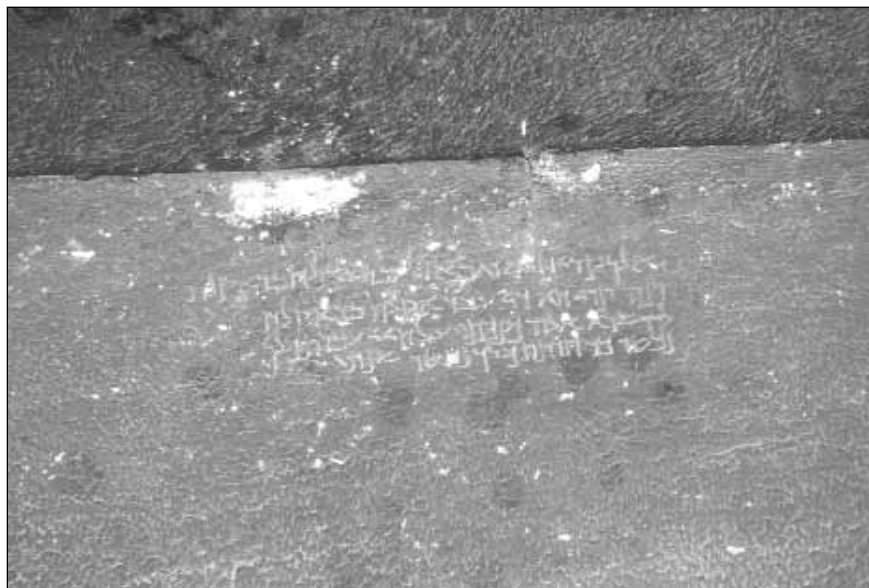
again. We measured and documented the room in full detail including ancient and more recent alterations, due to intense secondary use by the B'dool in the past and present (**Fig. 3**). None of the older plans of the triclinium proved to be correct (Dalman 1912: fig. 34; McKenzie 1990: pl. 167d; Zayadine and Farajat 1991: 277, fig. 2).

The Aşlah-Inscription

The triclinium constitutes the most important structure of the Southern Terrace as can be deduced from the Nabataean inscription cut high into the back wall (**Fig. 4**). We are dealing with at least two inscriptions as line 1 is to be separated from lines 2-4. The latter is a dedicatory inscription: "Aşlah, the son of Aşlah, made this rock-cut chamber for Dušara, the god of MNBTW (or MNKTW), for the life of Obodas, king of the Nabaṭū, the son of Aretas, king of the Nabaṭū, year 1." Following palaeographic analysis the Obodas mentioned in the text is in fact king Obodas I. He became king after about 96/100 BC and before 93/95. Therefore the inscription is often dated into the year 96/95 BC. It is stated that this is the oldest Nabataean inscription found in Petra so far. This was the main reason



3. Southern Terrace. Triclinium of Aşlah (Th. Kabs, L. Gorgerat).



4. Southern Terrace. Triclinium of Aşlah (D. 17). Nabataean inscription on the eastern wall (L. Gorgerat).

for us to chose the Aşlah-triclinium-complex in the framework of the “Early Petra Project”.

We studied the inscription carefully and noticed a few more damages since its last inspection ten years ago. The reading of MNBTW (Dalman) or MNKTW/Malikatu (Milik) is much debated. While the suggested interpretation of MNKTW by Savignac in 1913 (Savigny 1913: 442) seemed coherent according to his facsimile, a closer study revealed that the shapes of some letters in the published facsimiles (Dalman 1912: 172; Savignac 1913 441; Cantin-eau 1932: 2) do not fit with our photographs of the letters. Among them is the third letter of MNBTW. As the scholarly discussion is based mainly on the facsimiles, we decided to study the whole inscription once again. At the moment we cannot exclude the one or the other reading, since we have arguments for both. If the reading MNKTW is accepted, however, it might be rather associated with a PN than with the king Malichus.

In the first line we are told that Aşlah made rock-cut chambers and a cistern. They are not specifically dedicated to Dušara. The chambers can be identified with the two lateral rooms (D. 16 and D. 17' and possible D. 17 too) and the cistern D. 19. Line 1 used an older form of the demonstrative pronoun than in line 2. From this it was speculated that line 1 was older or younger than lines 2-4 and that the construction of the Aşlah-triclinium-complex could go back to the

middle of the 2nd century B.C. However, such a large span between the two inscriptions seems doubtful. The lateral rooms as well as the cistern must have been added to the complex after the triclinium was cut. We therefore deny any dating of the complex before the early 1st century BC.

At the southern lateral wall we discovered another Nabataean inscription, which is not so well preserved and is difficult to read (**Fig. 5**). In 1904 Brünnow-von Domaszewski mentioned multiple Nabataean inscriptions (Brünnow-von Domaszewski 1904: 199 no. 21), but up to now the second inscription was completely ignored. L. Nehmé kindly informed us that Milik discovered the inscription as well and has included it into the supplement to the CIS II (currently in the editing process). As the inscription is indeed difficult to read, but its content possibly being of great importance, we invited L. Nehmé to share her expertise with us. She agreed to study the inscription and to publish it in the Second Preliminary Report of the IAP. We are very thankful for her cooperation.

The Entrance

It has been often emphasized that the façade of the triclinium is without any decoration. However, the broad and high entrance had lateral simple flat frames. The frame can be measured at the northern door post, while the frame at the southern door post is broken off. There



5. Southern Terrace. Triclinium of Aşlaḥ (D.17). Nabataean inscription on the southern wall (L. Gorgerat).

seems to be no upper frame. The original width of the entrance can be measured only in the upper part since the lower parts are either disturbed or completely destroyed. The thickness of the northern entrance wall measures 43cm.

The entrance measures 2.98m in width. A large rock-cut threshold protrudes slightly outwards (**Fig. 6**). The width measures 59-60cm. The threshold is framed by an outer edge which continues for 27cm to the north and 30cm to the south beyond the entrance. In front of it a groove of 13.5cm width is cut. At the southern end of the groove a hollow of 12 x 13cm dimensions with a depth of 4.5-12.5cm can be seen, possibly

the rest of a door-hinge. It seems that originally the triclinium could be closed by a wooden door from the outside. It cannot be excluded that the lateral frames correspond with this door mechanism.

A round hole of 12 x 14 x 9.5cm is cut into the threshold close to the front edge situated 1.15m from the southern door post, which is about a third of the width of the entrance. It is not yet clear, if this hole belongs to the original or the secondary entrance situation. A shallow 20-27cm broad channel joins the inner side of the threshold at a level slightly deeper than the floor of the triclinium. The channel is roughly



6. Southern Terrace. Triclinium of Aşlaḥ (D. 17). Threshold (L. Gorgerat).

pecked. A narrow channel crosses the threshold about 33cm from the southern door post. This channel is 6cm broad and 5.5cm deep. It starts from the southern corner of the flat broad channel and could have carried water out from the interior, although today the poor state of preservation leads to the opposite. The channel continues a bit beyond the outer edge of the threshold. Whether a crack (FK 14) in the rock directly in front of the southern part of the entrance or the stepped edge towards trench 2 was used to direct water to the south remains uncertain. FK 14 was excavated at a length of 2.05m.

Three holes of different sizes with no particular alignment are cut into the broad channel running along the inner side of the threshold. They are clearly secondary in date. At least the middle one (15 x 13 x 9cm) could have been part of the door mechanism, which itself seems to be secondary, enabling the door to close from the inside. A fourth deep hole (16 x 16 x 15cm) was discovered in the floor of the triclinium to the east of the southern hole. It is as well secondary, but the function of it is also uncertain.

The Floor

Remains of the probably original floor can be seen in full width only in the back but other small fragmentary bits survive near the benches. The floor is damaged and irregularly splintered with large pieces broken out, especially towards the entrance as a result of the long secondary use

as a shelter for animals as it is still used today.

The Benches

Both lateral sides show benches (clinia). An irregular arrangement was chosen for the bench at the back (**Fig. 7**). Two steps once lead up to the lateral benches directly beyond the entrance wall. Only traces of the steps survive. The steps to the northern bench are 59 and 36cm broad, and the steps to the southern bench are 40 and 41cm broad. The upper step in the south is 32cm deep and about 21cm high.

The original width of the northern bench is preserved in the back and measures 1.17m. A recessed ledge, 34cm broad and 14cm deeper than the surface of the bench runs along the front and was used to deposit food and drinks. The height of the bench is 50cm. The original surface is preserved only at the eastern third of the bench. Other parts of the bench, specifically the front, are damaged.

The southern bench measures 1.12m in width in the back. Only here the original surface remains. A small part of the ledge can be seen where the bench abuts the lower part of the eastern one. The southern bench is even more damaged than the northern one of the front. Both benches show two large notches, but the southern bench has two circular holes as well as a funnel of 21cm diameter and 19cm in depth. They belong to the secondary installations of the Bdool.



7. Southern Terrace. Triclinium of Aşlağ (L. Gorgerat).

The eastern bench in the back is of normal shape where it abuts the northern bench measuring 1.17m in width. The ledge narrows from 29 to 36cm. 8cm above this ledge another one is cut widening diagonally from 11 to 24cm. It seems to be secondary, but is older than another notch which cuts into it. If it was carved in order to broaden the ledge, it remained unfinished.

In a distance of 2.20m from the northern lateral wall the eastern bench is deepened 27cm and built on a lower platform of 2.25 width in the back, 2.32 in the front and 1.29m in depth. The platform rises 24-26cm above the floor of the triclinium. The front of the platform is 21cm behind the front of the eastern bench in the north-east. In the southeast there is no continuation of the eastern bench and the platform is cutting 17-19cm into the lateral side of the southern bench and a small strip even protrudes 29cm inwards before the higher ledge itself begins. The original surface of the platform is flaked off in the centre, but can partly be seen in the corners of the lateral sides. It seems to be that the platform is not a secondary cutting. Neither the irregular arrangement nor the cutting of the platform (perhaps to set up a particular cline or tables?) can be explained (but cf. Br. 235, 704).

The Walls

The walls and the ceiling were constructed with fine pecking techniques (cf. Rababeh 2005: 93). Pointed chisel and mallet markings can be seen everywhere. Concerning the early date of the triclinium the quality of the masonry needs to be emphasized. There is no separate strip where the walls and the ceiling meet each other, and there is no indication for former stucco decoration or the use of plaster. The original surface survives only on the upper parts of the walls and the ceiling and is scorched black. Especially the lower parts of the walls are heavily damaged with its surface flaking off.

The Aşlah-inscription is cut very high on a smoothed part of the back wall. The other Nabataean inscription of the southern wall is incised without any smoothing. Especially the end of that inscription is badly preserved.

An aedicula (D. 17b) measuring 36 x 37.5cm is incised in the back wall, 1.07m above the platform. The aedicula shows pilasters with bases and capitals, an architrave and a triangular pedi-

ment. A secondary hollow with a so-called sand-glass hole to tie a rope, other objects or even animals is roughly cut into it. Contrary to Dalman and Merklein's assumptions (Dalman 1912: 40 fig. 35; Merklein 1995: 110; cf. also Wenning 2003: fig. 1a-c) this cutting is not a betyl and does not represent Dušara (Wenning 2003: 152-153). It rather was cut in the context of the secondary use of the chamber by the B'dool. There are a few identical cuttings in the triclinium, in room D. 17' as well as in some other chambers in the area. On the other hand, the aedicula symbolizes sanctity and corresponds with the inscription and the dedication to Dušara. The presence of the deity might be symbolized with the second incision, 41cm to the right of the aedicula. It shows a rectangular betyl (D. 17c) of 14.5 x 21cm.

An arched niche basin is cut into the southern lateral wall 50 cm from the entrance wall (**Fig. 8**). Such niche basins are common in the Petra triclinia and are found in 29 of 44 known examples (Brockes 1994: 12). Dalman connected these basins with ritual purification (Dalman 1908: 94). The frontal wall of the basin is lost. The width measures 1.01m in the front and 95 cm in the back. The height of the front measures approximately 1.20m. Also, the front part of the arch is broken off and does not allow exact measurements. But the original height of 66cm survives in the back. Contrary to McKenzie the back wall is not semicircular but straight (McKenzie 1990: pl. 167d). The flat bottom of the basin measures 43-52cm from the front to the back. In its centre an eroded hollow of 12-24 cm diameter and a remaining depth of 8-11 cm is cut. Parts of the original surface can be found at the bottom, the back wall and the western side of the arch. It is more roughly pecked with a pick axe.

All other installations and cuttings in the walls are secondary. Two hollows at both parts of the entrance wall could have been cut in the context of the secondary entrance situation. Both hollows, 55cm from the lateral walls, show sand-glass holes, which could be later in date. The one at the northern part is 1.54m above the bench and measures 21 x 18-21cm, the one at the southern part is 1.63cm above the bench and measures 19 x 13 x 14cm.

A total of 19 sand-glass holes were counted. There is no indication that any of these belong



8. Southern Terrace. Triclinium of Aşlah (D.17). Southern bench with step and the niche basin (L. Gorgerat).

to the Nabataean period, although such holes are known from Nabataean contexts elsewhere. In terms of position, however, an intact sand-glass hole 2.47m above the eastern bench of the back wall (and the upper aeroplane graffiti) might constitute an exemption, since all others are cut no higher than about 1.5m above the benches. Apart from these sand-glass holes other smaller and larger holes as well as small damages were noticed.

More striking than these holes and cuttings, however, are the incised graffiti of camels, horses, donkeys and even two aeroplanes. These graffiti and some Arabic names have scratched and damaged almost the complete original surface of the lower half of the wall and entirely changed the character of the whole chamber. This must be one reason why no pictures of the Aşlah-triclinium can be found. There are different styles and techniques. Some of the drawings and names are recent, but also the “older” fit with Bedouin drawings. The most prominent depictions are those of dromedaries, followed by horses and donkeys, each of them with riders as well. Many are oriented to the right, but some also to the left. Apart from caravan-like rows of dromedaries there are no further contextualised scenes.

The Niches

On the rock face outside the triclinium and room D. 16 a row of eighteen votive niches (D. 15a-t) continues to the southern tip of the rock (Fig. 9). Contrary to Dalman not twenty, but

eighteen niches can be counted. D. 15n is another niche basin, while D. 15r is not a niche at all. These niches are studied in the “Petra Niches Project” by Wenning. Niche D. 15c is conspicuous in size and strikes the viewer with its aedicula, and a pedestal (*mtwb*). Not only D. 15l, but also D. 15i and D. 15m show a *betyl* in the recessed form in the niche (cf. Wenning 2001: 85).

Sounding S 2

As we do know from several sites in Petra (Schmid 2009b: 139-170), mainly from the Wādī Farasa (Schmid 2009a: 95-105, Schmid 2001: 159-197), the Nabataeans planned their funerary structures as multifunctional complexes. According to this knowledge, one of the aim of the IAP 2010 was to check if any architectural structure

could be linked to the rock-cut structures. Therefore, we opened a 1.5m broad trench from the entrance of the triclinium (D. 17) to the visible bedrock about 10 m ahead. This sounding S 2 (Fig. 10) unfortunately yielded no architectural structures in front of the triclinium, but demonstrated how the rock was damaged by intruding water. While we expected such water damages near to the foot of the rock due to natural and artificial channels leading the water down as well as cracks in the rock itself, we discovered that the rock was affected by water also in the open area and in a depth up to 1.5m. From this trench, we got the so far earliest pottery found on this

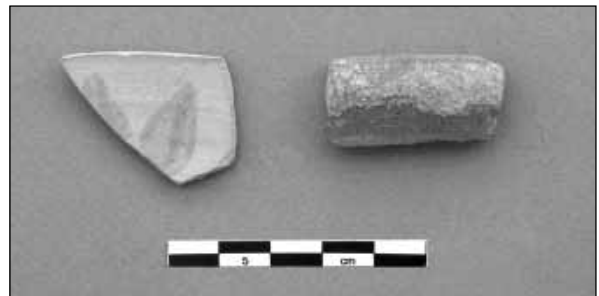


9. Southern Terrace. Votive niches D. 15c-m (L. Gorgerat).

site (**Fig. 11**). These Nabataean fine ware sherds can be attributed to Schmid's phase 1 (100-50 BC) and 2a (50-25 BC), which fits nicely with the dated inscription (Schmid 2000: 37). After



10. Southern Terrace. Sounding S 2 in front of the triclinium of Aşlah (L. Gorgerat).



11. Nabataean fine ware from sounding S 2 (L. Gorgerat).

the completion of the documentation, sounding S 2 was refilled and closed again.

Sounding S 6

The only visible structure on the surface of the Southern Terrace was a wall fragment in front of the small lateral chamber D. 16 (**Fig. 1**) which was checked in sounding S 6 (**Fig. 12**).



12. Southern Terrace. Sounding S 6 with wall 4 (L. Gorgerat).

Since the visible stones are not so well built, it was not clear in the beginning how to classify and to date this wall. One evidence for the dating was given by the construction technique of the wall itself. Below the upper row of large stones we excavated a layer of medium sized stones, under which a layer of small stones, pebbles and earth were found. The wall is founded on bed-rock with a thin layer of earth and small stones and pebbles between the rock and its lowest layer (**Fig. 13**).

Medieval pottery finds and the presence of *ballistae* (**Fig. 14**), however, supported the thesis that wall 4 was built in the Middle Ages by the Crusaders. The limestone blocs used to build this wall were possibly taken from the Nabataean building at the Northern Terrace. The bed-rock slopes to the west and can be reached from both side of the wall. The southeast corner lies on bedrock, which is weaker and partly miss-



13. Southern Terrace. Sounding S 6. Detail of wall 4 (L. Gorgerat).



14. Medieval pottery and ballista from sounding S 6 (L. Gorgerat).

ing beyond this point. In accordance with other archaeological finds from the Crusader's presence in Petra, the wall could belong to a post or a watchtower controlling the access to the city.

Northern Terrace

Sounding S 1

Concerning the presence of architectural remains, the Northern Terrace was much more promising (**Fig. 15**). Following Dalman 1908 the niches (D. 18) on the outer rock face of Tomb Br. 24 have merely been referred to as niches or have even been misinterpreted as votive niches (**Fig. 16**). However, they have never been discussed in the context of the few traces of building activities visible on the bedrock or the remaining rock-cut walls and the cemented niche basin (D. 18a). The first who recognized



15. Bāb as-Siq. Panoramic view of the Northern Terrace from the east (L. Gorgerat).



16. Northern Terrace. Entrance of tomb Br. 24 with abutments of arches (L. Gorgerat).

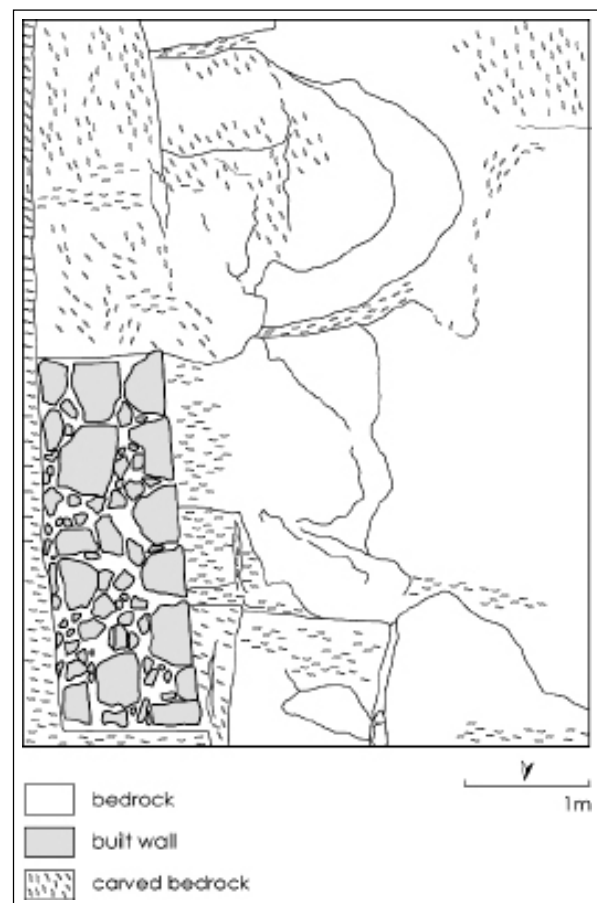
these buildings and classified the eight (not 6 as Dalman and others) niches as abutments of arches was Wenning in the context of his Petra Niches Project (PNP).

To confirm the use of these niches as abutments, sounding S 1 (**Figs. 17 and 18**) was opened in the northeast of the rocky plateau in some distance to the rock-cut face. In the north, we discovered a huge built wall (90cm) of limestone blocs close to the surface (**Fig. 19**). This wall 1 continued to the south in a visible rock-cut foundation (**Fig. 18**). The pottery found in the foundation level of wall 1 belongs to Schmid's phase 2c (**Figs. 19, 20**) and therefore indicates that this structure has to be dated in the 1st quarter of the 1st century AD (Schmid 2000: 42). Although wall 1 is running in parallel to the facades, the distance of 9m between both seems to be too wide for being covered by arches. We therefore presume that there was a second

built structure between the facade and wall 1 for which unfortunately no traces have been discovered yet. A further cleaning between the facade and S 1 is planned for a future campaign.



17. Northern Terrace. Sounding S 1 with wall 1 and rock-cut foundation (L. Gorgerat).



18. Northern Terrace. Sounding S 1 with wall 1 (K. Petrovsky, L. Gorgerat).



19. Northern Terrace. Sounding S 1. Wall 1 (L. Gorgerat).



20. Nabataean painted fine ware from sounding S 1 (L. Gorgerat).

Soundings S 3 and S 5

We laid the sounding S 3 from the northern half of the entrance of Tomb Br. 24 towards the opposite rock (**Fig. 1**). At the foot of that rock a small, partly plastered, channel comes down from the north leading the rain water and possibly the overflowing water from the reservoir Br. 24 to the cistern D. 19 as suggested by Zayadine and Farajat (Zayadine and Farajat 1991: 275). This cistern is situated a little bit to the west at a lower level of the bedrock in a kind of a small depression. While Dalman called it a pear shaped cistern and even some years ago it was only half filled, the cistern is now completely filled by debris and washed-in material. The western rock of this depression shows on its southern face a very well built niche with a *betyl* (D. 20). This niche is probably related to the channels and the cistern carrying the so called 'living water', for which the Nabataeans thanked their deity.

About in the middle of the trench we discovered wall 3 running north to south (**Fig. 21**). This wall is thinner (60cm) than wall 1 and originally also belongs to some built structures in front of Tomb Br. 24. There most probably was a architectural relation between wall 3 and the abutments of arches located on the northern side of the entrance to the tomb, similar to the structures described in sounding S 1.

Sounding S 3 also provides us with information concerning the entrance of Tomb Br. 24. First, it has to be mentioned, that at the threshold the bedrock was carefully cut out (**Fig. 22**). A few fragments of pavement stones, which were also found in that area, formed a step leading into Tomb Br. 24. The presence of an attic moulding (**Fig. 23**) found in front of the entrance is probably evidence of the rich decoration of the tomb's entrance. The pottery associated with this building mainly belongs to Schmid's phase 2c (1st Quarter of the 1st century AD) and ends towards the end of the 2nd century AD.

In order to gather some further information



21. Northern Terrace. Sounding S 3 with wall 3 (L. Gorgerat).



22. Northern Terrace. Threshold of Tomb Br. 24 (L. Gorgerat).



23. Molding from sounding S 3 (L. Gorgerat).

on the structures of the Northern Terrace we opened sounding S 5 (**Fig. 24**) which constitutes the junction of S 1 and S 3 (**Fig. 1**). Unfortunately the continuation of wall 3 was missing. A further structure in shape of a rock-cut block was discovered in the southern half of S 5. It seems that it was originally intended to cut this sandstone boulder out of the bedrock. For some unknown reasons this project was abandoned.

Sounding S 4

At the corner where the rock of the Aşlah-

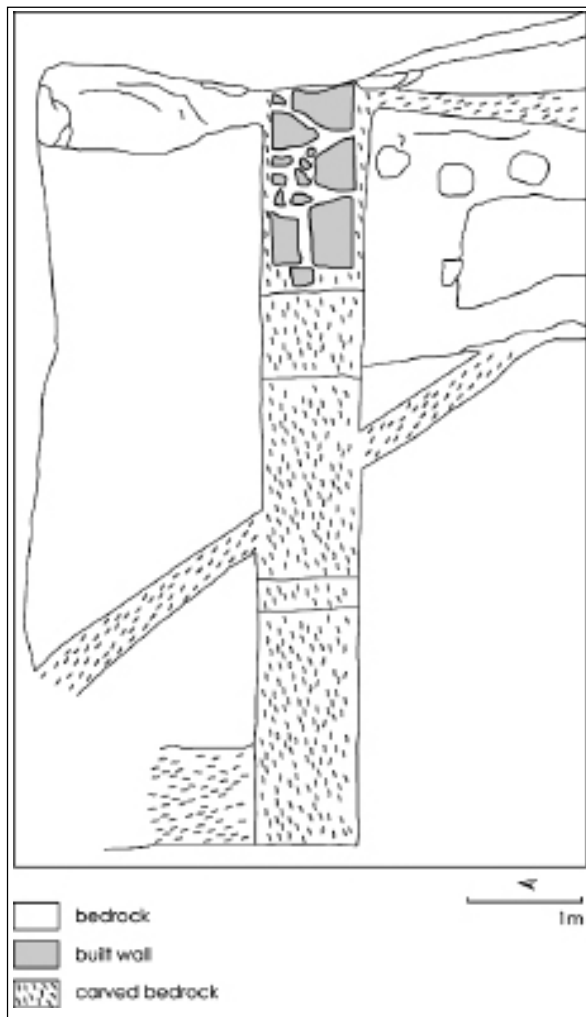


24. Northern Terrace. Sounding S 5 (L. Gorgerat).

triclinium is cut away for the building between the triclinium chambers and Tomb Br. 24, another part of a rock-cut wall foundation was partly visible in the surface (**Fig. 15**). This line constitutes a right angle with the continuation of Wall 1. We therefore opened sounding S 4 to clarify this foundation trench (**Figs. 25 and 26**). The foundation trench continues down from the west to the east in four large steps. On the lowest platform, wall 2 was built by large limestone blocs. The outer face of this built wall was nicely done by three limestone ashlar, the inner face was constructed by less large limestone blocs. Between the outer and the inner face and the rock-cut foundation trench, there was a small gap filled with pebbles and earth on both sides. It seems that a natural channel follows the foot of the rock and is led through under Wall 2. To the south of Wall 2 this channel formed a kind of a small split in the rock. Wall 1 and Wall 2 must have been part of a huge building. The question of the inner walls and the supports of the roof is still to be resolved. The rock-cut foundation to



25. Northern terrace. Sounding S 4 with wall 2 and rock-cut foundation (L. Gorgerat).



26. Northern Terrace. Sounding S 4 with wall 2, rock-cut foundation and channel (L. Gorgerat).

the west of Wall 2 cuts a channel running north to south. It may therefore be assumed, that this installation, which is a part of the water-management system of the Northern Terrace, belongs to an earlier phase of construction.

We did not yet excavate the cistern (D. 19), the reservoir (Br. 26), the 53 graves in the hill-ocks closer to the Wādī Mūsā and have not yet cleaned Tomb Br. 24, but we like to continue the research of the site and will consider these features and other installations, such as niches, in our further interpretations.

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THE PETRA NICHES PROJECT (PNP)

Robert Wenning

In 1995 -1998 Prof. Dr. Helmut Merklein of Bonn University and the author carried out a research project on the deities venerated by the Nabataeans (Merklein and Wenning 2000). The Nabataeans used non-iconic stones (*betyls*) and anthropomorphic figures to represent their deities. Since statues and reliefs often follow Greek prototypes it is much easier to identify the deities of this group than to distinguish the deities of the *betyls*. Very soon it became evident that there is a need for a thorough investigation of the rock-cut votive niches and *betyls*, which will be accomplished by the Petra Niches Project (PNP) directed by the author.

We organised three campaigns in the field (1997, 1999, 2001) and made four further short visits to Petra in 1999, 2002, 2004 and 2007. Participants have been H. Merklein, R. Wenning, S. Krogull, V. Löhr, M. Lurtz, W. Wenning, W. Thiel, and D. Kühn. The PNP was financially supported by the German Research Association (DFG), the Görres-Society, and the German Society for the Exploration of Palestine (DPV). Permissions and much help were kindly given by the Director General of the Department of Antiquities, Prof. Dr. Ghazi Bisheh and Prof. Dr. Fawwaz Al-Khraysheh and his representative at Petra, Suleiman Farajat. We encountered much interest and support by a large number of colleagues. Also, in the course of the Siq Project we were provided with a huge ladder enabling us to reach and measure niches high up on the rock face. We thank all institutions, organisations and colleagues for their co-operation. The death of Helmut Merklein and personal health conditions stalled further continuation as well as the publication of the project, but the PNP is now re-established and the next season is planned for spring 2010. Prof. Dr.

Stephan G. Schmid (Berlin) kindly invited me to include the PNP into the new French-German project on “Early Petra” allowing me to contribute to the work of the “Early Petra-Project”. I am very grateful for this opportunity and the backing of the PNP.

The PNP is more or less based on the extent of Petra as described by Dalman, but a lot of paths not yet researched by Dalman were added when we started to systematically survey the entire east of the city of Petra. Furthermore, even in the older documented areas we noticed many more monuments that were previously unknown. We followed Dalman in describing the monuments in reference to their wider as well as more exact geographical location. Due to our extended survey area, however, we had to differ from his original route. We divided Petra into three broad survey areas running north to south. We started in the southeast at the al-Birkah at Zurrāba and continued towards the west. In total, we have established 50 survey areas in Petra and some more in Greater Petra. Each area was repeatedly visited at varying times of the day as light conditions are an important factor in discovering niches and other monuments as well as recognizing details. The survey of areas 1 - 28 is completed. There are a few other areas without niches in the outskirts of the Petra mountains. Due to the great number of new discovered niches the old numbering of Dalman is no longer applicable. To avoid a mixture of numbering systems we decided to start a new numbering with the label “VN” in front of a set of continuing numbers. The Brünnow and Dalman numbers are added in brackets wherever possible. Other references are given in the bibliography to each niche and in the concordances among the indices.

1. al-Buraydhā
2. al-Wu‘ayra
3. Shib Qays
4. ar-Ramlā
5. ad-Dāra
6. Bāb as-Sīq North
7. al-Muḍhlim
8. Bāb as-Sīq South
9. aj-Jilf
10. Way to al-Madras
11. al-Madras gorge
12. al-Madras
13. Valley of al-Ḥuraymiyya
14. al-Ḥuraymiyya gorge
15. al-Qanṭara, aj-Jarra
16. Eagle gorge
17. Height north of as-Sīq
18. as-Sīq
19. Outer as-Sīq
20. Jabal al-Muḍhlim
21. Height north of Sadd al-Ma‘jan
22. Sadd al-Ma‘jan (Nischenklamm)
23. Height south of Sadd al-Ma‘jan
24. al-Khubtha northern slope
25. al-Khubtha southern slope
26. Ways to al-Khubtha
27. al-Khubtha western plateau
28. al-Khubtha eastern plateau
29. Jabal al-Mathbah (Theaterberg)
30. Ways to Zibb ‘Aṭūf
31. Zibb ‘Aṭūf (High Place)
32. al-Farasa East
33. al-Farasa West
34. an-Numayr
35. Jabal an-Numayr
36. al-Maṭāḥa
37. an-Naṣārā
38. Jabal al-Mu‘ayṣara ash-Sharqiyya
39. Jabal al-Mu‘ayṣara al-Gharbiyya
40. City area
41. Ways to ad-Dayr
42. Qaṭṭār ad-Dayr
43. Hermitage (Klausenschlucht)
44. ad-Dayr plateau
45. as-Siyagh
46. al-Ḥabīs
47. Umm al-Biyāra slope
48. Umm al-Biyāra terrace
49. Umm al-Biyāra
50. ath-Thughra
51. Wādī Mūsā, al-Jayy
52. Umm Ṣayḥūn
53. Mirwān
54. an-Nuwayra
55. al-Bayda
56. Sīq al-Bārid
57. Sīq al-Amtī
58. an-Naqa‘
59. Shammaṣa
60. Aṭ-Ṭunub
61. Sīq Umm al-Hiran, Sīq Umm al-‘ulayqa
62. Abū ‘Ulayqa, al-Waqīt
63. Jabal Hārūn
64. Sīq Daffit Hamad
65. Ṣabra
66. Baṭḥa

The first record and description of the niches in Petra was published by Dalman in 1908. Later surveys and excavations yielded some more niches. But there is much more evidence than previously assumed. Today we can account for about 1200 votive niches in Petra, but there are possibly much more. In comparison with Dalman the number of niches can be more than doubled. That makes the niches part of the more important and greater groups of rock-cut monuments in Petra such as the tomb façades, the cave-dwellings, the *triclinia*, and the shaft tombs. However, very little is currently known about the niches and the *betyls*. They deserve more attention.

In 1985 Roche established a typology of the Nabataean niches and *betyls* (Roche 1985). We have some objections to her description and typology. Despite the generally good approach of classifying the material, it does not, however, get us much further. Raymond also published a good survey of votive niches in 2008, but it is only based on a limited selection of monuments (Raymond 2008). Patrich merely gave a more general overview of the types and the relationship of *betyls* to the deities (Patrich 1990: 50-113), while Avner demonstrated what can be learned from their size (Avner 1999-2000, but cf. Wenning 2008: 616-617). The arguments presented in these studies and some other contributions should be considered, but they also call for some discussion. Another related group of monuments in Petra, the *nefesh*-pillars, are excellently discussed and catalogued by Kühn (Kühn 2005: 234-282, 449-500).

There are a few types of *betyls* (the rectangular slab or stele, the slab with a rounded top or the semicircular shape), of which the reliefs are either protruding or carved *into* the niche surface (Wenning 2001: 85-87, fig. 4). These types are of particular significance (**Figs. 1-2**), but at the moment we miss the criteria to give a closer explanation. The same is true for the different framings of the niches, which vary from very simple forms to elaborated fine architectural compositions (**Fig. 3**). Although some niches seem to have stylistic similarities with temple or tomb façades, the significance of the niches and *betyls* is not so much rooted in their artistic form but in their religious meaning. Therefore, a new contextual approach is needed to describe not only the setting of the niches, but also the constellation of the monuments going beyond traditional art historical classification.

None of the above mentioned *betyl*-types are exclusively related to a particular deity. Instead, the same type could have been used to represent different deities. Only four niches in Petra are accompanied by inscriptions and we simply do not know who is who among the *betyls*, even



2. Petra, Bab as-Siq, Aşlah triclinium complex, *betyl* niche D. 20 (R. Wenning).



1. Petra, Shib Qays, unpublished *betyl* niche (R. Wenning).



3. Petra, as-Sīq, niche D. 144 (R. Wenning).

when we consider inscriptions connected with *betyls* at other Nabataean sites (Wenning 2001: 80-84). In general, the *betyl* symbolizes the presence of a deity. The *betyl* could receive cultic veneration, as the *Suda* explains and as evidence many installations support. Most *betyls* in Petra, however, represent Dushara, the god of Petra and the god of the dynastic rulers and thus the main deity of the Nabataeans (Wenning 2003). Yet, according to surviving inscriptions, there are various other deities mentioned, such as Al-‘Uzza, “Lord of the House” and Atargatis. We must keep in mind that there are many possibilities of who the venerated deities were. In addition to the great Nabataean deities known from inscriptions, we should also consider particular protective deities venerated by the clans and other groups of the Nabataean tribal society like the *marzeah*. Therefore, we should avoid relating the *betyls*, or any particular type of *betyl*, to “Dushara” too quickly.

As *betyls* set in a votive niche, deities were sometimes venerated side by side in a row of two, three or even ten or smoothing into each other (Fig. 4). However rarely, *betyls* could also be replaced by figures (five examples in Petra, among them Isis is represented twice). Also, a few combinations of *betyls* and figures are known. Not all niches show a *betyl*, often we deal with “empty” niches. Here we suspect that the owners of the *betyl* took their portable *betyl* with them in order to set it up in their house or tent and brought it back to put it into the niche at particular occasions. Most “empty niches” have got a groove both at the bottom and the back wall of the niche to insert such a portable *betyl* (Fig. 5).

By communicating through the *betyls* the Nabataeans established a direct contact with their deities within a kind of family religion (cf. Healey 2001: 75). Most of the niches belong to individual monuments and testify to a personal relationship between the deity and the worshipper or a group of worshippers like a clan or a *marzeah*. This fits nicely with the contents of the inscriptions. We have to assume that the assemblage places, sanctuaries, and niches were not only cut by the inhabitants of Petra. As the reli-



4. Petra, as-Sīq, niche D. 172 (R. Wenning).



5. *Petra, al-Madras, niche D. 66* (R. Wenning).

gious and political centre, Petra must have frequently been visited by other Nabataeans, who were either living in other settlements or even still organised as nomads.

Concerning the question of the deity connected to a particular *betyl* or type of a niche we can hardly expect definite answers, although in some cases we may speculate from the context to whose the niches are directed to. Contrary to many suggestions in previous research and our own initial assumptions we became more and more sceptical about the possibilities for such identifications. Therefore, not the identification of the deity but rather the function of the niches and the reason why a niche was cut at a particular place should be emphasised.

The basis for any analysis must be a complete dataset of all votive niches in Petra. The interpretation of single or selected monuments can be misleading. That means, the first step is the registration and documentation of all niches in Petra within a systematic survey. Only after that can we investigate further and establish patterns and interpretations. Based on the charac-

terisation of the niches themselves and on the experience of the first survey, we developed an extensive questionnaire allowing us to collect as many data as possible. Each niche has been carefully measured, described and photographed. The niches are of rectangular shape or arched. Niches of both simple design as well as various types of framing such as simple strips or architectural compositions shaping an *aedicula* with pilasters, columns, bases and capitals, architrave, frieze, figural busts, an *attic zone*, a conch or a pediment and *acroterion* bases were documented. Some niches are set into each other showing a mixture of types. The architectural niche, or *aedicula*, shapes a sanctuary of its own. It can be a citation of a temple or of another architectural form. Apart from the basic niche and *betyl* types there is no standardization in form. We should also keep in mind that the Nabataeans have not been very meticulous about measurements.

The type of the niche and the type of the *betyl* can correspond in form (e.g. a rectangular *betyl* in a rectangular niche), but often do not, which needs to be examined. The interior of the niche is of interest as well. The arranging of the back wall, the ceiling, the bottom of the niche, grooves, divided parts and additions like benches were documented. Holes, so-called sand-glass loops, cup-holes and other installations in or near the niches were measured and recorded along various types of pedestals, often shaping the *mwtb* of the *betyl* -- which is not the foot, but the "seat" (cf. Wenning 2001: 88-90). Other features are benches, platforms, offering opportunities, stairs, niche basins, inscriptions, and graffiti (**Fig. 6**). We catalogued the niche basins as well, since they seem to be of equal significance to the niches themselves (**Fig. 7**). All these elements contribute to the ritual and cultic activities around the niches (donations, offerings, libations, purifications etc.) and demonstrate the complexity of these monuments and the activities associated with them. We assume that none of these features and installations were accidental and argue that each had a special function and meaning. Therefore, we have to treat all these elements in the same way as we do the different *betyl* and niche types.

Sometimes it is not easy to state, if we are dealing with a votive niche or a niche of another



6. Petra, Shib Qays, unpublished installation with two betyl niches (R. Wenning).



7. Petra, Shib Qays, niche basin and niches cut into a large fallen rock (R. Wenning).

function. Previous research has often failed to make a distinction between the function and the various types of niches. The rows of small postholes at the top of the *Al Khān* and other

tombs and chambers listed as niches by Dalman can easily be ruled out as such. It took us more discussion to classify the small semi-spherical niches in some rock-cut chambers of the *Bāb as-Sīq*, often connected with the so-called “sand-glass loops”. The most prominent one is the niche at the bottom of an incised *aedicula* in the back wall of the *Aṣḥaṭ*-triclinium (**Fig. 8**). In the end we were convinced that it was cut when the Bedouins reused the triclinium for their purposes (Wenning 2003: 151-153).

Other niches served clearly as abutments for arches and other architectural structures. In many cases the building itself is gone, but when built against the rock, often just the niches survive. They differ in the cutting technique as their back wall is not straight. Even when the rock-cut niches are situated in the back interior of a structure, they often just function as a kind of cupboard without any cultic meaning. Finally, it is sometimes difficult to distinguish between an almost destroyed niche and niche-like erosion of the rock surface, naturally washed out



8. Petra, Bāb as-Sīq, *Aṣḥaṭ* triclinium with two incisions D. 17b at the back wall (R. Wenning).

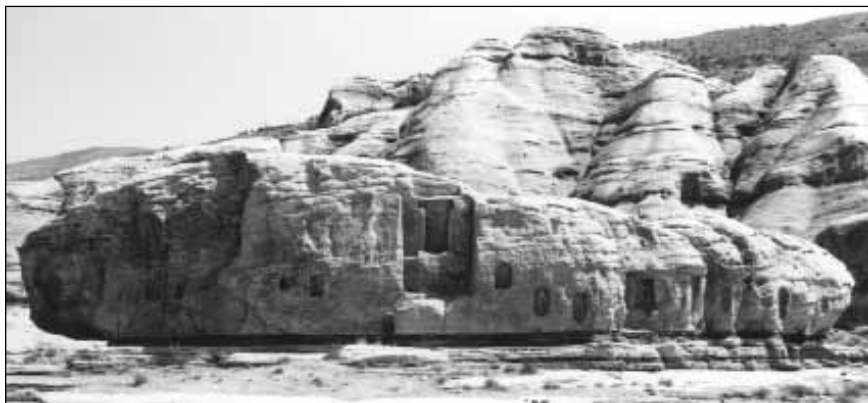
by wind and water. With the exception of the *loculi* in the tombs, all niches are mentioned and classified in the catalogue, but only the votive niches are documented in details.

Our main aim is to clarify the immediate setting of the niches as well as their wider context. For each niche we recorded cardinal points and GPS -position data. Specific orientations (for example if a niche / *betyl* faces another sanctuary, holy mountain etc.) have also been documented. Since in some areas it was technically not possible to get a GPS signal, we noted the distance to other installations and the next closest niche in order to fix the position of a niche not receiving a GPS signal. Niches are found outdoors and indoors, carved into steep rock faces or smaller outcrops. They can also be seen on isolated boulders or as part of a façade and also in *triclinia*, chambers or tombs. Niches are situated along simple paths, passages and processional routes with broad staircases. Some niches are more hidden when others are pointedly presented to passing visitors. Niches are found both isolated or in a group with others and can form an ensemble with other installations or a “sanctuary” as defined by Dalman (Dalman 1908: 67-69). They can be connected with assemblage places of tribal groups, sanctuaries, high places, tombs, and even with single graves in a tomb, and with *triclinia*, *biclinia* and *stibadia* in the open air as well as cisterns and aqueducts/channels (**Fig. 9**). Most rock-cut niches are immediately associated with such places, but also with access ways leading to the mountains around the city. Niches were also cut into walls of buildings in the city as and freestanding *betyls* were also set up at temples. The *betyl* in the tomb represents the protective deity of the buried person (Kühn

2005: 68-69).

Considering the large number of niches at least three volumes of the documentation of the votive niches are planned to be published in the *Abhandlungen des Deutschen Palästina-Vereins* (ADPV). With a total of about 290 niches the first volume will cover the following areas:

1. Al-Buraydha, the most southern part of an old route in the east of Petra from Zurrāba to the north, close to the modern road and possibly used as a caravan halt and as a threshing floor, two niches can be identified.
2. Al-Wu‘ayra, the Crusader castle and the area around up to Jabal ‘Urf ad-Dik, with no architectural features of the Nabataean period. It is difficult to decide whether or not the niches here originally belong to the Nabataean period as was suggested. Most niches do not follow the Nabataean masonry technique.
3. Shib Qays, a valley through which the northern Al-Khubtha aqueduct is led. The valley is famous for a plunged rock which closes the passage towards the city. There are no niches in the valley beyond the plunged rock, while the rock itself was taken as a place of commemoration. A total of 11 niches were found.
4. Ar-Ramlā, a rocky plateau behind the northern Bāb as-Sīq area. Its eastern monuments belong to the necropolis of Ad-Dāra, the southern ones to the Bāb as-Sīq. Only three niches can be found here.
5. Ad-Dāra is situated between the two most western hotels of Wādī Mūsa and was separated by Dalman from the northern Bāb as-Sīq, but both areas are part of one large necropolis incorporating the southern Bāb as-Sīq too. For convenience the necropolis is subdivided according to the areas given by Dalman. Con-



9. Petra, al-Madras, rock D. 70 with a row of votive niches (R. Wenning).

trary to Dalman's suggestion, however, there are no sanctuaries and no niches to be found at ad-Dāra.

6. Bāb as-Sīq North is a necropolis with a series of small gorges which open towards the Wādī Mūsā and the old path along the Wādī Mūsā to the entrance of Petra (**Fig. 10**). Yet, most of the monuments are not oriented among this path, but are arranged in smaller units shaped by the gorges and plateaus here. It is interesting to note where the 11 niches were found. There are tombs of various types, chambers, and *triclinia*, as well as the only sanctuary of the Bāb as-Sīq as defined by Dalman, which is the oldest monument in Petra, dating to about 96/95 BC by the Aṣḥāḥ -inscription. This sanctuary, devoted to "Dushara, the god of Manbatu", will be investigated by the new "International Aṣḥāḥ Project (IAP)" (cf. Gorgerat/ Wenning in this volume). A total of 24 votive niches are associated with this complex.
7. Wādī Mudhlim diverted the Wādī Mūsā around the Jabal al-Khubtha towards the Sadd Ma'jan. We have to imagine that in the Nabataean period the wadi water was stored with the construction of a huge reservoir and dam. Therefore, it was no surprise that we discovered six niches high up in the cliffs of the valley.
8. Bāb as-Sīq South is another part of the necropolis at both sides of the Wādī Mūsā. As opposed to the northern part, the area consists mainly of a flat rocky slope. The Obelisk Tomb is cut into the only larger rock. The river bed today touches the tombs at the bottom of the slope. In ancient times the bank of the Wādī Mūsā would have been less broad and deeper. This allowed save access to the tombs. Beside a few niches spread throughout the area and connected with tombs and chambers there is one short row of seven niches (D. 42). Today, the way to Al Madras starts at the terrace above the western end of Bāb as-Sīq South. But this plateau with tombs and a *stibadium*, which is flanked by the Wādī Jurayda, is also part of the necropolis of the Bāb as-Sīq South. A total of 19 niches have been counted in the area.
9. Al-Jilf is the rocky massif to the east of al-Madras. It can be reached by leaving the terrace above the western end of Bāb as-Sīq South and walking higher up along to the eastern face of the massif. Today this area is used for agriculture and a nursery. Dalman did not include this area. We discovered some tombs and six niches.
10. The way to al-Madras starts from the left of chamber Br. 32. The Wādī Jurayda can be crossed by a broad stepped way raising through a couple of small rocks towards al-Madras. Just before the path reaches al-Madras there is a sloping basin-shaped terrace to the left with eight niches around it. From this terrace one can continue northwards towards the high terrace of the western face of the al-Jilf massif with two elaborated niches or "sanctuaries" (D. 61-62). A total of 13 niches were discovered along the way to al-Madras.
11. Today the Wādī al-Madras is closed again by the restored dam towards the as-Sīq. Originally the access was possible by the steep staircase from the plateau above in the east. Two niches frame the top of the steps. Today these steps are very dangerous and should be avoided. Inside the basin-shaped wadi we discovered five niches higher up on some rock terraces and rock faces.
12. Al-Madras can be subdivided into units following Dalman and some new discovered areas, which are mostly small basin-shaped



10. Petra, Bāb as-Sīq (R. Wenning).

- valleys in the rock (Dalman's "*Höfe*"), a typical feature of this area with a total of 63 niches. There are no tombs at all in al-Madras, only assembling places of clans, sanctuaries etc. to celebrate the clan's festivals. The "north plateau" is dominated by a prominent rock with 16 niches (D. 70) at the front face and another six at the back. The "northern courtyard" has got two niches (D. 75-76). We found one niche in a new discovered area to the west of the "northern courtyard", and four niches in the "north-western courtyard", which was not mentioned by Dalman. The "middle courtyard" shows five niches (D. 77-81), while the "middle rock" carries six niches (D. 82-84) to which *triclinium* D. 89 belongs. It has one niche as well as the famous Nabataean inscription, mentioning "Dushara, the god from Madras". Because of that inscription one would like to interpret the *betyl* in the votive niche of the *triclinium* as representing Dushara. The area around the so-called "stepped rock" with a *biclinium* (D. 92) shows a great number of steps or benches for offerings, but no niches. Two niches at the bottom of the rock rather refer to a path leading to the large cistern to the east of the *biclinium*. In the "southern courtyard" 13 niches (D. 96—106) can be found. Crossing the rock by some steps the "southern terrace" is reached, also with a "courtyard" with five niches.
13. It is possible to take the staircase in the south of the area down from al-Madras to the broad valley of al-Ḥuraymiyya. We discovered three isolated niches. One of the niches is located in a basin-shaped "courtyard" in the midst of rocks. No niches could be found on the way to al-Qanṭara, neither on the rocks to the east nor on the Jabal adh-Dhurayyi to the south.
 14. Wādī al-Ḥuraymiyya can be reached from the al-Ḥuraymiyya valley a bit to the west from cistern D. 111. It leads into the as-Sīq, where it is closed by the reconstructed dam. The wadi is impassable in its lower part and is also difficult to climb to the upper part. We found five niches, among them an incision of three *betyls* of which one is an eye-*betyl* on a plunged rock. Merklein and the author have published this discovery together with a catalogue of the Nabataean eye-*betyls* in the Lindner *Festschrift* (Merklein-Wenning 1998). 27 examples of this type are known today. As all undecorated *betyls* must not necessarily represent Dushara, all eye-*betyls* must not always represent Al-'Uzza. Also, the famous block with the "goddess of Ḥayyān" shows a *betyl* type relating to North- and South-Arabic monuments and remains an exception among the Nabataean *betyls*.
 15. Starting at the southern part of the 'Ayn Buraq aqueduct we followed the Wādī al-Qanṭara and then the Wādī al-Jarra until the al-Khaznah. The area was partially visited by Dalman and Lindner. We found six niches along this area, only one directly connected with the aqueduct. Another new discovered niche depicts a snake carved in relief (publication with some other new discovered snake monuments in Petra in preparation).
 16. Crossing the Wādī al-Mudhlim tunnel and moving to the west one can reach the valley of the Eagle niche, an area of quarrying. The Eagle niche is a complex of seven niches, a basin in the floor in front of the niches and a small chamber close by. The eagle itself seems to be a secondary cutting. *Triclinium* D. 52 and seven niches can be found on a terrace opposite to the Eagle niche. Moving into the next valley to the west we found no niches, but further to the west we discovered another sanctuary with a small chamber and two niches.
 17. The area above the as-Sīq in the north bares witness to massive quarrying activity. Two niches and nine incisions have been discovered in the smoothed rock faces created by the cutting.
 18. The as-Sīq was and is the main passage into the city of Petra. On both sides of the high rock faces one can find 69 niches, four incisions and the two camel reliefs in the inner as-Sīq. While one would expect to find numerous inscriptions of visitors and worshippers in this important entrance way, surprisingly there are only a few individual examples. Normally the niches face the visitor walking towards the city as well as coming

from the city. The niches range from simple forms without framing to most elaborate architectural *aedicula* like D. 144. Beside the typical Nabataean niches there is a row of votive niches by the people from Adraa dating to the period of the *Provincia Arabia* also introducing Syrian types (D. 149-161).

19. The outer as-Sīq is the continuation of the passage into the city but also part of the necropolis. Between the necropolis of the theatre mountain and the one at the southern slope of Jabal al-Khubtha 14 niches and forty incisions, among them 36 *nefesh* monuments, are cut into the rock faces. It was clearly a very prominent position to commemorate the dead.

In preparation of the second volume with a total of ca. 460 niches the survey has so far covered the following areas:

20. Jabal al-Mudhlim (2 niches counted),
21. The plateau north of the Sadd al-Maʿjan (13),
22. Sadd al-Maʿjan (110),
23. The plateau south of Sadd al-Maʿjan incl. Lindner's "garden sanctuary" (25),
24. The northern slope of Jabal al-Khubtha (113),
25. The southern slope of Jabal al-Khubtha (23),
26. The ways to Jabal al-Khubtha (31),
27. The western plateau of Jabal al-Khubtha (11) and
28. The eastern plateau of Jabal al-Khubtha (37).

In the next season the survey will follow areas which have been visited several times, but were not systematically surveyed and documented yet:

29. The theatre mountain (31 known niches so far),
30. Ways to Zibb ʿAṭūf (21),
31. Zibb ʿAṭūf (1),
32. Wādī Farasa East (22),
33. Wādī Farasa West (4),
34. an-Numayr (7) and
35. Jabal an-Numayr (10).

The third volume will cover the western part of Petra adding another 27 areas to the survey project. So far about 300 niches are known from these areas. Approximately the same amount of unrecorded niches were also noticed in the al-

Baydā area.¹

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1. Will Kennedy kindly assisted to proof the English of the

article. Remaining mistakes are mine.

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PRELIMINARY REPORT OF THE SEASONS 2005-2008 OF EXCAVATIONS BY THE UNIVERSITY OF IOANNINA AT TALL AL-KAFRAYN IN THE JORDAN VALLEY

Thanasis J. Papadopoulos and Litsa Kontorli- Papadopoulos

Introduction

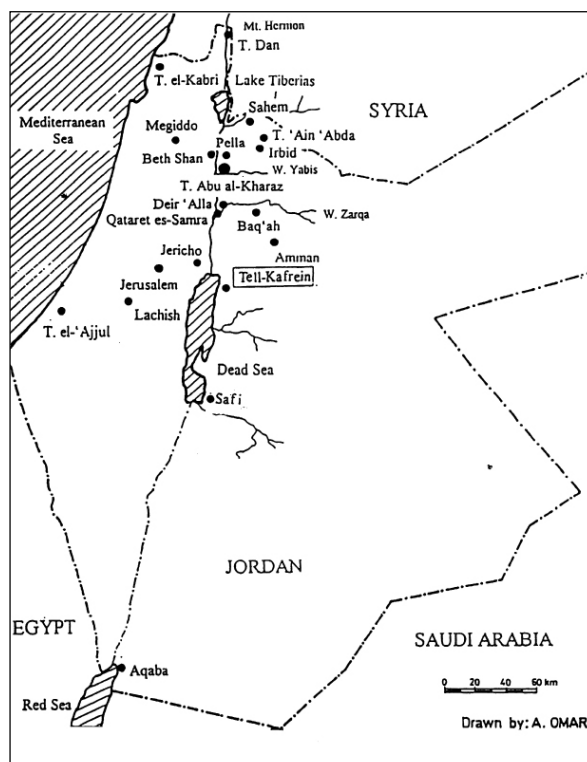
The Hellenic Archaeological Expedition of the University of Ioannina in Jordan continued its research activities in the Jordan Valley from 2005 to 2008 at the site of Tall al-Kafrayn (Phase II of the Project). Excavations were carried out with the permission of the Department of Antiquities of Jordan and were financed by the University of Ioannina, and the Greek Ministries of Culture and Foreign Affairs. The Project is jointly directed by the authors, assisted by a team of twenty to twenty five Greek archaeologists and students of the University of Ioannina and thirteen to sixteen local workers.

Tall al-Kafrayn, which has sometimes been identified as the biblical site of Gomora, is located approximately 5km south of the modern village of south ash-Shūna and 3km south southwest of the al-Kafrayn dam. A major highway connecting 'Ammān, south ash-Shūna, Jericho and Jerusalem runs close to the northern slope of the tall. In the area of the so-called "Jordan Disc", or "Middle Ghawr", where Tall al-Kafrayn belongs, there are more than ten different Levantine Bronze Age / Iron Age sites, including Tall Iktānū, Tall ar-Rāmā, Tall Nimrīn, Tall Barakāt and the most prominent being Tall al-Ḥammām, approximately 3km to the southeast. The site of Tall al-Kafrayn was identified in 2001. It is almost completely pristine and dominates the central Jordan Valley (**Fig. 1**). It was chosen as the key site for our research because of its strategic and prominent position overlooking the valley and because of the presence of visible ancient remains and parts of a fortification wall on the surface (**Fig. 2**). Excavations have been conducted at the site since 2002 and a preliminary synthesis of the results of the 2002 to 2004 seasons (Phase I) have been published

(Papadopoulos 2007).

Recording System

The polar-point grid and corresponding recording system employed at Tall al-Kafrayn are designed to facilitate computer-assisted analysis of data. Each 5m square (termed trench) is identified by the single point closest to the central reference point 1000/00, located on the summit. Because every point is unique within the system, computers can maintain three-dimensional provenance records of all loci and finds. Similarly, artefacts and stratigraphy can be correlated quickly.



1. Map of Tall al-Kafrayn.



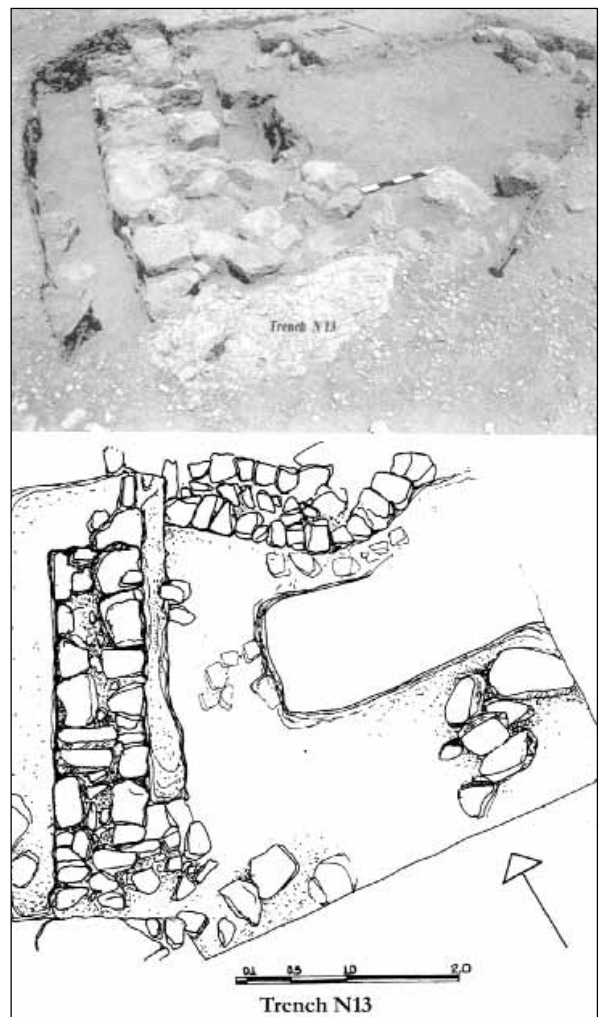
2. General view of Tall al-Kaf-rayn

Phase II of the Project

The principal objective of Phase II of the Project was to explore earlier occupational levels on the tall in order to resolve issues of phasing and dating that had arisen at the end of Phase 1. A related objective was to continue work in the adjacent Early Bronze Age (EBA) cemetery. Initially, five new trenches, 5 x 5m square, were opened on the top of the tall and on the north, south and east slopes (N13, K18, L8, P14 and P15), while investigations were continued in deeper levels on the previously semi-explored trench J17.

Remains of stone walls visible on the north-west corner of the levelled top of the tall, led to the opening of trench N13. At least three thick, well-constructed stone walls, belonging to a significant building, have now been unearthed in this square. The first measured 4m in length, the second 2.50m in length and the third *ca.* 4.15m long x 0.90m wide x 0.15-0.25m high (**Fig. 3**). Associated artefacts included Iron Age (IA) I-II sherds and some basalt grinders and pounders. Excavations in this area have however, been suspended due to the discovery of three Islamic tombs.

Work resumed in Trench J17, opened in 2004. Further architectural remains were discovered in two successive layers 2.27m deep, consisting of well-built stone and mud brick walls, and floors made of beaten earth, ash and small flat stones (**Fig. 4**). The fill of this deposit



3. Trench N13



4. Trench J17.

was a reddish brown colour with many lenses of ash and piles of stones in some locations. These deposits contained large quantities of IA I-II sherds and stone tools. Of special importance was the discovery of a thick carbonized wooden column, 0.12-0.14m in diameter standing erect and preserved to a height of 0.18m, with its stone base *in situ* (**Fig. 5**). Samples of it were sent to Demokritos laboratories in Athens for C-14 analysis and were dated by Dr Maniatis to 750-410BC. Another interesting discovery was a limestone slab bearing fossils of at least two whorl-shells on its surface (**Fig. 6**).

Trench K18, opened between trenches L18 and J17, also produced significant architectural re-



5. Trench J17. Wooden column.



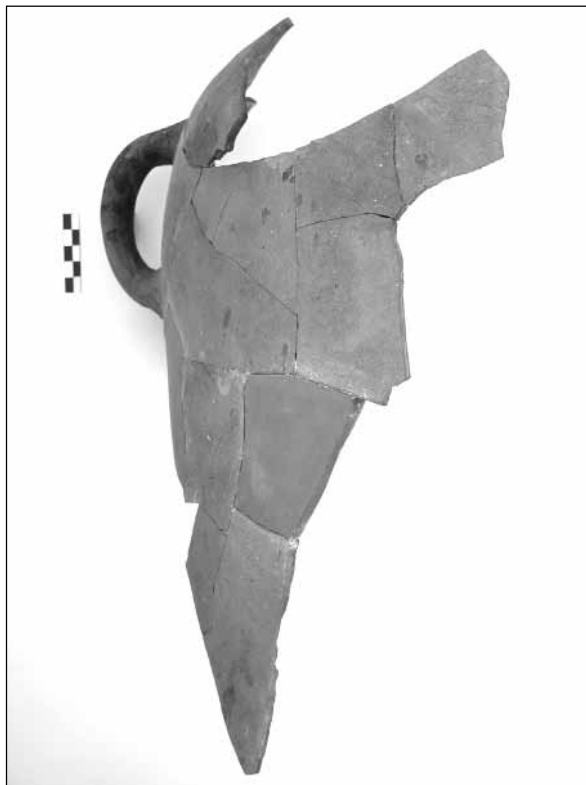
6. Trench J17.
Whorl –
shell fossil.

mains. Successive habitation layers, similar to and contemporary with those recognized in trenches L18 and J17, have been identified; including a slab-stone base which probably supported a wooden column. Of the three unearthed stone walls, the most important and well-preserved was that running north-south, with a curving at its southern end. This wall was preserved to 4.15m in length x 0.45m in width x 0.25m in height (**Fig. 7**). It is possible that these walls formed part of a larger structure with the similar walls unearthed in the adjacent trenches K18 and J17 because of the similar construction



7. Trench K18.

material and style. These walls can be dated on the basis of the pottery and other finds to the transitional Late Bronze Age (LBA) / Early IA (Figs. 8a, b).



8a. Trench K18. LBA/Iron Age pottery.



8b. Trench K18. LBA/Iron Age pottery.

Trench L8 was opened on the north slope of the tall. After removing the top soil a well-constructed stone wall was revealed, measuring as preserved, 4.10m in length x 0.60m in width x

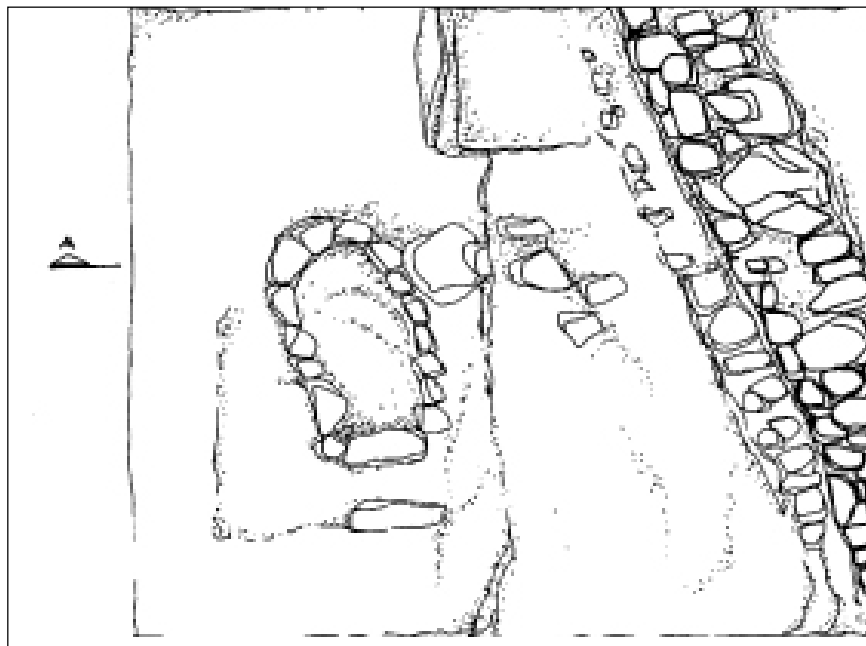
0.35m in high, running east-west at the southern extent of the trench (**Figs. 9a, b**). It was associated with a thick mud floor, broken and scattered mud bricks and pottery of the IA. Work was interrupted because of the discovery of an Islamic tomb, but it likely that this part of the tall would have produced further important finds if work could have been continued.

Of exceptional interest and importance were trenches P14 and P15. These were situated on

the east side of the tall, near the summit (**Figs. 10a, b**). Foundations of stone walls mixed with broken mud bricks were found in Trench P14 and which probably belonged to a rectangular tower of a fortification wall encircling and protecting the settlement (Bunimovitz 1992: 221-33; Filkenstein 1992: 201ff; Kempinski 1992: 127-42). Additional and similar architectural remains were found in the adjacent trench P15 indicate a second tower there. LBA sherds were



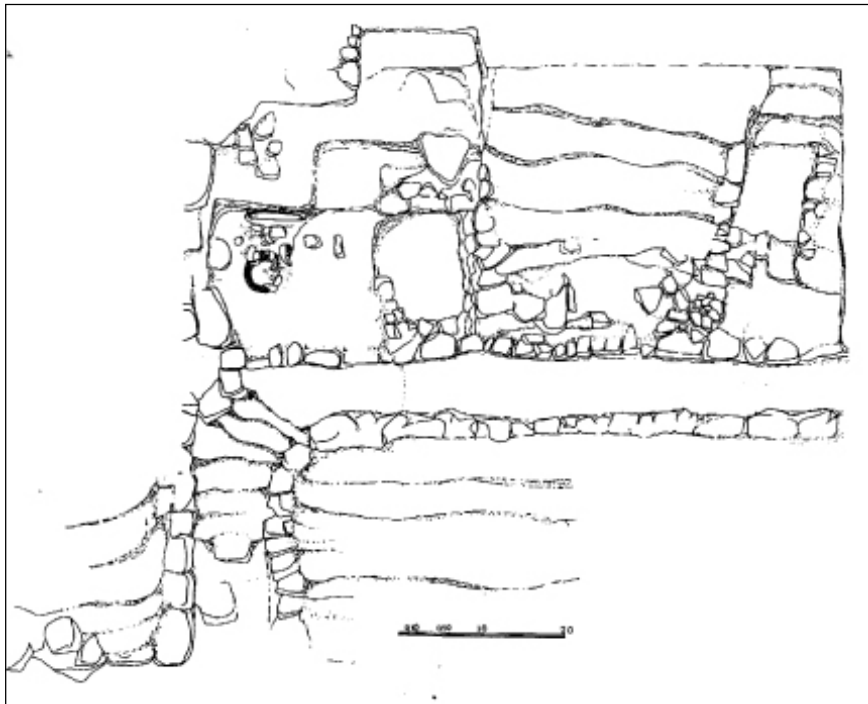
9a. Trench L8.



9b. Trench L8.



10a. Trenches P14-P15.

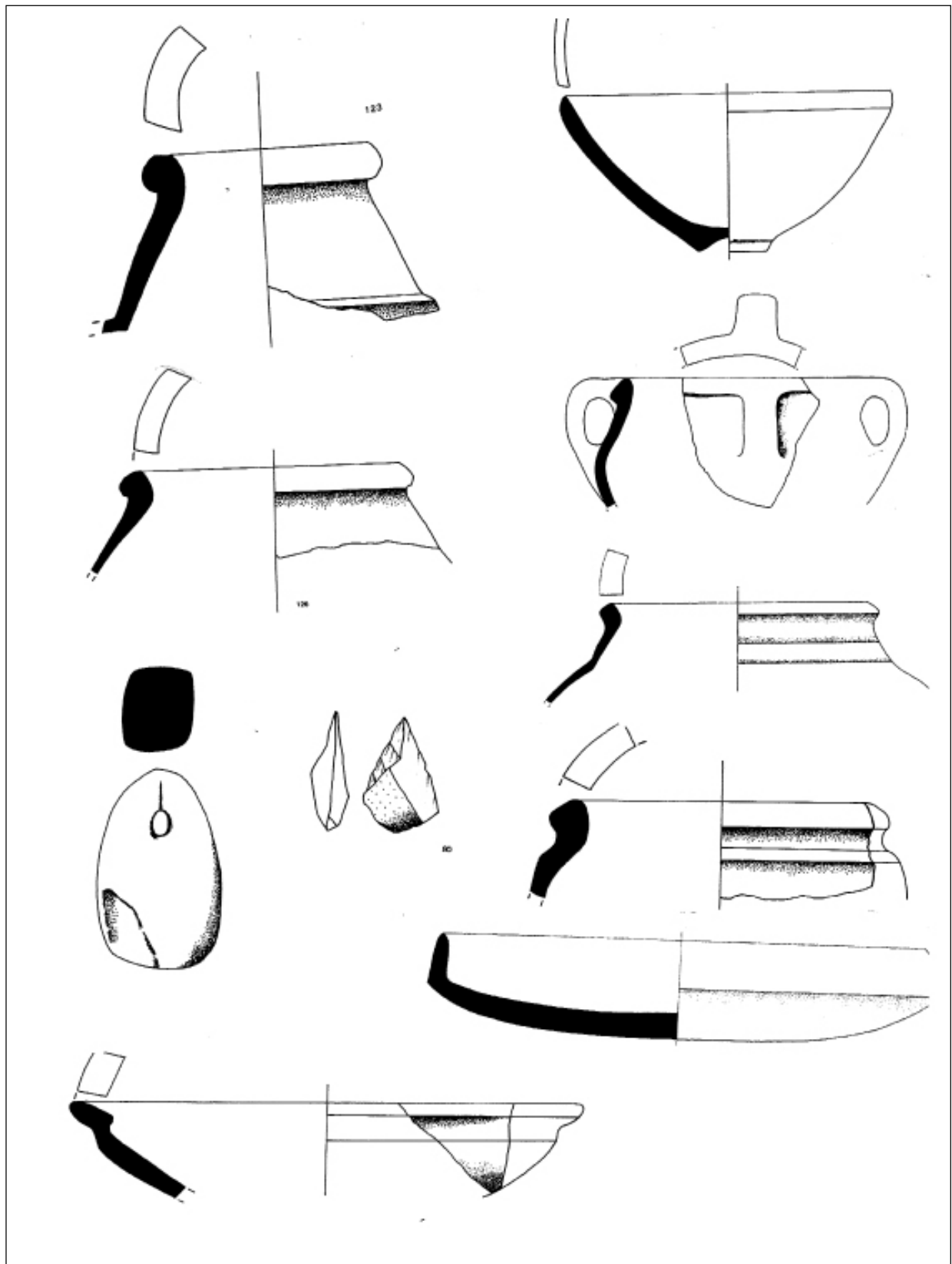


10b. Trenches P14-P15.

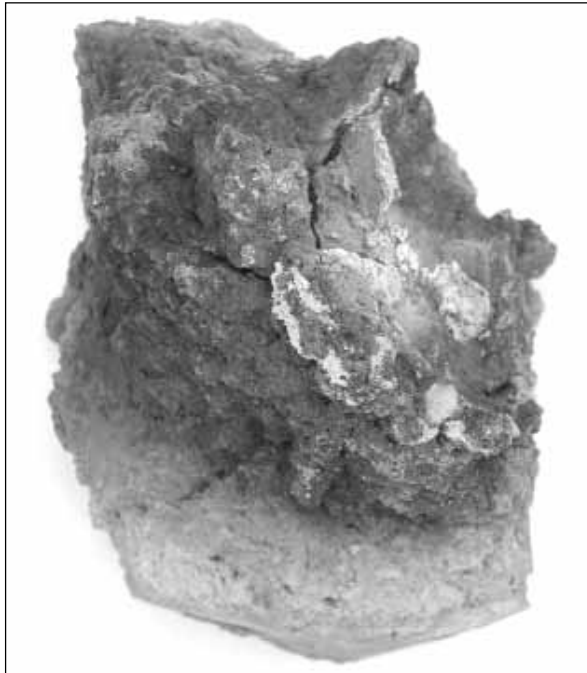
scarce but considerable. IA pottery was recovered (**Fig. 10c**) in addition to basalt and stone grinders, flint tools, fragments of carbonized wooden posts and two fossil shells. The most important discoveries however, were two small *tābūn*-like metallurgical smelting furnaces, containing a few bronze ores and slags (**Fig. 10d**). These may indicate that smelting activities were

undertaken in this area (Branigan 1974; Catling 1964; Tylecote 1970: 285).

Investigation of the EBA cemetery continued (**Fig. 11**). The rock-cut tomb B4 was totally cleared, revealing an intact burial of an adult in a slightly contracted position (**Figs. 12, 13**) and the disarticulated remains of a number of other individuals. Several joining sherds and



10c. Trenches P14-P15. LBA and Iron Age pottery.



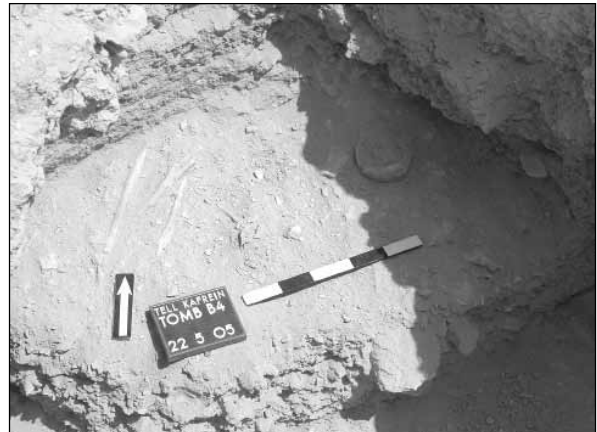
10d. Trenches P14-P15. Bronze ores and slags.



11. EBA cemetery, from W.



12. Rock – cut tomb B4 and burial in situ.

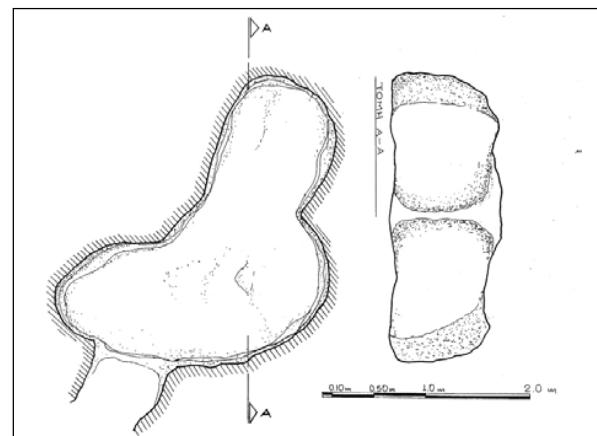


13. Rock – cut tomb B4 and burial in situ.

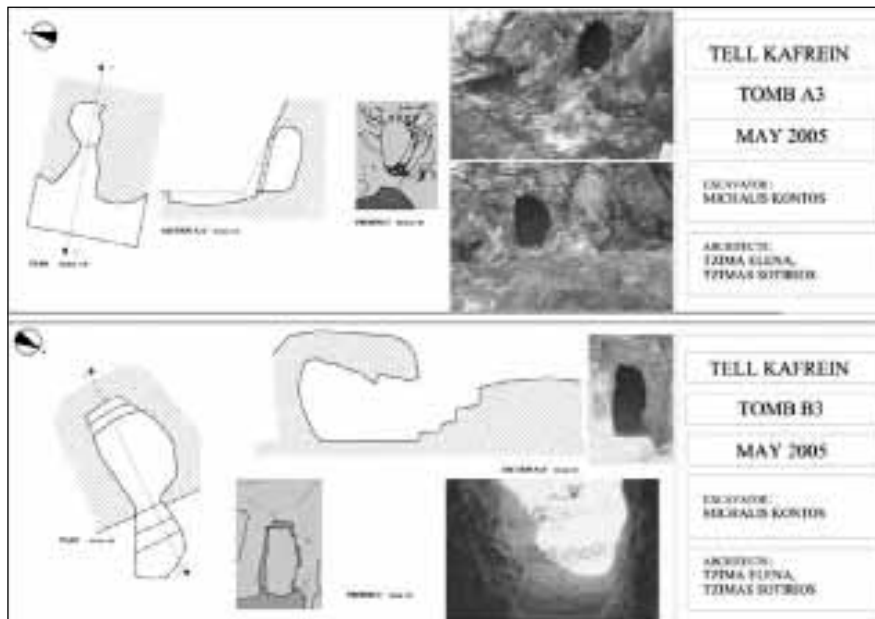
other small finds (glass beads, flint blades, etc.) were collected from this tomb and the adjacent tomb B5 (Figs. 14a, b) both dated to EBA I-II period. A brief search for other intact tombs was unproductive as tombs A3 and B3 were found empty (Figs. 15, 16), but this does not rule out the future discovery of unlooted tombs in this



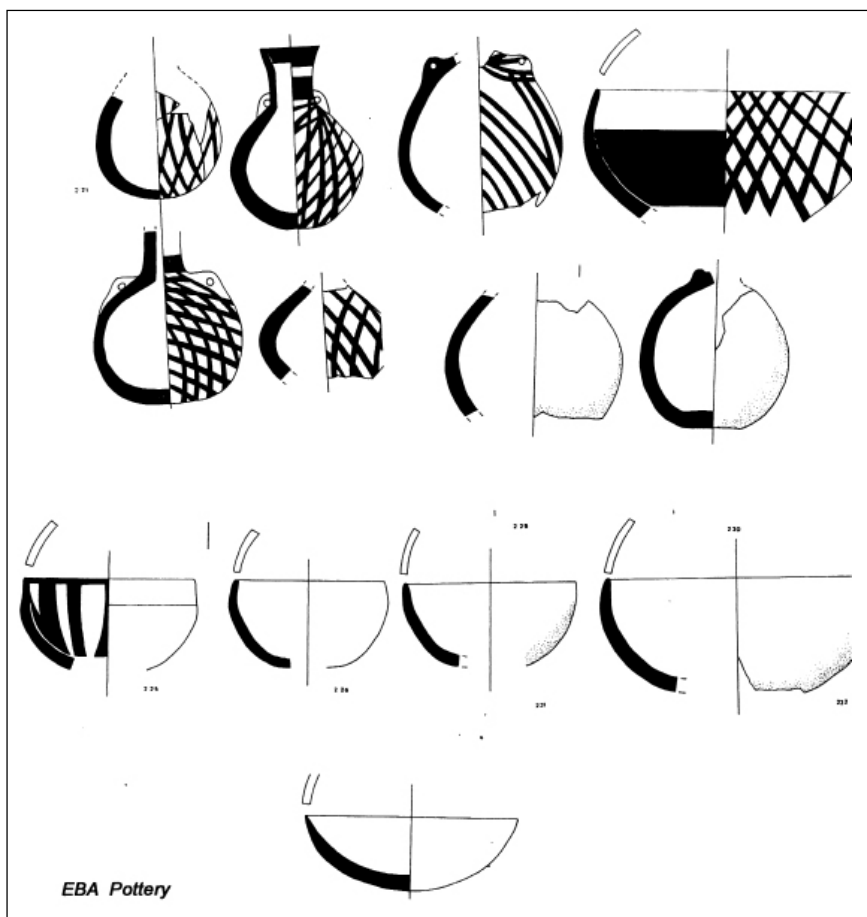
14a. Rock – cut tomb B5.



14b. Rock – cut tomb B5.



15. Rock – cut tomb A3 and B3. Photos, plans and sections.



16. Rock – cut tomb A3,B3. EBA pots and small finds.

extensive cemetery (over 50 looted tombs were counted).

Work continued at Tall al-Kafrayn during

2006 with the opening of sixteen new trenches and the re-investigation of trenches P14, P15 on the east slope and N1 on the summit. Part of an

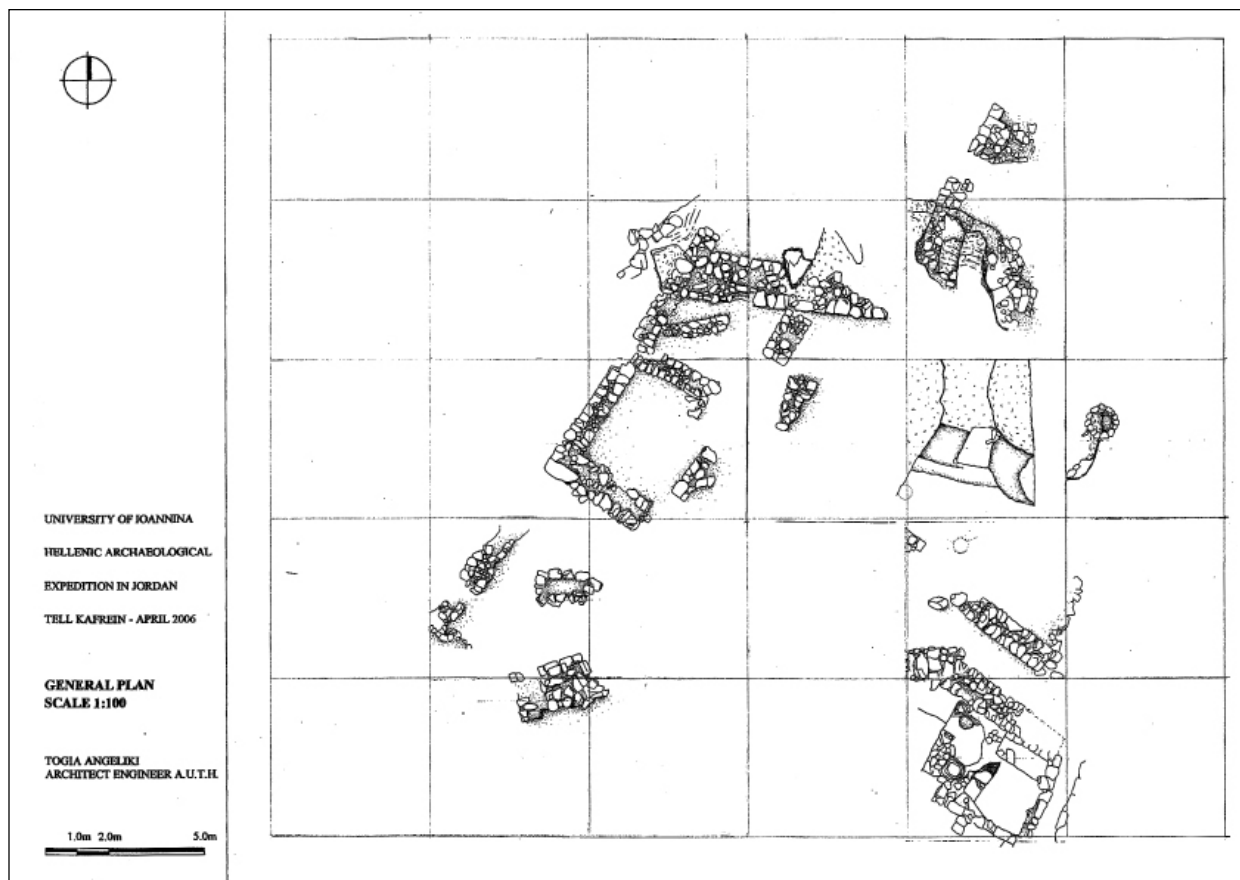
extensive complex of architectural remains has been revealed on the leveled top of the tall, possibly consisting of a central major building in N13 and some adjacent buildings to the north, south and east in trenches L13, M12-15, N14, O11-13, P11-13 (**Fig. 17**). The occurrence of Islamic tombs in most of these areas prevented further clearance during this season.

Noteworthy was the discovery, south of the central building, of a low-stepped, roughly rectangular structure, built of fine ashlar masonry (**Fig. 18**), which might provisionally be interpreted as the altar of a shrine (Wright 1985: figs. 138, 140, 154, 175) but which awaits verification by further work. On the northern side of the tall, just below the summit, in trench O11 (**Fig. 19**), stone and mud brick walls were revealed belonging to a room with a low platform and a small casing built of upright standing slabs. This room seems to have had a unique function not altogether understood at present. Part of a vertical wall positioned on a north-south axis was



18. Low – stepped rectangular structure (altar of a shrine?).

found in the adjacent trenches P11-12 and a circular well-built *silo* or *bothros* was unearthed in trench Q13 (cf. Dothan 1977: 865 for comparisons) (**Fig. 20**). Other finds from trenches O11 and P11-12 include pottery (the upper part of two flasks), stone tools and small objects (**Fig. 21**).



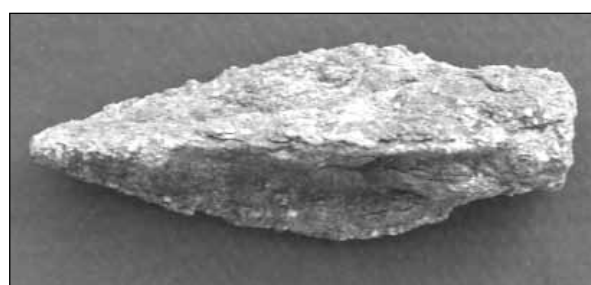
17. General plan of the central building.



19. Trench O11.



20. Trench Q13: Circular well-built silo or bothros.



21. Trenches O11 and P11-12: Stone tools.

Further work on trenches P14-15, revealed additional architectural remains consisting of stone walls and fallen mud bricks (**Figs. 22, 23**) mixed with LBA / IA I-II pottery, including an IA broken *pithos* jar (**Figs. 24, 25**). Further north, half of trench P13 consisted of a rock-cut floor with two narrow irregular channels running north-south of unknown use (natural cracking of the bedrock?) while the other half of the trench was much disturbed (**Fig. 26**). This context produced abundant IA pottery, including the upper half of a flask and two glass beads.

The two new trenches, K19 (**Fig. 27**) cut on the south slope of the tall, and K18 immediately below it, were both much disturbed but produced IA I-II pottery and remains of burned wooden beams similar to those found in the same area during the previous three seasons. One of these was over a meter long and most probably belonged to a collapsed ceiling and roof. Trench V8 (**Fig. 28**), opened on the north-east slope of the tall in an area destroyed by bulldozer activity, revealed two successive layers of habitation, dated on the basis of the pottery and other artifacts (stone grinders and whorl-fossils) to the IA I-II period (**Fig. 29**).

Investigation of the EBA cemetery was suspended as three trial trenches cut among the previously excavated tombs B4 and B5, were unproductive. We had, however, the chance to visit a private collection, ostensibly originating from the cemetery, in the village of Tall al-Kafrayn. With the kind permission of the owner, we were allowed to study the prehistoric objects, which included fifteen EBA vases, similar to those found in our excavations of the EBA cemetery (**Fig. 30**).



22. Trenches P14-15: Architectural remains.



23. Trenches P14-15: Architectural remains.



24. LBA/Iron Age I-II, big pithoid jar.



26. Trench P13.



25. LBA/Iron Age I-II pottery.



27. Trench K19.



28. Trench V8.



29. Trench V8: a whorl fossil from Iron Age I-II .



30. EBA vase from a local private collection.

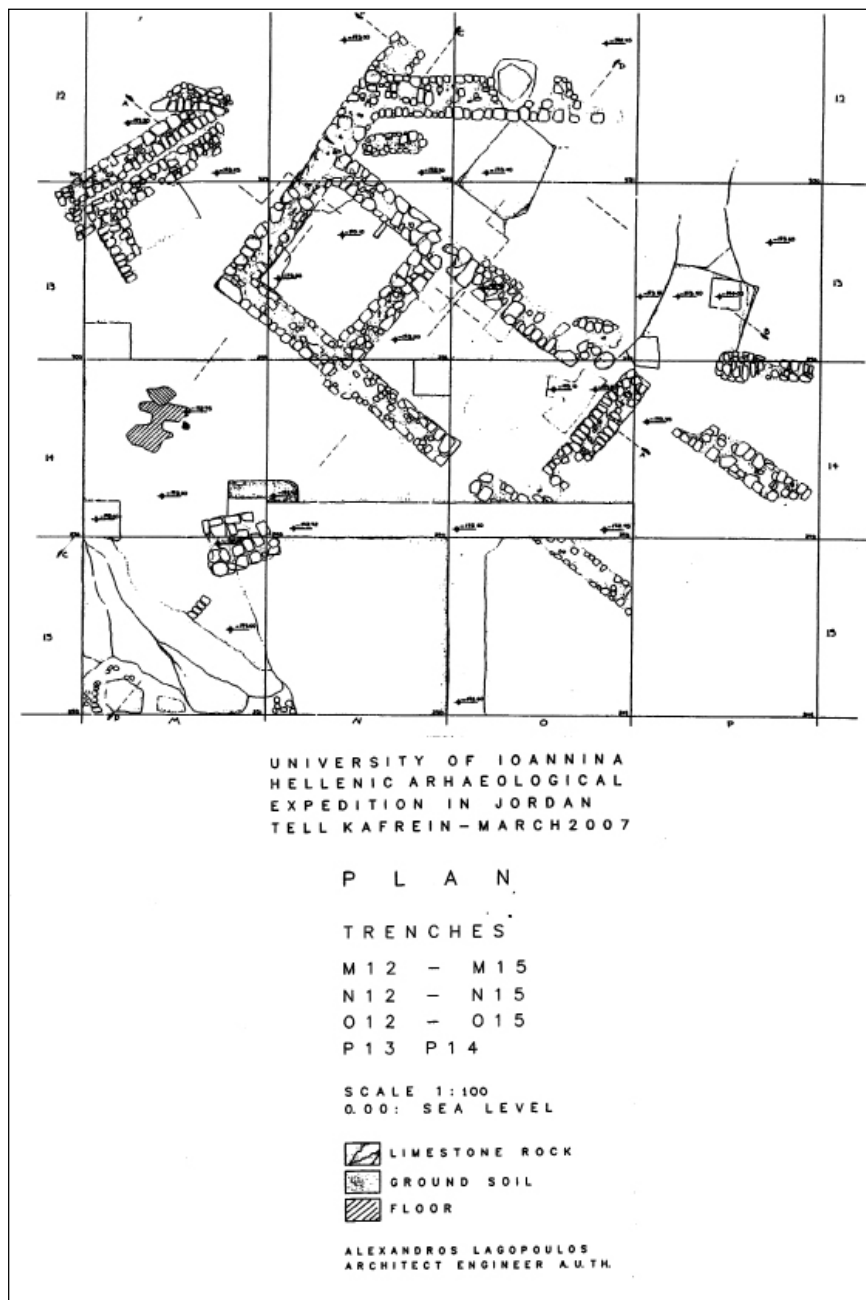
During the 2007 season work was continued on the top of the tall and the south-east slope. On the summit was a complex of buildings that had been partially revealed during the 2005 and 2006 seasons. Further work on fourteen new

and four old trenches brought to light new architectural remains and finds, which indicated the importance of this area.

Resumed excavations in trench N13, at the centre of the top of the tall, confirmed our 2006 view that a large three-roomed building existed there (**Fig. 31**). It was decided to clear this carefully, beginning with a rectangular room 3.50m x 3.10m. The foundations of the walls of this room consisted of large well-laid stones, preserved to a height of 0.75-0.80m. The floor was formed by partially cutting the bedrock and partially paving with clay or beaten soil. The discovery of scattered and collapsed mud bricks indicates that the stone walls had a mud brick superstructure. Noteworthy was a well-preserved entranceway, 1.2m x 0.9m comprising a flagstone threshold (**Fig. 32**) at its north-east corner, leading from the eastern open court to the interior of this room.

Immediately to the east of trench N13, in trench O14, the second larger room was constructed in a similar style to the first room and measured 5.60m x 3.50m. In the southern wall of this second room was another doorway, leading to the third room of the central building. It had well-constructed jambs and two large orthostats, approximately 0.80m high, standing vertically 0.60m apart (*cf.* Daviau 1992: 152, Pl. II:1). All three rectangular rooms communicated with each other via a smaller interior doorway at the northern corner of an adjoining wall. The discovery of a few MBA and LBA sherds and many IA sherds (**Fig. 33**) indicated that this building was used over an extended period. Other finds included two bronze pins and some stone implements. Of note was a rectangular gaming stone, bearing seven rows of seven shallow circular impressions on its upper surface, and a chess-shaped design on its left side (**Figs. 34a, b**). A similar gaming stone was found at Tall al-Kafrayn in trench M16 during the 2004 season, and similar objects are also known from 'Arād and Umm Saysabān (Amiran and Ilan 1992: 76-77; Hübner 1992: 67-71; Lindner *et al.* 2001: 291, fig. 9; Papadopoulos 2007: 182, fig. 9).

It was determined that special attention would be given to the plan of this three-roomed building, in order to ascertain its function and association with other structures adjacent to it. However, this proved a difficult job, due to the



31. Large three-roomed building on the top of the tell.

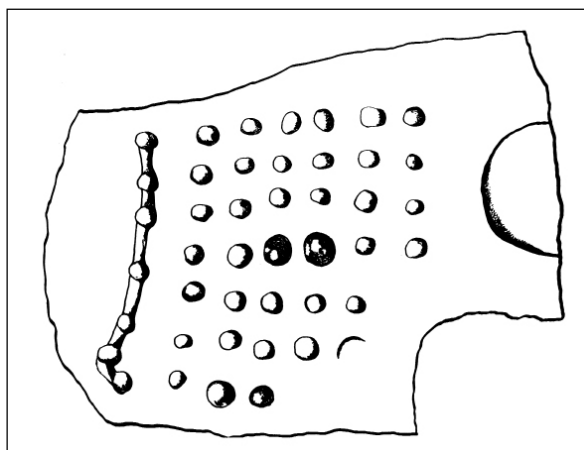
presence of recent Islamic tombs, which had destroyed much of the monument. Even so, its thick walls, large size (ca. 9.00m x 3.10-3.50m) and its location at the centre of the tell, suggests a different function from common domestic habitations and it might be hypothesized that this house was the residence of a person of high status, possibly a local leader or governor. Future excavation will help us to determine its use, especially since a great part of the tell is as yet unexcavated.

Trench P13, east of the central building, produced only a few pottery sherds and a rectangular cutting in the bedrock 2m x 1.13m x 0.50m (Fig. 35). This could be interpreted as a reservoir for collecting and storing water for everyday domestic activities.

Northwest of the three-roomed building, in trenches M12 and M13, there were parts of two separate, easily discernible foundation courses of defense walls, 13.50m in length (Figs. 36a, b). These suggest that the settlement was forti-



32. Three-roomed building with its doorway at its NE corner.



34 b. Trench O14: Rectangular gaming – stone.



33. Trench O14: MBA, LBA and Iron Age pottery.



35. Trench P13.



34a. Trench O14: Rectangular gaming – stone.



36a. Trenches M12-13.

fied at least twice during its occupation, but only future excavation will verify the sequence.

Further work in trenches M14 and M15 revealed scanty architectural remains, as a result

of the presence of at least six Islamic tombs. No definite interpretation of use of the rectangular structure was therefore possible, as pottery and other objects, which might help to establish the function of the structure as “cultic” were absent. Noteworthy however, was the finding in this



36b. Trenches M12-13.

trench of a partly preserved *tannūr* or *ṭābūn*-like bread oven (**Fig. 37**) similar to that found in trench J17, on the southern slope of the tall (Flanagan *et al.* 1996: 279, fig. 18; Steen 1991: 135-53; Politis 1995: 479, fig.4).

Work was continued in trench P15, on the east side of the tall, which had produced in previous seasons a possible metallurgical smelting *ṭābūn* or fire pit. During this season, work on the deeper levels reached the bedrock, upon which was observed successive well-built walls of irregular small and large stones and mud bricks (**Fig. 38**). Seven stratigraphic layers have been distinguished, corresponding to at least three main building phases and other activities on this part of the tall. Finds include IA sherds, fragments of stone vases, basalt grinders, flint



38. Trench P15.

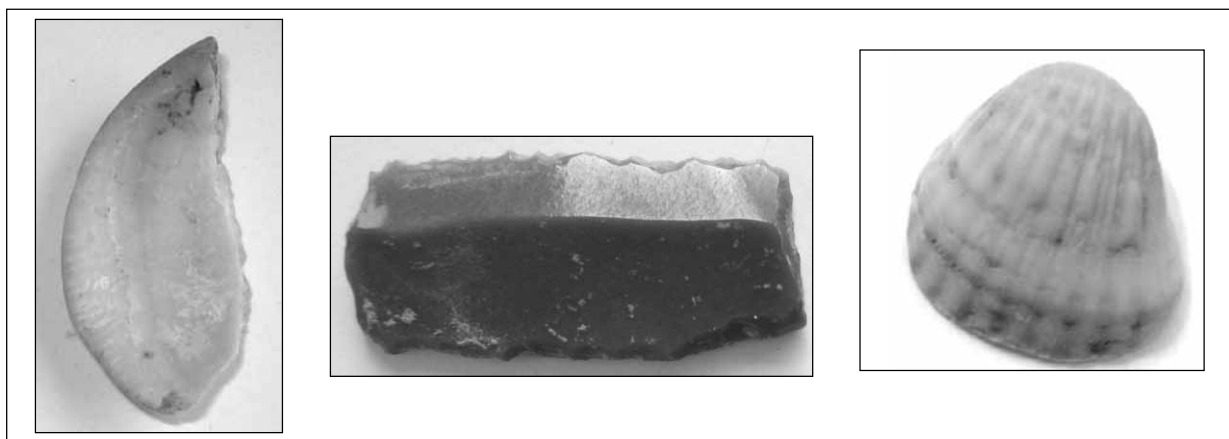
blades, shells and fossils (**Fig. 39**).

Finally, an effort to locate new EBA tombs at the eastern foot of the tall (trench 021) was unproductive, but revealed part of an east-west oriented wall, the preserved dimensions of which were 5.00m wide x 1.20m high x 1.10-1.60m long (**Fig. 40**) and which has been interpreted as a retaining wall. It is not surprising that as a consequence of the steepness of the tall slope, retaining walls had an important function at Tall al-Kafrayn.

During the 2008 season, work was continued on the top of the tall and on the east, south and north slopes. In the first instance, the area where a complex of buildings had been partially revealed during the last three seasons (2005, 2006 and 2007) was found to be badly disturbed by



37. Trench M14: *Tannūr* or *ṭābūn* type bread oven.



39. Trench P15: Finds (fragment of stone vase, flint blade, shell).



40. Trench O21.

local looters, however, repairs were made to the damage areas and most of the walls were able to be restored. Further work brought to light new architectural remains and artifacts, strengthening the view that Tall al-Kafrayn was an important settlement of the LBA and IA.

Trench L14 was opened near the southwest edge of the summit, the purpose being to shed more light on the probable use of the area around the central tripartite building. The natural bedrock was exposed throughout the trench,

producing among other finds a small iron spear-head, scraps of iron and two bronze hair-rings. In its northeast section, a layer of ash and burnt mud brick were uncovered but the most intriguing find was a big IA IIA-B amphora, almost totally embedded in the debris and lying upright *in situ* in a cutting close to the western edge of the trench (**Figs. 41a, b**). Its presence may be indication of a storeroom there. In the adjacent trench, L15 a plaster-lined water channel 2.15m long x 0.20-0.25m wide x 0.17-0.20m deep, partly covered with large flagstones, was discovered extending from the northwest section to the opposite end of the trench (**Fig. 42**) (cf. Flanagan *et al.* 1992: 102, figs. 16 and 17).

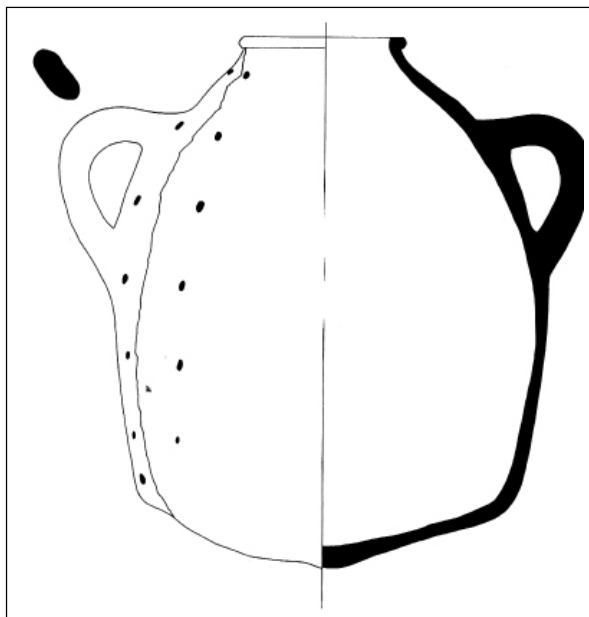
An effort was made to continue work begun the previous year in the partially explored trench O14, but the presence of some Islamic tombs prevented us clearing it out. Among the finds, the most important was a pottery sherd bearing an inscription (**Fig. 43**) not easily readable (“*m sh k t and n ts b*” or “*MfiKT N, B*”; Aramaic, Ammonite or Phoenician?) but showing similarities with some *ostraca* from Ḥisbān (Heshbon) or Assur dated to ca. 650/600BC¹.

1. We warmly thank Dr Kay Prag for useful discussion and references and Professors A. Millard and P. Bordreuil for their help on the transliteration of the script and the dating of the ostrakon. The well-written script seems to me to be Ammonite, perhaps from about 600BC, maybe slightly later. It shows similarities with some ostraca from Ḥisban. The letters of the two words preserved I read as *m sh k t* and *n ts b*; the letter at the right edge may be the end of a *z*, but I hesitate to read the marks at the left edge. What *m sh k t* and *n ts b* mean, I am unable to say *m sh k t* could possibly be “skins” or “cords”; the feminine plural ending — of being written without the

vowel letter *w*. *n ts b* may have to do with setting something up or be a noun meaning “stele” (A. Millard, *pers. comm.*). “Le caractère incomplete du texte n’en facilite pas la comprehension; au début de l’inscription, on un /B/. Après la fin du dernier mot, on voit des traces de deux ou trios lettres que je ne parviens pas à identifier. L’inscription elle-même se lit ainsi: ...x MfiKT N” “B” xxx... L’écriture pourrait être phénicienne, mais l’ostrakon araméen d’Assour (# 650BC), présente les parallèles les plus pertinents pour chacune des lettres. Les sens du premier mot (MfiKT) m’échappe encore, mais “N” “B” pourrait designer une stele” (P. Bordreuil, *pers. Comm.*).



41a. Trench L14 and Iron Age 11A-B amphora.



41b. Iron Age 11A-B amphora.

On the south slope of the tall a new trench, J16 was opened just above trench J17. Part of a wall 2m x 1.20m was found associated with many mud bricks, abundant IA I-II pottery and stone and flint tools. Of special importance was the discovery of a krater sherd with a frieze of a stamped cultic scene, showing a nude man raising his left hand and a ritual vessel placed on an incense altar (**Fig. 44**). This scene is identical to one known from a krater found at the nearby Tall Nimrîn (Flanagan *et al.* 1992: 93, 106 Pl I:2, II:1) published by Dornemann (1995:



42. Trench L15: Plaster – lined water channel.



43. Trench O14: Incised pottery sherd.

621-28) and now housed in the archaeological museum of 'Ammān. It has been suggested by the excavators that the motifs are Egyptian and Mesopotamian and they have dated them to the



44. Trench J16: Krater sherd.

seventh century BC. An alternative identification of the motifs are proposed by Dr Kay Prag, who dates it to the very end of the IA or Persian period and argues against its uniqueness, citing several parallels from other sites in the region, including En Gedi, Ramat Rahel, Busayra in Edom and Tall Iktānū on the Wādī Ḥisbān (Bennett 1975: 15, figs 8: 9-10; Mazar 1993: 402; Mazar and Dunayevsky 1967: 137, Pl. 31: 5; Stern 1978: 11-21; Prag 1989: 40-44, fig. 8: 6).

Prag suggests a local origin, perhaps influenced by Syrian/Assyrian, Phoenician, Phrygian or even Greek contemporary specimens “The current distribution of the style, on the western shore of the Dead Sea, in the south-east Jordan Valley, and the southern Transjordan plateau, is coherent and appears to testify not just to local ceramics, but to a very localized set of eclectic art forms which are likely to reflect the stories and cultural *milieu* of the contemporary population, where perhaps the influences are Syrian/Assyrian as much as Phoenician... There seems no reason to look further a field for the origin of this style than in tracing the broader aspects of a very eclectic art history – whether Assyrian, Phoenician, Egyptian, Phrygian or Greek, and note the reinforcement of these cultural affiliations across the contemporary political boundaries” (2001: 228-32).

Turning to the north slope of the tall, work in trench Q17 brought to light part of a wall 10.45m long (**Fig. 45**), most probably a section of the main fortification wall, another part of which was found in 2007 on the northwest slope of the tall. Work was also continued in the adjacent trench P11, producing IA I-II pottery and several small objects (**Fig. 46**) and in trenches P14 and P15, on the east side of the tall, where a metallurgical furnace / oven was found in an earlier season. The 2008 season proved largely successful and we now understand the stratig-

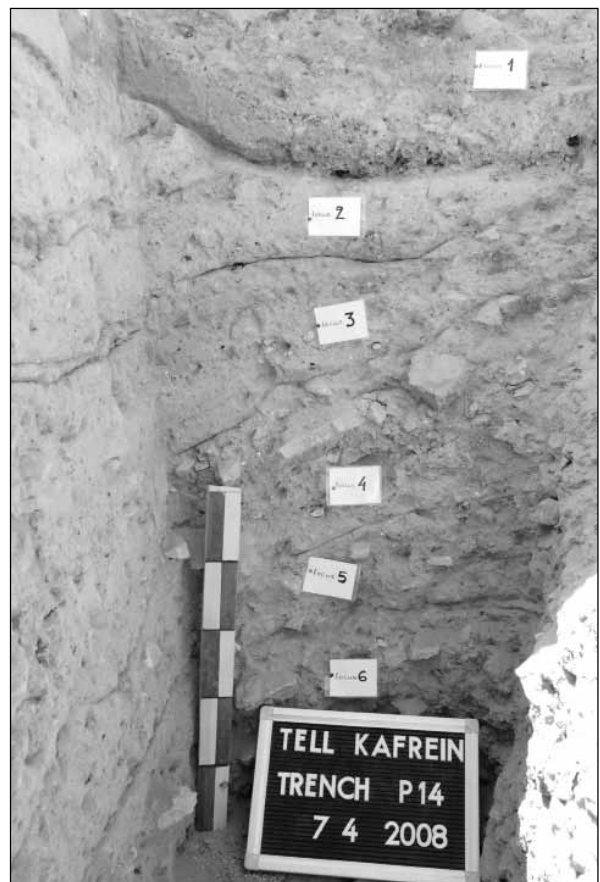


45. Trench Q17.



46. Trench Q17: Iron Age I-II pottery.

raphy of this sector much better than before, i.e. digging on its deeper levels we reached the bedrock and revealed successive walls built of irregular small and large stones and mud bricks. The re-analysis of the stratigraphic sequence shows that six to eight layers can be distinguished (Figs. 47, 48) which correspond to at least four main phases of construction activity on this part of the tell. It has been suggested on the basis of the pottery (Fig. 49) that habitation



48. Trenches P14-15: Stratigraphic profiles.

on this part of the tell was continuous from the end of the LBA to the late IA.



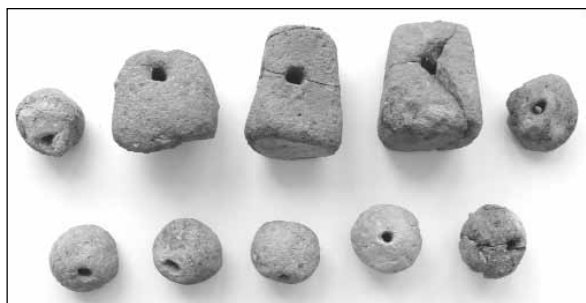
47. Trenches P14-15.



49. Trenches P14-15, Pottery sherds.

At the northeast corner of trench O15 a number of clay weaving and loom-weights were found (*cf.* Daviau 1994: 185, 1996: 86, 91) placed in a small rectangular cist made of mud bricks (**Figs. 50a, b**). These suggest the existence of a domestic quarter of the settlement where textiles were produced.

An exploratory trial trench 11m x 2m x 4m was opened on the north slope of the tall running from the summit to its base (**Fig. 51**). The purpose of this trench was to examine the long stratigraphic sequence in this area. During this season six successive layers were distinguished and of special interest was the finding of a substantial retaining (?) wall 1.90m high x 2.20m



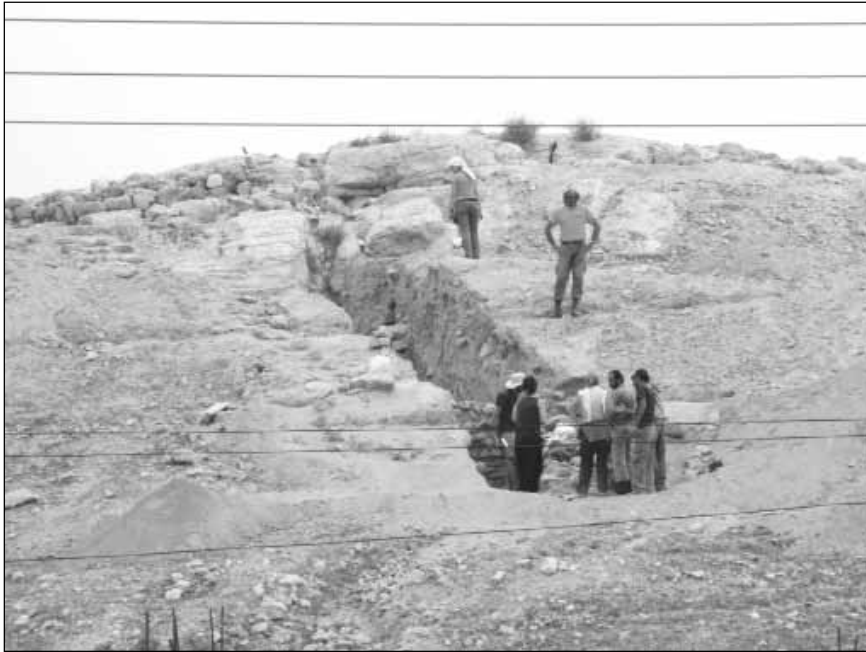
50 b. Trench O15: loom weights.

in length (**Fig. 52**). On the basis of the ceramics and other finds (**Figs. 53, 54, 55**) collected from the base of the wall its construction can be dated to the IA I, but as yet there is no stratigraphic relationship between the retaining wall and other walls situated on the slopes of the tall. Nevertheless, it is reasonable to postulate that continued investigation of the north slope of Tall al-Kafrayn will certainly produce more stratified evidence as the uppermost layers of the squares excavated on the slopes showed much less modern disturbance than other areas.

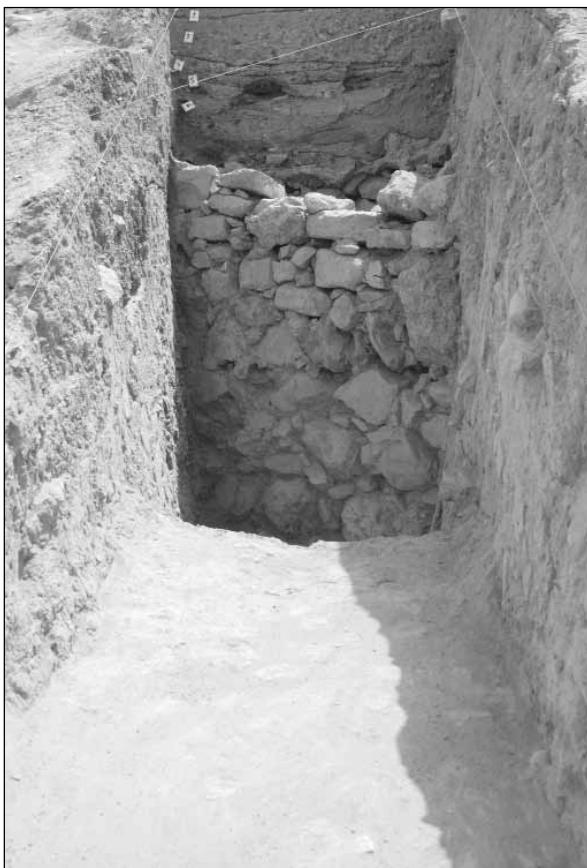
In summary, the overall picture on the top of the tall, as it has been revealed by the work Phase II, 2005- 2008, is more or less clear: an important, monumental three- roomed building existed there with open courts to its northern and southern sides and well-constructed doorways leading to its interior. A substantial double de-



50 a. Trench O15: Clay weaving and loom weights in the NE corner.



51. Exploratory trench, strong retaining wall.



52. Exploratory trench, strong retaining wall.

fensive fortification wall, reinforced at intervals with watch towers enclosed the upper perimeter

of the tall, providing efficient protection for the settlement complex (**Fig. 56**). Pottery and other finds (**Figs. 57, 58, 59, 60, 61**), suggest that tall Kafrayn was occupied from the EBA through to the Late IA.

The disturbance caused by the construction of Islamic tombs on the top of the tall prevented us reaching a definitive explanation for the probable use and chronology of the three-roomed building. The hypothesis that this was a local sanctuary or administrative centre for the management of agricultural activities and the control of trading routes is by no means certain. Only further work will give an answer to this problem.

Finally, running concurrently with the field-work was the study and preparation for publication of the artifacts, carried out by members of the expedition (**Figs. 62, 63**). Care was taken ensuring the protection and preservation of the excavated architectural remains by a team of specialists working with the project. In addition, a staircase was built on the northeast slope of the tall (**Fig. 64**) in order to make easier the access to excavation areas on the summit and the Department of Antiquities of Jordan built a fence to protect the tall from illicit intruders.

The Animal and Human Skeletal Remains

The faunal and human skeletal remains re-



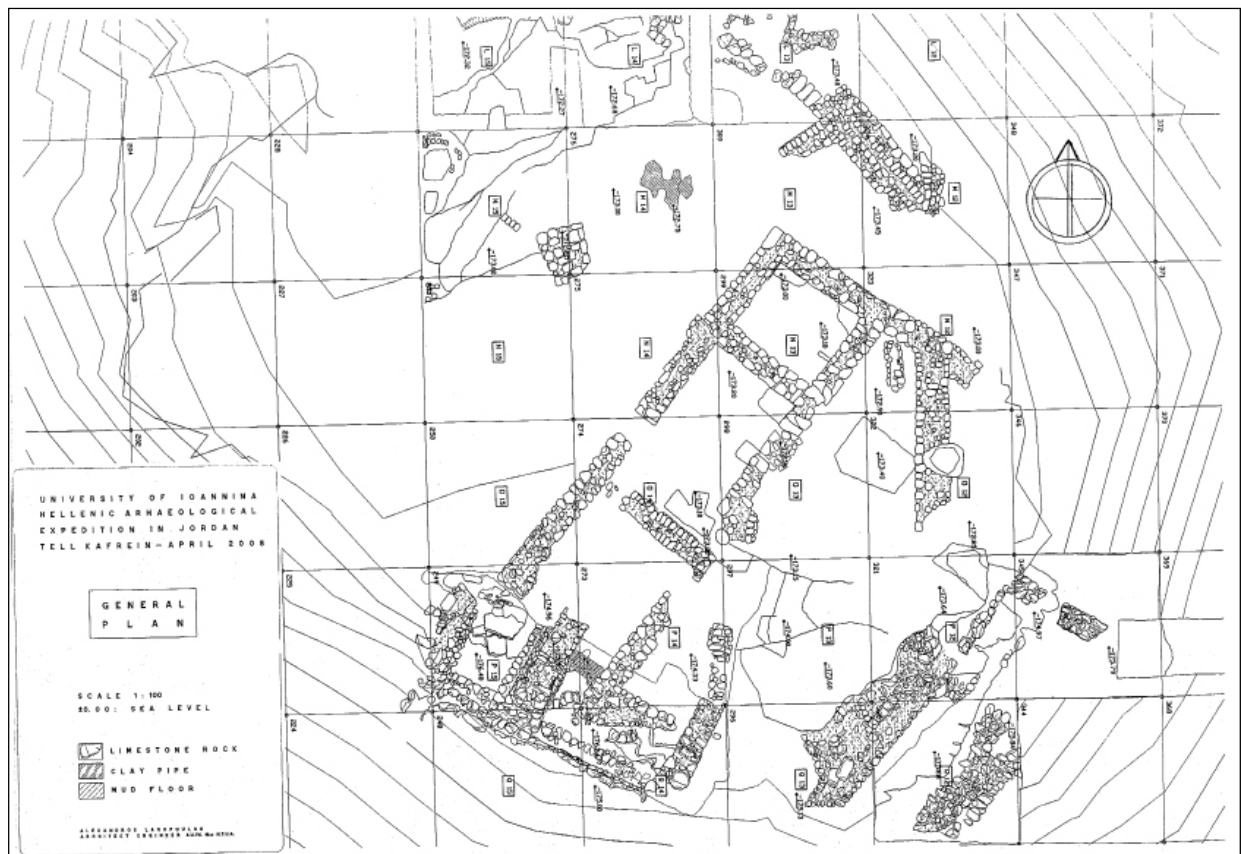
53. Iron Age I pottery sherds.



54. Iron Age I pottery sherd.



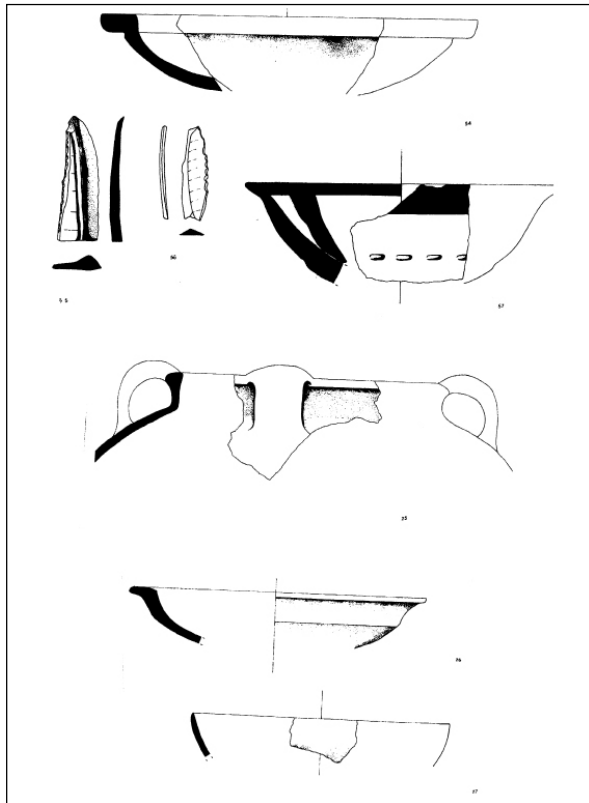
55. Other Iron Age I finds.



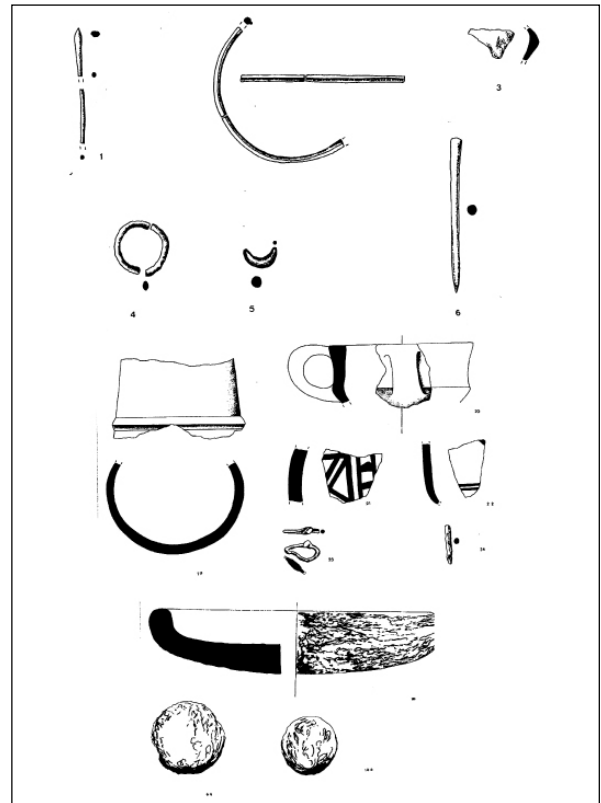
56. Tall al-Kafrayn: Plan of the architectural remains on its top.

covered during excavations were separately collected. The majority of the examined faunal remains represented sheep/goat (140 bones and 46

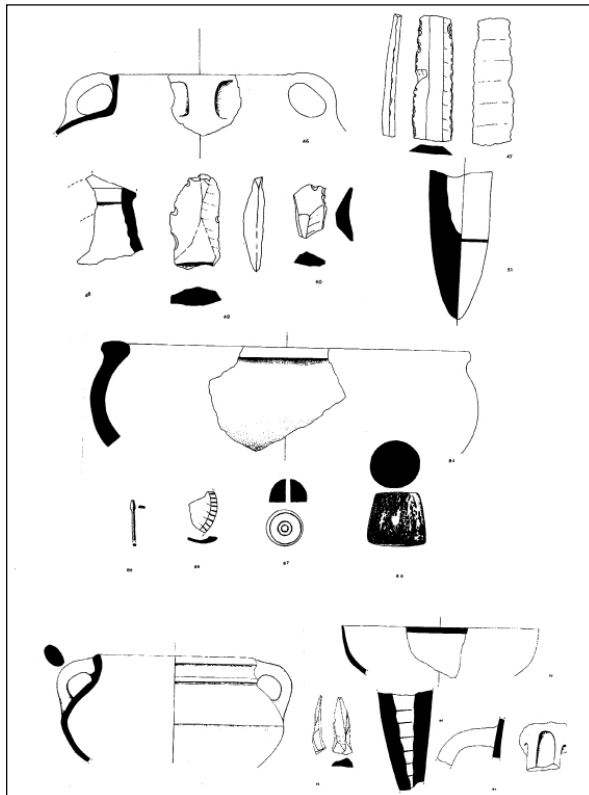
teeth). Twenty-six bones represented cattle. One tooth and four bones came from rodents. In addition, the semi-articulated fairly complete skel-



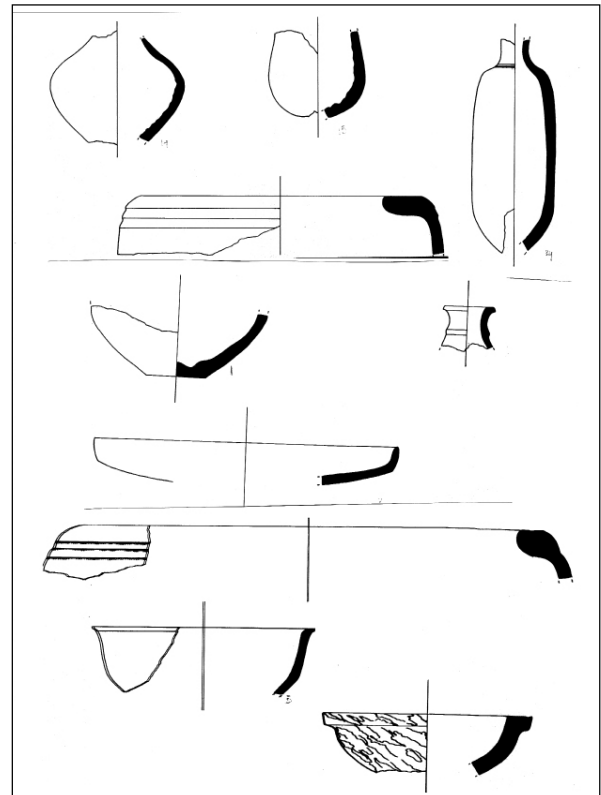
57. Selection of pottery profiles and various finds.



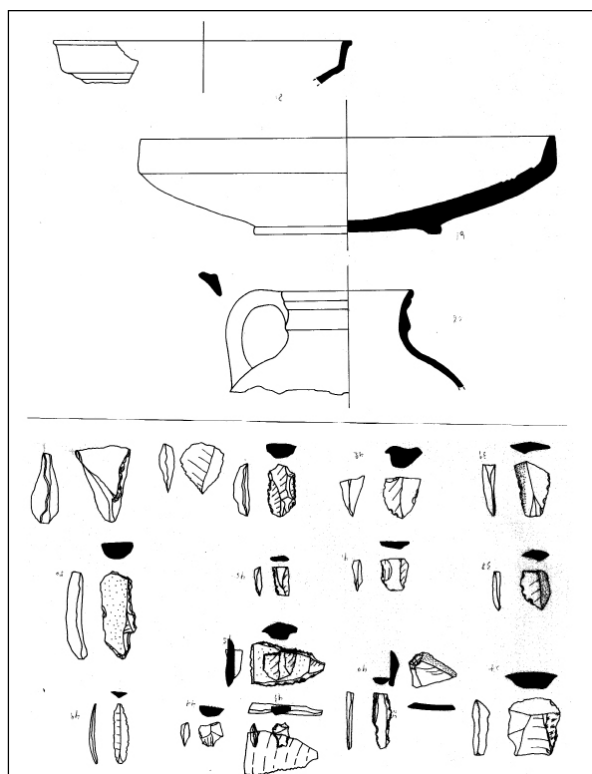
59. Selection of pottery profiles and various finds.



58. Selection of pottery profiles and various finds.



60. Selection of pottery profiles and various finds.



61. Selection of pottery profiles and various finds.

eton of a sub-adult sheep/goat was excavated in trench P14, locus 1b.

Nine human bone specimens were collected from trenches N15-O15, representing at least one adult and one juvenile, probably aged not less than $4\pm$ years. The incomplete post-cranial skeleton (less than 15%) of a juvenile, probably 3 to 4 years old was recovered from trenches L14-M14. Moreover, in two cases the author undertook herself recovery of skeletal material located by members of the excavation team. In trenches P-Q 14-15, locus 11, she recovered one complete occipital bone (posterior cranium). Thorough cleaning of the area revealed no further human bone. Based on the morphology of the superior nuchal line and external occipital protuberance on the ectocranial surface, this was identified as a male individual. As the lambdoid suture is mainly unfused, it may be tentatively suggested that he died at a rather young age. The size and morphology of this bone, however, is indicative of an adult individual (Dr Argyro Nafplioti, *pers. Comm.*) (Fig. 65).

Concluding Remarks

Although many questions remain regard-



62. The dig house and preparatory works for publication of the finds.



63. The dig house and preparatory works for publication of the finds.

ing the precise function and dates of the various strata and architectural features discovered during Phase II of the Project, some general and



64. Staircase built on the NE slope of Tall al-Kafrayn.



65. Dr. A. Nafplioti working on the animal and human skeletal remains.

tentative conclusions can be drawn.

Excavations to date have confirmed the great scientific importance and potential of the site, identifying it as a multi-period settlement. Further excavation will certainly provide precious archaeological data and information about the character of the site, its construction phases and the ways of life of the people who lived there, including their burial practices.

On the basis of the evidence available from the tall and the adjacent EBA cemetery, one might provisionally suggest that the site of Tall al-Kafrayn was inhabited from Early Bronze Age times with the floruit during the Iron Age. There is some evidence from pottery of a limited Late Bronze Age occupation, but no architectural remains fill the gap observed also at

other sites of this area, such as Tall al-Ḥammām, Tall Iktānū and Tall Nimrīn (Dornemann 1990: 153-81; Flanagan *et al.* 1990: 131-52, 1992: 89-111, 1994: 295-344, 1996: 271-92; Prag 1974: 69-116; Prag 1991: 55-66). It seems, however, that life on the site in the different periods was dominated by strategic, as well as economic and political factors. Of great interest is the discovery on the top of the tall of a monumental complex of buildings, possibly including an altar(?). In addition, a metallurgical smelting *ṭābūn*-type oven, carbonized wooden beams and cereal seeds, clay weaving and loom-weights, indicate small-scale local industry, handy crafts and domestic and possibly ritual activities all took place at the site.

Equally important is the occurrence of some possibly imported objects, for example, an alabaster cosmetic palette, the gaming stone with rows of circular impressions, an Attic red-figured vase fragment and the krater-fragment with stamped cultic scene. All these objects suggest links with Egypt, Syria/Assyria, Palestine, Phoenicia, Phrygia, Cyprus and Classical Greece.

Tall al-Kafrayn, like the adjacent and much larger Tall al-Ḥammām, may indeed hold key pieces of the archaeological puzzle from which a greater comprehension and appreciation of the regional history can emerge, a reasonable expectation based on the important finds and its strategically dominant location in the Jordan Valley. We strongly recommend the continuation of our excavation project.

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Our warm thanks go to our colleagues Profs. A. Mantas (University of Ioannina), K. Palyvou (Polytechnical School of Thessaloniki) and X. Moussas (University of Athens) for their scientific assistance. Trench supervisors and close collaborators in our excavations in Jordan and Greece, include archaeologists .V. Chrysikopoulos, M. Sofikitou, D. Meggidis, M. Nikolakaki, N. Mavroudi and post-graduate students in Archaeology of the Ioannina University: E. Papadopoulou, K.T Heodoridis, K. Paschalidis, D. Basakos, S. Thermos, A. Tsonos, S. Oikonomidis, G. Panousopoulos, I. Angelletopoulos, I. Giannakakis and K. Lambri. We sincerely thank also the following specialists who participated on the project: S and E. Tzimas, A. Toya, A. Lagopoulos (architects), Suleiman Al-Jamal (surveyor), Dr A. Nafplioti (archaeologist-os-

teoanthropologist), Dr I. Maniatis (Demokritos Laboratory, C14 dating), K. Zervaki (M.A. conservator) and D. Chatzhliou (photographer).

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CHANGING CITYSCAPES IN CENTRAL JARASH – BETWEEN LATE ANTIQUITY AND THE ABBASID PERIOD

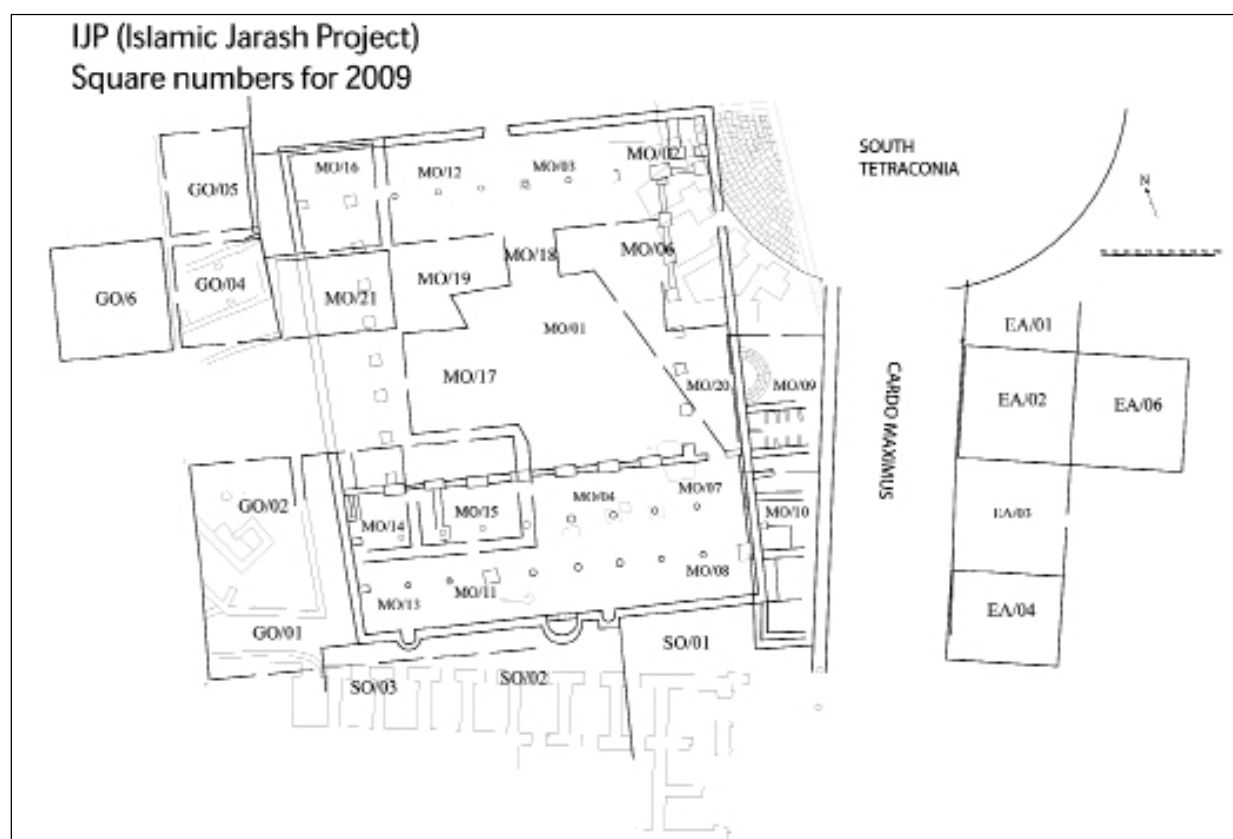
Louise Blanke, Patrick Dan Lorien and Rune Rattenborg

Introduction (LB)

The present article reports on the 2008 and 2009 seasons of excavation of the Islamic Jarash Project (henceforth IJP)¹. IJP commenced in 2002 with the principal objectives of establishing the existence of an Umayyad congregational mosque in the commercial centre of Jarash, along with a bathhouse occupying the area prior to the construction of the mosque. IJP has, through the years, developed to include further

areas of the Early Islamic town centre (Barnes *et al.* 2006; Blanke *et al.* 2007; Walmsley *et al.* 2009). In 2004 IJP expanded west of the overall area of investigation to examine the immediate urban surroundings of the mosque in an area designated GO. Latest excavations across the *cardo* in Area EA have revealed a building of monumental proportions roughly corresponding in size and date to the mosque (**Fig. 1**).

From 2002-2007, IJP uncovered a congrega-



1. Overview of Islamic Jarash Project following excavations in 2009 (by Hugh Barnes).

1. Aspects of the IJP has previously been published in Barnes *et al.* 2006; Blanke *et al.* 2007; Blanke 2007;

Damgaard and Blanke 2004, 2005; Walmsley 2003a, 2003b, 2003c, 2005 Walmsley *et al.* 2009).

tional mosque framed by the south *decumanus* towards north and the *macellum* to the south. Towards the *cardo*, a series of shops, built against the mosque wall, faced the street. The mosque proper, consisted of an open courtyard (*ṣahn*) flanked to the north, east and west by a portico, while the prayer hall (*qibla*) occupied the southern third of the building. Although not contemporary, four doorways in turn gave access to the mosque. Similarly, three prayer niches (*mihrāb(s)*) were incorporated into the architectural layout, one of which were blocked during the building's use while another was segregated by a perdition wall in the western third of the prayer hall (Fig. 1).

Careful exploration of especially the *qibla* hall and the portico area has established several consecutive structural phases, along with material continuity following the earthquake in 749 AD. This has long imposed important questions regarding the continuous use of the mosque in particular, and Jarash in general, into the later Islamic dynastic periods. Archaeological data from the mosque has, however, been too few to offer sufficient material for any final conclusions.

Following the conclusion of the excavation of the mosque, the foci of investigation of the Early Islamic town centre has progressed to areas GO and EA. Separated by a laneway leading south from the *decumanus*, area GO borders the western side of the mosque. In 2008 and 2009 the northern half of GO was subject to extensive excavation with a particular focus on a series of structures centred on an open courtyard and dating roughly to the time of the construction of the mosque (see Fig. 11). Four architectural phases have been established, with indications of a post 749 earthquake rebuilding supported by substantial ceramic evidence for continuous use well into the Abbasid period.

Comparatively, exploration of the newly begun Area EA is still in its initial phase, while the existence of a building, mirroring the mosque in size and time, has been established (see Fig. 6). Although layout and use of the building is still tentative, the architectural phasing is well understood. Similarly to Area GO, the structures in area EA holds an Early Islamic origin with well attested continuous use post dating the 749 earthquake and seemingly flourishing into the

Abbasid period.

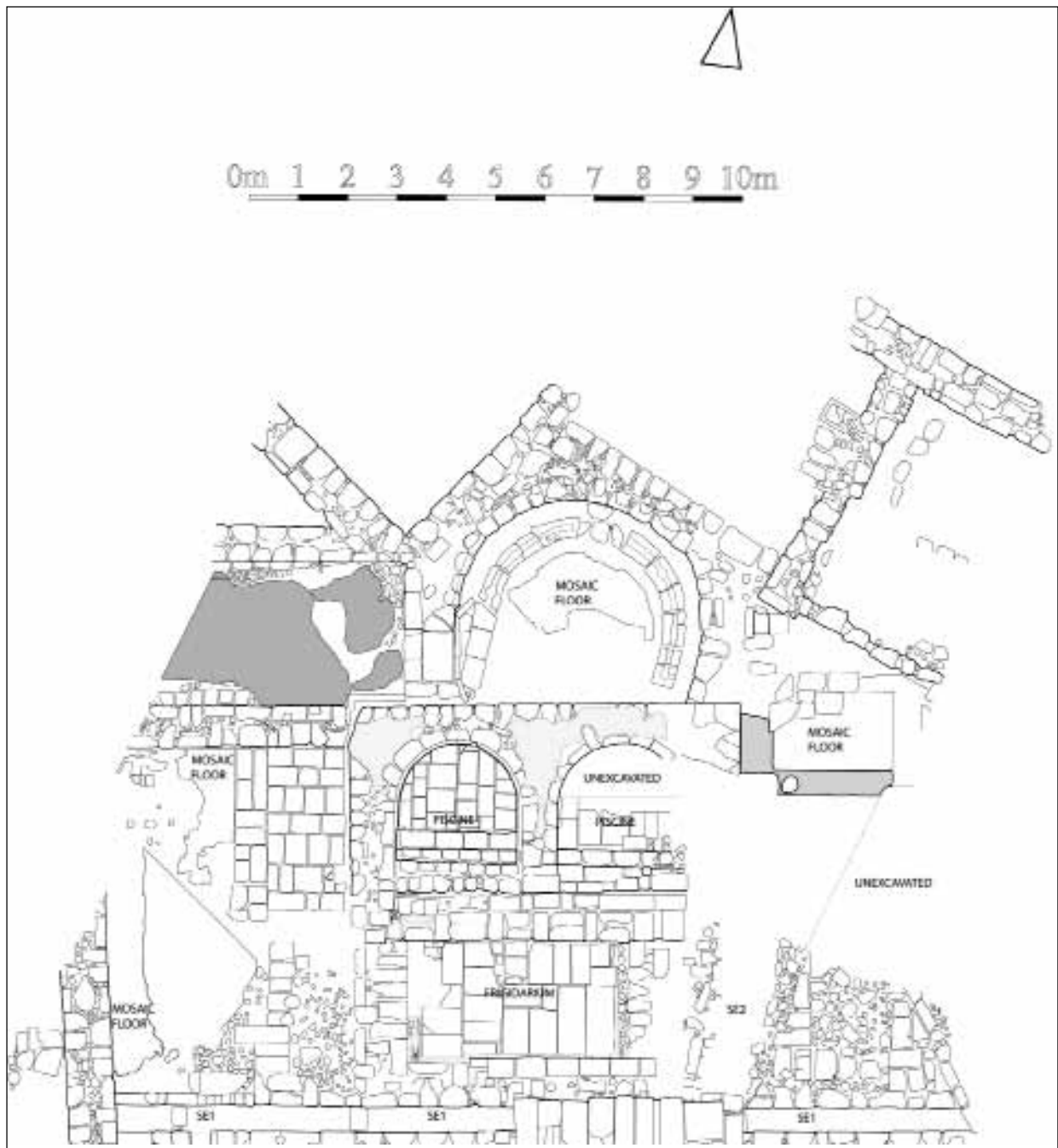
Combining the material evidence from the mosque and areas GO and EA have established a prosperous and developing town centre, lasting well into the Abbasid period, with evidence, across site, of post earthquake rebuilding and occupation.

Continuous exploration of the Central Baths, occupying the area prior to the construction of the mosque, has led to important observations on the social practices of the Late Antique population. Focusing on the entrance area in 2008 and 2009, excavations have uncovered two semicircular basins flanking the northern wall in the *frigidarium*, a semicircular latrine with a separate access from a joint corridor, and an entrance hall giving access from a laneway leading south from the *decumanus* (Fig. 2). The latrine in the Central Baths is only the third public toilet that has been identified in Jarash.

Below follow detailed accounts from the excavators of the three areas in question. Firstly, the article explores the continued investigation of the bathhouse followed by discoveries from the newly engaged Area Ea. Lastly; Area Go is addressed in detail.

North of the Bathing Suite – Accessing the Central Baths (LB)

The continuous exploration of the Central Baths in 2008 and 2009 focused on the northern part of the building, an area previously explored to the level of the mosque (Barnes *et al.* 2006; Blanke *et al.* 2007). Excavations of the baths from 2002-2007 have established six phases of architectural use through a complete recording of the heated rooms, part of the unheated section (*frigidarium*) and the remains of a changing room (*apodyterium*). The location of the service area was established below the mosque prayer hall through the excavation of a single furnace in 2005 and a secondary entrance to the *hypocaust*, currently interpreted as associated with cleaning and maintenance of the system (Fig. 2). Sealed numismatic and ceramic finds have dated the construction of the bathhouse to the late third to early fourth century and its demise to the early eighth century (Blanke *et al.* 2007: 196). The Central Baths went out of use when the area was redeveloped for the construction of a mosque. At this stage, the baths were highly



2. Unheated section of Central Baths following excavations in 2008 (by L. Blanke).

reduced in size and in a general state of disrepair (Blanke forthcoming).

The principal focus in 2008 and 2009 was to identify the entrance to the baths, suggested to be located in the northern section of the building. Excavations were carried out in an area covering 30 by 17 metres within five excavation units (MO/12, MO/16, MO/18, MO/19 and MO/21)

with the objectives of locating the access point to the Central Bathhouse as well as fully clarify the relationship between the bathhouse and adjacent architectural units (**Fig. 1**). Results from 2008 and 2009 have brought significant contributions to the interpretation of both the layout and development of the building. Below follows a detailed account of each individual area of fo-

cus starting with the entrance hall and then moving further into the bathhouse.

The Entrance

Excavations commenced in 2008 immediately north of the changing room (*apodyterium*) based on an assumption that this was the location of the entrance to the bathhouse. A single shop flanking the *stylobate* of the south *decumanus* and incorporated into the structural layout of the bath building was uncovered in 2005 (Fig. 2). It was, therefore, believed that the north facade of the bathhouse contained a series of shops lining the thoroughfare, as documented in other bathhouses both locally and in the broader Roman Empire (to mention a few: Fisher 1938a; Nielsen 1990; Yegül 1992). The current hypothesis is thus, that the Central Bathhouse would have been accessed from a laneway leading south from the *decumanus*, rather than from an entrance point on the *decumanus* itself.

Excavations in 2008 and 2009 were successful in locating an entrance hallway giving access to the bathhouse and an adjacent latrine (Figs. 3, 5). Measuring 7.10 EW by 2.80 NS the hallway was accessed by way of two steps leading down from the street level. The entryway was accessed from a laneway of stamped earth, seemingly running south from the *decumanus* to the baths. A sondage dug into the street surface revealed a corpus of Roman period ceramic material dating solely up to the third century. This context has provided a rough *terminus post quem* for the layout of the street, somewhat corresponding to the 3rd century date proposed for the construction of the Central Baths (Blanke *et al.* 2007).



3. Entrance hall to Central Baths with remains of staircase in the western part of the room and doorways to latrine and bathhouse proper in eastern end (by IJP).

A single preserved stone along with a line of plaster in the western end of the room has been interpreted as remains of a bench that spanned the entire west wall (Fig. 3). The eastern end of the room contains the remains of two entry points, one leading south to the bathhouse proper and one providing access to a semicircular communal latrine. Remains of a door post by the latrine and a threshold in the bathhouse entrance demonstrates that both areas could be closed off independently of the other. This architectural arrangement would have enabled the visitor to use the latrine without paying a potential fee to access the bathhouse. Concurrently, the entryway was organised so that it was not possible to peek into neither the latrine nor the changing room from the access giving laneway.

The stepping stone at the entrance to the latrine, polished by the foot steps of users throughout the centuries, witnessed an extended use of the facilities. Similarly, the floor in the entryway demonstrates a prolonged use of the building, as excavations revealed remains of a highly damaged floor with at least two construction phases. A small section of a mosaic floor was uncovered along the north wall immediately west of and below the stairs, while two layers of mortar covered the room east of the stairs. Both layers seem to have served as beddings for the mosaic floor, thus demonstrated that this originally covered the entire entryway. The area south and west of the steps has been subject to major repairs with reused floor tiles and *pilae* (round tiles associated with the *hypocaust*). That repair was probably associated to the later phases of the building, during which, only a limited section of the *hypocaust* system was still in use (Blanke forthcoming).

The Frigidarium

The unheated section of the bathhouse was, prior to 2008, defined by a rectangular room immediately east of the changing room and north of the heated bathing suite (Fig. 2). Previous excavations uncovered a room measuring approximately 6.5 EW by 3.5 NS metres consisting of a marble slab floor with sides plastered with an *opus signinum*. A stepped wall construction with remains of seats along the north and south side of the room resembled benches, and a drain at floor level in the centre of the south wall

allowed water to spill into the bath's east-west running sewer. These features inspired the interpretation that the rectangular room was, in fact, the remains of the bathhouse *piscine* (Barnes et al. 2006: 300-305). The archaeological data retrieved in 2008 firmly established a different scenario as two semicircular basins were uncovered immediately north of the presumed *piscine*. (Figs. 2 and 4)

The western basin measured 2.60 NS by 2.60 EW and 0.87 metre in depth. The bottom of the basin consisted of large stone pavers and the sides were protected from water with a pink *opus signinum* (Fig. 4). A lead drain was excavated in the northern end of the basin, leading waste water into a sewer running below the adjacent latrine. The drain was uncovered with a plug still in situ. Three steps, also functioning as benches, gave access to the basin from the south, allowing an estimate of four persons to comfortably use the basin at the same time.

The layout of the eastern basin was slightly different from its western counterpart. Like the western basin, it took up 2.60 by 2.60 metres and consisted of a paved stone floor and walls plastered with an *opus signinum*. However, the eastern basin was entered by only two rows of steps corresponding to its lesser depth of 0.70 metres.

The two basins were most likely fed by water running through pipes in the north wall of the room via spouts in the wall. This layout corresponded to architectural remains from the adjacent latrine discussed below.

The development of the easternmost basin was somewhat different from the western, as the former went out of use while the remain-

ing bathhouse was still utilised. This was established as a tile floor was constructed on top of the in-filled basin. Excavation of the fill was carried out through a sectioning in which the southern half was removed to obtain a recordable stratigraphy of the floor construction. The northern half of the basin was not excavated and the drain was not uncovered.

The uniformity of the composition of the fill in the western basin along with the lack of a secondary surface indicates that this basin was filled in as one event and very likely as part of the general dismantling of the bathhouse. A rough estimate of the ceramic material offers an early eighth century date.

Re-considerations of the rectangular room immediately south of the two semicircular basins have led to the conclusion that the *frigidarium* was the most prominent room in the Central Baths. This room, along with the basins is by far the largest in the complex, only followed by the original *tepidarium* (Fig. 2). The drain in the southern wall of the room, mentioned above, would have served to remove excess water, inevitable as visiting bathers used the basins. The in-fill of one basin while the other was still in use corresponds well to the general development of the bathhouse. Exploration of the heated section has demonstrated that only one *hypocaust* room continued to function throughout the use of the building, while smaller bathing tubs for individual use replaced the former communal structures (Blanke forthcoming).

The Latrine

Excavations in 2008 saw the surprising identification of a semicircular latrine accessed from the second doorway in the entrance hall. The actual threshold was not found, but remains of a door jamb established that the latrine could be closed off and, thereby as mentioned above, functioning independently of the bathhouse.

The latrine was identified through the combination of a sewer spanning the northern edge of the room along with a ledge in the stone wall for the insertion of seating (Fig. 5). Measurements of the room are 5.10 EW by 4.05 NS with a 0.38 metre wide sewer, which reaches a depth from 1.48 metre in the southeast end to 1.55 metre in the southwest end. A small channel, currently interpreted for the purpose of hygienic cleaning



4. Western semicircular basin flanking north side of frigidarium (by IJP).



5. Remains of semicircular latrine. Note ledge for insertion of seating (by IJP).

after using the latrine, was cut into the top of the inner sewer wall with evenly distributed circular holes. The channel was fed from the southwest corner of the room, seemingly from a water outlet in the wall separating the latrine and the *frigidarium*. This channel ran to an outlet in the southwest corner of the room. The clean water that fed the channel seemingly came from a piping system in the bathhouse wall, also feeding the two *figidarium* basins described above. Remains of the seats have not been found in any parts of the excavation, potentially suggesting that they were removed for reuse of a similar purpose elsewhere.

A section of the sewer was excavated in order to examine the construction and depth of the feature. The composition of the fill demonstrated that the sewer went out of use and was filled in at the same time as the general dismantling of the bathhouse. The bottom 0.30 metre was, however, clearly deposited while the sewer was still in use, as demonstrated from the high proportion of finds and the small fragmented size of the finds. A large number of ceramic sherds and glass was retrieved from this context along with a number of bones, coins, jewellery and a single gaming piece. The composition of these finds is currently being examined in depth as the majority of the finds are believed to have been deposited during the use of the bathhouse.

Thereby, these finds can offer a unique insight to the use and social practice associated with a Late Antique period bathhouse in Jarash.

The identification of a latrine in the Central Baths has significant implications for the understanding of, not only the particular bathhouse, but the general understanding of the Late An-

tique town. So far, two other toilet facilities have been excavated within Jarash. A latrine with a rectangular layout is located by the entrance to the Baths of Placcus (Fisher 1938: 265-270) and a second facility was identified in the southeast corner of the *tetrakionia* piazza (Kraeling 1938: 103-116). The location of the latrine in the Central Baths implies that the use of communal toilet facilities should be considered more common than previously conceptions have allowed.

A Note on the General Layout of the Bathhouse

Following the description above, it is clear that the architectural unit, defined as the Central Baths incorporated structures beyond the bathhouse proper. A semicircular latrine as well as a row of shops along the *decumanus stylobate*, were structurally integrated units in the building complex. The diversity of uses of space is also reflected in a peculiar ground plan combining two angles or grids within the same building (Figs. 2, 3). Among other aspects, the Central Baths is noticeable for referring to the *cardo/decumanus* grid, while at the same time accommodating a second angle within the building complex. Following the street layout, the shops would have been accessed directly from the *decumanus*, while the bathhouse proper is turned approximately 20 degrees west from this grid. The latter of the two is currently interpreted as an earlier grid system, predating the construction of the *cardo* and south *decumanus*.

The two grids met in the building through a series of architectural solutions, the most noticeable of these being the latrine. Rather than following a proper semicircular form, the eastern part of the room is shifted slightly towards the centre. The wall shared between the latrine and the northern lying shops is shaped to facilitate the joining of two angles (Figs. 2, 5). The western end of the wall measures 1.80 metre across while the eastern end only takes up 1.20 metre. The combination of a semicircular latrine and its associated back wall served to utilize and camouflage an, otherwise, trapezoidal shaped part of the building. Consequently, the perception of the space by the visiting bather would not have come across as either peculiar or irregular.

Previous preliminary publications of the Central Baths has suggested a redevelopment for industrial use in the northern part of the bath

building proper, towards the end of the building's history (Barnes *et al.* 2006; Blanke *et al.* 2007: 179). Excavations in 2008 and 2009 has firmly cemented that this was not the case. Contrary, the bathhouse maintained its original purpose, though in a diminished form, until the construction of the mosque. Early eighth century ceramic and numismatic material in the fill deposits in both the latrine and the western semi-circular *frigidarium* basin establishes a continuous use of the facilities, while archaeological evidence, previously interpreted for secondary use, has proved part of the later diminished phase of the bathhouse (Blanke forthcoming). Further elaboration on the bathhouse phasing will be included in the final publication of the Central Baths.

Concluding the Excavation of the Central Bathhouse

So far, eight seasons of excavation and recording have produced an extensive corpus of archaeological data. The layout, use and development of the bathhouse have been established given the state of preservation of the building. The excavation of the Central Baths is drawing towards an end but a few questions still remain, some of which will be addressed in the following season of work.

In an article published in 2002 W. Thiel dated the re-modelling of the *tetrakionia* piazza to the reign of the tetrarchs in the early fourth century (Thiel 2002). The relatively contemporary date for the construction of the bathhouse has induced a query regarding the relationship between the two structural events. The layout of the back wall of the shops in the southwest corner of the piazza runs parallel to that of the bathhouse, indicating, at the very least, that the two structures are following an orientation of the general area. It is, however, possible that the construction of the bathhouse and remodelling of the piazza should be perceived as part of a general reorganisation of this part of the Jarash. Re-excavation of the area previously examined by the Yale Joint Mission, with this question in mind, is hoped to produce enough information to establish the relationship between the two events. In continuation of this, the unexcavated stretch of shops along the south *decumanus stylobate* will be fully uncovered, to establish the

relationship between these shops and those of the *tetrakionia* piazza.

As mentioned above, a section was dug into the latrine sewer in 2008 producing a highly informative corpus of material remains. The finds from this context is currently being processed and the 2010 season of work will enlarge the studied material by excavating the remaining part of the latrine sewer. An examination will be carried out of the total corpus of the finds in order to examine the social practice associated with a Late Antique bathhouse in Jarash.

Following the final season of work it is the excavator's intention to backfill the remains of the Central Baths to achieve the best possible preservation of the building.

East of the Cardo (PL)

EA, short for East Area, consists of a levelled plateau, sloping down towards the *cardo*. The levelling appears to have taken place in relation to a more recent use of the site, in order to create a useable surface for public activities. Excavations commenced in 2008 with the immediate objective of locating the suspected Umayyad-Abbasid period shops, previously found running parallel to the *cardo*, next to the mosque. Further examination into the building behind the shops was intended, initially with a focus on the back wall of the shops, just visible above ground, in order to investigate whether it belonged to an additional, hitherto unknown, building.

Excavations in EA have confirmed the existence of shops along with a large building located east of the *cardo*, behind the shops. As such, the excavation area was quickly separated into two distinct areas. One area consists of the shops, the other, of the large building, which in the present article will be referred to as Building A.

So far we have identified 5 overall phases in the EA area. From earliest to latest these are:

1. Construction of Building A (unknown)
2. Shops (Umayyad - Abbasid)
3. Reconstruction of Building A (Abbasid)
4. Reuse of Building A (medieval)
5. The top layers (modern)

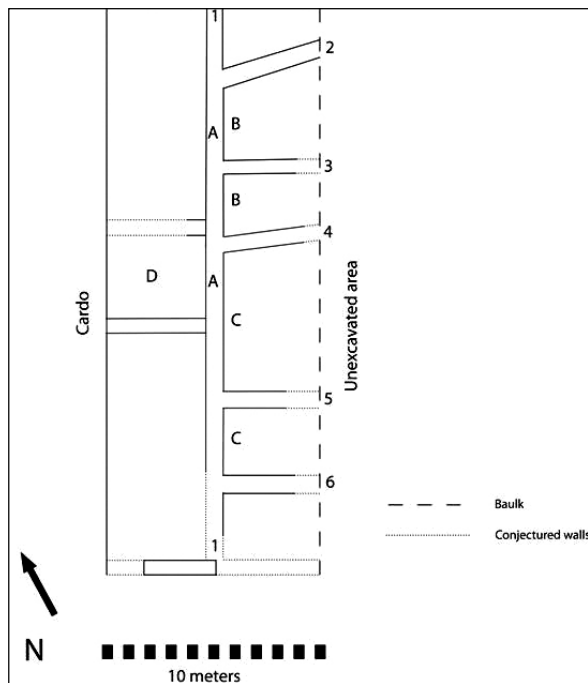
Construction of Building A

The construction and original use of Building

A took place in the, so far, earliest phase (**Fig. 6**). Measuring roughly 30 metres from north to south, the building is surprisingly large, and may well compare to the size of the mosque. Thus far, at least two of the building's outer walls have been exposed. The western wall (Wall 1) runs parallel to the *cardo*. The northern wall has only been partly excavated, and as such we can currently only note its existence. To the south of the building, what appears to be the building's southern exterior wall, has been located. This wall was badly disturbed, possibly as a result of Yale University's excavations in the 1930's, and so, only the very foundation remains.

To date, two distinct rooms have been uncovered within Building A. Each room displays an evenly well-constructed paved floor (**Fig. 7**). However, the pavement of the rooms varies in layout and size and it can therefore be suggested that either their construction is not contemporary or that *spolia* of different origin is responsible for the mixed result. The northern room corresponds to the two paved floors **B**, and the southern to the two paved floors **C**, as visible in Figure 9.

In the southern paved room, what could be the remains of two arch foundations have been located. However, no further evidence supporting the existence of the structure has been found.



6. Area plan of EA (by Patrick Dan Lorien).



7. Overview of EA southern paved rooms C (by IJP).

The building appears to have been emptied and partly reconstructed, making it difficult to determine the date of its original construction. Its origin may well be in the Umayyad period, although the possibility of an earlier date is not dismissed. The high proportion of tumble uncovered throughout the excavation of EA suggests to a potential second storey. However, recent levelling of the plateau could, in part, be responsible for this situation. It looks as though the building's original walls, visible underneath wall 3 and wall 5 (**Fig. 6**), would have been orientated towards the *cardo*, while the later walls follow the orientation of the mosque. At least part of wall 1 and wall 6 can be associated with Building A's original phase.

The Shops

This phase consists of, what could be up to five small shops, whereas only one (**D**) has been fully excavated. The incorporation of Building A's wall 1 as the back wall of the shops would suggest that they postdate the construction of the building. The one shop excavated in EA displays a raised bench towards the shop's back wall. Ceramic evidence from this shop suggests an occupation period ranging from the Umayyad to the Abbasid period.

Cut into the *cardo's stylobate* several door holes, probably corresponding to the placement of each expected shop, have been found (**Fig. 8**).

Reconstruction of Building A

The dating of the reconstruction of Building A is, for now, set to the Abbasid period (about the tenth century), based on a characteristic piece of blue glazed ceramic that was found as-



8. Doorsill in area EA giving access from the *cardo* to shop D (by IJP).

sociated with wall 5's foundation trench, thus providing a *terminus post quem*. The occupation floor layers of phase 3 consist of hard yellow clay, and are located about 0.50 metre above the paved floor mentioned above. At the height of the floor level, a doorway in wall 2 providing access between the two rooms was found. Moreover, at floor level in the room between wall 5 and 6, two fragmented jars from the Abbasid period were found. The floor level and its associated packing are almost sterile and have given very few clues towards the overall function of building A in this phase. Evidence for the reconstruction of the building can, however, seen in several places:

1. The paved floor in room 3 and 4 was partially removed, in order to create a foundation trench for Wall 5 (Fig. 9). Several of these pavers were incorporated in Wall 5 itself. This is easily visible because of the thickness of the pavers (0.30-0.40 metre), as well as they possessing one side that has been worn smooth, and having been cut to fit each other. Also Wall 4 has been constructed by breaking



9. Detail of wall 5 in area EA (by IJP).

- up the paved floor, although here, the pavers have not been reused, at least not in what remains visible in the coursing of the wall.
2. Apparently, both wall 2 and 3 have been constructed more or less on top of Building A's original walls, although further examination below the pavement is required before any conclusions can be drawn.
3. Evidence of two blocked doorways has been found in Wall 1 (Fig. 6. A), these doorways, facing the *cardo*, probably mark the original entrance points to the building from the *cardo*. We have yet to locate a large main entrance, if such exists. The blocking of the doorways could be related to a changing function of Building A.

Reuse of Building A

Reuse of Building A is documented within two adjacent areas. The first area could be the remnant of production activity, as it consisted of a stone platform, centred on a hearth (Fig. 10). The platform was roughly 2 by 2 metres, and was built with large uniform rectangular stones. In the soil around the platform a high proportion of glass sherds were found, along with minor pieces of charcoal.

The second area, on level with the first, consisted of another stone platform. The stones used in this platform were of varied size and thickness, but also here, the platform itself measured 2 by 2 metres. The platform was set on a foundation layer of rough stones and clayey sand, which continued for about 0.20-0.30 metre. A similar layer might be found underneath the first platform. The soil above both platforms has been severely disturbed by modern activity, and as such it has been difficult to conclude any-



10. Overview of phase 4 platforms in area EA (by IJP).

thing about the function of the two areas.

Specific Finds in EA

In Building A two lead seal impressions were found. The first carried the stamp of Byzantine official named Andrew, and is dated to the second half of the 6th century. The second appears to carry Arab inscriptions, but due to corrosion it is difficult to determine this with any certainty. Unfortunately both of the seal impressions were not found in secure contexts.

Excavations of the shop revealed a single marble fragment, which may have been used to support a marble tablet, utilized by the shop owner for accounting and keeping track of economic transactions. Such tablets have previously found during the excavation of the shops adjacent to the mosque (Walmsley *et al.* 2009).

General Interpretation of Building A

While only a small proportion of Building A has been excavated, a few tentative suggestions can be made. The building is situated in what was the main commercial centre of ancient Jarash, and is located adjacent to the presumably most important building in town, namely the mosque. Building A is almost the size of the mosque, and contains what appear to be two very large rooms, perhaps with arches supporting a second floor. Each room has a distinct well-constructed paved floor. The building has been in use for a considerable time, as witnessed by at least one phase of major reconstruction. It shares walls with at least five Umayyad-Abbasid period shops, and during excavation two lead seal impressions were retrieved. These facts might suggest a mercantile function of the building.

While Building A's date of construction is still uncertain, there are some aspects that might relate the building with the Late Antique period. This is mostly based on the fact that the original walls seem to be orientated towards the *cardo*. The thickness of the pavers in the two rooms might also hint at a Late Antique origin. Equally thick pavers, seemingly of the same type, was found in the Late Antique period "House of Blues", which is located about 100 metres to the east of Building A.

Through the location and size of Building A

we expect that it would have fulfilled an official purpose, whether administrative, related to trade or the two combined remains to be established.

The GO Complexes (RR)

Area GO designates a roughly rectangular area, some 50 by 40 metres in extent (**Fig. 11**), situated on a relatively even plateau immediately west of the remains of the congregational mosque (MO). The border between GO and MO follows the edge of a laneway running the full length of the western wall of the mosque, from the *decumanus* in the north to a junction of passageways at the northwestern corner of the *macellum*. Area GO is delineated by the *decumanus* to its north, where the plateau drops sharply towards the street, and a surmised street to its west, indicated by a widening in the colonnade opposite the so-called Umayyad House. The southern limit of the area corresponds with the mosque *qibla* wall. Topographically, the area reaches its highest elevation in the northern half, rising approximately two and a half metres over the level of the *decumanus*, and slopes gradually towards the south.

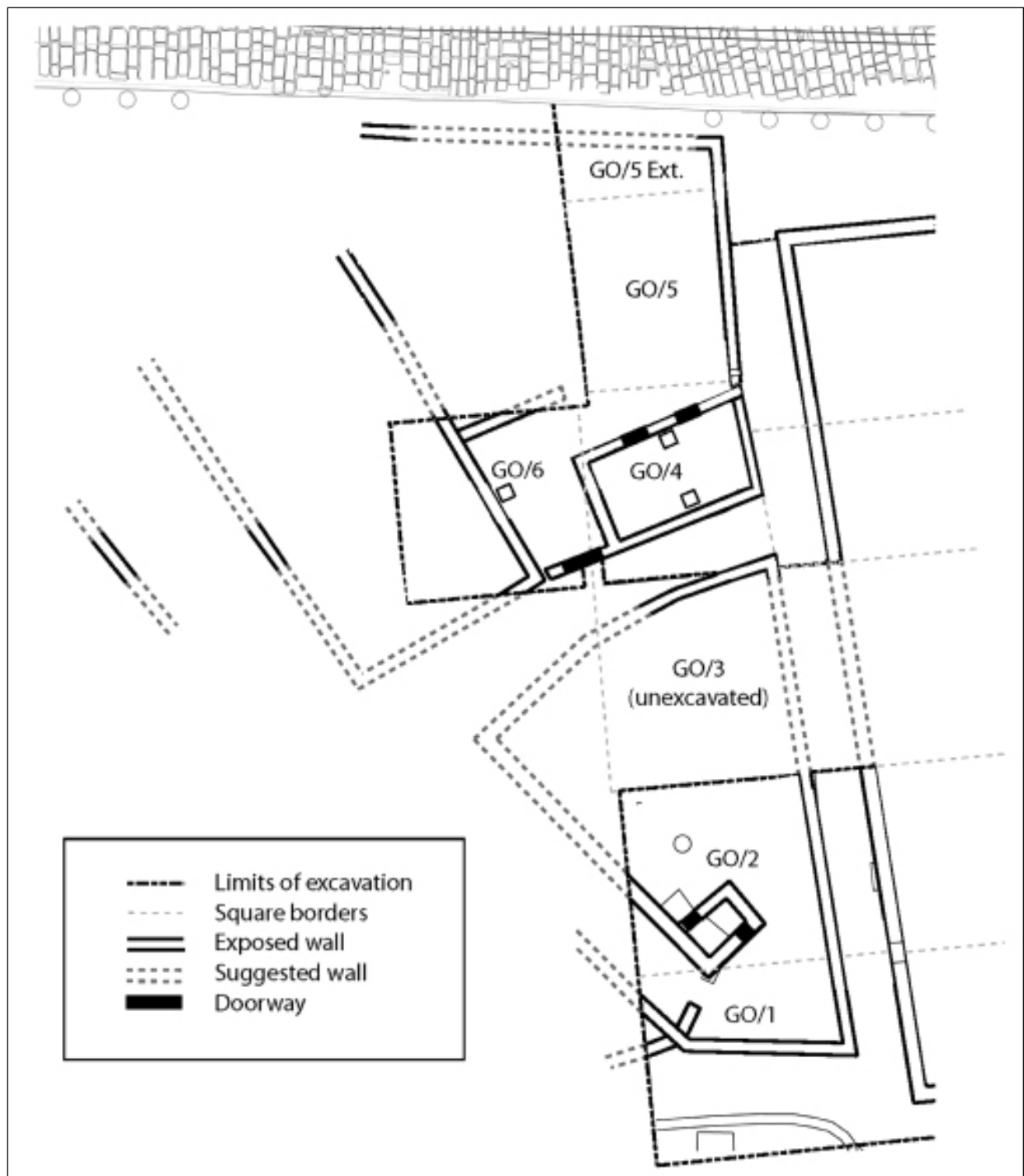
Initial surveying of the area started in 2004, resulting in the tracing of a number of walls in the northern half of the area, while actual excavation began in 2005. Work within GO has primarily aimed at investigating the immediate urban setting of the congregational mosque, and hence all current excavation units within the GO area, except one, are situated along the eastern border of the area, i.e. closest to the mosque.

Currently, excavation within GO numbers six 10 by 10 metres excavation units (GO/1-6) of which all but GO/3 have seen regular excavation over the years. As such, excavations within the GO constitute two separate areas, being GO/1-2 in the southeastern and GO/4-6 in the northeastern quadrant. The former has been excavated from 2005-2007, while investigations in the latter area started in 2007. So far, excavations within GO/4-6 have established a preliminary sequence of four consecutive building phases spanning the Late Umayyad-Early Abbasid periods, which can be summarised as follows:

Phase 4 - Late Umayyad (700-750AD)

Phase 3/I - Early Abbasid (750-800AD)

Phase 3/II - Abbasid (750-800AD)



11. General plan of the GO area, 2009 (by R. Rattenborg).

Phase 2 - Early Abbasid (800-850AD)

Phase 1 - Unknown

Since preliminary reports on excavations in GO/1-2 has been published earlier (Walmsley *et al.* 2009: 113-115), the following will report

on the investigations carried out during the 2008 and 2009 seasons of excavation, in turn followed by some general suggestions for an understanding of the evidence hitherto retrieved from the GO area as a whole.

GO/4-5: The Late Umayyad House (Phase 4)

The phase 4 structure constitutes a rectangular building, still only partially exposed, but most likely of the same width as the phase 3 building superimposing it. It extends westwards from the laneway separating the complex from the congregational mosque. A blocked doorway in the centre of the eastern wall opening onto the laneway was exposed from the outside in 2009. Furthermore, the exposure of a doorway in the west wall of the mosque, opening onto the laneway junction at the southeastern corner of the rectangular building, indicated that the phase 4 structure and the congregational mosque to be of roughly the same date (**Fig. 12**). The interior surface of the above lying phase 3 house is situated more than a metre above the step of the blocked doorway, paralleled by a roughly similar difference between the level of the associated courtyard surfaces evidenced in a trench dug north of the rectangular house in 2007, in both cases the likely consequence of substantial filling and levelling in the area before the construction of the phase 3 complex. As for the use of the courtyard space north of the building (**Fig. 13**), the presence of a massive ceramic dump extending over most of the eastern half of GO/5 has been established by initial excavations conducted in 2007, and the excavation of two 1x1 metre sondages in 2009. The sondages and studies of the associated section in the trench to the south of them have served to illuminate a continued depositing of broken ceramics along the eastern perimeter wall of the complex, along with finds of a substantial amount of animal bone, small



12. The laneway junction at the southeastern corner of the GO/4-structure seen from the east. Note the top course of the earlier phase 4 wall protruding from below the phase 3 structure (by IJP).



13. GO/5 at the end of the 2009 season, seen from the west, with the two sondages (top left) and the phase 2 pit (top right) next to the kiln excavated in 2007 (by IJP).

copper coins, and occasional pieces of shell and beads. The sondage sections indicate the deposit to have been compiled by a series of well-defined interchanging strata of yellow clay and ashy layers with a very high density of ceramic material. As indicated by the trench in southern GO/5, the extremities of the deposit were later covered by a substantial brownish clay layer in the process of levelling the courtyard following the demise of the phase 4 structures (**Fig. 13**).

Although only limited parts of the phase 4 structures have been exposed so far, it is clear that the eastern wall of the phase 3/I-II house was set at a slightly odd angle to the remainder of the outer walls of the building, otherwise set at right angles (**Fig. 12**). The reorientation indicates a changed layout of the building, in turn likely to mirror an overall reorientation of the urban planning in the area following the destruction of the phase 4 complex. It should be noted that we have yet to properly verify the termination of the phase 4 structures as contemporary with the earthquake of 749, even though this seems a tempting link to draw from present evidence.

GO/4-5-6: The Early Abbasid Levels (Phase 3/I-II)

The phase 3 complex (**Fig. 14**) comprises a rectangular building exposed in GO/4 and adjoining courtyard spaces to the west and north, forming one structural unit covering an area roughly 25 by 15 metres in extent (**Fig. 11**). The building, measuring 9 by 5 metres, is located at the northwestern corner of the laneway junc-



14. Overview of the western laneway and the phase 3 housing from the south (by IJP).

tion and comprised one large, later two smaller rooms following the insertion of a partition wall, the subdivisional phases 3/II and 3/I marking the time before and after the division of the room respectively. The partition wall was set between two square pillars abutting the northern and southern wall probably supporting points for an arch spanning the width of the room. A cornice still in place on top of the northern pillar, reused and of Byzantine origin, along with another cornice piece found in the clay filling next to it, may support this point. The partition wall of phase 3/I inserted between them was made from weathered limestone blocks, some clearly reused, without employing the usual terra rossa soil used in other walls of the structure as filling, indicating that it most likely served to divide the interior space of the building, but did not effectively seal off the two rooms from one another. The smaller rooms created by the partition wall were paved with limestone blocks, judging from the thickness and some markings also to be considered as reused building stones, the floors of the two rooms exhibiting a generally similar layout. In the eastern compartment, Room 1, a rectangular area in the northeastern corner of the room next to the doorway lacked the lime stone paving, and was covered instead by two sizable reused marble slabs, along with pieces of a third. In the southeastern corner, a small stone bench abutting the southern wall was exposed. A somewhat similar pattern was found in the western compartment, Room 2, where a rectangular area in the southeastern corner, next to the southern stone pillar, was partially overlaid with limestone slabs. The northwestern corner of Room 2 was occupied by a stone

platform approximately 1.8 by 1.3 metres in extent and raised some 0.40 metre above the floor level (**Fig. 14**), the surface partly covered with flat rounded stones of which some had clearly been exposed to fire. Though no substantial ash deposits or charcoal remains were found in relation to this feature, the outline may suggest a possible hearth.

The layout of the single phase 3/II room, though still in need of some final investigations, only differs from the phase 3/I rooms in the absence of the partition wall and the possible later addition of the stone bench in Room 1. The limestone pavement of Room 2, on a slightly higher level than that of Room 1, was separated from the latter by a clayey buildup overlying the upper course of a double row of stones, aligned with the square pillars, which were set directly upon it. The double row of stones is assumed to be the top of an earlier phase 4 wall, since it runs parallel to the eastern wall of the building, also most likely phase 4.

The exterior areas adjoining the phase 3 building is delineated by a northward wall extending from the northeastern corner of the building all the way to the southern *stylobate* of the *decumanus*, bordering the interceding laneway between the northern GO-complex and the mosque (**Fig. 11**). Although the full extent of the courtyard has not yet been established, excavations in GO/6 in 2009 suggest the complex to border an earlier structure on the western side.

The lowermost course of two supporting pillars, set at the northwestern corner of the building, may suggest the courtyard to have been partly roofed. The northwestern quarter of the complex still awaits excavation; however, the lack of walls traceable in the surface suggests this area to contain a further extension of the courtyard area to its east, further corroborated by fragments of an oven wall found close to the baulk in northern GO/6, likely to be located in an outdoor context.

Excavations to expose the northern boundaries of the complex were initiated in 2009 along the slope towards the *decumanus*. Since the eastern perimeter wall of the complex seems to join with a column on the southern *stylobate*, a northern wall running west from this point may have enclosed most of the space previously opening onto the *decumanus*, a pattern mirrored

in Abbasid structures found on the northern side of the *decumanus* (Gawlikowski 1986: 114–117). Though no indications of a northern wall were exposed during 2009, future work will hopefully convey a better understanding of the northern outline of the complex.

Regarding the use of the laneways bordering the complex to its east and south, it should be noted that the mosque laneway was filled with large amounts of stone and wall fill collapse, due to a probably quite extensive destruction marking the end of the phase 4 structure. The westward laneway, however, seems to have been partly cleared following the phase 4 collapse, as indicated by a hard packed greyish walking surface overlying scattered building stones of the earlier period (**Fig. 12**). Entrance to the phase 3 complex was made from this laneway by a raised earthen step lined with medium sized stones in front of the doorway, leading into the courtyard west of the rectangular building.

Important finds within this complex were mainly limited to a number of broken ceramic vessels found on the pavement of Room 1. Furthermore, an almost complete broken Abbasid Cream Ware pot was found in Room 2. A curious object, suggested to be a small ink well, neatly carved from a piece of dark bluish stone or steatite, was found in the fill of the partition wall, but may be of a later date due to its proximity to the upper layer postdating phase 2.

The Cream Ware pot mentioned above would suggest a late 8th/early 9th century date for the phase 3/I-II structure. Regarding finds in exterior areas, a substantial amount of ceramic sherds were scattered over most of the courtyard surfaces. A large percentage of these comprised early 8th century material. This is likely due to the partial exposure of the earlier phase 4 ceramic dump situated against the eastern perimeter wall well into phase 3.

GO/6: Abbasid Foundations and Cistern

Excavation in the western part of GO/6 has added some promising areas of investigation worthy of mention. The phase 3 structural unit found within GO/4-5 and eastern GO/6, described above, seems to have bordered a substantial complex to the west (**Fig. 15**). The two walls demarcating the western courtyard space of the former to the north and south abuts the



15. GO/6 at the end of the 2009 season, seen from the west. Note the cistern drain in the bottom of the picture (by IJP).

eastern wall of a structure found in western GO/6, which then naturally must antedate the phase 3 complex found in GO/4-6, though not necessarily by a long period of time. The GO/6 structure, if indeed outlined to the west by traces of a wall in the modern surface, consists of a rectangular building situated on an odd axis compared to the surrounding major streets and adjoining structures. On a general level, however, the structural layout of the buildings and passageways, so far identified within the GO, points to a larger urban re-organisation during phase 3, since the southern walls of the GO/4 and GO/6 structures constitutes a gradual turn of the westward laneway in a southwestern direction (**Fig. 11**). The same phenomenon can be observed more clearly in the wall line found in northern GO/3, which seems to have been constructed with a bend in the western part of the part presently exposed (**Fig. 14**).

No architectural features within the rectangular GO/6 structure were identified, and excavation only encountered a thick and fairly uniform layer of building stones, stemming either from collapse or used as fill. Below this layer, the upper arch of a presumed cistern, with a plastered drain hole for allowing water to run into the cistern still intact (**Fig. 16**), was partially exposed towards the very end of the 2009 season. The drain hole was plugged with a single stone, placed in such a way that it seemed unlikely to have fallen there by accident, and initial measurements upon removing the stone suggested the cistern to be approximately 3 metres deep.



16. Close-up of the cistern drain with plug in situ (by IJP).



17. Remains of phase 2 occupation in GO/4, seen from the east. With oven outline (left) and stone bin (right) (by IJP).

GO/4-5: The Later Phases (1-2)

As already mentioned following the conclusion of work in GO/4 in 2007 (see Walmsley *et al.* 2009: 113-115), traces of structural remains in GO/4 constituted the uppermost courses of the rectangular phase 3 building. A semi-circular stone setting roughly in the centre of GO/4 and partially resting on the partition wall of the Early Abbasid phase 3/I structure constituted the latest indication of occupation in the area. Parts of two Umayyad oil lamps found within this stone setting in 2007 are then quite clearly to be considered as located in a secondary context, and continued work in GO/4 and GO/5 has in general indicated a high degree of contamination in the uppermost strata, partly due to extensive rodent activity in the eastern part of GO/4, and partly to modern dumping and levelling throughout the excavation area. The stone setting, partially resting on the partition wall belonging to phase 3/I, is then the only reliable indication of phase 1 occupation throughout the northern GO area, and furthermore, there is no evidence as to the date of its construction, which may be fairly recent.

The phase 2 remains exposed in eastern GO/4 in 2008 were covered by a dark, ashy layer of sandy silt with a high density of ash and some charcoal remains. This layer covered a small half circular stone bin abutting the phase 3/I partition wall, and the outline of an oven set in the fill of a pit which had been dug into an underlying layer of yellow clay in a small enclosure between the southern phase 3 pillar and a stone bench butting the southern wall (**Fig. 17**). The ashy layer also contained a substantial amount of charred

animal bone fragments, and a relatively large amount of ceramics. In general, the ashy layer seemed to constitute burned remains dumped in the area, mirroring corresponding layers on the northern side of the structure which held similar bone remains.

The oven and the half circular stone bin extending from the phase 3/I partition wall, can be regarded features of the phase 2 occupation in the area. Shortly after the installation of the stone bin, the doorway in the northern wall was blocked, perhaps in relation to the use of the courtyard space to the north as a waste disposal area, indicated by the filling-in of a pit just north of the doorway (**Fig. 13**). In all, the phase 2 occupation may then have comprised an enclosure employing the north, south, and perhaps also the eastern wall of the earlier phase 3/I structure, along with the partition wall sealing it off from the remains of the western half of the house, which, although exhibiting a clay packing fully similar to that found in the eastern half, held no indications of phase 2 occupation.

So far, we have found no confirmable features of phase 2 occupation outside GO/4, although a substantial stone platform exposed in GO/5 in 2007 (Walmsley *et al.* 2009: 117) may belong to the same phase, though this connection rests solely on their corresponding elevation and proximity to the modern surface. Preliminary dating of phase 2 suggests mid/late 9th century AD, based on a number of Abbasid *Kerbschnitt* Ware sherds found whilst excavating the contents of the pit located in the northern courtyard, mentioned above.

Concluding Remarks

The last two years of excavation within the GO have offered new perspectives and considerations on the history of Early Islamic Jarash, and particularly served to evidence a continuous series of settlement phases reaching well into the Abbasid period, mirrored on a more well preserved scale in the findings of the excavation of the so-called “Umayyad House” on the northern side of the *decumanus* (Gawlikowski 1986). The realignment of the urban plan following the termination of the phase 4 settlement testifies to a substantial structural refurbishment of the area in the Early Abbasid Period. More detailed study of the Late Umayyad phase 4 structures will then naturally be one of the main objectives of future research in the area, alongside continued investigation of the Early Abbasid levels. Stratification and associated material remains in general seems to indicate a number of transitions of relatively short duration, well evidenced in the exposure of the ceramic deposit dating to phase 4, and parallels in the setting of walls in phase 4 and 3 as found in the architecture of the house of GO/4, again testifying to the presence of multiple settlement phases in a close and continuous sequence.

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THE SHAMMĀKH TO AYL ARCHAEOLOGICAL SURVEY, SOUTHERN JORDAN: PRELIMINARY REPORT (FIRST SEASON 2010)

Burton MacDonald, Larry G. Herr, D. Scott Quaintance and Hilary M. Lock

Introduction

The first season of “The Shammākh to Ayl Archaeological Survey, Southern Jordan” (SAAS) was carried out from April 23-June 4 and from June 14-19, 2010.¹ During the infield days of the project, team members stayed in the town of Wādī Mūsā, close by Petra. Preliminary analysis of both the lithics and ceramics were carried out at the American Center of Oriental Research, Amman during the last week of the season.

Objectives

The main objective of the SAAS project is to discover, record, and interpret archaeological sites in an area of approximately 600 square kilometers. The territory being investigated is part of the southern segment of the Transjordanian Plateau, that is, the so-called Edomite Plateau. It includes the area from just north of the village of Ayl in the south to Shammākh in the north, from the 1200m line on the west, and to the 1200m line on the east, that is, into the Jordanian desert immediately to the west of the city of Ma‘ān (Fig. 1). The area is ca. 30 km (N-S) by ca. 20km (E-W). As Figure 1 indicates, however, the survey territory is not rectilinear but follows the 1200m elevation line on both the west and east.

Most of the obtrusive sites, especially those along the main roads in the area, had been investigated prior to the beginning of our work. The SAAS project, however, surveyed not only those sites but also the ones that had been neglected, for example, camping and seasonal-pastoralists’ sites (see, e.g., Hart 1987b: 287), farms, lithic

sites (see, e.g., ‘Amr *et al.* 1998: 504), that is, those sites with little or no architecture, as well as those sites which are away from the main roads of the area and not easily accessed.

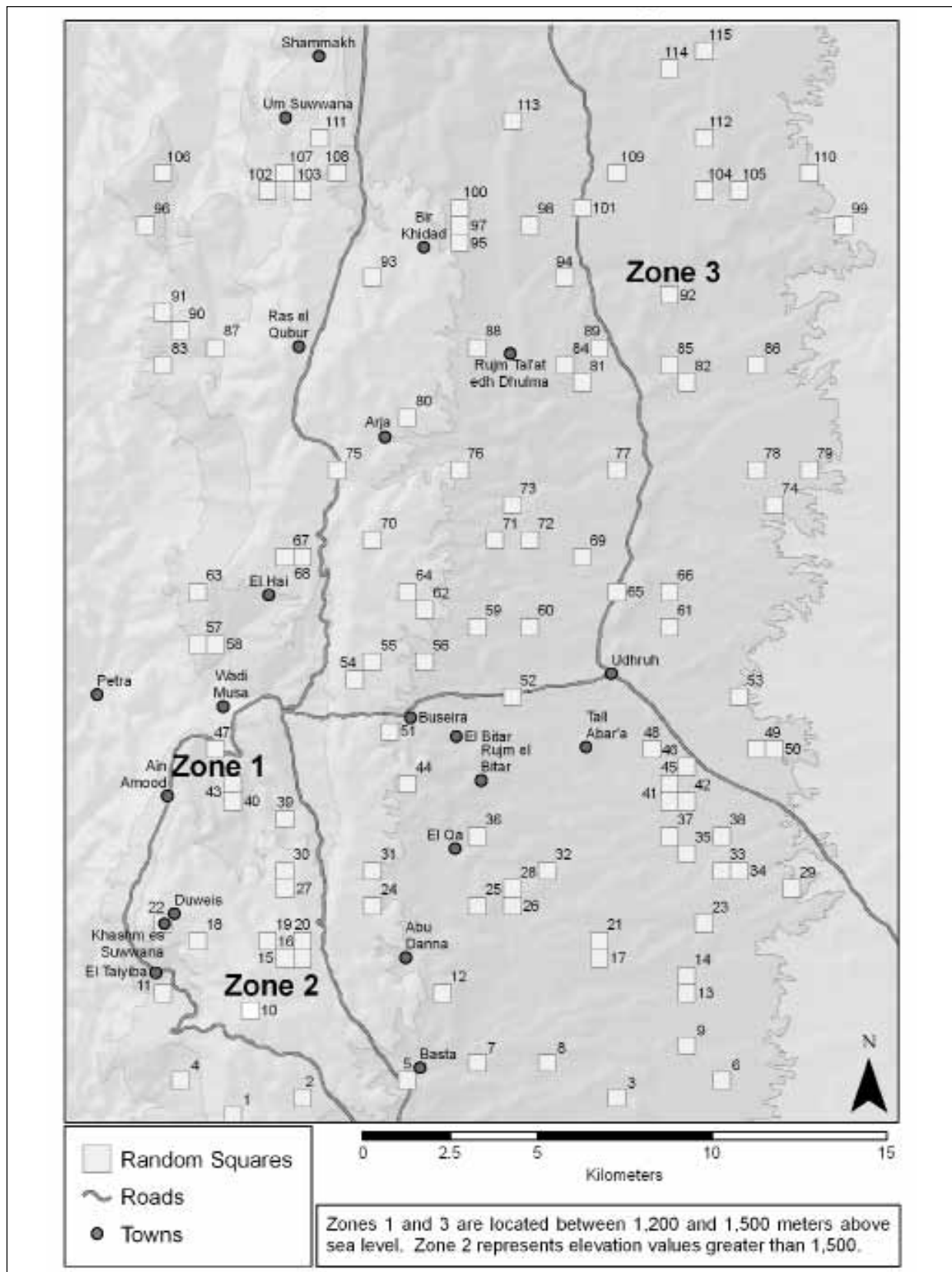
A second goal of the project is to discover, on the basis of the artifactual material studied, the area’s settlement patterns from the Lower Paleolithic (ca. 1.4mya) to the end of the Late Islamic period (AD 1918). Settlement pattern maps of the various cultural-temporal/time-stratigraphic units represented in the survey territory will be presented in the final report on the project to be published following the infield seasons.

Another objective of the project is the investigation of the Pleistocene (as late as ca. 10,000 BC) sediments and lakes in the eastern segment of the survey territory. This work is resulting in the discovery of Paleolithic materials, evidence of human presence, and information on paleoclimates in the area.

A fourth objective of the project is to document the many farms, hamlets, and villages that provided some of the food needs of the major international sites of the area. These sites include, for example, the fortress of Udhrūḥ (Killick 1986a, 1987b, 1989) located within the survey territory and dated to the Roman-Byzantine period (1st century B.C.-7th century A.D.), the Hellenistic-Byzantine period (4th century B.C.-7th century A.D.) site of Petra immediately to the west of the area, and the Crusader-Middle Islamic period (11th-16th centuries AD) fortress of ash-Shawbak (Brown 1989; Pringle 2001) to the north.

1. Team members for the 2010 season were: Burton MacDonald, Director; Larry G. Herr, ceramic specialist; D. Scott Quaintance, photographer, mapping, Global Positioning System, and database and website manager; Hilary M. Lock, Global Positioning System and artist;

Kelly Meagher, artifact registrar; and Ashraf Al-Khraysh, representative of the Department of Antiquities of Jordan. Drs. Maysoon Al-Nahar, University of Jordan, and Debbie Olszewski, University of Pennsylvania, carried out the preliminary analysis of the lithics.



1. The Shammakh to Ayl Archaeological Survey: Ecological Zones and Random Squares (Gary L. Christopherson).

A fifth goal of the SAAS project is to investigate further the *Khaff Shabīb* or “Shabīb’s Wall,” a low stone wall running in a generally north-south direction to the east of the *Via Nova Traiana* (Trajan’s road built between AD 111-114). Survey-team members encountered this wall while working on both “The Tafila-Busayra Archaeological Survey 1999-2001, West-Central Jordan” (MacDonald et al. 2001: 408; MacDonald et al. 2004: 343 [TBAS Site 186]) and “The Ayl to Ras an-Naqab Archaeological Survey, Southern Jordan (2005-2007)” (MacDonald et al. in press). Several researchers had encountered it previously in various areas of southern Jordan (see, e.g., Kirkbride 1948; Parker 1986: 89; Abujaber 1995: 740; Gibson 2002: 169-72; Kennedy and Bewley 2004: 138-39).

A sixth objective is the discovery of inscriptions, rock drawings, and *wusūm* (tribal markings) within the area. Previous archaeological surveys in southern Jordan have found them in pastoral areas similar to that of the eastern segments of the SAAS territory (MacDonald et al. in press; see also Jobling 1986; 1989).

An additional objective of the project is to link up with previous work that the project director and some other survey-team members have carried out in Edom. This involves, in particular, a comparison of the findings of the SAAS project with the findings of four previous surveys, namely, “The Wadi al-Hasa Archaeological Survey 1979-1983, West-Central Jordan” (MacDonald et al. 1988), “The Southern Ghors and Northeast ‘Araba Archaeological Survey” (1985-1987) (MacDonald et al. 1992), “The Tafila-Busayra Archaeological Survey 1999-2001, West-Central Jordan” (MacDonald et al., 2004), and “The Ayl to Ras an-Naqab Archaeological Survey, Southern Jordan (2005-2007)” (MacDonald et al. in press) that the project director conducted in Edom. A comparison of the settlement patterns of the SAAS project with those of these four will be published as part of the final report.

All the above-listed objectives will contribute to the writing of an archaeological history of southern Jordan from Wādī al-Ḥasā in the north to Rās an-Naqab in the south.

Archaeological Context

Glueck (1935) visited the proposed survey

territory during his “Explorations in Eastern Palestine”. Near the end of his work he was confident that “not very many ancient sites in Edom ..., whose ruins have not been completely obliterated, remain undiscovered” (1939: xxiii). However, subsequent work, including the project director’s (MacDonald et al. 1988, 1992, 2004; in press) has found this not to be so.

Although a number of explorers, archaeological survey teams, and excavators have worked in the survey territory, they have primarily devoted their investigation to areas along the main roads and have neglected other areas, for example, where lithic scatters and camp sites are likely to be found as well as hard-to-reach regions. Several of these projects are noted below in an attempt to situate the SAAS project in its archaeological context.

Because of the fact that the Roman Road (*Via Nova Traiana*), built to link Bostra in southern Syria to the Gulf of al-‘Aqaba, cuts through the area, a number of researchers have been interested in it and its associated remains. At the end of the 19th century Brünnow and von Domaszewski (1904) investigated the road’s route. Thomson (1917) studied the milestones along it. More recently, Parker (1976; 1986), Fiema (1995), Graf (1979; 1995a-b), and Kennedy and Bewley (Kennedy 2004; Kennedy and Bewley 2004) have investigated the road and the watchtowers and fortresses along it. Abudanh (2006) traced the remnants of the road that passed through the proposed territory from Udhruh to Petra. Despite the above work, a systematic survey of the area has not been done. The SAAS project is doing this and thus adding to the knowledge of the Roman presence in southern Jordan.

Killick, in conjunction with his excavations at the Roman fortress of Udhruh, located in the eastern segment of the survey territory, carried out survey work (1980-1985) in the area of the site (1982; 1983a-b; 1986a-b; 1987a-b; 1989). However, he did not publish a final report on either. The SAAS project will complete much of what Killick left undone relative to his survey work.

Hart (“The Edom Survey Project”) carried out two seasons (1984 and 1985) of survey work in the vast area from at-Ṭafila in the north to Rās an-Naqab in the south (Hart and Falkner 1985; Hart 1986a-b; 1987a-b). He describes his field

work as “mostly purposive vehicular transects” (1987b: 287), “flints were not collected, the survey concentrating on ceramic materials only” (Hart and Falkner 1985: 255). Hart states that, “it should be noted that evidence for temporary and transient occupation (such as camp sites) was not usually retrieved” (1986a: 337). The present project is remedying this by collecting, analyzing, and publishing the lithic materials and the evidence for transient occupation.

An important but unsystematic study related to a segment of the survey territory was that of the “Wadi Musa Water Supply and Wastewater Project” carried out in 1996 and 1998-2000 (‘Amr *et al.* 1996, 1997, 1998 2000; ‘Amr and al-Momani 2001). The work was initiated to protect and document archaeological sites affected by the layout of the pipelines. Project team members followed the construction of the pipeline and recorded the sites discovered. The work indicates that “one outstanding result of the archaeological survey is the large number of flint sites discovered” (‘Amr *et al.* 1998: 504). The SAAS project is documenting these sites.

Tholbecq carried out “The Jabal ash-Sharah Survey” in 1996 and 1997. His interest was in documenting the occupation of Petra’s hinterland from Edomite to Late Islamic times (900 B.C.-A.D. 1917) (Tholbecq 2001: 399). He limited his work to the natural extent of the Wādī Mūsā drainage basin, covering an area of around 72 square kilometers.

Abudanh followed up on Killick’s work in his study of the changes to settlement and land use that occurred in the region of Udhrūḥ following the annexation of the Nabataean kingdom by Rome in A.D. 106 until the Early Islamic Period, i.e., into the seventh and eighth centuries. He describes his work as a “vehicular survey” (2006: 44). The SAAS project, using pedestrian transects, is discovering materials that could not otherwise be obtained and, thereby, contributing to an understanding of the archaeological history of the region.

In addition to the survey work outlined above, a number of sites within the SAAS territory have been excavated. The most noteworthy of these are: the Neolithic site of Baṣṭa (7th

millennium B.C.) (Nissen *et al.* 2004); Khirbat an-Nawāfla/Wādī Mūsā (‘Amr *et al.* 2000), a multi-period site²; Iron Age Ṭawilān (Bennett and Bienkowski (1995); and Udhrūḥ (Killick 1989), referred to previously.

Despite all the work outlined above neither a systematic nor comprehensive survey of the area has ever been undertaken. Moreover, many of the contributions to knowledge, outlined in the “Objectives” segment above, have still to be made.

Geomorphology and Climate

The geomorphology of the SAAS territory includes two regional physiographic provinces: 1) the Highlands east of the Rift Valley; and 2) the Central Jordan Pediplain (Bender 1974, 1975; see also Tarawneh 2004: 23). The former occupies the hilly area on the west while the latter the eastern part of the territory.

Altitudes vary within the territory: 1200m on the western and eastern boundaries; 1521m just southeast of Shammākh; 1736m in the central segment; and 1506m at Ayl in the south-central area, immediately south of the survey territory. The western half of the survey area is part of the ash-Sharāh Mountains which extend from ash-Shawbak in the north to Rās an-Naqab in the south.

Present annual rainfall in the area varies from a high of around 300mm to less than 100mm: ca. 300mm in the ash-Shawbak-Nijil region (ca. elevations of 1500m or more); ca. 200mm immediately to the east and west (ca. elevations of 1500-1300m); and 100mm in the area between Udhrūḥ and Ma‘ān in the eastern portion of the territory.³ Thus, the eastern segment is located in the steppe, i.e., the area between “the desert and the sown”, where evidence of pastoral activity in many archaeological periods is present.

Methodology

The SAAS project’s “Objectives” outlined above are being accomplished by surveying, analyzing, interpreting, and publishing the archaeological materials recorded within the territory.

For archaeological-investigative purposes, the survey territory is divided into three topo-

2. Khirbat an-Nawāfla/Wādī Mūsā is now the site of Bayt Zamān, a touristic complex, and is, thus, almost completely destroyed.

3. It ought to be noted that at least 200mm of annual precipitation is required for dry-land farming.

graphical zones: 1) Zone 1 (the western segment) lies in the area where elevations are between 1200m and 1500m; 2) Zone 2 (the west-central segment) is the mountainous region where elevations values are greater than 1500m (actually a segment of Jabal ash-Sharāh); and 3) Zone 3 (the eastern segment) is the area from the 1500m to the 1200m line (see Figure 1).

The principal method for discovering archaeological materials, including sites, is a technique based on recording the remains collected while transecting randomly-chosen squares (500 x 500m) in the three topographical zones of the survey territory (Herr and Christopherson 1998).

A Geographic Information Systems (GIS) database randomly selected the 115 squares which represent about five percent of the total area of each of the topographical zones in the survey territory. Gary Christopherson, Director, Center for Applied Spatial Analysis, University of Arizona, Tucson, prepared this aspect of the project and the map (see, Figure 1).

The investigation of these random squares in each zone performs three primary functions: 1) it provides a baseline, against which artifactual material collected from archaeological sites in the region may be compared; 2) it forces survey team members into all areas of the territory, eliminating any sampling bias the team may have toward easily accessed areas; and 3) recording random squares has proven to be an effective means of discovering sites, within, adjacent to, and while traveling to/from the squares. In essence, the recording of random squares provides access to a statistically valid sample of archaeological materials, including sites, within the territory.

The GIS database provides the coordinates for each of the 115 randomly-chosen squares. Team members use a Global Positioning System (GPS) to locate one corner of a square. Once it is located, they (5 persons) position themselves, usually a distance of ca. 50m apart (the visibility in the region is generally good) along one of the lines of the square. With the help of compasses to keep a straight line, team members transect the square, picking up lithics, sherds, glass, slag, and other portable artifactual materials. (For each 500 x 500m square, two transects were walked).

The recording of a random square involves recording data on the "Random Square Data Sheet". The transecting and recording of each square takes approximately two-person hours. (This time does not include locating and getting to the square).

When an archaeological site, that is, individual features that combine in a variety of ways to form a single unit, was discovered within the square, it was recorded separately on a "Survey Site Sheet." The different features, e.g., cistern, cave, remnants of a building, tomb, road, etc., that comprise the site were recorded on the sheet.

Once the random square and any archaeological sites within it were recorded, survey-team members turned their attention to the surrounding area in their search for sites. We spent a reasonable amount of time searching for and recording any archaeological sites in the vicinity of the square. In addition, we spoke with the people living in and/or working in the area, e.g., farmers and shepherds, about the whereabouts of sites. Moreover, while driving to/from the square, team members were on the lookout for sites. When located, they were also recorded on "Survey Site Sheets."

Once a site was "discovered", it was "sherded" for artifacts, described, and plotted on a map using the coordinates obtained from the GPS unit. Survey data sheets were filled out initially in the field. All collected materials were labeled before being placed in the vehicle. Additional information is being added as analyses progress.

Digital photographs were taken of the topography of all random squares and the features of all sites. These were added to the project's database; they are used while analyzing the artifactual materials from squares and sites; some will be published in B & W in survey reports; and all will be put on a DVD which will be part of the project's final report.

Daily, preliminary washing and registering of the collected artifacts was done; "Survey Artifact Forms" completed; photographs taken of significant artifacts; and descriptions of the random squares transected and sites investigated were entered into the project's database.

Following the infield season, selected artifacts, namely, lithics and sherds, were shipped,

with the Department of Antiquities' permission, to the home universities of the director and his collaborators. These are being further analyzed, drawn, photographed, and prepared for publication.

Results of the 2010 Season

During the 2010 season, survey-team members transected 58 (50.43%) Random Squares: 8 in Zone 1; 16 in Zone 2; and 34 in Zone 3 (**Table 1**). This was done beginning in the southern segment of the survey territory and moving northward in an orderly fashion to the area of Udhrūḥ on the east and just south of al-Ḥay on the west (see **Fig. 1**).

Survey-team members collected lithics from 88 and sherds from 100 percent of the random squares. The lithic materials collected are typical of surface finds. They include: bifaces; borers; burins; cleavers; cores — a variety from several periods; Levallois flakes, points, and blades; perforators, some with notches; and scrapers — end, side, and transverse (**Fig. 2**).

On the basis of analyses to date, materials, primarily lithics and sherds, which survey-team members collected in the 58 random squares range in date from the Lower Paleolithic to the Late Islamic period. As the Figure 3 indicates, the Middle Paleolithic (at 59%) is the best represented of the cultural-temporal units from the prehistoric periods in the squares. For the historic periods, the Iron 2 (at 26%), Nabataean (at 71%), Roman (at 33%), Byzantine (at 72%), and Late Islamic (at 29%) are those best represented cultural-temporal units in them.

As indicated above, the Middle Paleolithic (MPL) period is well represented, especially in the collected materials from the random squares in Zone 3. In fact, it is the predominant one. This is especially true for those squares which lie immediately both to the west and east of the main road between Udhrūḥ and Ma'ān (see Figure

1). Relative to this, and understandably, sites, whether within or nearby (e.g., Sites 050-054) them, also yielded lithics from this period.

The small number of sherds collected and the absence of enclosures, which indicate seasonal-pastoralists' camps, support the position that the eastern segment of Zone 3 was probably an arid one throughout the Holocene.

Survey-team members recorded 154 sites (**Table 2**).

Forty-seven (or 30.50%) of these sites are within while 32 (or 20%) of them are nearby the 58-transected, random squares (**Table 3**). Thus, it is probable that some of the 154 sites would not have been recorded if team members were using a methodology that did not rely on the transecting of randomly-chosen squares.

The cultural-temporal units best represented at the 154 sites are: MPL (at 5%); Iron 2 (at 17.53%); Nabataean (at 58%); Roman (at 23%); Byzantine (at 66%); and Late Islamic (at 33%) (**Fig. 4**).

The ceramic specialist read and handled the pottery in much the same way as he did for "The Tafila-Busayra Archaeological Survey 1999-2001, West-Central Jordan" (MacDonald *et al.* 2004) and "The Ayl to Ras an-Naqab Archaeological Survey, Southern Jordan (2005-2007)" (MacDonald *et al.* in press). Diagnostics were pre-registered and were saved to be shipped to North America for publication where they will be published with their respective random squares and sites.

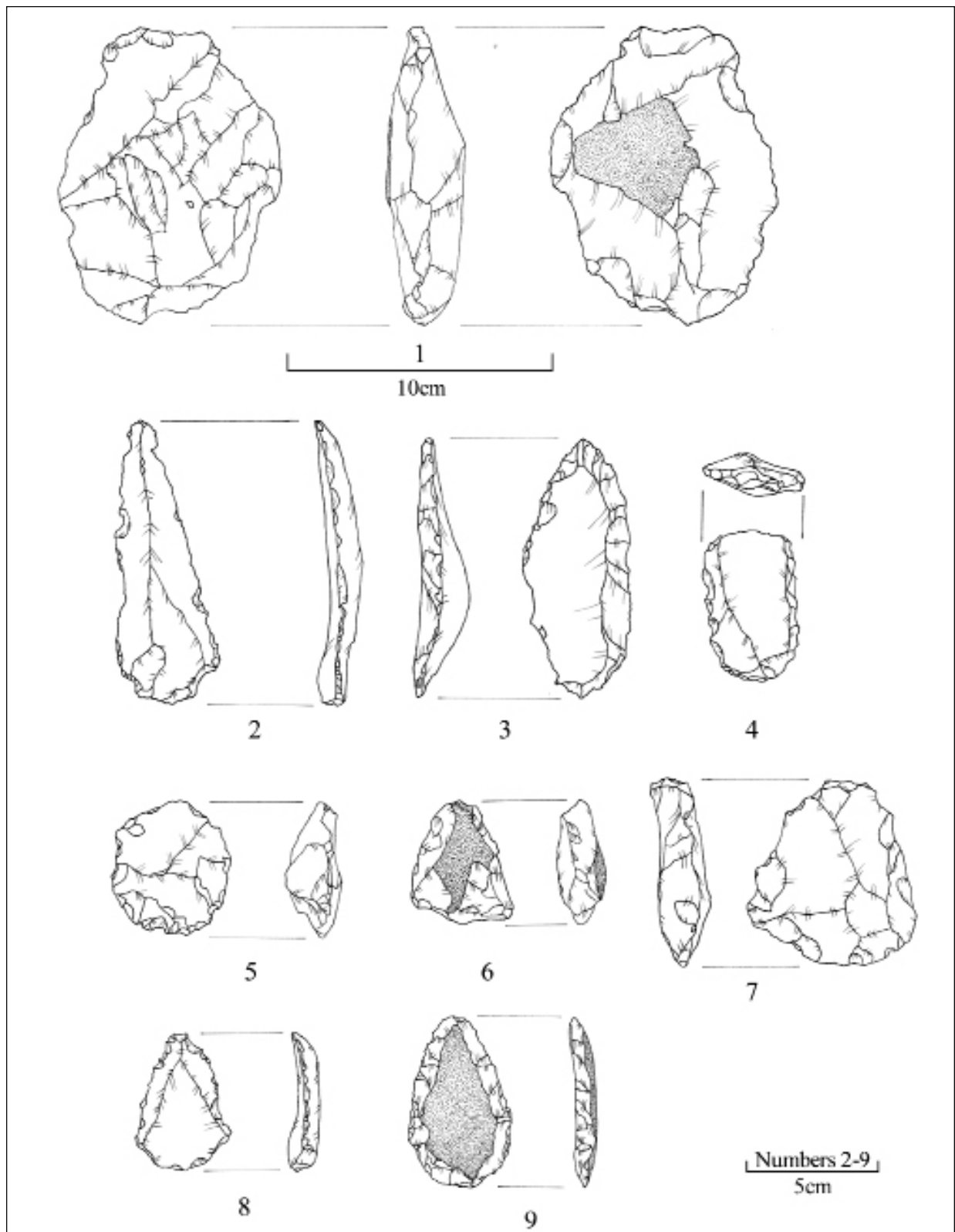
We had been requested to break some of the broad periods, e.g., the Byzantine period, into sub-periods. After considerable thought, we have retained the previous system of naming only the broad periods. We feel we need to avoid problems that arise when there are too many transitions. Some pottery may be isolated to a single sub-period, but others span two periods, etc. We felt that breaking the pottery into sub-

Table 1: List of Random Squares transected in each Topographical Zone of the SAAS Project Territory – 2010 Season.

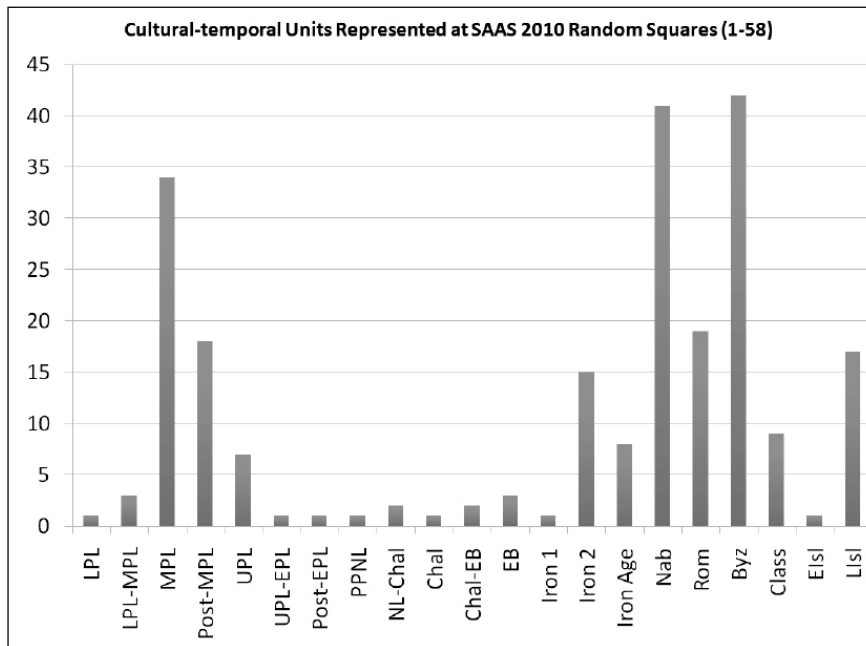
Zone 1: 4; 47; 40; 43; 39; 11; 57; 58.

Zone 2: 1; 2; 10; 22; 27; 30; 15; 19; 16; 20; 24; 31; 51; 18; 54; 55.

Zone 3: 3; 5; 6; 7; 8; 9; 13; 14; 35; 37; 38; 41; 42; 44; 45; 46; 48; 36; 29; 33; 34; 23; 25; 26; 28; 17; 21; 32; 12; 49; 50; 52; 53; 56.



2. 1. LPL-MPL Biface (RS 048); 2. MPL Levallois Point (RS 021); 3. MPL Transverse Scraper (RS 028); 4. MPL End-scraper (RS 041); 5. MPL Single-Surface Core (RS 048); 6. MPL Convergent Side Scraper (RS 003); 7. MPL Levallois Flake Core (RS 050); 8. MPL Levallois Point (RS 050); 9. NL-Chal Scraper (RS 013) (Hilary M. Lock artist).



3. Cultural-Temporal Units Represented at SAAS 2010 Random Squares (1-58) (D. Scott Quaintance and Curt Stepp).

Table 2: List of Sites – SAAS 2010 Season.

Site#	UTM Coordinates*	Site Name	Function**
001	0749785/3346009		Tomb/Grave and Inscription
002	0749889/3346484		Sherd scatter/camp (?)
003	0752580/3346887		Inscription
004	0752510/3346772	<i>Khatt Shabib</i>	Boundary line
005	0744242/3345149	Tal'at Sayf	Agricultural building (?)
006	0746843/3346220	Rujum	Watchtower
007	0747861/3347445		Pastoralists' camp (?)
008	0747681/3347491		Unknown
009	0738373/3322237		Agricultural building (?)
010	0738655/3344867		Agricultural village
011	0739017/3345249		Agricultural hamlet or village
012	0740649/3446412		Agricultural hamlet or village
013	0740832/3345656		Agricultural hamlet or village
014	0751686/3347974		Seasonal, pastoralists' camp (?)
015	0751539/3349110		Cemetery
016	0751977/3349155		Inscription
017	0736915/3346810		Winnowing area
018	0738557/3345597		Farming complex
019	0738458/3346001		Farm building
020	0738450/3349134	Kh. Majdal	Agricultural village
021	0739585/3348572		Pastoralist's camp/corral (?)
022	0743635/3346958		Rock-cut tombs
023	0743858/3346865	Basta	Neolithic village
024	0737319/3348089	Kh. ar-Ruways	Fortress (?)
025	0736804/3351228	Khashm aş-Şuwwan	Agricultural village
026	0736900/3351202	Duways	Agricultural facility
027	0736830/3351282		Water or storage facility (?)
028	073791/3349921	'Ayn Ghazāl	Spring and water installations

029	0737592/3348795	Kh. Ḍbā‘	Well, channels, cemetery, etc.
030	0736930/3355721	Kh. Brāq	Agricultural village site
031	0736870/3354721	‘Ayn Amūn	Spring/water resource
032	0736544/3354140	Kh. al-Mu‘allaq	Agricultural village site
033	0736760/3354381		Rectangular structure
034	0736277/3353201	Kh. Dubayl	Fortress (?)
035	0736921/3347507	Kh. Ḥubays	Agricultural village site
036	0739274/3347753	Kh. al-Mabrak	Agricultural village site
037	0741388/3346479		Agricultural storage facility (?)
038	0741376/3345956		Farm
039	0741677/3357249	Ar-Rasif	Roads intersection
	0741664/3357285		
040	0743217/3357202	Bir al-Biṭār	Agricultural village
041	0744622/3357806		Pastoralists’ camp – seasonal
042	0743729/3357361		Pastoralists’ camp – seasonal
043	0743880/3357097		Farm
044	0743685/3357050		Pastoralists’ camp – seasonal
045	0743495/3356843(W)	Umm aṭ-Ṭirān	Farm or agricultural hamlet
	0743680/3356859(E)		
046	0742235/3358175		Shepherd’s camp – seasonal
047	0743796/3356216		Pastoralists’ camp – seasonal
048	0743773/3355967		Agricultural camp – seasonal
049	0751655/3353462		Tomb
050	0751206/3353698		Lithic and camping (?) site
051	0750692/3354191		Watchtower (?)
052	0751118/3356403		Lithic scatter – dense
053	0750967/3356082		Inscription
054	0751028/3356224		Camping site and inscription
055	0745963/3354145	Kh. al-Mukhfiyyah	Pastoralists’ camp – seasonal
056	0745237/3354026		Farming installation – seasonal
057	0744460/3354299		Pastoralists’ camp – seasonal
058	0744181/3355175		Agricultural village/hamlet
059	0744837/3354670	Rujm al-Biṭār	Watchtower
060	0744156/3354001	Umm al-Futas	Well/reservoir
061	0746168/3356840	Dār ‘Alī ar-Rabī‘	Farm
062	0745244/3356619	Dar ‘Alī Mu‘ammar	Farm
063	0754824/3352162		Inscription
064	0752742/3352512		Inscription
065	0752583/3352482		Inscriptions
066	0751915/3351189		Inscription
067	0752002/3351143		Rock art
068	0751997/3351210		Rock art
069	0736709/3349346	Aṭ-Ṭayyibah	Traditional (Ottoman) village
070	0737029/3349105	Kh. al-Hāmāh	Agricultural village
071	0741239/3346967		Cistern
072	0739020/3355502	Bir Ṣariḥ	Well and associated (?) building
073	0738691/3355473		Farming/agricultural features
074	0738514/3355373		Farm
075	0738500/3355064	Mughur ar-Ruhbān	Agricultural building
076	0738807/3355107		Watchtower

077	0738468/3354556		Pastoralists' camp – seasonal
078	0738868/3354503		Cistern
079	0739051/3354175	Kh. 'Ayn al-Hajim	Traditional, extended-family hamlet
080	0739204/3353128	Kh. al-Minyah	Agricultural village
081	0739071/3353477		Agricultural hamlet/farm
082	0739251/3353957		Agricultural hamlet/farm
083	0739216/3354075		Water mill
084	0738971/3353627		Farm: cistern and associated buildings
085	0738710/3354042	Rujm 'Ayn al-Hajim	Defensive – related to water source
086	0740334/3354338		Defensive – related to water source
087	0740236/3354056		Hunting/camping site - seasonal
088	0741134/3353452		Agricultural village site – seasonal
089	0741040/3351751		Threshing/winnowing area
090	0741135/3350659		Cistern and associated structures
091	0739980/3352862		Agricultural facility – seasonal
092	0739848/3352862		Pastoralists' camp – seasonal
093	0739897/3351736	Kh. al-Muḥaraq	Fort (?) and/or waystation (?)
094	0740584/3354339	Kh. al-Farqadiyyah	Defensive – related to water source
095	0739432/3351227		Graves (?)
096	0739673/3351284		Graves (?)
097	0739782/3349997	Kh. Samra	Temple (?); Waystation (?)
098	0740537/3350108	Kh. Tal'at 'Umar	Agricultural Town
099	0740572/3350930		Cisterns and/or caves
100	0740646/3350637		Tomb (?) and/or watchtower (?)
101	0740894/3351048		Tomb (?) and/or watchtower (?)
102	0740613/3350860		Road
103	0741134/3349153	Rujūm (?)	Cemetery (?)
104	0741793/3346853		Cistern
105	0746065/3351491	Kh. al-'Abd East	Watchtower
106	0746817/3352080	Kh. Wādī Ḥissī	Extended Family Farm
107	0746987/3351101	Kh. al-Mu'āni	Cisterns
108	0746952/3351002		Circular enclosure – seasonal camp
109	0746748/3350772	Kh. al-'Abd West	Tomb/watchtower (?)
110	0747708/3352520		Circular enclosure – seasonal camp
111	0747380/3352804		Circular enclosure – seasonal camp
112	0750630/3350995		Caravanserai (?)
113	0747958/3351824		Cave – dwelling
114	0750630/3350995		Watchtower and tombs
115	0744827/3349436		Three small enclosures
116	0744867/3347856	Rujm Baṣṭa	Watchtower
117	0744972/3348411		Enclosures
118	0744091/3350088	Abū Dannah	Fort Associated with water source (?)
119	0750630/3350995	Kh. Abū Dannah	Traditional agricultural village
120	0742674/3350024	Kh. Tallāt 'Ali	Village and/or watchtower (?)
121	0743157/3349187	Kh. Zahārah I	Agricultural village
122	0743215/3349305	Kh. Zahārah II	Agricultural village
123	0743209/3348579	'Ayn Zahārah	Spring
124	0743193/3350501		Way station on road (?)
125	0742543/3350295	'Ayn Tallāt 'Ali	Spring
126	0743315/3350857	Rujm al-Khaṭābiyya	Watchtower

127	0742705/3351507	Kh. Umm Aj-Jarād	Agricultural village – seasonal
128	0742960/3351941		Pastoralists’ and/or hunting camp
129	0743087/3351920		Pastoralists’ and/or hunting camp
130	0743024/3351647		Pastoralists’ and/or hunting camp
131	0742742/3352929		Fort (?) – small
132	0742075/3352588	Kh. al-Haṭeh	Agricultural village site
133	0742445/3352136		Watchtower and tombs
134	0743878/3355069		Enclosure – pastoralists’ camp
135	0743909/3355528		Lithic and sherd scatter and tombs
136	0737859/3351536	Kh. as-Sa‘idiyyah	Well and associated structures
137	0736795/3351229	Khashm al-Ḥad	Agricultural village site
138	0742556/3358302		Agricultural station – seasonal (?)
139	0742743/3358972		Agricultural hamlet; Fort (?)
140	0742760/3357913		Spring and associated enclosure
141	0754518/3356428		Inscription
142	0754144/3356197		Aqueduct
143	0753941/3355793	Kh. al-Faqī	Agricultural village
144	0737821/3359526		Watchtower (?); agricultural facility (?)
145	0737966/3359297		Watchtower (?)
146	0738070/3359042		Agricultural building (?)
147	0738451/3359435		Roadway/pathway to spring (?)
148	0738090/3359572		Tomb (?)
149	0737794/3359248		Unknown
150	0749526/3358247	Udhruh	Roman Legionary Fortress
151	0750424/3357802	Ṭāhūnah	Windmill
152	0750391/3358215	Kh. ad-Dubays	Watchtower
153	0750204/3359198	Juraydah	Agricultural features: cisterns; caves; corrals; and rectilinear structures
154	0749792/3359969	Jabal Mūsā al-Ash‘arī	Fort; watchtower

* The coordinates system is UTM Zone 36N, European Datum 1950.
 ** Of course, the determination of “function” on the part of SAAS team members must be tentative at this stage of investigation. Generally, it is only with the excavation of the site in question will it be possible to determine, with greater certainty, its function(s).

Table 3: Sites Within and Nearby Random Squares – SAAS 2010 Season.

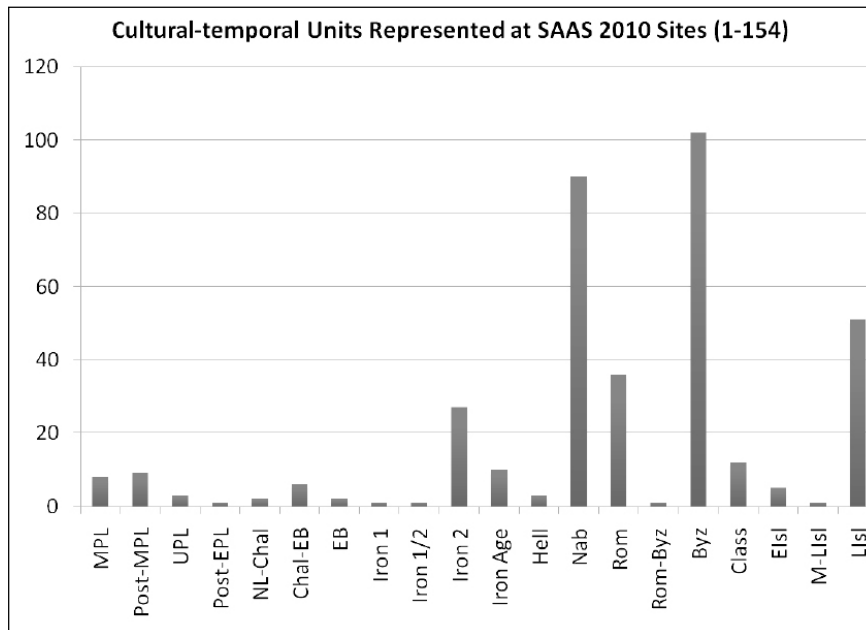
Sites within: 001; 002; 007; 008; 012; 014; 015; 016; 022; 023; 025; 026; 027; 045; 046; 050; 053; 063; 064; 068; 070; 073; 074; 075; 076; 078; 086; 087; 091; 098; 099; 100; 102; 106; 110; 115; 127; 128; 129; 134; 139; 142; 144; 145; 146; 147; 149 (n=47).
Sites nearby: 004; 013; 017; 018; 019; 020; 021; 040; 049; 051; 054; 055; 065; 067; 072; 077; 092; 095; 096; 097; 101; 111; 130; 131; 135; 138; 141; 143; 144; 148; 195 (n=31).

periods would have made the readings too subtle for many database searches to handle easily and could skew the results of future researchers. We believe it is better to let researchers find all “Byzantine” vessels and to decide themselves what the precise range of the forms allow.

As in the previous-two surveys the term “Nabataean” implies the typical pottery of Pe-

tra from the late Hellenistic to Early Roman periods. A “Roman” reading usually means Late Roman, but could also include forms that began in the first century AD.

This season was remarkable in that Early Bronze Age holemouth jar rims were found in one random square (005) and at one site (040). Moreover, the imported pottery which team



4. Cultural-Temporal Units Represented at SAAS 2010 Sites (1-154) (D. Scott Quaintance and Curt Stepp).

members collected includes African Red Slip Ware (RSs 002 and 019), terra sigillata (Site 137, Khasham al-Ḥad), and ware from the Black Sea (3rd-4th century) (Site 035, Kh. al-Ḥubays). This indicates that the international trade impacted not only the city of Petra but nearby areas and sites.

The type of sites documented include: agricultural hamlets and villages; an aqueduct; enclosures (probably seasonal-pastoralists' camps); farms; forts; graves/tombs; inscriptions and rock art; lithic and sherd scatters; rectilinear structures; roads; watchtowers; and winnowing areas. The function of some of the recorded sites is unknown and can probably only be determined by further investigation, e.g., excavation.

What is especially notable about the location of many of the sites is the fact that they are in areas which are now unused for cultivation but only for pasturage. These hard-to access areas show evidence off extensive use in the past. Within them, there is evidence off impressive terracing, now unused and damaged due to erosion. Thus, there were probably major changes over the past couple of millennia not only in climate but deterioration in land-cover in the areas affected.

SAAS team members judged a number of the sites to be good candidates for excavation (Table 4). This judgment was made due of the contribution that they could make to the archaeological

history of the area and/or the fact that they are in danger of damage due to development, e.g., residential construction, road building, and/or field clearance for agricultural purposes.

The *Khatt Shabīb* was encountered in several places throughout the survey territory. It was recorded as Site 004 which is located to the W of RS 003 – in Zone 3 – in the SE segment of the survey territory. It continues northward through Zone 3.

Inscriptions and/or rock art were recorded at ten sites (003; 015; 053; 063; 064; 065; 066; 067; 068; and 141). They will be published as part of the project's final report.

Comparison of Material Collected from the Random Squares and Sites

A comparison of the best represented cultural-temporal units, namely, the Middle Paleolithic, Iron 2, Nabataean, Roman, Byzantine, and Late Islamic, indicates a higher percentage of them represented in the random squares than at the sites. The only exception is the Late Islamic period where there is a higher percentage of this unit present at the sites than in the squares. The reason could be that in the squares one is transecting an area of 500 x 500 metres. The dimensions of the sites are quite small in comparison.

Conclusions

During the 2010 season, SAAS team mem-

Table 4: Sites that are good Candidates for Further Investigation – SAAS 2010 Season.

Site #	Name (if any)	Reason(s) for Excavation
007		Surprisingly large stones which comprise it
010		Multi-period and its size
024	Kh. ar-Ruways	Damage probable due to residential development
034	Kh. Dubayl	Due to danger from development
035	Kh. al-Ḥubays	Due to danger from development
036	Kh. al-Mabrak	In danger from field clearance
037	Tallāt al-Ḥajjāj	Its location makes it vulnerable to destruction
059	Rujm al-Bītār	Fairly intact and excavation could lead to valuable information
070	Kh. al-Hāmāh	On account of development, could be destroyed
071		Excavation could reveal its function; field clearance and road construction could destroy it
078		Due to possible damage from field clearance and house building
080	Kh. al-Minyah	Intact site that may provide information about an Iron Age farming village
085	Rujm ‘Ayn al-Hajīm	Due to its importance as a protector of a water source
086		Could provide information on a site defending a water source (same for Site 094)
094	Kh. al-Farqādiyya	Due to its importance as a protector of a water source
097	Kh. Samra	Due to its uniqueness and danger from development
098	Kh. Tallāt ‘Umar	Its size and probability of destruction by looters
118	Abū Dannah	In danger of destruction due to development
150	Udhruh	Because of its importance as a major Roman fortress
154	Jabal Mūsā al-Ash‘arī	Relatively intact, small fortress and rock shelter/cave on its E-facing slope

bers did not document all the archaeological sites within the study area between Ayl in the south and Udhruh and al-Ḥay in the north. A case-in-point is the sites which team members of the “Wadi Musa Water Supply and Wastewater Project” recorded (‘Amr *et al.* 1996, 1998; ‘Amr and Al-Momani 2001). A number of these sites, all above the 1200m line on the west and located in the northwestern and eastern segments of the town of Wādī Mūsā, still need to be incorporated into the project’s findings so that a complete picture of the settlement patterns of the area may be presented. This will be done in subsequent seasons and publications of the project.

The area of the SAAS project is one in which field clearance and the building and maintenance of terrace walls has gone on for millennia. As a result, there are numerous stone piles, some of them with impressive and imposing retaining walls, and heavily-eroded terraces throughout the territory. Although these are the result of human endeavours, we did not record them

as archaeological sites. Nevertheless, if they occur within a random square or near a site, they are generally noted in our random square and/or site’s description.

Jordan is undergoing rapid development in most areas of the country. This development is leading to the destruction of many archaeological sites. Thus, the findings of the survey are being communicated immediately to the Department of Antiquities of Jordan in order that important sites may be “salvaged” and as much information as possible obtained from them before further damage is done.

The lithic and sherds not shipped to Canada for further analyses are stored in the Department of Antiquities’ storerooms in ash-Shawbak Castle. They are thus available, with the Department of Antiquities’ permission, to researchers.

This publication serves as an invitation to researchers to follow up on these preliminary findings by carrying out further investigation of the area in which the random squares and the sites of the SAAS project are located. Survey-team

members welcome further investigation of the area and its sites.

Acknowledgements

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ITALIAN EXCAVATIONS AT JARASH 2002–2009: THE AREA OF THE EAST PROPYLAEUM OF THE SANCTUARY OF ARTEMIS AND THE ‘PROPYLAEA CHURCH’ COMPLEX¹

Massimo Brizzi, Daniele Sepio and Daniela Baldoni

Introduction

The first systematic investigations in the area of the eastern *propylaeum* were directed by George Horsfield on behalf of the British School of Archaeology in Jerusalem from 1925, and then from 1928 while Chief British Officer of the Department of Antiquities for Transjordan. Horsfield cleared the main colonnaded street of debris to facilitate visitor access to the ancient city. In the *atrium* of the church he found a Byzantine mosaic with an inscription mentioning the *diaconia* in the circular room on the northern side (Crowfoot 1938: 227).²

In 1928, during the first joint archaeological expedition of the British School of Archaeology in Jerusalem and Yale University under the direction of J.W. Crowfoot, the mosaic was again uncovered and the northern half of the square excavated. New trial trenches were dug in the symmetrical southern room of the square and in the eastern half of the church.

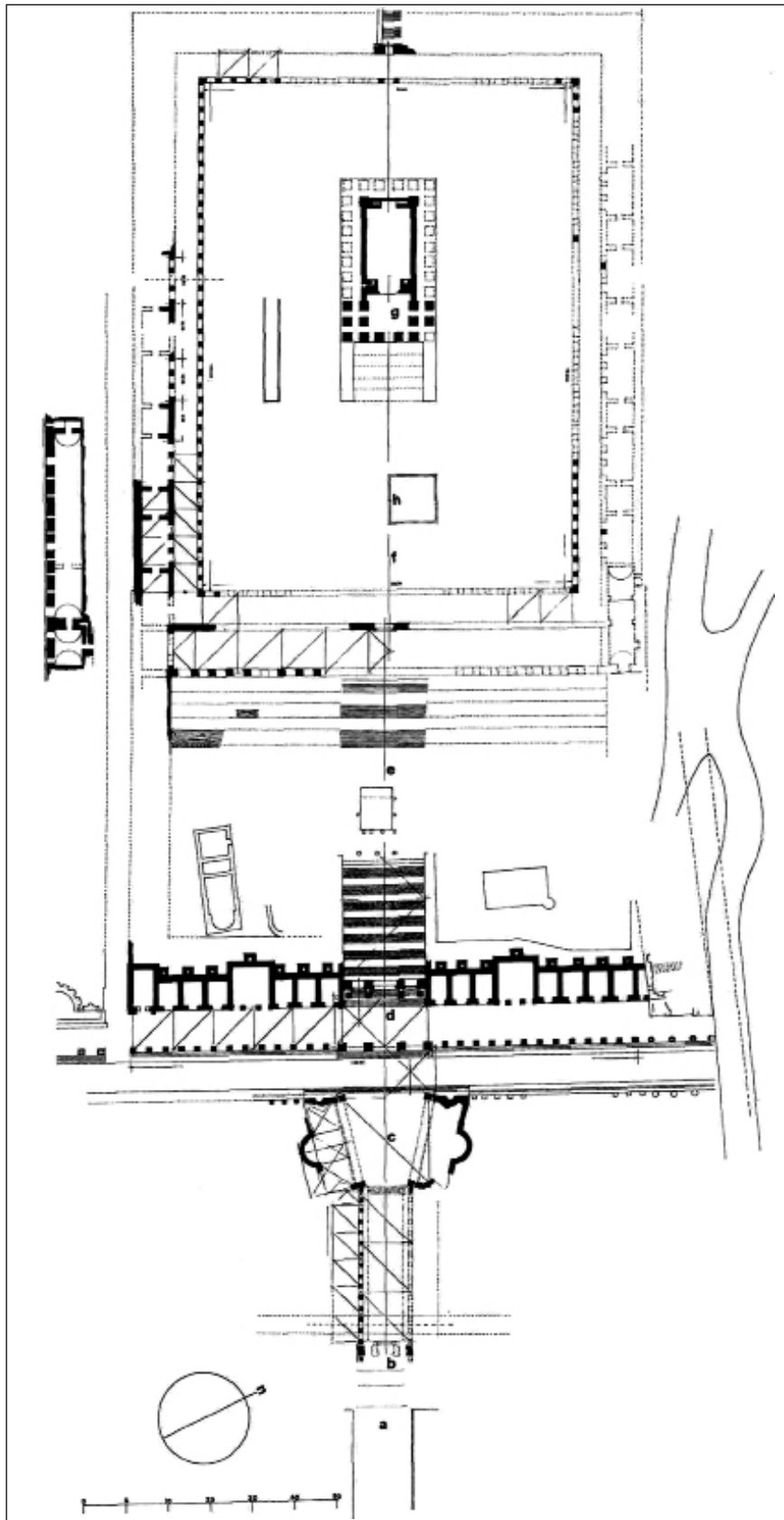
In 1934³, Stinespring completed the excava-

tion and survey of the church complex, called at that time the ‘Propylaea Church’ (Crowfoot 1935). Excavations were restricted to the *presbiterium* and to the clearance in the western sector of the church. Renewed excavations have been conducted at Jarash since 1977 by the Italian Expedition, specifically in the sanctuary of Artemis (Parapetti 1980: 1983–1984) and in the eastern area of the sanctuary in 1994 and again from 1999 until 2009 (Fig. 1).⁴

Despite the difficulty in understanding the sequence in an area where previous investigations and robber activity had already cleared a lot of stratigraphic evidence, the surviving contexts and structural relationships nevertheless allowed the identification of the main building and occupation phases. A brief report of the archaeological sequence is presented here, although more detailed contextual analyses will be documented in a final publication. Chronological indications are preliminary since the study of pottery and other finds is still in progress.

1. Six expeditions have been undertaken by the Centro Ricerche Archeologiche e Scavi di Torino under the direction of the architect R. Parpetti until 2008 and one by the association ‘Monumenta Orientalia’ in 2009. Team members for the archaeological campaigns were: the archaeologists M. Brizzi, (2002, 2003, 2005, 2008), M. Mastrogiovanni (2002), D. Sepio (2002, 2003, 2005, 2007, 2008, 2009), D. Baldoni (2003, 2005, 2007, 2008, 2009), L. Loots (2005); the conservators G. Bertolotto (2002, 2003) and W. Basilissi (2008, 2009); the pottery draftsman R. Cestari (2008, 2009). We also thank for their friendship and cooperation all the staff of the Antiquity Office in Jarash, in particular A. Mjelli for his assistance in the field.
2. The work of G. Horsfield at Jarash is briefly reported in the *Government of Transjordan Antiquities Bulletin*, no. 1 (1926) and following.
3. From 1930 to 1934 the excavations were managed by the joint expedition of Yale University and the Ameri-

- can School of Oriental Research under the direction of B.W. Bacon and M. Rostovtzeff. John W. Crowfoot, who was in charge of the study of the churches at the site, was not in the field in this phase of the project.
4. Excavation of the south-eastern side of the square happened in 1994. From 1999 until 2000, excavation of the southern building of the square took place. From 2002 until 2003 excavation of the south-western corner of the church and of the southern chapel was undertaken. From 2005 to 2007 clearing of the northern half of the square and completion of the nave and southern aisle of the church was undertaken. In 2008 excavations focused on the northern aisle and area east of the apse. In 2009, excavation of the northern aisle and the dismantling, consolidation, and restoration of the north-eastern pillar of the trapezoidal square were completed. The campaigns 1999–2000 were reported in Brizzi *et al.* 2001.



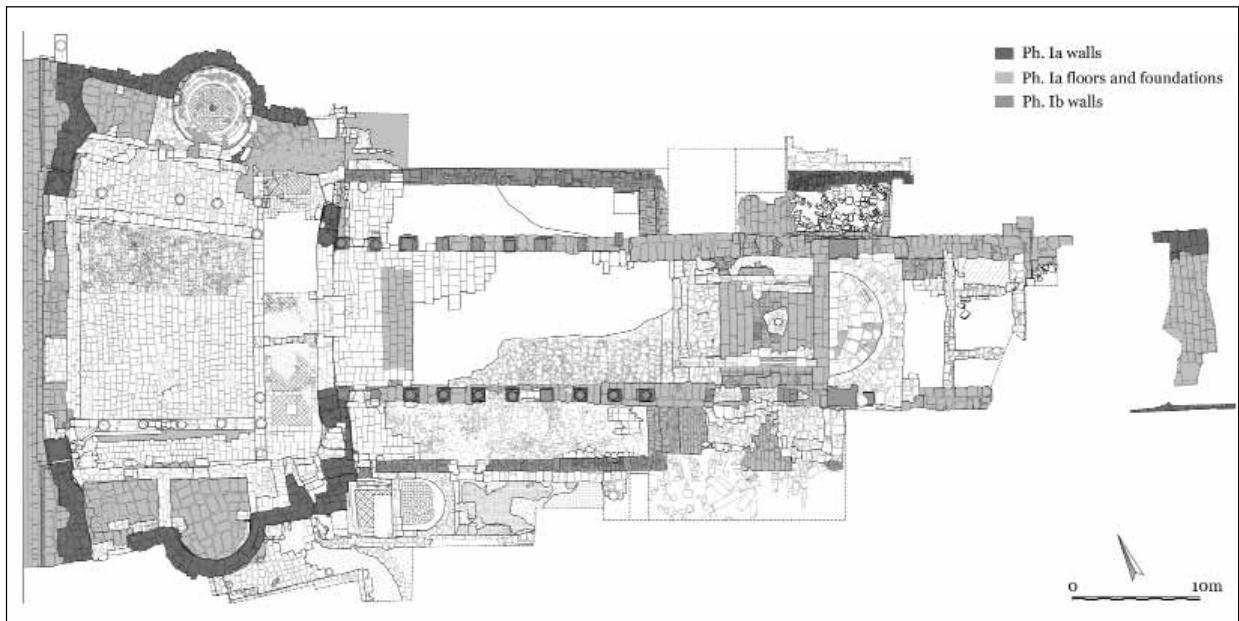
1. Jarash – the sanctuary of Artemis.

Phase 1a: the Construction of the Bridge on the *Chrysorhoas* and the Approach to the Sanctuary of Artemis, mid Second Century AD (M. Brizzi and D. Sepio) (Fig. 2)

No structures or contexts dated earlier than the construction of the *propylaea* of the sanctuary have been found in the area investigated.⁵ The urban redevelopment of this sector began with the construction of the bridge and the terracing of the natural slope, using a combination of walls made of regular stone ashlar masonry, vaulting and a massive platform of stone blocks east of the colonnaded street. The western end of the bridge, was however, is still *in situ*. Two parallel walls of limestone blocks bound with mortar define a roadway about 10m wide and 25m long, which climbs the steep slope of the Wādī Jarash.⁶ A paving of thick limestone slabs, placed at right angles to the walls, is also partially pre-

served.⁷ The paving rises sharply to the west and seals the extensive earth and stone fill of the bridge that is visible along the eastern edge.

The parallel walls of the bridge about a terrace wall halfway up the slope, oriented north-south and made of limestone blocks. This structure cuts the side of the bridge, but originally would have extended northward and southward creating a second terrace suitable for further building east of the colonnaded street.⁸ On the western end of the roadway, a mortar bedding layer is the only evidence of a staircase that originally linked the paving and the upper gateway.⁹ Beyond the terrace wall, two new parallel walls, identical to the eastern ones, continue the structure of the bridge westward for about 19m ending with the western-most arch of vaulting. A tunnel with a barrel vault, 4.2m wide is completely preserved.¹⁰ The vaulted tunnel has the



2. Jarash – the area of East Propylaeum of the Sanctuary of Artemis.

5. A few stone blocks and part of a terracotta water pipe, found on the bottom of a small trench in the atrium next to the main entrance of the church, are the only evidence of occupation of the area before the construction of the propylaea.
6. Before the construction of the present-day Amman-Irbid road (1950s), which passes beneath, the remains of the eastern pillar and the western shoulder of one of the arches of the bridge were also recognisable (see Pl. 24, photograph by Bonfils, in Kraeling 1938).
7. Some fire pits have been recognized in this area, probably from the September 1970 conflict.
8. The first terracing wall was unearthed in the eastern end

- of an excavation by the Dept. Antiquities of Jordan in 2001, south of the 'Propylaea Church', in front of the monumental *Nymphaeum*.
9. More investigations are necessary before ascribing this staircase to the building phase of the bridge or to the subsequent phases of construction of the eastern gateway. It is also necessary to verify the presence, before the construction of the church, of any alternative passage beside the stairway to the lower perpendicular road.
10. The southern bridge is similarly constructed (see Parappetti 1983-1984: pl. VI).

double function of terracing the slope and keeping open a route situated at right angles to the direction of the route to the sanctuary. The vault is built of well-dressed ashlar of limestone. Its height however, is still unknown¹¹ as is the original structure that connects the two storeys together. The parallel walls continue to the west of the tunnel for approximately 20m before reaching an outcrop of bedrock, uncovered in the southern gallery of the portico. The connection between the bridge and the road was uncertain before the construction of the monumental *propylaeum* (phase 1c). The paving of the roadway running between the walls is preserved in a later phase, contemporary to the construction of porticoes along the street.

The two buildings that delimit the edges of the trapezoidal square were constructed during the same phase as the bridge and the west *propylaeum* of the sanctuary (Welles 1938: 404, n. 60 and 63). The plans of the buildings are nearly symmetrical.¹² They have two separate foundations comprising platforms of rough limestone blocks on regular courses, bound with sandy mortar mixed with ash, bed and rising joints are dressed only on the external and superior blocks.¹³ The plan of the platforms is trapezoidal with a semicircular rear extension in the middle, forming a massive broad basement. Five courses of blocks forming the southern platform have been uncovered except for the lowest course, which was probably assembled on the bedrock.

The buildings are constructed onto a central *exedra* with two asymmetrical wings, the western one of which includes a deep niche. Both the wings end in two *antae* connected by entablature spurs with projecting columns. The two buildings are set in the shape of a fan and correspond

to the width of the west *propylaeum* on the opposite side of the colonnaded street. Preserved elements of the architectural orders of the buildings help to reconstruct the original elevation, heavily transformed in the Byzantine period. The level of the square was 1.2m higher than the Byzantine *atrium* floor, at the same height as the *ambulacrum* of the west *propylaeum*. The square was accessible from the east and the west via two stairways.¹⁴ Between the pedestals of the *antae*, two *pulpita*, 1.4m higher than the square paving, occupied symmetrically the northern and southern sides of the square. These were completed at the back by the two monumental façades where three different Corinthian orders framed the central *exedra*, the western niche and windows (Parapetti 1982; Brizzi *et al.* 2001).¹⁵ The buildings are an early example, in a unique double version, of monumental façades designed to display honorary statues, often explicitly dedicated to the imperial cult and widely known throughout *Provincia Arabia*.¹⁶ Here the celebratory function of the monuments matches well with the commission from the provincial governor. The western facades of the buildings on the colonnaded street interrupt its eastern portico with two monumental fountains decorated with niches framed by spirally fluted columns, inscribed architraves and arcuated pediments.¹⁷

The double inscription mentioning Lucius Attidius Cornelianus, governor of *Provincia Arabia* in 150AD, provides a precise dating of the construction of the trapezoidal square (Welles 1938: n. 63). The contemporaneity with the construction of the bridge, clearly evident from the plans, does not have at the moment the support of finds from stratigraphic investigations and the study of other contemporary con-

11. Some post-Umayyad packed-earth floors have been reached in the tunnel 5.50m beneath the level of the colonnaded road.
12. The most evident difference is the length of the buildings on the colonnaded street.
13. Blocks with decorative bossed faces are partially visible on the southern external side of the southern platform, in this phase.
14. A five stepped stairway is still preserved on the colonnaded street; on the eastern side the only evidence is the contact mark on the external walls.
15. The reconstructions proposed in Crowfoot 1938: pl. 35, and Parapetti 1983-1984: pl. 4, must be rethought.
16. These monuments are often assimilated into the typology of the Arabic *kalybē* (Ball 2000: 292-294; Segal

- 2001) but Butcher and Clauss-Balty are right to distinguish the three *kalybai* known in southern Syria from the variety of monumental façades even if built with a religious purpose (Butcher 2003: 360-361; Clauss-Balty 2008: 267-268 and 273-274). The traces of an enclosure between the western *antae* of the square, together with the presence of doors in the east *propylaeum*, give evidence of the function of this area as a day-time public area rather than a cardinal axis of the urban viability.
17. The architectural reconstruction of the façade by R. Parapetti is unpublished. In addition to the location of the two inscriptions above the niches mentioning the *κρηναί*, two later (Byzantine?) basins beside the western façades indicate the protraction of a water supply near this monument.

texts is still in progress.¹⁸

Phase 1b: Completion of the Road Between the Bridge and the Trapezoidal Square, Second Half of The second Century AD (Fig. 2)

Portico colonnades were built along the first stretch of road after the bridge. Two walls, about 4m from the structures were added to the north and south of the road, effectively delimiting it.¹⁹ The walls run eastwards for 23m from the eastern part of the buildings belonging to the trapezoidal square. They are built in limestone ashlar of various sizes, positioned in regular courses. Re-employed blocks were observed in the foundation of the southern wall. East of these, the basement of the *ambulacra* is built of three vaults. The western vault of the bridge was extended northward and southward, then two parallel vaulted rooms were built between these and the L-shaped walls; finally, east of the tunnel, there is evidence of one of the probable two perpendicular vaulted rooms, as wide as the *ambulacra*.²⁰

Part of the original paving of the road, constructed in regular limestone slabs, is preserved on the *extrados* of the tunnel vault. In this area, a U-shaped small channel, carved into the limestone slabs, provides evidence of a drainage system along the southern, eastern and northern edges of the road, advancing the hypothesis for the presence of a roofed portico colonnade along these sides.

This arrangement was modified with the construction of the east *propylaeum*. An important work of restoration recognized in the north-eastern corner of the northern *ambulacrum* is datable to the beginning of the third century AD.²¹ This is a *terminus ante quem* for the construc-

tion of the porticoes that should have followed soon after the previous phase.²²

Phase 1c: Construction of the East Propylaeum, First Half of the third Century AD (Fig. 2)

The foundation of the east *propylaeum* cut the walls that delimit the roadway of the bridge, 15m west of the terracing wall described above at the top of the entrance stairway, demolishing the previous edifice. The two external pillars of the *propylaeum* are partially preserved and, between them, three lower thresholds for the opening of double doors are partially visible. This evidence and numerous elements of the original architectural decoration, reused in the Byzantine church, allow a preliminary reconstruction of the *propylaeum* as a triple triumphal arch.

The two lateral openings 2.90m high and about 0.90m wide have continuous fasciated frames and a rectangular niche or window above. Nine *voussoirs*, reused for levelling the apse of the church, probably belonged to the central portal. In this case, the central opening was arched with a span of about 4m. A pedestal, still *in situ* in the eastern side, indicates the presence of four projecting columns.²³ A similar solution could have decorated the western face of the *propylaeum* or, more likely, the external pillars were directly connected with the two colonnades rising slightly westward and delimiting the new porticoes of the road.²⁴

The pedestals of the two rows of columns, identical to the ones of the *propylaeum*, are set into cuts in the walls that delimited the pre-existing road. The columns take a standard form used for all colonnades; plain shafts in limestone, attic bases with plinths, and Corinthian capitals.²⁵

18. The filling between the two foundation platforms of the trapezoidal square was investigated in a small trench in 1994.

19. There is a dimensional relationship of 1:2.5 between the width of the porticoes and that of the road.

20. Whether direct communication existed between the bridge, and the north-south road passing in the tunnel through these vaulted rooms, must be verified in future excavations.

21. Dating comes from pottery found in the fill of the cut made for restoring the wall (see Fig. 10). The highest courses of the foundation have blocks of different dimensions from other parts of the structure.

22. This phase could be considered the second stage of works concluding a single project. It is difficult to determine if the colonnades reused in the Byzantine church belong to this phase or, more likely, to the fol-

lowing renovation with the construction of the east *propylaeum*.

23. R. Parapetti is studying the architectural reconstruction of the *propylaeum*. Elements of a broken pediment could also have belonged to this façade.

24. In the Byzantine era the construction of the *presbiterium* of the church transformed this area, removing the original columns. A segment of architrave preserved *in situ* in the eastern face of the southern pillar of the *propylaeum* could have originally belonged to a projecting column as well as to an uninterrupted colonnade. The position of the architrave was brought down to adapt this element to the height of different granite columns erected here.

25. The height of the column, from pedestal to capital, is 6.40m; the shaft is 4.84m high.

Standardization is also evident in the architrave elements, roughly adapted to the leaning colonnade.²⁶ Only the outer faces of the architraves are decorated apart from two terminal elements on the end face, which were found in the superficial debris of the western end of the church.²⁷

The construction of the colonnades are best associated with the restoration works mentioned above and can be dated from accompanying finds to the beginning of the third century AD.²⁸ The homogeneity of the architectural elements of the colonnades, with the order decorating the *propylaeum*, suggests that the whole area was renovated at the same time by an unknown commission. This chronology indicated by the stratigraphic contexts does not diverge from the comparative analysis of the architectural decoration. In particular, the capitals of the colonnades, carved with a low *kalathos* and the inferior row of adjacent leaves, can be considered a production of late Severan age.²⁹

Phase 2A: The Construction of the ‘Church of the Propylaea’, mid Sixth Century AD (Fig. 4)

In the Byzantine age the area was completely transformed with the construction of a religious complex consisting of a church, erected in the place of the *propylaeum*, a colonnaded roadway, and various buildings assembled around an *atrium* where the trapezoidal square had previously stood.

This transformation can be explained by a change in the religious and public function of the area during the Middle and Late Imperial phases. The end of the pagan cult in the sanctuary, and accompanying political changes in the administration of the city made property transferral easier, thus enabling an unknown religious authority to establish a complex in this important precinct.³⁰

The colonnaded roadway shows the original division in the construction of the church, including roofing of the central area. This created a central nave, 38.50 x 10.80m, with a semicircular apse, 8.15m wide at its eastern end with two aisles, which became the porticoes. The southern portico measured 38.30 x 4.50m while the northern portico measured 38.55 x 4.30m. The front of the church was constructed by cutting through the eastern corners of the two imperial buildings, assembling a wall in irregular ashlar masonry between the eastern *antae* of the trapezoidal square, incorporating the projecting columns in the masonry and removing the staircase for the entrance to the square. Two columns with bases and pedestals were moved closer to the unearthed foundations of the buildings as terminations to the western end of the colonnades of the nave. The façade includes a central portal, 2.77m wide, with an external fasciated frame; two minor doors were cut in the Antonine masonry, connecting each aisle with the front portico.

Only the external pillars of the east *propylaeum* were not dismantled. Between them a semicircular apse was built, reusing several elements from the masonry of the gateway and extending out east of the pillars for 3.50m. The external walls of the porticoes were restored or completely rebuilt, becoming the perimetric walls of the church. Most of the road paving was removed and the limestone slabs were reused for the pavement of the church, together with other reused blocks. The pavement, preserved only in the western part, inclines slightly. The slope of the pavement is partially offset by the raised area of the *presbiterium*, 0.40m above the level of the nave in its eastern end.³¹ The platform for the *presbiterium* is a rectangular structure, about 12.20 x 7m,³² in which reused elements were aligned in order to contain a filling of earth and

26. Despite the transformations that occurred in the Byzantine period, the position of five architraves in the southern portico is probably pertinent to the original colonnade.

27. The position of the last western pedestals, abutting the foundations of the buildings, is the result of the adaptation of the colonnade for the construction of the church in the Byzantine period (see also Fisher 1938: 128).

28. See Fig. 10.

29. See the decoration of the *scaena* in the second phase

of the north theatre in Jarash, dated to Severus Alexander's reign after an inscription (Clark *et al.* 1986: 227). See also Freyberger 1988.

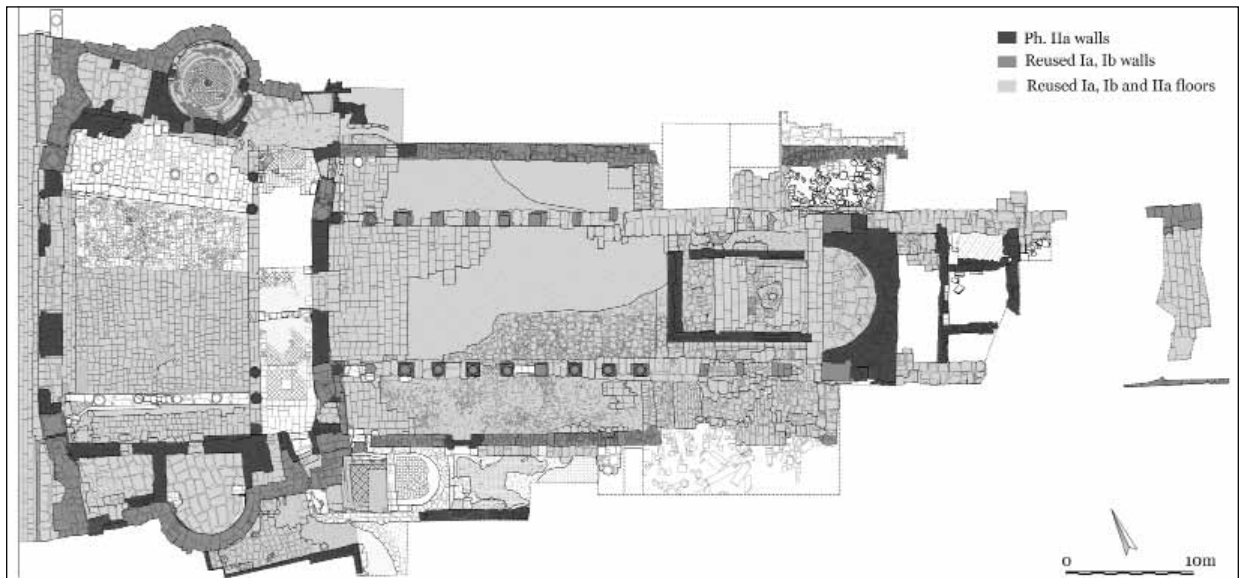
30. For property transfers between imperial administrations and religious authorities in eastern dioceses see Saliou 1994 and Saliou 1996.

31. The area of the *presbiterium* was dug in the 1930s removing the original floor and the filling.

32. The length of the *presbiterium* is obtained by doubling the circumference of the apse. At the intersection of the two circles are the *loculus* and probably the altar.



3. Jarash – the ‘Propylaea Church’ complex – the mosaic floor of the diakonia, from the south.



4. Jarash – the ‘Propylaea Church’ complex – Phase 2a.

stones.³³ This structure abuts onto the higher and wider podium in the apse and its western half is cut for assembling the small pillars and the screens of the *cancellum*.³⁴ A passage 2m wide is left between the *cancellum* and each colonnade. Two entrances to the *presbiterium* have

been recognized: one in the western side, on the central axis of the nave, and the other one in the southern side. In the *presbiterium*, 3.90m from the apse, positioned on the Roman paving and buried in the filling, a limestone basin 0.50m in diameter was placed surrounded by four dressed

33. An architrave from the Artemis *cella* can be recognized here together with seven pedestals belonging to the columns removed from the eastern ends of the colonnades.

34. No traces of the *synthronon* observed by Crowfoot

are preserved (Crowfoot 1931: 15); Duval supposes a wooden *synthronon* on the *voussoirs* set in the apse and on the rectilinear sides of the *presbiterium* behind the *cancellum* (Duval 2003: 94-95).

stones displayed to form a cross at the level of the higher floor (Crowfoot 1938: 231; Michel 2001: 266).³⁵ In correspondence with the *presbiterium*, the original columns were removed and substituted with at least two pairs of red granite monolithic shafts, without pedestals.³⁶

The area east of the church was occupied by two rows of rooms. A long rectangular hall linked to a small room to the north where *access* to three lower rooms was found.³⁷

West of the entrance, the area of the trapezoidal square was transformed into the *atrium* of the church, which formed an irregular trapezoidal court, 14.65m deep and 25.90m wide. The paving of the *atrium* was lowered by about 1.20m to the same level as the western threshold of the church. A paved floor made of small rectangular blocks was aligned along the perimeter of the court (probably the bedding platform for better dressed slabs). This is the only evidence of the court having been paved in this phase.³⁸ The two *pulpita* were also dismantled, removing about four rows of blocks and leaving the rear walls standing on the exposed and cut foundations.³⁹

The ashlar from the dismantling of the platforms were used for the construction of two edifices north and south of the court. A wall was also erected between the western *antae* of the buildings. Three doors afforded the access from the colonnaded street and three steps were added onto the whole western side to reach the level of the threshold.

The façade of the church had a portico, 23m long by 4m wide, occupying the full eastern side of the *atrium* and constructed reusing eight columns situated between two half columns cut in the masonry of the two new edifices (Crowfoot 1938: 238).⁴⁰ There is evidence of a mosaic pavement in the northern part of the portico (Fig. 5), probably belonging to this phase. The southern end of the portico opens onto a narrow passageway cut in the Antonine masonry and closed by a door. The passage leads into a small adjoining room, which to its east joins with a long hall, 4m wide, paved by a mosaic with a simple geometric pattern (Fig. 6). This hall communicates with the southern aisle of the church through a door.



5. Jarash – the ‘Propylaea Church’ complex – the mosaic floor in the eastern portico of the atrium.

35. According to Michel the basin was a *loculus* for relics and indicates the position of the altar. This structure, now lacking the upper stones, was roughly restored with cement before 1977.

36. Fragments of the shafts were found collapsed to the south and north of the *presbiterium*, but they were not removed from there.

37. East of these rooms the excavation is still in progress and it is not yet possible to verify the presence of further buildings and of an access to this part of the bridge. Work in progress also delays the analysis of the lower area, the apparent uninterrupted use of the road passing in the tunnel under the *presbiterium*, or

the attribution of this area to the church complex during any phase of its existence.

38. Part of the pavement is still preserved in the southern portico. The stone slabs preserved in the northern half of the *atrium* in a later paving are likely reused from this earlier one.

39. The presence in the debris, collapsed after the earthquake of 749AD, of several elements of the architectural decoration of the Antonine buildings, testifies to the widely practised reuse of extant Roman walls in new building works the Byzantine period.

40. Only four columns were *in situ* in 1994.



6. Jarash – the ‘Propylaea Church’ complex – the mosaic floor of the southern hall.

The northern end of the portico is badly preserved. A probable reason for this is that it connected with a room, only partially excavated at present, that has a water pipe coming from its north end and which may have caused general dampness in the vicinity of the church aisle⁴¹. The northern edifice is oriented like the Antonine building with the central *exedra* transformed into a circular chamber, 6.30m in diameter, with a single door opening onto the *atrium*. The two pillars, built in correspondence with the joint between the earlier and the later masonry, probably shored up an arch as a connection between the two half-domes. The chamber was paved with a well-known mosaic (Crowfoot 1938: 228-29),⁴² which mentions the function of the building and

the precise date of construction (Welles 1938: n. 331).⁴³ The mosaic is orientated eastwards as is the whole complex (see Fig. 3).

In the north-western corner, another direct access connects the *atrium* with a second room constructed in place of the Roman niche and partially keeping its irregular plan. The room is divided by two pillars abutting onto the middle of the northern and southern walls. A semi-circular landing reusing a large Roman ashlar was constructed outside of the door.⁴⁴

On the southern side of the *atrium*, parallel to the central axis of the complex, was a double-faced wall in irregular ashlar masonry delimiting two separate rooms. Before the Antonine *exedra*, a rectangular room was created, preserving the curved profile of the rear wall in the foundation courses, creating an apse.⁴⁵ The room was originally paved with a mosaic, as documented by small remnants, and the only door is west of the central axis. West of this room, a smaller trapezoidal room was created by cutting into the profile of the western Antonine wall. Here a second door was built in the southern wall, connecting the edifice with an area not yet investigated.⁴⁶ Part of a smaller semicircular landing situated in front of the door to the *atrium* is still *in situ*. East of the central room, a double flight of stairs was constructed from Roman platform ashlar, evidence of the presence in this phase of an upper floor in the southern edifice.

Archaeological investigations in the Artemis *cella* indicate that at the beginning of fifth century AD the temple was partially spoiled and then reused for a different function.⁴⁷ The date mentioned in the inscription of the *diakonia* (May 565AD) is the *terminus ante quem* for the dating of the construction of the *atrium* and of the church complex.⁴⁸ Finds from contexts in the

41. After the comparison with the church of St Theodore in Gerasa, these structures could have belonged to a baptismal font.

42. The mosaic was uncovered and consolidated in the 2005 expedition.

43. A summary of the discussion about the interpretation of the expression ‘*diakonia*’ in Michel 2001: 267, n. 924.

44. The flight of stairs starting from this landing probably belongs to the following phase, with a second flight southwards occupying the area east of the western wall, where there is evidence of a spoliation.

45. The room is circumscribed in the circumference of the Roman apse, but the different orientation of the new building makes an asymmetry between the eastern

and western walls.

46. The door reuses an architrave of the same type of a batch reused in a portico in the following phase, advancing the possibility of a later date for this entrance.

47. The excavation was completed in 1995, the processing of the finds is still in progress by M. Brizzi.

48. In contrast with Crowfoot 1938, 486 and Michel 2001, 267, the expression συνέσις η διακονία could refer to an interior setting other than the construction of the building itself. In this case the mosaic could belong to a later renovation phase documented by the construction of the northern portico, antedating the construction of the church complex (see phase 2b).

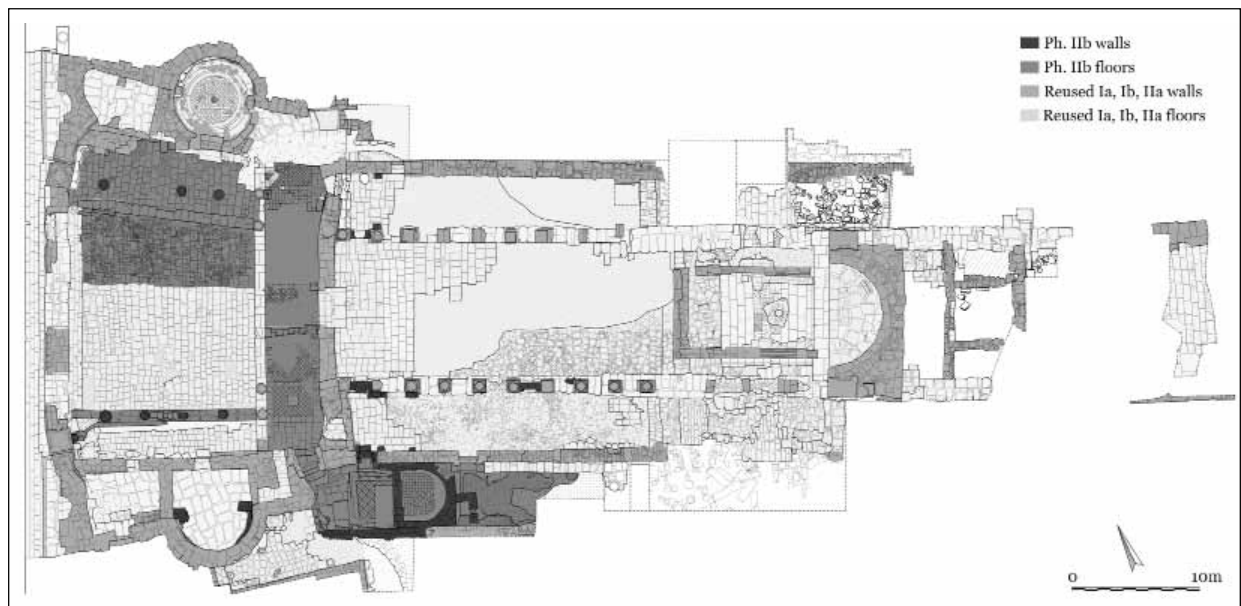
south-western room of the *atrium* and from the hall south of the church indicate a chronological range within the sixth century; a more precise dating will be possible after the complete processing of the finds.⁴⁹

Phase 2B: Second Half of the Sixth to First Half of the Seventh Century AD (Fig. 7)

Several renovations and changes in the original complex were identified in the period from the construction of the church until its desecration. These activities do not modify the original function of the complex. They are grouped together although they are not the result of a single planning but rather, should be considered as a series of works carried out over a century; evidence of the liveliness of the religious community here.

In the *atrium* two new porticoes were added in the northern and southern sides, probably not contemporaneously, obtaining more than 240 roofed square meters and reducing the area of the court to 205 square meters. The northern

portico is 6m wide, parallel to the front of the northern building. The paving of the gallery is about 30cm higher than the court, assembled by a platform of one course of irregular ashlar, where a pavement in thinner slabs, completely lost today, was probably originally set; the ash-lars of the platform are cut around the bases of the lower eastern portico columns. The entrance to the circular chamber was also rearranged with two steps. The southern limit of the platform was built in regular and larger blocks: this is the probable *stylobate* for four columns, aligned with the second column of the eastern portico.⁵⁰ A flight of stairs was built from the north-eastern landing, giving evidence of an upper floor in the northern edifice in this phase. The creation of this 75-square meter shelter in front of the circular chamber is a significant work linked to the function of the *diakonia* mentioned in the inscription.⁵¹ The charitable activities involved in this office were doubtless crucial for the whole complex and thus, gives a reason for these investments.



7. Jarash – the ‘Propylaea Church’ complex – Phase 2b.

49. The supposition of a relationship between the earthquake of AD 551 and the hypothetical interruption of the bridge with the construction of the church, advanced by Crowfoot 1938: 233, is neither denied nor confirmed, even if the distinctive use of the area in Roman times was not that of a transit way, and other passageways could have existed between the bridge and the lower terrace. Baylis 1999 advances that the

bridge was still in use after the construction of the church, but there is no evidence of any direct passageway between the church and the bridge for religious processions as the author argues.

50. All the bases found in this area were undoubtedly not *in situ*, they are all reused from different orders.

51. See n. 45, for the possible location of the mosaic in the early 2b phase.

In front of the southern edifice a portico was also constructed.⁵² It is about 3m wide, aligned with the first southern column of the eastern portico and reusing as a *stylobate* eight pairs of architraves belonging to two original orders. The earlier paving is cut for the setting of the *stylobate*; the new paving of the portico is completely lost but it was probably higher than the court and covered the *stylobate* itself. Four reused bases and one plain drum are still *in situ*. In the central southern room there were significant changes to the internal arrangement. The room is divided by two pillars constructed like two *antae* in the middle of the eastern and western walls, masking the asymmetry of this room. The western pillar still preserves the first of a set of limestone *voussairs* found collapsed in the debris; the *voussairs* made up an arch 4.30m high and had a simple linear decoration. The northern half of the room was covered in a white plaster with geometric and vegetal decoration. Painted Greek inscriptions mentioning supplications to God were found on collapsed fragments probably belonging to eastern wall (Del Corso and Mastrogiacomio 2007: n. 1, 2, 7). In the southern half of the room there is evidence of the removal of the mosaic and of a different plastering using a kind of hydraulic *opus signinum*. The stratigraphic analysis of the debris from the upper storey in both rooms of the southern edifice allowed for the identification of other fragments of plaster with Greek painted inscriptions (Del Corso and Mastrogiacomio 2007: n. 8, 9, 10 from south-western room and n. 11 from central room). The upper storey of the central room may have had the same plan as the ground floor and was enhanced by a structure that reused at least two monolithic plain shaft columns, 2.75m high, with a Corinthian capital. There is no other liturgical furniture in this edifice that could give a more precise idea of function. The presence of votive inscriptions painted in one or more rooms according to a coherent decorative programme

has a parallel in *Gerasa* in the Church of St. Cosma and Damian and could be identified with the documented Byzantine practice of the commemoration of supporters through votive inscriptions (Del Corso and Mastrogiacomio 2007: 204).

Subsequent to the construction of the portico, a terracotta water pipe was inserted into a ditch running alongside the *stylobate*. The pipe was made using *tubuli* 40cm long, preserved by the western wall of the *atrium*.⁵³ A column drum was reused as a spout holder to the central columns, where an L-shaped pipe element and a cut in the *stylobate* suggest the presence of a second terminal fountain.⁵⁴

The construction of the porticoes involved the renovation of the paving of the *atrium*. The northern part is paved by limestone slabs arranged in north-south rows, 0.40 to 0.80m wide. The other part of the court is paved with thicker slabs in a more random arrangement. Both pavings are later than the porticoes but only further investigation will clarify the sequence.

In the eastern portico the mosaic pavement was substituted with square red and white limestone tiles in a diagonal chess-board pattern framed by wider panels (Fig. 5). A coin found in the bedding layer of the pavement, a 12 *nummia* of *Phocas*⁵⁵, struck by the mint of Alexandria between 602AD and 610AD, gives a precise *terminus post quem* for this reconstruction. Only the western area of the church was stratigraphically preserved and provides evidence of activities that took place subsequent to the construction of the complex.

In both aisles, the space between the first two western columns and their stone thresholds was closed by walls 0.65 and 0.75m wide with L-shaped doorposts. The lower parts of three pairs of pillars, built directly on the pavement of the aisles, are preserved by the side of the second western column in the northern aisle and of the second and third columns of the southern one.⁵⁶ For the erection of the pillars, the masonry of

52. A more detailed description of the southern edifice in this phase can be found in Brizzi et al. 2001 and in Del Corso and Mastrogiacomio 2007.

53. The pipe was probably supplied by the same aqueduct used for the Roman fountains on the colonnaded street and was still working in the post-Roman period as documented by basins built in close proximity.

54. A semicircular monolithic *malakia* limestone basin, found in the *atrium* in the 1920s, identical to the one

still *in situ* in the 'Cathedral' courtyard, could have belonged to this fountain and both could have been robbed from the niches of the fountains of *Attidius Cornelianus*.

55. Diademed bust of *Phocas* right, wearing *chlamys*. ONO + PPOV / I + B. In exergue AΔEE. Diam. 1.4cm; weight 1.5g (analysis and description by D. Baldoni).

56. A seventh one is preserved by the fourth column of the southern aisle.

the perimetric walls and the pedestals of the colonnades were cut. As there is no evidence for the presence of walls, or for their removal, that could have enclosed a room and thus be associated with these thresholds, it is possible that these doors were the accesses through wooden staircases, to a mezzanine floor in the aisles supported by the arches.⁵⁷

An important transformation is documented in the hall south of the church, which was reduced for the construction of a single nave chapel, 10.50m long and 5.10m wide. A semicircular wall, 4.10m in diameter, was built between the southern wall of the church and the southern wall of the hall. The last one was restored and extended westward to include the narrow western room, adapting the nave of the chapel to its irregular plan. The threshold in the passage leading to the eastern portico was buried and a new one arranged at the northern end. A new direct access to the church was opened, next to the western end of the southern aisle. Evidence of extensive fill for raising the level of the chapel has been documented in a deep trench dug in the nave. The chapel had a raised *presbiterium*, paved by a mosaic with a geometric polychrome pattern (**Fig. 8**). The step preserved the cuts for the *cancellum*, with a central access 0.75m wide. Four quadrangular stone bases were found still *in situ* in the apse, providing evidence of the presence of the altar table here.⁵⁸ In the *presbiterium*, between the *cancellum* and the northern wall of the apse, one plastered bench is still preserved, whereas of the southern bench only some traces were recorded. The nave was also paved by a polychrome mosaic, poorly preserved and only in the south-western and north-western corners. Here the external band is decorated with acanthus scrolls alighted by a bird while in the corner, is the head of a man. No more than two bases of vessels were preserved in the western corners of the central panel, which was framed in a black line that probably generated vegetable scrolls all over the nave.



8. Jarash – the ‘Propylaea Church’ complex – the southern chapel, aerial view.

East of the chapel, the mosaic in the hall was roughly restored showing that this area was reused after the construction of the chapel. In the south-western corner, a small stone storage place held some pots. Traces of steps, leading eastwards to the lower terrace, were identified in the eastern part of the hall.

The end of the use of the church complex has been related to the evidence for a seismic event well documented in the chapel. Here some of the collapsed blocks have been found still *in situ* on the mosaic of the *presbiterium* (**Fig. 9**). Before the reoccupation, the debris was only partially removed, possibly just for rescuing the liturgical furniture. Evidence of collapsed structures has also been recorded on the floor of the eastern por-

57. The pillars are preserved wherever the paving of the church is not robbed, therefore it is probable that they were built along the entire length of the aisles. Evidence exists of tribunes in the aisles in the church of Horvath Hesheq in upper Galilee (Aviam 1990). The side doors of the church look like they were used until the desecration of the building.

58. A less likely guess is that the bases were used for a

ciborium (see Michell 2001, 233, in the chapel of the ‘Cathedral’). Another quadrangular stone base for a liturgical furniture has been found in the south-eastern corner of the nave, near the *cancellum*. The pattern of the mosaic in the apse should also be considered, where the central rear zone is undecorated: a liturgical furniture was probably foreseen here.



9. Jarash – the ‘Propylaea Church’ complex – Collapsed debris in the presbiterium of the southern chapel.

tico of the *atrium*, where the stone tiles preserved an unmistakable cracking by pointing shots.

In the church, the last activities before the addition of a packed-earth floor, might be identified with the decommissioning of the church; these are three building-lime heaps found on the paving of the church in the south-western corner of the southern aisle. This evidence suggests either that some works of restoration were begun in the church and never completed, or that, after the earthquake and the abandonment of the church, new owners restored the building just to use it as a storage facility, or for similar purposes.

In the southern edifice of the *atrium* a gap in the occupation of the rooms has been recorded. Layers of *eolic* sand, indicating a period of abandonment, were noted in many cuts made for Byzantine structures before the reoccupation documented by new floors and features in each room.

The earliest ruinous seismic events in the region, following the first decade of seventh century, were recorded in September 633AD, followed by two events in 659AD and 660AD (Russel 1985: 46-47).⁵⁹ We can assume that the church complex was suffered collapse brought about by one or more of the three earthquakes and, perhaps after an initial attempt to restore the function of the church, the whole complex

was converted for different uses.

Phase 3: Second Half of the Seventh to mid Eighth Century AD

The contexts and the structures belonging to the Umayyad period were systematically ignored and removed from the area without documentation in the excavations from 1926 to 1934. In these conditions it is difficult to reconstruct the sequence for the whole area when only isolated pockets of *in situ* material can be documented for this period, and primarily only in the recently investigated area.

After the desecration of the church and the despoliation of the whole complex, partially ruined by a seismic event, the area was probably divided into different functional purposes.

The southern part of the church and the chapel were incorporated into the property belonging to an unexplored residence south of the excavation area.⁶⁰ In the chapel the debris was razed and sealed by a packed-earth floor, extended to the southern aisle of the church. Finds from these pavements can be dated to the seventh century AD. It is likely that these areas were covered by provisional shelters relying on standing structures of the earlier phase.⁶¹ The side door of the aisle and the corridor to the *atri-*

59. We cannot definitely exclude localised earthquakes not recorded in known sources.

60. The northern wall of this building has been dug up. This structure collapsed northwards in the mid 8th-century earthquake and fine polychrome plaster frag-

ments, glass vessels and a stucco wall-lamp have been found in the debris.

61. There are no tiles in the aisle in the debris of the mid 8th-century earthquake, nor of the Byzantine roof nor of any reconstructed covering.

um were closed by limestone blocks. Benches in reused collapsed elements were set in the area of the chapel. A fireplace and a *ṭābūn* were found adjacent to the external wall of the southern *exedra*, where reused marble and limestone slabs paved an open area. At the moment of the earthquake of 749AD (Tsafirir-Foerster 1992; Ambraseys 2005) the area of the chapel and of the southern aisle were occupied by at least twenty large grey ware basins, containing a white powder rich in calcium carbonate, probably marble dust prepared for decorations in stucco or plaster coatings. A similar array has been found in the north-western corner of the northern aisle, including a packed-earth floor covering the whole area, a *ṭābūn* and a bench abutting onto the western wall of the church.

Scarce evidence of this phase has been left in the nave. In the eastern portico of the *atrium* the passage to the surviving main gate of the church was cut off by two small walls. This gave open access from the court to the nave, which was perhaps partially reconverted to a passageway.

In the southern edifice the rooms on the ground floor, the original pavements were replaced by packed-earth floors. In the central room a *ṭābūn* was found together with a small structure for storing pots. The upper floor collapsed in this room before the 749AD and the debris was never removed, but in the western room benches reusing architectural elements from this collapse were documented.

The porticoes of the *atrium* were partitioned by crosswise stone walls. In the gallery of the southern one, the stone paving was removed and substituted by a packed-earth floor. The colonnade was blocked up by walls in small limestone blocks bound together with earth mortar. In the western corner, several pit kilns have been documented in this phase. On the plaster of the northern wall of the edifice, close to the painted supplications described in the phase 2b, a graffito inscription in Kufic letters mentions a supplication to *Allah*.

In the gallery of the eastern portico a sequence of packed-earth floors covers the Byzantine stone tiles. Besides the two walls mentioned above, a third wall was built south of the north-

ern side door of the church, which had been transformed into a niche. In the southern half, two *ṭābūn* have been found in different levels and, in the south-eastern corner, a square platform in stone and earth, 2.45 x 2.85m and 30cm high, was built for an unknown purpose.

The subdivision of the roofed areas and the spread of the *ṭābūn* fireplaces in almost every unit are more appropriate for the putting in place of numerous workshops or shops than that of a permanent dwelling. Despite the gaps in the documentation of the area in this phase, a general view of the investigated contexts suggests that the court of the *atrium* maintained in this phase its connection with the colonnaded street and became again a public area where several artisans and merchant shops occupied the three galleries of the porticoes and the two edifices.

After the Earthquake of 749AD

The earthquake of 749AD destroyed most of the standing structures and made the whole area unusable. In contrast with other areas of the site, no Abbasid pottery was found here, and no other finds earlier than Mamluk have been recorded in the excavations. In the mid 13th century the pottery is associated with various traces of campfires and occasional pens and shelters for animals.

Concomitant with the arrival of *Circassian* refugees in 1878, was the practice of the reuse of building material and robbing from the ancient monuments.⁶² In the area of the '*Propylaea Church*' there is evidence of a systematic robbing of the stone slab paving from east to west.⁶³ It is possible that this spoliation was done in the first years of the 20th century and was resumed for a short period after 1934, the year of the last season of the American expedition.

Conclusions

The sequence that has been reported here is the result of ten years of investigations and analysis of documentation collected during archaeological fieldwork. The processing of finds is in progress and more interpretative study must be done. Although uncertainties and gaps could result in some changes in the phasing of

62. It lasted legally until 1946, when it was banned during the British mandate in Transjordan.

63. An iron lever was found in the first preserved eastern row of slabs.

contexts, the interpretation of the stratigraphic evidence, detailed above, will form the basis of future analyses and further choices in fieldwork, conservation and heritage management plans for each period it is possible to identify peculiar outcomes and uncertainties which have yet to be clarified. Among these are the as yet unknown natures of the urban organisation of the area before the mid second century AD.

The works managed to bridge the *Chrysorhoas* and the terracing of the western slope of the city is probably part of a city-scale planning renovation that shaped the townscape of *Gerasa* until its urban end in the 8th century AD. However, the particular importance of these buildings, recognizable in the inventiveness of the design and in the accuracy of the realization, was always linked to the religious identification of a *via sacra* associated with the sanctuary of Artemis, the existence of which is probable even if we do not have any written or iconographic evidence. Nevertheless, there is a clear difference in the way in which this area was managed and used, setting it apart from the sanctuary, at the beginning of the fifth century AD, when the temple and the whole sanctuary were renewed for different uses. Instead, radical changes were made to the area of the east *propylaeum* more than a century later.

Much importance has been focused on the Antonine governor commission for the construction of the complex of the west *propylaeum* / trapezoidal square, probably repeated for the triumphal arch of the east *propylaeum* at the beginning of the third century AD. Further detailed analyses will verify the supposition that the area was used for an imperial cult.

Advances in the interpretation of the church complex have been achieved chiefly in the chronological identification of several transformations characterizing this complex in its rather short existence. In the *atrium*, a correlation between the developing architecture and religious activities has been theorised and further investigation of the boundaries of the complex to the south and north will help to confirm this hypothesis. Despite the interpretative uncertainties

due to the lack of stratigraphic information, the chamber of the *diakonia*, that has been object of an interesting interpretative debate since its discovery, has been established as belonging to this architectural sequence. The circumstances of the abandonment of the complex and the desecration of the church deserve exhaustive analyses in view of the fact that they are recorded in the particular historical background of the series of earthquakes in the mid seventh century AD and the rise of Islam. It will be interesting to examine whether Christian internal conflicts could have played a role in the process, not easily elucidated through the available evidence however.

The Byzantine complex is characterized by the transformation and the reuse of conspicuous Roman buildings or parts of them, together with an extensive use of *spolia*, both as bare building material and for decorative purposes. Hundreds of architectural elements have been recovered and recorded in the excavation of the complex. The completion of the study of these elements will make an important contribution towards understanding the economic and political administration of the city during the sixth century AD. Finally, there is the supposition that in the Umayyad phase the church area was divided into two wealthy residences, one to the north and one to the south. Moreover, the use of the atrium as a market area and the extension of the shops along the colonnaded street should be verified through further analyses of the site.

The Pottery Finds (D. Baldoni)

The excavations have yielded homogeneous assemblages of ceramics datable between the beginning of the third and the first half of the 8th century AD.⁶⁴ These are mostly sherds attributable to shapes that, though well known at Jarash, are of particular interest because they come from closed contexts, within a precise stratigraphic sequence.

The pottery of the late Roman and early Byzantine periods appears typologically similar to that of other centres in the immediate region of Jarash.⁶⁵ Although the still not extensively studied, the deposits of this period contain a certain

64. I would like to thank Ina Kehrberg for her valuable suggestions for dating the pottery, based on comparison with unpublished specimens from her excavations at Jarash. I am also grateful to Annalina Morelli

and to Massimiliano Munzi for helping me to identify the coins.

65. On the pottery of Palestine, see Crowfoot *et al.* 1957; Loffreda 2008.

quantity of imported vases, mostly *Terra Sigillata* from Asia Minor and Cyprus, but also especially, Africa, which are imitated locally.

From the sixth century AD there is a marked increase in the output of pottery from local workshops with peculiar shapes and types, rarely attested in other areas occurring, which continue without significant change even after the Arab conquest.

Among these are the so-called 'Jerash bowls' (Watson 1989; Uscatescu 1995, 1996), common from the first quarter of the sixth century AD to about the middle of the seventh century AD, which imitates shapes typical of African Red Slip Ware. Their development is paralleled with that the lamps with animal-head handles, the manufacturing of which continues for a considerable period of time, becoming exclusive in the Umayyad period.⁶⁶

The pottery of the following period is characterized by the presence of jugs and storage jars with white-painted decoration, and the broad diffusion of a particular type of basin of grey clay with thumb-impressed or combed patterns, which seems to have no parallels outside the region. Both types, which appear at the end of the Byzantine age, recur, with few variations, throughout the 8th century AD, together with new shapes characteristic of the fully developed Umayyad age, such as the light buff jars with red-painted decoration, or the handmade bowls with cut-out ornaments.

The overall picture that forms from even a partial and still preliminary analysis of the Gerasan material is of a rather closed society, gradually tending towards economic self-sufficiency and a the limitation of trade relations to a restricted geographical ambit. Towards the beginning of the sixth century AD imports of fine pottery apparently cease, and the common kitchen and tableware vessels, as well as the lamps, seem to have been manufactured entirely *in loco*.

In different categories of objects, the repetition of the same shapes and the manufacturing techniques for long periods highlights the phenomenon of typological lag that seems to indicate a certain conformism and accentuated cultural conservatism on the part of a clientele that

tended to stay with established traditions.

Despite its mass-production, the local pottery appears to be of generally high quality and fine manufacture. The thinness of the walls, mostly ribbed, found also in the modest cooking pots or large storage containers, suggests a remarkable ability in the use of the wheel by highly specialized artisans.

From the ensemble of material recovered in the course of the excavation, the study of which is currently in progress, some assemblages have been chosen from contexts particularly significant for their stratigraphic reliability and for their chronological location in the sequence of the main phases identified in the area. These are:

1. The deposits belonging to Phase 1c, the construction of the 'East Propylaeum'. These contexts belong to the fill of a trench cut for the restoration of the northern portico. They are datable to the beginning of third century AD.
2. The contexts sealed by mosaic pavements and the paving of the hall south of the church, both of which are Phase 2a and the paving of the nave of the southern chapel, which belongs to Phase 2b. These assemblages have yielded material datable to the mid sixth and the beginning of the seventh century AD.
3. Finally the contexts relative to Phase 3 are the occupation of the area before its definitive abandonment, from which come artefacts attributable to the first decades of the 8th century AD. The chronology of these is particularly reliable since they lie immediately beneath the collapse caused by the earthquake of 749AD.

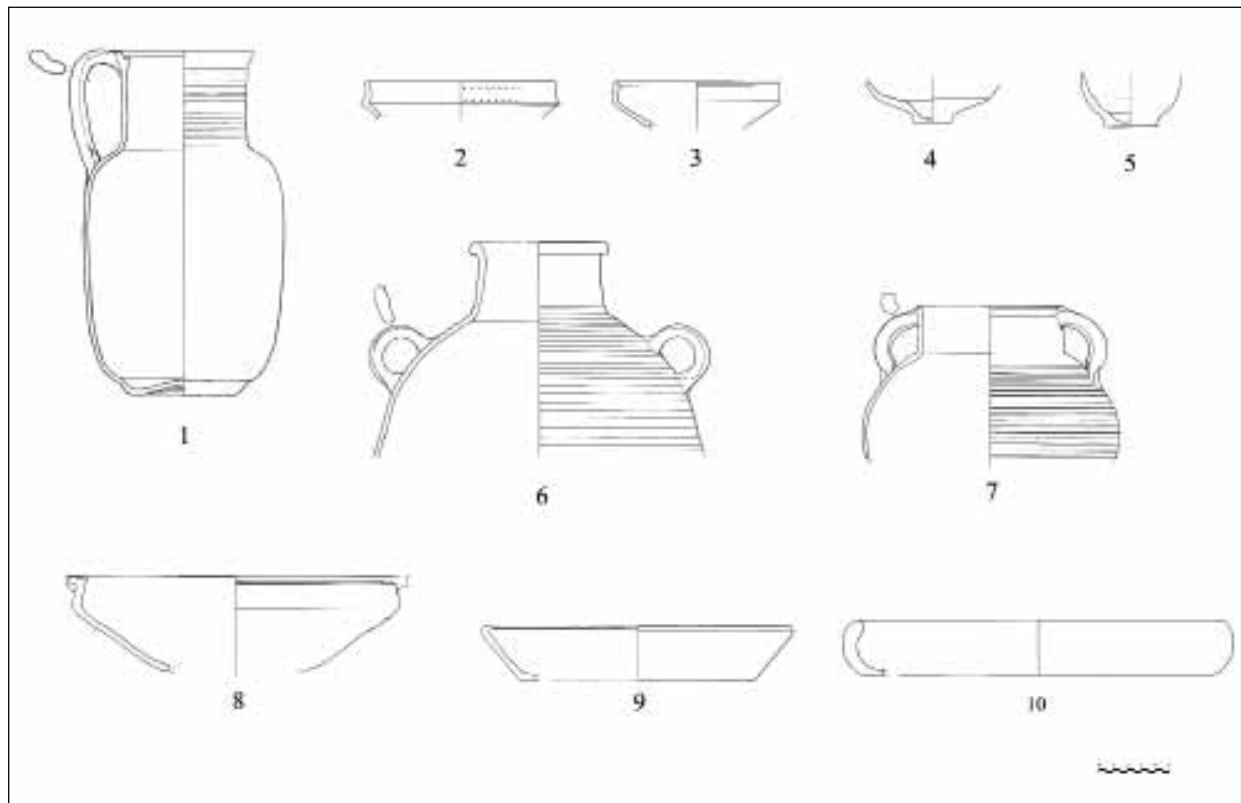
Contexts from Phase 1c (Beginning of the Third Century AD)

The material from the deposits of this period constitutes a homogeneous and well dated assemblage (**Fig. 10, Table 1**).

A significant quantity of reconstructable sherds was recovered indicating the existence of a pottery dump in the area.

Many sherds belong to table and kitchen vessels, which include types well attested at Jarash and moreover, are widespread throughout the Middle East. In general, they are very carefully

66. For a typology of the lamps of Jarash, see Kehrberg, in press.



10. Jarash – pottery from the phase 1c.

Table 1: Pottery from the phase 1c (context dated at the beginning of the third century AD) (Fig. 10).

No.	Class	Form	Manufacture	Parallels
1	Table vessel	Jug	Red clay (2.5YR 6/8); white grits; orange pinkish slip (5YR 7/4).	Rasson 1986, 67 fig. 17:1.
2	Table vessel	Bowl	Local imitation of Eastern Sigillata Ware. Red clay (10R 6/6); thin red slip.	Kehrberg 2007, fig. 2:4.
3	Table vessel	Bowl	Red clay (2.5YR 6/6); white grits; reddish slip (2.5YR 6/8).	Kehrberg 2007, fig. 6:89.
4	Table vessel	Juglet	Orange clay (5YR 6/6); white grits; pinkish slip (5YR 7/4)	Watson 1986, 367, fig. 3:4.
5	Table vessel	Juglet	Red clay (2.5 YR 6/6); white grits.	
6	Storage vessel	Jar	Orange clay (5YR 7/); white grits; pinkish-orange slip (7.5YR 7/6)	Clark and Falkner 1986, 249, fig. 20:8.
7	Cooking vessel	Cooking pot	Pinkish clay (5YR 7/4); white grits, reddish slip (2.5YR 6/6). Fired.	Clark and Falkner 1986, 249, fig. 20:2.
8	Cooking vessel	Pan	Red clay (2.5YR 6/8); white grits. Fired.	Uscatescu 1996, 108, fig. 38:23, group XVI, form 5; Kehrberg 2007, fig. 6:102.
9	Cooking vessel	Pan	Gray core (10YR 5/1); white grits; reddish slip (2.5YR 6/8). Fired.	
10	Cooking vessel	Pan	Local imitation of African Red Slip Ware (Hayes, form 181). Orange clay (5YR 7/6); white grits; thin red-orange slip. Fired.	Clark and Falkner 1986, 249, fig. 20:14; Kehrberg 2007, fig. 4:45-46.

made; the hard-fired clay, with small quartz and limestone grits, is mostly reddish, sometimes tending towards orange or pink; the surface is covered with a thin slip in a lighter shade.

The shape that recurs with greatest frequency is a globular cooking pot with ribbed surface vertical handles attached from the lip to the shoulder and a usually convex and knobbed base (**Fig. 10:7**). There is a groove on the rim, probably to receive a lid. The absence of traces of burning on some of the examples examined suggests that these may have been used also for storage.

The cooking vessels include numerous pans, some of which have a carinated body with flat horizontal rim, and a vertical handle (**Fig. 10:8**). Others have flaring walls and a flat rim protruding inwards (**Fig. 10:9**). One of these, covered with a thin reddish-orange slip, imitates the Hayes 181 of African Red-Slip Ware, characterized by a low, wide body with flat base, and curving walls (**Fig. 10:10**).

Imitations of shapes that belong to the contemporaneous imported *Sigillata* are produced in large quantities at Jarash especially between the second and the beginning of the third century AD. The most common type is the carinated cup with vertical, slightly concave rim, sometimes decorated with small impressed motifs reminiscent of some examples of Eastern *Sigillata* (**Fig. 10:2**).

The most common pottery found in the levels of this period is the standard Jarash 'red-ware'. A cylindrical jug with flaring mouth (**Fig. 10:1**), some globular juglets (**Fig. 10:4-5**) and a small carinated bowl with a groove underneath the rim present a reddish or reddish-orange clay (**Fig. 10:3**) and a thin slip that ranges from pinkish-beige to orange to red.

Contexts from Phases 2A and 2B (From mid sixth to the Beginning of the Seventh Century AD) (Fig. 11, Table 2).

Most of the vessels of these phases have very thin and well-fired ribbed walls; the clay is generally red with small quartz and limestone grits; the surface is covered with a slip that ranges from pink to reddish to brown.

The tableware, found in smaller quantities than the kitchen vessels, includes some conical cups with outflaring rims (**Fig. 11:4**) and espe-

cially bottles (**Fig. 11:1**) and jugs, with circular (**Fig. 11:2**) or trifoliate mouths (**Fig. 11:3**).

Numerous fragments come from the dishes known as 'Jerash bowls' (**Fig. 11:5-6**), typical of the local late Byzantine production, which have a painted decoration in white or purplish-brown on the inner surface. Their iconographic repertory includes floral and animal motifs and human figures, of stereotyped design but rich in detail, executed directly on the red-orange slip or on a central disc painted white. The red clay, with grey core, is rather porous owing to the presence of numerous white grits.

The cooking vessels have shapes already seen in late Roman pottery, such as the pot with everted rim and carinated shoulder (**Fig. 11:8**) or the globular two-handled pot, with narrow mouth, which is distinguished from the earlier ones by the convex profile of the neck (**Fig. 11:7**).

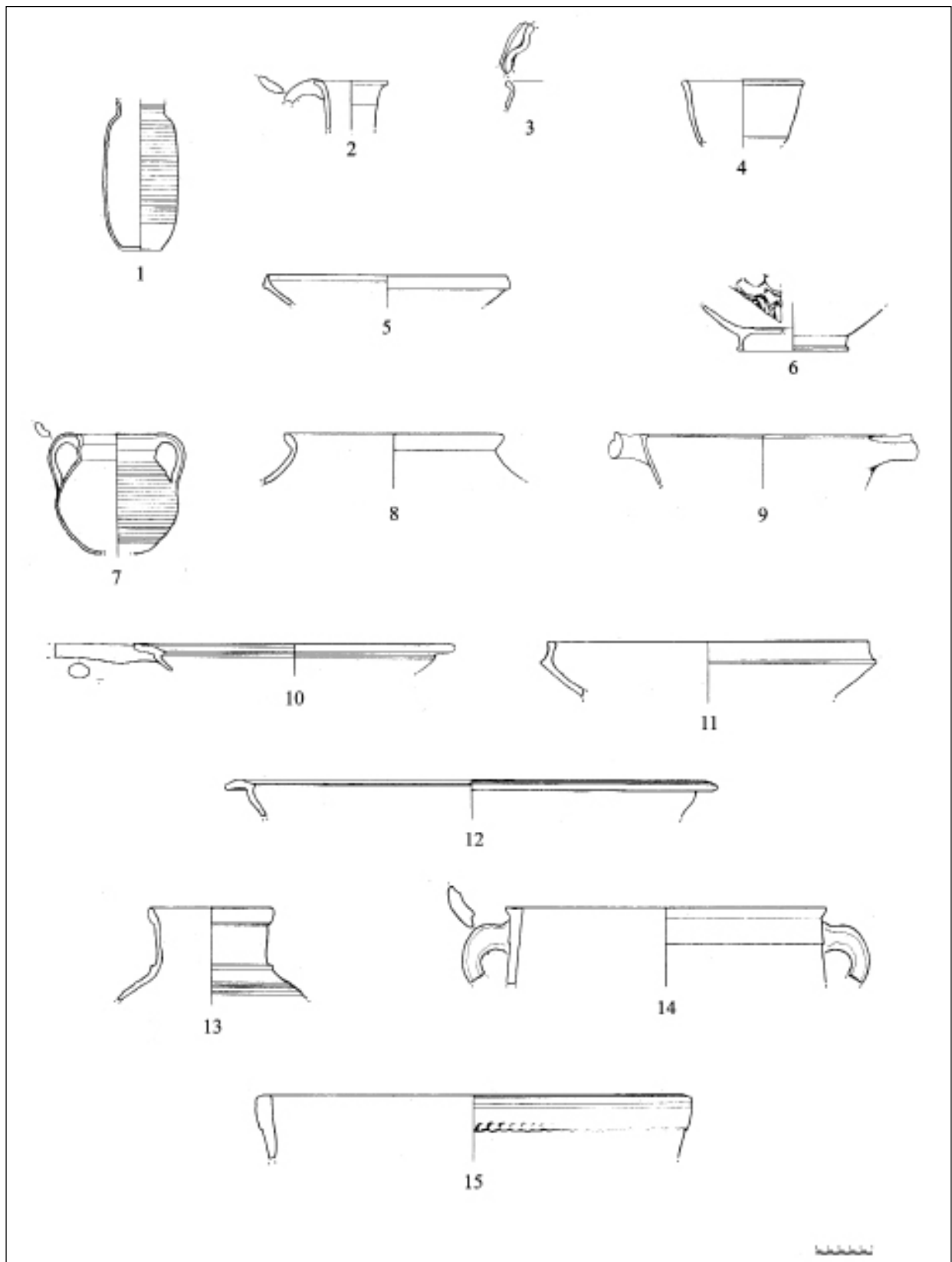
With these are often associated "casseroles" with convex base and horizontal handles attached at the rim, which is flat and thickens very slightly on the inside (**Fig. 11:9**). Also found are carinated pans (**Fig. 11:11**) and various kinds of frying pan (**Fig. 11:10**) including a type with broad flat rim and a long horizontal handle bent back at the end; one of the most common types in the sixth century AD.

The kitchenware also includes a kind of large bowl with broad out-flaring grooved rim, (**Fig. 11:12**) of a type very common at Jarash and traditionally assigned to the third century AD.

The discovery of similar specimens in contexts dated to the end of the seventh and the beginning of the eighth century,⁶⁷ however, attests the long duration of this type, with small variants only in the shape of the rim and, in some cases, the characteristics of the fabric.

Among the very common storage vessels is the amphora of the type, Late Roman 5/6, from whose shape, derive the amphorae with painted decoration typical of late Byzantine and Umayyad age (**Fig. 11:13**). This vessel typically has a bag-shaped body with ribbed surface, two handles attached vertically to the shoulder, and a cylindrical neck with sharp groove at the base terminating in an outflaring thickened rim.

Handmade grey ware basins, which would become widespread in the Umayyad period, have a rim in the form of a flattened band and



11. Jarash – pottery from the phases 2a and 2b.

Table 2: Pottery from the phase 2a and 2c (contexts dated from the mid sixth century to the beginning of the seventh century AD) (**Fig. 11**).

No.	Class	Form	Manufacture	Parallels
1	Table vessel	Bottle	Red clay (2.5YR 6/6); white grits.	Uscatescu 1996, 122, fig. 78:457, group XXVI.
2	Table vessel	Jug	Red clay (2.5YR 6/6); white grits.	Uscatescu 1996, 125-126, fig. 79:471, group XXVIII, form 3B.
3	Table vessel	Trifoliate jug	Red clay (2.5YR 6/6), gray core; white grits; reddish-brown slip (10R 6/4).	Uscatescu 1996, 128, fig. 80:482, gruppo XXIX, form 4.
4	Table vessel	Bowl	Red clay (2.5YR 6/6); white grits.	Uscatescu 1996, 96, fig. 68:329; group XIII, form 11A.
5	Table vessel: "Jerash bowls"	Plate	Gray core; white and gray grits; reddish slip (10R 6/6).	Uscatescu 1996, 73, fig. 51:170, group X, form 13; Watson 1989, fig. 1, form 8c.
6	Table vessel: "Jerash bowls"	Plate	Bird painted in reddish-brown over a white disk. Gray core; white and gray grits; thin red-orange slip.	Uscatescu 1996, 72-73, fig. 50:169, group X, form 12A; Watson 1989, fig. 1, form 7a/7f.
7	Cooking vessel	Cooking pot	Red clay (2.5YR 6/6); white grits; gray slip (5YR 6/1). Fired.	Uscatescu 1996, 135, fig. 83:510, group XXXIV, form 3D; Pierobon 1983-1984, fig. E:1.
8	Cooking vessel	Cooking pot	Red clay (2.5YR 6/6); white grits. Fired.	Uscatescu 1996, 136, fig. 84:522, group XXXIV, form 3H; Pierobon 1983-1984, fig. C:15.
9	Cooking vessel	Casserole	Pinkish clay (5YR 8/4); white grits; pinkish slip (5YR 7/4). Fired.	Uscatescu 1996, 107, fig. 74:389, group XVI, form 1B; Bujard and Joguín 2001, fig. 1:9; fig. 3:20.
10	Cooking vessel	Pan	Red clay (2.5YR 6/6); white grits; brown slip (5YR 6/1). Fired.	Uscatescu 1996, 110, fig. 75:401, group XVII, form 3D.
11	Cooking vessel	Pan	Red clay (2.5YR 6/6); white grits; pinkish slip (5YR 7/4). Fired.	Uscatescu 1996, 92-93, fig. 67:322, group XI, form 2B.
12	Kitchen vessel	Krater	Gray core (5YR 5/1); white grits; brown slip (5YR 6/2).	Uscatescu 1996, 105, fig. 72:379, group XV, form 8; Pierobon 1983-1984, fig. E:12-14.s
13	Late Roman 5/6 amphoras	Amphora	Pinkish clay (5YR 7/3); white grits.	Uscatescu 1996, 161, fig. 94:616, group XXXVII, form 10.
14	Basins	Basin	Pinkish-gray clay (7.5YR 7/2); white grits. Handmade.	Uscatescu 1996, 148, fig. 88, 561, group XXXVI, form 6A.
15	Basins	Basin	Thumb-impressed ridge below the rim. Brownish clay (5YR 5/3); white grits; light brown surfaces (5YR 7/3). Handmade.	Uscatescu 1996, 146, fig. 87:549, group XXXVI, form 2B.

a body in this phase, with rather thin, flaring walls, smaller than that of the later ones (**Fig. 11:14-15**). The decoration consists of bands of combed wavy lines made with a comb or, as in the case of one of the specimens found, thumb-impressed patterns applied beneath the rim. The pottery of this period is characterized by brownish or pinkish grey clay, compact and hard-fired, of a lighter shade on the surface.

Contexts from Phase 3 (First Half of the 8th Century AD) (Fig. 12, Table 3)

The vessels belonging to the contexts of the stratigraphic sequence datable to the full-blown Umayyad period, present few significant variants from the point of view of technique and shape with respect to that of the previous period.

The continuity of the shapes and of the working processes that characterize Jarash pottery, even after the Arab conquest of the city, seems to point to a gradual assimilation of the local uses and traditions.

Among the material worth noting from the deposits of this period are some storage jars with bag-shaped bodies and thin walls, partially ribbed, with two handles attached to the shoulder and a concave knobbed base (**Fig. 12:1-2**). The fabric, which has a grey core, is generally rather porous owing to the presence of numerous grits. The surface is decorated with wavy bands, spirals, and branches painted in white over brown slip, or in dark red on pinkish slip. The short cylindrical neck of one of the specimens examined is decorated with a thumb-impressed ridge (**Fig. 12:1**).

Containers of this type, which constitute a variant of the Late Roman 5/6 amphorae, are attested to at Umm ar-Raṣāṣ (Alliata 1991: fig. 7:37), at Pella (Walmsley 1995: fig. 6:6), and in numerous other centres of the region, in contexts dating between the seventh and the 8th century AD (Riley 1975: Pp. 26-29, 46-47; Hayes 1980). Particularly interesting is a group of vessels found *in situ* on the floor. They are large handmade grey ware basins, with wide conical bodies, flat bases, and two small vertical handles on the central part of the wall. The rim, generally protruding and rolled, is applied later and

wheel finished (**Fig. 12:3-4**).

On their inner surface are often evident the fingerprints of the potter who modelled them, in addition to traces of cloth, probably used for smoothing or to keep the clay moist during work. On the outside there is almost always a decoration consisting of combed incised (**Fig. 12:4**) or cut-out patterns in various combinations (**Fig. 12:3**), these last are characteristics, albeit not exclusive, of the production of this period. These appear very similar to the specimens of the late Byzantine to early Islamic age, from which they differ only in the greater thickness of the walls and the more rounded shape of the rim (**Fig. 12:14-15**). The blackish colour of the fabric too, homogeneous and hard-fired, distinguishes them from the earlier ones, which are characterized by a light grey clay, tending towards beige or pinkish grey.

It is likely that vases of this type, which recur with great frequency at Jarash in all the Umayyad deposits, were widely used outside domestic contexts also, for example, in shops, to hold grains and other goods or, as attested to by the specimens that came to light beneath the collapse of the church walls, for different building activities.

Inside the large basins abandoned on the pavement of the building at the moment of its destruction was found a conspicuous quantity of marble dust, which must presumably have been used for the plastering of walls.

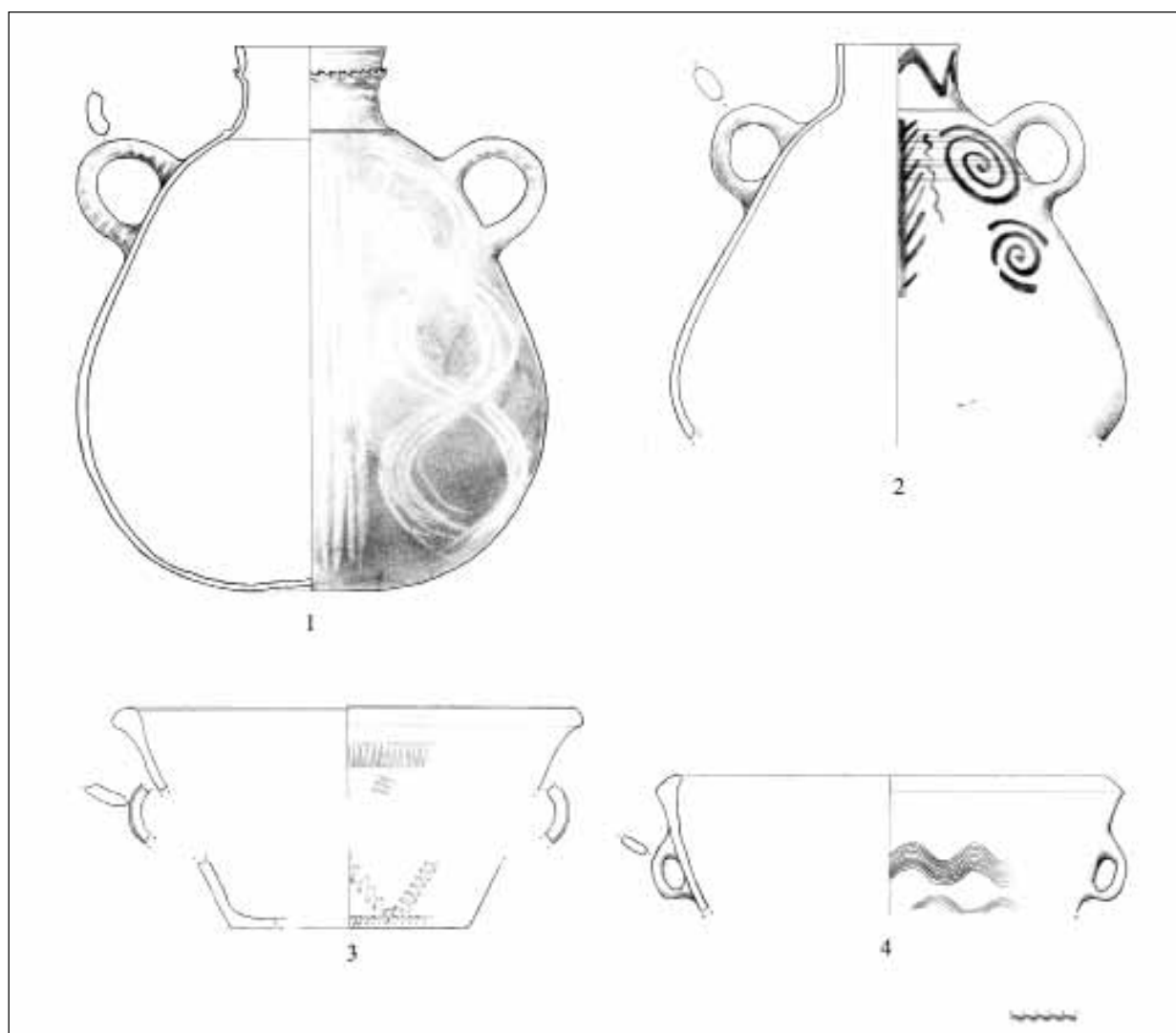
The evidence emerging from examination of the material of this phase provide further confirmation, at least in the first century of Islam, of the full integration and peaceful coexistence among 'conquerors', 'converts' and Christians.

The frequentation of the area seems to come to an end almost entirely after the earthquake of 749AD, as shown by the sporadic presence of material later than that date, which consists of rare fragments of Mamluk and late glazed pottery.

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67. See, for example, the material from the trial trenches in the terrace of the temple of Artemis in Pierobon

1983-1984: p. 98.



12. Jarash – Pottery from the phase 3.

Table 3: Pottery from the phase 3 (contexts dated in the first half of the 8 eighth century AD) – **Fig. 12.**

No.	Class	Form	Manufacture	Parallels
1	Storage vessel	Jar	White painted decoration; thumb-impressed ridge on the neck. Gray core; white grits; brown slip (7.5YR 6/4).	Smith 1973, 233-234, fig. 45:281.
2	Storage vessel	Jar	Red painted decoration. Gray core; white grits; pinkish slip (7.5YR 8/4).	Daviau and Beckman 2001, 268, fig 4:19; Humbert 2001, fig. 9.
3	Basins	Basin	Cut-out decoration on the wall. Traces of white paint on the rim. Light gray clay (10YR 6/1); white grits; dark gray surfaces (7.5YR 5/). Handmade.	Uscatescu 1996, 152, fig. 110:791, group XXXVI, form 21A; Schaefer 1986, fig. 8:11.
4	Basins	Basin	Combed decoration on the wall. Brown-grayish clay (7.5YR 6/2); white grits; dark gray surfaces (7.5YR 5/). Handmade.	Uscatescu 1996, 169, fig. 114:831, group XLII, form 4; Schaefer 1986, fig. 8:7; Humbert 2001, fig. 11.

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A COMPREHENSIVE REVIEW OF NEOLITHIC WATER CATCHMENT FACILITIES IN THE JAFR BASIN, SOUTHERN JORDAN: A PRELIMINARY REPORT OF THE JAFR BASIN PREHISTORIC PROJECT, PHASE 3, 2009

Sumio Fujii

Introduction

The Jafr Basin Prehistoric Project was organized with a view to tracing the process of pastoral nomadization in southern Jordan on the basis of specific archaeological evidence. It was also an attempt to recover the totality of Neolithic studies by means of shedding light on the poorly understood dimension. However, a methodological issue confronted us at the very outset. In comparison with sedentary populations, pastoral nomads are in general smaller in group size, higher in mobility, simpler in material culture, and therefore much inferior in archaeological visibility. Now that their footprints themselves are difficult to specify, archaeological methods can hardly be applied. This is the reason why the process of pastoral nomadization is yet to be clearly defined. However, they often construct stone-built burial cairns, and not sporadically but in a compact mass. This much is visible enough in an archaeological sense. Given this, we ought to be able to catch a glimpse of their social dynamics through their unique burial practice. With such a methodological perspective, we have successively investigated a dozen prehistoric funerary sites in our research field or the northwestern part of the Jafr Basin.

The first phase of the project was conducted over the eight years from 1997 to 2004, the vast majority of which was devoted to a comprehensive excavation at the stratified funerary site of Qā' Abū Ṭulayḥa West (e.g. Fujii 2003). The excavation shed light on a unique burial practice of prehistoric pastoral nomads in the Jafr Basin for the first time. The final two seasons addressed complementary operations to fill up a few gaps interstratifying in the chronological sequence of the key site (e.g. Fujii 2005a, 2005b). The

series of investigations enabled us to establish a tentative chronology of burial practice in the Jafr Basin from the Late Neolithic to the Early Bronze Age. The chronology provided a basic framework for understanding the process of the pastoral nomadization in the basin.

The second phase, taken place for the four years from 2005 to 2008, changed direction to retrace the origin of pastoral nomadism back to the PPNB (Pre-Pottery Neolithic B) period. A total of six excavation seasons at Wādī Abū Ṭulayḥa revealed that the Middle to Late PPNB Jafr Basin witnessed the beginning of short-range transhumance bringing along a limited number of domestic sheep and goats from a parent settlement probably to the west (Fujii 2006a, 2006b, 2007a, 2008a, 2008b, 2009a, 2009b; Hongo 2008). Quite unexpected was the fact that the PPNB agro-pastoral outpost was equipped with a well-organized water catchment system consisting of a large cistern, a basin-irrigation barrage, and two minor wadi barriers (Fujii 2007b, 2007c, 2010a). Available evidence suggests that the climatic deterioration toward the end of the PPNB caused the reduction in pondage at the cistern and the decline and/or instability in opportunistic agriculture within the flooded area of the basin-irrigation barrage. It seems that both of the crises led to the abandonment of the neighboring fixed outpost and a consequent shift to pastoral nomadism (Fujii 2010b). Given this, it follows that the water supply problem at the remote outpost holds another key to reading the process of pastoral nomadization in the basin.

The third phase of the Jafr Basin Prehistoric Project was designed to address this challenging issue (Fujii 2010c). Our research objective is to

shed new light on the process of pastoral nomadization from the viewpoint of water exploitation strategies in arid peripheries. We anticipate the four years from 2009 to 2012 for the research period. The first field season was conducted for about ten days from September 13 to 23, focusing on a comprehensive review of Neolithic water catchment facilities thus far known in the basin. The following is a brief summary of our preparatory work looking ahead to subsequent full-fledged investigations.

Neolithic Water Catchment Facilities in the Jafr Basin

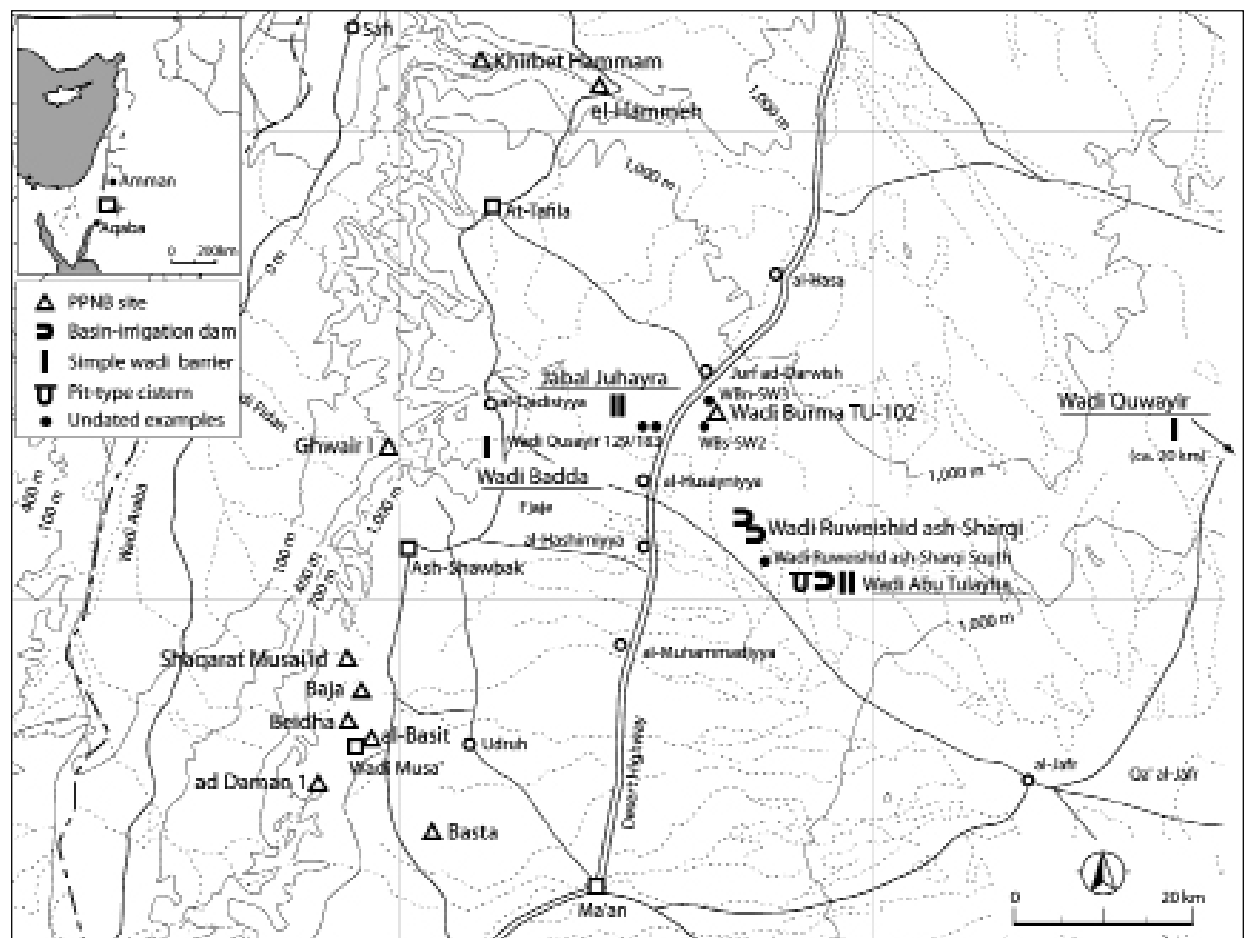
Our previous investigations located a total of seven Neolithic or supposedly Neolithic water catchment facilities in and around the Jafr Basin: four at Wādī Abū Ṭulayḥa, two at Wādī ar-Ruwayshid ash-Sharqī, and one at Wādī Baddā (Fig. 1). In order to double-check our previous identification, we reexamined them by means of

either trench excavation or surface cleaning. In addition, we newly confirmed three likely examples in the course of the retrospective survey.

Wādī Abū Ṭulayḥa

The site of Wādī Abū Ṭulayḥa is a small agro-pastoral outpost lying in the northwestern part of the basin, and is dated to the M-LPPNB period on the basis of a series of AMS dates and comparative studies of diagnostic artifacts. As mentioned above, the site contained one cistern and three barrages, all of which were intensively excavated and reported in some detail elsewhere (e.g. Fujii 2007b, 2009a).

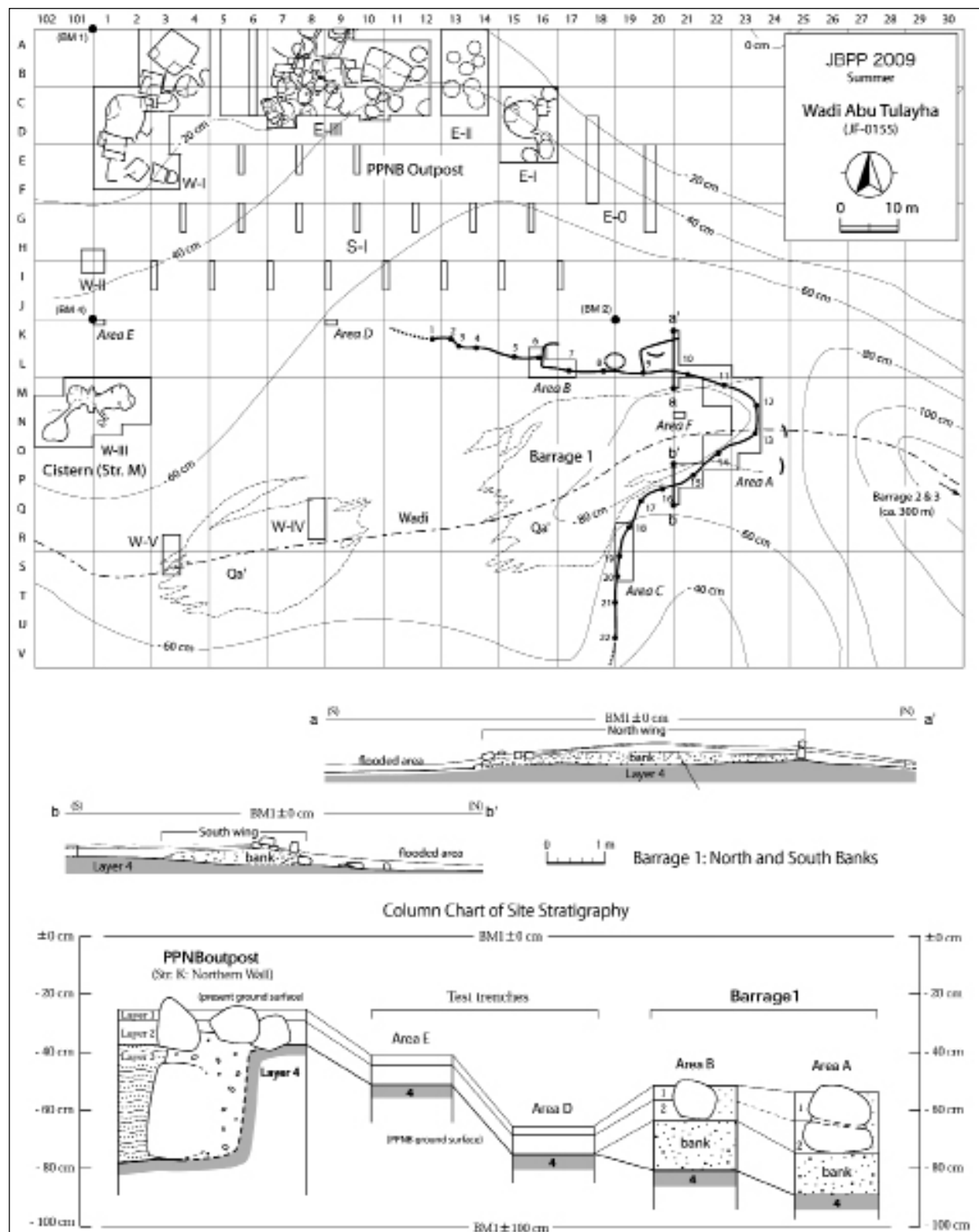
Our retrospective survey conducted a stratigraphic reexamination of Barrage 1 that was identified as a basin-irrigation dam in the spring field season of 2006. What we focused on was the structure of banks that fringed the flooded area of the barrage. In order to scrutinize the nature of the bank deposits, we newly opened two



1. Neolithic water catchment facilities in the Jafr Basin.

elongated test trenches across both wing walls (Figs. 2, 3). As a result, it turned out that the

stone-built wall of the north wing was founded on an anthropogenic bank ca. 6 m wide and up



2. Wādī Abū Tulayḥa: sections and elevations of Barrage 1.



3. Wādī Abū Ṭulayḥa: general view of Barrage 1 (looking N).

to ca. 0.3m high (**Figs. 2, 4**). Interestingly, the bank contained no impermeable material such as clay; instead, it consisted only of reddish brown silty sand and a number of abraded flint pebbles. It is likely therefore that the bank was constructed by means of scraping together surface deposits of *ḥamād* of those days. (This is the reason why our previous reports defined it by error as the PPNB surface layer; Fujii 2006a: Fig. 2; 2006b: Fig. 2.) This means that it was originally permeable in structure and, therefore, allowed standing water to infiltrate into the surrounding terrain. Thus it follows that the barrage was not intended for long-term water storage from the very beginning of construction. These observations corroborated our previous view that it was used as a basin-irrigation dam. It can also be reasonably understood within this

framework that the stone wall was poorly constructed with gaps being often left between any two adjacent stones. Presumably, the stone wall, especially its distal half, was placed on the permeable bank just for erosion control.

The south bank also proved to have the same structure (**Figs. 2, 5**). Here again, a permeable anthropogenic bank containing reddish brown silty sand and abraded flint pebbles was confirmed underneath a gappy stone wall. However, it was much more compact in dimensions than the northern counterpart, measuring ca. 2.5m wide and up to ca. 0.4m high. This is probably because it was constructed taking full advantage of a natural slope fringing the southern half of the flooded area.

The trench excavations corroborated anew our previous view that Barrage 1 was construct-



4. Wādī Abū Ṭulayḥa: close-up view of the North Trench (looking NNW).



5. Wādī Abū Ṭulayḥa: close-up view of the South Trench (looking SW).

ed for temporary basin-irrigation rather than long-term water storage. Collateral evidence for this functional identification comes from the fact that the neighboring outpost produced a certain amount of charred cereal and pulse seeds as well as numerous grinding implements (Nasu *et al.* 2008). Also suggestive is the coexistence of the large cistern specializing in reserving drinking water, which highlights the systematic use of water catchment facilities at the remote outpost.

The trench excavations also proved that the construction of Barrage 1 involved large-scale civil engineering works as well as laborious stone masonry works. Since both banks are ca. 1 square meters in cross-section and 40-50 meters in length, the total amount of earth used for their construction is estimated at 40-50 cubic meters or even more given the post-construction consolidation. Such an ambitious project cannot be done in spare time, supporting our view that the outpost was used, though on a seasonal basis, every year by a certain number of transhumants.

We also reexamined the cistern or Structure M, taking advantage of three illicit digging pits that were opened along the southern walls during our off-field season. As a result, it turned out that the masonry walls were backed with a more than 0.5m thick layer of clay mortar tempered with a large amount of limestone and flint rubble (Fig. 6). It is needless to say that the thickness of the clay-mortar layer coincided roughly with the planimetrical boundary line between the fill layer behind the walls and the PPNB surface layer. Thus it follows that the masonry walls were not only coated with fine-textured clay on their inner surface but also carefully waterproofed with rubble-tempered coarse clay on their rear side. This finding substantiated anew our functional identification. Incidentally, the rear coating also included flint flakes and a large amount of ash, both of which were probably brought from the neighboring outpost as tempering material of clay. This finding made the synchronism between the two structural entities more reliable. Several charcoal remains included in the ash, now under radiometric dating, would provide an exact construction date of the cistern.

Wādī ar-Ruwayshid ash-Sharqī (North)

Being located ca. 7km northwest of Wādī Abū Ṭulayḥa, this site occupies again a flat ter-

rain along a side wādī flowing eastward. It was briefly investigated in the spring field season of 2006 together with the three barrages at Wādī Abū Ṭulayḥa (Fujii 2007b, 2007c). The investigation showed that the site consisted only of two basin-irrigation barrages, and that unlike Wādī Abū Ṭulayḥa, it was not accompanied with a neighboring outpost. These observations led us to a tentative conclusion that the two barrages served as an enclave field or pasture for transhumants who made a seasonal round trip between a parent settlement to the west and the outpost (i.e. Wādī Abū Ṭulayḥa) to the east.

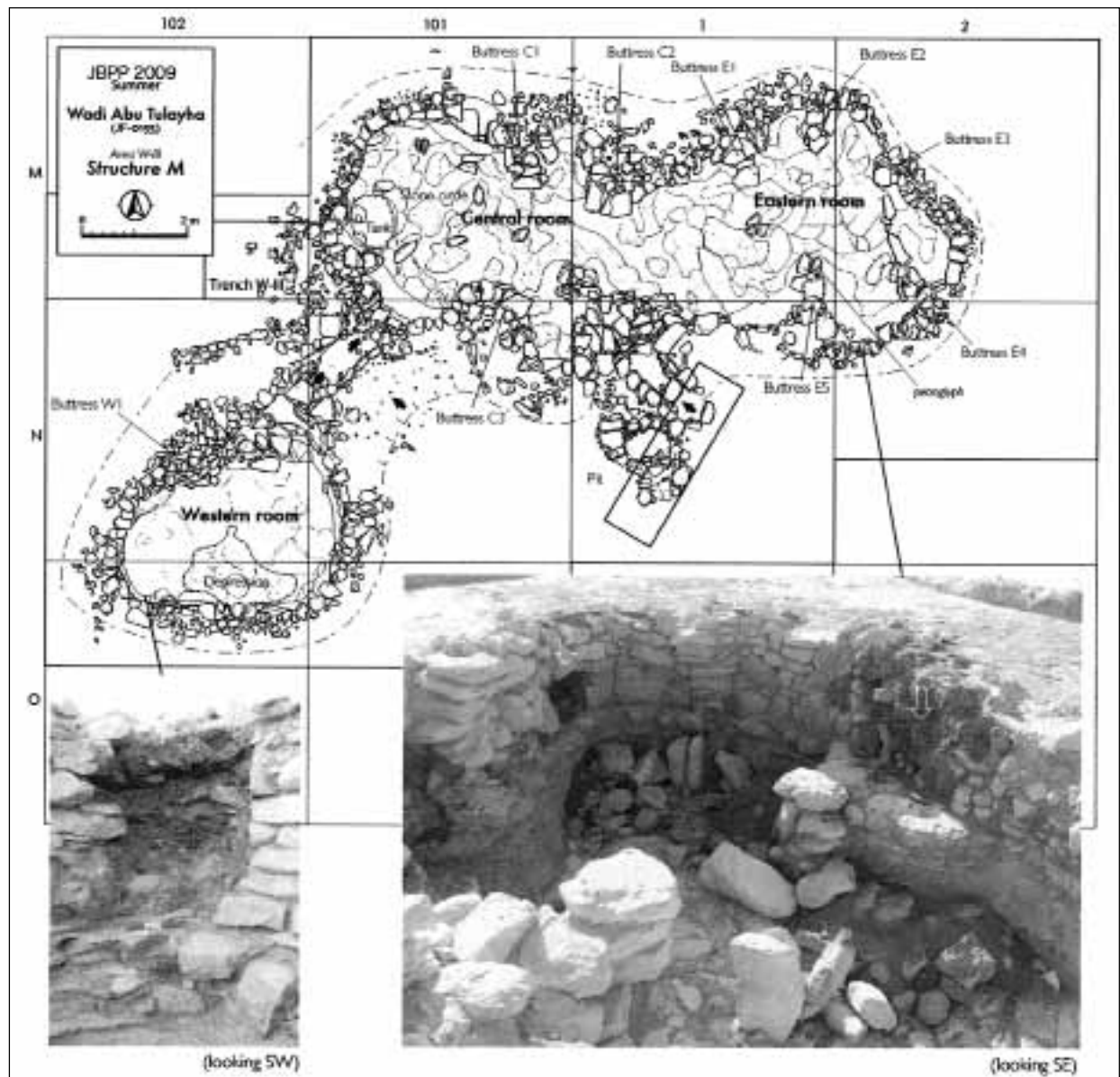
Our review started with a brief resurvey of the surrounding area, which revalidated that no settlement was incorporated into the site. So we turned to a stratigraphic reexamination of Barrage 2 and opened three 1m by 10m test trenches: two across both wings and the other across the converging point (Figs. 7-8). The investigation attested to a combination of permeable anthropogenic banks, ca. 6-7m wide and up to ca. 0.3-0.5m high, and poorly constructed stone walls, and our previous functional identification proved to be appropriate. The banks were constructed again taking full advantage of natural slopes bordering the flooded area of the side wādī (Fig. 9).

A bilaterally notched stone weight, a key to identifying Neolithic barrages in the Jafr Basin, was found around the north bank (Fig. 10). This was the second example found at the barrage and the first one was incorporated into the converging wall (Fujii 2007b, 2007c). Though out of the original context in this case, the repeated occurrence of such a diagnostic artifact has made our previous dating more reliable.

In addition to the main body of the barrage, we also sounded a few stone alignments dotted within the flooded area. This operation aimed to find out a pit-type cistern like Structure M at Wādī Abū Ṭulayḥa, but they proved to be simple windbreaks constructed probably in the recent past. The absence of a cistern makes sense, however, seeing that the site was devoid of a settlement.

Wādī Baddā

The site of Wādī Baddā is a small PPNB settlement lying immediately below the Fuyajja escarpment that borders the western edge

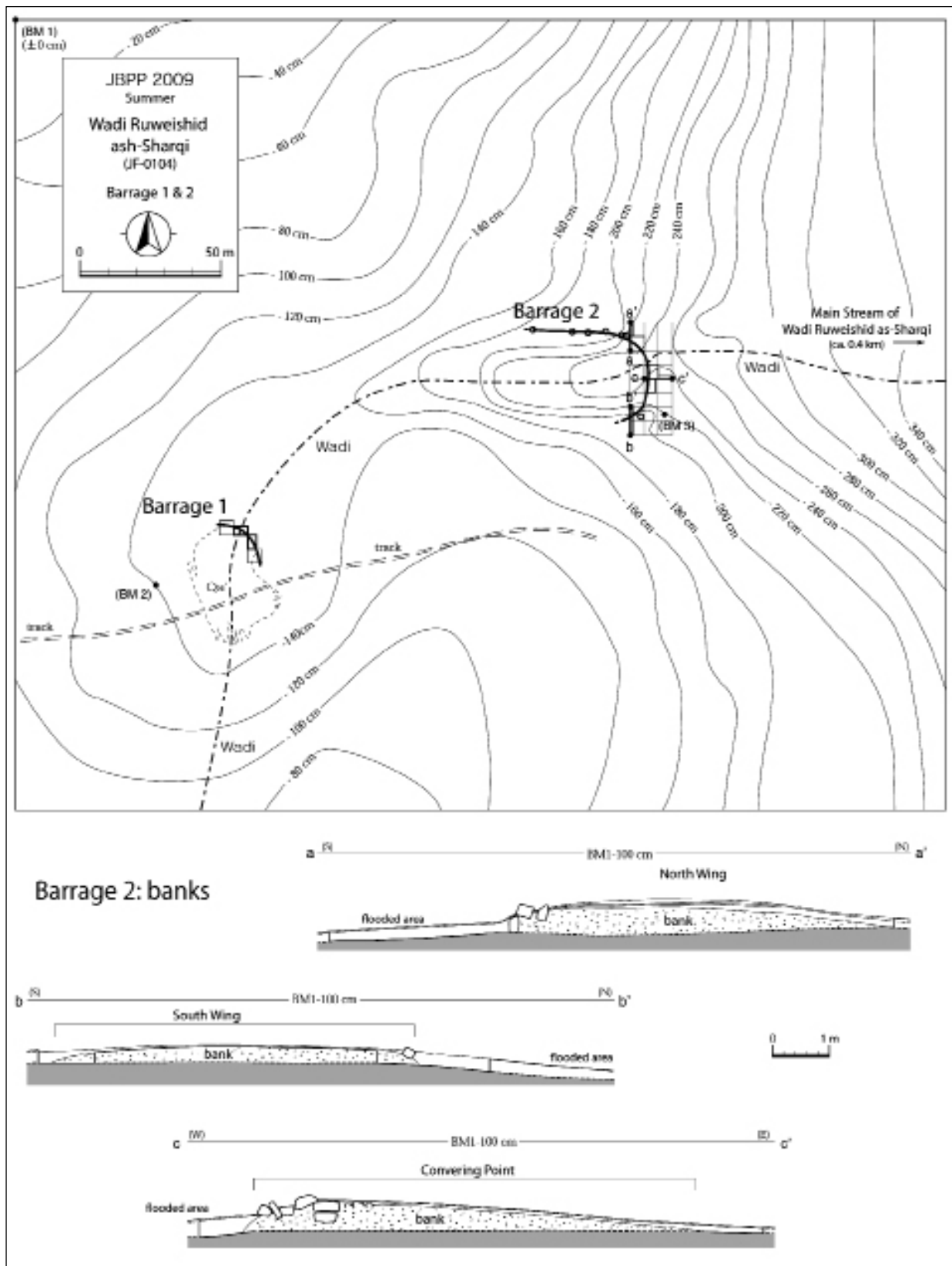


6. Wādī Abū Ṭulayḥa: illicit digging pits along the southern wall of Cistern.

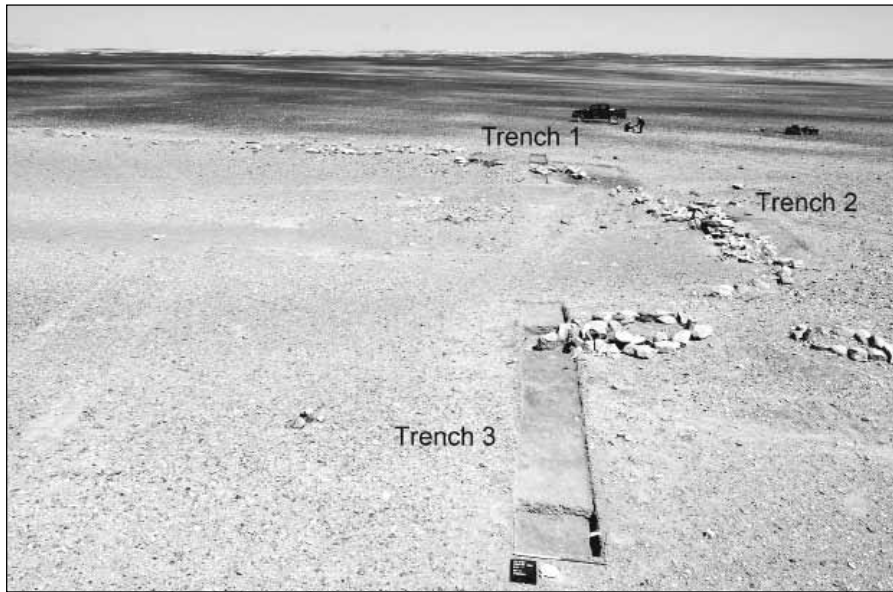
of the Jafr drainage system. It is situated atop of a small limestone hill, overlooking a meandering wadi flowing down westward from the escarpment (**Figs. 11, 12**). The site was found by chance in our one-day excursion in the summer field season of 2007, when a remnant of a barrage-like robust wall was noticed below the settlement, at the north bank of the wadi (Fujii 2007d).

We revisited the site and briefly reexamined the wall remnant by means of surface cleaning. The reexamination proved that the feature was ca. 1.5m high and ca. 1m thick, being con-

structed with three to four rows and four to six courses of undressed limestone angular cobbles (**Fig. 13**). It is still unknown, however, how far it buries itself under the slope deposits. The construction materials, ca. 0.3-0.6m long, were piled up irregularly in either a horizontal or an upright position. On the other hand, foundation stones were placed in a horizontal position and still half-buried in fluvial deposits. This masonry wall was quite different in both dimensions and structure from normal wall alignments exposed at the settlement atop the hill, suggesting its unique function. In this connection, it should



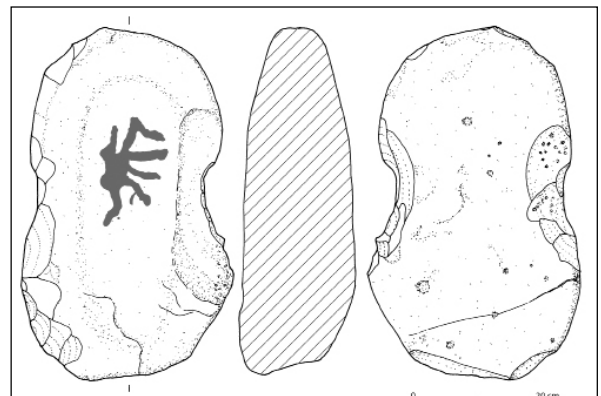
7. Wādi ar-Ruwayshid ash-Sharqi: sections of Barrage 2.



8. *Wādī ar-Ruwayshid ash-Sharqī*: general view of Barrage 2 (looking N).



9. *Wādī ar-Ruwayshid ash-Sharqī*: close-up view of Trench 1 (looking NW).



10. *Wādī ar-Ruwayshid ash-Sharqī*: bilaterally notched stone weight.



11. *Wādī Baddā*: general view of the site (looking N).



12. *Wādī Baddā*: general view of the wadi (looking SE).



13. *Wādī Baddā*: close-up view of the wall remnant (looking N).

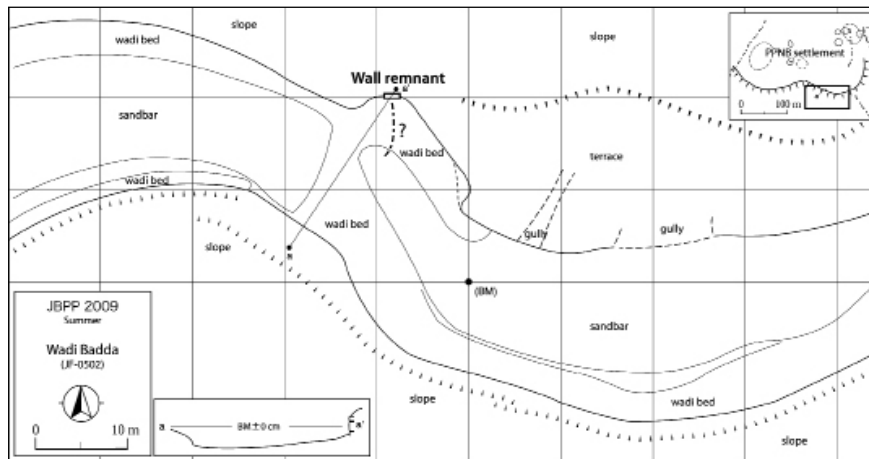
also be added that clay-like mortar was confirmed between construction materials. There is little doubt that the feature represents a remnant of a small reservoir dam.

The question is its date. Since no direct clue was found in our previous survey, we produced a topographical map around the feature in an effort to explore its archaeological background (**Fig. 14**). The map illustrated that the basement level of the wall remnant accorded roughly with the northern dry wadi bed, and that the latter was ca. 1m higher in elevation than the present wadi bed to the south. There is no doubt that the reservoir dam was constructed against the earlier stream. It is also worth reminding that the

wall buries itself into the slope sediments to a certain extent. There is an increasing possibility that it dates back to the same period as the neighboring PPNB settlement. This is even more so because the settlement is isolated in the ravine and essentially a single-period site, although the final conclusion must await a full-fledged investigation scheduled in the near future.

Jabal Juhayra

The site of Jabal Juhayra is a small PPNB settlement lying ca. 10km southwest of Jurf ad-Darāwīsh, a traditional village along the Hejaz Railway. It is located in a small-scale ravine on



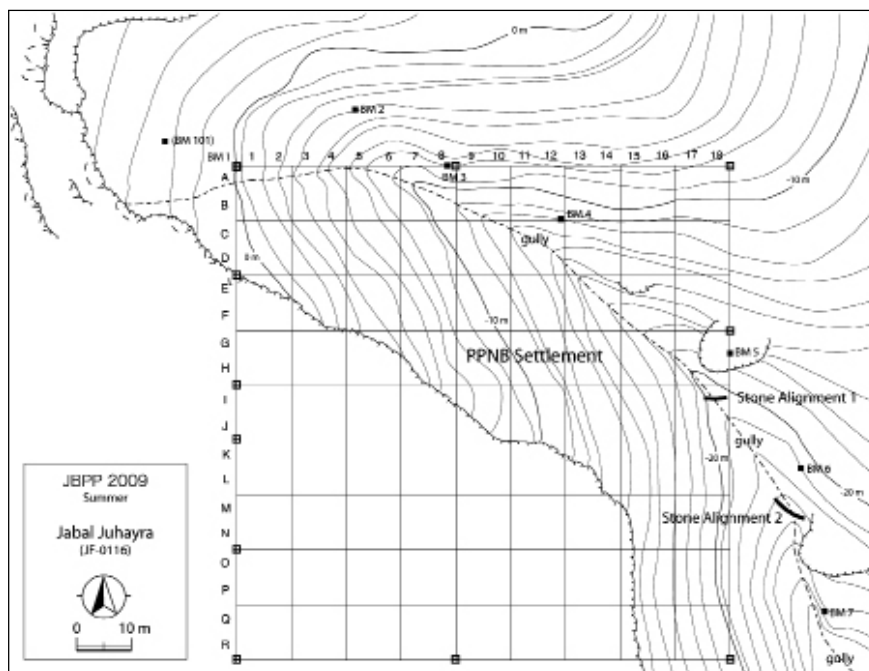
14. Wādī Baddā: topographical map around the wall remnant.

the southeastern flank of an isolated volcanic hill of the same name, overlooking a small gully flowing below the settlement (Fig. 15). The site was found for the first time during our 2001-2002 winter season survey and briefly reported elsewhere (Fujii 2002; Fujii and Abe 2008).

No clear evidence for water catchment facilities was found in the previous survey, but this survey confirmed for the first time two likely stone alignments in the middle and lower courses of the gully (Figs. 16-17). Both of them were small in dimensions, measuring ca. 2-3m long, ca. 0.3-0.7m thick, and ca. 0.2-0.3m in exposed height. They were constructed with a single row and course of undressed limestone cobbles, but



16. Jabal Juhayra: close-up view of Stone Alignment 1 (looking NE).



15. Jabal Juhayra: site plan and the location of the two stone alignments.



17. *Jabal Juhayra: close-up view of Stone Alignment 2 (looking NW).*

our brief sounding suggested that another course of stones underlay the exposed stone alignment. There is little doubt that they were used as small water storage facilities. Both of them do not always correspond to the direction of the present stream of the gully, but this might be due to minor change in channel.

Again, the question is their date. We produced a topographic map as a supplementary approach, but no useful clues to the issue were obtained. Thus an in-depth discussion must await a full-fledged investigation in the near future, but the two observations referred to above (i.e. the buried condition and the minor discrepancy with the present channel) seem to hint at a relatively early date for the two features.

Wādī al-Quwayr

Unlike the four sites described above, this site is located outside our original research area, in the northeastern part of the Jafr Basin. It was found for the first time by two American scholars and reported as a PPNB flint scatter (Quintero and Wilke 1998). Both of them revisited the site (or J-17 in their site registration code) in the summer of 2009, when they noticed that several masonry walls as well as numerous artifacts were exposed by an illicit excavation (Wilke personal communications). The reason why we visited the site in the course of the retrospective survey is that they sounded out the author about the feasibility of a rescue excavation.

The site was situated at the edge of a flat-topped plateau encompassing the northeastern part of the basin. The distribution range of flint artifacts suggested the site size of ca. 0.1 ha, the

norm of PPNB desert sites in southern Levant. The illicit excavation exposed several semi-subterranean masonry structures, which appeared to be aligned roughly in the east-to-west direction. The east-to-west orientation is common to PPNB outposts in Transjordanian Plateau. They were round or oval in general plan, measuring ca. 3-5m in diameter and up to ca. 1m in floor depth. The masonry walls were relatively superior in construction quality, being carefully built with up to several courses of undressed or partly dressed limestone cobbles (**Fig. 18**). The coexistence of a large structure and several smaller features reminded us of a combination of a key structure and attached components at Wādī Abū Ṭulayḥa (e.g. Fujii 2007a: Fig. 5). The same was also true with small finds, which included petroglyphs, flint basin-querns, and diagonally truncated stone bars, to say nothing of a large number of PPNB flint artifacts. There is little doubt that the site represents a PPNB outpost like Wādī Abū Ṭulayḥa. All of the finds were left intact for our future investigation.

In addition to the structural remains, a small stone alignment, ca. 2m long and ca. 0.2-0.3m in exposed height, was found in the lower course of a small gully that runs southward beside the outpost (**Fig. 19**). It was a single stone-row wide and single stone-course high, but our brief sounding suggested that another course of stones underlay the wall. Seeing that limestone bedrock layers were exposed throughout the gully bed, it was probably used as a wadi barrier to store seasonal runoff water. However, nothing can be said about its date, except that it may possibly have belonged to the neighboring PPNB outpost. Our rescue excavation scheduled in the



18. *Wādī al-Quwayr: general view of the site (looking E).*



19. *Wādī al-Quwayr*: close-up view of Stone Alignment 1 (looking NW).

2010 summer field season would hopefully provide a reliable clue to the key issue.

Other Examples

In addition to the Neolithic or supposedly Neolithic water catchment facilities described above, the survey also dealt with five isolated examples difficult to date. Four of them were known examples, but the other (i.e. *Wādī ar-Ruwayshid ash-Sharqī South*) was a new finding in the course of the survey.

Wādī ar-Ruwayshid ash-Sharqī (South)

This site is located on a wadi bed ca. 5km downstream of the PPNB barrage site of *Wādī ar-Ruwayshid ash-Sharqī* mentioned above. Though heavily shredded and half-buried by seasonal muddy streams, an intermittent stone alignment ca. 10m in preserved length was newly found (**Fig. 20**). It was slightly incurved toward the lower course, suggesting the use as a water catchment facility. It is most unlikely,



20. *Wādī ar-Ruwayshid ash-Sharqī South*: general view of the stone alignment (looking NW).

however, that it functioned as an impounding dam, since it occupied a flat, permeable terrain in the middle of the extensive wadi bed. Rather, the use as a basin-irrigation barrage would be more likely in view of the location and the simple structure. Seeing that it is not accompanied with a neighboring outpost, it may represent an enclave field or an isolated pasture like the two barrages at *Wādī ar-Ruwayshid ash-Sharqī*. No reliable clue to the dating was found, although a protruded reinforcement wall attached to the central part of the stone alignment reminded us of similar devices at *Wādī Abū Ṭulayḥa* and *Wādī ar-Ruwayshid ash-Sharqī*.

Wādī Burma South SW2

Wādī Burma is among major tributaries of *Wādī al-Ḥasā*, flowing northward through a hilly terrain that forms the northwestern watershed of the Jafr drainage system. Our research area includes its uppermost reaches, where several dozens archaeological features were located in the course of our comprehensive investigations in 2003 and 2004. The site of *Wādī Burma South SW2* (or WBs-SW2 in our site registration code) is among those and was partly excavated in the summer field season of 2003 (Fujii 2004). The investigation confirmed a pair of stone-built walls that stretched along an upper river terrace over ca. 400m and converged at their southern extremities (**Fig. 21**). It was originally defined as a kite site or a drive-hunting facility, but redefined later as a water catchment facility for lifting up seasonal runoff water to the surrounding flood plain ca. 1-2m higher in elevation (Fujii 2005a).

Here again, the question is its date. Although the previous investigation collected a small number of artifacts around the converging point, they were stray objects swept away from the upper course and, therefore, useless for dating. Unfortunately, the situation still remains unchanged. The retrospective survey revalidated our previous functional identification, but no clue to dating was obtained except that the location on the upper river terrace is suggestive of a relatively early date for the unique feature.

Wādī Burma North SW3

This site is located on an upper river terrace ca. 1.3km downstream or NNE of *Wādī Burma*



21. *Wādī Burma South SW2: general view of the site (looking SW).*

South SW2 and consists only of a remnant of a curvilinear stone alignment opening upstream (**Fig. 22**). It was tentatively registered as a kit site again in the 2004 summer field season, but left intact due to the poor state of preservation. The feature was a simple structure single stone-row wide and a single stone-course high, and often left a gap between any two adjacent construction materials. In light of these observations and the reassessment at Wādī Burma South SW2, there is little doubt that the feature can also be defined as a basin-irrigation barrage rather than a drive-hunting facility. No datable artifacts were found, but the remarkable elevation gap between the feature and the present wadi bed suggests the possibility that it dates back to remote antiquity.



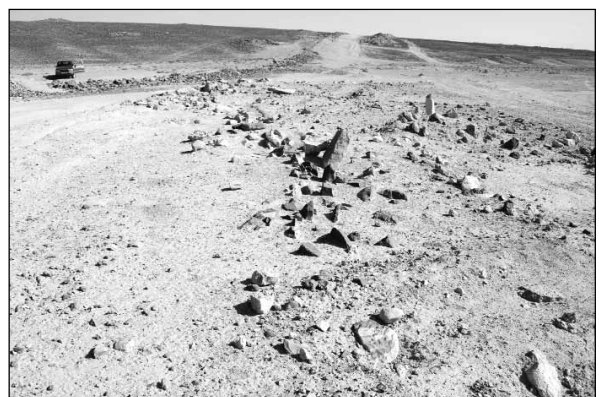
22. *Wādī Burma North SW3: general view of the stone alignment (looking NW).*

Wadi al-Quṣayr 183

This site lies on an upper river terrace in the lower course of Wādī al-Quṣayr, a side wadi of Wādī Burma. Our limited excavation, conducted in the 2004 summer field season, revealed a freestanding stone-built wall ca. 28m long and ca. 1.5-3.0m wide (Fujii 2005a). It occupied a flat, permeable terrain beside a small playa, suggesting the use as a small-scale basin-irrigation barrage. However, no clear evidence for dating was available. The retrospective survey of this field season did not provided any new information except that it was partly buried by a civil engineering work for laying a pipeline underground (**Fig. 23**).

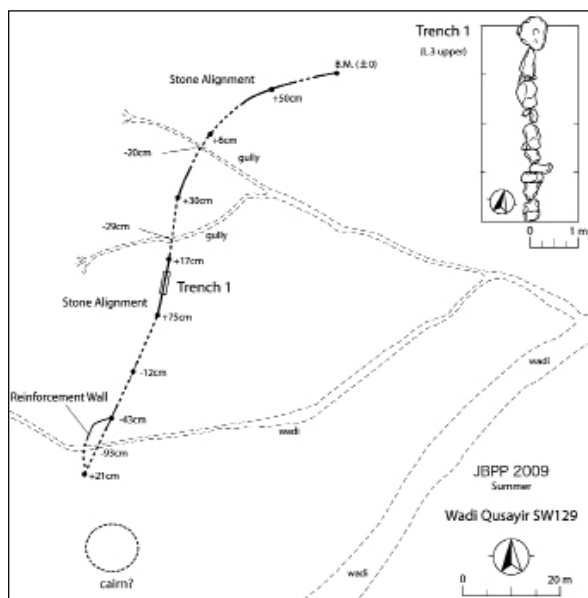
Wadi al-Quṣayr 129

The site of Wādī al-Quṣayr 129 is located on

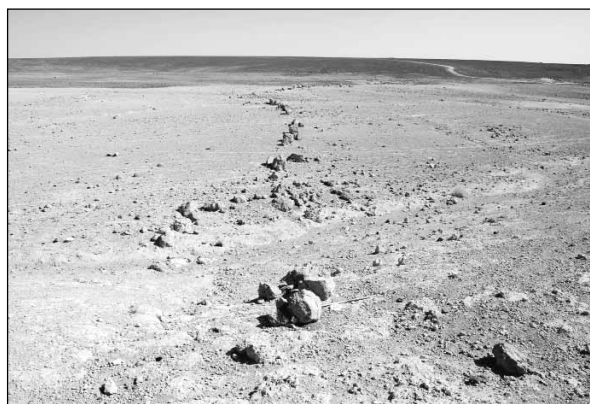


23. *Wādī al-Quṣayr 183: general view of the wall alignment (looking N).*

a gently undulating hilly terrain ca. 700m upstream of Wādī al-Quṣayr 183. Our previous investigation, conducted again in the 2004 summer field season, confirmed an intermittent stone-built wall ca. 100m in total length. It was slightly protruded against the slopes and, therefore, tentatively identified as a simple wadi barrier for splaying seasonal runoff water to its surrounding terrain (Fujii 2005a). Our reexamination newly confirmed a remnant of a small reinforcement wall at the southern extremity (**Figs. 24, 25**). Such a device is common to Jafr Neolithic water catchment facilities (Fujii 2007b, 2007c), but we have to maintain a cautious stance on the dating of the isolated example.



24. Wādī al-Quṣayr 129: the wall alignment and its surrounding topography.



25. Wādī al-Quṣayr 129: general view of the wall alignment (looking NNE).

Summary

The comprehensive review revalidated that the Jafr Basin contained a variety of water catchment facilities. As previously discussed (Fujii 2007b, 2007c, 2010a), six of them — four at Wādī Abū Ṭulayḥa and two at Wādī ar-Ruwayshid ash-Sharqī — can be dated to the PPNB period with considerable certainty. In addition, the barrage-like wall remnant at Wādī Baddā and the two stone alignments at Jabal Juhayra may possibly also be included in the PPNB devices. The existence of at least six (or nine when including the second-ranking candidates) water catchment facilities highlights the essential role of water for the survival in the Neolithic Jafr Basin.

Two things merit attention, however. First, there is a remarkable difference in variety of water catchment facilities between the central area of the basin and its peripheral parts. While the central, more arid area contained at least three basin-irrigation barrages as well as other minor facilities, the western hilly terrain nearer to sedentary farming communities focuses only on the small wadi barriers aside from a few undated examples. This unexpected picture, though possibly overemphasized by the difference in preservation conditions between the two areas, suggests that the initial transhumance was first established through transplanting a mixed economy common to the mother settlement area into arid peripheries. A good example is Wādī Abū Ṭulayḥa, where a line of evidence attested to a multi-faceted subsistence strategy consisting of basin-irrigation agriculture (sustained by Barrage 1), small-scale transhumance, and hunting of wildlife (Fujii 2009a, 2010a). It is important to note that the construction of full-fledged water exploitation facilities including basin-irrigation barrages first enabled early transhumants to penetrate into the Neolithic Jafr Basin.

We should also note that datable water catchment facilities in the prehistoric Jafr Basin focus exclusively on the PPNB period, and that no clear evidence for later examples has thus far been confirmed. This is possibly because while the PPNB transhumance was based on standard water use installations, full-fledged pastoral nomads in the subsequent periods substituted minor devices and/or natural ponds for them. Given this, pastoral nomadization in the Jafr Ba-

sin may be defined as a process of departure or liberation from fixed outposts sustained by full-fledged water catchment facilities, as suggested at Wādī Abū Tulayḥa (Fujii 2010b).

The retrospective survey proved that our working hypothesis mentioned at the beginning is worth testing in a broader context. It is now evident that the water supply problem at remote agro-pastoral outposts holds a key to reading the process of pastoral nomadization in the Jafr Basin. The next field season is to embark on a full-scale investigation of a few water catchment facilities newly found in the survey.

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THE ORIGINS AND DEVELOPMENT OF AGRICULTURE IN THE WĀDĪ AL-ḤASĀ REGION: 2006 TEST EXCAVATIONS AT KHIRBAT AL-ḤAMMĀM (WHS149), TBAS 102, AND TBAS 212

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Introduction

This is a report of the results of the first field season of the Origins and Development of Agriculture in Jordan (ODAJ) project. The project's primary goal is to examine the periods on either side of the transition to agriculture in the Wadi al-Hasa catchment in order to shed light on the biocultural changes associated with the shift from hunting and gathering to domestication economies. Test excavations at two Late Epipaleolithic sites and one Pre-Pottery Neolithic site were carried out during May and June 2006. ODAJ is one of the many excavation projects that was spawned by the archaeological surveys carried out in and around the Wadi al-Hasa catchment (Clark *et al.* 1994; MacDonald 1988, MacDonald *et al.* 2004) ODAJ project findings, to date, indicate that Natufian and Neolithic groups in the Wadi al-Hasa catchment devised local strategies and local identities, while simultaneously retaining meaningful cultural connections with other groups in the southern Levant. This work demonstrates that west-central Jordan is a productive setting for further investigations into both sides of the transition to agriculture.

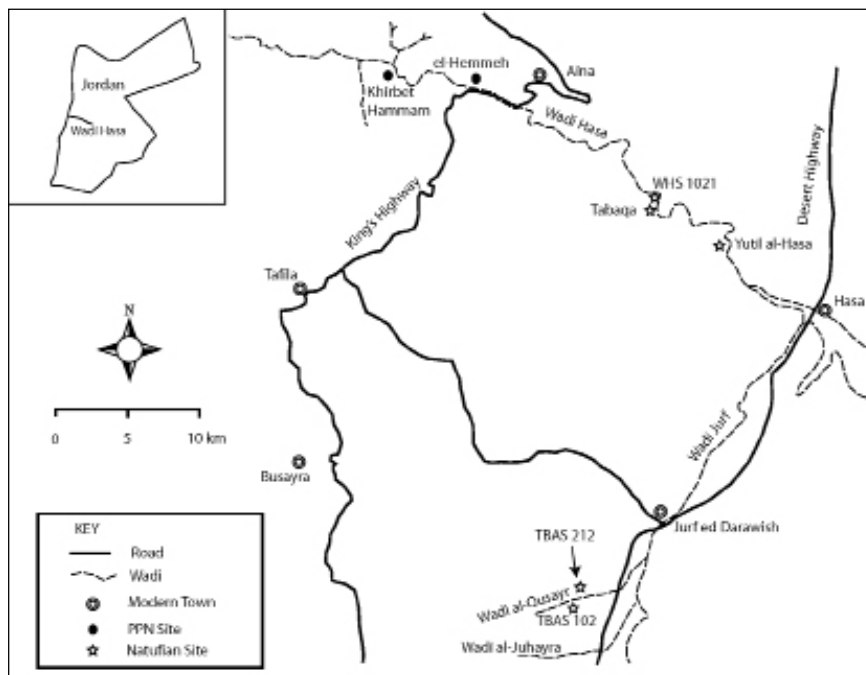
Sites

The Wādi al-Ḥasā is the southernmost major drainage into the Dead Sea depression. Beginning in the desert/steppe environment of west-central Jordan, the wadi traverses a number of different environmental zones before it empties into the Dead Sea plain near aṣ-Ṣāfi. Archaeological surveys of the wadi have recorded nearly 1600 archaeological sites (Clark *et al.* 1992, 1994; MacDonald 1988) attesting to the importance of the Wādi al-Ḥasā, in terms of resources and geography, to prehistoric and historic populations. Within the larger Wādi al-Ḥasā catch-

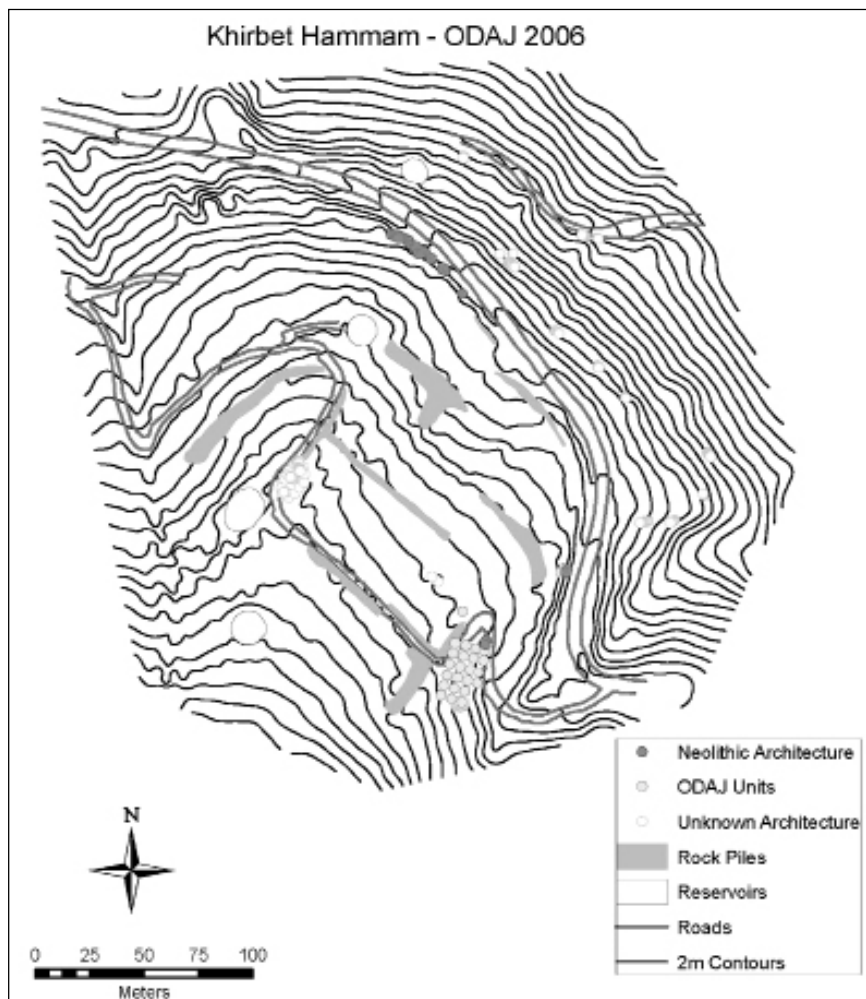
ment, the smaller wadis to the south (e.g., Wādi al-Jurf and Wādi Burma) contain numerous small drainages (e.g., the Wadis Juhayra and al-Quṣayr), all of which flow into the upper end of the Wādi al-Ḥasā. Thus, the regions investigated by the ODAJ project are linked by virtue of the continuity of the larger catchment region.

A cluster of ten Natufian sites was identified along the Wādi al-Quṣayr, a small, shallow wadi approximately 25km southeast of the Wādi al-Ḥasā during MacDonald's Tafila-Busayra survey (TBAS) in 1999-2000 (MacDonald *et al.* 2004; Neeley 2004, 2006). Two of these sites, TBAS 102 and TBAS 212 (**Fig. 1**), were selected for test excavations based on the density (greater than 200 pieces within a 1m diameter) and techno-typological characteristics (bladelet cores and small, abruptly backed lunates) of the surface remains. Following the 2000 survey, one of these sites (TBAS 212) was tested in 2004 by Fujii (2005) and identified as a Late Natufian camp. Previous publications (e.g., MacDonald *et al.* 2000, 2001, 2004; Neeley 2004, 2006; Neeley and Peterson 2007) have referred to the sites being located in the Wādi Juhayra. However, they are more appropriately considered to be part of the Wādi al-Quṣayr, a small wadi located north of the Wādi Juhayra.

Khirbat al-Ḥammām's location on the south side of the Wādi al-Ḥasā was noted in surveys by Glueck (1939) and MacDonald (1988) (**Fig. 1**). The Pre-Pottery Neolithic occupation was later confirmed by surface inspection (Rollefson and Kafafi 1985) and a test excavation trench along the roadcut (Peterson 2004). Khirbat al-Ḥammām covers approximately 7 hectares and rests on a sloped terrace 290 masl (**Fig. 2**). It has been spared the substantial erosion that has drastically truncated other Neolithic sites in the



1. Location of ODAJ Project Sites and Other Pertinent Sites in West-Central Jordan.



2. Topographic Map of Khirbat al-Hammām.

region. This enhances the research potential of the site, especially in combination with numerous architectural remnants, well-preserved organics, and over 2m of cultural deposits. Recognizing this potential, the Jordanian government purchased the site and now employs security personnel to protect it. Their presence has substantially diminished disturbances at Khirbat al-Ḥammām from cultivation, bulldozing, and vandalism.

Our rationale for expanding investigations of the agricultural transition outside the Wādī al-Ḥasā proper – and into the wider catchment zone – was grounded in previous research. Survey and excavation projects within the Wādī al-Ḥasā have identified several Early Natufian sites such as Ṭabaqa, Yutil al-Ḥasā, and WHS 1021, but no Late Natufian sites (Byrd and Colledge 1991; Olszewski *et al.* 1994; Olszewski and Hill 1997). Typo-technological analyses of the materials from the Wādī al-Quṣayr region suggested the possibility for Late Natufian occupation. Therefore we chose to expand the research area in hope of catching the terminal Epipaleolithic habitation which segued into the earliest manifestations of the Pre-Pottery Neolithic.

Chronology

The chronological sequence of the combined three sites spans much of the transitional Late Epipaleolithic and Early Neolithic sequence. AMS dates provide the anchors for the sequence, but are supplemented by typotechnological assessments of the lithic assemblage. The AMS dates are presented here, while the relative dating from stone tools will be discussed in the section devoted to artifact descriptions.

Late Epipaleolithic Sequence

The initial expectations regarding the chro-

nology at TBAS 102 and 212 were colored by the survey results in 1999-2000 (MacDonald *et al.* 2000, 2001) and previous work in the Wādī al-Ḥasā (Olszewski 2000). In the former, the local setting was identified as a lacustrine environment (Moumani *et al.* 2003) with the presence of some Helwan retouched lunates. Similar combinations found in the Wādī al-Ḥasā indicated an Early Natufian occupation. Thus, it was expected that an Early Natufian occupation would characterize the Wādī al-Quṣayr materials as well. However, two radiocarbon dates from TBAS 102, both around 11,000 bp (uncalibrated) (**Table 1**), indicate an early Late Natufian occupation (Neeley *in press*). These dates fit well with the calibrated dates for the Natufian found in Bar-Yosef (2000) and Aurenche *et al.* (2001). Furthermore, the typotechnological characteristics of both assemblages are consistent with the expectations for a Late Natufian occupation. In the larger picture of west-central Jordan, these two sites appear to be the first Late Natufian occupations identified within the Wadi Hasa catchment and their presence indicates that hunter-gatherers continued to occupy this region, at least initially, in the face of the environmental changes associated with the onset of the Younger Dryas about 11,000 bp.

Neolithic Sequence

Analysis of the 2006 materials suggests that Khirbat al-Ḥammām has a more complex, multiphase occupational history than previously thought. Originally, two AMS dates from the 1999 excavations documented a Late Pre-Pottery Neolithic B occupation (Peterson 2004). However, two additional AMS dates from the 2006 season suggest the need to re-evaluate that chronological interpretation (**Table 1**). Both conventional and calibrated dates fit within the

Table 1: Radiocarbon Dates from TBAS 102 and Khirbat al-Ḥammām (WHS 149).

Site	Sample No.	Unit/Level	Conventional Age	Two Sigma Calibrated Results
TBAS 102	Beta 221179	3/3	11170±70 BP	13410-12980 BP and 12940-12910 BP
TBAS 102	Beta 229411	4/2	11040±60 BP	13100-12860 BP
WHS 149	Beta 221347	2/3	8310±40 BP	9450-9240 BP
WHS 149	Beta 221348	2/4	8440±40 BP	9520-9420 BP

Middle PPN sequence using the chronology proposed by Kuijt and Goring-Morris (2002: 366). The calibrated dates straddle the MPPNB/LPPNB boundary using the Aurenche *et al.* (2001) chronology. Furthermore, projectile point styles hint at a PPNA/EPPNB component at the site. Overall, current data from Khirbat al-Ḥammām suggest that the cultural remains may stretch back further towards the inception of agricultural origins, and span a significant portion of the Pre-Pottery Neolithic. Finally, excavations did not reach the bottom of cultural deposits in either field season.

The 2006 field season resulted in a re-evaluation of the time periods represented at these sites. Most importantly, the new dates indicate a shift toward the time of the transition to agriculture with the identification of a Late Natufian component and the expansion of the PPN from Late into the Middle PPN and possibly including a PPNA/EPPNB component. Given the small scale of excavation to date, the presentation of these dates suggests that west-central Jordan merits more work in these crucial time periods.

Geomorphology

Today, the Wādī al-Ḥasā catchment is a region of rugged topography and distinctive geology and landforms. Ongoing work in this area highlights the need for finer-grained environmental reconstructions supported by geological data. Not only were the prehistoric environments during the transitional periods vastly different from present, but changes in local landforms due to climatic and anthropogenic factors have affected our ability to find sites and generate comprehensive models of the agricultural transition. Our environmental reconstructions rely heavily on the work of Hill, who relocated sites in the Ḥasā area and analyzed landscape change using settlement data and paleoenvironmental indicators in the region (Hill 2006). Continued geoarchaeological survey in and around the Wādī al-Quṣayr region and the Wādī al-Ḥasā were integrated into the 2006 ODAJ field season.

Natufian Landscapes

The present day landscape of the Wādī al-Quṣayr consists of a sparsely vegetated, rocky, arid environment. Nearly all the vegetation oc-

curs in the wādī bed which is broad and flat and shows little evidence of downcutting. Modern use of the area for agricultural or pastoral activities is rare due to the scarcity of water and foliage. These present conditions can be contrasted with the prehistoric environment of the Wādī al-Quṣayr which appears to have been much more conducive to human habitation.

During the Paleolithic, the dominant feature of the Wādī al-Quṣayr was the presence of water in the form of springs, ponds, and marshes. Support for this wetter environment is derived from the presence of marl deposits (Moumani *et al.* 2003). This landscape was probably part of a series or chain of marsh habitats extending north to Jurf ad-Darāwīsh and ultimately toward the Wādī al-Ḥasā. Indirect support for this greater resource base is the large number of archaeological sites clustered along these pond/marsh environments stretching from the Lower Paleolithic through the Late Epipaleolithic (Neeley 2006). For the Wādī al-Quṣayr, it is suggested that these marsh/pond environments were fed by a series of spring deposits that were active during wetter phases of the Late Pleistocene. A likely change in the environment occurs with the onset of the Younger Dryas (11,000 bp uncalibrated, 12,900 cal BP) in which climatic conditions became warmer and drier, effectively signaling the end of the pond/marsh environments. The archaeological record in the Wādī al-Quṣayr supports this climatically induced hiatus as the prehistoric occupation terminates with the Late Epipaleolithic (the first part of the Late Natufian about 11,200 bp) and is only sporadically represented during the Chalcolithic and Bronze Age with an absence of early Neolithic sites (though see Fujii 2002 for the identification of a PPNB site on the slopes of Tall Juhayra). This gap in the archaeological record is consistent with the occupational history from both Jurf ad-Darāwīsh and the eastern end of the Wādī al-Ḥasā as Late Natufian materials are absent as the marsh environments recede. Furthermore, those areas outside of these Late Pleistocene marsh/pond settings appear to contain little evidence of a Late Paleolithic (Upper and Epipaleolithic) settlement (e.g., the TBAS region), suggesting that these marsh/ponds were primary settlement locations in an otherwise marginal environmental setting (Neeley 2006).

Neolithic Landscapes

A database of sites in the Wādī al-Ḥasā compiled from the MacDonald (1988) south bank surveys and the Clark (Clark *et al.* 1992, 1994) north bank surveys documents that Neolithic and Chalcolithic sites are often perched on steep, sometimes unstable slopes with awkward access to agricultural lands either in the floodplain below or plateau above (Hill 2006: 77-78). Did people choose to settle in these awkward settings because they were the only options in an environment with few attractive options for farming? A more likely explanation, is that the Ḥasā of today looks drastically different than the Ḥasā of 8-10,000 years ago.

Specifically, substantial channel incision, due to both climactic and anthropogenic changes, can be inferred from settlement distribution, Dead Sea sedimentation records, and isotopic studies of speleotherms. Preliminary geoarchaeological survey during 2006 reinforces a hypothesis that the Neolithic Wādī al-Ḥasā was dominated by a wide, slow moving waterway – one that built up rich, alluvial soil rather than scouring it away. In this scenario, the wadi valley would have provided large expanses of arable land in a broad, flat floodplain. A landform in the Wādī al-La‘bān, a tributary of the Wādī al-Ḥasā, may represent a preserved remnant of the ancient wadi channel that remains intact at an elevation of 30m above the current wadi bed. Coring this landform should provide materials that can be dated to support to this hypothesis. High agricultural productivity at Khirbat al-Ḥammām is supported by indirect, artifactual evidence. The site’s surface is littered with hundreds of handstones and large querns. This view of the Ḥasā, as providing a landscape of sustained agricultural productivity, if further supported by recent discoveries at al-Ḥimmah, a Neolithic site that lies less than 10km from Khirbat al-Ḥammām on the north bank of the wadi (**Fig. 1**). Recent excavations document the presence of PPNA, LPPNB, PPNC, and possible PPN occupations at el-Hemmeh (Makarewicz and Austin 2006; Makarewicz *et al.* 2006).

Reconstructions of local environmental conditions are beginning to portray both the Wādī al-Ḥasā and its catchment zone on the plateau to the south as well-watered and economically productive locales capable of supporting thriving

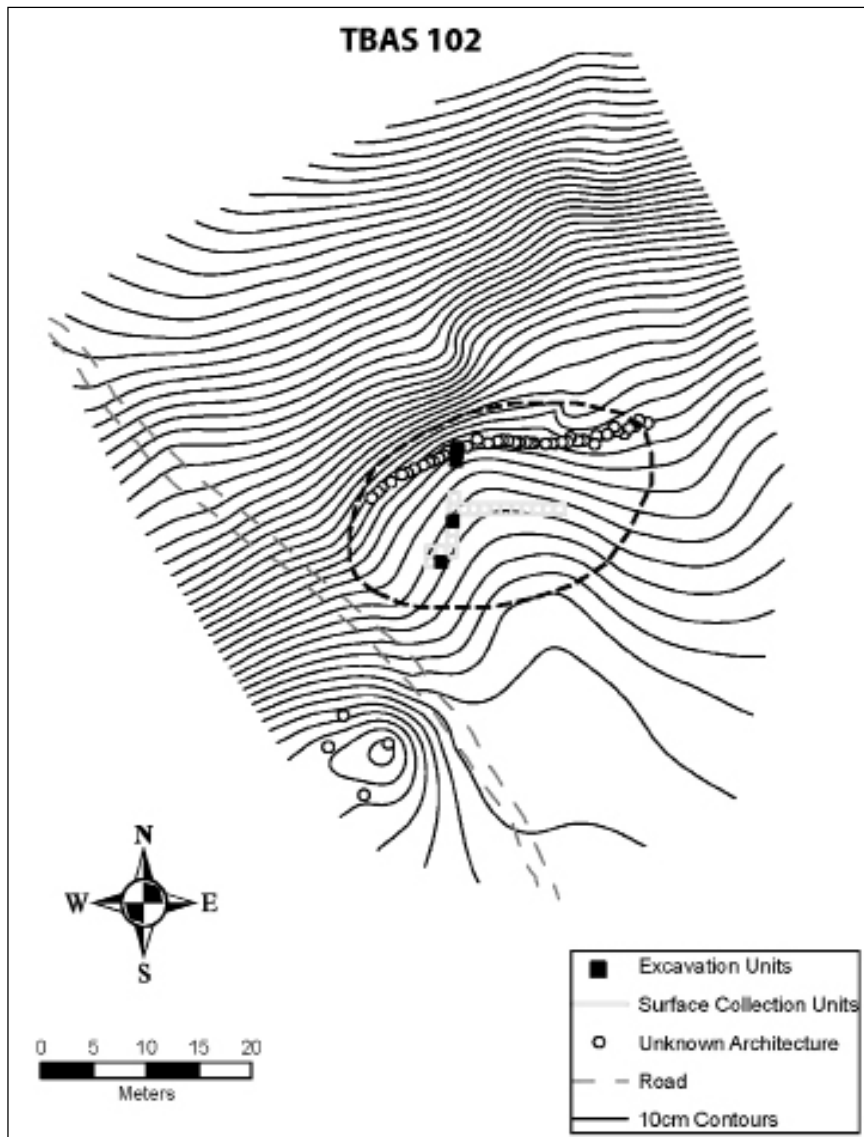
communities. The available chronological data indicate long, multi-phase, occupational histories at these sites which suggest a chronological convergence between the areas. Artifacts and economic data sets from these sites further add to our knowledge of Natufian and Neolithic environments and lifeways in the Wādī al-Ḥasā region.

Field Methods

Our first season of fieldwork involved mapping, surface collection, and test excavation. Both of the Late Epipaleolithic sites (TBAS 102 and 212) were subject to limited surface collections. The rationale behind this was the uncertainty that there would be substantial subsurface deposits. However, subsequent test units revealed that both sites had sufficiently intact subsurface deposits and were not solely surface manifestations. At TBAS 102, twenty 1 x 1m units were surface collected. Each of these was subdivided into four 50 x 50cm quadrants. In addition to the surface collections, four 1 x 1m units were excavated. Two of these, Units 1 and 2, bisected the 17m long stone alignment on the north side of the site (**Fig. 3**). The remaining two units, Units 3 and 4, were placed in the center of the site where the depth of deposits was expected to be greatest. All of the test units were excavated in 10cm levels and screened through .33cm mesh.

TBAS 212 was significantly larger than TBAS 102, as surface materials were scattered along the north side of the wadi. Only ten 1 x 1m surface units were collected, all of them in the immediate vicinity of the two test excavation units (**Fig. 4**). Again, the excavation proceeded in 10cm levels and all materials were sieved through a .33cm mesh.

At Khirbat al-Ḥammām, team members surveyed the site surface in 10m transect intervals, mapping exposed architectural elements and artifact distributions. Based on survey results, the site size was estimated at 7 hectares. Limited surface collections were conducted at twelve 5 x 5m units (300m²) that contained high surface densities and/or exposed walls of presumed Neolithic origin. Based on survey and surface collection, three test units (8m² in total) were excavated in the East Field. A top layer of disturbed soil containing modern rubbish was removed from all units before systematic excavation began. Below this, units were exca-



3. Topographic Map of TBAS 102 indicating Site Boundaries and Areas of Investigation.

vated in 10cm. arbitrary levels and all soil was sieved through .33cm mesh. A limited program of soil sampling was undertaken to test for the preservation of macrobotanical, phytolith, and spherulite remains. Test Unit 1 (1 x 2m) was abandoned after 10cm of vertical excavation showed that the deposits were largely devoid of artifacts and the wall alignment was only one course deep. Test Units 2 (2 x 2m) and 3 (1 x 2m) proved more productive and are discussed in further detail below.

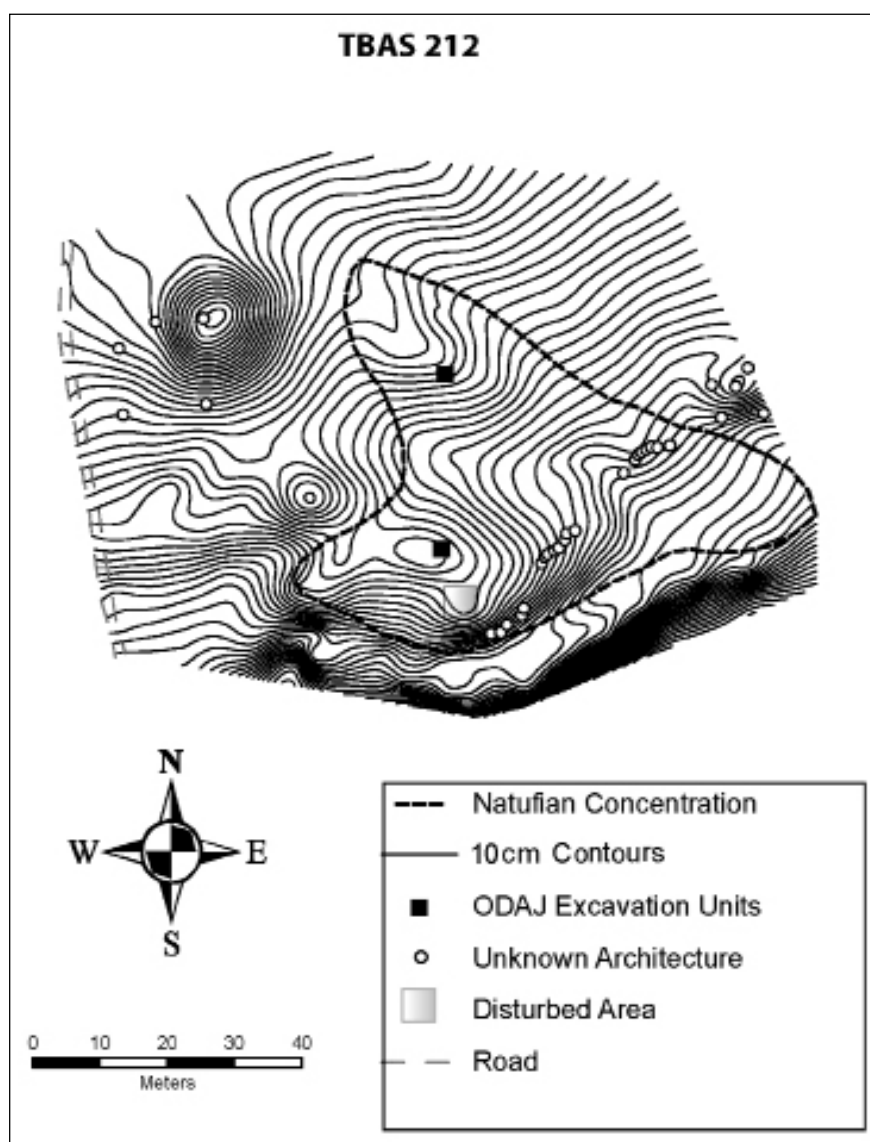
Stratigraphy/Architecture

Wādī al-Qūṣayr—TBAS 102 and 212

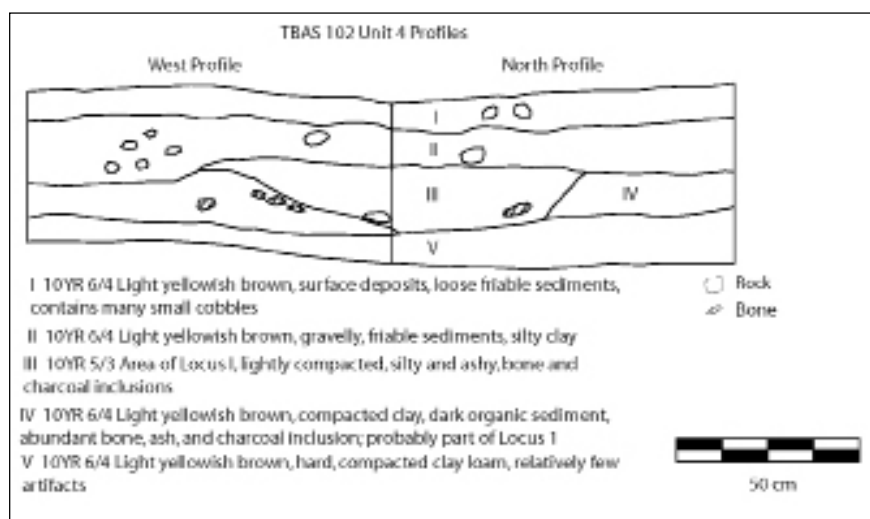
The test units at TBAS 102 contained a light yellowish brown (10YR 6/4) clay loam with oc-

casional inclusions of silts and sands. The lower levels of the four units contained small inclusions of calcium carbonate. Formal hearth features were absent but an area of darker soil (10YR 5/3 brown) containing fragmented burned bone, freshwater shell, and charred organics for dating occurred in the northwest quadrant of Unit 4 in levels 2 and 3 (20-30cm below the surface) (**Fig. 5**). Although the organic content was higher in this area, the edges were poorly defined and it is undetermined whether this constitutes a feature in the formal sense or whether it reflects activities related to disposal and post-occupational disturbance.

More enigmatic at TBAS 102 was the 17m long alignment of stones on the northern edge



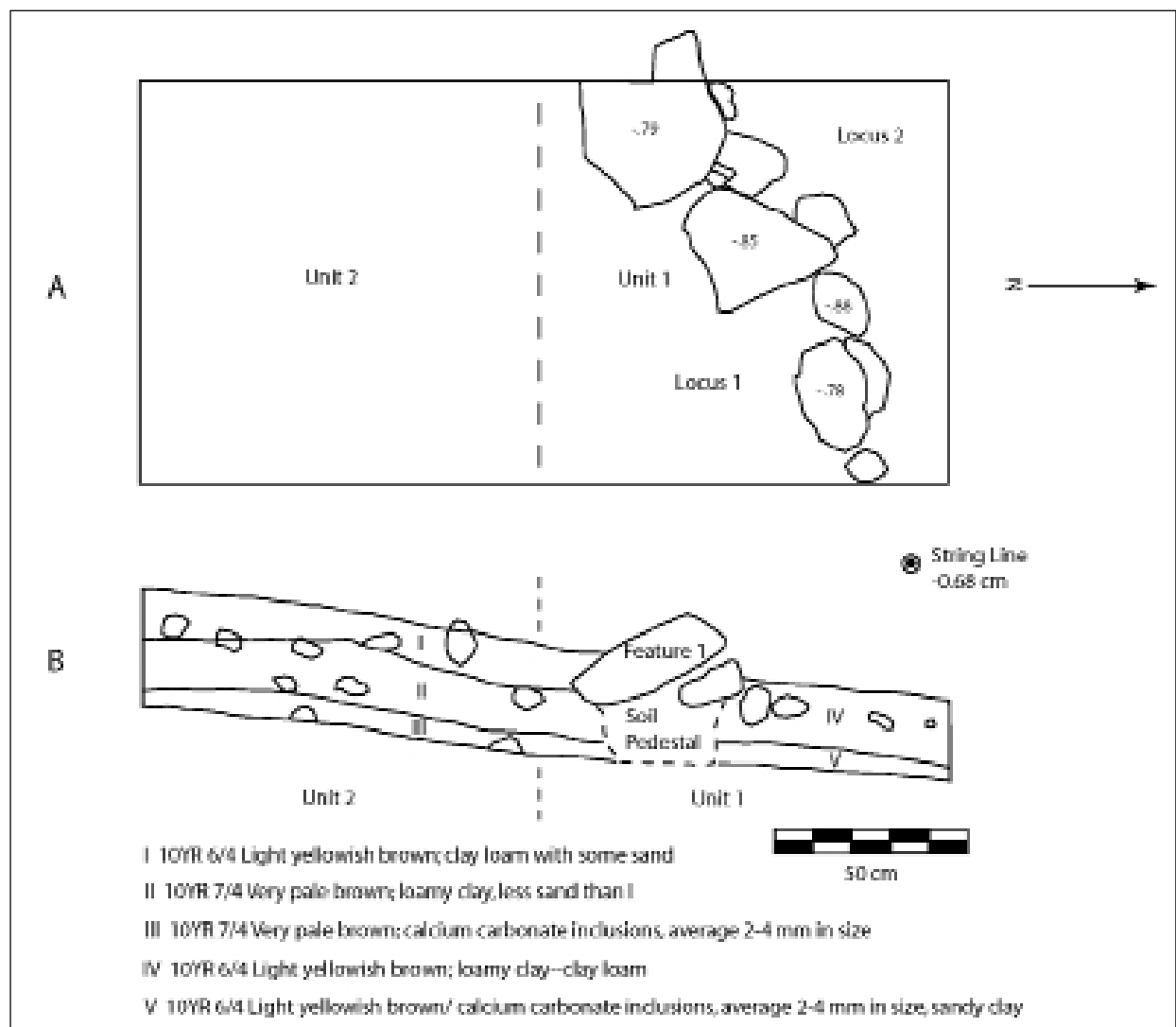
4. Topographic Map of TBAS 212 indicating Site Boundaries and Areas of Investigation.



5. West and North Profiles of TBAS 102 Unit 4.

of the site. The alignment is situated downslope from the site center and consists of a roughly linear alignment of unevenly spaced stones. Test Units 1 and 2 bisected this feature in order to determine its depth and possible cultural affiliation (**Fig. 6**). The larger stones, visible on the site surface, were supported by a series of smaller stones. Gaps were present between the stones suggesting that it did not function as a terrace or retaining wall. Furthermore, the depth of the sediment on the uphill side is not significantly different from that on the downhill side. A possible function for the alignment could be as a windbreak, especially since the gaps between the stones could be filled in with organic construction materials to create an ephemeral

barrier. This assumes that the prevailing winds were coming from a northerly or northwest direction. A potential problem with this explanation is the location of the alignment on the down-slope of the site. Unless individuals were directly against the windbreak, it would offer little wind protection on the upslope side of the site. Finally, it is worth noting that the lithic materials from Units 1 and 2 were least similar to materials in Units 3, 4, and the site surface. The materials from Units 1 and 2 were comprised of more coarse-grained, heterogeneous cherts that were larger and less well-made than the other Natufian materials. This suggests differences in activity locations or the presence of another cultural component, likely post-dating the Natufian



6. Planview (A) and West Profile view (B) of TBAS 102 Units 1 & 2.

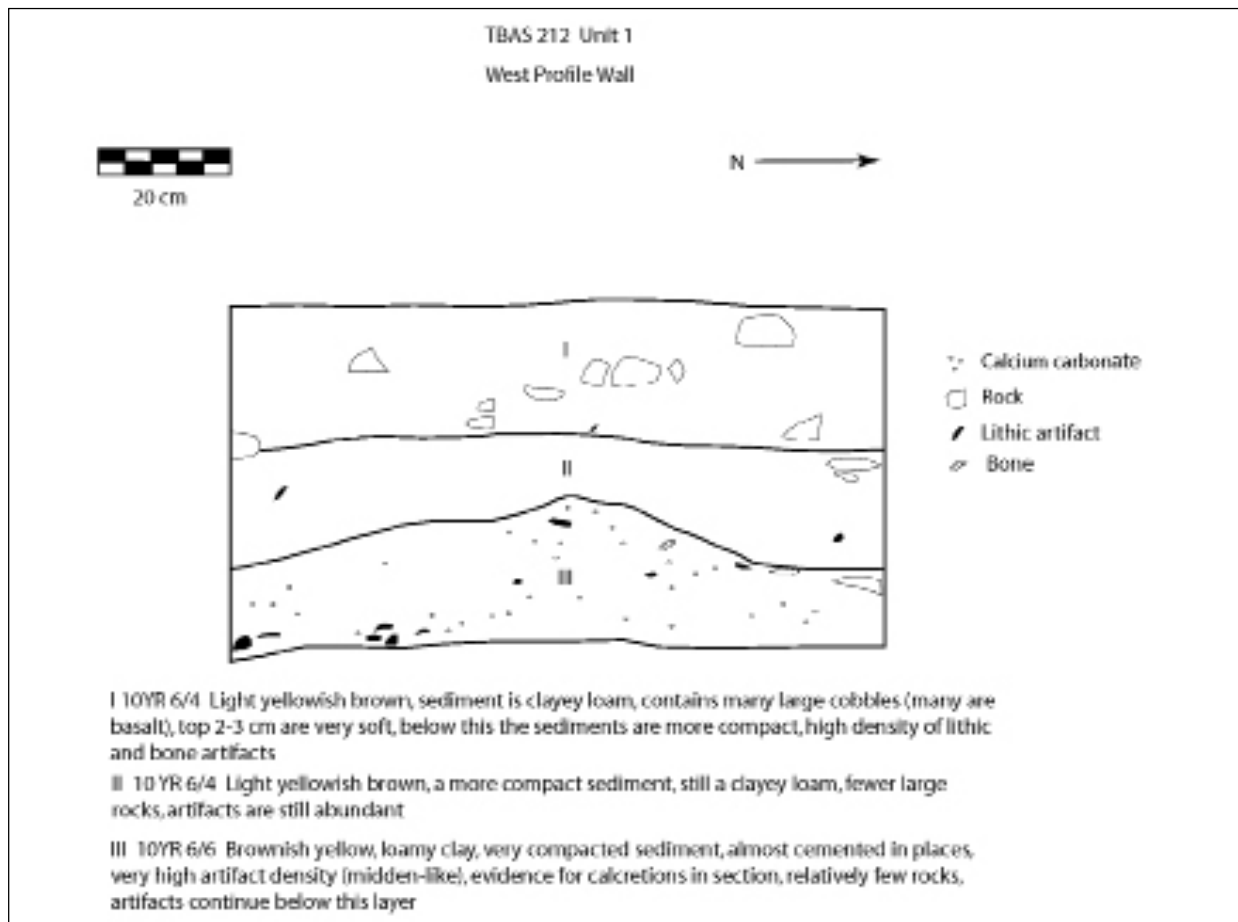
materials that dominate the site. In this case, we might be able to assign the stone alignment to this later site component and segregate it from the Natufian occupation. It should be noted that ceramics, which are associated with Holocene sites along the wadi, were not recovered from any of the excavated or surface collected units.

The two test units at TBAS 212 were characterized by loamy sediment, with variations in clay and silt inclusions that were light yellowish brown in color (10YR 6/4). Sterile sediments were reached in Unit 2 at a depth of 40cm below the surface while in Unit 1 the lower strata contain numerous inclusions of calcium carbonate and cultural materials increased in frequency (**Fig. 7**). Sterile deposits were not reached in the latter unit and there is potential for additional buried materials. Formal features were not observed, however, given the size of the site and the presence of subsurface materials, there is a high probability for features.

Khirbat al-Ḥammām

The ground surface of Units 2 and 3 was uneven due to the natural contour of the terrace as well as modern surface disturbances. The average depth of excavation across the units was 70cm. The fill from Units 2 and 3 consisted of homogeneous, loose, silt loam of grayish brown (10YR 5/2) or light grayish brown (10YR 6/2) color. The consistency and color suggested high ash content. Cobbles were frequent inclusions, and probably represent wall fall. The first four levels of excavated fill did not contain changes in color or texture indicative of natural strata. The homogenous fill may represent 1) trash deposits, with the abandoned structure serving as a midden for neighboring households, 2) slope wash, 3) or some combination.

Natural stratigraphic changes were first encountered in Level 5, as we came down on an irregular floor surface at between 60-65cm below ground surface (**Figure 8**, Feature 3). The

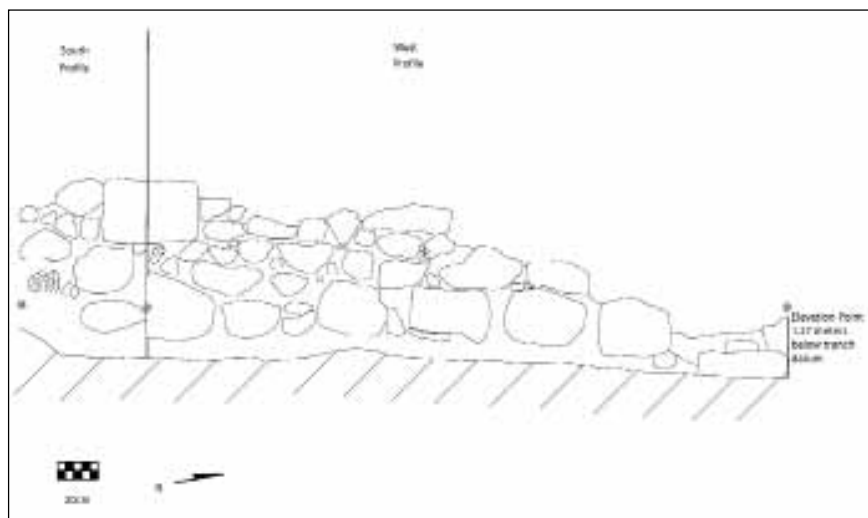


7. West Profile of TBAS 212 Unit 1.

surface was identified by a slight color change (10YR 5/4-yellowish brown), increased compaction, numerous flecks and small chunks of charcoal, and irregular patches of plaster. The course of stones sitting on this surface was noticeably larger than those in other courses, and presumably served as the wall's foundation (**Fig. 9**). This *huwwar* floor contrasts with the well-prepared, decorated plaster floor uncovered during the 1999 testing (Peterson 2004). Temporal or functional differences between architectural features uncovered in 1999 and 2006 may be significant. Furthermore, the East Field stone walls were preserved to a maximum of 4 courses

Resting slightly above this *huwwar* floor in Unit 2 were 2 large pierced ground stone items. Directly under these pierced stones, resting on the floor, were numerous intact faunal elements and a tight cluster of human bones and teeth. The human remains represent a child's skull, which appears to have been placed on the floor surface, perhaps in an organic container. There was no evidence that it was buried in a subfloor pit feature. We hypothesize that the ground stone artifacts served to mark to the location of the buried human remains. Additional bioarchaeological details of the human remains are provided later in this report.

Architecturally, throughout the excavation of Unit 2, Feature 1 was assumed to be a single wall formed double row of rectangular limestone blocks (**Fig. 8**). However, when we moved southwards and opened Unit 3, the two rows diverged suggesting that they defined walls of separate structures that ran alongside each other. There is also evidence that individual structures went through cycles of internal modification. For example, an internal dividing wall (**Figure 8**, Feature 2) within the structure does not extend to the floor, suggesting that it was a later addition. The 2006 excavations provide additional support for the agglutinated, shared wall architectural tradition that is becoming well-



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represented across southern and central Levantine PPN sites.

Lastly, three probable subfloor, stone channel constructions were identified during a visual survey of the exposed roadcut (**Fig. 10**). These are evocative of similar features at Baṣṭa (Nissen *et al.* 1987, 1991).

Artifacts

All three of the 2006 ODAJ sites contained numerous artifacts. The following presents preliminary analysis results of the lithic, shell, human, faunal, and botanical materials at the sites.

Lithics

Chipped and ground stone specimens were



10. Subfloor Channel in Roadcut at Khirbat al-Ḥammām.

washed and catalogued in the field. Detailed analyses of the Natufian materials were carried out under the direction of Dr. Neeley at his laboratory at Montana State University. Analyses of the Khirbat al-Ḥammām finds were carried out by Dr. Peterson and her students at Marquette University's Archaeology Laboratory.

TBAS 102 and TBAS 212. The 2006 field season yielded 32,507 pieces of chipped stone from the testing of these two sites. As presented in **Table 2**, the debitage percentages between the two sites are very similar. The main difference between the two sites is in the proportion of fragmentary and complete flakes. Another area of difference can be found in the density of materials (**Table 3**). When standardized by units of excavation (m^2), the lithic materials at TBAS 212 are over four times more dense than TBAS 102. A possible explanation for this difference in artifact density might be due to variations in the length of occupation or the frequency of reoccupation. In light of the small-scale of the present excavation, we feel that the frequency of occupation is a more plausible case. Our reasoning for this is based on (1) the nearly identical proportions of the different debitage classes, suggesting that the same sorts of reduction activities were in place at both locations, and (2) the more widely

Table 2: Debitage Counts and Percentages from TBAS 102 and TBAS 212.

	TBAS 102	% ¹	% ²	TBAS 212	% ¹	% ²
Cores	113	1.1	1.8	211	0.9	1.5
Core Trimming Elements	66	0.7	1.0	170	0.8	1.2
Blades (complete)	324	3.3	5.1	594	2.6	4.3
Blade fragments	1421	14.4	22.6	3149	13.9	22.8
Flakes (complete)	1001	10.2	15.9	1404	6.2	10.2
Flake fragments	2706	27.4	43.0	7127	31.5	51.6
Tools	446	4.5	7.1	870	3.8	6.3
Microburins	223	2.3	3.5	274	1.2	2.0
Chips (< 10 mm)	1854	18.8	-	5417	23.9	-
Chunks	1704	17.3	-	3433	15.2	-
Total	9858		6300	22649		13799
¹ percentages for all debitage categories.						
² percentages excluding chips and chunks.						

Table 3: Lithic density per m³ at TBAS 102 and TBAS 212.

	TBAS 102		TBAS 212	
	Units 1 & 2	Units 3 & 4	Unit 1	Unit 2
Volume of dirt (m ³)	.60	.90	.50	.40
Artifact density	2013	7855	15,048	7482
Standardized density per 1m ³	3355 (.11)	8727 (.28)	30096 (1.0)	18705 (.62)

scattered lithic materials at TBAS 212 relative to TBAS 102. At the latter site, occupation is constrained and localized, while in the former, site materials extend 60-70m along the north side of the wadi in varying densities. Such a pattern might emerge if populations returned to this location repeatedly.

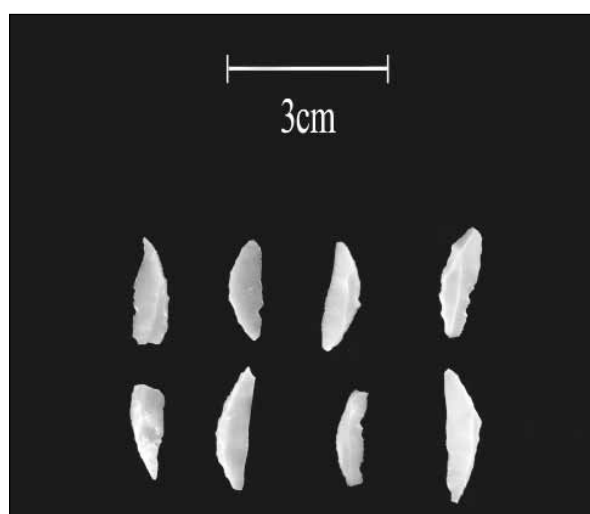
Raw materials are predominantly fine-grained flints. These range in color from light brown to gray, however, some of the color differences might be due to chemical weathering as most of the surface material was gray yet the subsurface material was more variable in color. There are also some heterogeneous cherts in the assemblage. These are characterized by differences in color, grain-size, cortex, and size from the other materials. The latter is of particular note, as the heterogeneous chert cores are significantly longer and heavier than the fine-grained materials (**Table 4**). While chert materials are

locally abundant and available, as evident by the use of these materials at nearby Paleolithic sites, the fine-grained flint appears to be selected for by the Natufian occupants. These raw materials are smaller than their chert counterparts as evident by the small-size of the discarded cores (many still retaining up to 50% of the surface covered with cortex), and the presence of a few tested cores that are roughly egg-size and shape. This suggests a pattern of raw material procurement that is unique to the Natufian as these raw materials do not appear in other local assemblages and the locally abundant cherts used during much of the Paleolithic are a minor component of the Natufian assemblages.

Retouched pieces consist largely of partially retouched edges of flakes and blades. Diagnostic elements are comprised of microlithic tools, primarily lunates (**Fig. 11**). Samples of complete lunates from both sites were examined

Table 4: Comparison of Core size (length and weight) between cherts and flints at TBAS 102 and TBAS 212.

	TBAS 102		TBAS 212	
	All Cores (Complete + Fragments)		All Cores (Complete + Fragments)	
	Chert ¹	Flint ²	Chert ¹	Flint ²
Length	47.29 mm	34.27 mm	49.33 mm	29.35 mm
Weight	92.1 g	23.49 g	77.8 g	14.7 g
N	19	69	12	195
	Complete Cores		Complete Cores	
	Chert ¹	Flint ²	Chert ¹	Flint ²
Length	49.98 mm	35.98 mm	61.10 mm	30.69 mm
Weight	105.6 g	28.9 g	135.55 g	17.1 g
N	15	39	6	118
¹ Course-grained, heterogeneous material.				
² Fine-grained, homogeneous material.				



11. Lunates from TBAS 102.

(Table 5). Lunates from TBAS 102 tend to be larger in terms of length, width, and thickness than TBAS 212. However, a size comparison with Early Natufian assemblages at Ṭabaqa and Bayḍa (Byrd 1991; Byrd and Colledge 1991) indicates that the TBAS assemblages are significantly smaller, conforming to the general notion that Early Natufian lunates are larger than those from the Late Natufian. An exception to this trend is observed with the Wādī Judayid lunates which are very small for an Early Natufian occupation (Sellars 1991). Perhaps more importantly for diagnostic purposes is the type of retouch on the lunates. It is generally recognized that Helwan (bifacial) retouch is a hallmark of Early Natufian industries (e.g., Bar-Yosef 1998; Belfer-Cohen 1991; Edwards 1991). This type of retouch is absent from the TBAS lunates where the dominant retouch type is abrupt retouch. This suggests that the assemblage is not typologically Early Natufian in age and is best

assigned to the Late Natufian. These typological patterns fit with the radiocarbon dates as well.

Khirbat al-Ḥammām. The chipped stone assemblage from 2006 contained 3982 artifacts. Khirbat al-Ḥammām demonstrates broad technological similarities with widespread, PPNB lithic patterns. The ranges of tool and debitage classes are consistent with Early Neolithic sites elsewhere (Tables 6 and 7). Most of the projectile points bear a typological resemblance to Byblos points, exhibiting unifacial retouch, rounded

Table 6: Tool Classes from the 2006 Excavations at Khirbat al-Ḥammām.

Class	n	%	% ¹
Projectile points	17	13	30
Perforators	10	8	17
Glossed blades	14	11	25
Scrapers	4	3	7
Burins	6	4	10
Notches	5	4	9
Adzes	1	1	2
Retouched blades	18	14	-
Retouched flakes	11	8	-
Utilized blades	39	30	-
Utilized flakes	6	4	-
Total	131	100	100

¹ Includes only formal tool classes (n=57) leaving out unclassified, retouched, and utilized pieces.

Table 5: Lunate dimensions of Complete Pieces from TBAS 102, 212, and other selected Jordanian sites.

	TBAS 102	TBAS 212	Ṭabaqa¹	Bayḍā²	Wādī Judayid³
N	13	25	31	-	286
Length	19.39 mm	15.10 mm	21.19 mm	26.95 mm	15.20 mm
Width	5.72 mm	4.35 mm	6.84 mm	-	4.87 mm
Thickness	2.42 mm	2.00 mm	2.35 mm	-	-
Weight	0.25 g	0.12 g	-	-	-

¹ Byrd and Colledge 1991.
² Byrd 1991.
³ Sellars 1991.

Table 7: Chipped Stone Counts and Percentages from the 2006 Excavations at Khirbat al-Ḥammām.

Category	n	%	% ¹
Cores	69	2	5
Core trimming element	6	>1	>1
Blades	254	6	20
Flakes	813	20	64
Tools	131	3	10
Chips, chunks	2709	68	-
TOTAL	3982	100	100

¹ Excludes chip, chunks (n=1273).

shoulders and retouched tangs (**Fig. 12**). Informal tools, such as retouched and utilized flakes/blades, are also well-represented.

Several observations are of chronological interest because they suggest pre-LPPNB occupation. Several projectile points match descriptions of earlier, EPPNB or PPNA, point styles. Specimen #25 (far right in **Fig. 12**) was found on the surface of Test Trench 2 before excavations began. The small point, produced on a blade, has bilateral notching. Morphologically the point shows similarities to el Khiam points. Specimen #60 (not illustrated) is the base of a similar point, with the lateral notches preserved. The artifact was found in the first 10cm of fill in Test Trench 2, a layer which had been greatly disturbed from both natural and cultural causes. These point types are widely regarded as *types fossiles* of the PPNA and EPPNB (Banning 1998; Gopher 1994). Erosion of the sloped site terrace, as well as a range of modern subsurface



12. Projectile Points from Khirbat al-Ḥammām.

disturbances may be responsible for the stratigraphic inversion of earlier points on top of later, *in situ* deposits.

Strategic exploitation of high quality raw materials in conjunction with naviform core-and-blade technology are hallmarks of MPPNB lithic production. The shift away from blade production has been correlated with LPPNB/PPNC manifestations at a number of sites, including 'Ayn Ghazāl (Gebel and Beinert 1997: 242; Nissen *et al.* 1987: 98-100; Quintero 1998; Rollefson 2003). However, local variation in the timing of the shift away from naviform blade and tool production is beginning to be documented as well (Barzilai and Garfinkel 2006; Galili *et al.* 1993). Two patterns from Khirbat al-Ḥammām are worth mentioning in this context, albeit with the caveat that our sample size is quite small. First, the flake:blade ratios in Units 2 and 3 show a marked decrease at/near the floor contact level (**Table 8**). Second, corresponding with the increase in blade production in the lower levels is an increase in the use of high quality flint raw materials. Cortical surfaces were examined to differentiate between high quality flint and wadi cobble material. Cortical pieces of high quality material – fine grained, few internal inconsistencies – typically had weathered cortex, indicative of having been quarried from bedded deposits. Cortical pieces with mechanically weathered cortex were assumed to be derived from local wadi cobbles. This material is more coarse-grained and has many more internal flaws visible that hamper standardized blade production. In Level 5, 89% of the pieces with identifiable cortex, appear to have originated from bedded deposits (Koska 2008).

Glossed blades make up 25% of the formal

Table 8: Blade and Flake Counts and Ratios by Level at Khirbat al-Ḥammām – Units 2 & 3

Level	Blade	Flake	Flake/Blade
1	44	89	2.02
2	23	77	3.35
3	19	64	3.37
4	17	59	3.47
5 ¹	49	52	1.06

¹ The bottom of Level 5 corresponds to floor contact.

tool assemblage. A preliminary functional analysis of the fourteen tools was conducted. The majority of specimens show no retouch and unilateral usewear. Exceptions are one denticulated specimen (far right in **Fig. 13**) and one steeply backed, more massive specimen (far left in **Fig. 13**). Tool metrics combined with location and invasiveness of gloss suggest that most of these tools were hafted and suitable for harvesting cereals. The Khirbat al-Ḥammām assemblage shows strong similarities with the 'Ayn Ghazāl glossed blades with respect to a number of metric attributes and breakage patterns (Olszewski 1994; Vande Walle 2008). Vande Walle asked whether some of the retouched and utilized blades might have been harvesting implements on which gloss had not yet formed. However, the unglossed specimens tend to exhibit distinctive patterns of retouch and/or wear suggesting different functions. For example, wear and retouch are often discontinuous, bilateral, or both.

A sample of the ground stone was analyzed and reported from the 1999 fieldwork (Peterson 2004). A noteworthy addition from 2006, are the three large 'pierced stones' found on the floor of the main room we excavated (**Fig. 14**). Several broken specimens had previously been de-

scribed from the surface assemblage analyzed in 1999. In the relatively unstandardized terminology applied to ground stone, these are variously described as mace heads, digging stick weights, loom weights, etc. without much in the way of formal description. These specimens are relatively large compared to other Neolithic specimens described by Wright (1992). They weigh, on average, 4 kilograms and measure 17cm in diameter. A child's skull lay directly under two of these large pierced stones, which were resting on a rough *ḥuwwar* floor.

Shell/Ornaments

Preliminary work on the shell from the sites has been completed by Aldona Kurzawska of the Polish Academy of Sciences (**Table 9**). The two Epipaleolithic sites yielded a total of 460 pieces of shell from both freshwater and marine contexts. The marine shell is indicative of Mediterranean and Red Sea origins, suggesting the trade of materials from these sources to the occupants in the Wādī al-Quṣayr. All of these have been modified and probably functioned as personal adornments. The bulk of the shell material (n=445) is freshwater in origin. These are not culturally modified like the marine shell, but are important to reconstructing the prehistoric environment as they suggest the nearby presence of spring deposits, an environment significantly different from the present desert conditions.

Khirbat Ḥammām's 2006 shell inventory includes both freshwater and marine shell specimens (n=46), and both types are culturally modified. Marine shell from both the Mediterranean and Red Seas are present. The shell assemblage mirrors general patterns found at Yiftahel, Abu Gosh, and Jericho. The shell data are relevant because they document that the site's residents were actively involved in fairly widespread economic and social networks on par with other large, well-documented PPNB sites. The fill directly associated with the child skull contained a *glycymeris* shell bead. So it seems likely that shell artifacts were incorporated into ritual practice at Khirbat al-Ḥammām, as well.

Biological Specimens

Human Skeletal Material at Khirbat al-Ḥammām

The skull found on the floor of Unit 2 was



13. Glossed Blades from Khirbat al-Ḥammām.



14. Pierced Stone Objects from Khirbat al-Ḥammām.

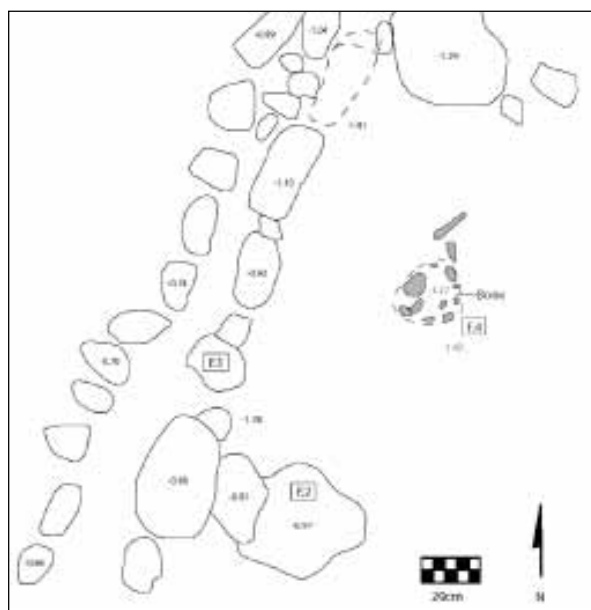
Table 9: Shell Species and Frequencies from TBAS 102, 212 (Natufian), and Khirbat al-Ḥammām (PPNB).

Species	Origin	TBAS 102	TBAS 212	Khirbat al-Ḥammām
<i>Melanoides tuberculata</i>	Freshwater	424	1	3
<i>Melanopsis buccinoidea</i>	Freshwater	13	6	18
<i>Bulinus truncatus</i>	Freshwater	1	-	-
<i>Theodoxus jordani</i>	Freshwater	-	-	1
<i>Xerocrassa</i> sp.	Land	2	-	-
<i>Sphincterohila zonata</i>	Land	-	-	8
<i>Nassarius gibbosulus</i>	Mediterranean Sea	2	-	1
<i>Acanthocardia tuberculata</i>	Mediterranean Sea	-	-	2
<i>Cerastoderma glaucum</i>	Mediterranean Sea	-	-	1
<i>Nerita polita</i>	Red Sea	-	-	1
<i>Euplica turturina</i>	Red Sea	-	1	-
<i>Cypraea isabella</i>	Red Sea	-	-	1
<i>Cypraea</i> sp.	Mediterranean and Red Sea	-	-	2
<i>Dentalium</i> shells	Mediterranean and Red Sea	9	1	-
Gastropod	Mediterranean and Red Sea	-	-	1
<i>Glycymeris</i> sp.	Mediterranean and Red Sea	-	-	4
<i>Donax</i> sp.	Mediterranean and Red Sea	-	-	1
Fossil bivalve	Fossil deposit	-	-	1
Total		451	9	45

highly fragmented, due in part from the weight of the ground stone artifacts lying directly above it. The skull appeared to be resting on the floor of the structure, as there was no indication of a pit feature. The fragile pieces had remained tightly clustered, as if they had been placed in a container that subsequently disintegrated (**Fig 15**). Excavators noted numerous well preserved caprine limb elements resting on the floor in proximity to the skull fragments. One might interpret these as offerings associated with the human materials, perhaps as part of a ritual associated with the abandonment of the structure, or some

other culturally significant event. However, the lack of a well-defined pit feature as well as the numerous faunal remains found throughout the excavation levels makes this association less than certain. The method of skull removal is not clear from the remains. The cranium and mandible are complete, but no cut marks are present. Neither are there vertebral fragments present.

Based on root development of the first premolar, the individual died at age 3 or 4 (Moorrees *et al.* 1963). Infants and juveniles are represented at other PPN sites. The assemblage of plastered skulls, for example, includes some



15. Plan View of Burial at Khirbat al-Ḥammām, Level 5.

juveniles (Bonogofsky 2003). And at MPPNB ‘Ayn Ghazāl infants were found in subfloor pits and foundation deposits (Rollefson *et al.* 1992). The number of infant and child remains has been increasing with new examples from several sites in southern Jordan: e.g., Ghwair I (Simmons and Najjar 2006) and Ba‘ja (Gebel *et al.* 2006).

The central and lateral permanent incisors, that were still been developing beneath the gum-lines, show evidence of multiple hypoplastic bands. These bands are hallmarks of events that disrupt normal growth patterns (laying down the enamel) in teeth. The presence of multiple enamel hypoplasias on multiple teeth is indicative of systemic stress that affected the child over a significant period of his/her short life, as opposed to localized trauma to a specific tooth or teeth. The placement of the bands can be used as a rough estimation of the timing of stress events and suggests critical problems beginning around

age 2. Hypoplasias were common among adolescents and adults from MPPNB burials at ‘Ayn Ghazāl, Baṣṭa, and Wādī Shu‘ayb (al-Abassi and Sarie 1997; Rollefson *et al.* 1992; Schultz 1987; Schultz and Scherer 1991).

The tradition of skull caching and intramural burial is a hallmark of the PPN. And the residents at Khirbat al-Ḥammām appear to be participating in this ritual practice. But placing a child’s skull in a container on the floor of a structure is less well-documented. The variation may reflect the interplay between local and regional forces in forging mortuary practices. Other cases of local variation in PPNB mortuary practices reinforce this interpretation and include the collective burials at Ba‘ja (Gebel *et al.* 2006), the unusually rich grave good assemblage associated with the burial at al-Ḥimmah (Makarewicz and Austin 2006), and the cultic, mortuary site of Kfar HaHoresh (Goring-Morris (2000).

Fauna

A total of 2,480g of animal bone was recorded from the three sites. Of this 610 g or 24.6% by weight was identified (**Tables 10-13**), represented by 173 fragments. The greater part of this material, 51.9% of the total weight and 67.6% of the identified fragments, unsurprisingly came from the larger and more intensively occupied Khirbat al-Ḥammām. The difference in state of preservation between the Natufian and Pre-Pottery Neolithic B assemblages was striking. The Natufian material from TBAS 102 and 212 was significantly more fragmented, pitted and abraded than that from Khirbat al-Ḥammām, and the proportion that could be identified was consequently very much lower: respectively 14.2 and 12.4% by weight, as opposed to 35%.

It should be noted that small samples sizes place profound limitations on the interpretation

Table 10: TBAS 102 and 212: Identified and Unidentified Animal Bone by Number of Fragments and Weight.

Category	TBAS 102				TBAS 212			
	N	%	Wt(g)	% Wt	N	%	Wt(g)	% Wt
Unidentified	844	97.3	566.1	85.8	612	94.9	467.0	87.6
Identified	23	2.7	93.5	14.2	33	5.1	66.0	12.4
Total	867	100.0	659.6	100.0	645	100.0	533.0	100.0

of these data. Identification was attempted for almost all fragments, excluding vertebrae other than the atlas and axis, as well as ribs. Teeth which comprised less than half of a complete tooth crown were also excluded. Measurements were taken following the guidelines of Driesch (1976) and Davis (1992); burned specimens were excluded. These measurements have not been examined in detail owing to the small sample sizes and preliminary nature of this report.

TBAS 102 and 212

A total of 659.6 g of animal bone was recorded from TBAS 102. Of this 93.5g or 14.2% by weight was identifiable (**Tables 10-11**), represented by 23 fragments. The remains of gazelle accounted for 16 fragments, or 69.6%. Three cattle bones and two bones each of equid and caprine were also identified. Of the latter, one specimen — a substantial astragalus — could be attributed to goat as opposed to sheep, but whether this specimen represents Persian wild goat or Nubian ibex is impossible to say on morphological grounds. As it was recovered from Unit 4 Level 1, the possibility that it may be a modern intrusion should also be considered.

A potential pit was identified within Unit 4 Levels 3 and 4, yielding six identifiable fragments, three of which could be attributed to gazelle. In addition, this feature also contained both of the equid and one of the caprine specimens identified in the assemblage. The unidentified material from this potential pit also yielded numerous equid-sized but otherwise unidentifiable scapula fragments, in all probability derived from the same bone as the identified equid scapula fragment. This suggests that the material

recovered from within this feature may, though fragmented, be more or less *in situ*.

A total of 533 g of animal bone was recorded from TBAS 212. Of this 66 g, or 12.4% by weight was identifiable (**Tables 10-11**), represented by 33 fragments. The remains of gazelle accounted for 30 fragments, or 90.9%. Three cattle bones were also identified.

The faunal remains from Unit 1 Level 2 were unusual in that they contributed no less than 21 identifiable fragments, or 63.6% of the total from the site. All but one of these could be attributed to gazelle, with the other being of cattle. The 20 gazelle bones were dominated by non meat-bearing lower limb elements, with 15 fragments coming from this part of the skeleton; these included 8 distal metapodial fragments. Split lengthways, gazelle distal metapodials were frequently used as bone tool blanks in the southern Levantine late Epipalaeolithic and Neolithic, most commonly for awls.

Although small, the faunal assemblages from TBAS 102 and 212 appear typical of open-air Natufian sites in the southern Levant, both in the range of taxa represented and the generally poor state of preservation of the remains. Minority of bones was burned, with a handful displaying cutmarks consistent with skinning, disarticulation and defleshing (Rixon 1988). The faunal remains from TBAS 102 appeared to be in a slightly worse state of preservation than those from TBAS 212.

There is little reason, at this stage of the late Pleistocene, to assume that the faunal remains from either site represent anything other than free-living animals subjected to greater or lesser degrees of controlled predation. A high degree of dependence on gazelle characterized most Natufian sites, though perhaps to a lesser extent to the east of the Jordan Valley than in the Palestinian woodland zone to the west (Martin 1994; Wasse 2000: 90-95). The sample of gazelle remains from TBAS 102 and 212 is unfortunately too small and badly preserved to permit specific identification with any degree of confidence. The relatively large size of some of the gazelle remains is however more reminiscent of mountain or goitered gazelle than of dorcas gazelle, a conclusion supported by the limited biogeographical evidence available (Uerpmann 1987: 90-110; Harrison and Bates 1991: 193-204; Tch-

Table 11: TBAS 102 and 212: Total Number of Identified Animal Bone Fragments.

Taxon	TBAS 102		TBAS 212	
	N	%	N	%
Gazelle	16	69.6	30	90.1
Cattle	3	13.0	3	9.9
Equus	2	8.7	-	-
Caprine	2	8.7	-	-
Total	23	100.0	33	100.0

ernov *et al.* 1987).

The presence at TBAS 102 of equid — most probably onager, but perhaps also wild ass (Uerpmann 1987: 19-32; Driesch and Wodtke 1997: 530-533) — and apparent absence at both TBAS 102 and 212 of woodland and/or mesic taxa such as deer and wild boar suggests that the Late Natufian environment may have been open, lacking in high vegetation and probably quite steppic. In this regard, the presence at both sites of cattle — almost certainly aurochs — is significant in view of the requirement of this taxon for drinking water at least every second day (Uerpmann 1987: 72). Though likely step-pic, the local environment is therefore unlikely to have been so arid as to preclude the presence of at least small seasonal springs and, perhaps, a larger body of water in the general vicinity of the sites at the time they were occupied.

Khirbat al-Ḥammām

A total of 1,287.3g of animal bone was recorded from Khirbat al-Ḥammām. Of this 450.4 g or 35.0% by weight was identifiable (**Table 12**), represented by 117 fragments. A minority of bones were burned, with a handful displaying cutmarks consistent with skinning, disarticulation and defleshing (Rixon 1988). Of the 117 identifiable fragments, the remains of caprines account for 109 fragments (**Table 13**), or 90.9%. A total of 31 caprine post-cranial and horncore fragments could be attributed to goat with varying degrees of confidence. The identified horncore fragments were of goat rather than Nubian ibex, but the possibility remains that a few specimens of the latter are included in the post-cranial material. Sheep were not identified in the assemblage. In addition, there were three cattle bones, one of gazelle, and two bones each of fox and a medium (duck-sized) bird; one of

Table 12: Khirbat al-Ḥammām: Identified and Unidentified Animal Bone by Number of Fragments and Weight.

Category	N	%	Wt(g)	% Wt
Identified	117	10.0	450.4	35.0
Unidentified	1,050	90.0	836.9	65.0
Total Sample	1,167	100.0	1,287.3	100.0

Table 13: Khirbat al-Ḥammām: Total Numbers of Identified Animal Bone Fragments.

Taxon	N	%
Caprine	109	93.1
(Goat)	(31)	(26.5)
Cattle	3	2.6
Fox	2	1.7
Bird	2	1.7
Gazelle	1	0.9
Total	117	100.0
NOTE: Brackets indicate caprine specimens identified as goat.		

the bird bones was a complete proximal posterior phalanx.

Khirbat al-Ḥammām is thought to date to the later phases of the PPNB period, by which time village-based herding economies based on domestic caprines had become firmly established in the southern Levant (Horwitz *et al.* 2000). Data from ‘Ayn Ghazāl (Wasse 2002) suggest that caprine-herding, based initially on goats rather than sheep, was making the major contribution to village-based faunal economies on the Jordanian plateau by the beginning of the Middle PPNB, if not earlier. It is however important to note that the first appearance in the region of domestic goats (whether by introduction or autochthonous domestication continues to be a matter for debate, e.g. Horwitz *et al.* 2000; Wasse 2001, 2007 and references therein) did not lead to the overnight replacement of earlier economic strategies based on hunting. At ‘Ayn Ghazāl, for example, although almost 2,000 caprine bones were identified from Middle PPNB contexts, more than 800 gazelle bones were found alongside them. (Wasse 2002: table 1). There is general agreement that domestic sheep were first introduced to the southern Levant from the north in small numbers some hundreds of years later, perhaps around the Middle to Late PPNB transition, but that they did not become economically significant until well into the Late PPNB and Pre-Pottery Neolithic C (PPNC) (Driesch and Wodtke 1997; Horwitz *et al.* 2000; Wasse 2002, 2007).

Notwithstanding the generally accepted existence of considerable grey areas in the middle ground between hunting on the one hand and herding on the other, it was deemed appropriate to attempt to assess the Khirbat al-Ḥammām goats against five criteria commonly used to distinguish the bones of a domestic animal from its wild progenitor, *viz.* (1) presence of a foreign species, (2) size reduction, (3) change in population structure, (4) morphological change and (5) increase in species frequency (Davis 1987; Meadow 1989; Legge 1996).

With regard to the first criterion, biogeographical considerations (Wasse 2001 and references therein) and the presence of at least one and possibly two caprine bones in the Late Natufian TBAS 102 assemblage suggests that it is highly improbable that this part of west — central Jordan lay outside the natural biogeographic range of Persian wild goat or, indeed, of Nubian ibex. On this basis alone, the Khirbat al-Ḥammām goats could represent free-living, hunted animals.

Systematic assessment of the second, third and fourth criteria would require much larger samples than those at our disposal here. However, on cursory inspection, the great majority of the Khirbat al-Ḥammām goat remains appear to derive from relatively small animals, broadly comparable in size with those from PPNB ‘Ayn Ghazāl, which the present author has interpreted as domestic (Wasse 2000, 2002). As at Middle PPNB ‘Ayn Ghazāl, Khirbat al-Ḥammām also yielded a minority of extremely large goat specimens, which could equally well represent hunted Persian wild goat or Nubian ibex as large domestic males.

Assessment of the Khirbat al-Ḥammām goats against the fifth criterion provides much more convincing evidence for domestication. As already noted, the great majority of Natufian and, indeed, Pre-Pottery Neolithic A (PPNA) faunal assemblages from the southern Levant are dominated by gazelle (e.g. Davis 1987, fig. 6.15), with exception of sites in the dry steppe and sub-desert zones of southern and eastern Jordan and the Negev, where caprines were more frequently exploited (Davis *et al.* 1982; Hecker 1989; Henry and Turnbull 1985; Martin 1994). Although small, the faunal assemblages from TBAS 102 and 212 suggest that this part

of west-central Jordan was one of the areas in which gazelle was the prey animal of choice for Natufian hunting communities. It therefore seems likely that the absolute predominance of goat at Khirbat al-Ḥammām post-dates the more general shift from gazelle to goat (Davis 1987, fig. 6.15) that had occurred in many parts of the southern Levant by the beginning of the Middle PPNB, which is thought by many to reflect the change from hunting to herding.

The faunal assemblage from Khirbat al-Ḥammām appears typical of PPNB village sites on the Jordanian plateau. Caprines were the most common taxon during this period at ‘Ayn Ghazāl (Driesch and Wodtke 1997; Wasse 2002), Baṣṭa (Horwitz *et al.* 2000), Bayḍa (Hecker 1975) and as-Sifiyah (Mahasneh 1997). It is generally accepted that the great majority of caprine remains from PPNB village sites on the Jordanian plateau represent herded domesticates, and there is little reason — at present — to assume that this was not also the case at Khirbat al-Ḥammām. It should not, however, be assumed that all caprine remains from the site necessarily represent herded domesticates; it is possible, even likely, that a small minority still derived from hunted Persian wild goat or Nubian ibex.

Similarly, the presence of a minority of cattle bones is a near ubiquitous feature of PPNB faunal assemblages from the southern Levant, although whether or not these were hunted or herded during the earlier part of this period continues to be a matter for debate. The presence of cattle in the faunal assemblages from TBAS 102 and 212 indicates that this taxon was hunted by the Late Natufian inhabitants of the area, and it is conceivable that their PPNB descendants may have done likewise.

The two fox bones in the assemblage are of particular interest, as both display cutmarks consistent with skinning, suggesting that these animals may have been exploited as much for their fur as for their meat; “in the early phases of the PPN in the Levant, we can see an intensive hunt for fur-bearing animals” (Driesch and Wodtke 1997: 534). The first fox bone was a relatively large distal femur fragment, almost certainly of red fox, with cutmarks on the lateral epicondyle. The second was a much smaller proximal radius fragment, tentatively attributed to sand fox, sliced all the way through some-

what below the proximal end. In this respect it should be noted that Driesch and Wodtke (1997: 534) have identified both red fox and sand fox at 'Ayn Ghazāl.

In sum, the predominance of goat, scarcity of gazelle and absence so far of sheep in the faunal assemblage from Khirbat al-Ḥammām suggests, to the extent that data from sites elsewhere may be considered representative of this particular corner of west-central Jordan, that the site post-dates the earliest Middle PPNB phases of village-based caprine herding in the region, during which hunting continued to play a significant role, but pre-dates the widespread introduction of sheep from the Late PPNB onwards. In this respect, the 2006 faunal assemblage would sit comfortably within a transitional Middle to Late PPNB timeframe, as currently understood.

The faunal assemblage recovered in 2006 from Khirbat al-Ḥammām has demonstrated that this site has the potential to deliver an enormous assemblage of adequately preserved, well-dated and demonstrably *in situ* faunal remains dating to a key period in southern Levantine prehistory. The abundant caprine remains potentially represent early Neolithic goat-based animal husbandry in its most fully developed form. The recovery of larger samples of material upon which to base a systematic zooarchaeological analysis would therefore be highly desirable. It will be recalled that intensive herding of goats - in the manner most likely practiced at Khirbat al-Ḥammām — has been implicated in severe environmental degradation around a number of early Neolithic villages (e.g. Rollefson 1996), which may in turn have paved the way for the development of more mobile sheep-based forms of pastoral economy in the PPNC (Rollefson and Köhler-Rollefson 1993; Wasse 1997). It should, however, be cautioned that analysis of the large samples of faunal material that would undoubtedly be recovered from more extensive work at Khirbat al-Ḥammām would be both time-consuming and expensive.

Botanical Remains

The flotation program did not yield any macrobotanical remains in the five samples processed from Khirbat al-Ḥammām. However, good preservation of both seeds and wood at nearby al-Ḥimmah encourage us to search for

features which might provide more productive samples (Makarewicz *et al.* 2006).

To complement geoarchaeological and macrobotanical investigations, five sediment samples were collected to examine spherulite and phytolith concentrations at Khirbat al-Ḥammām (Canti 1998; Henry *et al.* 2003; Piperno 2006). Studies of these microscopic formations have yielded significant information about local paleoenvironmental conditions, agricultural practices, and pastoral activities at other Neolithic sites in the southern Levant (Albert and Henry 2004; Cummings 2003; Henry *et al.* 2003; Jenkins and Rosen 2007).

Samples were processed at the Geoarchaeology Laboratory of Boston University. Each sample was sieved through a 250 micron geological sieve, and five milligrams was mounted on a microscope slide using Entellen New. The slides were then examined with a Nikon Labophot 2 polarizing microscope utilizing crossed polarized light at 200x. Identification of spherulites was carried out using pertinent literature (Canti 1997, 1998, 1999) and thin-section references. Phytoliths were observed on these slides only at the presence/absence level and compared with the relevant literature (Kaplan *et al.* 1992) and the phytolith reference collection.

Spherulites, while present, did not occur in high enough concentrations to indicate herbivore dung deposits (e.g., goat or sheep penning deposits). Low concentrations of spherulites could represent background noise from the local environment, including runoff from nearby grazed fields (Albert and Henry 2004), or could indicate faecal remains of humans, birds and dogs (Canti 1999). Various phytolith forms were also observed on the slides, even though the slides were not formally processed for phytolith extraction. Phytoliths observed include simple sheet elements and various trapezoids indicative of the Poaceae family (Kaplan *et al.* 1992). These forms are coming found in a variety of grass species.

These initial investigations establish the presence of both faecal spherulites and phytoliths at Khirbat al-Ḥammām. Future phytolith and spherulite research will integrate additional micromorphological and microartifact analyses to address a range of taphonomic and behavioral questions.

Summary

Two decades of survey, excavation and geoarchaeological study in the Wādī al-Ḥasā have produced a wealth of information. Preliminary work at the Natufian sites has added to our knowledge of late Pleistocene adaptations in west-central Jordan in several ways. First, it is apparent from marl deposits and potential springs that marsh/wetland environments were more numerous in this area during the late Pleistocene. Second, it appears that Natufian settlement in the area was closely tied to these resource areas. This is apparent from the Wādī al-Quṣayr as well as the Wādī al-Ḥasā. It remains to be determined whether these were seasonally productive areas resulting in repeated short-term occupation or more sedentary occupations. We presently lack the architecturally components that characterize other parts of the Southern Levant. Third, the typological and radiocarbon evidence point to a Late Natufian occupation in the Wādī al-Quṣayr, which makes these the first sites of this period in west-central Jordan. A Late Natufian presence is potentially significant for addressing local influences on the subsequent development of agricultural communities.

Test excavations at Khirbat al-Ḥammām shed light on Neolithic occupation in the area. Geoarchaeological investigations suggest that the Hasa environs may well have provided a stable and productive foundation supporting developments in farming and animal husbandry. From the vantage of Khirbat al-Ḥammām's multi-phase occupation, we suggest that certain locales within the Wādī al-Ḥasā sustained repeated, and perhaps continuous occupations dating to the PPNA/EPPNB, MPPNB, and LPPNB. At Khirbat al-Ḥammām, continuity between the MPPNB and LPPNB is manifest across a range of behavioral correlates including masonry construction techniques, shell acquisition, and faunal exploitation patterns and may suggest an *in situ* transition. Our results also show that the residents at Khirbat al-Ḥammām were inextricably linked to a larger PPNB world via ritual practice, symbolism, trade relationships, and shared technological repertoires (plaster production, chipped stone styles, etc.).

The results from 2006 provide further evidence that the Wadi al-Hasa catchment provided a well-watered, sustainable landscape for

groups on either side of the agricultural transition. Productive test excavations confirmed the presence of both Late Natufian and PPN groups. Accumulating absolute dates and typological evidence, narrows the temporal gap between the last foragers and first farmers in this area.

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ANTHROPOGENIC INFLUENCES ON CHAMBER HUMIDITY IN PETRA, JORDAN

Thomas R. Paradise

Abstract

However seemingly eternal is the unique setting of Petra, Jordan, its hewn architecture is deteriorating from natural and induced influences. Weathering studies have shown that wetting and drying cycles accelerate weathering, however little is known about human-induced moisture changes affecting deterioration of stone architecture. So, comprehensive interior and exterior humidity measurements were made in Petra's most celebrated structures, al-Khazneh and Urn Tombs in conjunction with data on visitor numbers and frequency. This study found that small visitor groups entering the tomb chambers caused interior relative humidity increases of 5% to 15% -- a possible accelerating weathering influence on the sandstone walls. Statistical correlations of determination (r^2) were used to explain the relationships between visitors and humidity. It was found that that indeed strong relationships occurred between visitor contributions and chamber humidity, however, they were not simultaneous but after a lag time of fifteen minutes. Correlations increased dramatically when the tourist numbers were compared to relative humidity in the chambers both simultaneously ($r^2=0.007, 0.136$), and to fifteen minute delays ($r^2=0.707, 0.895$). Relationships were found for thirty minute delays, however they were not as strong ($r^2=0.149, 0.514$). These relationships indicate that it takes ten to twenty minutes for human respiration and transpiration to contribute to relative humidity in chambers of this volume (2,000-3,600m³) — an important finding regarding the possible anthropogenic acceleration of architectural deterioration.

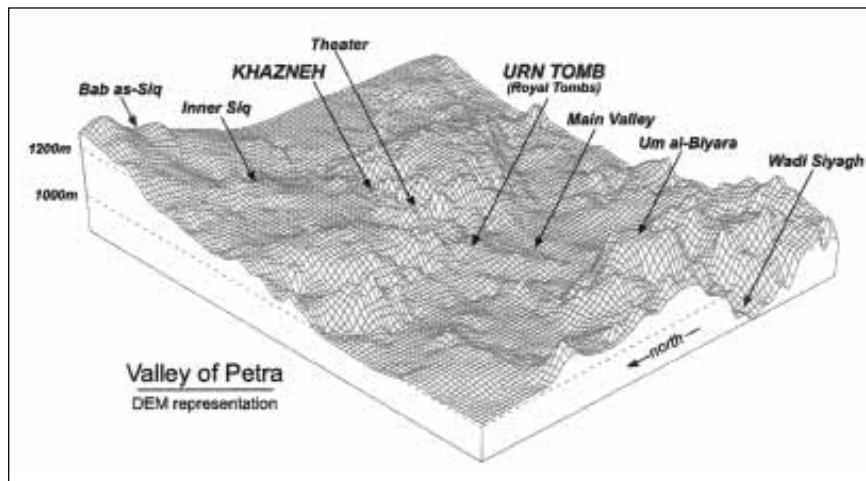
Introduction

Petra is located in a deep valley surrounded

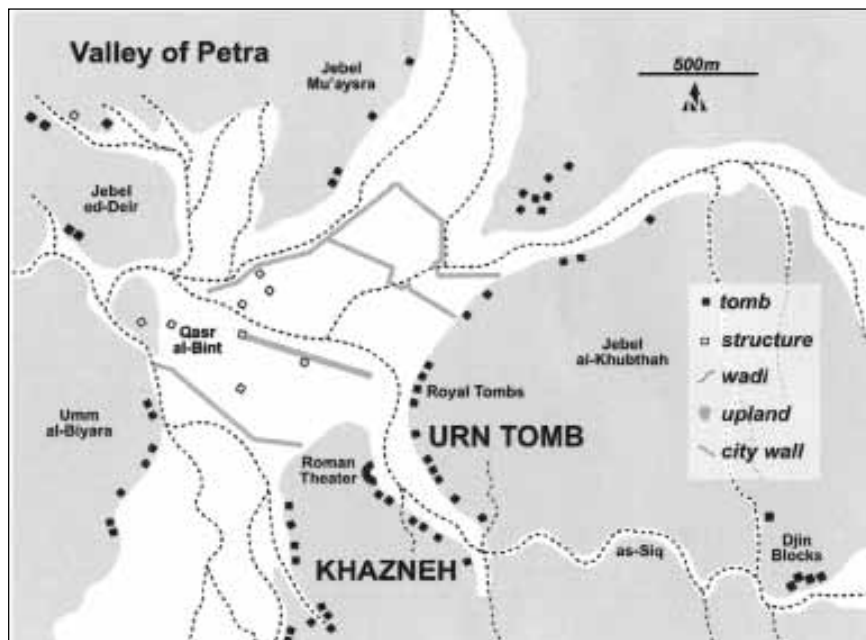
by steep, nearly impassable sandstone cliffs and winding gorges in the arid environment of Jordan's southern desert. However, it is the beautiful, hewn classical architecture rather than its spectacular setting that has drawn worldwide attention and tourists since it was first 'discovered' and presented to the Western world in 1812. Although evidence indicates occupation in the area since 7,000 BC, it was its Nabataean residents, and Roman visitors that gave Petra notoriety then and now. The citizens of Petra worked the sandstone walls into elaborately carved tombs and spaces, hewn directly from the reddish-brown and yellowish sandstone cliffs, many exceeding fifty meters in height. Since its construction 2000 years ago, natural and anthropogenic forces have been working to ruin this friable architecture.

Petra, has also been called 'Sela' and 'Rekum' and was repeatedly mentioned in the Old Testament (i.e. 2 Kings 14:7, Isaiah 16:1, Judges 1:36), and in writings as early as Pliny the Elder (c. 79AD) and Josephus (c. 95AD). In his important Christian tome, *Ecclesiastical History* (326AD), Eusebius depicts 'Rekem' as an large city at vital crossroads in the region; a crucial hub for caravan routes since the 3rd century BC, known for its wealth and strategic location. It was first the ancient capital of Edom, to later become the capital of the Nabataeans. It is unknown when the Edomites and Nabateans merged or moved across the Jordan River and the Wādi 'Araba, however they migrated into Judea when the Jews were removed from the region, enslaved in Babylonia. This migration and expansion, also gave the Nabataeans control of the Gulf of 'Aqaba and the Red Sea (Agatharchides in Josephus c. 95AD) (Figs. 1, 2).

Since Johann Burckhardt 'discovery' of Pe-



1. DEM representation of the Valley of Petra and its monuments, including al-Khazneh and the Urn Tomb.



2. Map of Petra highlighting the locations of al-Khazneh and the Urn Tomb.

tra in 1812, Petra has become a popular tourist destination seeing as many as 5,000-8,000 visitors in one day. Visitors have increased from 100,000 in 1990, to 200,000 in 1994, to an astounding 800,000 in 2008 (JMT 2009); yearly totals exceeding one million visitors are forecast within the next few years. Despite regional conflict and instability, Petra's visitor numbers continue to rise, and from recent research on the anthropogenic influences on the deterioration of the architecture, Petra's decay is accelerating.

Petra however, represents an ideal outdoor laboratory for sandstone and limestone deterioration research — the structures have a known exposure, the sandstone lithology and conserva-

tion attempts have been documented, and Petra is situated in a region with little climate change since its construction 2,000 years ago (Paradise 2005). So, as tourism increases, it has been observed that in-tomb humidity is also increasing. Started in 1997, this long term project was undertaken to ascertain the fluctuations of moisture in these tombs as a function of entering tourists, as an indication of possible accelerated sandstone weathering, all in the hopes of slowing the decay of this magical, ruined city.

Weathering studies for sandstone architecture or landscapes in desert environments are relatively rare. Early observations on stone and architectural deterioration in the Near East

and their often unusual features were made by Herodotus (c. 450BC), Strabo (c. CE10), Pliny (c. CE50), and R.F. Burton (c. 1850), however it is not until the 20th century that we begin to see the conceptual development of weathering studies (Turkington and Paradise 2005). Bryan (1928) and Blackwelder (1929) discussed many of the processes responsible for deterioration, in addition to the characteristics often distinctive to sandstone deterioration such as tafoni, honeycomb, and alveolae. Since Strabo, possible links have been suggested between moisture and weathering. Increased weathering in arid regions, and its subsequent surface recession and features (ie tafoni) have been observed near more humid areas (like in caves, alcoves, and overhangs), causing speculation that moisture accelerates weathering (Strabo CE10; Burton 1869). These were some of the first Western works that addressed sandstone weathering processes and not just the descriptions of weathering features.

Although studies on chamber moisture and fresco, mosaic, and painting deterioration are relatively widespread, research on tomb humidity and stone architectural weathering is relatively rare. This research has been important for its contributions to theoretical backgrounds of landscape change, geomorphology, and rock weathering modeling and conservation studies (environmental and architectural), and in practical arenas and applications such as materials conservation. Early observations by J.L. Stephens (c.1830) postulated relationships between humidity and stone decay both on geologic and architectural surfaces. However it would be the catalog of Petra's tombs, monuments, façades, and structures by Brünnow and Von Domaszewski (1904: 125-428) that represents the earliest recorded descriptions of Petra's architecture and condition. Since then, few papers have addressed weathering relationships in Petra, sandstone and moisture fluctuations (Heinrichs and Fitzner 2000; Turkington and Paradise 2005).

Studies on tomb interior moisture and stone deterioration have been conducted in Egypt and in urban settings. It has been shown that repeated drying and wetting cycles, or regular moisture spikes in closed spaces (like tombs) will accelerate stone weathering. In some cases, decreases from nearly saturated states (95%-100%) will

increase architectural decay and stone weathering (MCB 2007), however in arid landscapes, it is the increase in humidity that is often the culprit (Mustoe 1983). Emery (1960) discussed the visible effects of fluctuating humidity on the interior chambers in the Pyramids of Giza. Other studies (i.e. Winkler 1996, Wust and McLaneb 2000) explained how moisture changes caused warping and buckling in rock materials (like marble veneers or wall marls). When the tomb of Queen Nefertari was unearthed in 1904, was overrun with tourists until by 1940, the chamber walls exhibited such extensive plaster spalling and flaking from human-induced humidity, the tombs were closed. It was found that a relative humidity increase from 30% to 50% was accelerating chamber wall deterioration of the frescos and stone substrates — and only due to the presence of 17 visitors in the tomb for 20-30 minutes. Also in the Valley of the Kings, computer simulations in the tomb of Seti II were used to assess chamber humidity fluctuations. It was found that visitor groups exceeding 25 caused relative humidity increases from an ambient level of 30% to 75% (Khalil 2009). The increase was attributed to respiration, perspiration and transpiration; these results in Egypt are markedly similar to our findings in Petra and the thrust of this research.

Methodology

Daily tomb interior and exterior relative humidity measurements (RH) were taken and correlated to visitor numbers and times of entry and exit into the primary tombs of al-Khazneh and the Urn Tomb. Days were chosen for measurement when large bulk tickets sales were made in advance, and when tickets sales were high at the entrance into Petra. This would ensure variable sized tourist groups. Since tomb interiors in Petra are consistently higher (5-10%) than ambient relative humidity (RH) across the valley, it was important to link the spikes in RH to human respiration, transpiration, and perspiration. So, busy days were chosen for daytime measurements, usually taken from 10am-3pm when the tourists are wandering the valley and visiting the primary tombs. Since it takes roughly one hour for visitors to walk from the gatehouse to al-Khazneh — the most visited tomb — and the gate opens at 8am, measurements at the al-

Khazneh were not taken until 9am. Using an *EXTECH Humidity-Temperature Pen* (resolution of $\pm 0.1\%$ RH and $0.1^\circ\text{F}/^\circ\text{C}$), measurements were taken every fifteen minutes throughout the day. With each RH reading, the number of visitors in the tomb was also recorded, in addition to exterior RH and temperature.

Al-Khazneh Tomb Chamber: Tourism, Weathering and Humidity

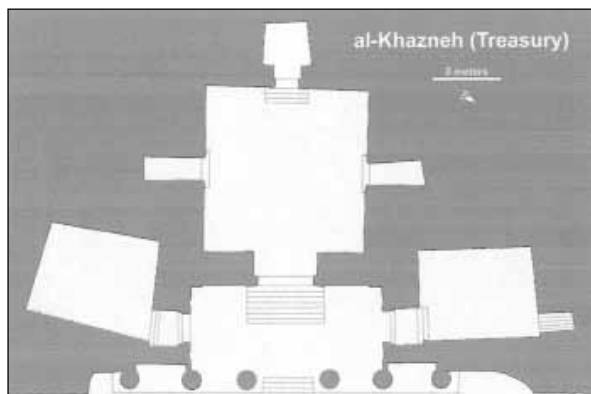
Current research in Petra is investigating changes in anthropogenic (human-caused) humidity and its effects on weathering rates. Previous research and a recent study at the ‘Anjar quarry above Petra (Paradise 2005) indicate that moisture and temperature in tandem accelerate stone deterioration in arid regions like Jordan. However, studies are rare that address the direct effects of humans and small-space humidity changes in arid region tomb chambers like Petra’s al-Khazneh (Fig .3).

This large temple/tomb rises 40m above the sediment-filled ‘plaza’ that lies at the T-intersection of the Inner Siq and the Outer Siq in Petra. It is elaborately faced with classical elements (pediment, columns, entablature, etc.) all carved directly out of a northeast-facing box canyon cliff face of the Umm ‘Ishrīn Sandstone Formation (Paradise 2005). It consists of a primary chamber with three antechambers (interior volume of approximately $2,000\text{m}^3$) with a façade aspect of 061°N . As is typical of most Nabataean architecture, the intricately hewn façade was constructed with interior ante-chambers and halls that exhibit no or little surface decoration. Its original purpose is unknown but has been speculated as a tomb, shrine and/or wor-

ship site (Taylor 2005: 224). This hewn structure was made famous in Spielberg’s 1987 film ‘Indiana Jones and the Last Crusade’. Since 1998, environmental monitoring in the interior of al-Khazneh indicates that there is a strong relationship between large numbers of visitors in the tomb and a subsequent rise in relative humidity (and unrelated to outside climatic fluctuations). Preliminary measurements indicate that the greatest increases in humidity occur when visitor groups exceeding 25-30 persons remain within the tomb for more than five minutes. This is an important finding since many tour groups visiting al-Khazneh in Petra consist of at least 20 persons and remain more than 5 minutes in the inner chamber.

Prior studies have shown that increased moisture in restricted spaces can increase the production of surface salts (efflorescence), increase in-rock permeability, moisture wicking, and a general accelerated deterioration of sandstone from particle disaggregation (Price 1995; Paradise 1995, 1999). Extensive research in arid regions (i.e. Egypt, Arizona) suggests that drier structures exhibit slower deterioration rates than wetter ones (i.e. Emery 1960, Young 1987). Precisely how this increased moisture regime contributes to accelerated deterioration in Petra, however, needs further study. So, as tourist numbers increase in Petra’s chambers or tombs, interior humidity increases will accelerate deterioration. Because Petra’s visitors have increased from roughly 100,000 in 1990 to 900,00 in 2008, it is essential that we monitor all environmental variables (external and internal) in order to evaluate carrying capacities and accessibility in this UNESCO World Heritage Site.

Possible solutions may be two-fold for the anthropogenic weathering in al-Khazneh. For humidity-induced deterioration, mitigation could involve modification of interior microclimate through the use of fans or dehumidifiers. This would stabilize human-induced shifts in interior ambient humidity. Another solution would be to simply restrict the in-tomb visitor numbers at any one time, with time spans between visitors long enough to permit the tomb chambers to re-stabilize to a naturally lower humidity. This policy has been imposed now since 2000-2001 and — so far — and only time can prove the effectiveness of the new policy.



3. planimetric map of al-Khazneh (grey color represents the solid sandstone of the cliff face).

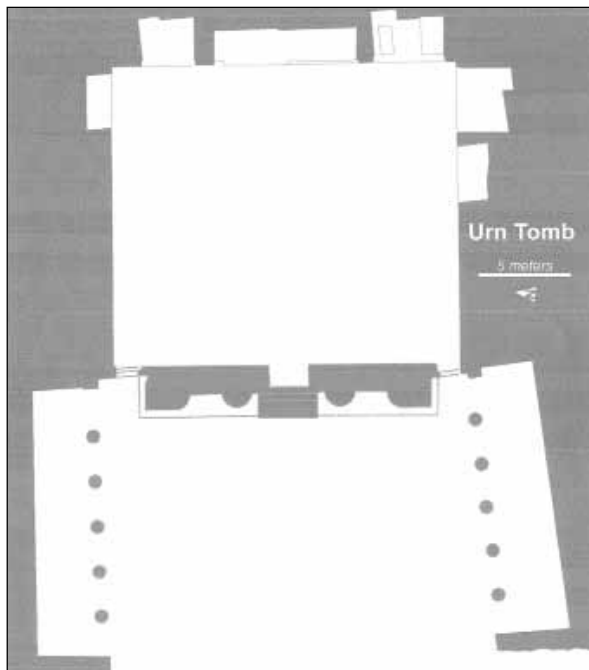
Urn Tomb Chamber: Tourism and Humidity

Along the southwestern slopes of Petra's mountain barrier, Jabal Khubtha lies the hewn row of the Royal Tombs. The Royal Tombs include the Urn, Silk, Palace, and Corinthian tombs. The Urn Tomb was hewn and constructed high up on the cliff face and requires a number of stairs to visit. The original Nabataean access has been lost, but since its use as a Byzantine church in the 5-6th centuries, a series of vaulted flights lead up to the façade. Scholars have suggested that the Urn Tomb was the tomb of the Nabataean Kings Aretas IV (d. 40AD) or Malchus II (d. 70AD) (Mackenzie 2005). Inscriptions inside the church indicate that it was consecrated as a church or chapel in 447AD and was modified to act as a worship site, after its possible use as a tomb (**Fig. 4**).

The Urn Tomb façade faces directly east (090°N) — one of the few structures in Petra that exhibits any sort of exact cardinal or celestial alignment. The structure consists of a large chamber with seven niches (six to the rear, one near the front), and an even larger plaza (25x15m) with two flanking colonnades. Its interior chambers and main hall displace approximately 3,600 cubic meters of volume (or nearly double that of the Khazneh at 2,000m³). This

volume represents only the interior space and not the plaza that fronts the tomb-chapel.

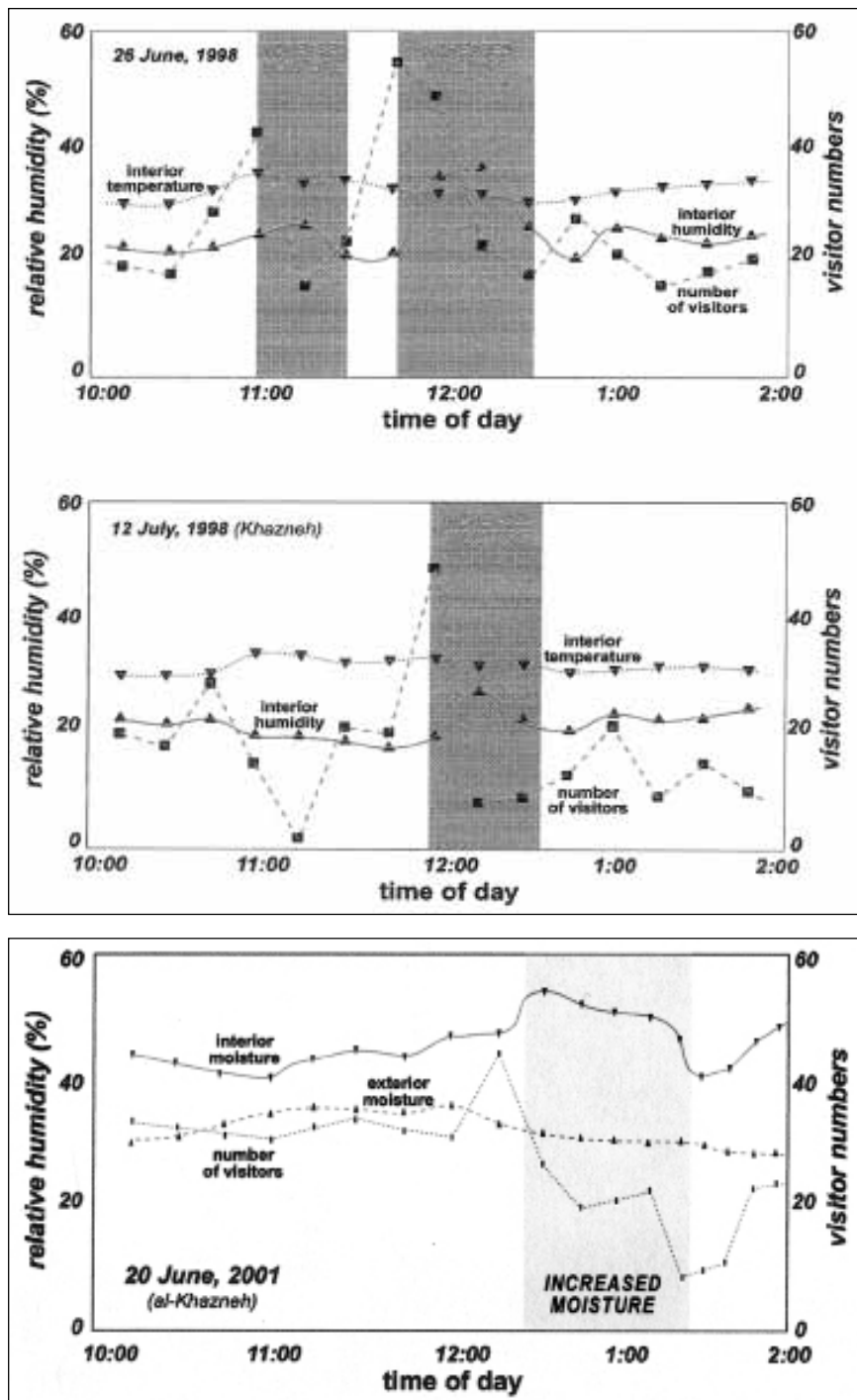
Second or third only in visitor numbers to the tombs (Salem 2003), the Urn Tomb is typically filled with tourist groups throughout the busiest months of April-May, and September-November. Groups of 20-30 visitors often visit the tomb in series with as many as 100-120 persons in the tomb during peak season, and peak times (10am-2pm). Since the Urn Tomb interior displaces a much larger volume than al-Khazneh, it follows that more moisture is needed to change the specific humidity (and relative humidity). When visitors inside the Urn Tomb increased from 11 to 17, the relative humidity was recorded to increase from 6% to 18%. While, in al-Khazneh humidity increased from 21% to 35% when 20 tourists jumped to 50 inside the chamber -- a significant change. Overall in the Urn Tomb, although it was twice the volume of the Khazeh, our readings recorded a faster humidity change than in al-Khazneh. This may be due to the air mixing that occurs with two large entrance portals, a more exposed façade, and its elevated location. Because of the two flanking doorways, a draft is often felt in the Urn Tomb, an uncommon phenomenon in al-Khazneh (**Figs. 5, 6 and 7**).



4. planimetric map of the Urn Tomb (grey color represents the solid sandstone of the cliff face).

Humidity Analysis: Urn Tomb vs. al-Khazneh

To explain the relationships between visitors, relative humidity and tomb chamber volumes, correlations of determination (r^2) were conducted for the data from both al-Khazneh and Urn Tomb. Correlations were done for both (a) visitor numbers to relative humidity (%), and (b) visitor numbers to delayed relative humidity (%) measurements: 15 minutes and 30 minutes. An analysis of lag-times was conducted to investigate any possible delayed relationship between tourism humidity introduction (respiration, perspiration, transpiration) and ambient air humidity changes; a relationship was discovered. When correlations were conducted for the Urn and Khazneh tombs, the strongest r^2 were found with a lag-time of 15 minutes, most notably for the smaller space of al-Khazneh. It would follow that smaller spaces (al-Khazneh) were affected faster, than larger volumes (Urn Tomb). Essentially, the greatest relationships were explained when tourist numbers were correlated to



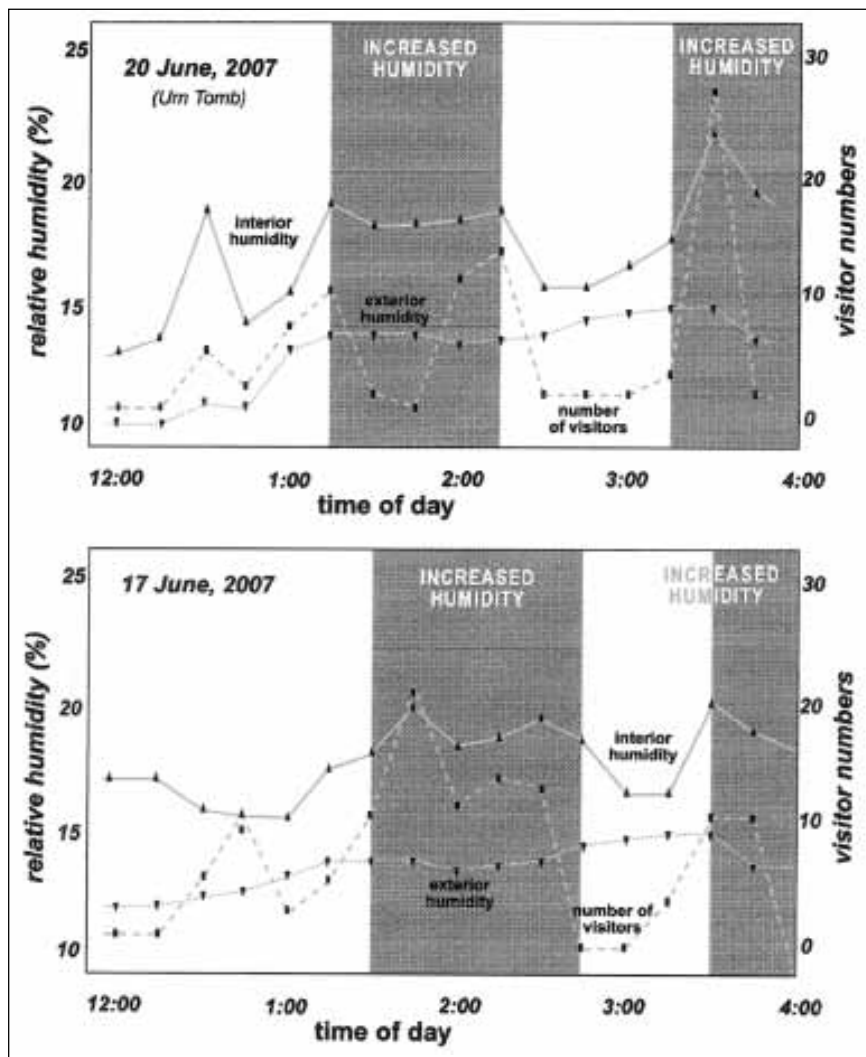
5. graphs representing the relationships between visitor numbers in al-Khazneh and the changes in relative humidity.

6. graphs representing the relationships between visitor numbers in al-Khazneh and the changes in relative humidity.

the relative humidity recorded fifteen minutes later. Since measurements were taken at fifteen-minute intervals, the only lag relationships possible were at 15 and 30 minute intervals.

Correlations were strong in both structures with values as high as 0.895 (Khazneh) and 0.814 (Urn Tomb). This implies that more than 80% of the humidity change is dependent upon

the number of tourists in the chamber. In al-Khazneh, relationships jumped dramatically from 0.005 to 0.707 when the recorded humidity was correlated 15 minutes later, indicating that the greatest influence on in-tomb moisture occurs after 10-20 minutes and not simultaneous to the production of moisture through respiration (moisture release through the exhalation air



7. graphs representing the relationships between visitor numbers in the Urn Tomb and the changes in relative humidity.

in exchange oxygen-carbon dioxide exchange), and transpiration (cell-level moisture release

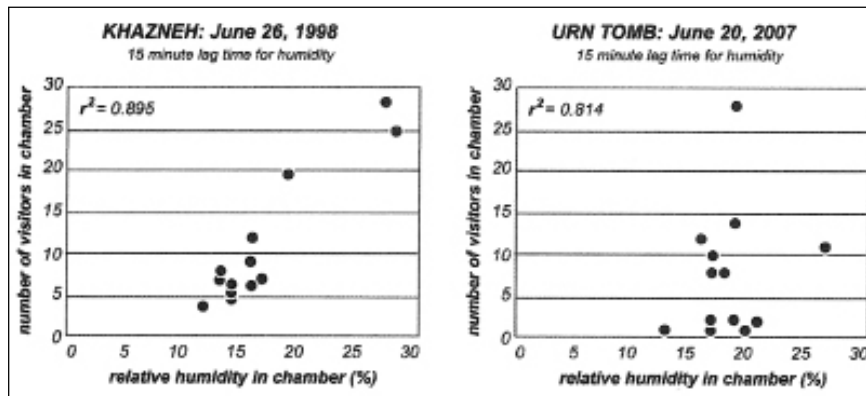
through tissue, pores) **Table 1.**

Interestingly, one would speculate that the

Table 1: table of the correlations of determination (r^2) explaining the relationships between visitor numbers in the chambers and relative humidity trends. Strongest relationships can be seen for fifteen minute lag times between peak visitor numbers and peak relative humidity.

		simultaneous	15-minute lag	30-minute lag
Urn Tomb	June 17, 2007	0.216	0.501	0.518
	June 20, 2007	0.704	0.814	0.814
al-Khazneh	June 26, 1998	0.136	0.895	0.149
	July 12, 1998	0.005	0.707	0.008
	June 20, 2001	-0.059	0.253	0.229

* correlations of determinations (r^2) represent 0.99 confidence



8. scattergrams representing the distribution of visitor numbers in the chambers and relative humidity trends. These figures represent the strongest relationships found for fifteen minute lag times between peak visitor entry into the chamber and peak relative humidity.

smaller chamber of al-Khazneh would show the biggest relationships between visitor number (and consequent moisture production), and increases in chamber relative humidity. This was indeed the case when 90% of the relationship (0.8950) can be attributed within fifteen minutes. However, the relationships in the Urn Tomb were nearly as strong accounting for up to 81%, because the Urn Tomb displaces twice the volume of air, it follows that the relationship would be weaker. Overall, this is an important relationship that not only links the number of in-chamber visitors to humidity changes, but also links those changes to space volumes (**Fig. 8**).

Conclusion and Implications

Nearly one million visitors entered the narrow Siq to walk the short mile into the Valley of Petra in 2008 and 2009, to visit the more than 800 carved tombs, temples and structures across the famous Valley of Petra (JMT 2010). This is an increase of 40% over 2007's visitors, and with its recent vote as one the new Wonders of the World (by 22 million votes), it seems likely that Petra's wonders will be seen by more and more visitors.

While global tourism has surpassed one billion international arrivals each year (Steele-Prohaska 1996), the second Palestinian *intifada* only briefly slowed Petra's visitation in the early 2000s. However, the Jordanian government and regional Petra tourism council have developed plans to continually increase visitation across the Valley. Therefore, in popular and susceptible tourist destinations like Petra, research that investigates natural and anthropogenic influences on architectural decay and environmental deg-

radation are essential before it is too late and irreversible changes have occurred in these vulnerable sites. As tourism increases, the unique architecture of Petra deteriorates at rates often faster than conservation efforts are able to halt or decrease this decay.

It is known that tourism can accelerate rock decay simply through touching, climbing, and treading (Amorosa and Fassina 1983), however in this research it was found that even small visitor numbers can elevate moisture in chambers that can accelerate stone weathering through the mobilization of matrix salts, and matrix argillaceous and/or matrix carbonate expansion and contraction (Price 1995).

Possibly the most ubiquitous, and invisible influence on weathering is the visitor-induced humidity recorded in both tomb chambers in Petra. With as few as five tourists entering a chamber, relative humidity was found to spike 5% to 15% in chamber volumes ranging from 2,000 m³ (Khazneh) to 3,600 m³ (Urn Tomb) — an amount found in prior studies to accelerate rock disaggregation when cycling from drier to wetter and back.

Moreover, it was also found that chamber humidity was influenced within fifteen minutes by visitors entering the chamber. Through statistical correlations of determination (r^2), maximum increases were identified through the largest correlation, which occurred between ten and twenty minutes after entry. Differences were dramatically significant between the correlation of simultaneous visitor numbers and relative humidity and those with a lag time of fifteen minutes between the visitor entry and the correlated humidity. Striking increases were found from 0.136 to 0.895, and from 0.005 to 0.707 when the time

variable was simply shifted fifteen minutes.

Measurements of human-induced humidity in al-Khazneh and the Urn Tomb are bringing new attention to the potential effect of tourism on the accelerated stone deterioration in vulnerable settings like Petra, Jordan. We are only now beginning to understand the complex and delicate nature of sandstone architectural deterioration and possible solutions that can help conserve, and preserve it for years to come*.

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THE ACHEULIAN OCCUPATIONS AT ‘UYŪN AL-QADĪM, AL-JAFR BASIN, JORDAN: A PROGRESS SUMMARY

Philip J. Wilke, Leslie A. Quintero, and Jason A. Rech

Introduction

Since its inception in 1997 the al-Jafr Basin Prehistory Project has focused research on Lower Paleolithic use of this arid and empty part of southern Jordan during the Middle Pleistocene. Fieldwork during 1999, 2004, and 2005 continued survey and surface collection of artifact assemblages at Lower Paleolithic sites in the basin. Major objectives of the current research explore several important issues:

- (1) relationships between Middle Pleistocene site locations and ancient geographic settings and landforms;
- (2) characterization of the assemblages, especially the well-preserved lithics, and the behavioral information they yield;
- (3) character of the lithic assemblages, with special emphasis on the Acheulian handaxe industry to understand the complete reduction sequence and use-life history from acquisition of raw material to discard of exhausted tools;
- (4) similarities and differences between the Acheulian assemblages of al-Jafr Basin and those of other regions, notably at sites in al-Azraq Oasis 150km to the north; and
- (5) generalizations that can be drawn from information on site locations, ancient landforms, and lithic artifact assemblages about the ways Middle Pleistocene hominins adapted to the ancient landscape of what is now Jordan.

In our research conducted to date, all of the Lower Paleolithic sites and assemblages documented in the basin are assigned to the Acheulian complex, with most of the material attributable to the Late Acheulian. Current research focuses on ‘Uyūn al-Qadīm (‘Ancient Springs’), an important Acheulian locality centered on a

box-canyon landform along the northeastern margin of the basin (Quintero *et al.* 2007; Rech *et al.* 2007; Quintero and Wilke n.d.). The locality includes a complex of seven surface archaeological sites, the assemblages of which are entirely lithic, dominated by large collections of handaxes, with lesser representation of Levallois cores and unstandardized cores and their respective reduction products. As used here, the terms Acheulian *handaxe* and *biface* are synonymous, and most of the handaxes are properly classified as *bifacial cleavers*, a form of large butchering tool.

The ‘Uyūn al-Qadīm site complex has yielded a rich body of information especially on the later Acheulian, the oldest widely distributed archaeological expression well documented in Jordan. Research carried out thus far suggests that the locality was an important focus of ambush hunting and butchering of large game species at an oasis setting by Middle Pleistocene hominins. Recent classification of Middle Pleistocene hominins has resulted in the claimed existence of several contemporaneous species across Eurasia and Africa. Nonetheless, in the absence of skeletal material, the hominin species represented by the Middle Pleistocene archaeological expressions discussed here is referred simply to *Homo erectus*.

The discussion that follows is a progress summary. It includes detailed geomorphological and paleohydrological evaluation of the landform to establish its Pleistocene character. Analysis of the lithic assemblages recovered from all of the sites at the locality is continuing. As in our earlier work in al-Azraq Basin, the major focus of the artifact analysis is studying the use-life history of individual handaxes in order to characterize overall site assemblages, and site char-

acter and function. The result of this research discloses much about the formal transformations these artifacts underwent during their use and maintenance, which in turn reveals their overall role in the everyday life of Middle Pleistocene hominins. Other important aspects of our work involve attempts to refit fragmentary bifaces because analysis of unconjoined fragments is otherwise severely constrained, and analysis of debitage to understand better the patterns of tool production and maintenance, and the technological activities that occurred.

Background: the Acheulian Complex in Jordan

So far as is now known, Acheulian technology originated in the Early Pleistocene of East Africa by 1.5 Ma (Ambrose 2001). It is attributed there to *Homo erectus*. The Acheulian represents the earliest known lithic technology to emphasize bifacial flaked-stone reduction and the production of large bifacial tools, or handaxes. Acheulian lithic assemblages were produced over a very long span of time, and are widely distributed in Africa, the Near East, southern Asia, and Europe. Thus, the region that is now Jordan and its neighboring countries constituted a crossroads for movements of *H. erectus*, probably in both directions, between Africa and the Eurasian landmass (Bar-Yosef 1987; Goren-Inbar and Saragusti 1996; Goren-Inbar *et al.* 2000; Bar-Yosef and Belfer-Cohen 2001; Saragusti and Goren-Inbar 2001; Quintero *et al.* 2004, 2007). Most of the known Acheulian assemblages in Jordan are believed to date to the later part of the Middle Pleistocene, probably to the interval ca. 0.35 - 0.45 Ma, and are assigned to the Late Acheulian. A few expressions are, however, believed to be older, and to represent the earlier Middle Acheulian, which otherwise is not widely documented in Jordan (Copeland 1998).

The stone-tool kit of *H. erectus* is dominated by the ubiquitous handaxe, a large cutting or butchering tool, of which there are several general forms (Bar-Yosef 1994; Copeland 1998; Copeland and Hours 1989; Goren-Inbar and Saragusti 1996; Goren-Inbar and Sharon 2006). A recent trend is to include all Acheulian handaxes in the functional category of large cutting tools ("LCTs"), recognizing that they must have

had a common or generalized function.

Across much of North and East Africa (e.g., Biberson 1954; Balout *et al.* 1967; Isaac 1977), in the Jordan Valley (e.g., Goren-Inbar and Saragusti 1996; Saragusti and Goren-Inbar 2001), and in much of India (e.g., Petraglia 2006), many handaxe assemblages are much older and include or are dominated by cleavers made on large flakes detached from blocks of often coarsely grained, extrusive igneous rock ("lavas" including basalt, trachyte, andesite, etc.). Such cleavers have cutting edges that originated as sharp margins of the original flake blank from which the tools were fashioned. Once that edge was selected to become the intended cutting edge of the cleaver, the grip portion of the tool was simply formed around it. These cleavers thus consisted of a grip and an associated cutting edge, the whole made from a large flake. While the bit of such a cleaver was initially an effective cutting edge, it afforded only limited possibilities for resharpening because the grainy material could not readily be bifacially flaked to restore a sharp cutting edge. Most of the assemblages characterized by these coarse flake cleavers are quite ancient, among the oldest sites yet found in the Near East, notably Gesher Benot Ya'aqov, at 0.78 Ma (Goren-Inbar and Saragusti 1996; Saragusti and Goren-Inbar 2001) and 'Ubaydiyya, 1.2 - 1.4 Ma (Bar-Yosef and Goren-Inbar 1993) in the Jordan Valley.

In Jordan, sites with large assemblages of Acheulian handaxes were found at Fujayjah at the head of Wādī al-Bustān near Shawbak in the southern highlands (Rollefson 1981), various sites including 'Ayn al-Asad (Rollefson 1983; Copeland 1989a, 1989b), C-Spring (Copeland 1989c, 1991; Copeland and Hours 1989), and 'Ayn as-Sawda ('Ain Soda) (Rollefson *et al.* 1997; Quintero *et al.* 2004, 2005, 2007) in al-Azraq Oasis. Subsequently, they were found in al-Jafr Basin (Quintero and Wilke 1998; Quintero *et al.* 2004, 2005, 2007; Quintero and Wilke n.d.). While the ages of none of these sites have been determined chronostratigraphically, on typological grounds most of them are thought to date to the later part of the Acheulian tradition. Sites at al-Azraq Oasis (Rollefson *et al.* 2006) probably date to about 350-450 ka. It is likely that most of the Acheulian material at sites in al-Jafr Basin spans at least the older part of that

time range, but that occupation there extends farther back into prehistory, the handaxes there being, on the whole, significantly larger, more robust, and more coarsely flaked. A longstanding consensus among Near Eastern Acheulian archaeologists, based on cross dating of assemblages, is that, in the Levant, larger and more coarsely flaked handaxe forms generally are of greater age (e.g., Gilead 1970).

As so far represented in Jordan, Acheulian handaxes are not made on large flakes of coarse volcanic rock, but instead are nearly always bifaces made of flint, and are well-flaked on both faces. Very few of them are clearly made on flint flakes. Our technological examination of over 1,000 Acheulian handaxes from the butchery site of 'Ayn as-Sawda at al-Azraq Oasis revealed both the production strategy and the use-life history of these artifacts (Quintero *et al.* 2007). The vast majority of them are bifacial cleavers and, expectably, most of them are exhausted, having been discarded when no longer useful. They were formed from flint nodules or tablets with the goal of first creating not the bit, but the grip. Because these cleavers were intended to be resharpened distally, an expendable midsection was then configured. Finally, attention focused on the distal cutting edge, or bit. The bit was created, and subsequently resharpened as needed, by detachment of highly diagnostic transverse (*tranchet*) flakes inclined slightly through the plane of the cleaver. These *tranchet* flakes were detached, from either face of the cleaver, first to create, and thereafter to restore, a sharp, transverse, cutting bit. Each such detachment removed a small portion of the distal end of the cleaver, shortening its length. Detachment of *tranchet* flakes also usually narrowed the distal end of the cleaver. Distal width was lost by preparation of striking platforms for detachment of *tranchet* flakes, and often by overshoot of such flakes when they were detached. Thus, resharpening altered the form of bifacial cleavers and, importantly, shortened their expected use-lives, until finally they were declared exhausted, and were discarded (Quintero and Wilke 1997; Rollefson *et al.* 1997, 2006; Wilke *et al.* 2005; Quintero *et al.* 2007). Discard size and degree of reworking are of course factors that relate to raw material availability.

Thus, one can see the importance of envi-

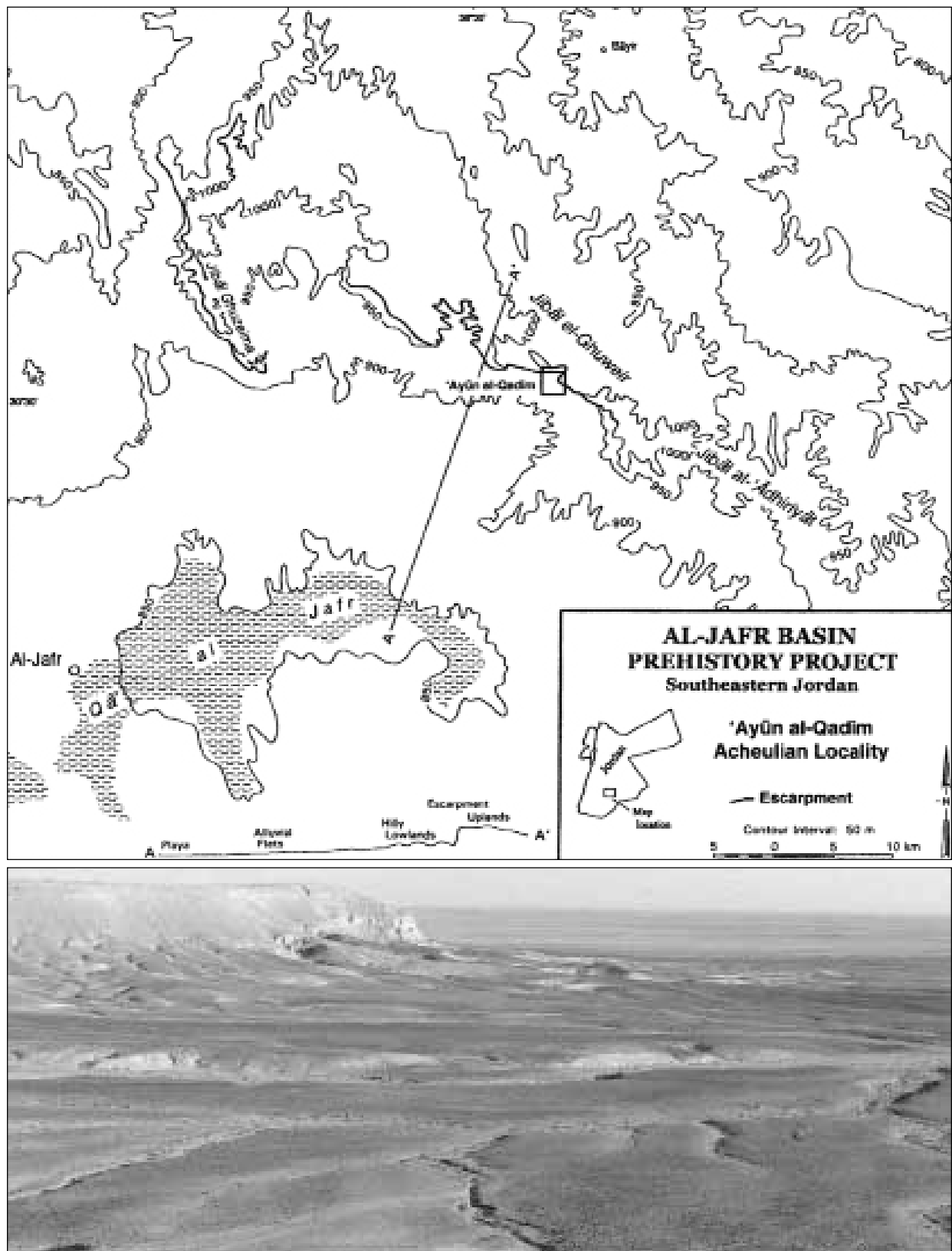
sioning most forms of Acheulian handaxes as tools that were not of static form, but rather were intended (as were many flaked-stone cutting tools around the world) to be resharpened as necessary. As a consequence, they were tools that changed their form and size during their use-lives. For that reason, studying the use-life history of individual handaxes is important for deciphering technological information at each reduction stage and, more importantly, for envisioning actions, concepts, and decisions involving production, use, maintenance, and discard of these tools. Using this approach, it is possible to understand the underlying cultural behaviors responsible for assemblage formation. This approach stands in stark contrast to traditional methods used in analysis of handaxe assemblages, in which these artifacts are, explicitly or implicitly, viewed as objects of generally static form of uncertain function.

In al-Azraq Basin the evidence is abundantly clear that the overwhelmingly dominant handaxe, the bifacial cleaver, is an implement intended for butchery activity. These artifacts occur in like form in a Late Acheulian butchery context at Boxgrove, Britain (Roberts and Parfitt 1999). There, following long tradition (Bordes 1961), they were generally classified simply as handaxes that were resharpened by *tranchet*-flake removal. Meticulous work there showed these handaxes to have been used to butcher large game animals.

The 'Uyūn al-Qadīm Locality

A few small handaxe sites were found in al-Jafr Basin during our initial reconnaissance, all seemingly in association with ancient water sources, but these assemblages consisted of only a few artifacts. The 'Uyūn al-Qadīm Acheulian locality (**Fig. 1**) was discovered in 1997, when it was tentatively named *Fossil Springs Canyon*. It became the focus of fieldwork in 1999. During that field season the box-canyon feature that dominates the locality was surveyed and extensive assemblages of handaxes were found on the floor of the canyon. Other sites were found outside the canyon that same year, and more were located in 2004 and 2005.

The box canyon, called *Juwit al-Ghuwayr* ('Inside Ghuwayr') by local Bedouin, is about a kilometer long and about that wide at



1. Location and setting of the 'Uyūn al-Qadīm locality. Site Jafr-83 extends from left to right across the center of the photo.

its mouth. It is overall somewhat V-shaped in configuration, and delineated by steep escarpments that rise to a height of 60m or more. Almost everywhere the lower part of the exposed bedrock consists of soft, Paleocene (and latest Cretaceous) chalk-marls of the Muwaqqar Formation, 25-40m thick. The upper part is hard and resistant, bedded, Eocene limestone of the Umm Rijam Chert-Limestone Formation, 25-35m thick (Kherfan 1987; Moumani 2008). This same sequence is exposed in an escarpment that extends along most of the northeastern flank of the basin. The upper formation contains extensive beds of flint nodules, many of considerable size, and these are abundantly available where they are weathering out of the escarpments and the talus slopes below. Sometimes a flint bed is expressed locally as a solid stratum formed by coalescence of individual nodules. The flint supplied raw-material needs for stone-tool production throughout the prehistory of al-Jafr Basin (Wilke *et al.* 2007).

The box canyon is drained by a northern headwater tributary of Wādi al-Ghuwayr, and is a distinctive landform in the locality. Early impressions were that the canyon was evacuated over a long period of geological time by headward erosion of that wadi which during the Middle Pleistocene was fed by discharge of spring waters from karstic conduits within the Tertiary limestones exposed in the escarpment. Further, the several spring heads at the base of the escarpment, and their tributary drainages, would have been sources of water during the Middle Pleistocene. The initial impressions proved to be essentially correct.

Also in 2005 attention focused on a thorough study of the geomorphology and paleohydrology to characterize the Lower Paleolithic landscape of 'Uyūn al-Qadīm (Rech *et al.* 2007). The results of that study are summarized below.

The Lower Paleolithic Landscape of 'Uyūn al-Qadīm

Archaeological sites are located on old pediment surfaces and fluvial strath terraces. Sites near the mouth of the box canyon of Juwit al-Ghuwayr and those along the base of the escarpment to the southeast all occur on dissected pediments. The site located within the canyon is situated on top of two different fluvial strath

terraces just to the north of the main stream channel and partially on pediment surfaces to the south. Pediments and fluvial strath terraces of similar age, evident as surfaces with similar color on Landsat 7 TM satellite imagery, are common along the northern escarpment of al-Jafr Basin. However, our archaeological surveys only identified dense Lower Paleolithic assemblages in selected areas. We therefore interpret the location of these archaeological sites to be a primary feature associated with the focus of human activity and not a function of the preservation of geomorphic surfaces of a particular age.

Fluvial strath and pediment surfaces are all formed on the Muwaqqar Formation. This marl is extremely friable, and in most locations appears to be actively eroding by fluvial processes and eolian deflation. Any sedimentary units that may have encased Lower Paleolithic artifacts at 'Uyūn al-Qadīm have been removed. In a few locations, however, strath terraces contain a thin bed (<60 cm) of alluvium. All geomorphic surfaces are covered by a chert *hamada*, or desert pavement, that is moderately well developed and coated with desert varnish. Older geomorphic surfaces are identifiable in general by fewer limestone clasts, a greater number of 'pot-lid' flint spalls, vertically-oriented and fractured flint clasts, and a high degree of clast interlocking. However, in locations where resistant limestone is present just beneath the surface, there is a more advanced degree of desert pavement development and gypsic soil formation. Therefore, the relative degree of maturity for desert pavement appears to be a function of both age and the localized nature of the underlying Muwaqqar Formation. As such, the degree of desert pavement formation can be used to help guide the search for old landscape surfaces, but cannot be used quantitatively to discern the age of landscape surfaces.

Paleoenvironment and Paleohydrology

Paleoenvironmental investigation at 'Uyūn al-Qadīm began in 2005 with a thorough search for Quaternary sedimentary units that would provide insight into why this locality was such a focus of human activity during the Middle Pleistocene. However, our examination of the Juwit al-Ghuwayr canyon and surrounding region identified few Quaternary deposits, and

none that could provide detailed insight of the paleoenvironmental setting. Our search to place human activities at 'Uyūn al-Qadīm within a paleoenvironmental context then led us to examine the modern hydrologic system.

The surface hydrology atop the Umm Rijām plateau, the plateau atop the escarpment north of 'Uyūn al-Qadīm, is characterized by large intermittent stream channels that flow to the northeast as well as extensive areas of flat topography with flint *hamadas* that lack organized drainage systems. Flat topographic areas adjacent to Juwīt al-Ghuwayr canyon contain small playas and sinkholes. Many of these sinkholes have clear openings, or conduits, that are 5 to 15 cm wide and are surrounded by concentrations of large gravels that were transported by surface water entering the subsurface at these locations. Surface hydrology atop the Umm Rijām plateau is also strongly influenced by structural faults and folds. Many of the small drainages on the southern margin of the Umm Rijām plateau are oriented along faults or small synclines. Moreover, the head of Juwīt al-Ghuwayr canyon is centered along a small syncline that plunges to the southwest.

The limestone escarpment, demarcating the southwestern limit of the Umm Rijām plateau, and Juwīt al-Ghuwayr canyon display several features indicative of groundwater seepage, sapping, and discharge (Higgins and Coates 1990). These features include a pronounced headwall at the upstream termination of Juwīt al-Ghuwayr canyon with an amphitheater shape, as well as stream channels that initiate on the sides of the canyon at the contact between the Umm Rijām limestone and Muwaqqar chalk formations. Discrete point-source discharge conduits are present at the head of some of these stream channels, and most channels display evidence of seepage. Channel heads are generally incised a few meters into the Muwaqqar chalk, and some are deeply incised (~5-8m). The majority of these stream channels have no catchment area atop the escarpment. The main difference between Juwīt al-Ghuwayr canyon and other canyons under the direct influence of groundwater sapping is that Juwīt al-Ghuwayr does not have an active spring at the base of its headwall.

We interpret the hydrology of the Umm Rijām plateau as being a karstic system. Surface water

infiltrates into the subsurface through sinkholes and fractures and flows through organized subsurface shafts, tunnels, and pipes. Stream channels that initiate near the contact between the Umm Rijām and Muwaqqar formations demonstrate that a significant amount of this subsurface water discharges episodically into Juwīt al-Ghuwayr canyon and adjacent areas along the escarpment. Karstic conduits within the Umm Rijām limestone, which contain impermeable bands of flint that act as aquicludes, are strongly influenced by structural controls such as faults, fractures, and folds. Although the Umm Rijām limestone appears to have a well-defined subsurface drainage system (i.e., karstic), the underlying Muwaqqar Formation does not. The chalk-marl is not well-lithified and cannot support stable groundwater conduits. Therefore, groundwater flow in the Muwaqqar Formation is mainly through groundwater seepage and ephemeral groundwater conduits. We therefore interpret that the canyon of Juwīt al-Ghuwayr formed as a result of groundwater sapping and discharge from karstic groundwater sourced from the Umm Rijām plateau, and likely was a source of perennial groundwater discharge (i.e., springs) during the Early and Middle Pleistocene.

We suggest that sometime near the end of the Middle Pleistocene, possibly during the Final Acheulian/Middle Paleolithic transition, groundwater discharge in Juwīt al-Ghuwayr canyon switched from perennial or seasonal to intermittent. The cause for this change is unknown, but likely was related to a drop in the regional water table either due to climate change or more local geomorphic factors. Consequently, the springs within Juwīt al-Ghuwayr canyon and the 'Uyūn al-Qadīm locality in general would have ceased being a reliable water source.

The Sites

'Uyūn al-Qadīm was a major focus of activity by Middle Pleistocene hominins. Flint tool assemblages dominated by bifacial cleavers are clustered into seven known archaeological sites in, and within about 2km of the entrance to, Juwīt al-Ghuwayr. All are deflated, as evident from surface observations, and from shallow test pits that merely removed the desert pavements and exposed the underlying Paleocene

sediments. No faunal remains were preserved. Artifacts occur on and within the desert pavement that armors the landscape in the area today, inhibiting its further deflation. Except for several items (bifacial flake cores that may be extensively reworked handaxes) of a high-quality orthoquartzite, or quartz arenite (Pettijohn *et al.* 1987: 176), all of the artifacts are made from the local Eocene flint. The amount of flint available for tool production in al-Jafr Basin is in unlimited supply.

Considerable effort was devoted during both the 2004 and 2005 field seasons to conducting repeated pedestrian surveys of the recorded archaeological sites in the locality to recover all artifacts, including diagnostic debitage. Artifacts were pin-flagged, mapped with respect to a series of datum points established at each site, and then labeled and collected for analysis. Many of the handaxes show pot-lidding, or thermal spalling in which distinctive circular flakes were ejected from their surfaces. Such damage is more prevalent on the undersides of the artifacts.

All of the Acheulian sites are surface artifact occurrences, having deflated substantially, but to an unknown extent, over time. Nonetheless, geomorphic analysis of the ancient land surfaces attest to the preservation of the essential configuration of the Pleistocene terraces and pediments. Thus, the overall horizontal distributions of artifacts generally reflect their original

deposition on the landscape. Specifically, they have not been transported by fluvial action. The surface artifact assemblages at the respective sites are summarized in **Table 1**.

Beginning within the box canyon of Juwit al-Ghuwayr and proceeding to just outside the entrance to it, and then southeasterly along the escarpment for a distance of nearly 2km, seven Acheulian sites were located and studied.

Jafr-83. Site Jafr-83 lies entirely within Juwit al-Ghuwayr. Originally recorded as several smaller sites, it was later recognized as a fairly continuous surface scatter of Acheulian cleavers and other artifacts. It is long and linear, extending for about 800m along the main wadi draining the canyon. Along the right (north) bank of the wadi the artifact scatter occurred on flat terraces. The left bank is flanked almost continuously by low hilly terrain consisting of dissected pediments extending to the nearby escarpment. Site loci along the left bank of the wadi are accordingly characterized by variable relief. One of these loci had an assemblage of handaxes that were badly spalled away by pot-lidding and other natural fractures. The cause of this destruction is not known, but it may have resulted at some time in the past when a fire burned over the locus while the artifacts were exposed on the surface or lay just below it. An assemblage of 304 Acheulian handaxes was mapped and recovered at Jafr-83, along with a small sample of Levallois cores and reduction products and

Table 1: Site assemblages at 'Uyūn al-Qadīm.

	Sites and Isolated Artifacts								Total
	J-83	J-140	J-25	J-92	J-136	J-138	J-158	Isolate	
Artifacts									
Acheulian handaxes	304	1046	412	76	24	39	14	11	1926
Nonbifacial tools									
Scrapers	0	5	2	0	0	0	0	0	7
Levallois points	3	1	6	0	0	0	0	0	10
Other tools	1	2	3	0	0	0	0	0	6
Cores and debitage									
Lower Paleolithic flake cores	4	73	70	7	3	3	2	0	162
Lower Paleolithic debitage*	35	146	333	9	13	12	6	0	554
Levallois cores	27	120	73	9	3	8	0	1	241
Levallois debitage	13	15	19	3	1	0	0	1	52
Total	387	1408	918	104	44	62	22	13	2958

*Some of this material could have resulted from production and maintenance of Levallois cores. The total includes 20 tranchet flakes from creating or restoring the cutting edges on bifacial cleavers.

miscellaneous debitage.

Jafr-140. The largest scatter of Acheulian artifacts in the locality, Jafr-140 is a site of variable relief more than 500m long and half as wide, just outside the entrance to the box canyon at a major intersection of drainages. An initial phase of pedestrian survey, mapping, and surface collection has been completed. The assemblage so far recovered from this site includes 1,046 handaxes and fragments, as well as flake cores of several configurations, tranchet bit flakes and other types of debitage, and Levallois cores and reduction products. A more thorough search will be carried out to recover a larger sample of debitage from the rocky surface of the site and delineate its extent. That 00 will enable a better characterization of the range of lithic reduction that occurred there (e.g., initial handaxe production, handaxe maintenance, or both).

Jafr-25. Jafr-25, a dense scatter of Acheulian artifacts about 150 x 75m, occupies a low chalk-marl ridge just to the south of Jafr-140 and along a moderate-sized drainage. Many of the 412 handaxes recovered here were of substantial size, considerably larger than most of the examples recovered at the other sites and at 'Ayn as-Sawda (Rollefson *et al.* 1997, 2006). Levallois points, cores, and a sample of debitage were found here as well.

Jafr-92. This site occurs on either side of an incised drainage that originates at the escarpment and dissects eroded chalk-marl sediments. Its surface assemblage includes 76 Acheulian handaxes, a few Levallois reduction artifacts, and a few flakes in a linear pattern for about 100m along the drainage.

Jafr-136. Located adjacent to an inselberg that stands off a short distance from the escarpment, about a half-kilometer south of Jafr-92, this site is only about 40m across. Its surface assemblage was scattered over a low ridge along a drainage emanating from the escarpment, and includes 24 Acheulian handaxes, several Levallois cores, and associated debitage recovered from a badly deflated surface.

Jafr-138. Located about 200m south of Jafr-136, this site occurs on and around a low rise on terrain of otherwise little relief, crossed by a shallow drainage. Its surface assemblage included 39 Acheulian handaxes, a few Acheulian and Levallois flake cores and reduction products,

and debitage over an area of about 60 x 40m.

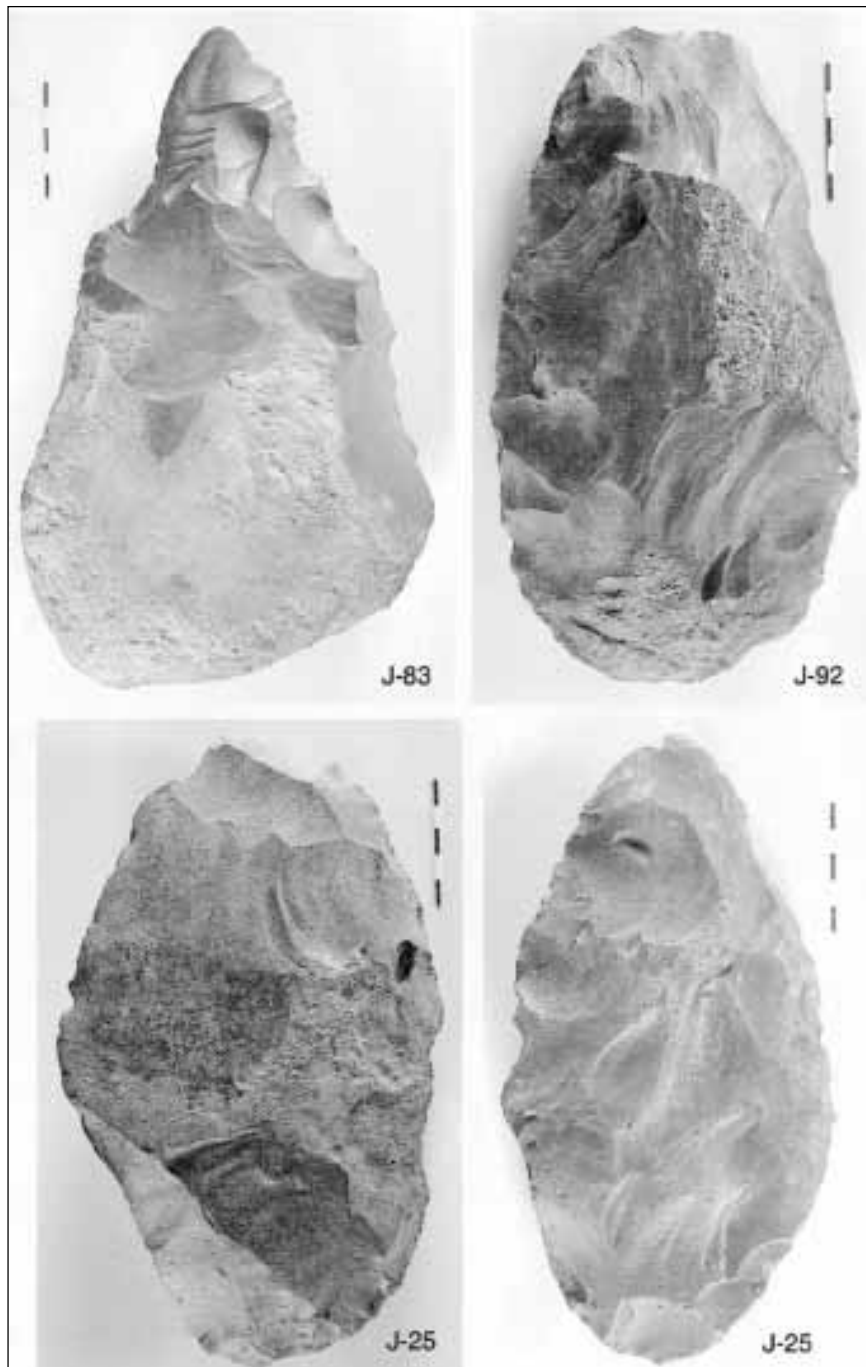
Jafr-158. In area, Jafr-158 is the smallest site with the smallest artifact assemblage. It lies close to the escarpment, just out from a small alcove, in an area of eroded chalk-marl sediments. The character of this erosional feature suggests a former point of groundwater discharge. Fourteen Acheulian handaxes were mapped and collected here, along with a flake core and a small collection of debitage distributed over an area about 30m across.

All of the sites at the 'Uyūn al-Qadīm locality thus conform to a basic pattern. They are located within the box canyon or near the escarpment. They also are located near points of spring discharge on what likely was a savannah or steppe landscape during the Middle Pleistocene, and their assemblages are dominated by handaxes to the exclusion of most other tool categories.

The Lithic Assemblages

The assemblages from the seven sites consist primarily of handaxes, which so far total 1,926 specimens, including a small number of still-unconjoined fragments (Figs. 2-7). Handaxes constitute well over 90 percent of the formed tools. The remaining tools include 10 Levallois points, a few large scrapers, flake cores possibly used as scrapers or choppers, and hammerstones. Levallois cores, flakes, and blades constitute a minor percentage of the artifacts in the site assemblages. Debitage in general is not well represented, and no small flakes were recovered, possibly due in large part to the difficulty of discovering them in the coarse desert pavements that cover most of the site surfaces. Among the debitage items recovered are 20 examples of the distinctive tranchet flakes from cleaver production and maintenance.

Because the assemblages were recovered from deflated surfaces where they had lain for indeterminable, but certainly enormous, stretches of time, the artifacts have sustained damage from natural agencies, possibly trampling by large animals, frost, etc. A number of handaxes are broken, most often into proximal and distal fragments, and the breaks usually display no bulbs of force. This fracture pattern may be the result of repeated freezing temperatures acting on moisture in marginal cracks, over vast periods of time. But differential patination on some



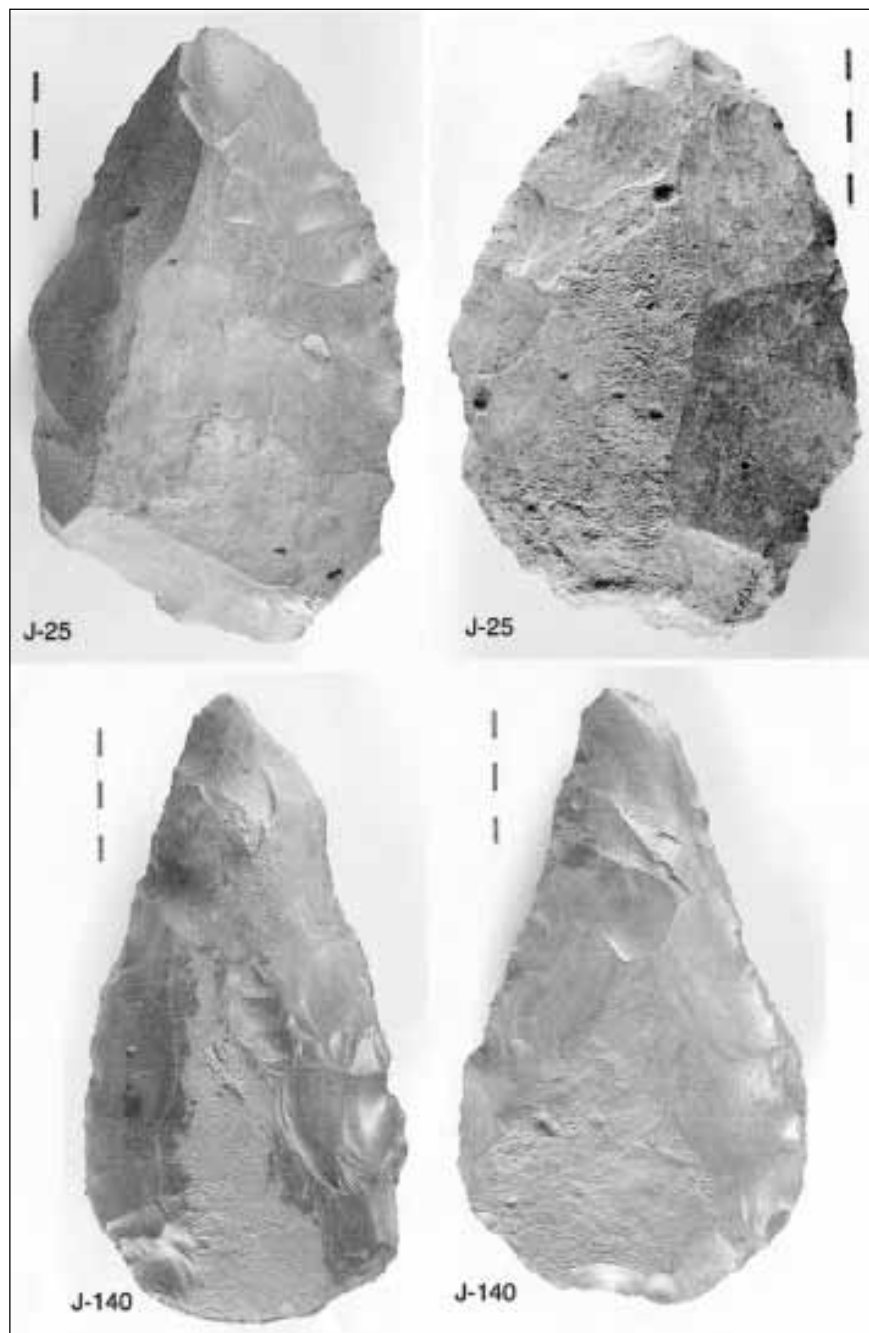
2. Very large handaxes. Upper left example with cortical grip (butt) resembles certain examples at the Early Acheulian site of 'Ubaydiyya. Others are provisionally attributed to the Middle Acheulian. Use of the tranchet technique for configuring and maintaining the bit was already in use. Here and elsewhere, scale increment 1cm.

specimens shows that the process has occurred in more recent times and probably continues today. Provenience information has enabled refits of some of these fragmentary pieces.

As in the case with the large assemblage of Acheulian handaxes analyzed at 'Ayn as-Sawda (Quintero *et al.* 2005, 2007), the vast majority of these tools at 'Uyūn al-Qadīm are tranchet cleavers. At 'Ayn as-Sawda this figure is

about 90 percent of all handaxes. Our analysis of the 'Uyūn al-Qadīm assemblages is not yet complete, but preliminary studies suggest the cleaver percentage will also be very high.

A few handaxes display clear tranchet flake scars from their original production. But a large proportion of them retain such scars from subsequent maintenance. Their identity as bifacial cleavers is clear and certain. On numerous oth-

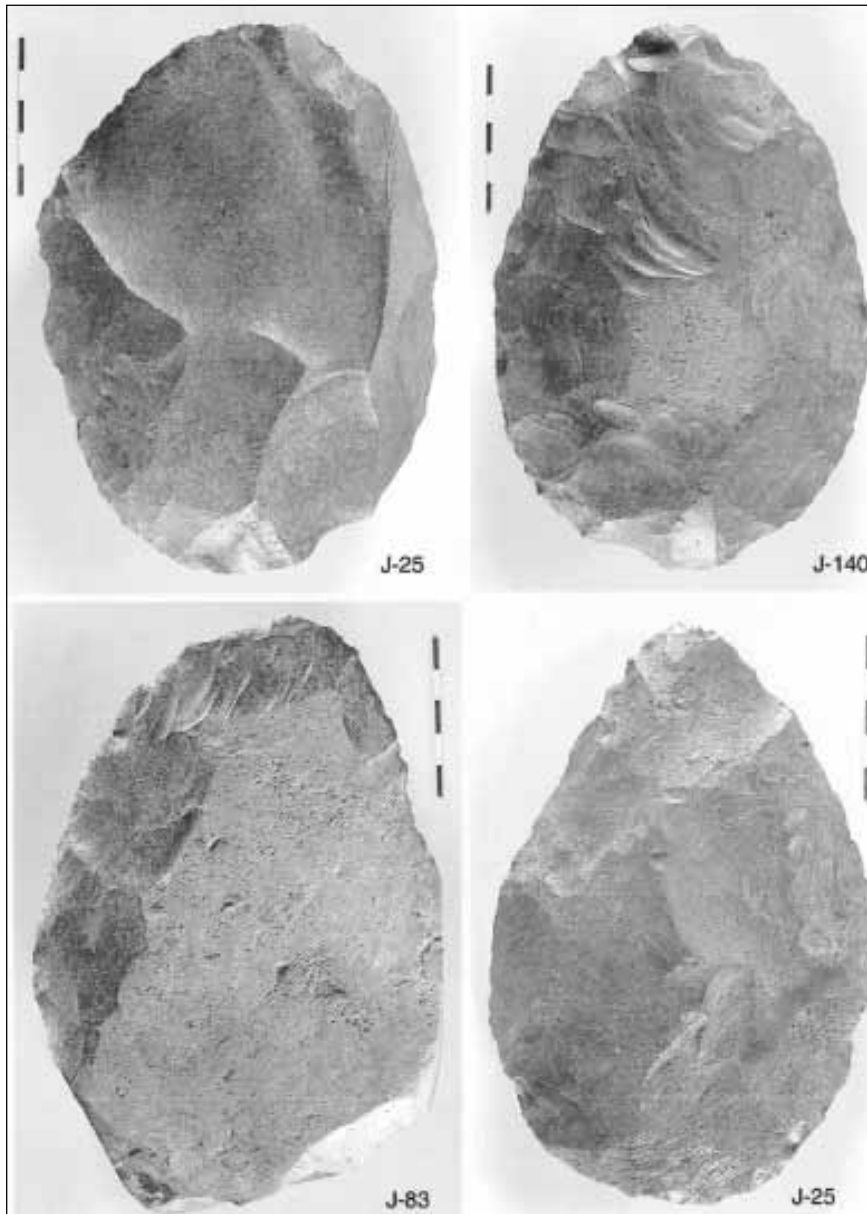


3. Large handaxes, provisionally attributed to the Middle Acheulian.

ers the distinctive scar is partially obliterated by damage to the cutting edge, or by the user of a given tool having resorted to bifacial resharpening toward the end of its use-life when the shape of the distal end precluded further resharpening by tranchet flake detachment. In any case, as at 'Ayn as-Sawda, the 'Uyūn al-Qadīm assemblages are overwhelmingly composed of exhausted cleavers (**Fig. 7**). In a few instances, exhausted cleavers were recycled as flake cores, which

greatly altered their forms. Only by careful interpretation of the remnant flake scars toward the distal ends of handaxes, and the grip attributes, was their identity as cleavers determined.

Resharpenable tools most often end their use-lives when they can no longer be resharpened and where they were last used. Some might have been abandoned when they could no longer be counted upon to be resharpened, or when they could readily be replaced, in anticipated fu-



4. Large handaxes, provisionally attributed to Middle Acheulian, coarsely flaked, all tranche cleavers.

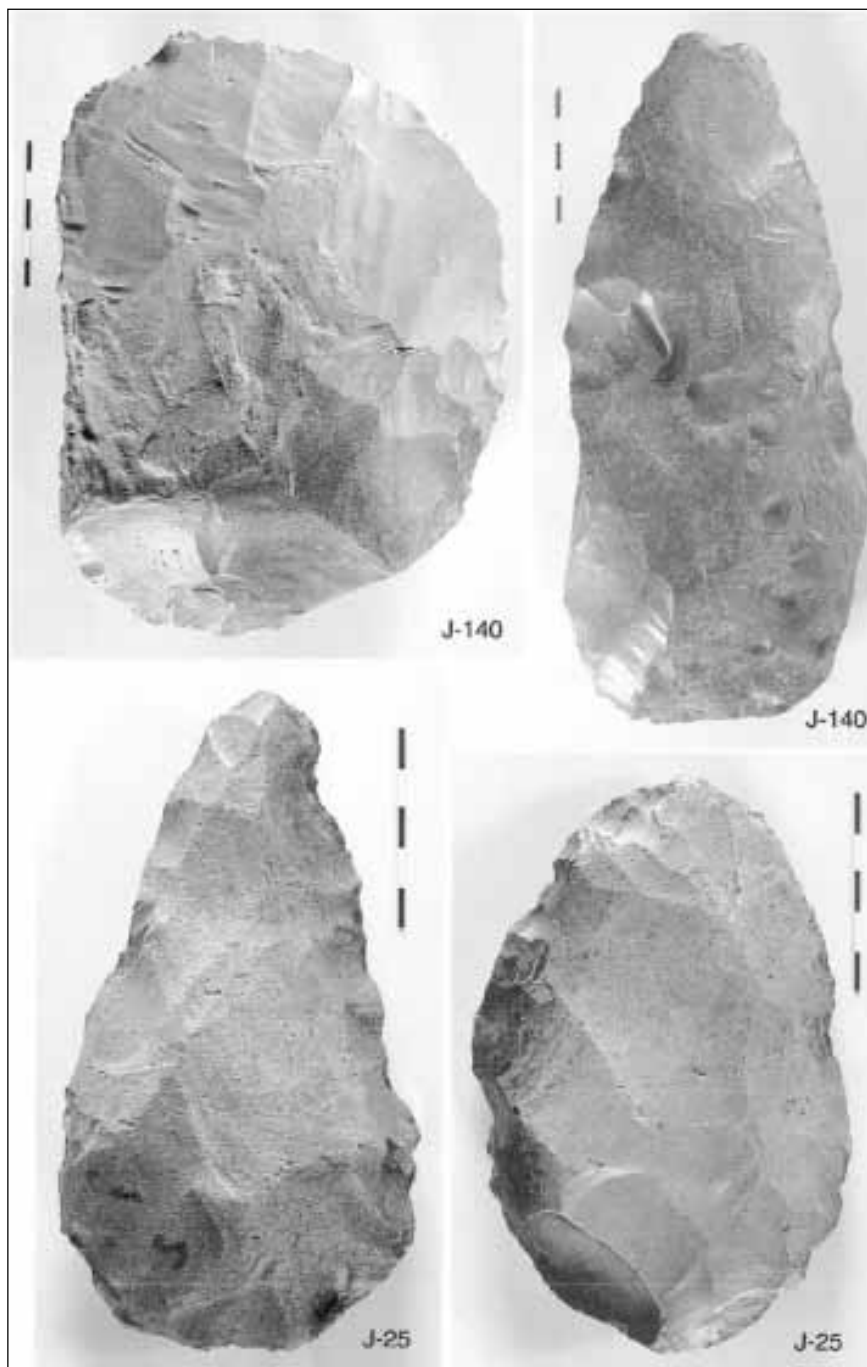
ture contexts. So our analysis bears heavily on concepts of use-life, and the approximate stage between initial production and exhaustion at which any individual handaxe can be estimated to have entered the archaeological record. Our assessments of these use-life stages are based on analysis of more than 4,000 handaxes from al-Azraq, Tabun Cave near the Mediterranean coast, and al-Jafr Basin (Rollefson *et al.* 2006).

Levallois artifacts (**Table 1**), present in relatively small numbers at all but one site (Jafr-158), number 303 objects, of which nearly 80 percent are cores. They came mostly from sites

within and near the entrance to the box canyon. By comparison, the 10 Levallois points and only 52 other debitage products suggest that many Levallois tools were removed from the locality, although some small flakes may still reside in the desert pavement.

Chronology

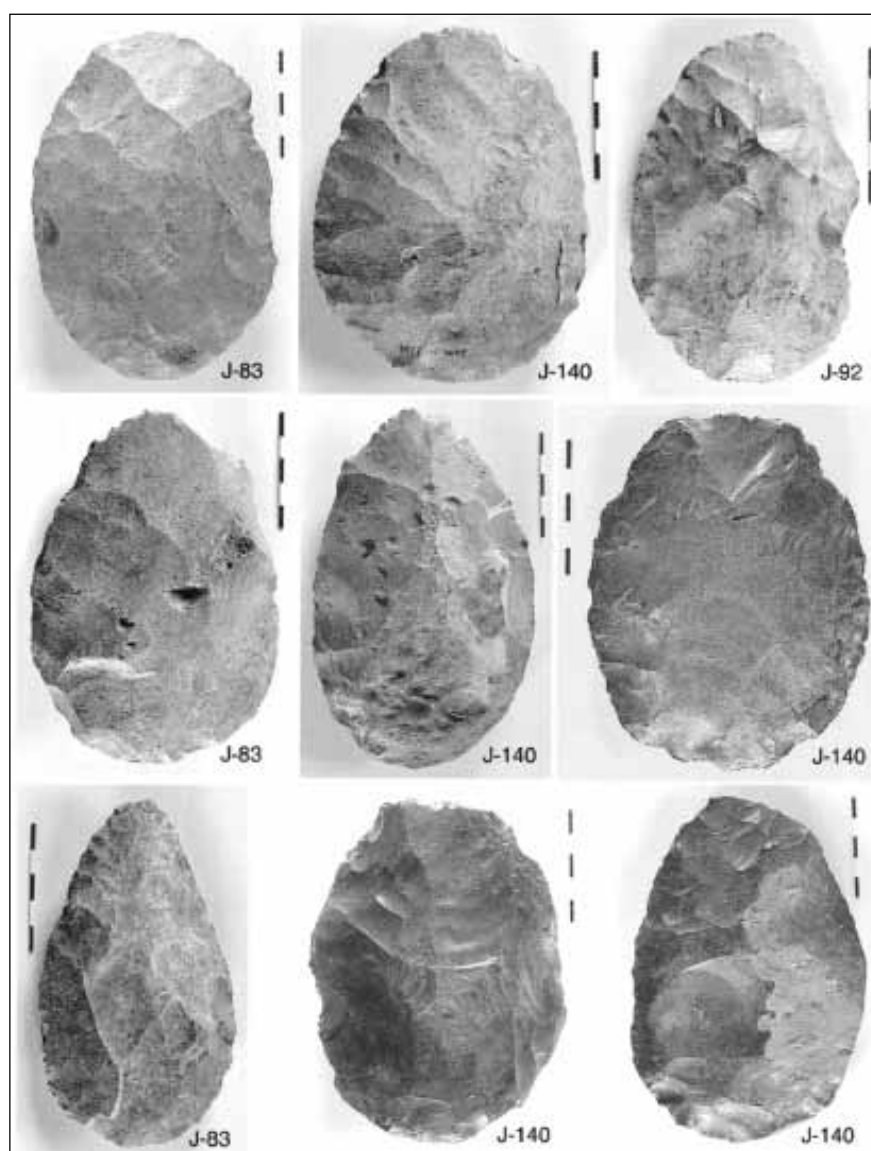
In considering the chronological placement of the ‘Uyūn al-Qadīm assemblages, the following discussion of Near Eastern sites (discounting occurrences of isolated specimens) draws on several of those with more substantial assem-



5. Large handaxes, provisionally attributed to the Middle Acheulian.

blages and for which the dating is reasonably well known. (For a detailed review of Jordanian Acheulian site data and their chronostratigraphic assignments see Copeland [1998]). Our comparison is made somewhat difficult and awkward because in general artifacts have been presented in the literature as static types, the forms and dimensions of the handaxes having been viewed as unchanging and unaffected by resharpening.

Our approach continues to be a functional one in which Acheulian tool forms were the result of raw-material choices and stages of use-life alterations. Working edges of large cutting tools became dulled and damaged during use, and maintenance of those edges altered the forms of such tools throughout their use-lives. Individual tool dimensions and forms thus continually changed. Consequently, “large” and “primitive”

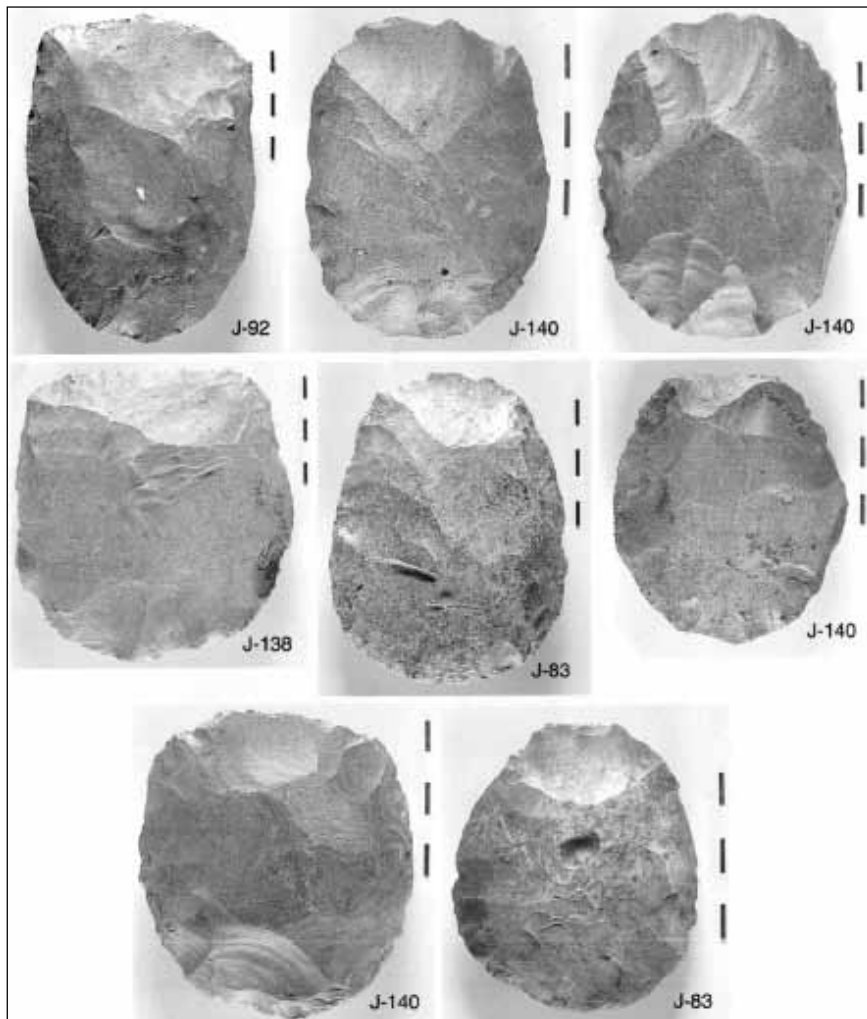


6. *Tranchet cleavers, Late Acheulian. Mid- to late-stage in use-life, shortened by resharpening, and having lost distal width.*

may indicate raw-material constraints or possibilities, or early stages of a tool's use-life, or may equate with the evolution of handaxe forms over hundreds of millennia. Nonetheless, comparisons of general assemblage characteristics can be informative chronologically.

Very large and coarsely flaked handaxes (**Figs. 2-5**), notably at sites Jafr-25, -83, -92, and -140, suggest that occupations at 'Uyūn al-Qadīm began during the Middle Acheulian, far back in the Pleistocene. The largest handaxe from 'Uyūn al-Qadīm (**Fig. 2**, upper left) has a massive, cortical grip (or butt) reminiscent of, but much larger than, Middle Acheulian flint examples at El-Meirah in the El-Kowm Basin of Syria, dated to 0.7 Ma (Boëda *et al.* 2004),

and to examples made of basalt and dated to 1.2 - 1.4Ma at 'Ubaydiyya in the Jordan Valley (Bar-Yosef and Goren-Inbar 1993). These comparisons suggest that the 'Uyūn al-Qadīm specimen may date to the early part of the Middle Acheulian. There also are strong similarities between some of the other large al-Jafr handaxes and examples from the Middle Acheulian site of Latamne on the Orontes River in Syria (Clark 1967, 1968). Near Clark's excavations, Middle Acheulian artifacts in the modern gravel quarry of Miramil in the Latamne Formation overlay sediments dated by thermoluminescence to ~0.567 Ma, providing a rough estimate of the dating of the original Latamne site (Dodonov *et al.* 1993). The age of the Middle Acheulian site



7. *Tranchet cleavers, Late Acheulian, resharpened down to the grip, fully exhausted, yet still retaining distal width.*

of Joubb Jannine, Lebanon, is estimated by the investigators at ~0.5 Ma (Besançon *et al.* 1982), but perhaps may be contemporary with Latamne (Copeland and Hours 1993:90). Evron Quarry on the Mediterranean coast of northern Israel is sometimes compared technologically with Latamne (Gilead and Ronen 1977; Ronen 1991). It is now thought to date >0.65 Ma (Ron *et al.* 2003). So at present the ages of these Middle Acheulian sites and assemblages are estimated at a minimum of 0.5 Ma to well over 0.75 Ma.

The assignment of specific artifacts from al-Jafr Basin sites to the Middle Acheulian nonetheless remains problematic. Coarsely flaked, cortical-grip trihedral handaxes seen at several Middle Acheulian sites in the Near East are hardly represented in al-Jafr Basin. Two such implements were found at Mashāri' 4 in the lower member of the Ṭabaqat Faḥl Formation

(~0.5 Ma) in the northern Jordan Valley (Maccumber 1992). The essential absence of these tools in al-Jafr Basin assemblages may be due to the functions that different forms of handaxes served in different Middle Acheulian contexts. For instance, a point of divergence from this Middle Acheulian pattern is the use at 'Uyūn al-Qadīm of the tranchet technique for creating and maintaining the cutting bit on large bifacial cleavers (Fig. 2, upper right). This Middle Acheulian (?) assemblage character reflects the butchering of large game. However, the number of well-characterized and dated Middle Acheulian assemblages in the Near East is still relatively few. Assemblage variation as dictated by site function, tool use-life history, and time is not yet well realized. At this point, based on the presence of the large and coarsely flaked handaxes, we think there is a significant, perhaps

distinctive, but undated, Middle Acheulian presence at several of the 'Uyūn al-Qadīm sites.

Handaxe forms we assign to the Late Acheulian equate well with those at several undated Jordan sites, including Fujayja, Wādī Qalkha J401 near the Rās an-Naqb (Henry 1995), and 'Ayn al-Asad, C-Spring, and 'Ayn as-Sawda in al-Azraq Oasis. The abundance of smaller handaxes (Figs. 6, 7) that clearly are bifacial cleavers typify this period, and their forms suggest that they have been extensively resharpened by tranchet and bifacial flaking, often to the point of exhaustion. But because the assemblages at 'Uyūn al-Qadīm are all confined to the surface, they cannot be segregated into the Late, Late Evolved, and Final stages of the Acheulian as others have done based on more discrete assemblages (e.g., Copeland and Hours 1993). Here we can only suggest the age of these artifacts in al-Jafr Basin is likely to be ~0.3 - 0.5 Ma. At some undetermined time Levallois technology was added to the Late Acheulian tool kit.

Discussion

The foregoing narrative suggests that the Acheulian occupations at 'Uyūn al-Qadīm reflect a pattern of repeated use of the same locality, for the same reason, over an immense range of time. We believe that pattern was specifically for ambush hunting and butchery of large game animals, and that most of the handaxes recovered there were designed as butchering tools. It seems likely that the presence of spring discharge from karstic channels within the Eocene limestone created an oasis setting on a savannah or steppe landscape that attracted large herbivores. *Homo erectus* hunters took advantage of this situation and used the landform for ambush hunting, both within the box canyon and in smaller alcoves and box canyons evacuated by former spring vents along the escarpment. Hunting weapons may well have been wooden throwing spears with self points, such as those found at Schöningen, Germany (Thieme 1997), that are dated to about 0.4 Ma. The substantial assemblage of bifacial cleavers at sites in the 'Uyūn al-Qadīm locality attests to the singular and persistent pattern of butchering large prey species that had to have been killed and butchered where they died at these locations. Thus the locality provides an enriched view of *Homo*

erectus hunting strategies during the Middle Pleistocene of Jordan.

Numerous studies support these interpretations. Technological analysis of the lithic assemblages established the function of most of the handaxes as bifacial cleavers. Handaxes have been shown by use-wear studies to be used as butchering tools (e.g., Keeley 1980: 143-147). Technological and typological studies of the assemblages from 'Ayn as-Sawda reveal the formal transformations that result from the resharpening of these butchering tools (Wilke *et al.* 2005). The most clearly revealed behavioral analogy is with butchery contexts at Boxgrove (Roberts and Parfitt 1999). The focus by Acheulian hunters on Middle Pleistocene spring settings and other watering places in the Near East has several strong parallels. This situation prevailed at the al-Azraq Oasis sites of 'Ayn al-Asad (Copeland 1989a, 1989b; Rollefson 1983), 'Ayn as-Sawda (Rollefson *et al.* 1997; Quintero *et al.* 2005, 2007), and C-Spring (Copeland 1989c, 1991), and at Nadaouiye in El-Kowm Basin of Syria (Le Tensorer 1996; Le Tensorer *et al.* 1993).

At al-Azraq Oasis the fauna identified in firm association with Acheulian handaxes at C-Spring (Clutton-Brock 1989) includes aurochs (*Bos primigenius*, ancestor of modern cattle), hartebeest (*Alcelaphus buselaphus*), steppe rhinoceros (*Stephanorhinus* [*Dicerorhinus*] *hemitoechus*), Asiatic wild ass (*Equus hemionus*, onager), and an extinct equid (*Equus hydruntinus*). Of these, aurochs inhabited open forests and meadows of southern Asia, Europe, and North Africa. Historically, hartebeest, a large antelope, inhabited dry grasslands over much of North, East, and South Africa, and the onager ranged over dry landscapes from Palestine to the Gobi Desert (Nowak 1991). Fauna associated with the Acheulian at 'Ayn as-Sawda (Dirks MS; Dirks *et al.* 1998) include steppe rhinoceros (*S. cf. hemitoechus*) and elephant (*Elephas* of the *E. hysudricus-E. maximus* lineage). With the Levallois industry at 'Ayn as-Sawda were aurochs and the extinct equid *E. hydruntinus*.

Thus, the faunal remains from al-Azraq serve as proxy data and suggest that 150 km to the south at 'Uyūn al-Qadīm, Middle Pleistocene hunters of the Middle and Late Acheulian traditions exploited oasis settings on a savannah/

steppe landscape. There they hunted a broad range of large game animals that likely included aurochs, hartebeest, steppe rhinoceros, onager, extinct equid, and elephant.

Taken together, the information and interpretations gathered at 'Uyūn al-Qadīm establish southern Jordan as a premier region for learning about Middle Pleistocene human behavior. The record of evolving technology and culture revealed there apparently began by 0.75 Ma and prevailed, at the same locality, over at least the next 400 thousand years. During that time significant changes occurred in the ways stone tools were produced, but they always reflect the butchering, and the implied ambush hunting, of large and generally dangerous game species at this oasis setting. Evidence points to a broadly distributed life-way across the now-desert inland regions of the Near East, extending northward from at least southern Jordan through al-Azraq Oasis and on to the El-Kowm Basin of northeastern Syria (Quintero *et al.* 2007). The interpretations offered here provide a technological, natural historical, and behavioral framework within which to assess other Acheulian assemblages in the region.

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MOSAICS OF MĀDABĀ (THE PAST AND THE PRESENT)

Ali Abed al-Kareem Al-Khayyat

The art of mosaic making originated in ancient Sumeria but only became popular in the second millennium BC in Mesopotamia, from where it developed and spread over time to the Greek, Roman, Byzantine and Islamic worlds. The art of mosaic production was thus constantly evolving through time and across different states and civilizations; from big cubic shaped (Tessera) to small colored and crystallized pieces of later periods.

Over the past century a number of mosaic pavements have been uncovered in Mādabā; discovered as part of extensive excavations undertaken by previous explorers. When you visit Mādabā in Jordan, it will become clear that the art of mosaic making acquired a unique standard, one shared by all the architectural remains which have mosaic pavements. Whether they are palaces, temples, churches, chapels or public houses, mosaics were used for decorative purposes to visualize local religious and social concepts.

In 1992, the Mādabā Mosaic School was established by the Franciscan Institute, with the cooperation and support of the Italian Government, the Jordan Ministry of Tourism and the Department of Antiquities of Jordan. The main objective of the School is to train national teams in the scientific treatment, conservation and preservation of mosaic pavements in order to preserve and consolidate existing mosaics for the education and enjoyment of the people of the Kingdom of Jordan. Many students have already graduated from the School and have been hired into the government sector (e.g. The Department of Antiquities), while others have established their own workshops, participating in the development of this sector in order to strengthen that part of the economy concerned

with tourism. Over time, the mosaic workshops run by the School have had a significant role to play in enhancing the income of the city and it has been inevitable that the Department of Antiquities have set several criteria and standards for their operations. In particular, new standards have been implemented which oversee the methods used to protect national heritage (for example, the imitation of mosaic portraits). It has been important to differentiate between workshops, and to manage the export of imitations abroad.

With cooperation from USAID, the School has become a scientific institute capable of dealing professionally with surviving mosaics in archaeological contexts and with the preservation of this important aspect of Jordanian heritage.

The Department of Antiquities has set several “must comply” prerequisites:

1. The name Jordan or its abbreviation, JOR, must be printed in English on all reproduced or imitated mosaics.
2. It is forbidden to imitate a newly found mosaic before it has been studied and publicized.
3. To print clearly on the back of the portrait the identity of the portrait and the name and address of the workshop that produced it.
4. To present an Origin Certificate for each portrait, with codes and with fixed dates.
5. To obtain an official Hand Written Assurance from the workshops that they would be suspended if they are found guilty of breaking the Jordan Antiquities Law No. 21/1988.

The expert outputs and creations of highly-trained workshop owners and the skilled technicians they employ, created a new challenge, where the transformation of an ancient art form, previously treated as an historical reading and visualization of the past, became a form of eco-

conomic income. Enhancing and reinforcing local production of imitated mosaics creates wealth and prosperity for Jordanians who might also considered the descendents of those who invented the art of ancient mosaic making. In this respect, the following are examples of some of the ways in which local production has been enhanced:

- Local production of small sized micro-mosaic stones, which enhance the detail of locally produced portraits.
- The introduction of new colors of stones for reproductions of mosaics.
- The invention of new designs and technologies, such as photographs that can be shaped into a mosaic portrait.
- The expansion of mosaic portraits into other media, not just pavements but swimming pools, building entrances and walls designs.
- The introduction a new technique of illustrating the mosaic art concept on Ostrich egg shells and pottery using images from original mo-

saic pavements found on archeological sites.

- The production of rugs and carpets with imitations of original mosaic portraits.

The enduring attraction of mosaics is exemplified by the recent discovery of a most beautiful mosaic pavement in the Mādabā Archeological Park which shows three ladies sitting on chairs with a cross and fruit baskets in their hands. Above each lady there are three Greek inscriptions naming three important cities: Rome, Gregoria and Mādabā. The mosaic is now used as the official logo for social activities, publications, posters and tickets sold at tourist sites. It has also become the official logo of Mādabā's Mosaics Institute. In the future it is hoped that it will become the logo for Mādabā Municipality's cultural publications.

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TALL ABŪ AL-KHARAZ: THE SWEDISH JORDAN EXPEDITION 2009 TWELFTH SEASON PRELIMINARY EXCAVATION REPORT

Peter M. Fischer and Rainer Feldbacher, with contributions by M. Rinner and S. Schilk

Introduction

The twelfth season of excavation at Tall Abū al-Kharaz was carried out with the kind support of the Department of Antiquities of Jordan between 27 September and 1 November. This year's field work was a direct continuation of a research project which started the year before (see *ADAJ* 53, 2009) and which is mainly devoted to the Iron Age occupation of the site (see the earlier publications on the Early, Middle and Late Bronze Ages in Fischer 2006a, 2008; Fischer ed. 2006). The excavations were resumed in order to collect new material and include refined stratigraphic evidence and additional radiocarbon dates for the next publication, namely, that on the Iron Age (Fischer forthcoming). Excavations were continued in the most westerly part of Area 7, which is in the northern part of the tall, and in Area 9, to the south of the tall (for map see Fischer 2008: 21, fig. 9). Both areas fulfilled the research objectives of this project: many intact architectural installations and a large number of artefacts, more than a few of them imported from Cyprus, Phoenicia and Assyria, were discovered.

The 2009 team consisted of Peter M. Fischer (director), Rainer Feldbacher (assistant field director), Hikmat Ta'ani (foreman, trench master), Muwafaq al-Bataineh (surveyor, draughtsperson), Eva Björkander-Mannheimer, Michaela Rinner, Simone Schedl and Sheba Schilk (all trench masters) and Katarina Nordström (assistant trench master). The representative of the Department of Antiquities was Khalid Jannaideh. The team was once more supported by Ismael Melhem, for which we are most grateful. Further support was provided by Musa Mohammed Ahmad (transport) and Khalid Mohammad Dheeb (cook). Fifteen local workers from Pella

and al-Mashāri' were engaged in the excavations.

The Royal Court, represented by T.R.H. Prince Raad Ibn Zaid and Princess Majda Raad, and the Swedish Embassy again showed sincere interest in our work: H.R.H. Princess Majda Raad and H.E. the ambassador of Sweden, Charlotta Sparre, visited the site. The Department of Archaeology and Anthropology of the Yarmouk University in Irbid, headed by Dean Professor Zeidan Kafafi, supported the expedition in many ways and also arranged a public lecture at the Yarmouk University, where the director of the expedition presented an overview over 20 years of excavations at Tall Abū al-Kharaz. Another, more popularised, lecture was given at the Friends of Archaeology and Heritage Society in Amman, presided over by Professor Moawiyah Ibrahim. Members of the society also visited the site.

RESULTS

Area 7 (Fig. 1)

Three trenches (eight sub-trenches) were opened in the westernmost part of Area 7, which lies in the central-northern part of the tall (Fig. 1): Trenches XLVIII A-D, XLIX A, B and L A, B. The trenches are in Grids RR/SS-24/25 (see e.g. Fischer 2008: 21, fig. 9). The opened but only partly excavated area corresponds to 190 square metres. The area of the excavations slopes from east to west 2.05 m in 15 metres (measured in the central part), and from south to north 1.73 in 14 metres (measured along the eastern boundary of the trench system). The occupational phasing presented here is only applicable to the area of excavation from 2009 but parallels to the earlier excavations in Area 7 and its general phasing will be referred to.

Strata 1A1 and 1A2¹

Walls 232, 167, 155, 446 and 486 from east to west from the excavations of 1993 to 1998, and to W548/569 from the excavations of 2008 in the easternmost part of Area 7. This gives the hitherto exposed Abbasid city wall in Area 7 a total length of approx. 70 m.

In addition to small pits the Abbasid settlers dug a large pit approx. 4.4 m in diameter in the northern/central part of the area, thereby mixing up their material with material from the Iron Age. There are some installations in the southern part of the opened area which are difficult to

reserved for the Late and Middle Bronze Ages, and Stratum 3 with sub-divisions for the Early Bronze Age. All these divisions and sub-divisions are only valid in the preliminary reports. The final phasing for the Early, Middle and Late Bronze Ages is in Fischer 2006a,b; 2008. There are six sub-phases for the Early Bronze Age (IA,B; IIA,B; IIIA,B), two sub-phases for the Middle Bronze Age (IV/1 and 2) and four sub-phases for the Late Bronze Age (V-VIII). The final phasing of the Iron Age will consequently start with Phase IX.

ascribe to either the Abbasid period or the most recent Iron Age occupation. These include three *ṭābūn*(s) and a stone-built, 1.3 m deep, circular grain silo. However, judging from their construction they should be dated to the most recent Iron Age phase. These findings suggest dividing Stratum 1A into two sub-strata.

The most recent pottery is typical of the Abbasid period of the 9th century AD (see the pottery from the 1993 season of excavation described by Walmsley 1995: 107, 116-7), e.g. vessels with “turban” handles. Another find from the Abbasid period is a partly preserved bracelet of bronze. Nonetheless, Iron Age II C pottery dominates the majority of the loci. Amongst the finds from the Iron Age is a Cypriote Black-on-Red juglet and an elaborate bronze/iron fibula (**Fig. 7**, see also Appendix 2).²

Strata 1B1 and 1B2 (one of the sections in Fig. 3)

These phases of Iron Age occupation, by convention designated Iron Age IIC, are largely unaffected by Abbasid settlers with the exception of the large pit in the northern-central part of the area, which was dug in Abbasid times and which cut through some of the Iron Age walls (see above).³ There are the remains of two domestic buildings to the north, of which the most northerly construction elements are missing due to erosion of the northern edge of the tall (see the observations during earlier seasons in the eastern part of Area 7). However, it may be anticipated, judging from the evidence in Area 7 East, that they were built against the city wall, which is also missing. Many architectural elements were taken over almost unchanged from the previous phase of occupation (Phase 1C). The two houses are separated by a 0.3-0.6 m wide, stone-paved, gutter (L424), the purpose of which is to drain rain water from the upper part of the tall down the slope. The building to the west is 7.6 m (east-west) by at least 7 m (north-south) in size. The mudbrick superstructure of some of the approx. 0.6 m wide, stone-foundation, walls is still in a good state of preservation (W601, 598 and 597). The outer walls of

the western house are W601,⁴ 600/580 and 579. There are two well-preserved dividing walls inside the building (W598, 597), of which W597 takes a different direction, thus not fitting into the fairly rectangular system of the structure. This wall might represent a later addition. The space to the west is 1.6 m wide and that to the east 4.3 m (the later addition, W597, is not taken into consideration). In the south-eastern corner of the eastern space there is a 0.9 by 0.5 m large stone-built bench.

The next house, which is approx. 4 m to the east of the gutter, measures, in its southern part, 7.5 m (east-west) by approx. 7.5 m (north-south; reconstructed). It was taken over almost unchanged from the previous period. The outer walls, 0.5-0.6 m wide, are W595, 587, 585, 485 and 487 (the latter two to the east are from the excavations in 1998). Two dividing walls, W602 and 489 (from 1998) created three spaces of which the central space is a courtyard. The western space, 1.7 m wide, could be entered from the west via an approx. 0.8 m wide entrance where a door socket was found, and from the south through a 0.9 m wide, stone-reinforced, entrance. The eastern space, approximately 2.5 m wide, to the east of the courtyard had an approx. 1 m wide entrance in W485 from the south. There is a 2.6 m wide annex to the south, of which W589 and 582 are preserved. This annex is somewhat larger than the corresponding annexes in the eastern part of the area. The southern part of the exposed area revealed the northern ends of additional structures (W594, 583 and 581; 0.4-0.6m wide). Between these two compounds there seems to have been a street running west-south-west to east-north-east.

Between the two houses, directly east of the gutter, are three well-constructed walls: the parallel north-south W584 and 596/603 and the transversal short W604, all them 0.5 m wide. Their interpretation is speculative. It might be that they represent the eastern limits of a walled external yard and, at the same time, functioned as stabilizers of the soil and the walls along the gutter. The narrow space between the two parallel walls might have been used as a storage

2. This is one of four fibulae which were discovered during this season.

3. It seems that the Abbasid settlers dug this and other large pits in order to get building material for their own

structures.

4. This house might extend towards the west. In that case W601 is not an external wall.

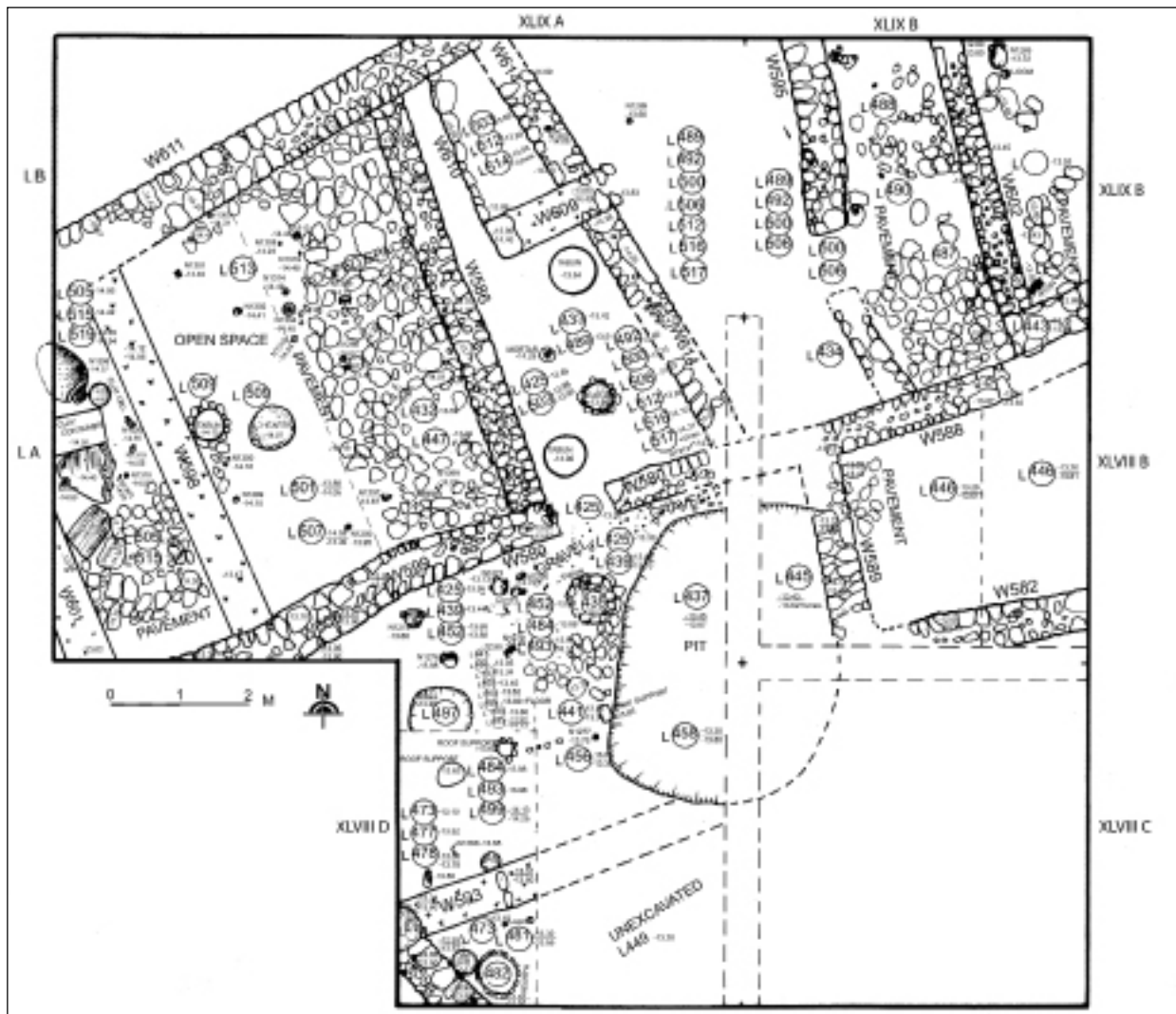
facility, although there are no finds, which could confirm this theory.

Numerous objects for daily use belong to this phase. Amongst these are millstones, mortars, flint blades, loom weights of sun-dried clay and arrow heads of iron. The pottery belonging to the typical Iron Age II repertoire of the site comprises, inter alia, rounded and carinated bowls, juglets, both plain, shaved and burnished, and the characteristic “black juglets”, jugs, cooking pots and storage jars, one of which once contained more than 100 l of fluid. There is also a clay pot with three stump legs, obviously an imitation of the more elaborate and expensive tripod bowls of basalt, of which there are several from our Iron Age contexts.

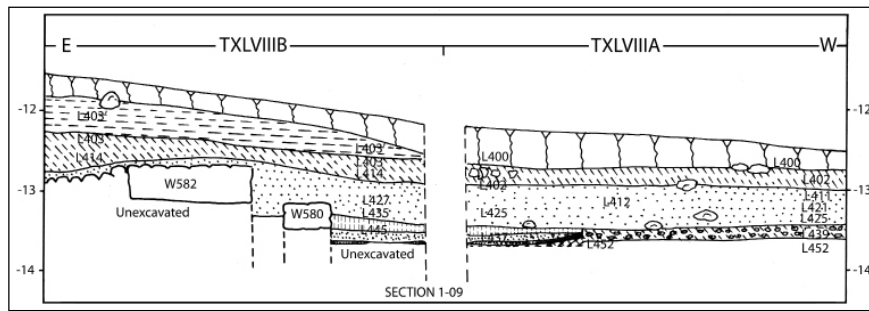
Stratum 1C (**Fig. 2**; one of the section in **Fig. 3**)

Many of the structures which have been ascribed to Strata 1B1-2 were originally built in this phase, which according to the locally produced pottery can be dated to the Iron Age IIB/C. This phase is even better preserved than the previous one and produced many well constructed structures and *in situ* find assemblages which contain numerous intact or complete earthenware vessels and other objects, one of which is unique so far (see below).

The overall plan of the architectural remains is approximately the same: to the north are two houses separated by a drainage, and to the south — on a higher level — south of a terrace-retaining wall (W593) is another only partly exca-



2. Area 7, plan of Iron Age phase 1C.



3. Area 7, Section 1.

vated structure (W594).

The ground plan of the building to the west surrounded by walls W601, 600/580, 614 and 611, is approximately 10 m (east-west) by 7.2 m (north-south). The widths of the wall vary between 0.5 and 0.8 m. The complex contains three rooms separated from each other by W598 and W586, both approx. 0.6 m wide. The mudbrick superstructure of some of the stone-based walls is still in a good state of preservation (W601 and 598). The space to the west is 1.6 m wide and is partly stone-paved. It contained, in addition to many small finds, including a black juglet, a lamp (see Appendix 2) and five arrow heads, two large storage jars (contents more than 100 l each), a large millstone and a rectangular clay trough.

The next room to the east in the western house, centrally placed and 4 m wide, was most likely roofed in its eastern half. The western, open, part contained a *ṭābūn* and a hearth, and several tools which include spindle whorls of limestone and fired clay, working tools of basalt, and a bronze earring with a knob. The western, roofed part, contained tools of limestone and basalt, for instance, a mortar, a pestle and a polisher. There is also a tripod of basalt, another arrow head and unfired clay loom weights. Jewellery includes three carnelian beads, a fibula of iron and an extraordinary find: an intact cosmetic palette of alabaster/calcite (**Fig. 6.1**). Excellently manufactured and decorated with incised circles, it still contained the remains of the cosmetics last used: one is of an intensive light-blue pigment, and the other of lilac colour.⁵

The third space of the western house to the east is 2.5 m wide to the south and narrows to 1.25 m to the north, obviously adapting to the topography of the tell. This room is divided into

two small spaces by W609 which leaves a 0.5 m wide corridor towards the northern room, which contained a stone-paved bench in its north-eastern corner ("W610"). The bench was most likely used as a working table for the preparation of food in connection with the two *ṭābūn*(s), with a mortar between them, and the hearth in the southern room. There is a 0.8 m wide exit in the southern room, from which a partly roofed and stone-paved backyard could be reached.

The backyard contained three stone pillar supports which are positioned in line halfway between the southern house wall and the terrace-retaining wall towards the south, a distance of approximately 4.2 m. This backyard was one of the most rewarding find spots in Area 7 in this season: in addition to another, quite large, stone-paved *ṭābūn* there were several complete earthenware vessels: a carinated bowl, a crater, a pilgrim flask, jugs and juglets, the latter including a "black juglet", and a tripod bowl. A carinated, red-slipped, Assyrian bowl should be mentioned. Other finds were a millstone and a bronze/iron fibula. A large pit is in the eastern part of the courtyard.

To the south of terrace-retaining W593 and on a higher level is a stone-lined hearth (dia. 0.6 m) and next to it a clay-lined recessed container (diam. 0.3 m) and several loom weights of sun-dried clay.

There is an open space between the two exposed houses. An interesting find from there is a handle of a storage jar with a rectangular seal impression. The next house lies approximately 2 m to the east. The outer walls, 0.5-0.6 m wide, are W595, 587, 585, 485 and 487 (the latter two are from the excavations of 1998). Two dividing walls, W602 and 489 (from 1998), created three spaces, of which the central one is a courtyard.

5. Analysis of the cosmetics is planned.

The western room, 1.7 m wide, which in this stratum is stone-paved, could be entered from the west via an entrance approx. 0.8 m wide, where a door socket was found, and from the south through an entrance 0.9 m wide, stone-reinforced. The eastern room, 2.5 m wide, had an approx. 1 m wide entrance from the south in W485. Amongst the finds from the eastern house are a jug of obvious Phoenician origin, several tools of stone and bone (shuttle) and a complete tripod bowl of basalt.

There is another walled and stone-paved space to the south of the eastern house, the function of which is not clear. It is surrounded by the 0.5-0.6 m wide W588, 589 and 582 and partly paved, but devoid of any finds of interest.

A collection of Iron Age pottery can be studied in Figures 5 and 6.

Stratum 2 (Figs. 8, 9; see also Appendix 2)

The terrace which lies south-east of the terrace-retaining wall W593 (Stratum 1C) actually represents remains from a much earlier period which were found on the same level as the remains from Phase 1C (immediately to west). The earlier remains are ascribed to the Late Bronze Age Phase V according the phasing of the site (see Fischer 2006a). These remains cover an area of approximately 3 m x 2 m and consist of the (partly excavated) corner of a domestic building with a 0.6 m wide entrance from the north-west. Numerous complete earthenware objects, which include a bichrome-decorated Chocolate-on-White Ware juglet, a lamp, storage jars and tools of basalt, were discovered imbedded in a substantial layer of ash which also contained plenty of grain. A selected number of ceramic finds can be studied in Figures 8 and 9.

Stratum 3

Three test soundings revealed structures and finds which belong to various phases of the Early Bronze Age. The exposed structures are three walls, W590, 591 and 605, all approximately 0.6 m wide. In W591 (Trench XLVIII B), in particular, it was possible to study the structural details: 0.64 m in width, it is preserved to a height of 1.05 m. There are 1-2 courses of stones at its foundation which lie directly on bedrock/levelled surface. The preserved superstructure above the stone foundation consists of four

courses of sun-dried mudbrick, approximately 0.6-0.64 m x 0.3-0.35 m in size. The mudbricks seem to derive from two clay sources because alternating yellow and brown mudbricks were used, certainly intentionally. Remains of clay plaster were found on the north-western surface.

W591 and the associated Loci 454 and 476 are dated to the local Phase IB, which corresponds to Early Bronze Age IB. This date is based on the absence of Metallic Ware, which is typical of Early Bronze Age II and which corresponds to Phase II at Tall Abū al-Kharaz, and the presence of pottery shapes which are identical with those from earlier excavated Phase IB contexts (see Fischer 2008). Another observation strengthens our date: the ceramic finds to the north-west of Wall 591 are all imbedded in a thick destruction layer with contained a considerable amount of grain: it has been demonstrated that Phase IB came to a violent end due to a general conflagration.

Whereas the date of W605 is difficult to assess, the provisional date of W590 is Early Bronze Age II or the local Phase IIIA based on an almost complete cup (*in situ* ?) which has a fairly good parallel in the eastern part of Area 7 (Fischer 2008: 254, fig. 260:4).

Area 9 (Fig. 1)

At the outset of the 2009 season of field work it was intended only to clean and consolidate the city walls from the Early Bronze Age through to the Abbasid period in Area 9. We were able to expose and clean some 30 m of the defence system of all periods in Area 9 east of the trenches which were excavated in 1994 and 1995. All walls visible on the surface were recorded by our total station in order to present them digitally in a three-dimensional view, and some were also consolidated. During the cleaning process an almost square structure, 4.4 m x 4.2 m in size (outer dimensions), built on top of the MB/LB city wall and protruding towards the south was exposed. Further cleaning during the last week of our field season exposed several complete vessels which required immediate excavation before we could leave the site. Thus work forces were moved from Area 7 in the north to Area 9 in the southernmost part of the upper tell, and regular excavations were initiated (Trench LIA). Two phases of Iron Age occupation, which are

provisionally matched with Strata 1B and C in Area 7, were exposed.

Stratum 1B

This phase of occupation suffered a great deal from erosion due to its closeness to the surface. However, we were able to expose a 0.6m wide wall (W613) of which only the stone foundation remained. To the north of the wall, inside a domestic building (?), was a stone silo, 0.4 m in diameter, and a pierced basalt weight of approximately 2 kg. We also found numerous lumps of yellow, red, brown and lilac pigments which might have been used, for example, in the production/decoration of pottery.

Stratum 1C (Fig. 4)

This stratum represents the best-preserved spot of Iron Age occupation at the site. After the removal the burnt-down roof construction, which consisted of a 0.1-0.15 m thick layer of twig-reinforced sun-dried clay, we exposed a “primary find context” in the shape of a storage room with numerous intact or complete finds. This excellent find situation, where none of the room’s many objects were disturbed after the conflagration, came as a surprise when one considers the room’s closeness to the surface, especially in its southern part. The space was enclosed by the walls W606, 607, 608 and 612 — some of them preserved up to 1 m high. There was a 0.12 m thick wooden roof support approximately in the centre of the room. There



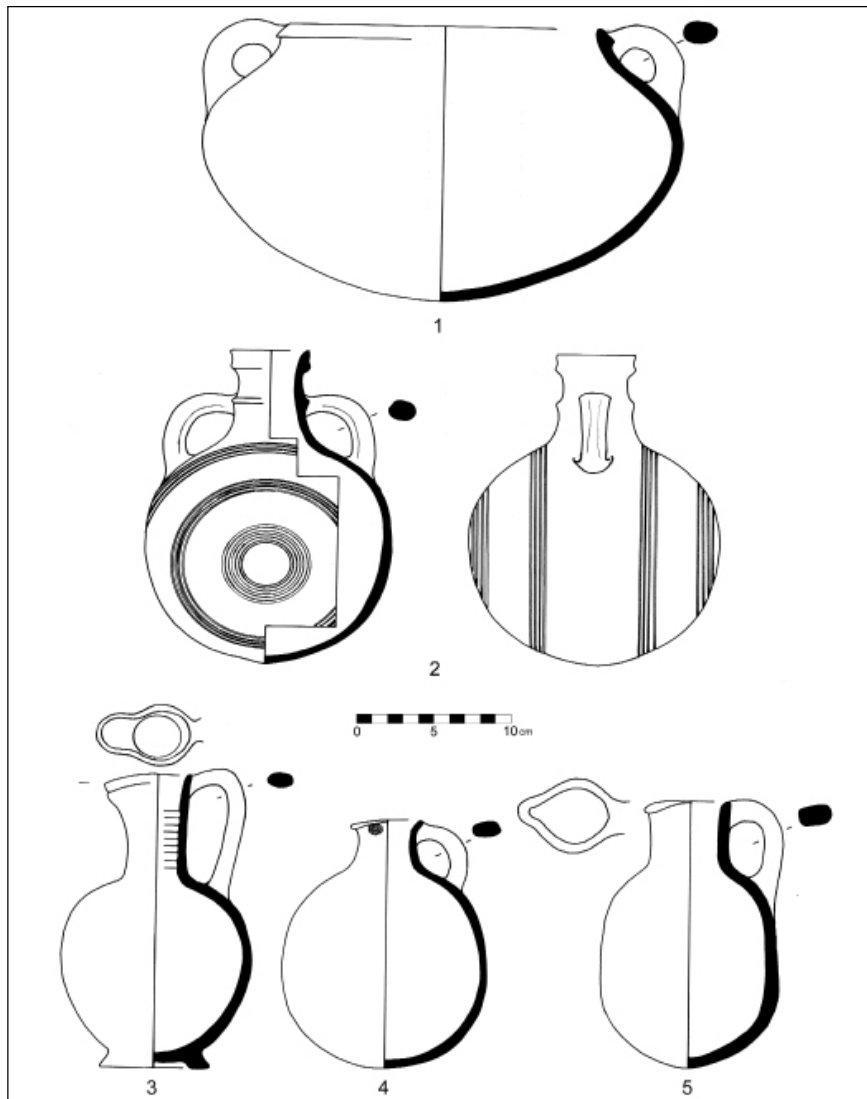
4b. Barley flour from one of the storage jars (approx. 4 kg).

is an entrance 0.8 m wide in the north-western corner together with a step leading up to the next room, which could not be excavated due to shortage of time. In the south-eastern corner of the passage to the next room is a door socket of limestone. The room was crowded with finds intermingled with an ashy destruction layer which made the excavations somewhat difficult.

Eighteen earthenware vessels were exposed: three juglets, one strainer jug, one crater and 13 jars. Three jars contained the remains of (barley?) flour, of which one contained as much as four kilograms (!), and the crater contained the dried remains of, most likely, olive oil and olive pits. Finds of basalt include a mortar and a mill-



4a. Area 9, uppermost layer of Iron Age storage room after removal of the collapsed roof. Observe the olive press of limestone to the right of the photograph's centre. Vessel to the left of olive press contained approx. 4 kg of barley flour.



5. Selected Iron Age pottery.
1. Cooking pot. 2. Pilgrim flask. 3. Red-burnished imported jug. 4, 5. Plain jugs.

stone, and a spindle whorl which was probably reused because its shape and production technique are definitely at home in the Early Bronze Age. Another find of an uncommon shape is a ribbed spindle whorl of fired clay. A sheet of bronze might belong to the door construction. A stone cylinder, 0.3 m long with 0.23 m diameter, shows a centrally placed depression on one side whereas the other side is broken off. This stone was used for crushing olives. Immediate restoration of the contents of this room was initiated.

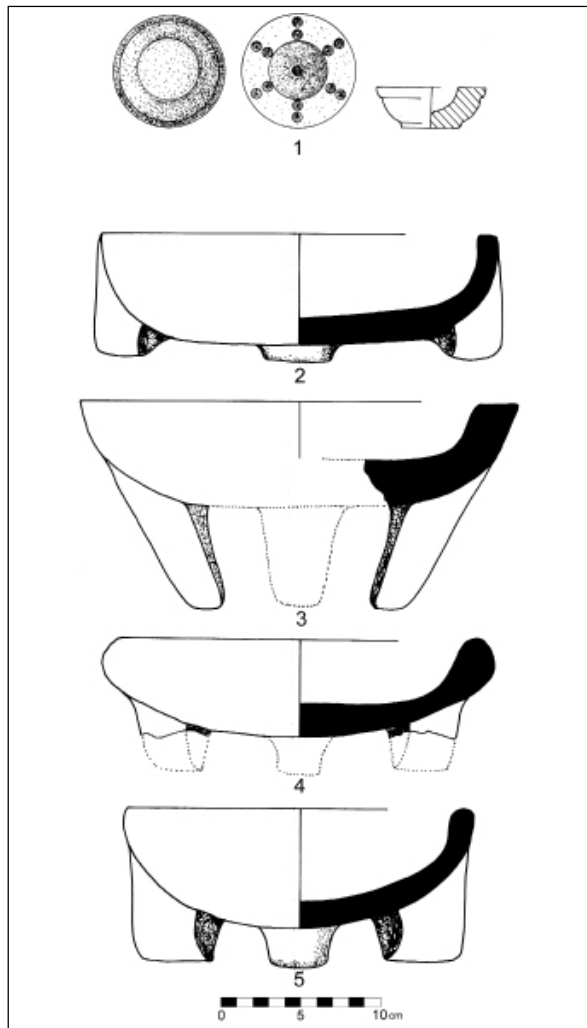
Appendix 1: Iron Age Fibulae from Tall Abū al-Kharaz (M. Rinner)

Introduction

The specific shape of the four fibulae which

were discovered in an Iron Age II context during the excavations at Tall Abū al-Kharaz in 2009 derives originally from Europe and the Mycenaean culture of the thirteenth century B.C. and arrived in the Near East via Cyprus (Pedde 2000: 3). The discovery of a number of fibulae in the Caucasus area indicates that various Near Eastern forms of fibulae arrived there via Urartu in eastern Anatolia (Stronach 1959: 181). Although the roots of the fibula are not in the Orient, independent fibula shapes developed there according to Pedde (2000: 3).

In general there are two types of fibulae described in the Near East: the one-piece fibula, i.e. bow and pin are integrated, and the two-piece fibula, i.e. bow and pin are produced separately (Pedde 2000: 99). The two-piece fibulae



6. 1. Cosmetic palette of alabaster. 2, 3. Tripod bowls of basalt. 4, 5. Tripod bowls of fired clay.

can further be subdivided, for instance, according to material, geometry of the catch plate or ornamentation. An especially important criterion for the classification is the arrangement of so called “beads” (plastic decorations resembling beads). Pedde (2006: 6) used these decorations for typological studies.

The basic function of fibulae is to hold clothes together. The forerunner of the fibula is the toggle pin. These two objects differ at first glance, but their function is the same. Beside practical aspects, toggle pins and fibulae were used as jewellery. Fibulae might also have had an apotropaic function (Pedde 2000: 8). While they were in widespread use in the European area, they rarely appear mass-produced in the Near East (Pedde 2000: 3). Furthermore, as observed by Pedde (2000: 373), in the latter region fibulae seem not to relate to social status. Here Pedde describes fibulae as grave goods in both elaborate tombs as well as in simple trench graves. Only in exceptional cases like a princess grave, discovered in Nimrud in Mesopotamia, were richly decorated fibulae found (Pedde 2000: 373). Therefore, unlike in Europe, the Near Eastern fibulae do not necessarily allow conclusions about the social status of the user, according to Pedde.

Description (Table 1)

All fibulae derive from domestic contexts. One, N1250, was found in a *ṭābūn*, possibly lost by the owner during the preparation of food

Table1: SEQ Description of our four fibulae from 2009. Maximum dimension in cm. “beads” refers to rounded decorations on the bow.

Object	Trench	Material	Length	Width	Height	No. of “beads”
N1250	XLVIIIIC	bronze	7.5	1	3.8	2
N1250/pin		iron	5.7	0.5		
N1268	XLVIII A	iron	7.3	1.1	4.7	0
N1283	XLVIII D	bronze	5	0.6	2.6	1
N1283/pin		iron	4.6			
N1303	LA	bronze	4.7	0.5		1

(**Fig. 7**). They all have a circular, asymmetrical, bow and differ in size: their lengths vary between 4 and 7.5 cm and their widths between 0.5 and 1.1cm. N1268 is a simple one-piece fibula made of iron, without decoration or ornamentation. It has a triangular form and a sharp angle between bow and pin. Despite the rather simple design some processing after casting is evident. The bows of the other fibulae (N1250, N1283 and N1303) are made of bronze while the pins consist of iron and were obviously manufactured in a second step. Only N1250 has two “beads” while N1283 and N1303 are decorated with one. N1250 and N1283 are especially well preserved, with their iron pins intact, which is rare.

Discussion

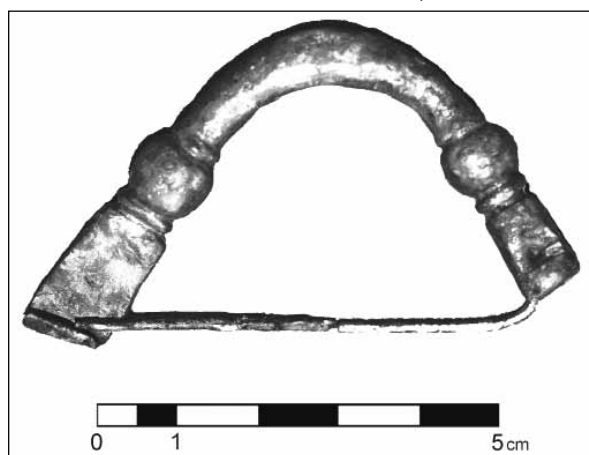
The fibulae dated to Iron Age II at Tall Abū al-Kharaz were all found in domestic contexts. Although the Iron Age settlement at Tall Abū al-Kharaz is quite extensive there are only five complete and a few incomplete fibulae, which could support Pedde’s (2000: 372) claim these items are fairly uncommon in the Near East. Contrastingly Stronach (1959: 203) assumed that the fibula became fairly common in the Near East in the first millennium. He supports his claim with the discovery of 175 fibulae from a royal tomb at Gordion in 1957 dating from the 8th century. However according to Pedde (2000: 372), a total of only 280 fibulae, dating from the 13th century to the beginning of the 8th century, are recorded from the Near East. The high number of fibulae found at Gordion is thus likely to be an unusual case. After that, and until the

end of the Iron Age, fibulae became more common items. This can be deduced from another nearly 850 fibulae that were discovered between the 7th and 4th century in the Near East (Pedde 2000: 372).

Pedde (2000: 373) also reports that fibulae of the same type were used by both sexes and by infants. Consequently fibulae do not relate to sex or age of the owner. Wealth and social position do not seem to be reflected in the possession of fibulae. Nevertheless, in the present author’s opinion, as bronze and iron were very expensive goods, fibulae were certainly reserved for a higher social class.

Three of our four fibulae are made in the two-piece-style, which could be used longer than the one-piece fibula because the iron pin could be replaced when broken. The handicap of the one-piece fibula is its fragility. When the pin is broken, the fibula is unusable. The fragility of the pin is demonstrated by the fact that only two of our four fibulae (N 1250; N 1283) were found with their pins. This may also depend on the heavy corrosion of iron common at Tall Abū al-Kharaz. Complete fibulae are therefore rare (cf. Green 1998: 68). The two-piece design seems to have been established in the north of Syria and Iraq at the end of the 8th century, and one-piece and two-piece fibulae were for some time used side by side (Pedde 2000: 121). Objects similar to our two-piece fibulae were excavated, for instance, in Megiddo, Hama, Lachish and Enkomi (Pedde 2000: tables 7 and 25).

As proposed by Pedde, the presence and the arrangement of decoration are important criteria for classification. Of the four discovered items the three of bronze have at least one “bead” while the iron pin is plain. It may be speculated that the bronze fibulae were predominantly used as jewellery and were therefore more extensively processed, while the rather simple iron form may have been designed for daily use. An example is N1250. It is a two-piece fibula composed of a bow with two symmetrically arranged artificial “beads”, a catch plate at one end of the bow and on the other end a precast hole to attach the pin. This type of fibula was manufactured by casting (Pedde 2000: 7). N1250 has similarities with fibulae from Tall en-Nasbeh (Pedde 2000: table 25), Tall Knedig (Pedde 2000: table 27) and Ugarit (Pedde 2000: table 24). This type of



7. Fibula of bronze with preserved iron pin.

fibula was cast in a straight form and bent afterwards (Pedde 2000: 171-172). The catch plate was bent to hold the iron pin and the pin was also attached to the bow by hammering. N1250 has a design common in the whole near eastern area (Falkner 1971: 60). Characteristic details are for example the catch plate resembling a hand or the rounded, asymmetrical bow of the fibula (Stronach 1959: 182). According to Pedde (2000: 371) the type of the bow can be used for dating.

In 1989, during the first season of excavation at Tall Abū al-Kharaz, a fibula, dating from Iron Age IIC, was found (N0043; Fischer 1991: 83, 16). This two-piece fibula was even more decorated than N1250 from 2009: it had a carnelian and a faience bead still threaded on the iron pin, which was attached to the bronze bow (Fischer 1991: 76). This fibula has a more triangular general shape. Unlike this year's fibula the ornamentation of N0043 resembles flower buds. The sparsely decorated fibulae N1283 shows similarity to objects found in Tall Michal (Pedde 2000: table 20). Although manufactured in the two-piece-style it has only one artificial "bead". The diameter of the bow is not constant but tapered at both ends. The catch plate clearly shows the irregularities derived by hammering. Compared to N1283, N1250 is more accurately manufactured. The four fibulae found during this year's excavation, all different in style and size, confirm the vast variety in design described, for example, by Stronach (1959: 182).

Future studies of well-stratified fibulae may provide a hint as regards chronology. It should, however, be kept in mind that they represent a significant value and — at least where the two-piece fibulae are concerned — that they were certainly kept for a considerable time.

Appendix 2: An Isolated MB/LB Context from 2009 (*S. Schilk*)

Introduction

During the excavations at Tall Abū al-Kharaz in 2009 an isolated, undisturbed, Late Bronze Age context was exposed. It was discovered on the same level as finds from the Iron Age and is part of a terrace-retaining structure which was left untouched by the Iron Age occupants. The current report focuses on the find material from

this specific context, mainly the pottery, and on parallels from earlier published material from Tall Abū al-Kharaz and the nearby Pella (Fischer 2006; Fischer ed. 2006).

Stratigraphy

The context includes loci L419, L423, L430, L440 and L449, which stretch over Trenches XLVIII C and D. The 0.5 m wide baulk between these two trenches could not be excavated due to lack of time and there might be additional finds within the small baulk area. In regard to architecture the stone foundation of Wall 581 in Trench XLVIII C and the mudbrick Wall 583 in Trench XLVIII D, both fairly well-preserved, form the corner of a structure which could be entered through Wall 583 via a 0.7 m wide entrance. Loci 419, 423 and 440 are regarded as belonging to an indoor space, whereas Loci 430 and 449 seem to belong to a courtyard. There is an Islamic pit to the north of our context. To the west and to the east on the same level are Iron Age contexts and to the south the southern limit of the 2009 excavations (see above).

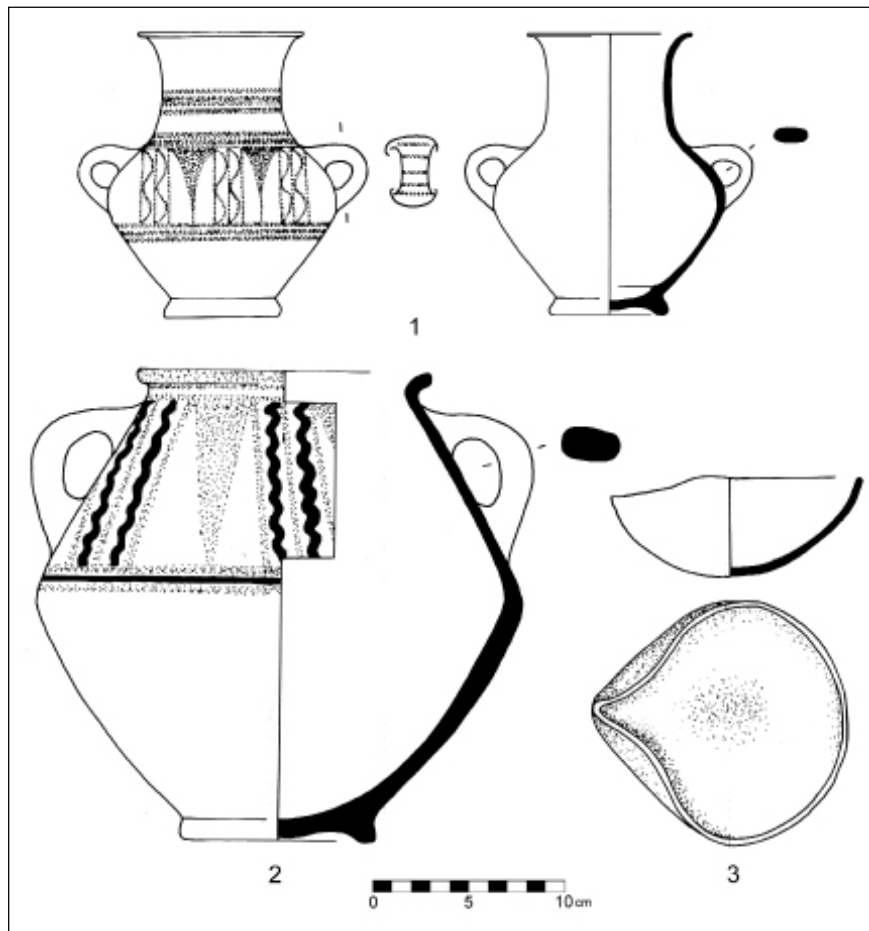
Our context was covered by ash and burned mudbrick. Grain, most likely barley, and straw were found in considerable quantities, which enabled us to take samples for radiocarbon dating. This destruction level is also clearly visible in the section.

The Finds

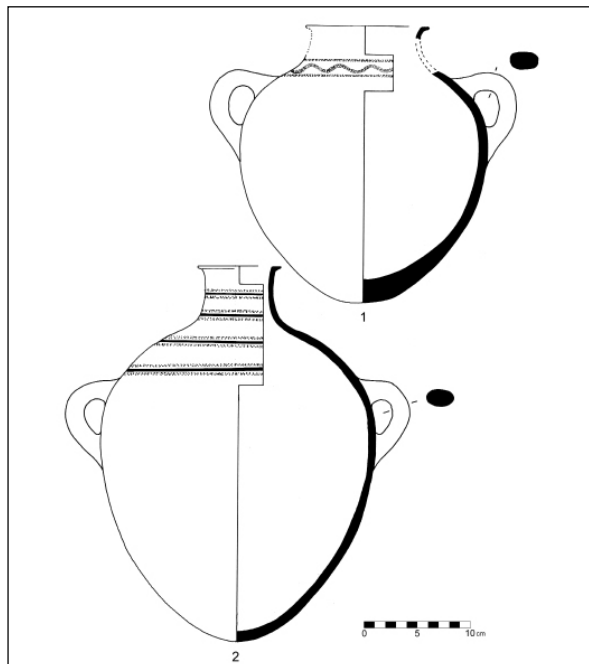
Pottery

Many earthenware vessels were found on a flat surface which was obviously a floor. These vessels include several storage jars of different size, jugs/juglets including Chocolate-on-White Ware, a lamp which was intact and cooking pots (Figs. 8, 9). Most of the vessels were broken but complete or almost complete.

Courtyard: Find N1261 from the courtyard is a Chocolate-on-White Ware juglet with a wide mouth and flaring rim, and a globular/biconical body with two vertical handles on the shoulder and a ring-base. The bichrome decoration is typical of Chocolate-on-White Ware with horizontal bands and a metope pattern which consists of alternating groups of straight and wavy lines flanking triangles or stylized trees. There are sherds of two more juglets/jugs which have parallels at Tall Abū al-Kharaz (Fischer 2006:



8. Selected finds from the Late Bronze Age context (Phase V). 1. Chocolate-on-White II juglet. 2. Bichrome decorated biconical jug. 3. Lamp.



9. Selected finds from the Late Bronze Age context (Phase V). Monochrome and bichrome decorated jars.

117.1,2, fig. 122.1,) and at Pella (Bourke, Sparks and Schroder 2006: 50, fig. 43.1,2 but here with one handle). From the previous excavations the presence of Chocolate-on-White at Tall Abū al-Kharaz was ascertained in Phases IV/1 and 2, V and VI. Chocolate-on-White Ware includes six subgroups: Proto-Chocolate-White, Chocolate-on-White Bichrome Ware, Eggshell Ware, and Chocolate-on-White I, II and III (Fischer 2006: 255). Our almost complete Chocolate-on-White Ware juglet belongs to the Chocolate-on-White II group which was found in Phase V context in earlier seasons (Fischer 2006: 259; 274).

A jar (N1274), egg-shaped with a rounded base and two handles on the belly, which does not belong to the Chocolate-on-White Ware group, shows bichrome decoration of horizontal bands in black and lilac beneath the rim and on the shoulder. There is another partly preserved jar with a rounded base (L430-3) with reddish-brown decoration on the neck in the shape of two bands flanking a wavy line. A large storage

jar (pithos; N1262) is only partly preserved, viz. the rim, neck and the shoulder. It has parallels in Phase V (see this type in Fischer 2006: 241). Another one (L430-4), also only partly preserved, belongs to the same group. A cooking pot (L430-5) has parallels in Phase V (Fischer 2006 (ed.): 127, fig. 58.1,2). The base of another jar or large jug (L430-2) also seems to belong to Phase V. Many other sherds belong to two other jars which could not be reconstructed (one of them is L430-6). The latter, which was of the biconical jug type, although not Chocolate-on-White Ware, was bichrome decorated (cf. Fischer 2006: 269). An intact lamp (N1263) also belongs to the courtyard assemblage. Although a little deeper in profile, it belongs to Phase V (VI), as is evident from its slightly pinched spout (Fischer 2006: 245, fig. 276.3). All the vessels were very much affected by fire.

Indoor space: Locus L 419 produced a partly preserved, plain, one-handled jug with a trefoil mouth (N1259). It is comparable to the jugs belonging to Phase V of the site (Fischer 2006 (ed.): 111, fig. 44.1). Next to it eight rims of LB cooking pots were found. These are also representatives of Phase V cooking pots (Fischer 2006: 248, fig. 279.7 and 279.8). There was a high concentration of sherds in L 423 and L 440, but only one juglet (N1253) could be partly reconstructed.

Other Objects

Intermingled with the pottery was a grinding stone of basalt (N1256A/B), complete but broken, and a pestle (N1260). The limestone pestle fits into a group of stone tools found in Area 2, on the level belonging to Phase V (Fischer 2006: 127, fig 139.2-4). Close to wall W583 was a stopper of fired clay (N1258).

Discussion

The condition of the finds and the find circumstances of our context very much indicate that we are dealing with a destruction level caused by a conflagration. The entire area was covered by ash and almost all the finds were affected by fire. The catastrophic event caused the collapse of the roof, which explains the burned mudbrick and the carbonized straw.

It seems very likely that what we found were the remains of a partly preserved room and its

courtyard. The find position of the pottery suggests that the inhabitants stored their food along Wall W583. The storage jars, the cooking pots and the mass of barley together with the grinding stone and the pestle indicate some kind of food preparation and storage in this area. The position of the pestle almost looks as if it was actually located right on top of the grinding stone, until the latter broke in two. The good state of the context might be explained by the topography of the walls in this area. If the collapsed material (roof and walls) started to slide from the top of the tall towards the north, the walls would have stopped it and so protected the objects north of it. This could also be an explanation for the fact that the Iron Age people left this spot untouched, whereas they removed the prior occupation layers in the rest of the area. The convenient terrace formed by the above-mentioned events would have been of use for later people building on the tall.

Conclusions

Our context represents a “primary context”, viz. all finds were *in situ* and not disturbed in later times. It should be ascribed to Phase V, the destruction of which is dated to the mid-15th century BC. (Fischer 2006: 374, table 70). The find circumstances point to the likelihood that the inhabitants left the site in haste and did not rebuilt this specific area although Tall Abū al-Kharaz was occupied after the catastrophe. The function of the two spaces is clear: they were used to store food and prepare meals.

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EXCAVATIONS AT AL-BASĀTĪN, A LATE NEOLITHIC AND EARLY BRONZE I SITE IN WĀDĪ ZIQLĀP, NORTHERN JORDAN

Kevin Gibbs, Seiji Kadowaki and E.B. Banning

Introduction

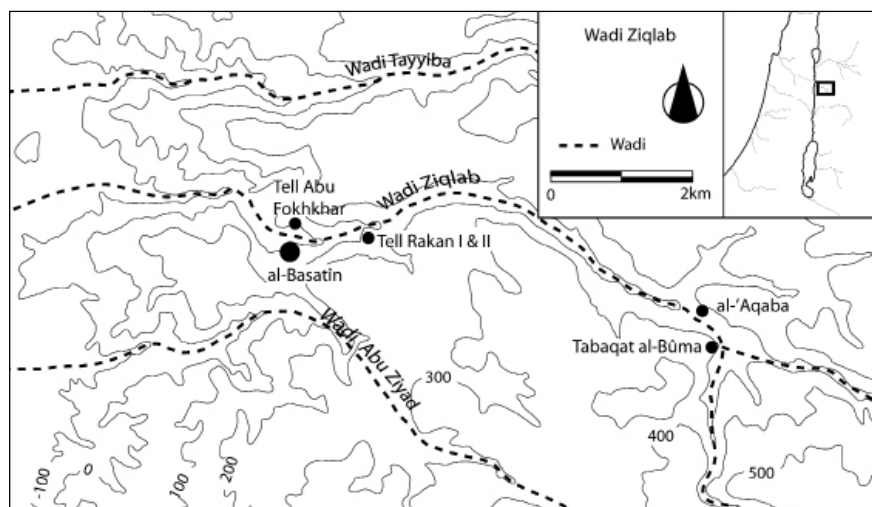
During the summer of 2009, the Wādī Ziqlāp Project renewed excavations at al-Basātīn in Wādī Ziqlāp, al-Kūra, northern Jordan. The site was initially discovered during archaeological survey by the Wādī Ziqlāp Project of the University of Toronto in the summer of 2000 (Maher and Banning 2001). Discovery of a small number of Late Neolithic artefacts on a river terrace (WZ 140) near Tall Abū al-Fukhkhar led to test excavations in 2002 (**Fig. 1**). These confirmed the presence of a Late Neolithic site and further excavations in 2004, 2006, and 2009 have demonstrated that the bulk of Late Neolithic occupation in the vicinity was in fact on a higher terrace (WZ 135), where there was also occupation in Early Bronze I, and use of the site, at least for agricultural and probably arboricultural purposes, in the Classical periods (**Fig. 2**; Banning *et al.* 2005; Gibbs *et al.* 2006, n.d.; Kadowaki *et al.* 2008).

The site is situated on a sloping terrace around 30m ASL, and about 1km downstream from the

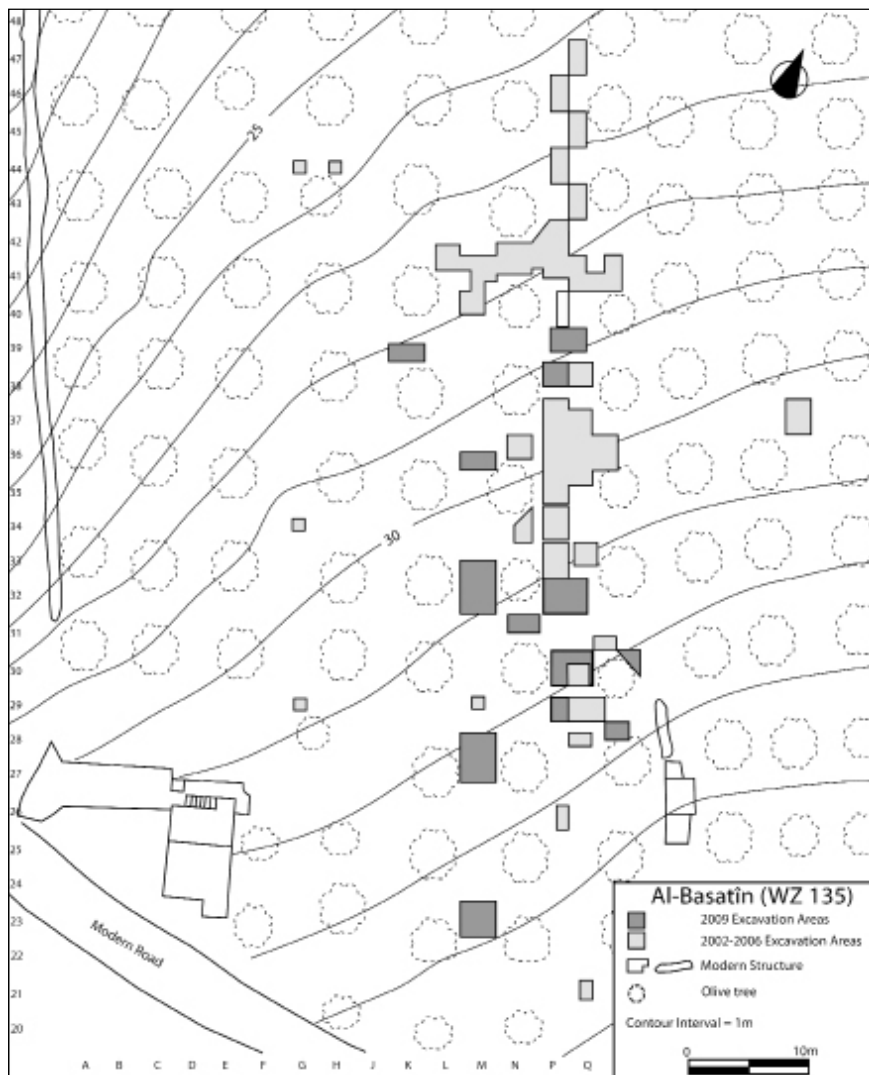
site of Tall Rākān I (WZ120), a village site with evidence of occupation in the Late PPNB, Yarmoukian, Chalcolithic, and Early Bronze Age (Banning and Najjar 1999, 2000; Banning *et al.* 2008). Most of the terrace is currently used for olive production.

Excavations at al-Basātīn

Excavations at the site are distributed over a nominal 3 x 3m grid in an attempt to determine the extent of the site and the nature of architecture in both Late Neolithic and Early Bronze I. Provenience of artifacts was to “bag”, a subdivision of “locus” based on the lithological characteristics of deposits and spatial extent within each grid unit. We use record forms to document the lithological characteristics of sediments, excavation methods employed for each “bag”, levels, stratigraphic and spatial relationships, and other relevant information. We screened almost all archaeological deposits, with the exception of the uppermost sediment (i.e., plough zone), usually through a mesh with apertures approximately



1. Map of Wādī Ziqlāp showing sites mentioned in the text.



2. Map of al-Basātīn (WZ135) showing the location of excavated areas.

3mm. However, in order to reach the Late Neolithic levels more quickly, screening of many deposits in 2009 was less than 100%, and as low as 5% for some disturbed contexts, but this percentage is documented for each bag and locus.

Stratigraphy and Radiocarbon Chronology

Stratigraphic analysis, examination of finds, and a suite of radiocarbon dates indicate that there are three main stratigraphic levels at al-Basātīn, dating to the Late Neolithic (sixth millennium cal BC), Early Bronze I (fourth millennium cal BC), and Classical period (**Table 1**). Residual and surface remains indicate that there was some Epipalaeolithic and PPNB activity on or near the site as well. As noted elsewhere (Kadowaki *et al.* 2008; Gibbs *et al.* 2009) Late Neolithic radiocarbon determinations cluster

around 6680-6400 BP, indicating occupation about 5700-5300 cal BC, while those from Early Bronze Age deposits cluster around 4700-4600 BP, and suggest an EB occupation ca. 3700-3300 cal BC. Note that several samples from Late Neolithic contexts have produced dates that are clearly too late. These may be the result of rodent activity, tree roots or other natural processes introducing later material into Late Neolithic contexts or may reflect disturbances related to the continued use of the site during the Classical, and probably later, periods. Most of the problematic dates are from wood charcoal. More reliable Late Neolithic dates include two from residues from the interior of Late Neolithic sherds. These are from contexts that should be approximately contemporary with those that produced the problematic dates.

Table 1: Radiocarbon Determinations from al-Basātin.

Context	Material	Lab No.	Date BP	Comments
Classical or later				
P35 locus 008	Olive pit	TO-11994	1250 ± 50	
Early Bronze contexts				
N34 locus 003	Olive pit	TO-12024	4630 ± 60	
P35 locus 010	Wood xylum	Beta-208233	4550 ± 40	Silo contents
P35 locus 010	Olive pit	Beta-208234	4790 ± 50	Silo contents
P35 locus 010	Olive pit	TO-11995	4400 ± 60	Silo contents
P35 locus 010	Tree bark	TO-12422	4720 ± 70	Silo contents
P35 locus 010	Wood xylum	TO-12423	1270 ± 60	Intrusive
P36 locus 013	Wood xylum	TO-12025	5510 ± 130	Residual?
Q29 locus 008	Olive pit	TO-12027	4660 ± 60	Pool dates
Q29 locus 010	Olive pit	TO-12026	4590 ± 60	
Q29 locus 010	Olive pit	TO-12028	4570 ± 80	
Neolithic contexts				
P33 locus 022	Charcoal	TO-13123	5340 ± 170	Intrusive
P33 locus 024	Charcoal	TO-13124	5290 ± 60	Intrusive
P34 locus 010	Charcoal	TO-13094	6400 ± 80	
P39 locus 007	Charcoal	Beta-275083	8080 ± 50	Residual?
P39 locus 015	Charcoal	Beta-275082	5030 ± 40	
Q32 locus 022	Wheat	Beta-275081	320 ± 40	Intrusive
Q33 locus 014	Charcoal	TO-13093	6410 ± 510	
Q37 locus 006	Charcoal	TO-13092	6680 ± 60	
Q41 locus 016	Residue	TO-12151	6710 ± 70	
Q41 locus 016	Residue	TO-12738	6650 ± 140	
Q41 locus 018	Wood xylum	TO-12030	2030 ± 60	Intrusive
Q41 locus 018	Wood xylum	Beta-208231	2080 ± 40	Intrusive
Q41 locus 018	Wood xylum	TO-12029	2060 ± 60	Intrusive
R36 locus 006	Charcoal	TO-13091	6550 ± 60	
R41 locus 008	Wood xylum	TO-11992	2110 ± 60	Intrusive
R41 locus 009	Wood xylum	TO-12420	2040 ± 80	Intrusive
R41 locus 010	Wood xylum	TO-11993	2040 ± 60	Intrusive
R41 locus 010	Wood xylum	TO-12421	2030 ± 60	Intrusive

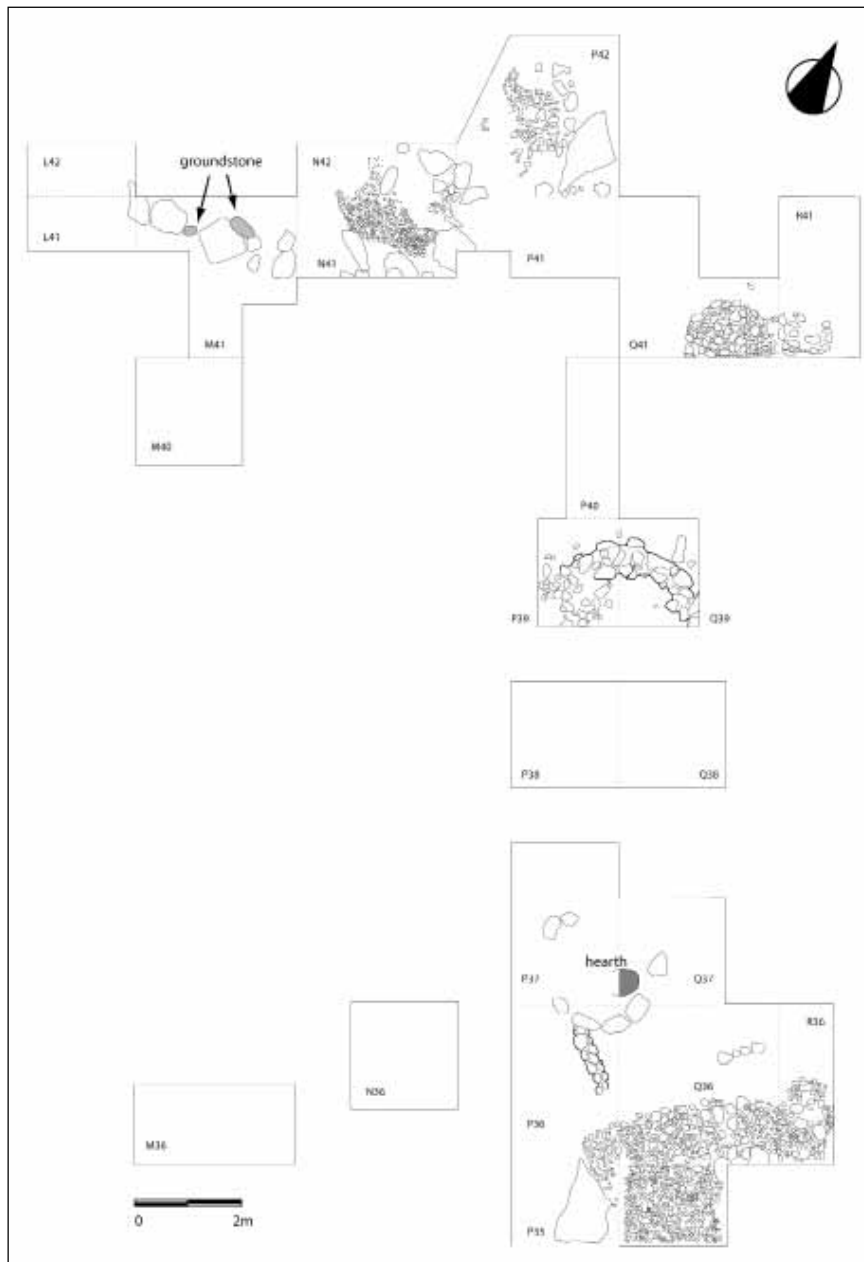
Architectural Features

Late Neolithic

Previous excavations at the site only rarely detected substantial architecture, and most of this consisted of rectangular or circular cobblestone floors with no associated walls (**Fig. 3**). There were also some short segments of straight walls and one instance of a small arc of stones in Area P36-Q37, with an associated burnt feature that may be a hearth, suggestive of a circular structure about 3m in diameter. In 2009, while most excavation areas again intercepted only outdoor areas with artifacts but no structures, there was a clear example of a circular, stone-walled structure in Areas P39 and Q39 (**Fig. 4**).

Although rectangular buildings appear to have been more common at Wadi ar-Rabah-related sites, including nearby Tabaqat al-Buma, it is noteworthy that circular structures 2-3m in diameter apparently occurred at the Jericho IX site of Lod (Gopher and Blockman 2004: 4).

Other features of the Late Neolithic include at least two stone-filled pits (Areas M23 and Q32) in addition to one previously discovered in Area R41. A possible cobbled floor was discovered in Area M33, but this is not as clear as ones discovered previously in Areas N41-42, P42, Q35-36, and Q41, and may simply be a stony colluvial deposit. Taking all the evidence together, it is now clear that there were both



3. Plan of Late Neolithic archi- tecture.

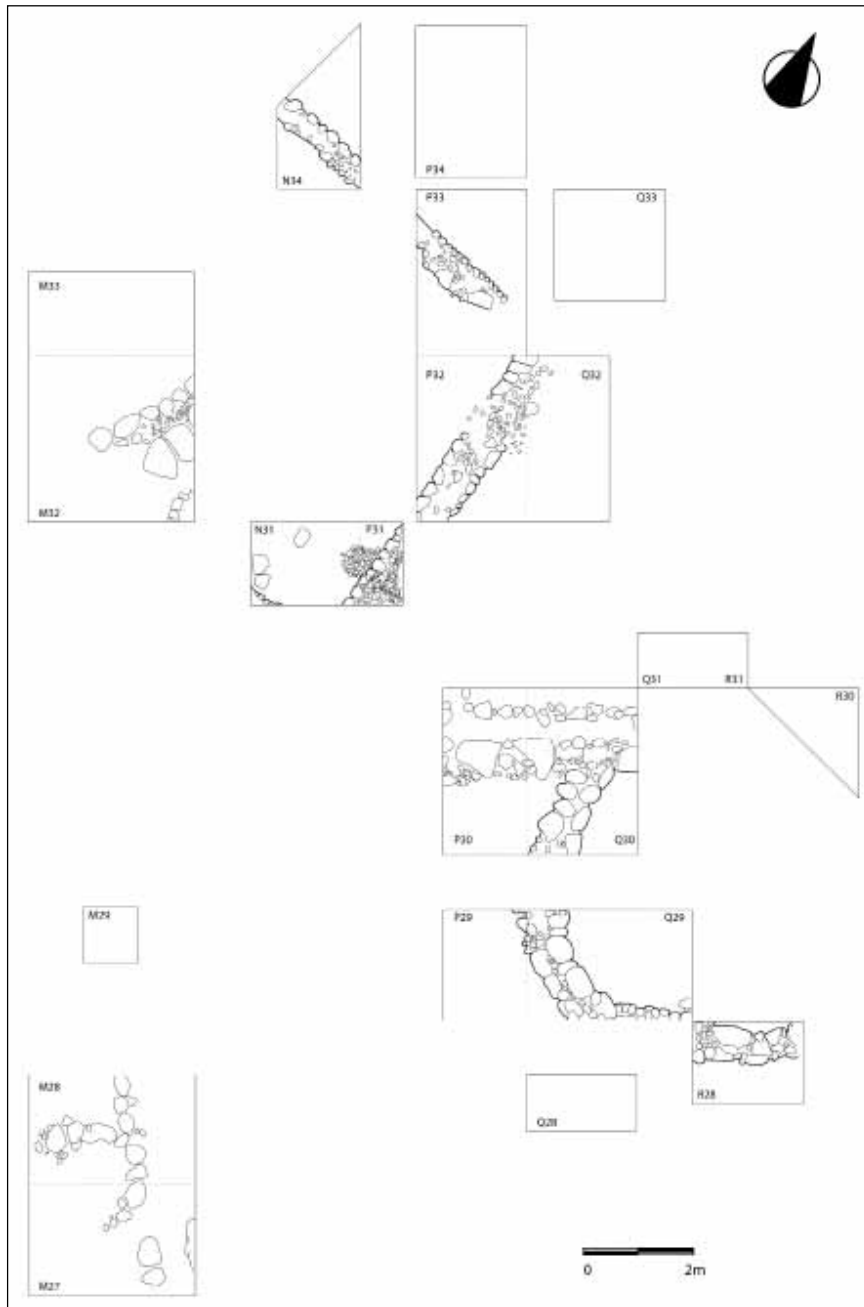


4. Circular Late Neolithic structure from Areas P39-Q39.

circular stone-walled structures and unwallled cobble floors or platforms, perhaps used as tent floors, at the site during the Late Neolithic. Interestingly, a similar cobbled platform accompanied the rechilinear houses of phase LN5 at Tabaqat al-Būma farther upstream (Banning *et al.* 1994; Blackham 1997; Kadowaki 2007).

Early Bronze I

Early Bronze Age architecture occurs in Areas M27-32, N31-34, P29-33, Q29-32, and R28-30 (**Fig. 5**). This includes a fairly well pre-



5. Plan of Early Bronze I architecture.

served, circular building, originally discovered in 2004 but more completely exposed in 2009. This has a double-leaf stone wall that is preserved in some places to three courses. Excavations in 2009 in Areas P30 and Q30 exposed two straight, parallel walls less than 1m apart, one of which abuts the circular building (**Fig. 6**). In Areas N34 and P33, previous excavations had uncovered a single-course double-leaf wall or foundation of a rectilinear Early Bronze struc-

ture. Excavation in Areas P32 and Q32 during 2009 uncovered a similar wall at right angles to it, suggesting that they may belong to the same building, but as they do not meet at the corner we cannot confirm this. However, excavation in Areas N31 and P31 to investigate the continuation of this wall found that it enclosed a room whose floor was carefully paved with EBI potsherds. A circular stone feature that might be a formal hearth was constructed on top of the



6. Part of Early Bronze I circular structure showing abutting rectilinear wall.

potsherd-paved surface and abutting a wall (Fig. 7). Segments of other EB walls were discovered in Areas M27-28 and M32-33.

Pottery

Late Neolithic

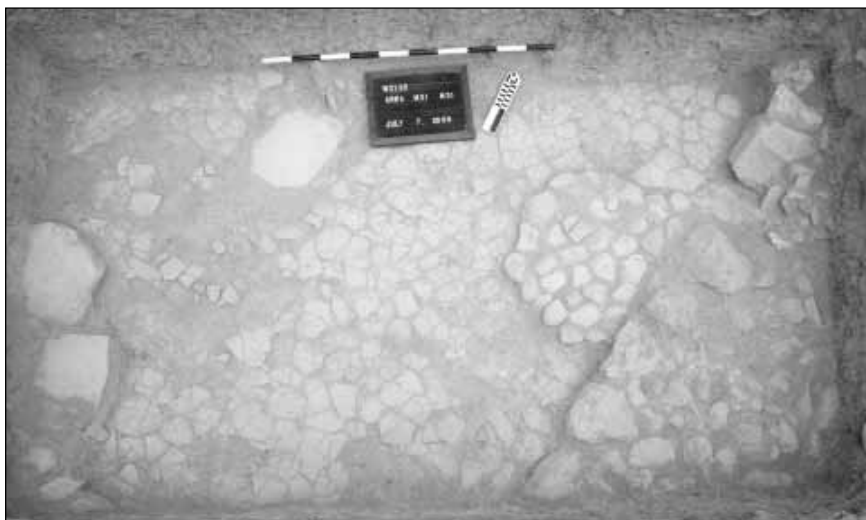
As in previous seasons, most of the Late Neolithic pottery consists of crudely manufactured, poorly fired, handmade pottery that is now extremely fragile (Kadowaki *et al.* 2008). Common fabrics are soft and brown, yellow or salmon-pink in colour, typically with distinct dark or yellow cores. Limestone and chalk inclusions are common, with smaller amounts of chert, iron oxides, and quartz, while some sherds show evidence of fibrous temper. Where sherds are large enough for forms to be recognizable, they include small cups, V-shaped and hemispherical bowls, holemouth jars, and there are

a few indications of necked jars (Fig. 8: 1-10). Handles include strap or loop handles, usually with oval cross-sections, and some knobs, small ledge handles, and triangular or pointed lug handles (Fig. 8: 15-19). Surface treatments include combing (Fig. 8: 19-23), often very rough but sometimes more regular with wavy, horizontal or alternating pattern (cross-combing or “weave combing”; Fig. 8: 21). Other vessels show fields of coarse, parallel incisions made with a stylus (Fig. 8: 25) or impressions made with circular or semi-circular implements and combs (Fig. 8: 24). Red slip occurs rarely, and red and black burnished sherds are rarer still.

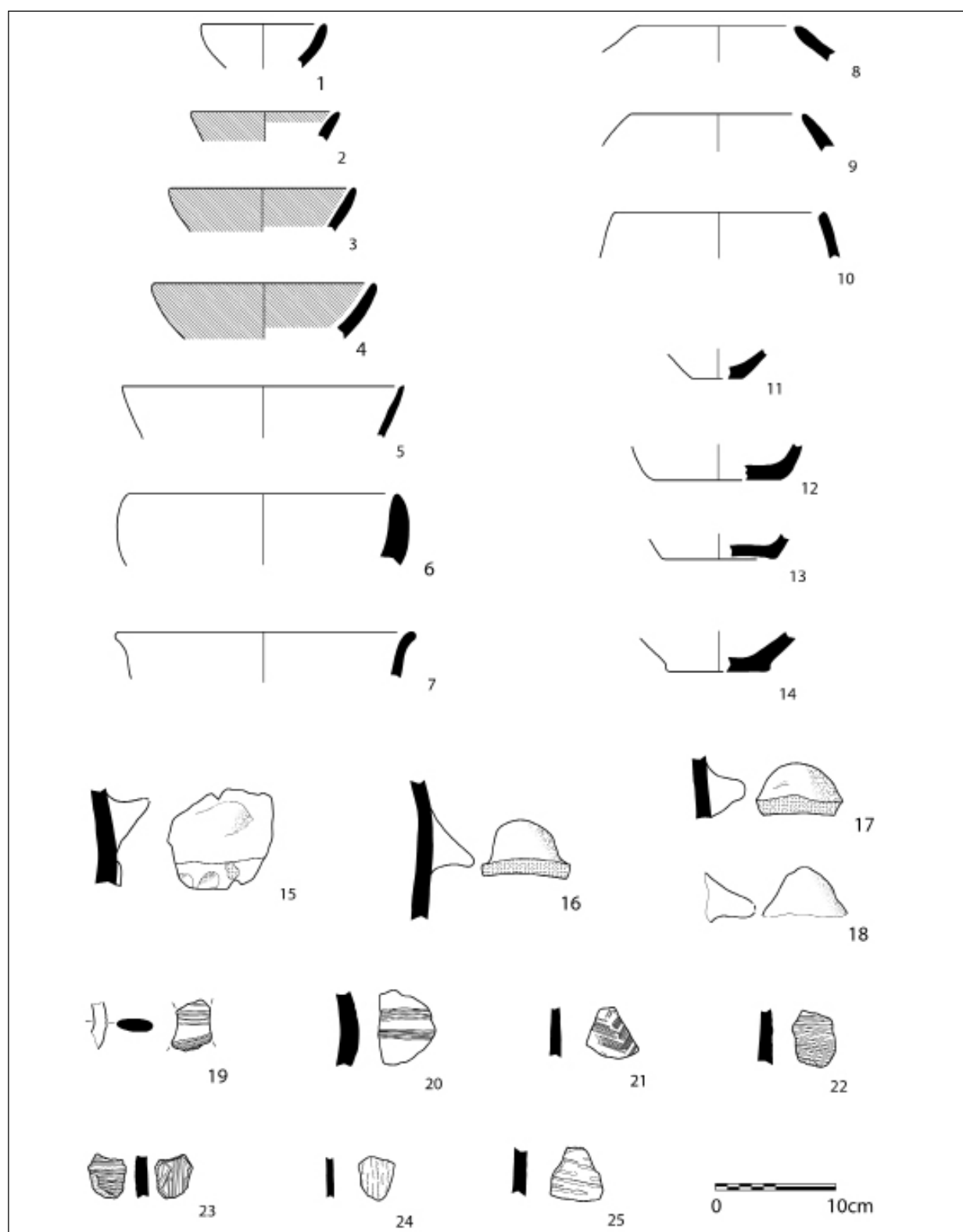
Although some elements are missing, such as clear examples of bow-rim jars, many characteristics of the Late Neolithic assemblage from al-Basātīn are similar to those of Wādī Rabbah assemblages to the west, such as ones from Munhata 2A, Abu Zureiq, Nahal Beset I, and Tel Te’o, while its closest affinity is to phase LN4 at nearby Ṭabaqat al-Būmah (Banning 2007; Eisenberg *et al.* 2001; Garfinkel 1992; Garfinkel and Matskevich 2002; Gopher *et al.* 1992).

Early Bronze I

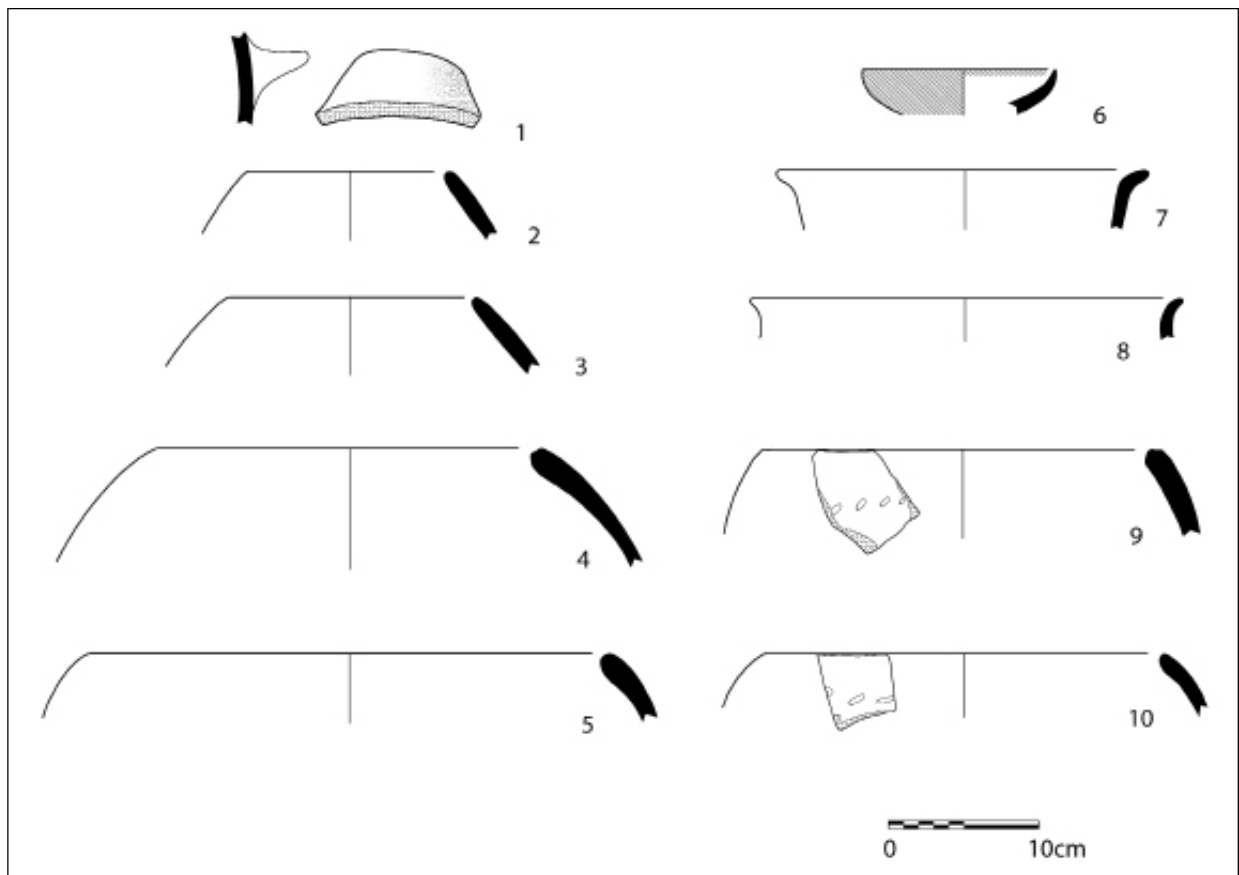
Early Bronze pottery from al-Basātīn has general affinities to assemblages from sites that date early in EB I (Gibbs *et al.* 2009). Inverted rim sherds derive predominantly from holemouth jars although some of them could be large inverted *pithoi* (Fig. 9: 2-5, 9-10). Most of these have rounded or squared rims, occasionally thickened on either the interior or exterior



7. Early Bronze I room with potsherd-paved floor and possible hearth feature.



8. Late Neolithic pottery (from 2002-2006 seasons). Bowls (1-6); everted bowl or jar (7); holemouth jars (8-10); flat (11-12), concave (13) and disk (14) bases; ledge handles (15-18), one adjacent to possible impressed "rope" decoration (15); combed strap handle (19); combed body sherds (20-23); impressions made with a comb (24); incisions made with a simply stylus (25).



9. Early Bronze I pottery (from 2009 season). Ledge handle (1); plain (2-5) and decorated (9-10) holemouth jars; small bowl (6); everted bowls or jars (7-8).

surfaces. Everted shapes include vessels with flaring, rounded, and V-shaped profiles, some of which are certainly bowls while others are likely fragments of necked jars (**Fig. 9: 6-8**). Clear examples of necked vessels have everted rims or slightly inverted ones.

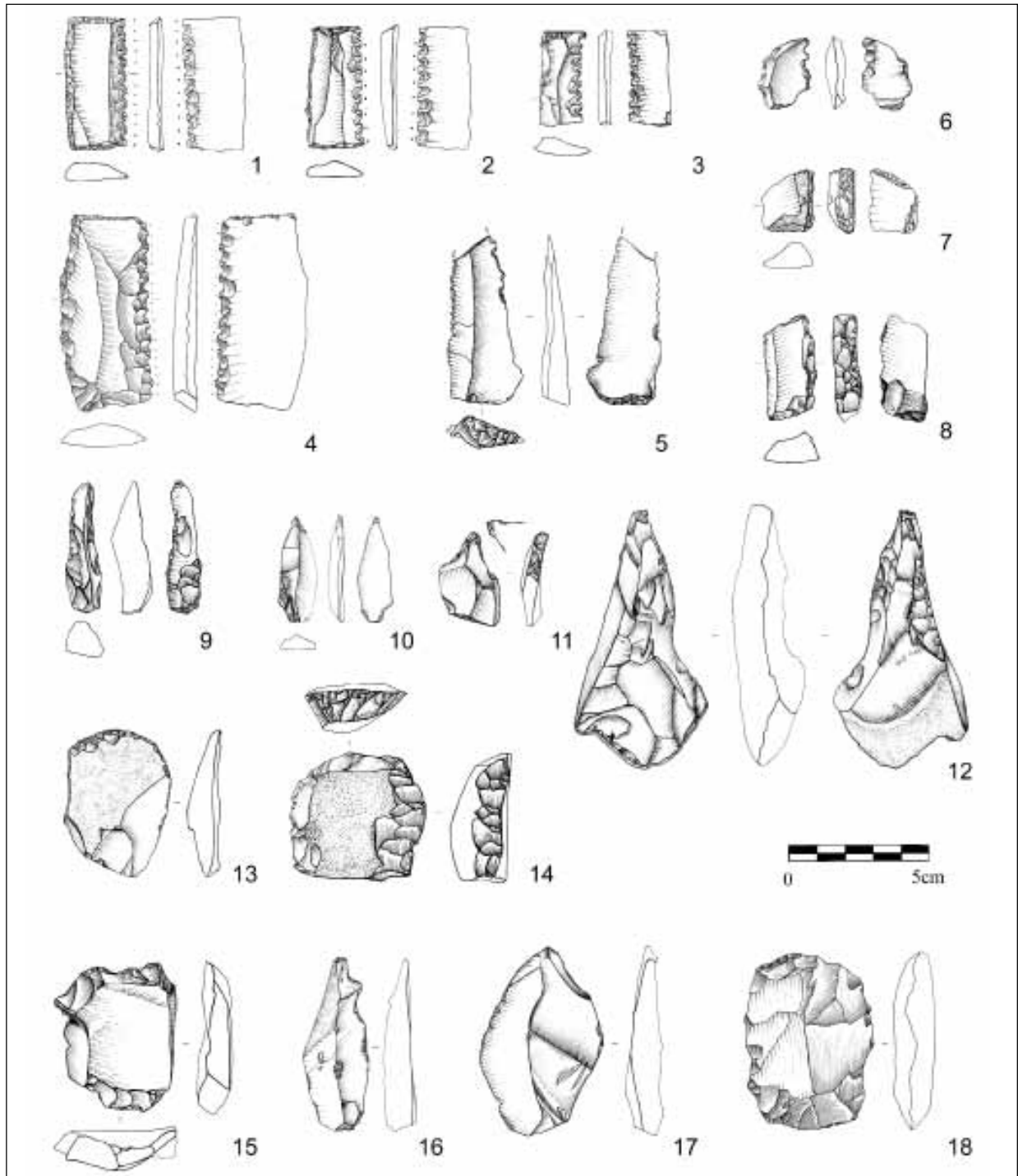
Handles include strap or loop handles, ledges, and small lugs. Ledges and lugs are generally simple (**Fig. 9: 1**), sometimes covered with a red slip although thumb-impressed ledge handles do occur. Bases are generally thin and flat or disks.

Red slip is the most common surface treatment and is found on both exterior and interior surfaces. The slip is rarely burnished. Holemouth jars, and more rarely bowls and everted-necked jars, are sometimes decorated with a band of oblique impressions or short incisions on the exterior surface near the opening of the vessel. More rarely, a band of circular impressions or short vertical incisions occurs. "Rope" appliqué also occurs in a band around the rim

of holemouth jars. In previously excavated samples there was one example of an impressed "piecrust" rim and a single body sherd with "grain-wash" surface treatment.

EB fabrics from the site are usually quite coarse, with large, angular inclusions of chert, calcite, and limestone. Fabric colours range most often among light gray, buff, and pale yellow, but dark gray, brown, pink, and even black sherds occur. Although the EB pottery is generally much better fired than the Late Neolithic material from the site, it is still often rather friable and gray cores in many sherds indicate incomplete oxidization.

Parallels for the impressed or incised jars at al-Basātīn can be found at sites with pottery attributed to the "Impressed-Slashed Ware" tradition (de Miroschedji 1971; Hanbury-Tenison 1986; Philip 2001; Stager 1992), including Tall Umm Ḥammād (Betts 1992) and Jāwā (Betts 1991), although certain important elements are



10. Late Neolithic chipped-stone artefacts. Sickle elements (1-4); Blades with regularly denticulated edge (5 and 6); Backed and truncated blades (7 and 8); Borers (9-12); Scrapers (13 and 14); Denticulate (15); Retouched blade (16); Retouched flake (17); Bifacial piece (18).

missing, including the characteristic pushed-up lug handles that are often found near the rim of holemouth jars from these sites. Gray-Burnished Ware, which is considered a characteris-

tic of early EBI sites in the northern part of the southern Levant (Amiran 1969; Philip 2008), is absent at al-Basātīn. This may represent regional variation, with impressed and slashed deco-

ration being more common east of the Jordan River and Gray-Burnished Ware more common to the west (Joffe 1993: 39). The impressed and slashed decoration and the absence of Grain-wash (Band-slip) pottery, combined with the radiocarbon evidence, suggests that the site was occupied quite early in EBI.

Lithics

Late Neolithic

The Late Neolithic deposits excavated in previous field seasons contributed more than 22,000 chipped-stone artefacts, to which the 2009 excavations have added an estimated 5,000, most of which consists of unmodified waste flakes. They are made of locally available flint, which includes brown to beige, fine-grained flint cobbles and dark brown flint nodules with chalky white cortex as well as medium to coarse-grained flint angular cobbles of greyish brown colour (Kadowaki *et al.* 2008: 113). Despite the wide range of raw material types, all of them were primarily exploited for the production of flakes from single or multi-platform cores. However, the core-reduction of fine-grained flint sometimes involved intentional blade production by unidirectional flaking from single-platform blade cores.

Retouched tools from previous seasons account for less than 3% of the Late Neolithic assemblage of al-Basātīn and consist mainly of informal flake tools such as retouched flakes, scrapers, denticulates, and notches (**Fig. 10: 13-15, and 17**). Although some of the scrapers are made on cortical flakes, their plan forms and retouches on the edge are less standardized than EB tabular scrapers. More standardized tools include sickle elements, retouched blades, borers, and truncations, which are often made on blades (**Fig. 10: 1-12, and 16**). Of these, sickle elements are the most abundant and have a rectangular shape formed by steep retouch at one lateral edge and the truncation of both ends of blades or flakes. The cutting edges of sickle elements have denticulations and often exhibit sickle sheen. Most samples from al-Basātīn can be classified to Gopher's types C/E or D (Gopher 1989; Barkai and Gopher 1999). One of the backed bi-truncated sickle elements from the 2009 season, measuring 7.1cm in length and 3.2cm in width (**Fig. 10: 4**), is distinctive-

ly larger than the rest of the sickle elements, which range from 2-6cm in length. In addition, backed blades, sometimes with truncated ends, share techno-morphological traits with sickle elements (**Fig. 10: 7 and 8**), although the former type does not show sickle sheen. It is also notable that some blades, mostly made of fine-grained flint, are regularly denticulated, sometimes by bifacial flaking, on their cutting edge (**Fig. 10: 5 and 6**). Some of the denticulated blades are also backed or truncated (**Fig. 10: 6**). These pieces are likely to be unfinished sickle elements because of their similarity to sickle elements in the selection of raw material (fine-grained flint), the blank form (blade), and the retouch techniques (denticulation, backing, and truncation). The morphology of borers varies depending on the blank form, the presence of shoulders, and the length of the tip. A massive borer (**Fig. 10: 12**) is made on a large cortical flake, shaped by bifacial flaking. Similarly large borers are known from other Wadi Rabah assemblages, such as Nahal Zehora I (Barkai and Gopher 1999: 105-109).

In addition, the 2009 excavations also increased our samples of Neolithic bifacial tools. One of them is a chisel with a ground edge. It is shaped by bifacial flaking into an elongated rectangular form with a trapezoidal cross-section. Another bifacial piece is broader (**Fig. 10: 18**) and shows a biconvex profile. However, the edges of this specimen are still jagged, leaving coarse flaking scars, and not ground like the other axes. This pieces thus may represent an unfinished stage.

Late Neolithic groundstone artifacts from the 2009 season include a large fragment of a concave basalt grinding slab from the bottom of a rock-filled pit in Area Q32, as well as some basalt fragments of uncertain form. On comparison with artefacts from previous seasons, it is likely that some of these come from loaf-shaped upper and lower milling stones.

Early Bronze I

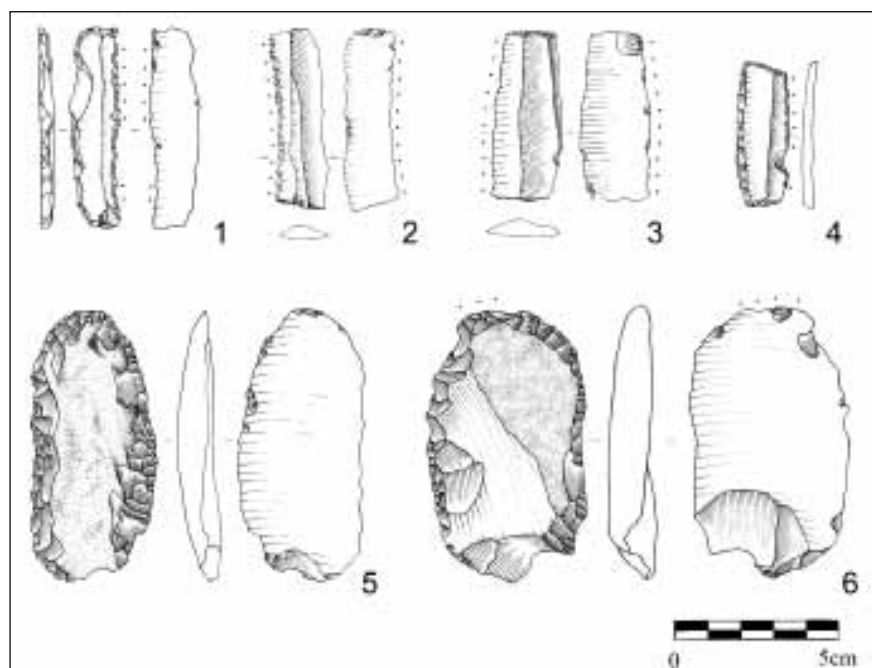
More than 9,000 chipped-stone artifacts were recovered from Early Bronze Age deposits in previous seasons at the site, to which the 2009 excavations contribute about 3,500 more. The excavations near the EB structures added several more Canaanite blades and tabular scrapers

to our previous collections. Canaanian blades that still retain a proximal end show faceting on their striking platform, and the overhang at the platform edge is rarely removed. Some of the Canaanian blades are retouched and/or show sickle gloss on the edge (**Fig. 11: 1-4**). One of the tabular scrapers from this season also has a small glossy area at the distal edge (**Fig. 11: 6**). Both of these tool types are made of brown, fine-grained flint with chalky cortex. Although this raw material (probably Eocene flint) is locally available, the debitage assemblage does not indicate their production on site. Instead, the core-reduction technology at this site is oriented towards the production of flakes and coarse blades, which provided blanks for informal tool types, such as scrapers, notches, and denticulates.

Sickle elements that can be attributed to the Early Bronze Age are made on regular blades with fine or no denticulation on their cutting edges (Gopher's Type E or F: Gopher 1989; Gibbs *et al.* 2009). Some are made on Canaanian blades without backing retouch (**Fig. 11: 2 and 3**), while others have a straight or arched backed edge, sometimes with truncated ends (**Fig. 11: 1 and 4**). The Early Bronze Age deposits also include residual Neolithic and Epipalaeolithic artifacts that originate in underlying layers.

Groundstone artefacts from the previous excavations in Early Bronze Age contexts included about 20 pieces, including handstones, a pestle, and fragments of stone vessels, mostly made of basalt. The 2009 excavations added more of these, including a large base fragment of a limestone vessel from Area R28, the rim of a straight-walled basalt mortar also from R28, another basalt mortar or vessel fragment with a more curvilinear profile from M33, and a fragment of a loaf-shaped upper milling stone, possibly a Neolithic residual, from Area M32. Other minor tool types found in all seasons include worked cobbles and pounders of limestone or flint.

As in previous excavations, the 2009 ones also recovered chipped-stone materials that clearly belong to earlier periods, most of which are clearly Epipalaeolithic artifacts, notably including retouched and unretouched bladelets and bladelet cores. Both narrow and wide bladelets appear, but none exhibit retouch that would indicate any particular complex of the Epipalaeolithic. A few artifacts also indicate an origin in some nearby PPNB occupation. In 2009, these include a broken Amuq point, recalling the discovery of broken points in 2006, and the 2004 surface finds of a naviform core and an axe of PPNB type (Kadowaki *et al.* 2008: Fig. 7).



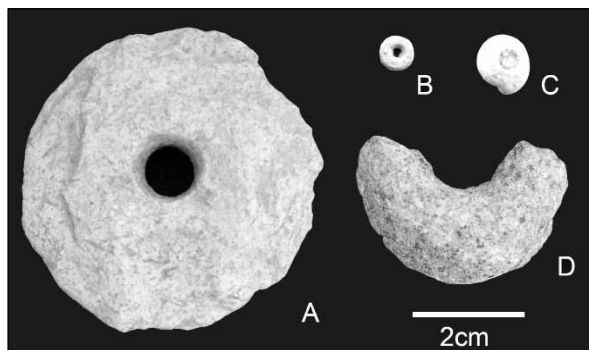
11. Early Bronze Age chipped-stone artefacts. Sickle elements on Canaanian blades (1-4); Tabular scrapers (5 and 6).

Fauna

Faunal remains found at al-Basātīn are highly fragmentary and usually difficult or impossible to assign to a skeletal element or taxonomic Family. Preliminary analyses of both the Late Neolithic assemblage (Kadowaki *et al.* 2008: Table 5) and the Early Bronze one (Gibbs *et al.* 2009) from the 2004 and 2006 excavations show fairly strong similarity. This similarity is likely due, in part, to the fact that sheep, goats, or both were the primary economic foci of the pastoral economy in both periods, distantly followed by pigs. However, it is also likely that some of the faunal remains in the EB I deposits are residual from the Late Neolithic levels, which would tend to blur the differences. Faunal remains from the 2009 season await analysis.

Small Finds

It is noteworthy that some beads found in Early Bronze deposits in 2009 recall the earlier discovery of numerous tubular objects, consisting both of the truncated shafts of bird bones and natural plant casts from local travertine deposits, in and around the curvilinear EBI building first excavated in 2004. One of these from an EB deposit in M23 is tubular, appears to be a truncated bone diaphysis with a diameter of 6mm and length of 10.6mm, and seems identical to some of those discovered earlier. Another, from P32, is a pierced disk with a diameter of 6.6mm and thickness of 1.8mm (**Fig. 12: B**); its material has yet to be identified. A helicone shell pierced at one end (**Fig. 12: C**) that was found in an EB deposit in R28 may also have been used as a bead or sewn onto clothing. Although others may be identified during further faunal analysis, so far the only bone tools identified are



12. Small finds. EB flaked and pierced limestone disk (A); EB bead (B); EB pierced shell (C); LN weight (D).

four fragments of apparently worked bone from two Late Neolithic contexts in P32. In EBI contexts in Areas M23 and M33 excavations produced a small number of possible crucible fragments. These have green residue that is likely copper. Other interesting small finds include a flaked and pierced limestone disk from an EB deposit in R28 (**Fig. 12: A**), a fragmentary basalt pierced weight from an undated deposit in J7 (**Fig. 12: D**), and a similar one found in a Late Neolithic context in M28.

Discussion and Conclusions

The 2009 excavations at al-Basātīn, taken in conjunction with previous results, suggest that the site was a farmstead or small hamlet in the Late Neolithic and a hamlet or small village in Early Bronze I. In both periods, the architecture is sparsely distributed on the site, is likely domestic in nature, and consists of a mixture of circular and rectilinear buildings and outdoor activity areas, while the Late Neolithic settlement also exhibited a number of formally cobbled surfaces, either round or rectangular, that could have been for storage or to serve as the floors of tents or other less substantial structures. In both periods, lithics include sickle elements and groundstone that point to the processing of grain, while the discovery of olive pits, some of which were directly dated to the EBI while a few were found in Late Neolithic deposits, suggests the exploitation of wild or domesticated olive. Predominant *Ovis/Capra* remains in the faunal assemblages fit expectations that herding of sheep, goats, or both was economically important, although we should be mindful of the likelihood that, in terms of meat yield, cattle were probably more important than our small sample of identifiable specimens would seem to suggest (Grigson 1995). Even considering that much of the fauna from the EB levels at al-Basātīn could be residual, the similarities between the Late Neolithic and EBI faunal assemblages are striking. Both pottery assemblages include fairly coarse jars (rather larger in EBI) as well as smaller bowls, as we would expect in a domestic environment, for storage, cooking, and serving. Pierced disks made from body sherds or stone are found in both LN and EBI deposits and could have been spindle whorls used in textile production.

It is also interesting to note that the reoccupation of Wadi Rabah-related sites during the Early Bronze Age, after more than a millennium of abandonment, is not uncommon in the broader region. Much as at al-Basātīn, we find this pattern at Yiftah'el, Jezreel, Qiryat Ata, and Telulyot Batashi, while at Tel Qiri and Tel Te'o there was also a period of Late Chalcolithic occupation (Baruch 1997; Gopher and Shlomi 1997; Kaplan 1958; Khalaily 2003). This calls for investigation of the forces that may have caused this pattern, particularly as Chalcolithic sites are not at all uncommon in the vicinity of sites occupied only during Wadi Rabah and EBI.

Excavations at al-Basātīn contribute towards understanding early EBI occupation in the highlands of northern Jordan and how this occupation related to the rest of the southern Levant. Our reconstruction of al-Basātīn as a largely self-sufficient, and somewhat isolated farmstead or small hamlet is consistent with Joffe's (1993) suggestion that the early EBI was a period in which reorganization of settlement favoured small, agricultural sites (see also Braun 1985: 103). It is also possible that al-Basātīn was an element of a settlement expansion into areas with potential for olive production and other forms of arboriculture. Colonization of areas with good potential for olive groves appears to have begun in the Chalcolithic (Banning *et al.* 1998: 155; Bourke 2001; Epstein 1993; Hanbury-Tennison 1986: 87; Lovell 2002; Mabry and Palumbo 1988: 189, 1992: 68-69), and olive was undoubtedly even more economically important only a little later in the Early Bronze Age, so there is some reason to suspect that EBI settlement expansion in this region was related to the olive industry (Philip 2001: 192). The somewhat later use of Tall Rākān II (WZ 130), probably an EBIB olive-oil factory (Banning *et al.* 2008), would also fit this view.

While there has yet to be much work on early EBI sites in the highlands of northern Jordan, similar sites do occur in other parts of the southern Levant. Parallels for the round structure can be found at a number of EB sites in the southern Levant, including Jabal Abū ath-Thawwāb (Kafafi 2001: 74, 89), al-Hissi (O'Connell and Rose 1980), Tall ash-Shūna North (Philip 2001: 178), and Lod (Kaplan 1977: 573). Pottery with impressed and slashed decoration occurs at Tall

ash-Shūna North (Philip 2008: 199), Tall Umm Hammād (Betts 1992) and Jāwā (Betts 1991), although each of these sites has pottery that is not paralleled at al-Basātīn.

As we have pointed out elsewhere (Gibbs *et al.* 2009) a strong tendency toward regionalism in EBI makes it all the more important to investigate this period locally rather than assuming that it will be much the same as in other parts of the southern Levant. In addition, it is important to keep in mind that the well-watered highlands of northwestern Jordan would have made the region especially attractive to Early Bronze Age producers of grain and olive oil, just as it is today. In that context, it is somewhat surprising that so little work has been done on this period in the north relative to more arid parts of Jordan.

For the waning centuries of the Late Neolithic (or Early Chalcolithic), the relative deficiency of information for northwest Jordan is even more striking, especially relative to comparable regions west of the Jordan River. Apart from small exposures in the deepest levels at Abū Hāmid in the Jordan Valley (Lovell *et al.* 1997), Pella on the valley's edge (Bourke 2007; Bourke *et al.* 2003), and perhaps Tall ash-Shūna North (Gustavson-Gaube 1986), virtually nothing is known about the sixth millennium cal BC in northwestern Jordan except in Wādī Zīqlāp. Since al-Basātīn seems to contrast in some ways with its contemporary neighbour of Tabaqat al-Buma (Kadowaki *et al.* 2008), it seems important to investigate other small sites of this period in northern Jordan so that we can begin to understand the reasons for the variability and the possible tendency for most people to have occupied relatively small and dispersed sites rather than large villages, as they did in both preceding and following eras, even though there are rarer examples of large Wadi ar-Rabah sites, such as Beisamoun (Rosenberg *et al.* 2006). We hope that our results from al-Basātīn will help to stimulate such work.

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HOMICIDE AT QAŞR AL-ḤALLABĀT

R. Taylor Montgomery and Megan A. Perry

Introduction

Qaşr al-Ḥallabāt is an Umayyad period (636-750AD) “desert castle” located in the steppe region of eastern Jordan (**Fig. 1**). During restoration and excavation of the Qaşr in 2007, excavators from the Spanish Archaeological Mission discovered the skeletal remains of six individuals at the bottom of one of the Qaşr’s cisterns. Radiocarbon dating of bones from two of the individuals revealed that they perished, and presumably deposited in the cistern, between the 8th and 9th centuries AD. Five of the six individuals (four males and one female) show evidence of blunt force cranial trauma, while three of the six (two males and one female) show sharp force trauma in their appendages. Physical anthropological methods have determined that a majority of this trauma occurred perimortem (i.e., around

the time of death) as a result of violent confrontation. Here, these results are interpreted within the broader historical and archaeological context of socio-political relations and the role of the Qaşr during this period.

Background

Qaşr al-Ḥallabāt served as a luxurious retreat for the ruling elite and as a center of desert agricultural production during the Umayyad period (636-750AD). The structure originally was built by the Ghassanids in the mid-sixth century AD from the remains of a Roman fort (Arce 2009). The Umayyads renovated the structure into a main palatial building, and also constructed a mosque next to the Qaşr and a bath approximately 8km to the west (Ḥammām as-Sarāḥ). The Umayyad political leaders distributed goods to the local semi-pastoralist communities surrounding the Qaşr, garnering their support. After the Abbasid takeover of the Islamic Empire (ca. 750AD), elite use of the Qaşr declined. Ties between the elites and bedouin nomads supposedly dissolved as a result, which some feel caused the bedouin to resort to raiding and threatening communication and pilgrimage routes as a means to obtain subsistence and express their disfavor of the new political regime (Jabbur 1995: 484). This breakdown in control and inter-societal relationships may have stimulated an increase in localized violent conflict.

A system of eight cisterns along a slope to its west and two cisterns located within Qaşr provided water for the Umayyad elites, and later, local pastoralists. The semi-arid to arid climate of this region makes water collection systems such as these important resources for agriculture and drinking water. Excavation of a cistern located in the innermost palatial room in 2007



1. Location of Qaşr al-Ḥallabāt.

uncovered the skeletal remains of six individuals. The skeletons were located directly on the bottom of the cistern, suggesting they were deposited while the cistern was in use and before post-abandonment soil deposition began. Carbon-14 analysis of two skeletal samples implies that these individuals died and were immediately deposited in the cistern between 772 and 895 CAL AD¹, after the Qaşr went out of official use. The importance of water sources in the region makes the choice of a cistern as a place of final rest a curious choice. The purpose of this study is to combine historical and archaeological data with skeletal analysis through the application of physical anthropological methods to provide an accurate depiction of what happened to the individuals recovered from the cistern.

Materials and Methods

The skeletal sample includes the comingled, well-preserved remains of a minimum of six individuals. Many of the postcranial remains could be separated by individual due to morphological and taphonomic differences; however, they could not be linked definitively to crania in the sample. Age and sex estimation was accomplished using morphological features of the skull and pelvis following Buikstra and Ubelaker (1994). Skeletal pathologies also were recorded following Buikstra and Ubelaker (1994). Health and quality of life of the sample was assessed via non-specific indicators of stress (dental enamel hypoplasias, cribra orbitalia, porotic hyperostosis, evidence for infection).

The patterns of trauma and pathology associated with these individuals were analyzed using macroscopic, microscopic, and radiographic techniques. Trauma in the skeleton first was scored according to the standards within Buikstra and Ubelaker (1994). Microscopic and radiographic investigation of trauma in the cranial and post-cranial remains identified any healing at the trauma site indicative of antemortem trauma (i.e., occurring before death) or unique breakage patterns that could indicate postmortem trauma (i.e., occurring after death). Additional radiographic examination was conducted on skeletal elements with evidence of perimortem trauma. Furthermore, any visible discolorations along the edges of the fractures in the skeletal remains

were examined to investigate taphonomic influences on the bones. An assessment of antemortem and perimortem trauma patterning provided evidence for accidental vs. violent incidents before or around the time of death. Finally, the morphology of the trauma was examined to try and determine the possible instruments used to cause them based on historical and archaeological evidence.

Results

Health and Quality of Life

The sample from the Hallabāt cistern displays relatively few skeletal pathologies with the exception of antemortem and perimortem trauma (see **Table 1**). Half of the individuals survived conditions resulting in cribra orbitalia. Furthermore, one out of six survived stresses that led to the development of dental enamel hypoplasias (DEHs) based on the observable dentition. One-third of the individuals had developed dental caries. Only one bone, a right femur, displayed a periosteal reaction indicative of infection and no osteoarthritis was noted in the sample beyond slight spicule formation on the superior aspects of two sacra.

Blunt Force Trauma

As noted in the introduction, five out of six of the individuals recovered from the cistern displayed perimortem blunt force trauma, and four out of six had well-healed antemortem blunt force trauma. Examples of cranial blunt force trauma are outlined below:

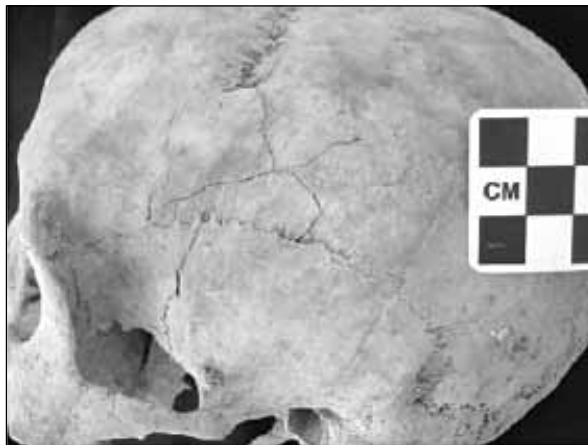
Cranium 1 displays perimortem blunt force trauma on the left and right parietals. The trauma on the left parietal (**Fig. 2**) appears as an impact site on the left anterior portion with fractures radiating outward from the center. These radiating fractures extend to and follow along the coronal and squamosal sutures. As the fractures move along the path of least resistance, they continue through the temporal bone to the glenoid fossa. The right parietal displays a depression injury just posterior to the coronal suture (**Fig. 3**) that resulted in fracturing along the coronal suture and posterior from the coronal suture just superior to the impact site. The frontal bone also contains three partially healed circular depressions indicative of antemortem blunt force trauma.

1. Sample Nos GX-33006 and GX-33066 analyzed by Geochron laboratories.

Table 1: Descriptions of the individuals discovered in the Qaṣr al-Ḥallabāt cistern.*

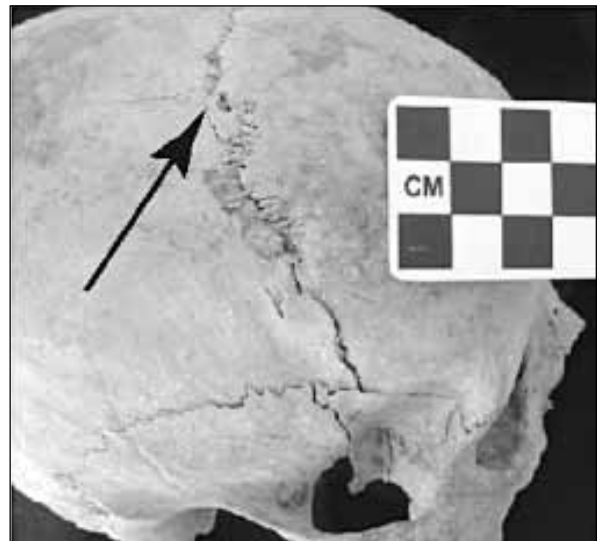
	Age	Sex	Antemortem trauma	Perimortem trauma	Other pathologies
Cranium 1	35-50	M	Frontal (3 healed)	Left side of skull near pterion, right parietal near coronal suture	Caries RM ² , healed cribra orbitalia
Cranium 2	27-44 yrs.	M?	Frontal (2 healed)	Left posterior side of skull near asterion, left and right eye orbits and zygomatics	Dental calculus, dental caries, DEHs (RPM ² , RPM ¹ , RPM ²), healed cribra orbitalia
Cranium 3	35-50 yrs.	F?	Left parietal (1 healed)	Left posterior side of skull near asterion, right side resulting in removal of temporal	Cribra orbitalia, dental calculus
Cranium 4	35-50 yrs	M?	None	Left side near squamosal suture involving left parietal and resulting in removal of temporal, trauma also may have resulted in destruction of craniofacial skeleton (unrecovered)	None
Cranium 5	indeterminate	M	Frontal (2 healed), occipital (1 healed)	Left parietal, occipital, left temporal, left side of frontal	Caries (RM ²), dental calculus
Cranium 6	indeterminate	indeterminate	None	None	None
Postcrania 1	40-49 yrs.	M	None	None	Abnormal bone loss R humerus
Postcrania 2	40-44 yrs.	M	None	None	None
Postcrania 3	40-44 yrs.	M	None	SFT L ulna	Active periostitis L femur
Postcrania 4	30-34 yrs	M	None	None	Vertebral osteophytosis superior sacrum
Postcrania 5	indeterminate	M?	None	SFT R femur and R tibia	None
Postcrania 6	indeterminate	F?	None	SFT L tibia	Vertebral osteophytosis superior sacrum

*Crania and postcrania from the sample could not be associated with each other due to similar age and sex profiles of the individuals. The final demographic breakdown of the sample is: one 35-50 year old female, one 30-34 year old male, three 40-49 year old males, and one male of indeterminate age.



2. Cranium 1: perimortem blunt force trauma on left parietal.

Cranium 2 displays perimortem blunt force trauma on the posterior left side of the cranium and the left and right sides of the cranio-facial skeleton. The posterior impact site is located along the lambdoidal suture near asterion, and radiating fractures extend along this suture into the occipital bone and along the squamosal suture (**Fig. 4**). Cranio-facial trauma also resulted in fracturing along the right zygomatic sutures and of the ethmoid within the right eye orbit (**Fig. 5**). Perimortem fracturing also surrounds the left eye orbit, causing fracturing between the zygomatic and the frontal and the greater wing of the sphenoid, and between the ethmoid and the maxilla. Healed ovoid wounds were observed on the frontal bone, one ca. 5 mm above the right orbit, the other ca. 50mm above the left



3. Cranium 1: perimortem trauma on the top of the right parietal (indicated by arrow).

orbit near the coronal suture.

Cranium 3 shows perimortem trauma on the posterior left side and on the right side that possibly resulted in removal of the temporal bone. The small fractures on the posterior left side (**Fig. 6**) originate from an impact site just inferior to asterion. In addition, perimortem trauma likely caused fracturing along right squamosal suture down to the foramen magnum, completely disarticulating the temporal bone from the cranium. The edges of the trauma are sharp and distinct with no sign of an osteogenic response. While the external auditory meatus is still partially present, the temporal, mastoids, and entire



4. Cranium 2: perimortem blunt force trauma impact site at left rear of skull.



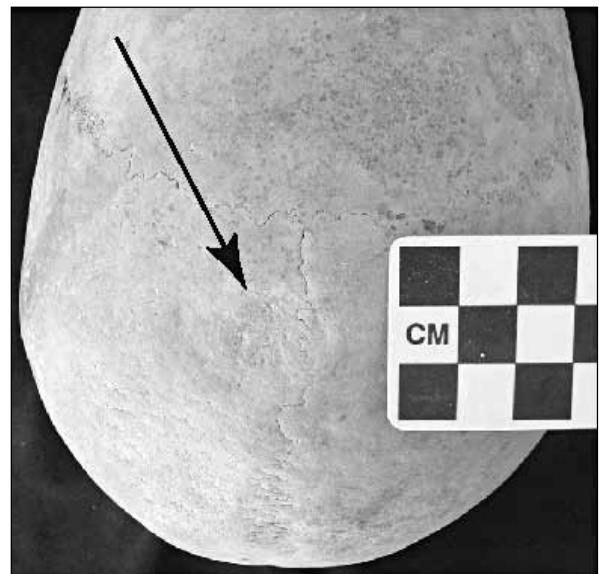
5. Cranium 2: perimortem fracturing of cranio-facial skeleton.

zygomatic arch have been removed. Lastly there is a large (22.21 x 29.08mm) healed depression fracture to the left of the sagittal suture just behind bregma (**Fig. 7**).

Two other crania, 4 and 5, also have perimortem trauma. The left and right temporals and cranio-facial skeleton of Cranium 4 apparently have been removed due to substantial trauma. An 86.99 mm-long radiating fracture extends posteriorly on the left parietal from the squamosal suture to and following along the lambdoid suture due to the force of impact. Cranium 5 displays a blunt force impact point on the left parietal surrounded by two rings of concentric fractures (**Fig. 8**). Massive force also caused



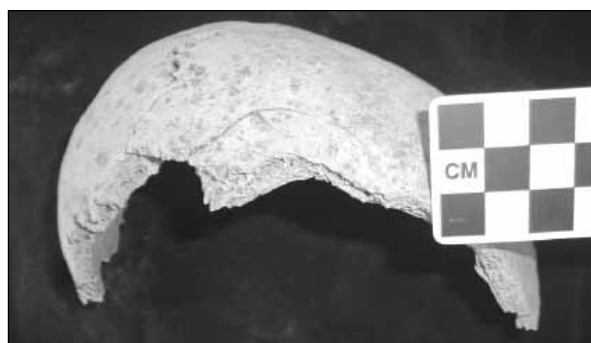
6. Cranium 3: perimortem blunt force trauma impact site on left rear of skull (indicated by arrow).



7. Cranium 3: healed antemortem depression fracture.

fracturing along the left squamosal, lambdoidal, and coronal sutures, and created a linear fracture running from left asterion across the occipital.

Cranium 6 is composed only of portions of the calvarium. All of the broken edges of the calvarium are more rounded in appearance. They also show a great deal of flaking on both the inner and outer tables of the cranium. A distinctly lighter coloration also is present along all of the edges of the calvarium. As a result, there does not appear to be any fractures associated with perimortem trauma within the remains.



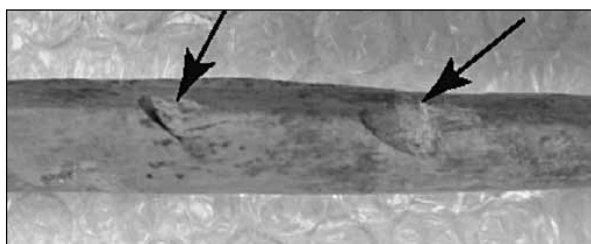
8. Cranium 5: perimortem blunt force trauma impact site on left side of skull.

Sharp Force Trauma

The sharp force trauma only was observed in the postcrania. A right ulna displays two small cutmarks on its lateral margin: one 6.08mm v-shaped cutmark 1/3 of the way down the shaft from the proximal end and another 8.18mm x 7.91mm wound at midshaft which contains a cutmark with splintering and breakage (**Fig. 9**). The location of these cutmarks is similar to that seen in defensive wounds when the victim tries to protect their head with the forearm. Furthermore, a left tibia has small (6.60mm and 2.58mm) v-shaped cut marks on the proximal end along the anterior margin, and a larger (926.72mm) v-shaped cutmark on the posterior side just proximal to midshaft. A right tibia has a 14.29mm v-shaped wound just medial to the tibial tuberosity (**Fig. 10**). Finally, a right femur displays a small v-shaped wound just above the lateral condyle.

Discussion and Conclusions

The skeletal sample recovered from the cistern at Qaṣr al-Ḥallabāt clearly contains an interesting assortment of skeletal trauma. Crania numbers one through five all show evidence of blunt force trauma inflicted perimortem. In addition, three individual display an assortment of sharp force trauma in their postcrania. The

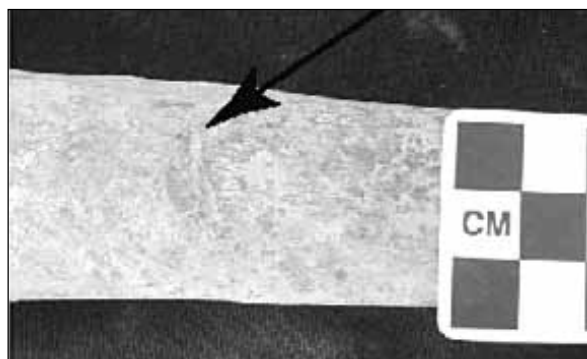


9. Perimortem sharp force trauma on right ulna (possible defensive wounds) (indicated by arrows).

microscopic examination of each wound seems to show uniformity in coloration, sharp fracture lines and broken edges, and acutely angled patterns of breakage. All of these characteristics are consistent with wounds that occur at or around the time of death.

The patterning of trauma and lack of blunt force trauma in the extremities clearly indicate that the injuries did not result from falling into the cistern but were the result of intentional violence. The perimortem wounds indicate that both blunt and sharp instruments were used in the skirmish. Furthermore, assessment of military equipment and the high prevalence of sharp force (as opposed to blunt force) trauma in skeletons from Islamic/Crusader-period battle sites signifies that violence at Ḥallabāt was likely not committed by an organized military (see Kennedy 2001; Mitchell 2006, Mitchell *et al.* 2006; Nicolle 1997). Evidence for similar antemortem injuries in the skeletal remains implies that these skirmishes, with the same or multiple groups, occurred relatively regularly.

This study therefore concludes that the manner of death of the individuals recovered from the cistern at Qaṣr al-Ḥallabāt was homicide. The fact that these bodies were deposited in the cistern seems to show a desire to disrupt occupation and activity at the site or cover up the deeds that had been done. Despite the circumstances surrounding their death, these individuals did not suffer extensively from poor health or nutrition while they were alive. Crusader-period communities in Israel, such as Caesarea and Tel Jezreel, have notably lower frequencies of these conditions (Mitchell 2006; Smith and Zegerson 1999). The individuals from Ḥallabāt have almost no periosteal reactions or other signs of in-



10. Perimortem sharp force trauma on right tibia (indicated by arrow).

fection. Half of the individuals had at least one non-specific indicator of stress but all occurred during childhood or were inactive. The lack of pathologies may indicate a primarily pastoral-nomadic lifestyle and suggests that, presuming these are locally-derived individuals, the political changes of the 8th century did not result in decreased access to resources in the region. The presence of extensive antemortem trauma on the other hand suggests that these individuals were not strangers to violent skirmishes during their lifetime. However, the fact that these individuals survived this cranial trauma may indicate that they had knowledge of how to treat such injuries.

Two questions remain: why were these individuals killed, and why was one of the precious local water sources contaminated with their remains? The latter activity would imply that at least the disposal of the bodies, if not the violent activity itself, was carried out by outsiders unconcerned with contaminating local resources. Furthermore, under Umayyad rule, the influence of elites in the Qasr probably would have kept violent conflict to a minimum. They likely acted as adjudicators in internal disagreements and would have had weaponry to repel external combatants. However, the political vacuum after the 8th century Abbasid takeover may have let conflict with outsiders run unchecked. At some point shortly after deposition of the bodies in the cistern, the cistern went out of use and began collecting silt and debris. Finally, building debris from an earthquake sealed the entrance of the cistern, hiding evidence of this ancient homicide until the 21st century.

Acknowledgements

We are grateful to Dr. Ignacio Arce of the Spanish Archaeological Mission for facilitating the study of these skeletal remains. Funding for the Qasr al-Hallabāt restoration and excavation has been provided by the Spanish Agency for International Cooperation and the Spanish Institute for Cultural Heritage. This project would not be possible without the support of Dr. Fawwaz al-Khraysheh and the Jordanian Department of Antiquities. Jessica Walker assisted with the initial cleaning and analysis of the skeletal remains.

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A NEW ROMAN ROAD SITE ON AL-KARAK PLATEAU

Karen A. Borstad and Jehad Haroun

Introduction

This paper presents the description and preliminary analysis of a newly discovered Roman road site, found during fieldwork undertaken in 2009 to study the travel networks of al-Karak plateau. The survey fieldwork was purpose-driven, looking for built road sites as well as topographic and ethnographic patterns that affect movement and settlement of population groups. The goal was to study evidence for road networks among the sites found in previous surveys of the plateau. This road survey was part of al-Karak Resources Project (KRP), a multi-disciplinary endeavor that examines how people utilized natural resources, both in the past and the present. The KRP research philosophy considers “communication routes”, used for human travel from place to place, as part of the natural resources of al-Karak plateau.

Overall objectives of the road survey included 1) gathering ethnographic data of agricultural and pastoral land use patterns through Bedouin interviews, 2) mapping water resources in relation to natural travel routes, and 3) analyzing the features and patterning of sites from previous surveys. The survey methodology included perusal of topographic maps, vehicle travel along agricultural roads, and interviews with both seasonal Bedouin populations and local residents. For this inaugural survey, only sites from the Miller-Pinkerton survey of al-Karak plateau (Miller 1991) were assessed for context-

ual analyses¹.

The ethnographic and water resource survey data gathered in 2009 will be reported more fully elsewhere, as will a newly discovered Nabataean water catchment system mentioned here. This report includes a GIS-based presentation of the newly identified Roman road site in its spatial relationship to settlement sites, local terrain, and previously-identified Roman roads and milestones on al-Karak plateau.

The Roman Road (Site RR1)

The 2009 road survey began in the southeast quadrant of al-Karak plateau. This area was chosen because it contains al-Fajj al-‘Usaykir, a broad linear valley lying over 100m. lower than its flanking cliffs (Koucky 1987a: 30) that is considered to be a long-term travel thoroughfare (Mattingly 1996: 360; Miller 1991: 124). The southeast quadrant is also the location where the well-known Roman highway, the *Via Nova Traiana*, enters and exits the plateau at the north rim of the Wādī al-Ḥasā. The plateau is spatially divided into quadrants by two modern highways, one east-west between the modern towns of Karak and al-Qatrāna, the other north-south from the Wādī al-Mujib to the Wādī Ḥasā.

In the survey area we identified two sections of Roman road that are previously unrecorded. In order to spatially assess this new Roman road site in relation to local terrain and settlement sites, a regional map published by the Miller-

1. The names of sites are presented according to current transliteration standards, with older transliterations as they appear in referenced publications. The sites from Miller (1991) are named MPSites. The authors wish to thank the American Schools of Oriental Research (ASOR), J. Maxwell Miller, and Duane Calhoun for their kind permission to use their published maps. The

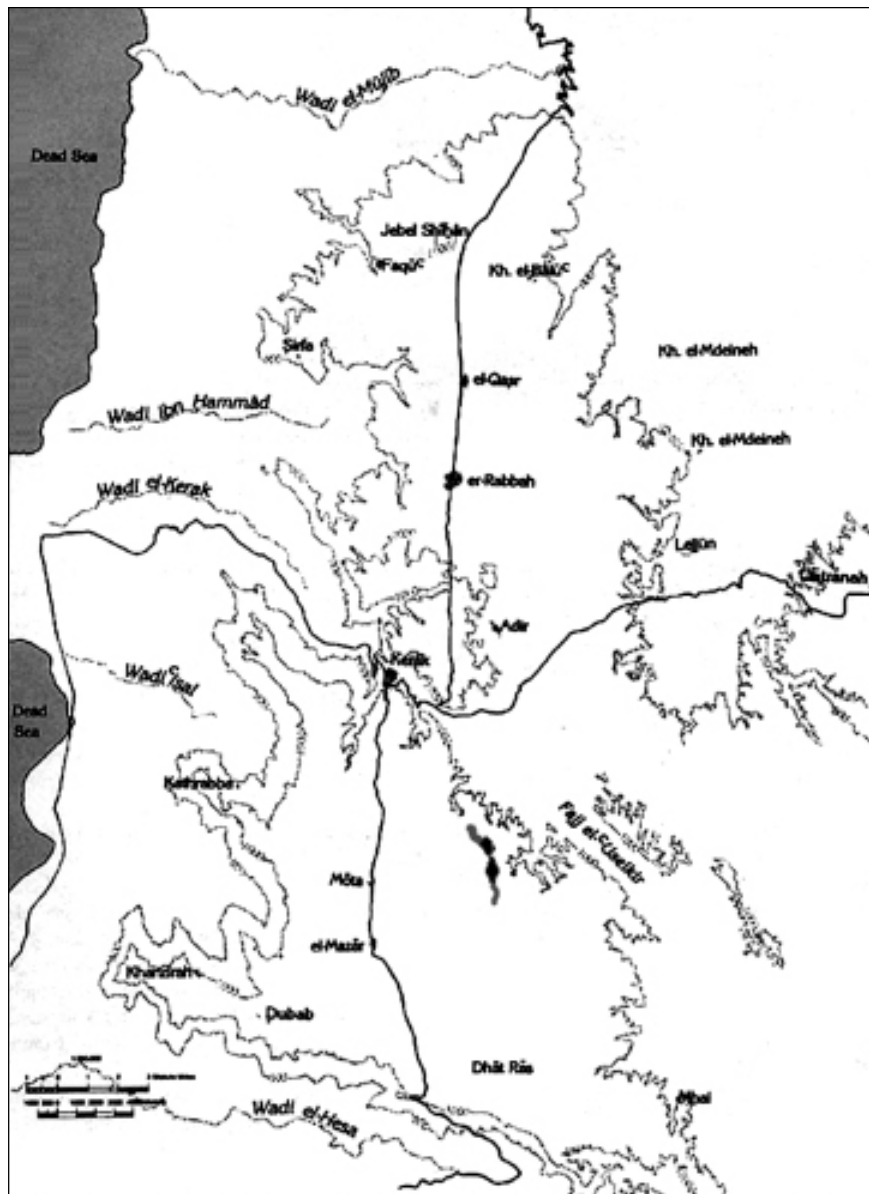
2009 Road Survey was made possible through the generous support of the Karak Resources Project and its director, Gerald Mattingly. Raid Baquin was an essential team member as the Environmental Survey leader. We wish to thank the Department of Antiquities and its director Fawwaz Khaysheh for support and for the helpful participation of Akram Otoum, representative.

Pinkerton archaeological survey (Miller 1991: 2) was geo-referenced using ArcGIS software (ESRI 2003). Geo-referencing is a GIS process that turns paper maps into digital landscapes with coordinate points where sites can be viewed together in accurate spatial relation to each other.

The newly discovered Roman road sections lie along an isolated ridge, with the landscape descending to a wadi on the west and to al-Fajj al-'Usaykir (hereafter, al-Fajj) on the east (**Fig. 1**). The two road sections are treated here as one site, named RR1, with a north and a south segment. The north and south segments are sepa-

rated by a plowed field where there is a dip, or "saddle", in the ridge line. The north segment of RR1 is approximately 250 meters long and curves towards the west. The south segment is approximately 480 meters long on a straight north-south alignment.

The road remains consist of rows of basalt cobbles embedded in the ground (**Fig. 2**); its construction is consistent with roads beside Roman milestones south of Wādī al-Ḥasā (K. Borstad, personal observation). The width of the roadbed varies considerably, having been disturbed in both segments: on the south segment, agricultural activities and a modern dirt



1. Roman road site RR1 shown as black diamond shapes in the southeast quadrant of al-Karak plateau. The thick grey line to either side indicates the ridge area surveyed.



2. Roman road Site RR1 as first identified, view to the north.

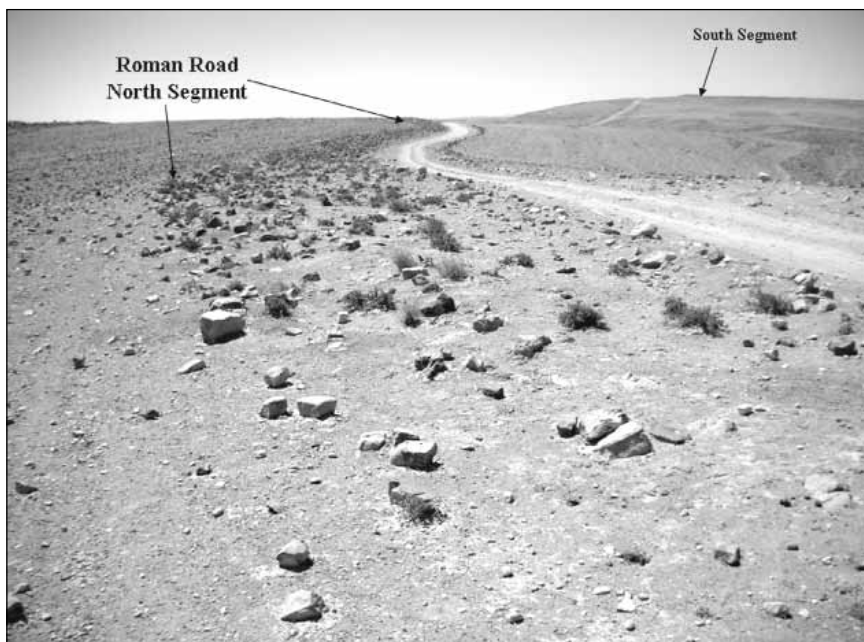
track have narrowed the Roman roadbed and the north segment has been intersected by the same modern dirt track (**Fig. 3**).

The cobbles of the south segment fade away at each end near large stone heaps. These stone heaps were designated as archaeological sites in previous survey (MPSites 343 and 344, Miller 1991: 130) and appear to have been created with cobbles robbed from the RR1 roadbed. Survey further on the ridge, both north and south of

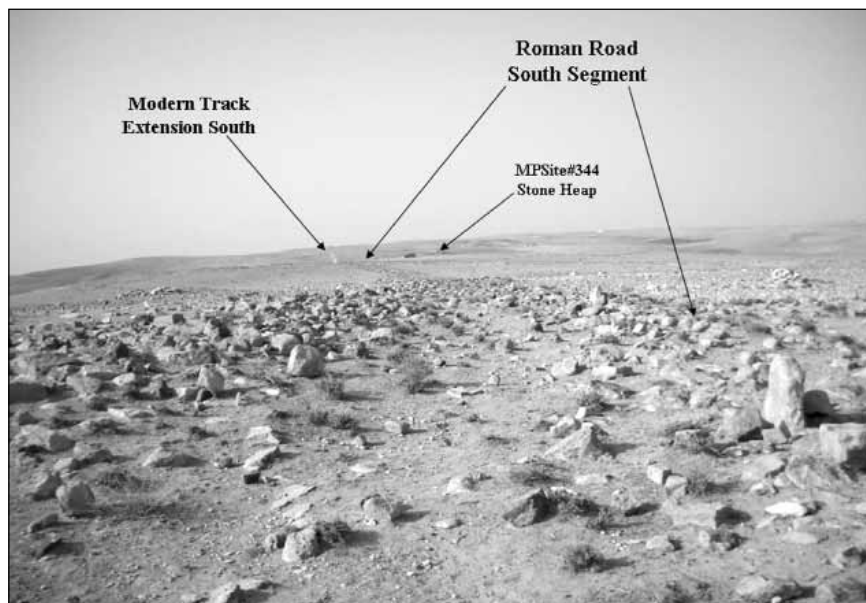
RR1, revealed no additional sections of Roman road remains. However, the modern dirt track, mentioned above and well-used, extends southwards from the stone heap MPSite344 and is a most probable continuation of the Roman road route (**Fig. 4**).

Topographical Context

Site RR1 is notable for its location in the landscape, not contingent to settlement sites but



3. Northern-most point of RR1, view to the southeast. Note modern dirt track/road beside Roman roadbed.



4. Site RR1, south segment, view to south. Stone heap marks end of distinctive roadbed remains. Modern dirt track continues along ridge to south.

rather situated along a ridge of high land that is difficult to access from east and west. To represent the terrain, a section of al-Karak map from the Hunting Survey 1:25,000 series was geo-referenced. The RR1 coordinate points, represented by diamond shapes, and the line of survey along the ridge, represented by a thick grey line, were added. As seen in this visual representation, the terrain to the west of RR1 is the Wādī Middīn, a steep valley filled with high hills (**Fig. 5**). Due to the steep hills in the wadi there is no direct way to the ridge from the west; access during survey was very difficult.

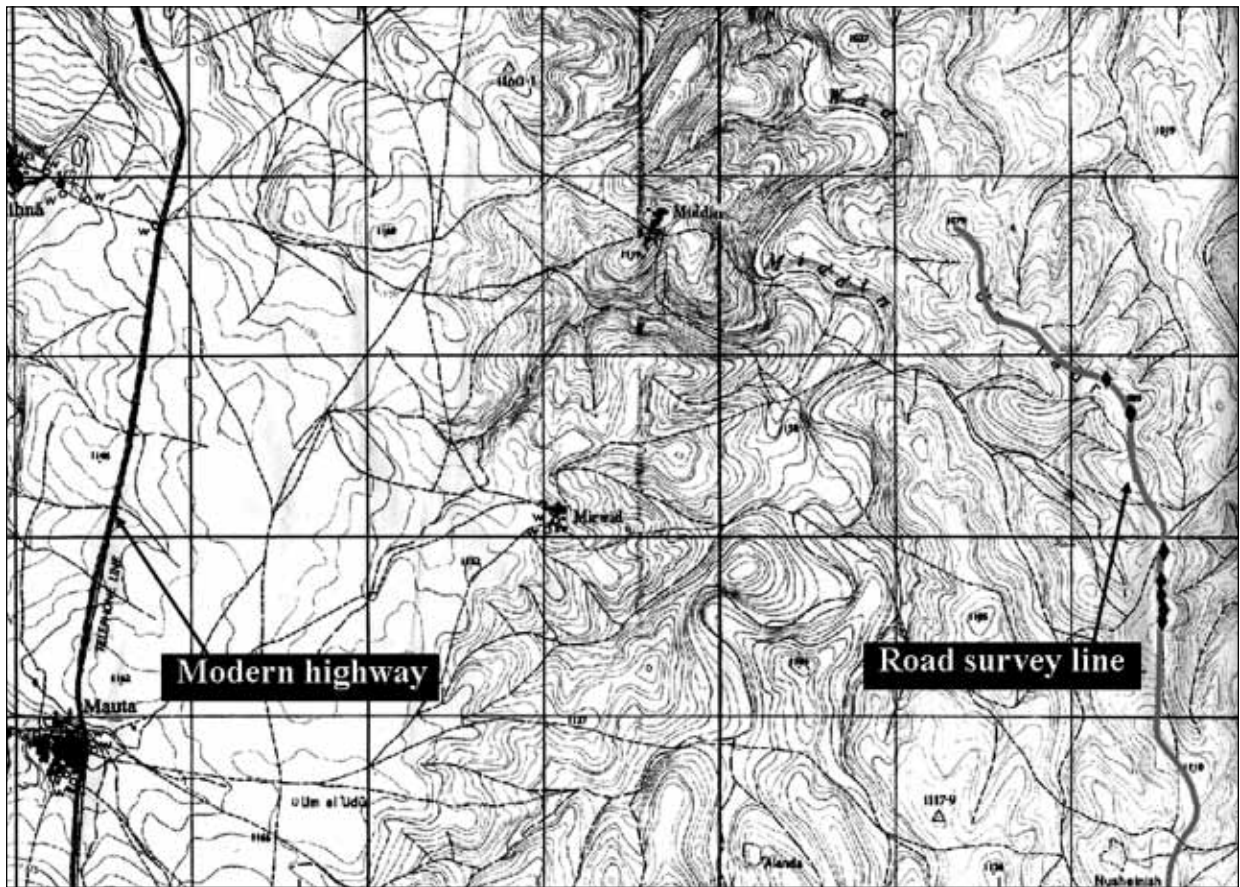
The eastern terrain slopes steeply away from the south segment of RR1 towards al-Fajj, which cannot be seen from this point. However, further north, at the saddle of the ridge where a plowed field separates the two RR1 segments, the slope to al-Fajj is less steep. Access eastwards at this point is relatively easy, although the north segment of RR1 turns here in a westward direction.

Only one settlement site lies in relative proximity to RR1, although it is 1.5km south along the modern dirt track. This settlement site is not situated on the ridge itself but occupies the top of a steep hill in the wadi to the west of it. The settlement ruin is Nushaynish, a large Nabataean village (MPSite353 Kh. en-Nsheinish, Miller 1991: 131-2; cf. **Fig. 5**, above, Nushaynish at lower right). A water catchment system lay by the modern dirt track, and so directly across the valley from Nushaynish. This constructed sys-

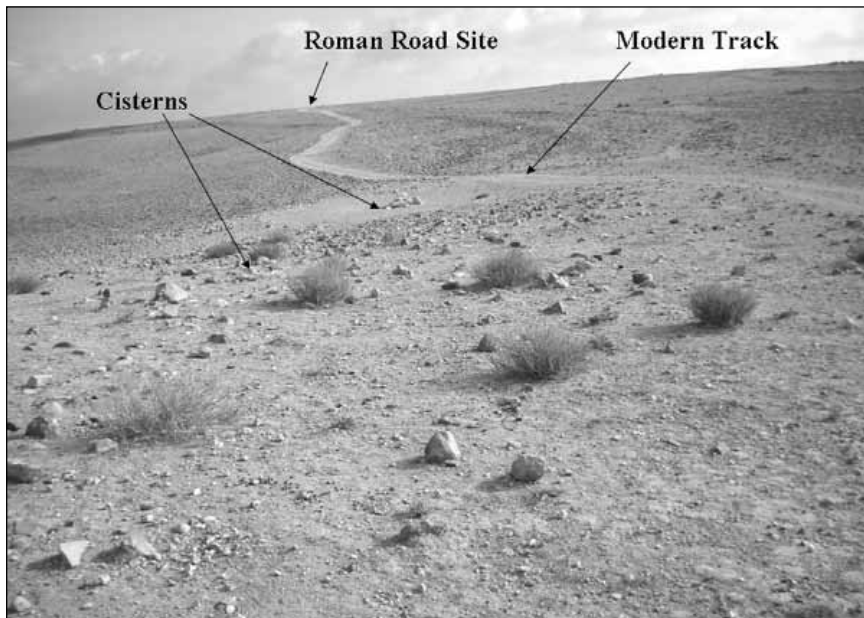
tem, including four cisterns and two water channels (**Fig. 6**) is previously unrecorded. It appears to be Nabataean in date, according to field reading of the surface pottery gathered there, and is significant as the only accessible water along the ridge.

On the ridge itself, previous survey found ten sites that lie in proximity to Site RR1, although RR1 was not identified at that time (**Fig. 7**). Analysis of the published descriptions of these sites reveal that they are stone heaps, all but three with no discernable construction features. The three with possible features appeared to have wall lines measuring 3x3 or 5x5 meters, suggesting that they were collapsed watchtowers (MPSites 335, 341, 344; Miller 1991: 128-130) or possibly small way stations. This pattern of stone heaps or cairns, and way stations or watchtowers is consistent with a road isolated from settlements.

Clearly the route of the Roman road represented by RR1 was placed in rugged terrain isolated from settlements. Most particularly, the RR1 site is distant from the expected Roman road route: the modern highway is the location considered by scholars today as the main long-term travel artery through al-Karak plateau, the route of the first Roman highway in the region, the *Via Nova Traiana* built in 111AD over an earlier road, an ancient King's Highway (e.g. Koucky 1987b: 71; Graf *et al.* 1992: 783). A pattern of long-term settlements along the modern



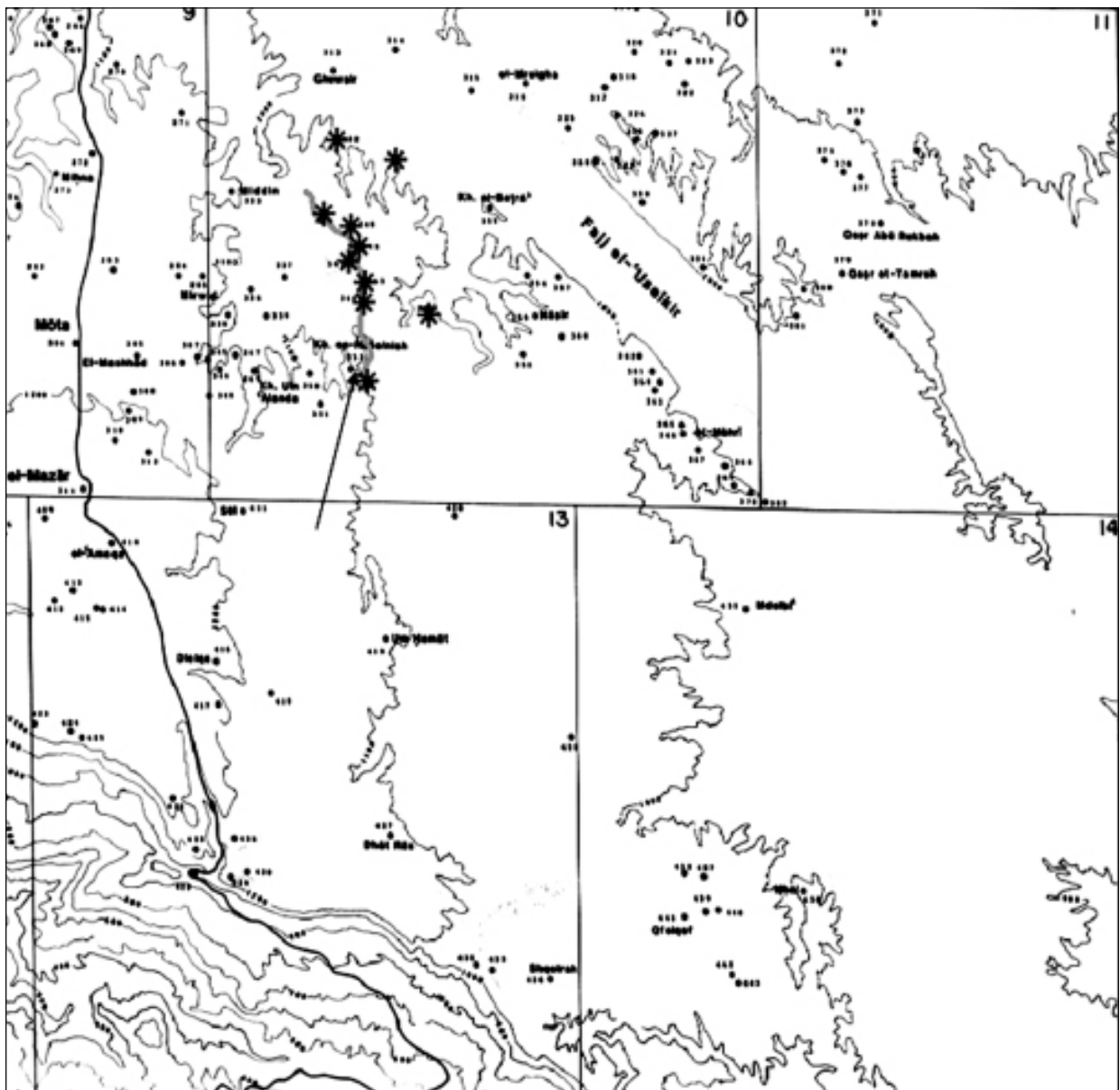
5. Section of Karak map from Hunting survey 1:25,000 series. Coordinates from RR1 are shown as diamond shapes; thick grey line shows extent of road survey



6. A portion of Nabataean water catchment system along modern dirt track south of Site RR1, view to north.

highway suggests that it was indeed the indigenous travel route (Borstad and Haroun 2009:

2). The presence of two Roman milestones near the town of Mu'ta on the modern highway (cf.



7. A portion of the site map from Miller (1991). Asterisks highlight sites in proximity to RR1. Arrow points to Nushaynish (Kh. en-Nsheinish). Note Dhāt Rās in center right of Map Area 13 and al-Muraygha (el-Mreigha) in upper center of Map Area 10.

Fig. 5. Mu'ta, lower left), contribute to the interpretation of this route as the *Via Nova Traiana* (hereafter, *Via Nova*). However, the new data of Site RR1's location remote from the modern highway requires a re-assessment of the presumed Roman road network and an attempt to determine whether a new network including the RR1 site can be inferred from the available data.

Historical Context

Perhaps the closest we can come to construct-

ing a new view of the Roman road network on al-Karak plateau is to locate RR1 spatially among other Roman sites that were found before the advent of modern development caused their disappearance. Most helpful in this regard is a map of Roman roads, milestones, and sites as they were discovered and recorded by Western explorers to the Roman provinces of Palaestine, Syria, and Arabia in the 1800's and published by Peter Thomsen in 1917.

The map that resulted from Thomsen's

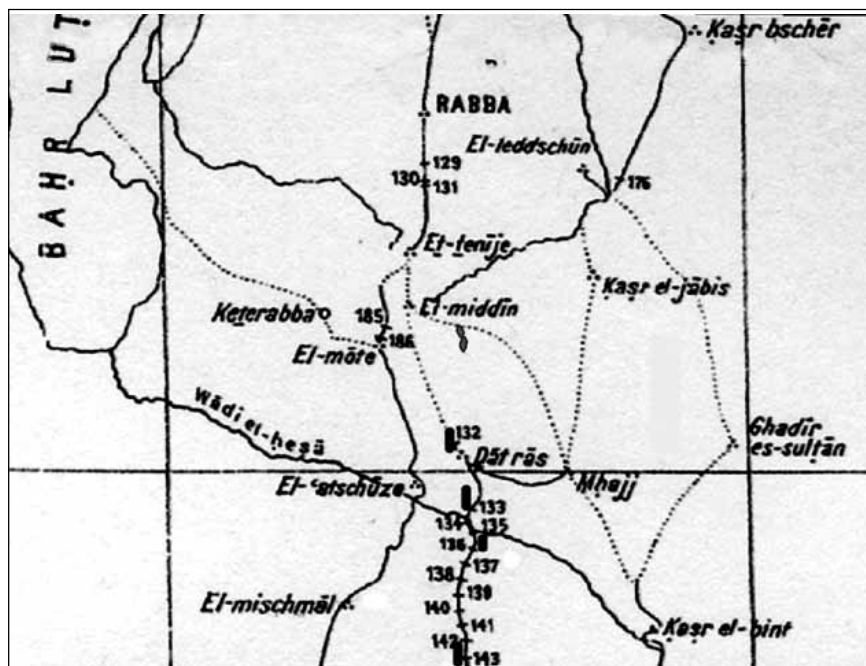
compilation of recorded site coordinates presents milestones as numbered points and roads as solid lines (Thomsen 1917: map 1). By geo-referencing the al-Karak portion of Thomsen's map and adding the Site RR1 coordinates, aspects of a new model of road networks may be more readily observed. For example, to determine a northern connection between Site RR1 and the known Roman network, indicated by milestones 129, 130, and 131 (upper center of **Fig. 8**), the most helpful information is the pair of dotted lines indicating two Roman roads running south from the village eth-Thaniyyeh (et-Tenije; cf. ath-Thaniyyeh, Miller 1991: 91).

Although marked by dotted lines, meaning their locations were considered uncertain by the mapmaker, the eastern line leads towards RR1. Recent survey observations noted that ath-Thaniyyah lies near the crossing of the main north-south and east-west routes through al-Karak plateau (Koucky 1987a: 32); its eastern slopes provide a more direct route south than the current modern road that curves sharply towards al-Karak town (cf. **Fig. 1**). The village of ath-Thaniyyah is occupied today and visible in the distance from the RR1 site (**Fig. 9**).

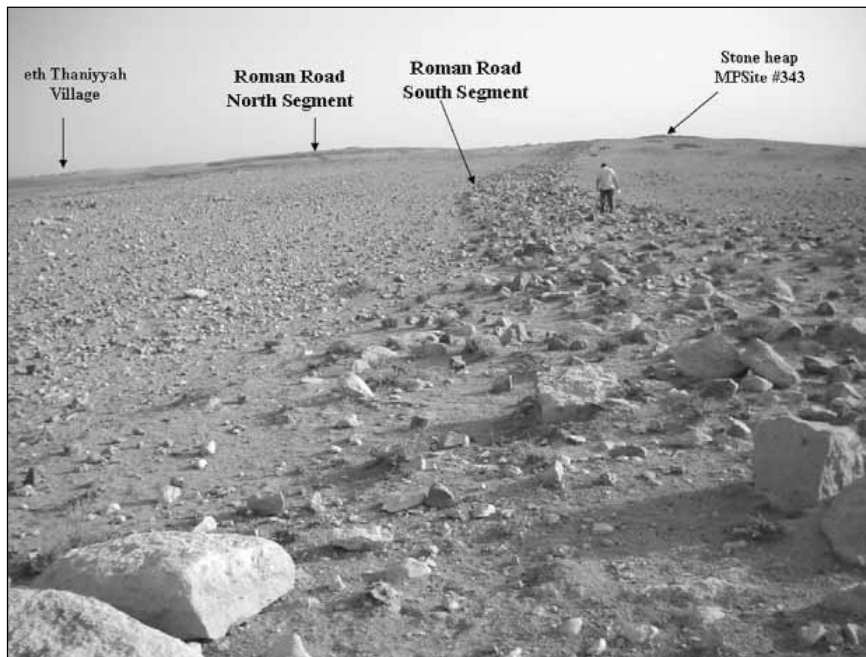
To the south, the most direct connection for placing Site RR1 within the Roman road network would be along a straight alignment past

the village Dhāt Rās (Dat ras in **Fig. 8**), then south along the Roman road to the milestones of the *Via Nova* in Wādī al-Ḥasā. Note that the road from Dhāt Rās, south to the milestones at the al-Ḥasā rim, is a solid line; the former presence of this Roman road was confirmed in our 2009 survey by an elderly resident who described the location and features of a black cobbled road south of Dhāt Rās that was dismantled in the 1950's.

Several of the Roman road remains in Wādī al-Ḥasā have been re-surveyed in recent times; their coordinate points were added to Thomsen's geo-referenced map as a check on the accuracy of his coordinates. Two coordinates, represented by black columns in **Fig. 8**, are from the Wādī al-Ḥasā survey: milestones at Thomsen's # 143 and the Roman bridge at #136 (Macdonald 1988: 374). Another recently obtained coordinate point is displayed at #133 (near al-'Ayna village, cf. Thomsen 1917: 52); and one near Dhāt Rās (displayed at Thomsen #132) taken to confirm the location of the Roman temple there, since the milestone has disappeared (both by K. Borstad, 2009). It is apparent that Site RR1 fits well into a new Roman road network along a direct route between Dhāt Rās and the milestones north of ath-Thaniyyah, without any necessity for the road to curve west and merge with the modern highway route.



8. al-Karak portion of Thomsen (1917) map. Milestone locations are indicated by numbers. Lines in solid black indicate roads, dotted lines indicate speculative roads that the map maker considered to be "uncertain". Black columns indicate coordinate points from recent surveys.



9. Site RR1, south segment, with ath-Thaniyyah village visible to north.

Conclusion

It is our working hypothesis that Site RR1 is part of the *Via Nova* through al-Karak plateau. The earliest milestones of the *Via Nova*, from 111 AD, are attested to the south in the Wādī al-Ḥasā, and in the north at Wādī al-Mujib (cf. Borstad 2008: 65). The RR1 site is in a direct alignment with these earliest milestones. A strong case can be made for the *Via Nova* built as a separate Roman road, parallel to the indigenous route along the line of long-term settlements on al-Karak plateau. As such, it is a logical continuation of the *Via Nova* south of the Wādī al-Ḥasā, also built on a separate route (cf. MacDonald 1988: Fig. 57).

The definitive evidence of Site RR1 presents us with a new model for travel networks in Roman times and therefore requires a re-assessment of regional settlement locations and functions. For example, Dhāt Rās can now be seen as the entry/exit gateway town for Roman government traffic, its milestone marking a junction of the *Via Nova* with a road west from Muhayy (cf. Fig. 8 Muḥajj; Mhai, Miller 1991: 163-6). Likewise, the Roman fortified camp at Umm Ḥamāt, directly north of Dhāt Rās, seen by Muslim long ago but now disappeared (Miller 1991: 153-4), helps us to secure the *Via Nova* route's new alignment.

The construction of Roman highways had re-

percussions on settlements, but the location of indigenous settlements also likely affected the placement of Roman highways. The fact of Site RR1's location remote from the settlements to the west suggests that there was a reason for its placement, built to avoid towns when traveling north-south through al-Karak plateau. The obvious reason would be that *Via Nova* travelers needed to avoid inter-community roads likely much used for economic and social daily use, crowded with vehicular and pedestrian traffic. The corollary is that the *Via Nova* was purpose-built as a route reserved for rapid transit, to avoid crowded ways with slower-moving people and animals. Side roads would provide ready, marked access to provisioning stations and hostelties reserved for government travelers.

Further study of the region surrounding Site RR1 is planned as we wish to field research the reports of Roman roads between Mu'ta and Middīn (Alt 1937: 240-1), now that Site RR1 is established as lying just southeast of Middīn. A possible survey strategy would search for an eastward extension of the well-known Roman road (Mittman 1988: 178) that runs up the escarpment from the Dead Sea (marked as a junction with the indigenous road by the milestones near Mu'ta), then connecting with RR1 at the ridge saddle, and continuing eastward past al-Muraygha, an extensive walled town in al-Fajj

located at a natural crossroads (el-Mreigha, Miller 1991: 124, with references). This major site, overlooking a natural thoroughfare, could now be proposed as a significant entry point for traffic from the east with connections across the plateau to the Dead Sea.

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PRELIMINARY REPORT TALL JALŪL 2009¹ AND 2010 SEASONS² FIELD G AND W

Paul and Helena Gregor

Since Field A, which is located on northeastern ridge of the tall, failed to produce any remains of city fortifications, the decision was made in 2007,³ to open a new Field (G) on southeastern ridge of the tall (see **Fig. 1**). After the first season of excavation in Field G it was evident that a stretch of the city wall was revealed with adja-



1. *Topographical map of Tall Jalul.*

cent building structures in its vicinity. Square G2 revealed, what appeared to be the southeastern corner of the city wall. However, it seemed that some sort of a channel was running along the inside of the southern wall. The nature and purpose of this channel was not known at that time, but it was evident that the wall and the channel next to it were not constructed at the same time. In addition to the channel and wall, several other architectural features were discovered in Square G4, located north of G2, while Squares G1 and G3 did not yield any architectural results. Discovery of a possible city wall prompted further excavations conducted in 2009 and 2010.

During the 2009 season work continued in Squares G2 and G4, where architectural remains were discovered, and a week after the season started work also resumed in Square G1. In addition to Squares G1-4, which were opened in 2007 season, Square G6 was opened east of G4, but was abandoned after a few days of excavation due to the fact that the eastern stretch of city wall was not found there. However, the area

1. The authors of this report would like to express their gratitude to volunteers and staff members who participated in this field. We would like to express our appreciation to our sponsoring institutions; Andrews University, Cincinnati Bible University and ACOR. Also, we would like to thank the Director-General of Antiquities, Fawwaz al-Kraysheh for the support the Department of Antiquities of Jordan provided this season for us. Finally, we appreciate the services of Mr Basem al-Mahamid and Mr Hussam Hjazin who served as representatives of the Department of Antiquities of Jordan. The staff for this season included, director Randall Younker, co-director Connie Gane, field supervisor Paul Z. Gregor. Basem al-Mahamid did the architectural drawings. Square supervisors were Micah Johnson, Jeff Hudon, Chad Washburn, Michelle Berglin and Justin Singleton. Volunteers included Gary Achenbach, Stephen Allock, Denis Fortin, Erika Fortin, David Glazer, Eva Glazer, Sasa

Glazer, John Heczko, Young Kim, David Merling, Jeremy Merling, Kohl Merling, Nadine Plummer, Daniel Regal, Zenaída Salazar, Douglas Simmons, Victor Tenorio, Tine Vekemans, Frances Watkinson, Bob Wilkins and Florie Yang, and their contribution was much appreciated.

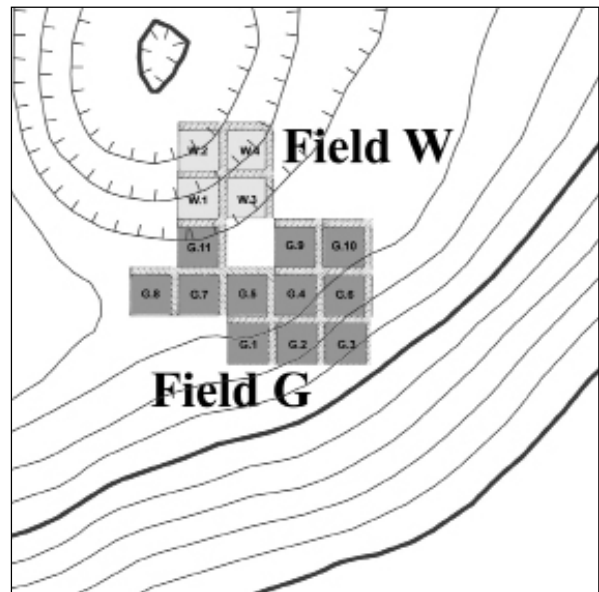
2. We express our gratitude to Hanadi Al-Taher who served during this season as representative of the Department of Antiquities of Jordan. Staff for this season included director Randall Younker, co-director Paul Gregor, field supervisors Paul and Helena Gregor. Paul Ray did the architectural drawings. Square supervisors were Denis Fortin, Sabal Zaben, Jeff Hudon and Michelle Berglin. Volunteers included Amanda McGuire, Jacob Moody, Owen Chesnut, Medaliz Gutierrez, Joshua Heczko, John Heczko and Aaron Moushon, and their participation was much appreciated.

3. Staff for the 2007 season was provided by the Cincinnati Bible University led by Mark Ziese.

west of Square G4 seemed to be very promising so we opened Square G5 to better understand the function and purpose of the structures found in Square G4 during the previous season. Later, Squares G6-9 were opened to bring more light and understanding to the city wall remains.

Work resumed at the site during 2010 for only three weeks. The main goal this season was to follow the water channel and discover its route. For this purpose Square G11 north of G6 was opened. In addition, Square G10 was opened to reveal the continuation of the eastern stretch of the city wall. While the water channel continued in Square G11, Square G10 did not bring the desired results since no trace of the city wall was found in that square. Since the water channel seemed to lead toward what appears to be an ancient water reservoir, a new Field (W) was established just north of Square G11. Four squares were opened in Field W (W1-4) whose purpose was to reveal the continuation of the water channel (see **Fig. 2**).

Three seasons of excavation have revealed three major occupational phases. According to the preliminary pottery readings the city wall dates to the 9th century BC, a pillared building found in 2007 belongs to the 8th century B.C., while the water channel was erected and used sometime during the 7th century BC. There are also a few architectural remains dating to the

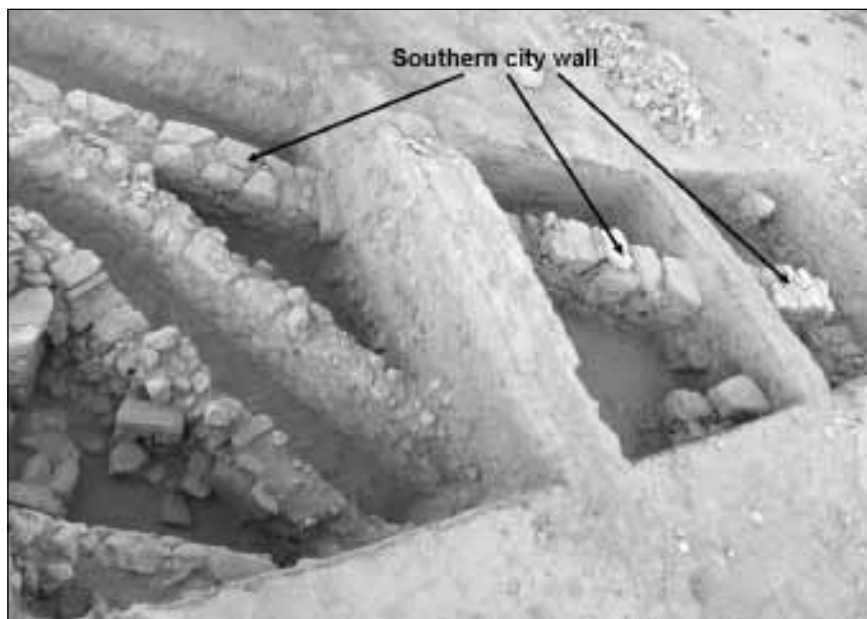


2. Fields G and W.

Persian period.

9th Century City Wall

After a number of seasons of excavations at Tall Jalūl, significant portion of the city wall has been found.⁴ During the 2007 season only few meters of its length were discovered in Field G, but during 2009 another 20 meters were exposed (see **Fig. 3**). The city wall, which belonged to a fortification system of ancient city, was found



3. Southern city wall.

4. Earlier, a fraction of the city wall was found in Field B.

at the southeastern corner of the tall. During the excavation, the foundation trenches of the walls were not found which leads to conclusion that ancient architects laid the first course of its stones on the existing surface. Through the time of its existence layers of silt were accumulated outside the wall with a significant amount of broken pottery sherds. Alongside the wall, a trench was dug to establish the date of its use and construction. In the trench, a few Early Bronze Age pottery sherds were found mixed with some Middle and Late Bronze Age material. However, the most frequent sherds date to Iron Age I and II. As excavation of the trench progressed, the surface, upon which the wall was constructed, was found and produced pottery sherds which date to Iron I with the exception of one or two sherds from Early Iron Age II. However, when the soil which was located under the first course of the wall was excavated only Iron Age I and Late Bronze Age material was unearthed. Since some sherds in immediate vicinity to the wall were dated to Early Iron Age II the wall was dated to 9th century BC.

The southern part of the city wall is 20 meters in length and connects to the eastern section of the wall at right angle. At that intersection the wall is preserved to a height of more than three meters. Both walls were approximately one meter wide and well constructed, with roughly-

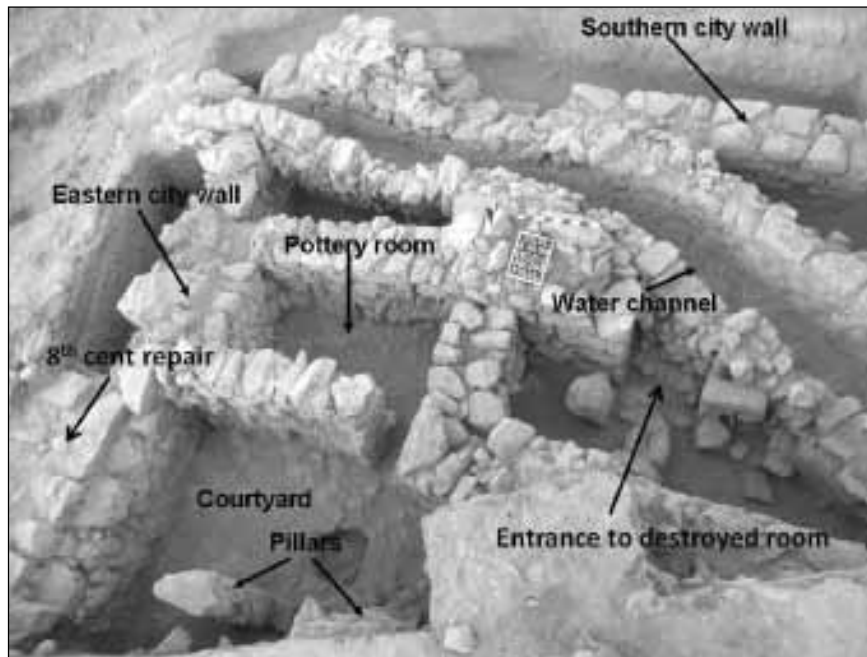
hewn medium-and-large-boulders, filled with chink stones. After 20 meters in length, the southern wall abruptly ends with what appears to be a tower which was upgraded and repaired at least one time, probably 8th century BC (see **Fig. 4**). Further excavations will hopefully reveal if this was indeed a tower, or yet another stretch of the wall. Also, the eastern wall appears to had been repaired at the same time (see **Fig. 5**). A number of sling stones, arrowheads and javelin points (see **Fig. 6**) were found inside and out of the city walls, indicating their destruction during the 7th century BC, probably by the Babylonian invasion in the region.

8th Century BC Pillared House

During the excavation in 2007, Square G4 was opened where several architectural features emerging, parallel to the southern city wall. Discovery of these structures prompted work in the same square the next season (2009), adding two new squares; G5 located west of G4, and a few weeks before season ended, G9, just north of G4. By the end of the season, a building was partially excavated, revealing several of its rooms and a courtyard with pillars (see **Fig. 5**). The building was located at southeastern corner of the tall, incorporating the city walls as part of the structure. Debris were carefully removed from a beaten earth floor, in the courtyard and separated



4. Possible tower.



5. Building.



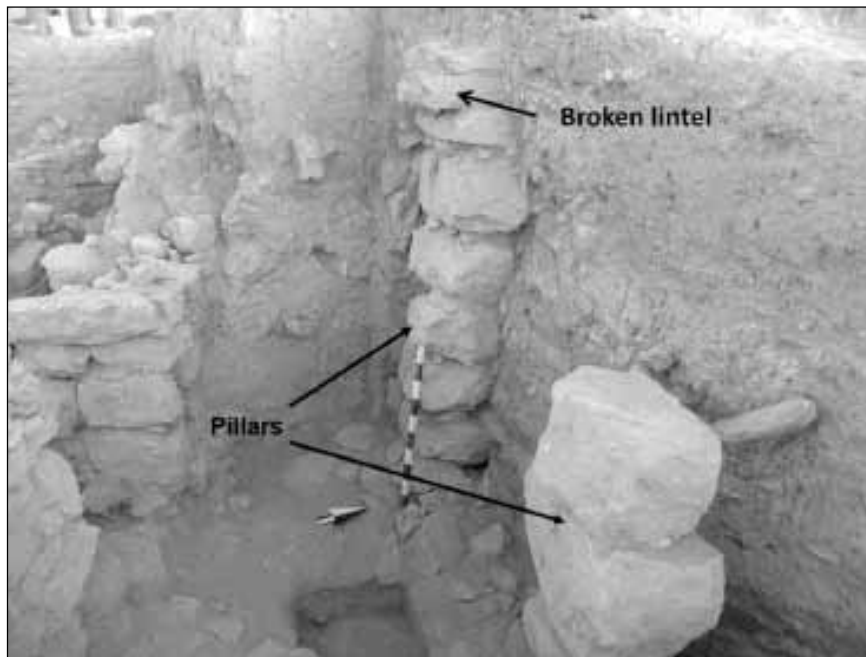
6. Arrow head.

in to several pails for dating. A preliminary pottery reading suggested that the building was destroyed, probably at the same time or little later than the city wall, during the end of the 7th century BC. A small probe was excavated in the floor of the courtyard, where only a few pottery sherds were found. A preliminary reading indicates that the building was constructed during earlier part of Iron Age II, probably in the 8th century BC.

The courtyard, with two pillars standing in the middle of it probably served as an open space for food preparation. The pillars are equally spaced, with a one meter distance between them and the eastern section of the city wall, which also served as the outer wall of the building. The space between the eastern pillar and eastern part of the wall was blocked with narrow brick wall, while the space between the pillars was open and served as an entrance to another possible room

(not excavated yet). Both pillars are constructed of medium and large boulders, placed on top of each other. The eastern pillar, which is closer to the city wall, was preserved to 1.5 meters, while the western counterpart is preserved to its entire height of 2.5 meters, with a broken lintel still in place (see **Fig. 7**).

In addition to the courtyard, the building consists of several adjacent rooms. One or two back rooms, south of the courtyard were destroyed by the water channel (see **Fig. 5**). The entrance to one of them is still visible in Square G5. However, only one small room was found intact. Its narrow walls (0.5 meters in width) were constructed of a single line of unhewn field stones and is preserved up to 1.5 meters in height. Its narrow entrance (0.5 meters in width) is located at the northwestern corner of the room. Its walls create a rectangular space 1.4 meters wide and 2.7 meters long. Toward the end of its usage, the room was used as a dumping place for damaged and unusable pots. The entire room was filled (up to 0.7 meters) with broken pots of different kinds. Mainly the assemblage consisted of domestic pots of everyday use. The room was void of storage jars and pithoi. Among the pots, various kinds of jars were found in addition to cooking pots, plates, lamps, pilgrim's flasks, jugs, juglets, and bowls of all sizes, even several large tripod bowls were present (see **Fig. 8**). All



7. Pillars.



8. Sample pottery found in small room.

pottery from the room dates to the Late Iron Age II, probably 7th century BC. Besides the pottery, several seal impressions and a plaque figurine were found (see **Fig. 9**).

Squares G5 and G9 also produced remnants that possibly belong to the same structure. While Square G5 revealed one face of a wall which is partially located in northern balk, Square G9 revealed a section of a structure which seems to belong to the same building.

Water Channel 7th Century BC

A water channel was discovered during the 2007 season, even though at that time its function was not obvious. This became apparent



9. Figurine head.

during 2009 and 2010 seasons. Preliminary pottery readings indicate that the channel was constructed during the 7th century BC, but not after the destruction of the city walls and pillared building. This conclusion is based on path of the channel and its exit outside the city wall. When the ancient architects constructed the channel they did not build it in a straight line from the water source to its exit, but carefully navigated the channel in such a way that the 8th century BC, building structure would be left intact as much as possible. The channel begins its course from the water source (see **Fig. 12**) moving toward southern wall in a straight line, but after 20 meters curving toward the east and exiting through the city wall at the corner where eastern and southern wall connect (see **Fig. 10**). Fur-

thermore, its architects destroyed a portion of eastern wall to accommodate the channel's exit outside the city walls (see **Fig. 11**). Interestingly, the elevation of the channel at both ends indicates that the highest point is where the channel connects to the water reservoir (806.44 above sea level) while the end which exits through the city walls is much lower (805.82 above sea level). This seems to indicate that its function was not to feed the reservoir but rather to empty the water from its source. It would appear that at times the water level in the reservoir was so high that the city dwellers ultimately had to get rid of excess water by building a channel to prevent flooding of the city streets.

To construct the channel the ancient architects carefully leveled the area where the channel would pass, laid down its foundation and then built its walls. Then, earth was brought into support the walls on the outside while both the floor and its inside walls were plastered. The channel found in Squares G2, G5, G11, W1, W3 and W4, is 0.5 meters wide throughout its excavated length of 33.5 meters. It is well preserved except for one side of the wall in the middle of the channel, whose ends were partially de-



10. Section of water channel.



11. Cut through eastern city wall



12. Possible Beginning of water channel.

stroyed in antiquity by stone robbers. The walls are 1.5 meters in height, indicating that the volume of the water being led through it was likely considerable.

In addition to the three occupational phases mentioned above, there were some unimpressive remnants of Persian occupation, consisting of wall fragments, floors and pavements found in Squares G10, G11, and W4. Each occupational phase was followed by an abandonment phase, evident by earth fills and pits. It is also interesting to note that around the city walls horse bones were present, while closer to water reservoir there were scattered donkey bones. Again the most common bones were of sheep and goats, indicating a nomadic or semi-nomadic flavor of ancient society at this particular time.

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POSSIBLE EVIDENCE OF ROMAN EMPEROR WORSHIP AT ABILA

Bob Smith

An installation found at Abila provides possible evidence of Roman emperor worship, local architectural creativity and a view of a structure which once stood in Palmyra. This installation is located on the east side of the Wādī Quwaylibah opposite the civic center of Abila which lies between Khirbat Umm al-‘Amad to the south and Tall Abil to the north.¹ This installation was excavated by Dr. W. Harold Mare in 1998.² Unfortunately the study of this structure has been sidelined by his death and the structure is just a heap of rocks smothered by thistles, under appreciated by scholars of the Decapolis and tourists. Evidence suggesting its significance as a part of local municipal adoration of the emperor Hadrian during the second century is presented in this article.

The Abila architectural installation under consideration is essentially a more than 25 meter long hall oriented on an east-west axis³ that opens to the west (**Fig. 1**). The structure is largely made of local sawn limestone ash-lars that comprise the side walls. The masonry is preserved up to a height of up to 2.39 meters above the floor level in six well-bonded courses. The side walls are preserved to a greater height to the east as they are protected by the slope of the soil on the side of the wadi. This long hall between the parallel walls is generally 5.05 meters wide. Entering the installation from the west the limestone side walls are not parallel and are inferior in construction but still encompass a special space that is 15.60 meters long. This hall retains some evidence of having been paved with rectangular paving stones

that were laid perpendicular to the side walls. A 45cm wide and 10cm deep circular stone basin cut into the exposed bedrock on the south side of the entrance suggests that there might have been some expectation of ritual washing prior to entrance. The outer section of the hall enclosed an area ca. 78.8 square meters. This outer section of the installation is separated from the inner more special area to the west by a wall that is bonded to the side walls of the structure. This wall that cuts perpendicularly across the hall was punctuated by a ca. 1.10 meter wide doorway. The basalt threshold remains in place and the pivots for the doorway demonstrate that two 65cm doors wide swung open into the interior chamber to the east. The inner more private section of the installation is 10.05 meters long and its better masonry encloses an area of ca. 51.43 square meters.⁴ Thus, the interior more secluded space is roughly two-thirds that of the exterior space of the structure. At the east end of the structure is a limestone wall with a well cut basalt insert. This basalt insert is the aspect of the structure that is of particular interest in this discussion. The basalt installation forms the center of the eastern wall. In it there is a large recessed semicircular niche which has an integrated bench along its sides and it was once covered by a half-dome ceiling. The 2.35 meter wide niche is flanked by integrated pilasters made of four courses of vertical ash-lars that rise before voussoirs begin arching over the seating area. The flanking pilasters have bases and capitals that are integrated in the structure. The engaged pilasters were made to appear as if they are sup-

1. The structure described in this article is located at E 769328.7727 N 3619508.055
2. W. Harold Mare, "The 1998 Season of Excavations at Abila of the Decapolis" *ADAJ* XLIII (1999):451-458

on pp.452-453.

3. 276 degrees 45 minutes 30 seconds.

4. This calculation includes the threshold and the floor space of the vaulted apse.

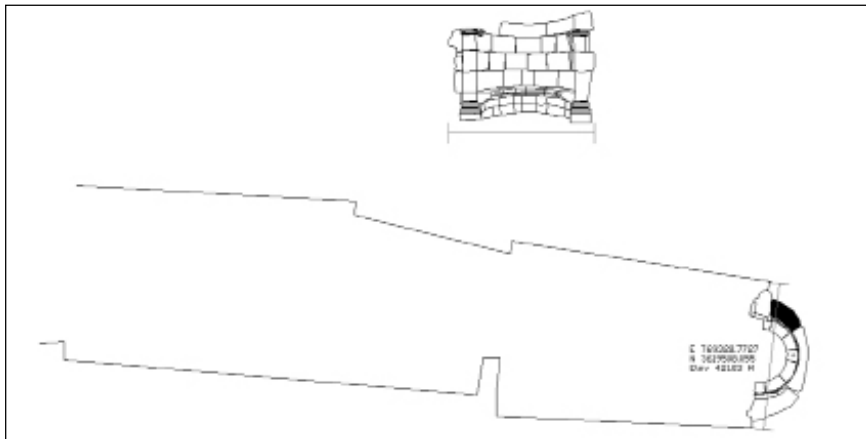


1. View of the basalt niche looking west down the hall (photo by the author).

porting the half-dome which was comprised of eighteen tightly fitting wedge-shaped stones locked in place by a semi-circular keystone. The sides of the keystone have projections that locked it into grooves cut in the flanking voussoirs of the arch at the front. The semicircular bench beneath the half-dome is 32cm wide and 48cm above the floor level and can easily accommodate up to five adult persons. The front edge of the stone bench is eased and shaped in such a way as to suggest that it is cushioned. The narrow stone bench and vertical back to the niche would have tended to cause persons to lean inward and does not provide particularly comfortable seating (**Fig. 2**).

In the excavation reports there is no record of evidence regarding possible roofing of the structure. No voussoirs of a stone vault or large nails from a wooden roof were reported. It appears to be possible that the structure was open at the top. The orientation of the hall and basalt niche would seem to have made the structure a likely venue as a chapel in the Byzantine era but no exclusively Christian symbols were found in the artifacts within the structure. The presence of Byzantine era glass lamp fragments, however, led Dr. Mare to suggest “this installation may have been a small enclosed Byzantine religious shrine.”⁵ The pottery discovered in the installation includes representations from the Roman,

5. Mare p. 453.



2. Reconstruction of the niche and bench (by the author and Tawfiq al-Hunaiti).

Byzantine and Umayyad periods. The rough integration of the basalt installation within rough limestone workmanship in the east wall raises the possibility that this may not have been the original location of the niche structure. The fine workmanship in basalt would generally suggest that the whole face would have been originally made of basalt ashlar. It is possible that the niche could have been a component from a larger basalt structure from which it was recycled or reconstructed after one of the earthquakes that rocked the region in the Late Roman period. The structure appears to have served as a public venue until the collapse of Abila's urban vitality. That collapse was promoted by the great earthquake of 749AD and decline in regional wealth that came with the transition from the Umayyad caliphate in Damascus to the Abbasid caliphate in Baghdad.

The physical evidence at Abila points towards the structure as being an installation that provided a special area with limited access and seating that overlooked the civic center. Probes excavated by Dr. Mare disproved his working hypotheses that the niche was part of an entrance to a mausoleum or a nymphaeum served by a large cistern upslope.⁶ No inscriptional evidence has been found in the structure. An inscription

found in secondary usage in Palmyra, Syria, however, raises the intriguing possibility that this structure was originally made for emperor worship and that the structure was a prototype that was copied in Palmyra to honor the emperor Hadrian. Hadrian had a long association with the Levant as he served as the governor of Syria in 117AD and then travelled through the region in the years 129-130AD,⁷ observing his realm and promoting a greater sense of Roman identification among his subjects. In the Decapolis the largest monument testifying to the local devotion to this emperor is the triple-arched gate on the south side of Gerasa.

The nine-line Greek and two line Palmyrene inscription that raises possibilities for the Abila installation was found in 1861, by M. le D'Levy, on a 45.5cm square limestone block incorporated in the wall of a mosque in the village of at-Ṭayyiba on the outskirts of Palmyra (**Fig.3**). The mosque was constructed of stones that were recycled from the ruins of the Roman era city. This inscription is noted in major discussions of inscriptions from Syria.⁸ The framed inscription was removed from the mosque wall and passed through various hands⁹ until it was acquired by the British Museum in 1858, where it continues to be conserved.¹⁰ The inscription

6. Mare, p. 453.

7. *Augustan History* 13, *Cassius Dio* 69.

8. See *Corpus Inscriptiones Graecae*, Number 1430 or R. Cagnet, et al. *Inscriptiones Graecae Ad Res Romanas Pertinentes*, (The Scholar's Reference Edition: Chicago: Ares Publishers, 1975, reprint of the 1906 edition), #1057, p. 405. W. H. Waddington, *Inscriptions* p. 609 #2631.

9. The British Museum records that it acquired the inscription from William Chaffers who obtained it from

a collection of the Earl of Bessborough.

10. The inscription is identified by the registration number 1858,0817.1 BM #125025 and an image and details may be viewed at http://www.britishmuseum.org/research/search_the_collection_database/search_object_details.aspx?objectid=282178&partid=1&IdNum=1858%2c0817.1&orig=%2fresearch%2fsearch_the_collection_database%2fmuseum_no__provenance_search.aspx



3. Basalt installation from the west (photo courtesy of the British Museum).

up to this point has been a subject in the discussion of what cities comprised the Decapolis since Pliny omits the city of Abila from his first century listing and Ptolemy includes it in his second century enumeration.¹¹ This inscription that identifies a man as being from “Abila of the Decapolis” together with coins and an inscription with the name Abila found at the site at the Wādī Quwaylibah is a component in the argument of the Abila excavators to include Abila as a member of the Decapolis.¹² John Wineland has produced an English translation of the Greek inscription and argues convincingly that the “Agathangelos of Abila” refers to the specific name of the patron rather than an anonymous “good messenger” which translates the name. Wineland’s translation reads “To the thundering God (Zeus) for the safety of Trajan Hadrian Sebaste the lord. Agathangelos of Abila of the Decapolis built this vaulted arch and set up this bench, out of his own expenses, in the year 445 (and) the month of Leos.”¹³ Wineland explains that the chronological indications on the inscription identify the monument dedication period as August/ September of 134AD since

the Palmyrenes employed the Seleucid era and the Macedonian system of naming the months. This would make the dedicated structure a memorial to the emperor who had already left the region to return to Rome. Wineland, speculating on the nature of the structure observed, “It may be a dedication inscription of a public structure like a vaulted arch with an associated bench that Agathangellos funded,”¹⁴ but he prefers that the monument dedicated in Palmyra was a funerary structure in an archesolium.¹⁵ It is unlikely; however, that an expatriate Decapoltian Abilaite like Agathangellos living in Palmyra would have anything to brag about in having built a tomb for himself out of his own resources. As a patron of a public structure built for the purpose of honoring the deified emperor who had safely returned to Rome, Agathangellos of Abila would have reason to leave a public inscription.

The British Museum identifies the inscription produced by Agathangellos as a commemoration of a “votive *lectisternium*” in which a banquet was presented in honor of the deified emperor whose symbolic presence was recognized with the aid of a bust or a recumbent

11. See S. Thomas Parker, “The Decapolis Reviewed”, *Journal of Biblical Literature*, 94(1975); 439.

12. W. Harold Mare, “The 1980 Survey of Abila of the Decapolis.” *Near East Archaeological Society Bulletin* 17(1981):12 reasserted this in his “Abila: A Thriving Greco-Roman City of the Decapolis” *ARAM* 4:1&2

(1992):57-77 and was followed by John Wineland, *Ancient Abila: An Archaeological History*. (BAR International Series #989) Archaeopress: Oxford, 2001.

13. Wineland, Pp. 60-61.

14. Wineland, p.61.

15. Wineland, p.61.

statue. The practice of “spreading a couch” and serving food before reclining statues of the gods appears to have been adopted in Rome in the period of the Republic as a means to propitiate the gods.¹⁶ By the period of the Empire the custom in Rome, following contemporary eating practices, appears to have moved towards *sellisternium* in which the image of the deity was seated rather than reclining.¹⁷ In the Levant in places like Palmyra and the Decapolis the custom of eating on a couch for banquets probably persisted in the Second Century.¹⁸ The exact nature of the devise built for repose under the vault mentioned in the inscription is not specified by Agathangelos. A structure built for sacred meals honoring the emperor and thereby, in contemporary thought, fostering civic well-being would be the type of structure that would bring public praise upon its patron and explain the erection of a monumental inscription.¹⁹

The structure found at Abila fits the description of what Agathangelos of Abila made in the Palmyrene inscription. It comprises a bench or couch under a vaulted arch. The bench in the

Abila installation would have provided a sturdy venue for a bust of the emperor or statue of the emperor to be placed as a banquet was presented and shared by civic leaders. The representation of the emperor would have been graced not only with the votive banquet but it would also be reminded of the source of the benefaction by the view of the city. While many small vaulted niches may be found in monumental Roman period architecture in Jordan, and vaulted niches of similar size were constructed on either side of the south face of the Triumphal gateway dedicated to Hadrian outside of Gerasa²⁰, the installation at Abila is unique in its integration of a bench under the vault. The basalt installation found at Abila could be an example of or even a prototype for the structure commemorated by Agathangelos in the Palmyrene inscription. The architectural details point towards the possibility that the installation at Abila overlooking the city center was originally constructed as a venue for municipal emperor worship and that it continued to serve a civic function even after the emperors of Rome lost their aura of deity.

16. Livy 5.13 indicates that the practice was adopted by the Romans in 399 BCE.

17. Tacitus *Annals* 15.44 in his description of sacred banquets as a part of Nero's response following the burning of Rome before Christians were identified as culprits so as to divert blame from the Emperor himself.

18. A fresco of a man reclining on a couch next to a table was found on the painted wall of an archesolium at Abila in 1996. See Harold Mare and Robert Smith, “A Roman Tomb at Abila of the Decapolis.” *Journal of Roman Archaeology* XIV (1998): 309-317.

19. The most extensive study of Roman emperor veneration is that of Duncan Fishwick, *The Imperial Cult in the Latin West: studies in the ruler cult in the western provinces of the Roman Empire*. 4 vols. Leiden:E.J. Brill, 1987-2005. In this study he provides important insight on the adoration of emperors but does not highlight any parallels to the Abila structure in the western part of the Roman world.

20. It is possible that in the Gerasa gateway niches benches were not integrated in the masonry but were free standing.

MACHAERUS PROJECT: PRELIMINARY REPORT OF THE 2010 HUNGARIAN-JORDANIAN EXCAVATIONS

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Introduction

After a thorough field study in 2009 at the Qal‘at al-Mishnaqa in Mukāwir, known from ancient sources as Machaerus (Machairos), a new archaeological excavation started in the fortified royal palace on the hilltop, overlooking the Dead Sea in Jordan (**Fig. 1**). The joint mission of the Hungarian Academy of Arts and the Jordanian Department of Antiquities (Excavation Permit No. 2010/13, given to Dr. Győző Vörös) conducted a sixty-one day long archaeological investigation on the site from 1 April to 31 May 2010.

The architectural heritage of the Machaerus fortress represents three superimposed structures of the Hellenistic, the Herodian and the Roman eras. Our building archaeological investigations gave a comprehensive and comparative architectural analysis of the three historical periods of the fortress, based on our field work and on the scientific results of the research in the 20th century.

According to Flavius Josephus, the naturally defended fortress was erected by Alexander Janneus and destroyed by Gabinius in 57BC (JW I 8, 6). Concerning the Hellenistic layers, the Franciscan excavations of the archaeological site (led by Fr. Virgilio Corbo between 1978 and 1981; see Corbo and Loffreda 1981; Piccirillo

1981a, 1981b), were summarized by the late Fr. Michele Piccirillo as the following: “Quite nothing is still known of the Hasmonean fortress buried and reused in the later fortress” (Piccirillo 2004). Our excavations proved with stratigraphical data and architectural arguments that this statement already has to be reconsidered.

The second period of the architectural heritage is the result of the building activity of Herod the Great. We have five additional fortresses from this Herodian period that are giving excellent architectural parallels for the comparative analysis: Alexandreion, Cypros, Hyrcania, Masada and Herodion – the latest is the only non-Hasmonean legacy. As a result of the comparative archaeo-architectural analysis of these six fortresses, we can state that they are not only representing similar architectural conceptions of the Herodian fortified palaces, but the group of buildings were erected and designed by the same constructors. Our excavations proved this statement with evidences.

After the Tetrarch Herod Antipas and King Agrippa I, Machaerus became the dominium of the Roman Praefectus Iudaeae in 44AD. Following the Jewish Revolt eruption in 66, Lucilius Bassus besieged the fortress in 72 (JW II 18, 6; VII 6). This event has remembrance monuments on the archaeological site: in the vicinity



1. The fortress of Machaerus overlooking the Dead Sea, view from the East.

of Machaerus there are Roman camps (campus), encircling walls (vallus) and an unfinished attack ramp (agger). The closest analogies of these monuments can be examined on the other side of the Dead Sea, most prominently at the fortress of Masada. In these structures the classical Roman siege-techniques can be examined and detected as well (Strobel 1974a, 1974b).

The objectives of the Hungarian research team in collaboration with the Jordan Department of Antiquities were the architectural and archaeological examinations as well, as the preservation and consolidation of the Machaerus fortress, and its attractive future presentation to the public.

The Architectural Survey

As the result of the earlier investigations conducted on the archaeological site, the profession could have used only a sketch drawing as a ground plan of the Machaerus. Neither the elevation documentation nor the professional architectural descriptions of the superstructure's walls have been surveyed earlier, including the necessary architectural monumental building diagnosis and analysis. Following the comprehensive architectural examinations and building archaeological research, we were able to conclude the relations of the different architectural periods and construction phases of the buildings and group of buildings of the archaeological site (Gy. Vörös, T. Dobrosi, T. Papp, B. Arnóczki). Our scientific results provided fundamentally new perspectives in comparison with the previous researches. In addition to the architectural descriptions, we could not only establish the sequence of the Hellenistic (Hasmonean), the Herodian and the Roman periods, but after we prepared the theoretical reconstruction of the archaeological monument, we identified the architectural space development of the Machaerus fortress as well. With the help of the 3D computer modelling, the architectural developments of the ancient (and unfortunately) modern constructions (Marino 1994) were illustrated not only by the theoretical architectural reconstructions, but with the presentation of their archaeological remains as well (Vörös, Forthcoming).

The Geophysical and Geological Surveys

For the better understanding of the archaeo-

logical site, we have conducted instrumental examinations during our survey. These instruments were on the one hand Ground Penetrating Radars and on the other an Eddy Current Detector, with different antennas.

Among the antennas of the radar surveys, the 40 Mhz GPR antenna, under the same conditions, can reveal soil and rock structures down to 40 meters, while the 400 Mhz GPR antenna (launching 60 electromagnetic pulses per second) can reveal structures down to 4 meters under dry soil conditions. The antennas of the Eddy Current Detector, operated (by P. Eisler) in different-strength-signals, were used primarily for the upper strata of the archaeological layers, until one meter deep from the surface. The examinations were extended to the Herodian and the freshly discovered Hasmonean cisterns as well.

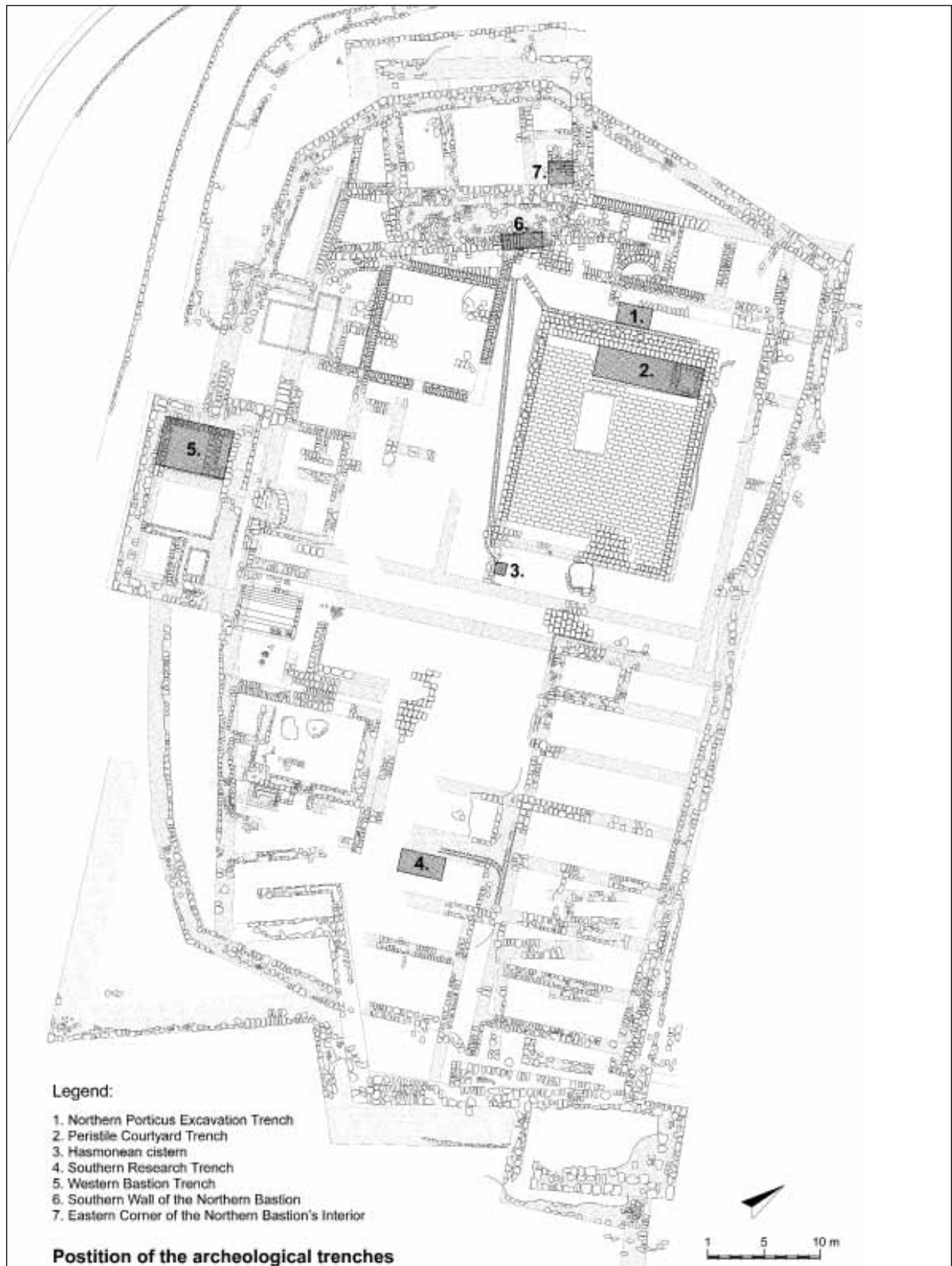
As the fruit of the geological and geophysical researches (A. Gachet, Radar Technologies International, France) we were able to prove the effect of the 31BC earthquake on the Alexander Jannaeus' Hasmonean walls, and discover the anti-seismic nature of the architecture of the Herodian cistern. On the walls of the latter, two fractures orientation have accurately determined the seismic waves direction which are perpendicular and oriented N 70°. He considered the approximate time of this earthquake to be the one at 113/114AD.

The Archaeological Excavations

Our archaeological investigations used also classical methods, i. e for the better understanding of the architectural heritage we opened seven archaeological research trenches: four in the Herodian palace; one in the western and two in the northern bastions of the Hasmonean fortification (**Fig. 2**).

1. The Northern Porticus Excavation Trench

In right angle on the NW SE symmetrical axis of the Herodian palace's peristyle courtyard (lat. peristylum or gr. tetrastoon), we have opened a 3.5 x 2 meters trench in its northern porticus (it. portico), which reached the bedrock of the hill after 1.2 meters. On all sides we have found an artificial homogenous filling from natural local stones topped by the intact Herodian floor level foundations, and with the remains of



2. The 2010 ground plan of the Machaerus fortress, marked with our excavation trenches.

an underlying Hasmonean wall in the NW and a Herodian rain drain channel in the SE sections respectively. On the SW excavation profile we found a very interesting stratigraphy adjacent by two reused column drums and one coin, *in situ* on the very characteristic 3-4 centimetres high carbon layer (**Figs. 3 and 4**).

2. The Peristyle Courtyard Trench

Parallel with the previous one and in the same deep (1.2 meters), we have opened a 9 x 3 meters trench in the peristyle courtyard of the Herodian palace (**Fig. 5**). The trench contained the whole area in the courtyard, which is not covered by the modern pavement. The NW section was adjacent with the remaining *in situ* floor level foundation, so we were able to understand the complete stratigraphy of the foundations of the original (and previous?) courtyard structure (**Fig. 6**). The other three sections were disturbed by modern building activities, but we were able to make the detailed architectural description of the little sediment basin cistern in the northern corner of the former Ionic courtyard (**Fig. 7**).

3. The Southern Porticus Excavation Trench

During our radar examinations in the southern porticus of the peristyle courtyard, we have found huge anomalies of an underlying architectural space. After opening a 2 x 2 meters trench-sondage, parallel with the previous ones, in the centre of this anomaly we found a still

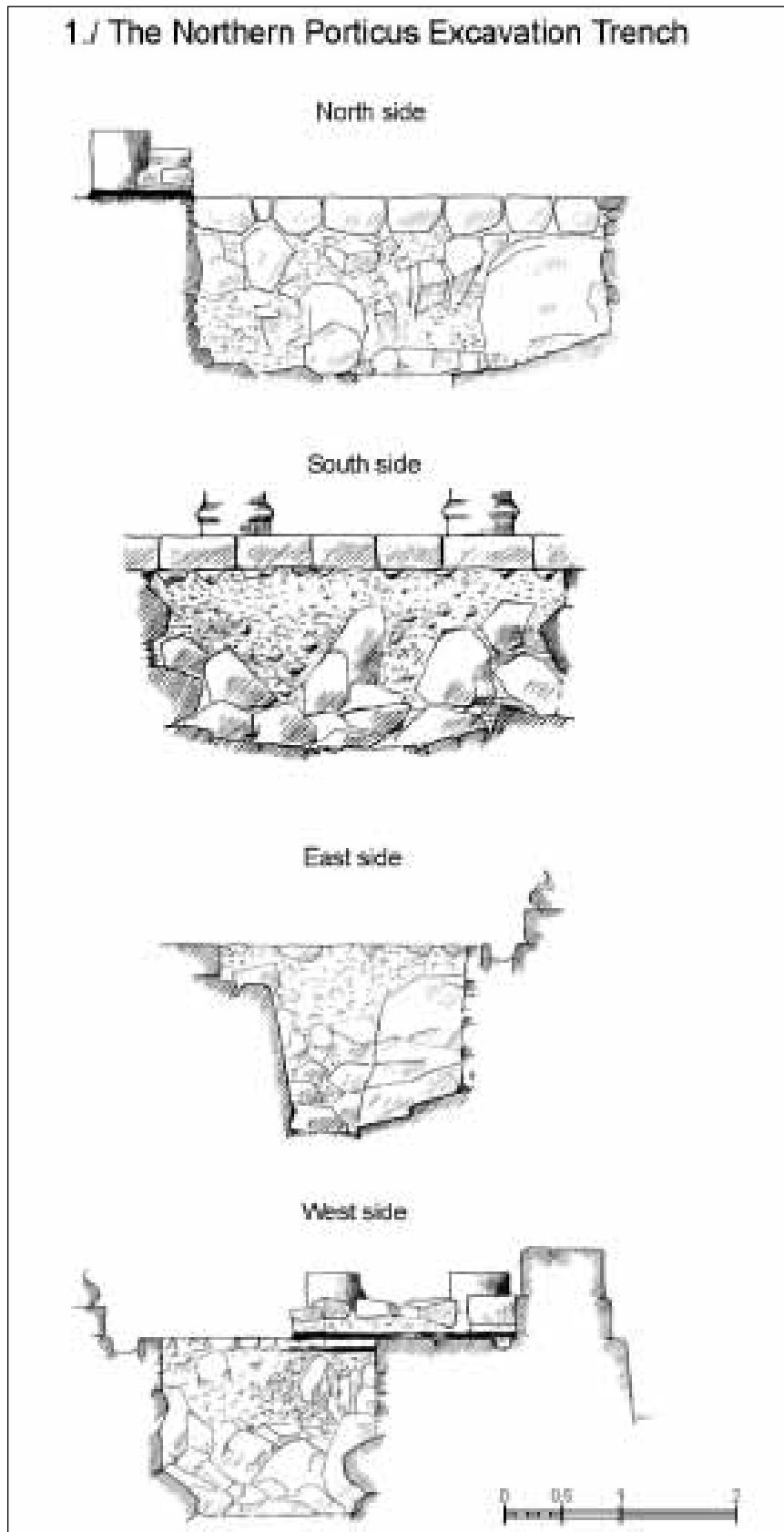
in situ limestone mouth-block of a cistern. After detailed graphic and photographic documentations (**Figs. 8 and 9**) we removed the limestone block, and were descending down on a rope to the bottom of the cistern that is 15.5 meters deep. The architectural appearance of the conical space is ending in a 4 x 4 meters square, as a stack base. At the bottom of the cistern we have found (underneath the one meter deep recent stone debris) an intact ancient debris layer, with average height of 50 centimetres (**Fig. 10**). After a three-day-long micro-archaeological cleaning of this accumulated precious ancient debris (as a time capsule), a serious amount of ancient archaeological material came to light (ceramics, glass and bone fragments), including one Hasmonean and one Roman coins.

4. The Southern Research Trench

During our architectural survey we realized the need to open a research trench to the west from the storerooms and to the east from the bath-quarter, for the better understanding of the architectural space between them. Our investigations were fruitful. We opened the 4 x 2 metres research trench parallel by the previous three trenches, and excavated it until two metres deep. We concluded that on the top of the artificial stone terrace there is a one meter high homogenous ancient soil layer, and the two are separated by a layer of cemented (water-shed?) mortar. After the thorough examinations of the



3. The Northern Porticus Excavation Trench of the peristyle courtyard, view from the NE.



4. Section drawings of the Northern Porticus Excavation Trench's stratigraphical profiles.

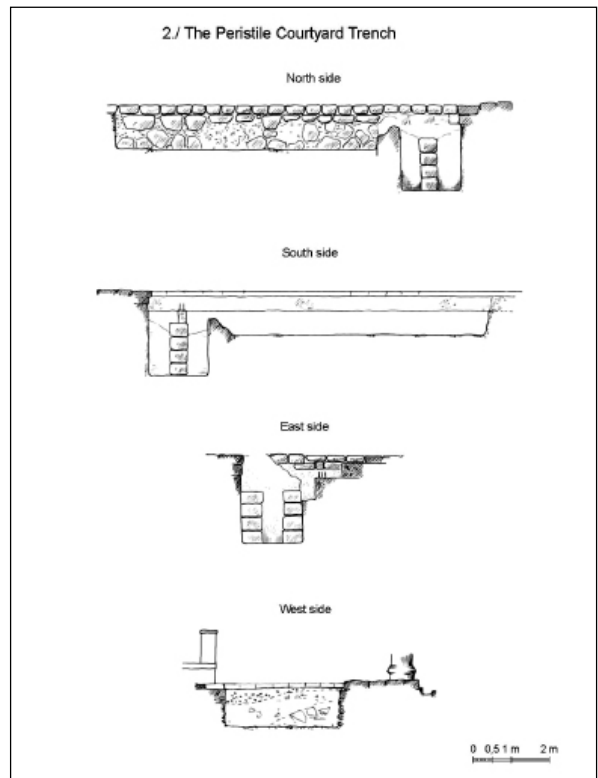


5. The Peristyle Courtyard Trench of the Herodian palace, view from the NE.

section-stratigraphy of the archaeological profiles, we were able to establish that the southern courtyard of the Herodian palace was filled up with soil, and by this they were probably creating a place for a royal garden (Figs. 11 and 12).

5. The Western Bastion Trench

We opened a 6 x 4 metres archaeological trench in the northern section of the western bastion. The borders of the trench were the SW, NW and the NE walls of the bastion itself. For the better understanding of the stratigraphy of the archaeological debris accumulated inside the bastion, we defined the SE border of the trench on the midway of the 6 x 8 metres hall. As a surprise, we were not uncovering the archaeo-



7. Section drawings of the Peristyle Courtyard Trench's stratigraphical profiles.

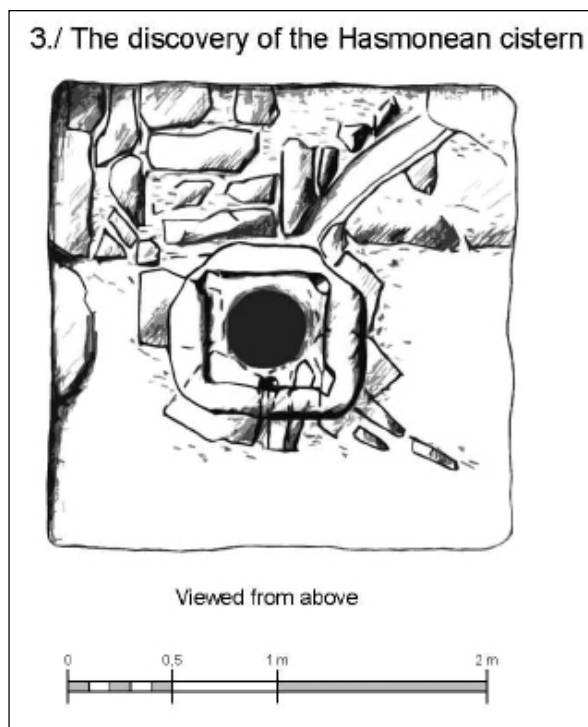
logical stratigraphy in this section profile, but we revealed the architectural elevation of a previously unknown wall (Fig. 13). In the six metres deep archaeological trench we discovered collapsed wall debris that was accumulated between the intact ascending walls and above the



6. Detail of the NW section of the Peristyle Courtyard Trench, view from the SE.



8. The Southern Porticus Excavation Trench of the peristyle courtyard, view from above.



9. Drawing of the limestone mouth-block of the Hasmonean cistern, view from above.

well preserved bed rock and floor level foundation (**Figs. 14 and 15**). In addition to the serious volume of pottery material, eight bronze coins came to light (five of which were found in the buckets of the workmen). From the three coins found during the cleaning process *in situ*, one depicted the Hasmonean anchor, and another the Herodian double cornucopia.

6. The Southern Wall of the Northern Bastion

While we were surveying the southern wall of the northern bastion, we have discovered a

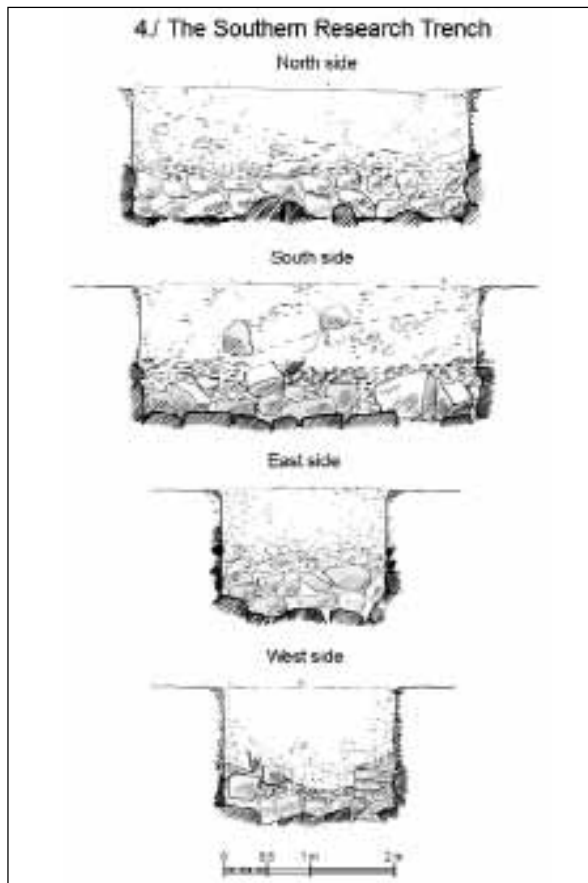


10. The interior of the 15.5 meters deep Hasmonean cistern with the excavation profile of the ancient debris, accumulated in the bottom. View from its Eastern corner.

previously unidentified architectural structure filled with the accumulated wall debris. After the detailed graphic and photographic documentation of the physical status of the wall, we dismantled the wall ruins with great care, and uncovered an ancient staircase. The entrance start from the peristyle courtyard (so it had to be used



11. *The Southern Research Trench with the modern column reconstructions in the background. View from the SE.*



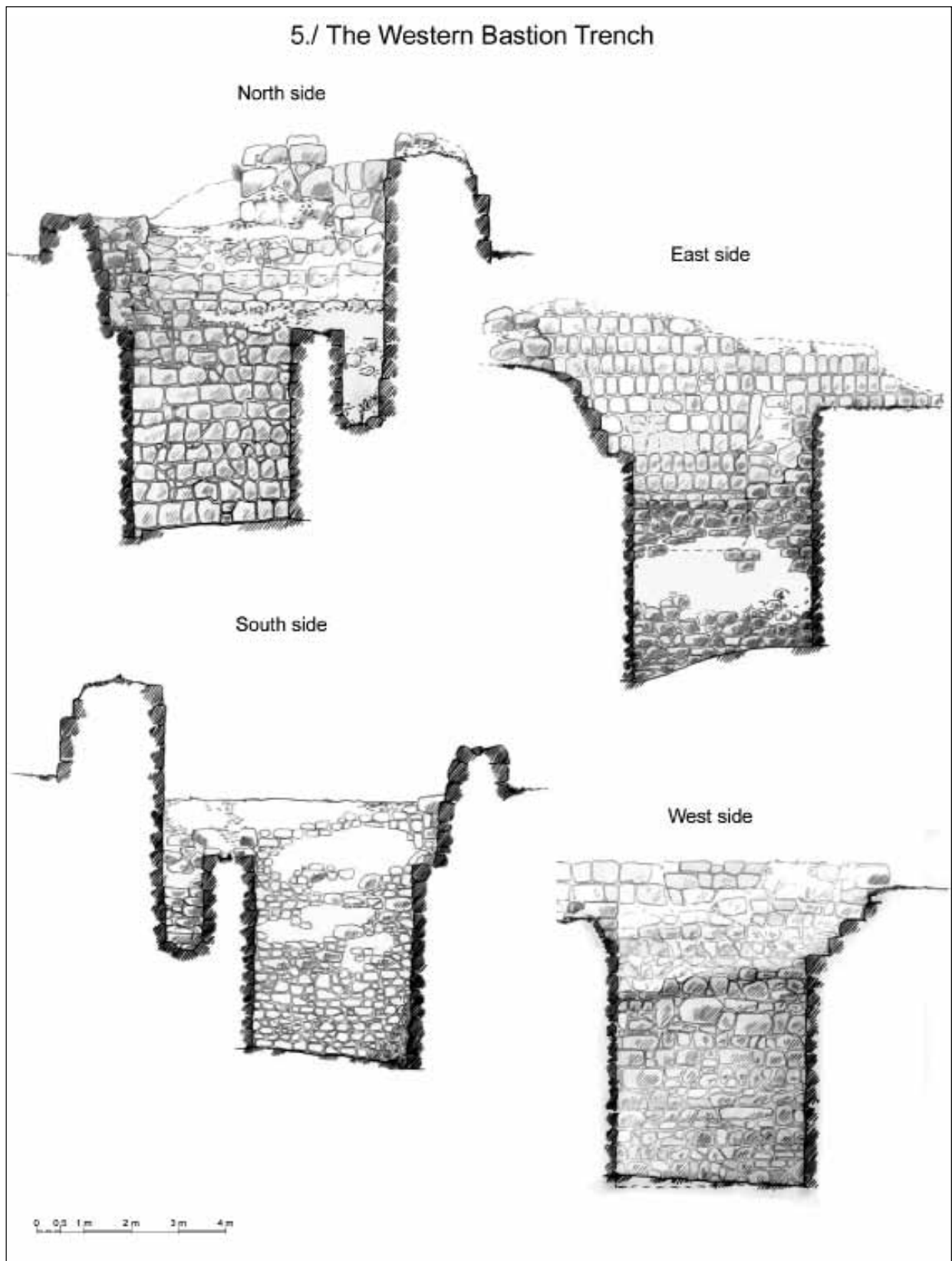
12. *Section drawings of the Southern Research Trench's stratigraphical profiles.*



13. *The Western Bastion Trench's SE border with the newly discovered Hasmonean walls. View from the NW.*

under the Herodian era as well), the staircase is leading into the bastion, after three stairs is arriving to a 1.5 x 0.8 metres breathing space, and

after this in a right angle by six stairs upward to the west. The all together nine stairs are leading unambiguously to an upper floor of the bastion



14. Section drawings of the Western Bastion Trench's stratigraphical profiles.

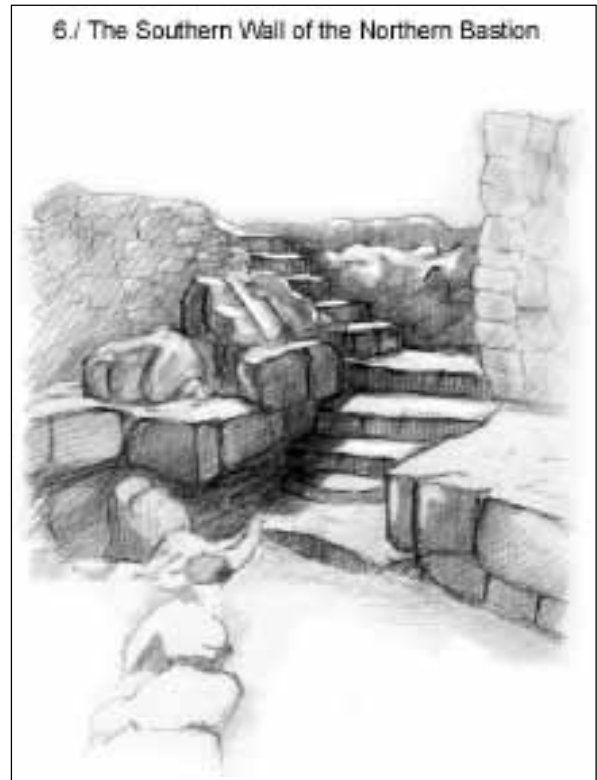


15. The Western Bastion Trench with modern constructions and pilgrims in the background. View from the South.

(Figs. 16 and 17).

7. The Eastern Corner of the Northern Bastion's Interior

The architectural survey of the northern Hasmonean bastion gave another unexpected



17. Perspective drawing of the nine steps of the staircase in the Southern Wall of the Northern Bastion.

result. At the eastern part of the interior we noticed further stairs. However these were not heading upwards but down from the Herodian floor level, and in their architectural character and physical appearance were similar with the ones discovered in the southern wall (e.g. the



16. The Southern Wall of the Northern Bastion, with the revealed staircase, view from the East.

stairs are 32 centimetres, Greek feet deep). We were excavating them only down to five stairs, since it was already enough to prove that a basement level had to exist under the Herodian peristyle courtyard's floor level, and the northern bastion had to consist at least 3 floors (**Fig. 18**). If we add this to the fact that the western bastion's interior is today 8.75 metres high in its ruins, than someone can assume that the description of Flavius Josephus was not very far from the architectural appearance, what we can detect and reconstruct today.

Summary

As a result of our 2009 study and the 2010 two-month-long archaeological excavations, we can state that we understand much better the architectural and material heritage of Machaerus, as ever before (Vörös, Forthcoming). After the field work we have such a scientific data base in our hands (the complete architectural description, the data of the geophysical surveys combined by the information provided by the seven excavation trenches and approximately 7000 large scale professional digital photographs by T. Papp, K. Eisler and I. Óri-Kiss), which gives the base of the scientific archaeo-architectural analytical work that will preserve the heritage of Machaerus, pregnant with the information for the future generations. After the completion of our work, we will give a recommendation to

the government of Jordan for an architectural monumental reconstruction that can give a creative and new presentation for the visitors and the pilgrims of this precious Biblical site (**Fig. 19**).

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18. The Easter Corner of the Northern Bastion's Interior, with the revealed staircase, view from the SW.



19. Aerial photograph of the Machaerus fortress from the SW, © APAAME_19980517_RHB-0082.tif (Robert Bewley).

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مدفنان في ظهر السرو/جرش^١

محمد أبو عبيلة

الموقع

يقع المدفنان إلى الغرب من سور المدينة في منطقة ظهر السرو عن الاحداثي^١ N32 16 49.6, E35 53 11.8, N32 16 49.2, E35 53 11.7 (الشكل ١، ٢)، ويبلغ ارتفاع منطقة المدافن موضوع البحث ٦٣٥م عن سطح البحر فيما يبلغ ارتفاع سور المدينة الغربي المحاذي لهما ٦١٠م عن سطح البحر، وتمتاز طبوغرافية المكان بأنها عبارة عن هضبة قليلة الارتفاع تنحدر إلى جهة الشرق، وهي ذات صخور جيرية سطحية تتخللها التجاويف الكهفية والمقاطع الصخرية وترتبتها تربة حوض البحر المتوسط (الشكلين ٣، ٤) (عابد ١٩٨٢: ٧٢)، (Bender 1974: 73-74; Kennedy 2005: 4-5).

وتأتي التنقيبات بالموقع بعد تعرضه للعبث من قبل مجهولين بقصد البحث عن دفائن ذهبية حيث وجدت عظام القبور مبعثرة، لذا كان لا بد من التنقيب في الموقع لمعرفة مخطط المدافن وأنموذجها من جهة وتوثيقها بالرفع المعماري والمساحي من جهة أخرى.

الوصف العام للمدافن

أولاً: مدفن رقم ١ (الشكل ٥): يتكون تخطيط المدفن من مدخل عمودي عميق مقطوع في الصخر يتجه من الشرق إلى الغرب وهو مستطيل الشكل طوله ١٧٣سم وعرضه ٤٥سم وعمقه ١٦٠سم، قطعت على جوانبه الأربعة العلوية حواف أفقية (الشكل ٦) عرض الواحدة منها ١٨سم أعدت لارتكاز بلاطات حجرية مربعة لإغلاق المدخل، وكانت تغطي بالتراب حتى سطح الأرض. والجدير بالذكر أن المدخل يتسع عند قاعدته ليشكل بهذا الاتساع حنية قوسية بسقف منحني على كلا الجانبين وتحت كل حنية، قطع في أرضيتها قبرين الأول عبارة عن قبر مستطيل الشكل مقطوع في الصخر الجيري يتجه من الشرق إلى الغرب يبلغ طوله ١٨٠سم وعرضه ٦٠سم وعمقه ٦٠سم. أما القبر

الثاني فهو أيضاً مستطيل الشكل مقطوع في الصخر موازي للقبر الأول، يبلغ طوله ١٨٠سم وعرضه ٦٠سم وعمقه ٦٠سم باتجاه شرق-غرب.

ثانياً: مدفن رقم (٢) (الشكل ٧): يتكون مخطط المدفن من مدخل عمودي عميق مقطوع في الصخر (الشكل ٨)، يتجه من الشرق إلى الغرب وهو مستطيل الشكل طوله ١٧٣سم وعرضه ٤٥سم وعمقه ١٦٠سم، قطعت على جوانبه الأربعة العلوية حواف أفقية أعدت لارتكاز بلاطات حجرية مربعة لإغلاق المدخل والجدير بالذكر أن المدخل يتسع عند قاعدته ليشكل بهذا الاتساع حنية قوسية بسقف منحني على كلا الجانبين وتحت كل حنية، قطع في أرضيتها قبرين الأول (الشكل ٩) عبارة عن قبر مستطيل الشكل مقطوع في الصخر الجيري يتجه من الشرق إلى الغرب يبلغ طوله ١٨٠سم وعرضه ٦٠سم. أما الثاني فهو عبارة عن قبر مستطيل الشكل مقطوع في الصخر الجيري يتجه من الشرق إلى الغرب يبلغ طوله ١٨٠سم وعرضه ٦٠سم وعمقه ٦٠سم.

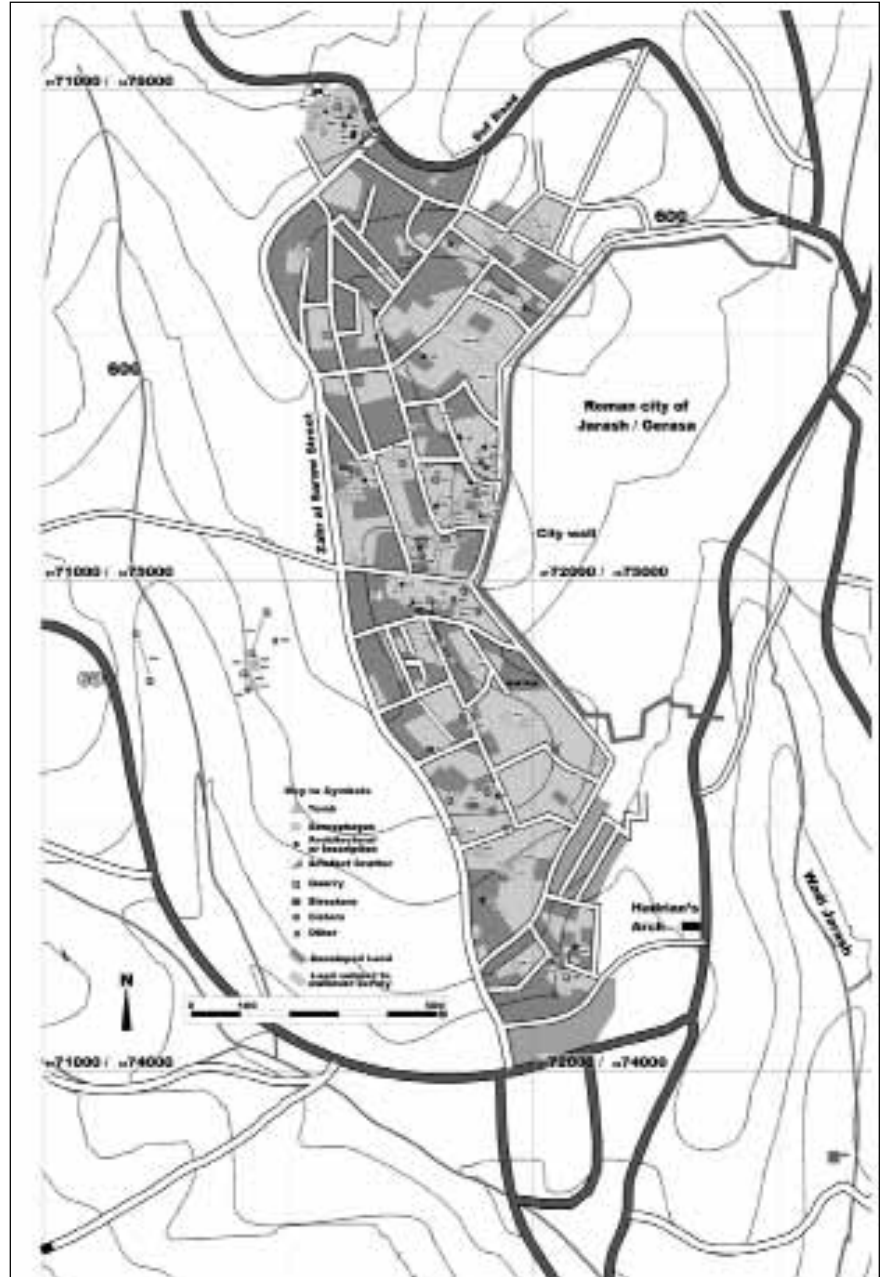
وأهم موجودات المدافن المكتشفة بعض الكسر الفخارية وتشمل أجزاء من مصابيح فخارية وبعض المعادن التي تشمل صليب برونزي ومقابض ومسامير برونزية أعدت لتثبيت توابيت خشبية وخرز ومسكوكات معدنية متأكلة.

التحليل والمقارنة

التخطيط: عند دراسة نمط المدافن المكتشفة ومقارنتها بالأمثلة المتشابهة والمؤرخة نجد أن هذا النوع من المدافن قد عرف منذ الفترة الهلنستية المتأخرة والرومانية، وشاع استخدام هذا النمط من المدافن في الفترة البيزنطية، وينقسم إلى إنموذجين فمنه البسيط وهو عبارة عن قبر فردي قطع في الأرضية له حواف جانبية ترتكز عليها بلاطات التغطية، ومن الأمثلة على ذلك في الأردن مدافن قويلبه رقم ٢٩، ٣٠، ٣٤، ٣٥.

د. محمد أبو عبيلة، م. علي العويصي، موسى ملكاوي، أكرم عتوم، عدنان مجلي، ناجح أبو حمدان وتوماس ليبون من المعهد الفرنسي للآثار للتنقيب في القبور.

١. اكتشفت المدافن في ٢٠١٠/٣/٦ بعد أن أقدم فاعل مجهول بالعبث في هذه القبور وقامت الأجهزة الأمنية بالإبلاغ عنها وشكلت دائرة الآثار فريق أثاري يتألف من



١. خارطة مدينة جرش وموقع المدافن (Ken- nedy 2005: Map1).

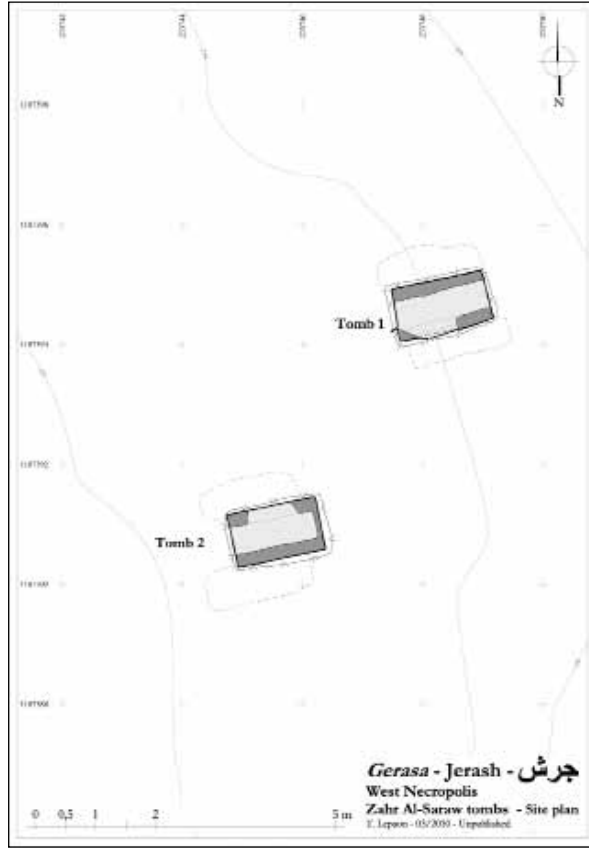
قبر مستطيل الشكل باتجاه شرق-غرب. ومن الامثلة الدالة على هذا النوع من المدافن في ضوء الادلة الاثرية المتوفرة في الاردن مدفن حسيبان ك ١ (Davis 1978: 129-148)، وناعور (Abbadi 1973: 69-71) وتل العميري خصوصا في المنطقة الثانية القبر رقم 13 (Krug 1991: 356-369) وفي فلسطين مدافن أريحا ١٦، ١٧، ٦٨، ٢٤ (Bennet 1965: 516-545) والعيزرية (بيثاني) (Nitowski 1979) (Saller 1952: 155-161, plate 19) والقدس (Tzaferis 1991: 132, plate 145) وبيت

(Smith 1992: 40-59)، ومدفن تل العميري في منطقة ٤ قبر رقم ٢ (Krug 1991: 356-399)، وحسبان منطقة ف رقم ١١ ب (Deegly 1975: 203-211)، وحقل مدافن مطار الملكة علياء الدولي (ابراهيم ١٩٨٦ : ٢٠-١). واما المدفن موضوع هذا البحث: فهو عبارة عن مدخل عمودي رأسي عميق مقطوع في الصخر على شكل مستطيل له حواف جانبية ترتكز عليها بلاطات حجرية لاجلاق المدفن، وتغطي بالتراب حتى سطح الارض. وهذا المدخل يتسع عند قاعدته ليشكل حنية قوسية بسقف منحني على الجانبين وفي أرضية كل حنية

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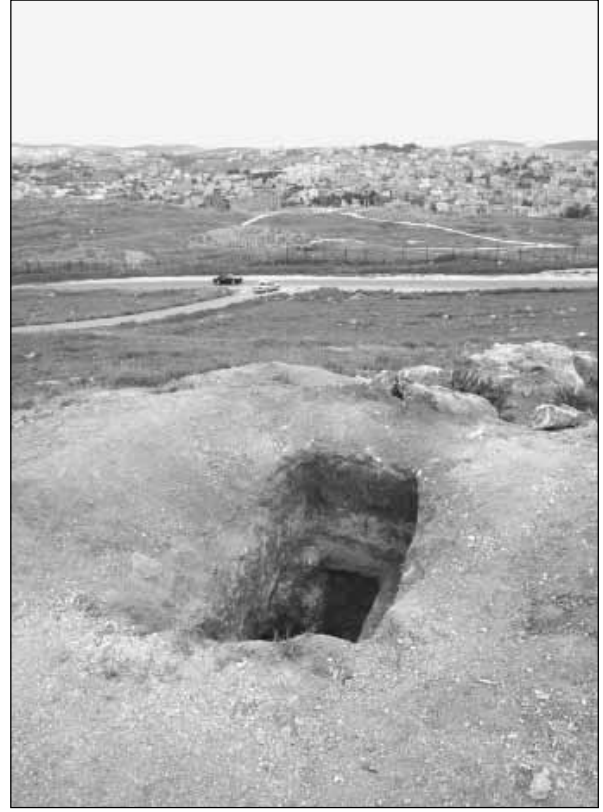


٢. صورة جوية لمدينة جرش الاثرية تبين موقع المدافن.



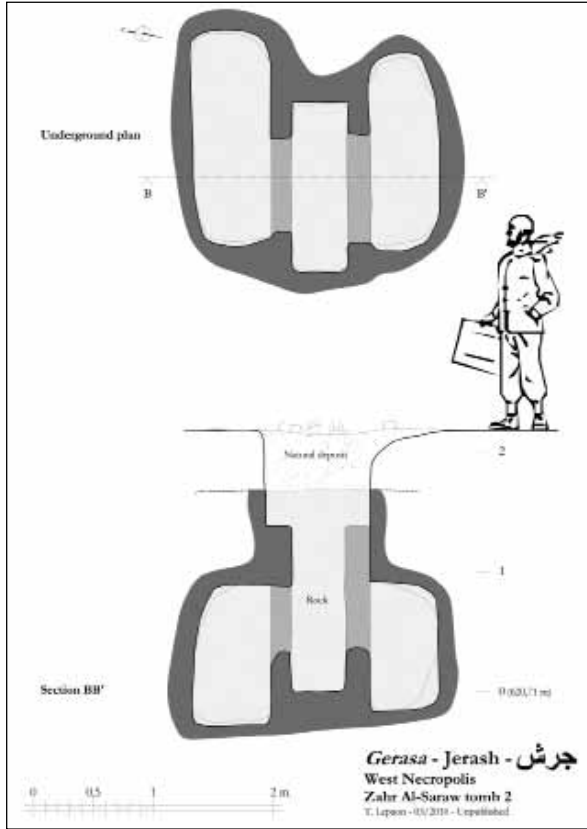
٤. مخطط عام كنتوري للمدفنين.

على عدد من القطع المعدنية البرونزية منها صليب ومقابض استخدمت لحمل تواييت خشبية وخرز، وتشكل مجموعها مرفقات جنازية كانت ترافق الموتى في قبورهم خاصة بالميت توضع معه في مكان الدفن المخصص له.

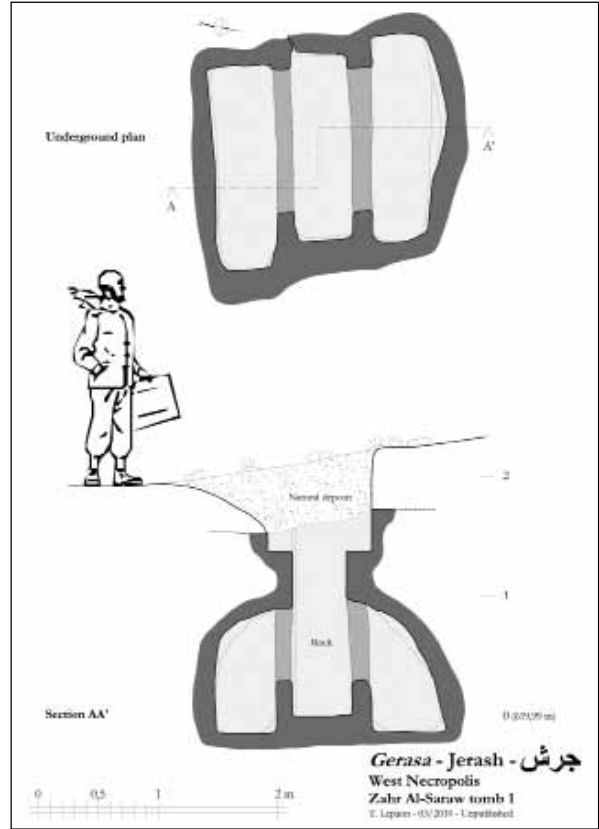


٣. منظر عام لموقع المدافن ويظهر سور المدينة الغربي.

فاجي رقم ٢٦ (Saller 1961: plate 29-30) وتل النصبية (McCown 1974: 101-108, plate 20, 24) ومدافن جبل الزيتون (Bagatti 1958: plate 12) وفي سوريا مدافن حي الشرقية بحمص رقم ٧ (البنى ١٩٦١: ٢٣-٣٤). المكتشفات: عثر خلال التنقيبات التي اجريت في المدفنين



٧. مخطط للمدفن رقم ٢.



٥. مخطط للمدفن رقم ١.

الأراضي والتي تضم مدافن في غاية الروعة والجمال لإنقاذ هذه المعالم لما لها من أهمية تعكس حياة المجتمع الكلاسيكي من النواحي الاجتماعية والاقتصادية من جهة والفنية والدينية من جهة أخرى وهي خير شاهد على تطور المجتمع وازدهاره.

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١٩٨٢ جيولوجيا الاردن، صخوره، تراكيبه، معادنه. مكتبة النهضة الإسلامية..



٦. منظر عام للمدفن رقم ١.

الخلاصة:

تعتبر منطقة ظهر السرو المجاورة لسور المدينة الغربي بمثابة Necropolis المدينة في العصور الرومانية والبيزنطية، وهذا ما تؤكدّه الشواهد الاثرية الباقية، الا انه وللأسف الشديد عند تنظيم المنطقة وتغير صفة استعمال الأراضي من مناطق خضراء (زراعي) إلى مناطق سكنية ، ادى ذلك إلى توسع المدينة الحضرية باتجاه الغرب وانشاء المساكن مما عرض مدينة الموتى في العصور الكلاسيكية إلى الطمس أحياناً والاندثار أحياناً أخرى، فقامت دائرة الآثار العامة خلال العشر سنوات الاخيرة باستملاك العديد من قطع

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١٠. حلي مكتشفة في المدفن ٢.



١١. صليب من البرونز وبعض المقابض التي اعدت لتثبيت التوابيت الخشبية والتي اكتشفت في مدفن ١.

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٨. منظر عام للمدفن رقم ٢.



٩. منظر عام للقبر ١ في مدفن ٢.

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الشكل	الوصف والمقارنة	الفترة	المكان	اللقى الاثرية
10	مجموعة من الخز على بعض منها زخارف عبارة عن خطوط محززة المقارنة (أبو عبيلة 2008: 76 تسلسل 41)	البيزنطي	مدفن 2	1
11	صليب لاتيني طول 3سم وعرض 2سم له حلقة للتعليق المقارنة (أبو عبيلة 2008: 76 تسلسل 42) (Nabulsi 2007: 273, plate 7)	البيزنطي	مدفن 1	2
11	مجموعة من المقابض البرونزية استخدمت لحمل التوابيت الخشبية (أبو عبيلة 2008: 77 تسلسل 63)	البيزنطي	مدفن 1	3

حفريّة سمر الإنقاذيّة ٢٠٠٩

وجيه كراسنة

المقدمة

تقع منطقة سمر على بعد ٢٠ كم شمال شرق مدينة أربد، وتمتاز هذه المنطقة بأنها مطلة على هضبة الجولان وتشتهر بوجود بعض ينابيع المياه وزراعة الزيتون والرمان.

زار المنطقة الرحالة شوماخر وقال عن وادي سمر أنه واحد من بين الأودية الذي لا تجف مياهه في الصيف ويصب في الشريعة قرب عراق الهيطلية، ويطلق عليه السكان المحليين أسماء متعددة حسب المواقع التي يمر بها ومنها وادي حمرا وادي عين التراب ووادي عين غزال، وكلها تسميات محلية لوادي واحد هو وادي سمر.

بدأ العمل في المنطقة بعد أن قام أحد السكان المحليين بالكشف عن معالم أثرية وذلك أثناء قيامه بتجريف أرضه بهدف بناء منزل، وهي عبارة عن جزء من أرضية فسيفسائية وبعض الجدران. قامت دائرة الآثار العامة بعمل حفريّة علمية إنقاذيّة لبدء عملية الحفر والتنقيب وذلك بتاريخ ٢٠٠٩/٨/١٦م حيث استمر العمل لغاية ٢٠٠٩/٨/٣٠ (الشكل ١).

أهداف المشروع

١. الكشف عن المخلفات الأثرية في الموقع.
٢. المحافظة على الأرضية الفسيفسائية ونقلها بواسطة وحدة الفسيفساء إلى متحف آثار محافظة أربد (دار السرايا).

مجريات العمل

بعد دراسة الموقع تم تخطيط أربعة مربعات بأبعاد ٥ X ٥ م وتم العمل فيها حسب التتابع الأثري حيث عثر على بعض العناصر المعمارية التي تدل على وجود إشغال سكني يعود للعصر البيزنطي وذلك من خلال العثور على بعض الدلائل الأثرية مثل لوحة فسيفسائية بالإضافة إلى بعض الكسر الفخارية والتي تعود إلى نفس الحقبة الزمنية (الشكل ٢).

نتائج العمل

المربع رقم (١): بعد استكمال الحفر في هذا المربع لوحظ وجود أرضية فسيفسائية يتزامن بنائها مع الجدران المحيطة وهو ممر مستطيل الشكل ينتهي بعتبة تؤدي إلى الرواق (الشكل ٣).
المربع رقم (٢): كشف عن أرضية فسيفسائية ملونه ومزخرفة، تصل لغاية الجدران المحيطة، ويتم الدخول إليها من ممر يقع جنوب المبنى وهو رواق ذو أرضية فسيفسائية فيه قاعدة عامود مع الجدران وربما كان يحمل أقواس (الشكل ٤).

المربع (٣): عثر على جزء من أرضية فسيفسائية ملونه ومزخرفة وتحتوي على صليب وجزء من كتابة وهي لوحة مدمرة ولم يبق منها سوى جزء بسيط (الشكل ٥).
المربع رقم (٤): لوحظ في هذا المربع والمربعات المجاورة وجود



٢. منظر يظهر بداية العمل.



١. موقع حفريّة سمر.



٤. مربع رقم (٢) بعد الانتهاء من العمل.



٣. مربع رقم (١) بعد انتهاء العمل.



٥. جزء من الأرضية الفسيفسائية بعد عملية الخلع.

وجيه كراسنة: حفرة سمر الانقاذية ٢٠٠٩

٣. بوابة تقع بجدار الجهة الجنوبية الشرقية للمبنى بعرض ٧٥ سم، تتجه للخارج.

٤. عامود في وسط الرواق يتألف من مدمك واحد، أبعاده ٧٠ × ٧٠ سم.

العناصر الزخرفية

عثر على ثلاث لوحات فسيفسائية منها ما هو مكتمل والبعض الآخر يحتوي على أجزاء من نقوش وزخارف نباتية وحيوانية وهندسية، وهي على الترتيب التالي:

١. لوحة بيضاء اللون مستطيلة الشكل تقع جنوب شرق المبنى تتراوح أبعادها بين ٤,٥ سم × ١٦٥ سم مصنوعة من حجارة كبيرة الحجم، ذات لون ابيض تتراوح أبعاد حجارتها ١,٥ سم × ١,٥ سم، تحتوي على إطار بأسلوب بناء مختلف يلف اللوحة بعرض ١٥ سم.

٢. جزء من لوحة ملونة تقع في الجهة الجنوبية الغربية من المبنى، ذات خلفية بيضاء وهي مزخرفة على شكل شبكة وبداخلها زهورات باللون الأسود، أبعاد أضلاع الشبكة عن بعضها ١٥ سم وأبعاد الزهرة ٥ سم × ٥ سم، وإلى الجهة الشمالية منها يوجد صليب بحجم ١٨ × ١٨ سم ذو إطار بلون أسود ومن الداخل لونه أحمر، محاط بجزء من كتابة باللون الأسود وزهورات محاطة بإطار أسود فيه أشكال نباتية باللونين الأبيض والأحمر بعرض ١ سم.

٣. لوحة ملونة تقع في الجهة الشمالية من المبنى، وتقدر مساحتها بـ ٢٠ متر مربع تقريباً. مصنوعة من حجارة ملونة أبعادها ١ سم × ١ سم، مصنوعة بأسلوب حراشف السمك، ومزينة باللون الأحمر وإطارها أسود ٨ سم × ٤ سم، تحتوي على شكل حيوان له قرون، مفقود الرأس ربما يكون غزال ملون بعدة ألوان كالأحمر والأسود والأبيض والأصفر، وتحتوي على ذيل لحيوان آخر مميز، وكذلك على أشكال هندسية ملونة بالأحمر والأسود (الشكل ٨).

المعثورات

عثر على أرضية فسيفسائية غير كاملة، وقد تم خلعها من قبل وحدة الفسيفساء العاملة في مكتب آثار محافظة اربد، ويجري العمل الآن

أرضية mortar وهي عبارة عن أرضية فسيفسائية مدمرة (الشكل ٦).

المخطط المعماري

لم يتم الكشف عن جميع العناصر المعمارية للموقع وذلك بسبب وجود شارعين رئيسيين، ولكن كشف جزئياً من خلال المربعات الأربعة عن مدخل يؤدي إلى ممر مستطيل الشكل طوله ٤,٥ م وينتهي بعتبة حجرية أبعادها ٥٨ سم × ١٦٥ سم، تؤدي هذه العتبة إلى رواق فيه قاعدة عمود وهو متعامد مع الجدران وربما كان يحمل أقواس (الشكل ٧).

العناصر الإنشائية

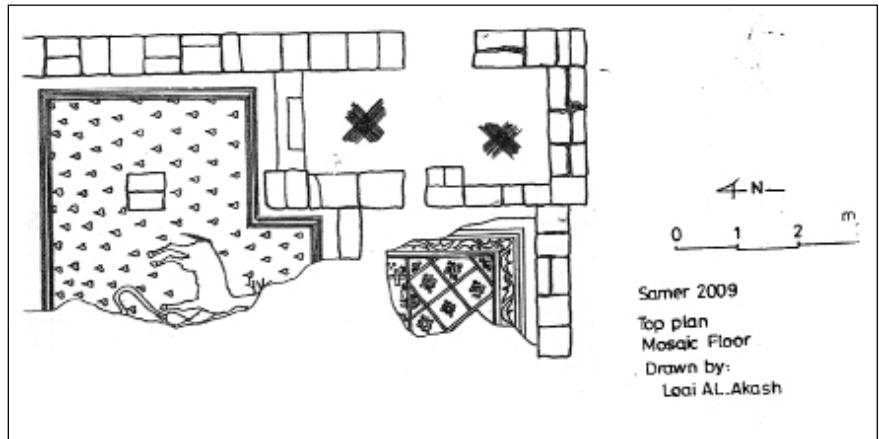
استخدم في البناء حجارة كلسية متوسط الحجم، تراوحت سماكة الجدران من ٦٠ سم إلى ٩٠ سم، واحتوت على مجموعة من الفتحات للأبواب والأعمدة وكانت كما يلي:

١. مدخل بوابه في الجهة الشمالية يحتوي على ثلاث درجات تتجه إلى الأعلى عرضها ٧٥ سم.

٢. عتبة حجرية بطول ١٦٥ سم وعرض ٨٥ سم تقع في منتصف المبنى، تفصل بين الممر والرواق.



٦. مربع رقم (٤) أثناء العمل.



٧. مخطط يبين الارضية الفسيفسائية.

لتجهيزها على لوحات ليتم نقلها إلى متحف دار السرايا، وعثر أيضاً على
كسر فخارية تعود للفترتين البيزنطية والأموية.

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٨. لوحة فسيفسائية تمثل غزال مفقود الرأس.

ترميم وتأهيل أول نموذج لمعصرة زيتون أثرية في منطقة الشرق الأوسط كهف المعصرة في لواء الكورة

أمجد البطاينة

مقدمة

تعتبر شجرة الزيتون من النباتات الاستراتيجية في حياة الانسان فقد استمد من حطبها وجفتها الطاقة للطهي والتدفئة، واستخدم زيتها في الطعام والدواء والانارة.

شجرة الزيتون من الاشجار دائمة الخضرة وانواعها يعد بالعشرات، حيث تختلف عن بعضها في شكل وحجم ولون ثمارها ومذاق زيتها ورائحته ونسبة الزيت المستخرج منه.

ولأهمية الزيتون فقد جاء ذكره في الكتب السماوية، وتعتبر شجرة مباركة وأغصانها رمزاً للسلام، يقول الله تعالى في سورة النور "الله نور السموات والارض مثل نوره كمشكاة فيها مصباح المصباح في زجاجة الزجاجه كانها كوكب دري يوقد من شجره مباركه زيتونه لا شرقيه ولا غربيه يكاد زيتها يضيي ولو لم تمسسه ناره" صدق الله العظيم.

ومن الامثلة الشعبية على أهمية الزيت وفوائده: القمح والزيت عماره للبيت، الزيت عامود الدار. اشتهرت منطقة حوض البحر المتوسط بزراعة شجرة الزيتون وتحديداً منطقة بلاد الشام التي تعتبر بيئته مثالية لوجود اجواء دافئه نسبياً وعدم حاجة الزيتون إلى كميات كبيره من المياه، فقد زرع اجدادنا العرب ومنذ الآف السنين شجرة الزيتون وما تزال ماثله في الأردن العديد من المناطق المزروعة باشجار الزيتون المعمرة والتي يطلق عليها اسم الزيتون الرومي كناية على قدمها.

كما أكد اكتشاف فريق فرنسي أن اقدم منطقه مزروعة بشجر الزيتون في العالم مكتشفة لغاية الآن هي منطقة وادي رم في الأردن في قرية هضيب الريح والتي تعود زراعة الزيتون فيها لحوالي ٥٤٠٠ سنة قبل الميلاد.

إن وجود معالم واطلال لمعاصر زيتون أثرية في انحاء كثيرة في الأردن ما هو الا دليل قاطع على عراقة زراعة الزيتون وانتشاره وإستخداماته المختلفة.

معاصر الزيتون القديمة والأثرية وآلية عملها

تمر عملية استخراج الزيت من الزيتون بمرحلتين اساسيتين هما الهرس والعصر.

المرحلة الاولى: عملية هرس حبات الزيتون

بعد أن تنتضج ثمار الزيتون في تشرين أول اكتوبر إلى تشرين ثاني نوفمبر من كل عام تقطف وتغسل ثم تبدأ عملية هرس حبات الزيتون (وتحويلها إلى عجينة) بواسطة آلة حجرية تسمى (البد)، تتألف من قطعتين حجريتين دائريتين ذات أوزان كبيرة يدوران فوق بعضهما البعض والمسميتين (بالقصعة والمهر).

القطعة الحجرية الأولى للبد: والتي تسمى (القصعة) فهي عبارة عن صحن حجري دائري ضخم مجوف يبلغ قطره ٢م تقريباً وسماكته بحدود المتر ويزن خمسة اطنان تقريباً وله حواف عالية لتمنع الزيتون من الخروج من التجويف أثناء عملية الهرس.

القطعة الحجرية الثانية للبد: تعرف بإسم (المهر) وهي عبارة عن عجل حجري دائري مصنوع من الصخر الطبيعي القاسي البازلتي أو الكلسي أو من مادة رخام الجرانيت، قطره متر واحد تقريباً وسماكته نصف متر ويزن بحدود ١٠٠٠ كغم.

اثناء دورانه يكون بالوضع العمودي داخل تجويف (القصعة) ويتم تحريكه بواسطة جذع خشبي طويل يسمى (النير) يصل طوله إلى أربعة أمتار ويحركه إما شخص وإما دابه، وفي بعض أنواعه يكون لها عجلين لهرس الزيتون بدل من واحد (الشكل ١).

أما عن عملية هرس ثمار الزيتون فتوضع في حوض البد بكمية يتناسب مع حجم البد، فتهرس بواسطة العجل الحجري الذي يدور داخل البد إلى ان تصبح ثمار الزيتون عجينة لينة ممتلئة بالزيت.

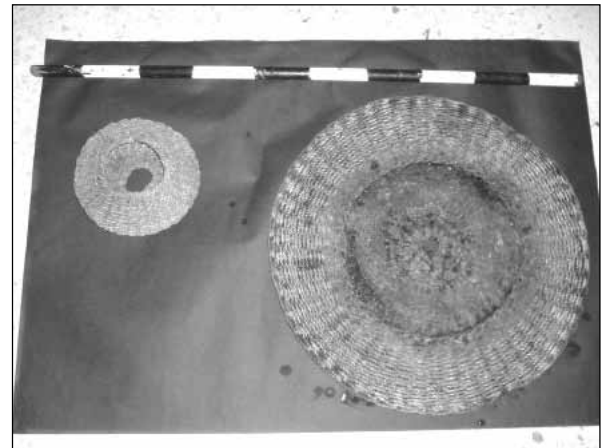


الشكل ١

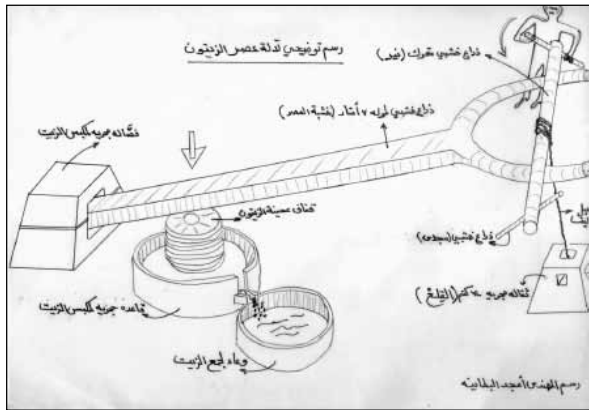
عملية استخراج الزيت

بعد ان تتم عملية الهرس وتحويل حبات الزيتون إلى عجينة بواسطة (البد الحجري) تنتقل العجينة إلى المرحلة الثانية وهي اخراج الزيت، فتوضع العجينة في اوعية دائرية تسمى باللغة العامية بالقفاف (والقفاف هي اوعية دائرية ذات اقطار مختلفة تتراوح بين ٢٥سم و ٤٠سم مؤلفة من طبقتين على شكل جبية، والقفاف القديمة مصنوعة من مواد طبيعية مثل اللب أو نبات يسمى السعد الذي يعيش في منطقة غور الاردن). أما القفاف الحديثة فهي مؤلفة من طبقة واحدة فقط وقطرها يتراوح من ٥٠-٦٥سم ومصنوعة من خيوط صناعية (الشكل ٢). يتم وضع القفاف الدائرية فوق بعضها البعض على شكل طبقات مؤلفة من خمسة إلى خمسة عشره ويتم الضغط عليها بواسطة آلة الكبس وهي عبارة عن آلات بسيطة التكوين وظيقتها إحداث ضغط كبير على عجينة الزيتون لاستخراج الزيت منها. أما عملية الكبس القديمة فقد كانت تجري بطريقتين على الاغلب، فالطريقة الاولى تجري باستخدام ساق شجرة (ذات خشب قاسي ومتين يتحمل الضغط مثل شجرة البلوط أو الكينا ويتراوح طول الساق من ٢ إلى ٩ امتار حسب حجم المعصرة وقطر الساق يصل الى ٥٥ سم)، والساق مثبت باطرافه فصالة تسمح للطرف الاخر الحركه بحرية بالارتفاع والانخفاض.

توضع القفاف الممتلئة بعجينة الزيتون تحت ساق الشجرة الذي يقوم بعملية الضغط عليها وبلاستعانة بثقلات حجرية (تسمى القلع) لاضافة المزيد من الضغط يصل وزنها إلى ٧٠٠كغم تقريبا (الشكل ٣). أما الطريقة الثانية فتتم من خلال عملية الكبس أو الضغط على القفاف بواسطة ملزمة خشبية عمودية ذات عمود خشبي لولبي على شكل برغي ضخّم مثبت بالأرض حيث انه بدوران قطعة خشبية اخرى على شكل صامولة لها ذراع طويل لاعطاء العزم اللازم لعملية الضغط وبعد وضع القفاف بين فكي الملزمة الخشبية يتم دوران الصامولة لإحداث الضغط المطلوب لعملية العصر فيخرج الزيت. ولا تزال بعض القرى الاردنية تستخدم أدوات مشابهه لمعاصر الزيتون القديمة مصنوعة من الفولاذ (الشكل ٤).



الشكل ٢



الشكل ٣



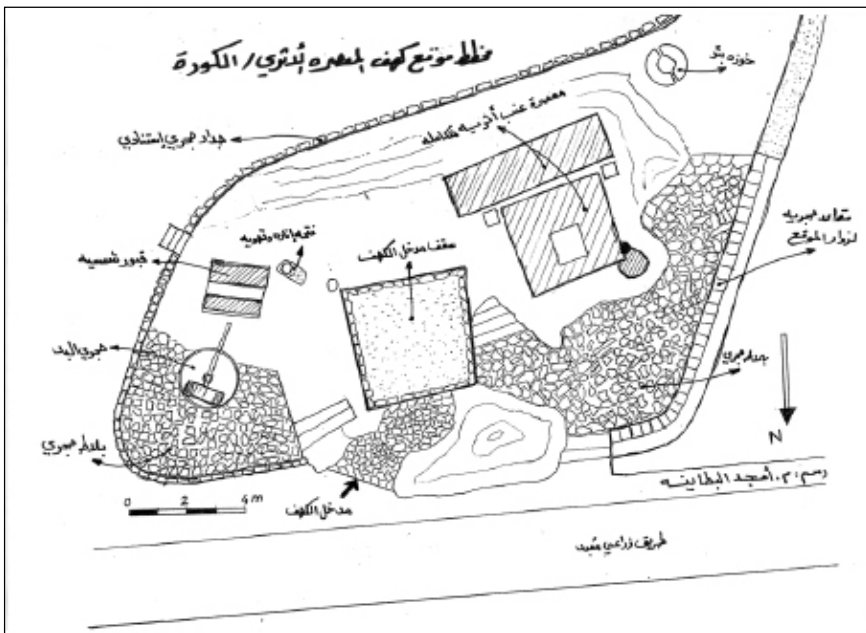
الشكل ٤

وصف الموقع

يقع كهف المعصرة الأثري في لواء الكورة بمحافظة اربد إلى الغرب من قرية بيت إيدس في منطقة تسمى (صير) والتي ترتفع ٤٥٠ م فوق سطح البحر. وبالقرب من موقع الكهف الأثري توجد أحواض لمعصرة عنب اثرية ومجموعة من المدافن وأبار المياه الاثرية بالإضافة إلى وجود خربة وكنيسة على مقربة من الموقع (الشكل ٥أ، ب).

تقدر مساحة الكهف ب ١٠٠ متر مربع، يستخدم كمعصرة زيتون ومما يؤكد ذلك العثور على قطع حجرية أثرية داخل الكهف كانت تستخدم في معاصر الزيتون ووجود أحواض الزيت المحفورة في أرضية الكهف الصخرية وكسر فخارية في محيط الكهف تعود في معظمها للفترة الرومانية والبيزنطية المبكرة. أطلق على هذا الكهف عدة أسماء منها كهف صير، مغارة الجندي (نسبة لإسطورة ظهور شخص في منطقة الكهف على هيئة جندي)، وكهف المعصرة (لوجود اثار واضحة لمعصرة زيتون أثرية داخل الكهف)، وأخيراً كهف السيد المسيح عليه السلام، اذ يعتقد بأن السيد المسيح عليه السلام قام بزيارة الكهف برفقة عدد من اتباعه ومكث فيه عدة أيام قادماً من جبال الجليل كما ورد في انجيل برنابا، وكذلك وجود دلائل دينية في الأرضيات الفسيفسائية للكنيسة الأثرية الموجودة على مقربة من موقع الكهف.

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الشكل ٥ أ.



الشكل ٦.



الشكل ٥ ب.



الشكل ٧أ.

مقاعد حجرية: بناء مقاعد حجرية تتسع لـ ٣٥ شخص تحت شجرة البلوط المعمرة يستظل بها زوار الموقع، وكذلك تم تليط أراضيات

أعمال الصيانة والترميم وإعادة تشغيل المعصرة

أ. أعمال تطوير وتأهيل محيط موقع الكهف الأثري

إستملاك: كهف العصرة الأثري مستمك لدائرة الآثار العامة بمساحة ١٢٣ متر مربع وهي المساحة الفعلية للكهف تقريباً، وقد جرت في عام (١٩٩٨) أعمال إزالة طمم وصيانة لمدة اسبوعين حيث كان يستخدم الكهف كحظيرة للاغنام.

التيار الكهربائي: تم توصيل التيار الكهربائي للموقع الأثري وتركيب عداد خاص له ووحدات إنارة خارجية (الشكل ٦).

تنظيف معصرة العنب: توجد معصرة عنب أثرية أعلى الكهف مؤلفة من أحواض لهرس العنب وبئر تخمير، حيث تم تنظيفها بالكامل لتكون كذلك إحدى معروضات الموقع الأثري (الشكل ١٧، ب).

حولية دائرة الآثار العامة ٥٤ (٢٠١٠)

حجرية ذات طابع تراثي قديم أحضرت خصيصاً من منطقة عجلون (الشكل ١٧، ب).

بناء جدران: تم بناء جدران حجرية واستنادية للموقع، حيث تم بناء ما يقارب ٢٠٠ متر طولي من الجدران وبارتفاعات مختلفة تصل إلى ثلاثة أمتار في بعض المناطق وتم تكحيلها لزيادة قوتها وإكسابها منظراً ذو طابع أثري (الشكل ١٨، ب، ج، د).



الشكل ٨ ج.



الشكل ٧ ب.



الشكل ٨ د.

تركيب لوحات إرشادية: تم تركيب لوحات إرشادية للموقع على الشارع الرئيسي ودخل الموقع باللغتين العربية والانجليزية مما أدى إلى زيادة عدد الزوار للموقع وبشكل ملحوظ.

نقل وترميم حجر البد: حجر البد الموجود حالياً في الموقع تم إحضاره من قرية جديتا بعد أن قام بإهدائه الحاج محمد مصطفى عجاج. كان حجر البد مكسوراً وبحالة سيئة حيث تم نقله إلى الموقع بالتعاون مع بلدية برقش ومكتب أشغال الكورة، وجرى ترميم البد وإصلاحه وإكمال الأجزاء الناقصة منه باستخدام قضبان ومرابط وأطواق معدنية. كما جرى تصنيع ذراع خشبي متحرك طوله أربعة أمتار لتحريك حجر البد الداخلي حول محور خشبي يسمى (العروس) بكل سهولة ويسر وجرى هذا كله بعد تجهيز منصة حجرية خاصة لجلوس البد عليها (الشكل ١٩، ب، ج، د، هـ، و).

أدراج حجرية: بناء أدراج حجرية في كافة أنحاء الموقع ليسهل على زوار الموقع الأثري الانتقال من مكان إلى آخر بكل سهولة ويسر.



الشكل ١٨ أ.



الشكل ٨ ب.

ب. أعمال إعادة تأهيل الكهف الأثري من الداخل وتشغيل آلة عصر الزيتون

لغايات تشغيل معصرة الكهف كان من الضروري العثور على ذراع

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الشكل ٩ هـ.



الشكل ٩ أ.



الشكل ٩ و.



ب. ٩



الشكل ٩ ج.

مناسب لمكبس المعصرة حيث تم العثور وبعد جهد وعناء على شجرة كينا في وادي زقلاب وعلى بعد ٢٠ كم من موقع الكهف تقي بالأبعاد والقياسات اللازمة، وبعد أخذ موافقة وزارة الزراعة بقص الشجرة ثم نقلها إلى الكهف ومعالجتها بالزيت الحار وادخالها إلى الكهف باعجوبة متناهية نظرا لطول الساق الذي يبلغ تسعة أمتار ووزنه بحدود طن ونصف وصغر حجم بوابة الكهف (الشكل ١٠ أ، ب، ج، د).



الشكل ١٠ أ.



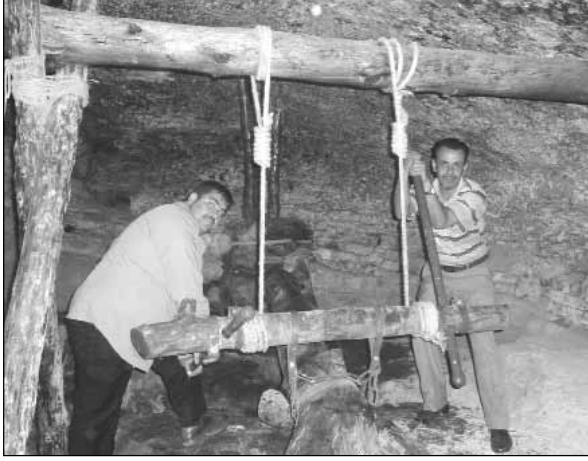
الشكل ٩ د.



الشكل ١١ ب.



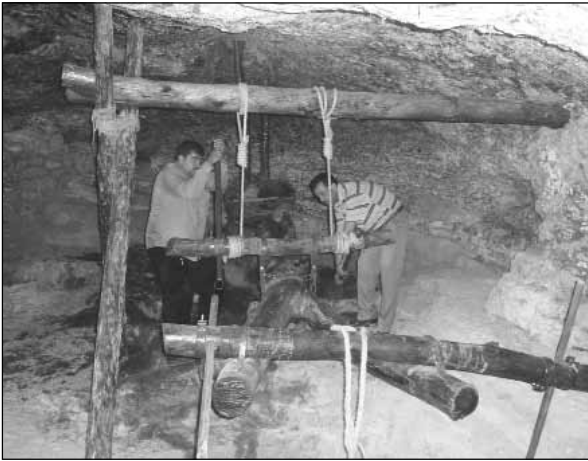
الشكل ١٠ ب.



الشكل ١١ ج.

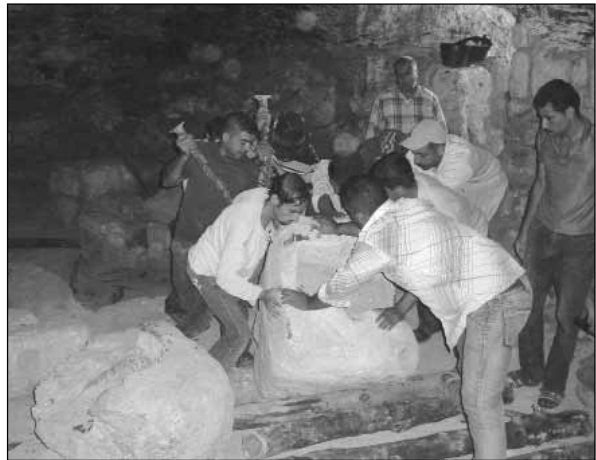


الشكل ١٠ ج.



الشكل ١١ د.

وضع حجر الفصالة في مكانه الصحيح والذي يبلغ وزنه طن تقريبا، وكذلك تم تركيب جهاز رفع لنظام الكبس والمؤلف من عدة جذوع خشبية له القدرة على رفع وزن ١,٥ طن، وتزويد الجذوع الخشبية بمرباط معدنية لزيادة تحمل الضغط الكبير عليها (الشكل ١١ أ، ب، ج، د).



الشكل ١١ أ.

كما تم تنفيذ أعمال تأهيل أخرى للكهف من الداخل إشملت على بناء منصة حجرية نصف دائرية ليتمكن الزوار من مشاهدة المعصرة بكل وضوح، حيث تتسع المنصة لحوالي خمسة وعشرين شخص

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١٢ ج.

الأجيال القادمة بأمانة (الشكل ١٣). حيث تعتبر معصرة الكهف النموذج الأثري المتكامل الوحيد في المملكة الأردنية الهاشمية وفي منطقة الشرق الأوسط.

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الشكل ١٣.

(الشكل ١٢، ب، ج). وزود الكهف بالتيار الكهربائي ووحدات الانارة وتم اخفاء التمديدات بطريقة مناسبة.

تهدف عملية ترميم وتشغيل معصرة الزيتون الأثرية إلى المحافظة على الموروث الثقافي والاجتماعي والأثري ونقله إلى



الشكل ١٢ أ.



الشكل ١٢ ب.

مشروع التنقيبات الأثرية في تل العميري الشرقي الموسم الأول ٢٠٠٩

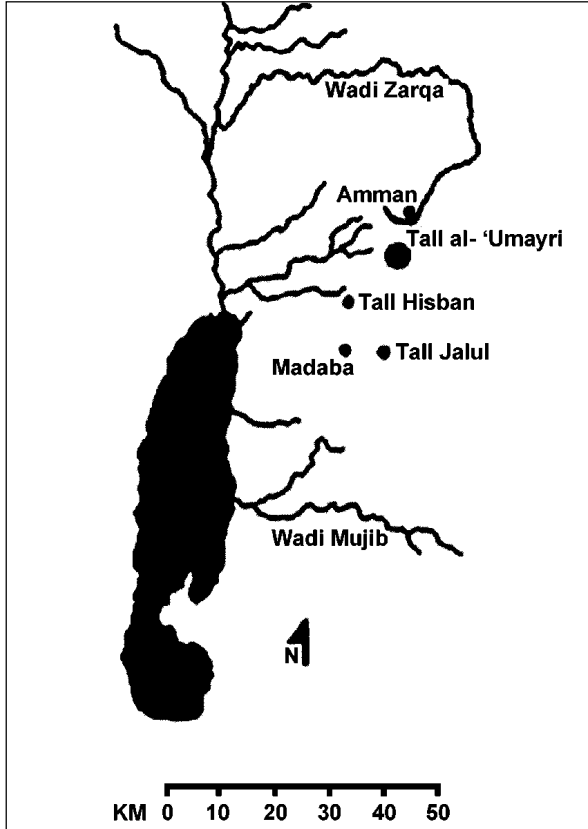
أحمد جمعة الشامي

تمهيد

في ضوء التعاون والتنسيق ما بين دائرة الآثار العامة ووزارة الأشغال العامة وكما هو الحال مع باقي مؤسسات الدولة في التنسيق والتعاون المشترك بهدف المحافظة على الآثار وحمايتها قبل الشروع بتنفيذ مشاريع البنية التحتية وشق الطرق، وبسبب توسعة شارع مطار الملكة علياء الدولي فقد قامت دائرة الآثار العامة بإجراء تنقيب إنقاذي لموقع تل العميري الشرقي (الشكل ١) والذي كان مقرراً أن يمر منه الطريق المذكور أعلاه. وبدعم من وزارة الأشغال العامة قام فريق وطني من دائرة الآثار العامة بالبدء بأجراء تنقيب أثري في الفترة الواقعة ما بين ٢/٧ ولغاية ٢٠٠٩/٤/٩* وكان الهدف من التنقيب معرفة أهمية الموقع المسجل مسبقاً لدى دائرة الآثار العامة، ولإنقاذ ما يمكن إنقاذه قبل شروع آليات وزارة الأشغال بشق الطريق الذي سيأتي على جزء كبير من الموقع كما كان مقرراً من قبل (الشامي ٢٠٠٩: ١-٣).

الموقع الجغرافي

يقع تل العميري في منطقة جيولوجية ذات ترسبات كلسية في منطقة جبلية استراتيجية مرتفعة بالقرب من متنزه عمان الوطني على طريق المطار، ويبعد عن عمان ١١ كم ويرتفع عن مستوى سطح البحر ٩٠٠ متر



٢. موقع تل العميري الغربي والشرقي والذي يقع على طريق مطار الملكة علياء الدولي، ويبعد عن عمان ١١ كم (Herr et al. 2005).

(الشكل ٢).

اطلقت تسمية (تل العميري) على ثلاث تلال هي: تل العميري الشمالي الشرقي الذي يعود تاريخه الى العصور الكلاسيكية (الرومانية والبيزنطية والإسلامية)، والذي نحن بصدد الحديث عنه، وتل العميري الجنوبي الشرقي ويعود تاريخه الى العصور الهلنستية، وتل العميري الغربي ويعد من أكبرها وأعلىها إذ يعود بتاريخه إلى العصور البرونزية والحديدية. في سفحه الشمالي في الوادي يقع مصدر المياه الذي كان



١. صورة جوية تظهر شارع الملكة علياء الدولي - شارع المطار وموقع تل العميري بشقيه الغربي والشرقي الذي يفصل بينهما الطريق (Google Earth).

* تكون الفريق من السادة أحمد الشامي مديراً للمشروع وجمال صافي مساحاً ورساماً وزياد جلود فني صيانة وتنقيب وعمر سليحات سابقاً بالإضافة إلى ٤ فنيي تنقيب و ١٤ عاملاً.

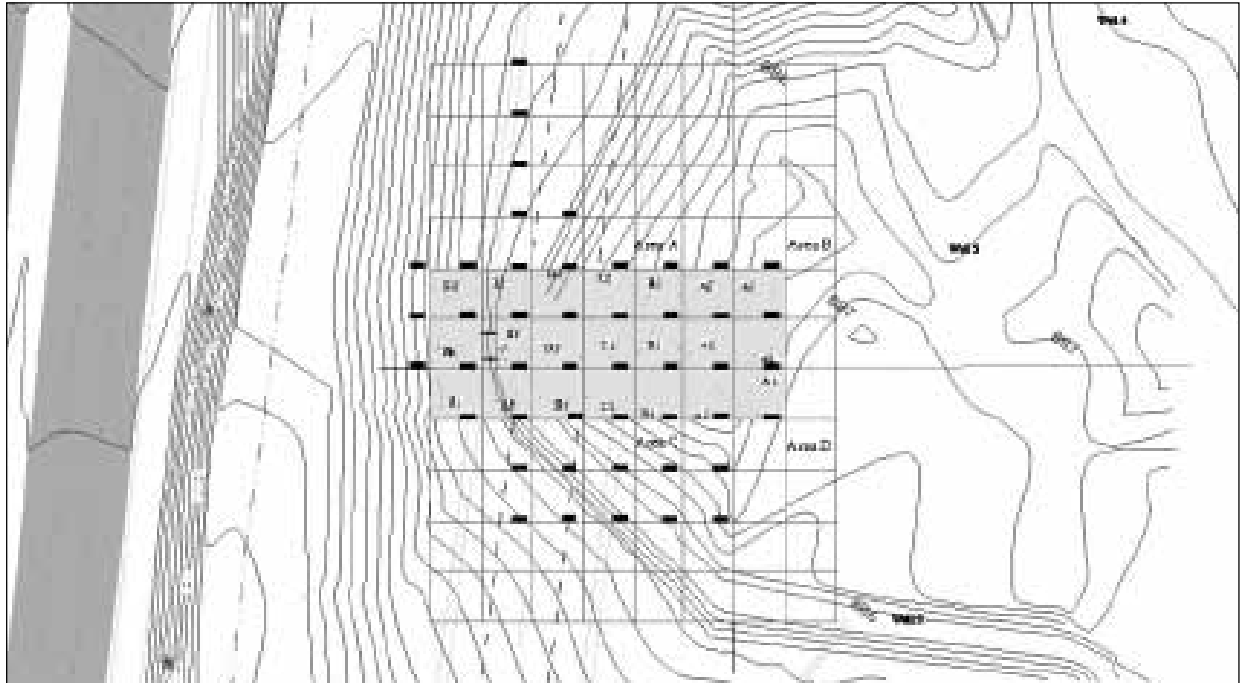
سبباً في استمرار الاستيطان في التل عبر الفترات التاريخية التي تعاقبت على التل وحتى العصر الحديث. ولا تزال التنقيبات الأثرية مستمرة في هذا التل منذ عام ١٩٨٤ وحتى هذا التاريخ من قبل بعثة أمريكية من جامعة أندروز (Geraty et al. 1987: 188).

منهجية العمل

لقد تم تحديد الأجزاء الأكثر تعرضاً للضرر من التل حيث قام الفريق بمسح أثري للجهة الغربية منه والتي سيمر منها الطريق ورسم مخطط كنتوري للتل بشكل عام وتحديد المربعات المزمع التنقيب بها، وقسم الموقع إلى أربع مناطق A, B, C, D (الشكل ٣). تركّز العمل في المنطقتين A, C لوقوعهما في مسار الطريق، مع العمل بشكل جزئي في المنطقتين D, B. أما المربعات التي جرى التنقيب بها في المنطقة C فهي A1, B1, C1, D1, E1, F1، أما المنطقة A فقد جرى التنقيب في المربعات التالية A1, B1, C1, D1, E1, F1. والمنطقة B كان العمل بها يجري بشكل محدود جداً في المربعين A1, A2 وكذلك الحال في المنطقة D إذ تم العمل في مربع A1 فقط لتتبع الجدار الخارجي الشرقي للبناء (الشامي ٢٠٠٩ ب: ٢).

لقد تركّز العمل بداية في الكشف عن الآثار التي قد يعثر عليها على المنحدر الغربي للموقع في المنطقتين A, C فجرى فتح المربعين E1 في المنطقتين A, C لظهور بعض الحجارة التي يعتقد بأنها ستساعد في الكشف عن بقايا أساسيات عمارة بشكل سريع مستغلين الانحدار الشديد وعدم وجود تراكم طبقي مرتفع من الأتربة، إذ أن الجهة الشرقية من الموقع وفي أعلى التل ترتفع عن الجهة الغربية التي بدأنا التنقيب بها ما يقرب

من ٤م مما يعني سرعة الكشف عن العمارة في الجزء الغربي (الشكل ٣) بالمقارنة مع تراكم الردم وارتفاع حجم التتابع الطبقي في الجزء الشرقي (الشامي ٢٠٠٩ ب: ٣)، فكشف في هذه الأثناء عن أساسيات المبنى الخارجية في الزاوية الشمالية الغربية للمربع E1 من المنطقة C. ولكثرة الردم من الحجارة الساقطة كان يصعب علينا الاستمرار في التنقيب لعدم وضوح الرؤية وعدم القدرة على تتبع الجدران التي قد تقودنا بشكل سريع لإنجاز العمل المطلوب، وبالتالي انتقلنا للعمل في المربع E1 من المنطقة C لمحاولة تتبع الجدار الرئيسي الغربي من المبنى والمتجه شمال - جنوب ولتعذر الاستمرار والمجازفة بإزالة أي من الحجارة التي تنتشر في المربع والتي كان يصعب تحديد ماهيتها، فقد تم فتح عدداً من المربعات في كلا المنطقتين السابقتين ففي المنطقة A فتح المربعين E1, E2 لتتبع الجدار الرئيسي الخارجي للمبنى ولتتبع أساسيات العمارة التي بدأت تتكشف تم فتح المربع D1 في المنطقة C والمربعين D1, D2 في المنطقة A ليظهر الجدار الشمالي الخارجي للمبنى، والذي يتجه شرق - غرب وبالتالي إتضح أجزاء مهمة من العمارة، فالكشف عن الجدار الخارجي للعمارة المكتشفة سهل عملية البحث واستكمالها ضمن إطار محدد وواضح، وبالتالي كشف في المربعات E1, D1 في المنطقة C والمربعات E1, E2, D1, D2 عن بناء ملحق بالكنيسة يضم عمارة مكونة من خمس حجرات مستطيلة، جدرانها متهدمة وترتفع لما يقرب من ١م، أرضيتها فرشت بالمكعبات الفسيفسائية كبيرة الحجم بيضاء اللون سيأتي الحديث عنها لاحقاً (الشكل ٤). يفصل ما بين هذه الحجرات في الغرب ومبنى الكنيسة في الشرق ممر - موزع - يتم الدخول إليها بواسطة مدخل رئيسي يقع في الجدار الخارجي الجنوبي بعرض ٧٣ سم، يتم النزول



٣. خريطة كنتورية للتل العميري الشرقي تظهر شبكة المربعات التي تم التنقيب بها وشارع المطار الحالي والتوسعة المفترضة للطريق.



٤. منظر عام لمبنى ملحق الكنيسة يمثل ملحقات خدمية للكنيسة من تخزين للمياه وحجرات لتخزين المواد والحبوب وأبار وقنوات لجمع مياه الأمطار.

العصر الروماني، ويظهر ذلك بوجود عناصر معمارية أعيد إستخدامها في مبنى الكنيسة مثل بعض الحجارة الكلسية الصلبة المزخرفة بأشكال هندسية ونباتية تمثل رسم وريادات وإكليل وطاولة قرابين (مذبح) بني في الجدار بشكل معكوس بالإضافة لكسر فخارية من سراج روماني متأخر ومسكوكتين رومانيتين وبعض أساسات الجدران أسفل أرضية الكنيسة. ولأن يصعب تحديد ماهية البناء الروماني الذي أستخدمت حجراته في الفترات التي تلت (الشكل ٦) (الشامي ٢٠٠٩ ب: ١).

لأرضية المر بثلاث درجات، عرض الممر ٨,٨٠م يقع في منتصف البناء ويتجه شمال- جنوب، ويطل مدخل الكنيسة الرئيسي في الجدار الغربي على هذا الممر ويتم الدخول للكنيسة من خلاله وكذلك مداخل الحجرات ذوات الأرقام ٢ و٣ و٤ و٥. والملاحظ أن هذا المدخل في الجدار الجنوبي يبدو أنه أنشئ في فترة متأخرة عن فترة بناء الكنيسة الأولى والكنيسة الثانية في عملية إعادة البناء إذ يظهر أن هذه الإضافات قد تمت في العصر الأموي (الشكل ٥) (الشامي ٢٠٠٩ ج: ٢).

الموقع في العصر البيزنطي

تميز التل بانتشار الفخار البيزنطي والإسلامي تحديدا الأموي منه على سطحه. ومع البدء بالتنقيب الفعلي في الجزء الذي كان سيمر منه الطريق كشفت ملامح عمارة ضخمة ألت في النهاية لبناء كنيسة بيزنطية على النظام البازليكي مكون من رواق أوسط (صحن الكنيسة) ورواقين جانبيين صغيرين ويبلغ طول الكنيسة ١٤,٥٠م وعرضها ٨,٥٥م (الشكلين ٧ و٨).

ويبدو أن الكنيسة قد أعيد بناؤها مرتين أخرها هذه التي بصورتها الحالية، ويظهر ذلك جليا في حجارة حاجز الكنيسة الثانية التي شيدت فوق الكتابة اليونانية التكريسية حيث اختفى سطرين من النص تحت



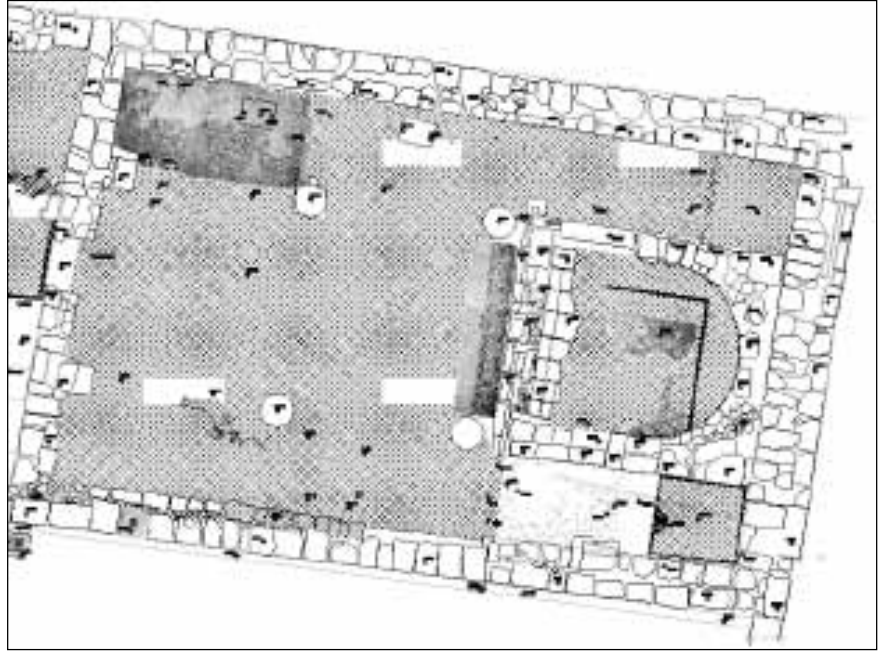
٦. إعادة استخدام العناصر المعمارية الرومانية لمباني رومانية لم تعثر عليها استخدمت في واجهة الكنيسة الشرقية.

الموقع في العصر الروماني من خلال الشواهد الأثرية

تشير الدلائل الأثرية في تل العميري الشرقي أن الموقع قد سكن في



٥. المدخل الجنوبي والممر الذي يفصل بناء الكنيسة عن الملحقات الخدمية والذي يطل عليه مدخل الكنيسة الرئيسي الغربي ومداخل حجرات الملحقات الغربية.



٧. مخطط لعمارة الكنيسة المكتشفة في الموقع والتي بنيت في أواخر القرن السادس وأعيد بناؤها في بداية القرن السابع في العصر الأموي.



٩. منظر عام لمبنى الكنيسة بعد انتهاء المرحلة الأولى من التنقيب.



٨. منظر عام لعمارة الكنيسة.

مستطيلة الشكل بطول ٩,٣٢ م X بعرض ٨,٥٥ م (الشكل ١٠). تعرضت الأرضية للتدمير قديماً بسبب الإضافات والتغيرات التي طرأت في الفترة البيزنطية المتأخرة من بناء الكنيسة الحالية (أرضية الكنيسة الثانية)، واستخدم داخل الكنيسة للسكن في الفترة الأموية. كما تعرض الموقع لفترة هجر مما أدى إلى تكسّر الردم على الأرضية بارتفاع ٢-٣ م. أما حديثاً فقد اعتدى اللصوص في السنوات الماضية على التل بشكل عام، إذ تم تدمير الجزء الجنوبي الغربي من الرواق الأيمن وجزء من الرواق الرئيسي الأوسط (صحن الكنيسة) في الجهة الغربية، فوجد مدمراً بحثاً عن الدفائن والكنوز.

كشفت أمام حنية الكنيسة عن نقش يوناني طوله ٣,٥٠ م وعرض ٠,٧٠ م مكون من سبعة أسطر تخليداً لذكرى إنشاء الكنيسة ولا يزال النقش بحاجة لمزيد من الدراسة والتحليل ، بالإضافة لفقدان جزء من طرفه في

حاجز الكنيسة، وبالإضافة لذلك فقد تم بناء رواق الكنيسة الجانبي الشمالي - والذي يمثل أيضاً جزءاً من جدار محراب الكنيسة - أمام مدخل الكنيسة الخاص في الجهة الشرقية. ومن الأمور التي أكدت إعادة البناء للكنيسة تلك الأعمدة الأربعة التي بنيت في فترة متأخرة عن فترة بناء أرضية الكنيسة الأولى والتي إختزلت الأرضية واتلفتها، ثم أعيد بناء وترميم الفسيفساء بشكل ملفت للنظر وبحجم حجارة أكبر وبارزة عن مستوى الأرضية مما أدى إلى تلف في نهايتي النقش الكتابي اليوناني مكان زرع الأعمدة وبخاصة في الزاوية الجنوبية الشرقية التي كتب فيها سنة البناء والتي فقدت من جراء إعادة البناء (الشكل ٩).

تميزت أرضية الفسيفساء بالغنى في تنوع الأشكال الهندسية والنباتية والحيوانية والطيور، وكذلك استخدام الألوان المتعددة منها الأحمر والأصفر والأسود والرمادي (السكني) والأبيض ضمن مساحة



١٠. أرضية الكنيسة الفسيفسائية الملونة والمزخرفة بالأشكال الهندسية والحيوانية والطيور والتي يظهر عليها آثار التخريب والإضافات اللاحقة في مرحلة الكنيسة الثانية.



١١. النقش اليوناني التكريسي أمام الحنية الرئيسية والمكون من سبعة أسطر بالون الأحمر والذي تعرض للتلف من وسطه وفي طرفيه بسبب إضافة الأعمدة في المرحلة الثانية.

الشهيد المقدس للقدس (سيرجيوس) بالفسيفساء
بنقود المار رابوس، كاهن الرعية الأكثر تقوى، وجورجيوس الشماس،
وسابينوس وماريا، في شهر ابريل من سنة (٩٠٠٠) (الشكل ١١).

الموقع في العصر الأموي

لقد أعيد إستخدام الكنيسة في الفترة الأموية، ويظهر ذلك من خلال
توظيف الرواق الأوسط (صحن الكنيسة) كحجرة كبيرة واسعة (صالة)
والرواقين الشمالي والجنوبي حيث قسم كل رواق لحجرتين مستطيلتي
الشكل في الأجزاء الأربعة للأروقة الجانبية، فالحجرة الشمالية هي
حجرة مستطيلة أبعادها ٢ X ٤م، أما الحجرة الجنوبية أبعادها ٣,٥ X
١,٩٠م بارتفاع ٢,٢٠م والتي تعرضت حديثا للتدمير والعبث.
أما الحجرة في الجهة الجنوبية الشرقية فهي مستطيلة أبعادها
٥ X ١,٨٠م بارتفاع ٢,٣٥م - ٢,٩٠م، في جدارها الشرقي حنية
مغطاة بالبلاستر الأبيض اللون بارتفاع ١,٢٠م وعرض ٠,٨٣م وعمق
٠,٥٠م، وفي جدارها الشمالي كوة مستطيلة بارتفاع ١,١٠م وعرض

المنتصف في السطر الأول وفي نهايته الشمالية والجنوبية بسبب بناء
الأعمدة في الأرضية كما ذكر سابقا واختفاء تاريخ انشاء الكنيسة إلا
أن ورود أسم الملك الغساني المنذر بن الحارث ملك العرب الغساسنة
بوليوكتوس بطريك فيلادلفيا والتي تؤرخ فترة حكمة للثلاث الأخير من
القرن السادس الميلادي بين عامي ٥٧٠ - ٥٨١م ساعدت على تأريخ
الكنيسة بالرغم من تدمير مكان ذكر السنة في النقش.

أما الترجمة الأولية للنقش فهي كما يلي :

يا سيدنا تقبل تقدمية المتبرع والکاتب (---) موسيليوس وأبنائه
سيدنا يسوع المسيح، رب القديس سيرجيوس، إحمي الأكثر
عظمة القادم الامندوروس (المنذر)

يا رب القديس سيرجيوس، بارک خادمك يوسيبیوس وأبنائه
يا رب القديس سيرجيوس، بارک خادمك يوحنا وزوجته وأبنائه
يا رب القديس سيرجيوس، بارک خادمك عبدالله وديونيسيوس
وس...

في زمن البطريرك الأكثر محبة لله بوليوكتوس تم رصف صرح

٦٠,٠م ذات أرضية فسيفسائية من المكعبات الحجرية الكبيرة، أبعادها ١,٨٥ X ١,٧٠م وتنتهي بتجويف نصف دائري بنفس الفسيفساء قطره ٢٠,٢٠م وبعمق ١٠,٠م والتي تعود للفترة الأموية، مدخلها في الجهة الغربية بعرض ٦٠,٠م (الشكل ١٢). أما الرواق الشمالي الشرقي فعرضه ١,٩٠م يقع فيه مدخل رئيسي ضخم (المدخل الشرقي) ارتفاعه ٣٠,١م وعرضه ٧٥,٠م، عمق جدار المدخل (السلك) ٢٥,١م، تم إنشاء درج في هذا الرواق وذلك في فترة متأخرة من بدايات القرن الماضي فوق الأرضية الفسيفسائية مكون من بسطة ١ X ٢م وسبع درجات من الحجارة الكلسية المشذبة بطول ٩٠سم وعرض ٣٠سم (الشكل ١٣) (الشامي ٢٠٠٩ ب: ١-٢).

مبنى الملحق الغربي التابع للكنيسة

لقد تميزت الساحة الغربية خارج مبنى الكنيسة ببناء عدد من الحجرات تمثل ملحقات للكنيسة من تخزين للمياه وحجرات لتخزين المواد وأبار وقنوات لجمع مياه الأمطار، ويشمل هذا المبنى:

حجرة رقم ١: بناء الخزان: في الجهة الغربية من المنطقة A في الجزء الغربي من المربعين E1, E2 وكذلك المربعين F1, F2 في أقصى الجهة الغربية من التل مشرفاً على طريق المطار مباشرة. وفي أثناء التنقيب في هذه المربعات كشف عن بناء مستطيل أبعاده ٣,٨٠ X ٢,٩٠م وعرض الجدار الغربي ١,٢٠م، استخدمت حجارة ضخمة مشذبة أخذت من مبان رومانية أعيد استخدامها لم تحدد ماهيتها بعد، وكان السقف يحمل بواسطة عقد لا تزال أساساته باقية. بني الخزان على منحدر صخري طبيعي ينحدر باتجاه الغرب استعمل لجمع مياه الأمطار من خلال قناة شيدت بالمونة وكانت مغطاة بالواح من الحجارة الكلسية الصغيرة، حفر في أرضية زاوية الخزان الشمالية الشرقية أخدود غائر مستطيل الشكل بطول ١م وعرض ٣٠سم وعمقها ٣٠سم يعتقد بأنها كانت تستخدم لتصفية ما علق بالمياه من الشوائب.

أما القناة التي تنقل المياه للخزان فهي مستطيلة الشكل، شيدت أرضيتها وجوانبها من الإسمنت (المونة) وسقفت بحجارة كلسية عشوائية الشكل، طول القناة في الجهة الغربية ٣,٥٠م وعرضها ١٨سم وعمقها ١٠-١٥سم (الشكل ١٤).

الحجرة رقم ٢: "حجرة الخزن": تقع في الجهة الجنوبية الغربية من الموقع، مستطيلة الشكل طولها ٥م وعرضها ٢,٣٠م وعرض مدخلها ٨٣سم.



١٢. الرواق الجنوبي للكنيسة والذي أعيد استخدامه كحجرة للسكن في الفترة الأموية.



١٣. الدرج الذي أنشئ في فترة متأخرة في رواق الكنيسة الشمالي في الجهة الشرقية.



١٤. جزء من قناة الماء في الجهة الغربية.



١٦. القبر النصف برميلي أسفل الحجرة رقم ٣.

الحجرة رقم ٤: تقع في الجهة الشمالية الغربية وهي مستطيلة الشكل صغيرة أغلب جدرانها منهاره لم يبق منها إلا الأساسات وبعض من مدمك أو إثنين. يقع المدخل في الجدار الشرقي وهو بعرض ٧٨ سم.

الحجرة رقم ٥: صغيرة مستطيلة الشكل تميزت بوجود بئر في الزاوية الشمالية الغربية قطره من الداخل ٣٦ م ومن الخارج ٦٠ م بالإضافة لحوض عميق محفور بالصخر الطبيعي مغطى بالبلستر في الزاوية الجنوبية الغربية بطول ١ م عرض ٧٠ م وارتفاع ٦٣ م، وجرن من الحجر الجيري صغير في الزاوية الشمالية الغربية بطول ٦٣ م عرض ٤٥ م وارتفاع ٢٨ م. يقع المدخل في الجدار الجنوبي في أقصى الزاوية الجنوبية الشرقية بعرض ٨٤ م. تميز الجدار الشرقي بطول ٣٢ م عرض ٩٠ م وهو مكون من حجرين موجهين من الداخل والخارج (الشامي ٢٠٠٩ ب: ٣-٥).

حجرة رواق الكنيسة الشمالي: حجرة مستطيلة أبعادها ٤ م X ٢ م، تقع في الجهة الشمالية من المبنى في نهاية رواق الكنيسة الشمالي. يقع المدخل في الجدار الشمالي مغطى بالبلستر عرضه ٦٢ م وارتفاعه ٣٢ م، يبلغ عرض العتب السفلي ٤٠ م وارتفاعه ٢٦ م أما الجدار



١٧. الحجرة الشمالية التي أنشئت في رواق الكنيسة الشمالي في الفترة الأموية.

تغطي الأرضية فسيفساء على شكل مكعبات حجرية بيضاء اللون تبلغ قياسات المكعب الواحد ٢ X ٢ سم ولكنها تالفة. تم تبليط أرضية الغرفة ببلاط مكون من ألواح حجرية وهي أقدم من الأرضية الفسيفسائية، ولا تزال بحالة جيدة باستثناء الجزء الذي يقع في منتصف الأرضية الذي تعرض للانهار. تميزت هذه الحجرة بوجود عدد من الكسر الفخارية التي تمثل جرار خزين ضخمة محطمة في الجهة الشرقية من الحجرة بالإضافة للكسر الحجرية البازلتية.

الحجرة رقم ٣: تقع في الجهة الغربية وهي مستطيلة الشكل أبعادها ٥ م X ٢,٦٠ م. جدارها الغربي منهار تماما طوله ٢,٦٠ م عرضه ١ م بارتفاع ٢٠-٥٠ سم، في منتصفه حفراخدود غائر (قناة) لنقل الماء من أرضية الحجرة عبره للقناة الخارجية الرئيسية أسفل الجدار الموصل للخزان. يقع مدخل هذه الغرفة في الجدار الشرقي بعرض ٥٦ سم، أما السقف فيوجد به بقايا أساسات لقوسين يتجهان شمال - جنوب، قياسات حجارة القوس ٦٠ X ٣٠ سم. أما أرضية الحجرة فمغطاة بالفسيفساء الحجرية البيضاء ٢,٥ X ٣ سم، بعض الأجزاء تالفة (الشكل ١٥). يوجد في منتصف الأرضية فتحة تؤدي لقبو أسفل الحجرة شيد من حجارة كلسية مشذبة مقطوعة بإتقان، وفتحة القبو من الأعلى مستطيلة الشكل ٦١ X ٤٧ سم، ويفصل ما بين فتحة القبو وأرضية الفسيفساء إطار حجري مستطيل الشكل ١,٢٦ X ١,١٠ م ويظهر في الجهة الغربية في منتصف الحجرة غطاء حجري مكون من جزئين مساحته ٦٣ X ٥٥ سم.

القبو: تميزت هذه الحجرة بوجود قبو أسفلها على كامل المساحة بسقف نصف برميلي لبناء مستطيل الشكل طوله ٤ م وعرضه ١,٨٠ م، حفرت أرضيته في الصخر الطبيعي الطباشيري، إرتفاعه ١,٥٥ م فصل من الداخل ببناء حجري لقسمين مساحة الجزء الشرقي ١,٨٥ X ١,٨٠ م، أما مساحة الجزء الغربي ١,٨٨ X ١,٨٠ م طول الجدار الفاصل ١,٨٠ م وعرضه ٢٥ م وارتفاعه ٤٥ م، فتحة القبو من الأسفل تبلغ قياساتها ٥٠ X ٤٣ م أي أنها تتسع من الخارج وتضيق من الداخل (الشكل ١٦).



١٥. الحجرة رقم ٣ من ملحق الكنيسة في الجهة الغربية.

في الكنيسة الأولى أكبر من الحنية الحالية ويظهر ذلك بتغير في إطار الفسيفساء الموجود في أرضية الحنية، وفي بناء حاجز الكنيسة الذي يفصل الحنية - منطقة قدس الأقداس - عن صحن الكنيسة وبالتالي ربما تم بقصد إخفاء سطرين من النقش اليوناني التكريسي في عملية إعادة البناء الثانية وكذلك بناء أربعة أعمدة في أرضية الكنيسة الأولى أدت إلى تلف وفقدان بعض الأحرف من النص الكتابي اليوناني. أما في الفترة الأموية والتي يعتقد أن الكنيسة الأولى والثانية قد بنيت إبان الحكم الإسلامي فلم يطرأ تغيير كبير على عمارة الكنيسة ولكن وظفت مساحة الكنيسة لغايات السكن وخاصة في الرواقين الشمالي والجنوبي كحجرات للسكن دون أن يحدث تدمير مفتعل للأرضية الفسيفسائية.

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الغربي فهو مكون من صفين موجهين من حجارة كلسية إرتفاعه ١,٩٠ م (الشكل ١٧).

وفي الجهة الشرقية من الحجرة تم بناء جدار يفصلها إلى قسمين يتجه شمال - جنوب مكون من مدماك من الحجر الطباشيري طوله ٢ م عرضه ٢٠, ٢٥ - ٣٠ م وارتفاعه ٣٠ م، أزيل لاحقا لمتابعة الأرضية الفسيفسائية الملونة بأشكال هندسية متعددة، كما تميزت الحجرة بطبقة سميكة من الرماد بارتفاع ١ م وبقايا جذوع اشجار النخيل المتفحمة التي ربما كانت تمثل سقف الحجرة، عثر فوق الأرضية على عدد من الجرار والأباريق الفخارية الأموية صغيرة الحجم البعض منها كان مكتملاً كامل (الشكل ١٨).

التحليل التاريخي للحقب الزمنية في الموقع

بإنتهاء العمل من المرحلة الأولى لموسم ٢٠٠٩ فقد تم التنقيب بمساحة ٥٠٠ م تقريباً؛ وهي مساحة تعد ضئيلة بالنظر لمساحة الموقع الذي يمثل تلا أثريا كبيرا يتضمن عددا من الحقب الزمنية وذلك من خلال الكسر الفخارية المنتشرة على سطحه، فقد كشف التنقيب عن أدلة مادية تبين غنى الموقع وتمثله لحقب زمنية ثلاث منها الرومانية والتي لم يكشف عن عمارتها الأصلية المتكاملة حتى هذه اللحظة سوى الكتل الحجرية الضخمة التي أعيد استخدامها في عمارة الكنيسة. وفي نهاية القرن السادس وبداية القرن السابع الميلاديين مرت عمارة الكنيسة بعدد من التغييرات وعملية إعادة البناء لتشمل تغيرا في بناء الحنية فكانت الحنية



١٨. أباريق فخارية صغيرة وجدت في الحجرة الأموية ضمن طبقة الرماد فوق الأرضية الفسيفسائية في الرواق الشمالي من الكنيسة.

تحليل لختم روماني ذو نقوش يونانية من مدرج طبقة فحل (الاولديوم)

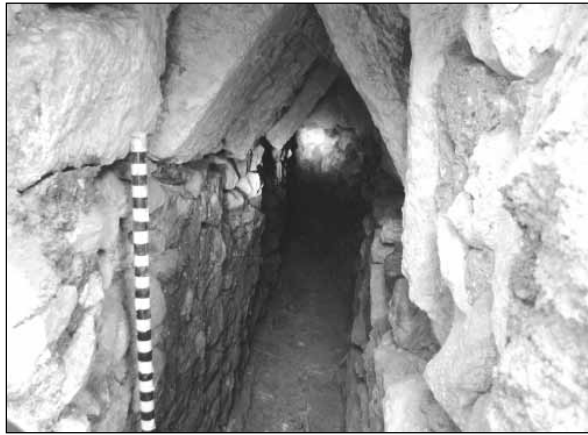
إسماعيل ملحم وعبد القادر الحصان

Abstract

The aim of this research is to study the Greek incipations on a small bronze seal discovered in Tabaqat fahl (Pella) Odeum dated back to the Byzantine Period. Words engraved on the seal are philosophical phrases that glorify morality, virtue and justice to achieve happiness. It is very close to the thoughts and beliefs of the Roman philosopher 'Seneca' or of his followers (4BC-65 AD).



١. منظر عام لمدرج طبقة فحل.



٢. منظر عام لقناة النفق / طبقة فحل.

مكونان من مجموعة أحرف يونانية، أما السطر الثاني وهو الأوسط فيتكون من ثلاثة حروف على جانبها زخرفة رأس رمح (الاشكال ٣، ٤، ٥). أما الترجمة إلى العربية فهي كالتالي:

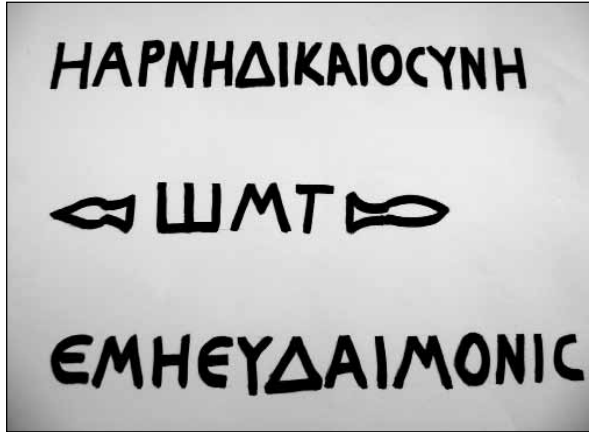
موقع الكشف

يقع مدرج طبقة فحل (الاولديوم) في مجرى وادي الجرم في وسط الموقع الأثري، وينخفض عن سطح البحر حوالي ٦٢ م، مما يجعل منه أخفض المسارح المدرجة في العالم، ويعود تاريخه لنهاية القرن الأول الميلادي. تعرض المسرح للإهمال في أواخر القرن السادس الميلادي، إلى أن أعيد إشغاله سكنياً في أواخر العصر البيزنطي مع بداية القرن السابع الميلادي. وقد أجرت دائرة الآثار العامة في المدرج تنقيبات أثرية خلال السنوات ٢٠٠٨ م، ٢٠٠٩ م، ٢٠١٠ م، استكمالاً للتنقيبات التي أجرتها كلية ووستر الأمريكية خلال السنوات ١٩٧٩م-١٩٨٠م، وأدت تنقيبات دائرة الآثار العامة التي ما زالت مستمرة إلى الكشف عن معظم أجزاء المدرج وأساسات لحجرات سكنية أقيمت فوق الأنقاض وسط المدرج وتؤرخ للقرن السابع الميلادي، وكذلك تم الكشف عن قناة نفقية لتصريف المياه تقع في الجهة الشرقية من المدرج، وأسفل الجدار الوقائي الممتد شرق-غرب، ويبدو أنها تلتف حول المدرج، وكانت على الأغلب تستوعب تدفق مياه السيول المياغة للوادي، أو مياه الينابيع المتدفقة حول المدرج (الشكلين ١، ٢).

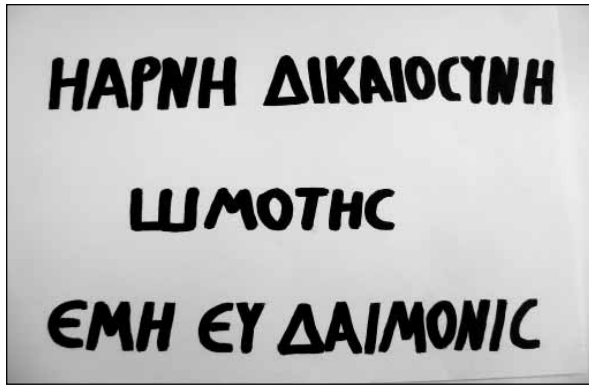
الكشف عن الختم

عثر في تنقيبات موسم ٢٠١٠م، على ختم برونزي صغير مستطيل الشكل بقياس (٧سم X ٢,٧سم) ووزنه (٩٣غم)، عليه كتابة منقوشة باللغة اليونانية الإغريقية بشكل نافر، وتتكون من ثلاثة أسطر، وللختم مقبض حلقي من الوجه الآخر. وجد هذا الختم ضمن طبقات الفترة البيزنطية المتأخرة ملقى بشكل عشوائي فوق أحد جدران الحجرات السكنية (حجرة رقم ١) في المربع B 61 في الجهة الجنوبية من المدرج، وذلك أثناء إزالة هذه الطبقات بشكل منهجي بهدف كشف كامل المعالم العمرانية للمدرج.

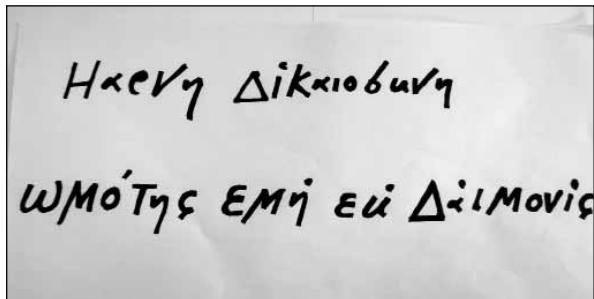
نص النقش: يتكون النقش من ثلاثة أسطر، السطران الأول و الثالث



٦. النقش اليوناني كما وجد.



٧. قراءة النقش اليوناني.



٨. نقحة النقش اليوناني.

الميلاديين، وهي الفترة الزمنية التي نشط فيها عمل المدرج (الاولديوم) في طبقة فحل / بيلا كمسرح للنشاطات الثقافية والموسيقية في بداية عهده، حيث كانت تؤدي عليه الحفلات الموسيقية والرقص والمسرحيات الإيمائية والهزلية والاجتماعات العامة، وكانت اللغة اليونانية في هذه المرحلة لغة الثقافة في العصر الروماني إلى جانب استعمال اللغة اللاتينية للأغراض الرسمية.

وتمثل العبارات التي وجدت على الختم البرونزي عبارات فلسفية تمجد الأخلاق والفضيلة، ويبدو أنها عبارات مميزة لأحد الشخصيات المهمة سياسياً أو أدبياً، وأريد منها أن تكون شعاراً ودعوة عامة إلى الفضيلة، ويمكن القول أنها تنتمي إلى المدرسة الفلسفية الرواقية



٣. الختم البرونزي المكتشف.



٤. الختم البرونزي المكتشف.



٥. مقبض الختم البرونزي المكتشف.

(إذا لم امتلك المعرفة، الاستقامة، العدالة، الحقيقة والعفة، فإنني سأكون بكل بساطة منحطاً ومشؤوماً وذليلاً).

التحليل

إن شكل الحروف في هذا الختم البرونزي تشير إلى انه من نمط الكتابة الإغريقية اليونانية التي استخدمت في القرنين الثاني والثالث

اسماعيل ملحم وعبد القادر الحصان: تحليل لختم روماني ذو نقوش يونانية من مدرج طبقة فحل (الاوليوم)

هذا الختم تأتي بأنه أحد الأختام المعدنية القليلة جداً التي عثر عليها في الأردن، إذ أن غالبية الأختام التي عثر عليها في المواقع الأثرية الأخرى كانت إما حجرية أو فخارية، والكتابة عليها تحمل أسماء أشخاص أو أدعية، وليس عبارات فلسفية.

اسماعيل ملحم
دائرة الآثار العامة

عبد القادر الحصان
دائرة الآثار العامة

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اليونانية، والتي ظهرت بعد فلسفة أرسطو، وتعتمد على إرساء الفضيلة، ومحاولة اصطناعها في الحياة العملية، وهي قريبة من طرح الفيلسوف والسياسي والمسرحي الروماني (سنيكا) (٤ق.م - ٦٥م) الذي يعتبر أحد المع الشخصيات الفلسفية والأدبية في التاريخ الروماني، وله عدة مسرحيات اتخذ بعضها طابعاً تراجمياً، يقول (سنيكا): (إن الفلسفة هي البحث عن الفضيلة نفسها، وبهذا تتحقق السعادة التي تمثلت في الزهد في اللذات ومزاولة التقشف والحرمان) و(إن التغلب على الرذيلة لأيسر من قمعها وصدها من بدايتها لأسهل من الاستيلاء عليها بعد ولوجها القلب).

أما عن وظيفة هذا الختم فهو على الأغلب مرتبط بالمكان الذي وجد فيه، وهو المسرح حيث كانت تطبع هذه العبارات المميزة على قطع فخارية أو على الجلد لتوزع على الجمهور لارتباطها على الأغلب بنص مسرحي يؤدي على خشبة المسرح، لا سيما وأن العبارة الواردة على الختم يحتمل أنها لفيلسوف مسرحي مثل (سنيكا) أو أحد أتباعه أو المتأثرين بفلسفته، كما لا يستبعد أن تختتم أيدي جرار فخارية من الحجم الكبير بمثل هذه العبارات التي تروج للفضيلة والأخلاق.

غير أن مثل هذه العبارات الفلسفية على هذا الختم مثير استغراب وندرة، إذ أن مثل هذه العبارات تكون موجودة في العادة على الحجارة كالتى وجدت في موقع أم قيس على لسان الشاعر (ارابيوس) وتؤرخ إلى سنة ٣٥٥م / ٣٦٥م والتي نصها (إليك أقول أيها المار، كما أنت، كنت أنا، وكما أنا تصير أنت، فتمتع بالحياة كأنك تموت غداً). وهي تعبير عن فلسفة ساخرة من الحياة متأثرة بالتيار الفلسفي الابيقوري. كما أن ندرة

مراجعة في تاريخ قطعة عملة أموية نشرت في حولية دائرة الآثار

أديب أبو شمس

قطعة العملة التي تحمل الرقم الاردني ٨٩٩٣ حسب سجلات متحف الآثار الاردني، وساعد في الوصول إلى رقم القطعة السيدة عايدة نفوي بعد أن احضرت نسخة من مقالة السيد فرح معايعة، حولية دائرة الآثار العامة، عدد ٦، ٧، ص ٧٦-٨٠ لعام ١٩٦٦ مرفق بها كتاب موافقة عطوفة مدير عام الآثار الأستاذ الدكتور زياد السعد، تحت اسم نموذج وقائع رقم ٢٩٩٤/١٥/٤ تاريخ ٢٠١٠/٦/٣٠ م.

نبذة تاريخية

انه ومن خلال ما ورد بخصوص بداية ضرب العملة في العهد الاموي، فإن أول مسكوكة عربية خالصة سكّت، كانت في عهد الخليفة الاموي عبد الملك بن مروان سنة ٧٧ هـ (٦٩٧ م). ولهذا الانتاج قصة ذكرت من قبل المؤرخون، فقد استمر المسلمون يستخدمون في معاملاتهم التجارية النقود الساسانية العربية الفضية في المشرق العربي والنقود العربية البيزنطية الذهبية منها والنحاسية في المغرب العربي (أي أن طراز السك كان يعتمد القالب الخاص بهذه الامبراطوريات، رغم التغيير في جزء من الشكل المرسوم والمطلوب من قبل ممثلي القوى التجارية في هذه الامبراطوريات)، كان ذلك حتى أواخر حكم الخليفة عبد الملك بن مروان، فقد كانت تصل القطع النقدية هذه إلى المسلمين عن طريق التجارة، وخاصة تجارة ورق البردي الذي كان يصدر إلى القسطنطينية كعاصمة القوة السياسية والتجارية في ذلك الوقت. هذا الانتاج من قراطيس البردي كان يصنع في مصر ويحمل اسم السيد المسيح كون هذه الحرفة ما زالت تستعمل أختام وشارات الدولة البيزنطية التي كان يحق لها اصدار الفرمانات والتعليمات، وخاصة تلك التي تتعلق بالتجارة والمال، فقد هجرت بعض دور السك نتيجة لأوضاع الفساد والاستغلال الاقطاعي الذي ساد في نهاية حكم الامبراطورية البيزنطية (نهاية القرن السادس وحتى منتصف القرن السابع الميلادي).

من هنا كان لابد من التفكير بصيغة تثبت رسمية التعامل التجاري من خلال الدولة العربية الاسلامية الجديدة، حدث ذلك على يد الخليفة عبد الملك فأصدر أمراً بطبع البسمة على القراطيس المصدرة لروما، وجاء الرد من الحاكم البيزنطي عنيفاً ولا يتفق مع صيغة التعامل التي تعارف عليها الحكام على مر الأزمان، وذلك بالتوقف عن استخدام البسمة كشارة بديلة لما كان معروفاً زمن

على ضوء محادثة مع الاستاذ الدكتور فالح حسين بخصوص قطعة نقد تعود للعصر الاموي كانت قد نشرت في حولية دائرة الآثار لعام ١٩٦٦ العدد ٦-٧ للسيد فرح معايعة تحت عنوان (الشكل ١)

A Hoard of Ommayad Dinars from Orif (Orif is a village in Nablus district)

فقد اخبرني الاستاذ فالح عن ما ورد في تلك المقالة التي تشير إلى ان قطعة النقد قد أرخت إلى عام ثلاثة وسبعين للهجرة، وانه لم يكشف حتى الان عن قطعة عربية خالصة تعود لهذا التاريخ المتقدم في بداية عهد بني امية. ومن هنا كان لي جهد التمحيص والتدقيق لإثبات ذلك أو نفيه من خلال اعادة قراءة هذه القطعة والتعليق عليها لهدف الدراسة والبحث، كون التاريخ والطراز يمكن ان يحدث فجوة حضارية اقتصادية لم تشر اليها الابحاث والدراسات حتى الان. وقد تكون بمثابة ثورة جديدة في الاقتصاد المالي في العهد الاموي والتاريخ العربي الاسلامي بشكل مميز، وتمثل هذه الثورة استكمال السيادة وتدعيم البنيان الاقتصادي لهذه الدولة الفتية (الاستقلال الاقتصادي).

لذا تقدمت بطلب إلى دائرة الآثار العامة للسماح لي القيام بدراسة



١ . صورة لصفحة من مقال السيد فرح معايعة تظهر قطعة العملة موضوع الدراسة.

الحكم البيزنطي. ذكر ذلك البلازدي، وابن الاثير، والدميري (نشرة معهد الآثار والأنثروبولوجيا / جامعة اليرموك - اربد ٢٠٠٢ تحت عنوان: نقود إسلامية تاريخية).

ساعد التقدم الاقتصادي والتجاري الذي صاحب فترة الفتوحات العربية الإسلامية، على ضرب نقد عربي خالص، يفهم من خلاله وجود سوق تجاري قوي ثابت لا يوصف بقوة السلاح فحسب بل يتميز بوجود نظام مؤسسي حضاري واقتصادي يعتمد دواوين ادارية تنفذ سياسة العدل والمساواة للشعوب التي تعيش الان تحت راية الدولة العربية الإسلامية، وتبرز كيانا مستقلا بين القوى المؤثرة في المنطقة على مر التاريخ الماضي، وهذا يعني ظهور قوة تجارية وسوق منافس. ومن هنا كان لا بد من تعزيز قواعد الحضارة العربية الإسلامية التي انبثقت من العقيدة الجديدة، لهذا كان لابد لتدبر الامر لتصبح اللغة العربية لغة رسمية للدولة بدلا من اللغات الاغريقية واللاتينية والفارسية التي كانت مستخدمة بين ارباب التجارة والصناعة والحكام الاداريين على مستوى ما يعرف الان بالوطن العربي من مشرقه إلى مغربه.

كانت اول عملة عربية إسلامية ضربت عبارة عن تقليد للنقود البيزنطية والساسانية، فقد كانت مشابهة تماما للسوليدوس البيزنطي Solidus من حيث الحجم والوزن، فكان على الوجه رسم لثلاثة اشخاص وعلى الظهر تحوير للصليب (على شكل عمود يقف على درج وتعلوه كرة) وفي المدار حول هذا الشكل: **لا اله الا الله-وحده-محمد رسول الله.**

وكان أن ظهر التحدي بهذا الامر من خلال الحكام أنفسهم حيث أصدر الامبراطور البيزنطي جستنيان الثاني أمراً بضرب نقد يحمل راس السيد المسيح عليه افضل السلام وعلى الظهر صورة الامبراطور بلباسه التقليدي (الثوب الملكي) حاملا الصليب، وبهذا ضرب اول دينار سنة ٧٤هـ يحمل صورة الخليفة عبد الملك بلباسه العربي التقليدي واضعا يده على مقبض سيفه المغمد وكتب حول صورة الخليفة عبارة: **بسم الله لا اله الا الله-وحده-محمد رسول الله**، وعلى ظهر العملة صورة العمود نفسه وكتب حوله في المدار: **بسم الله ضرب هذا الدين سنة اربع وسبعين.** ولكن الخطوة التي اظهرت النقد العربي الخالص كانت عام ٧٧هـ التي اشرت اليها في التقديم والتي اعادت جميع دور ضرب العملة إلى دار سك عربية إسلامية تنفيذا لامر صادر عن ديوان الخليفة الأموي باستخدام الدينار العربي الجديد في بلاد المسلمين كافة ومخالفة من ثبت انه ما زال يخالف ذلك المرسوم. وقد نقش بالخط الكوفي واستمر ذلك في العهد العباسي، حيث استبدل العباسيون آيات سورة الاخلاص بوضع **(محمد رسول الله)** وبقي ما عدا ذلك كما نقشه الأمويون.

نورد فيما يلي قراءة قطعة النقد التي أثارت الاهتمام من حيث التأريخ والتي تحمل نقشا بالعربية استمر استخدامه طيلة العهد الأموي: **وجه القطعة:** نقش بالعربية وكتب بالحرف الكوفي كما كتب على الظهر ايضا بنفس الخط.

الرقم الاردني: ٨٩٩٣ حسب سجلات متحف الآثار الاردني.

نوع المعدن: من الذهب الخالص.

فئة القطعة: دينار.

طريقة السك: قالب مفرغ بإطار محرز ضعيف، شكل خط هامشي حول الكتابة/ شكل حبل بارز

الشكل: دائري غير منتظم/ضعف في تصنيع القالب الاصلي.

القطر: ٩،٨ سم وقد يقل أو يزيد في بعض الاماكن كون الشكل دائري غير منتظم.

الوزن: ٤،٣٦ غم.

الوجه: نقش وسط قطعة العملة:

لا اله الا

الله وحده

لا شريك له

ونقش في المدار:

محمد رسول الله ارسله بالهدى ودين الحق ليظهره على الدين كله

جاءت كلمة محمد بشكل متقطع وكذلك كلمة كله في نهاية الاثر(الجملة).

الظهر: نقش في وسط قطعة العملة:

الله احد الله

الصمد لم يلد

ولم يولد

ونقش في المدار:

بسم الله ضرب هذا الدين سنة ثلاث وتسعين

نهاية حرف الميم (ذيلها) لم يكن واضحا أما بقية الحروف فقد كانت واضحة تماما للقارئ.

وهنا يتضح لنا اللبس الذي وقع، فكما ذكرت فإن ميم البسملة هنا قصيرة الذيل تماما كما جاء سابقا اي في نقش وسط قطعة العملة (الشكلين ٢، ٣).

كلمة ضرب: لوحظ وجود نقطة لحرف الباء وهذا غير معهود في كثير من قطع العملة التي سكنت في بداية العهد العربي الاسلامي، ولا يمكن اعتبار ذلك خلافا فنيا لدى صانع القالب.

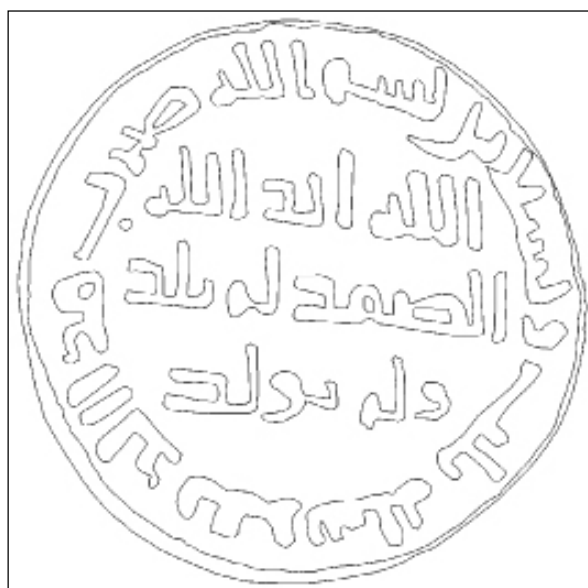
وفي كتابة كلمة تسعين: يلاحظ ما يلي، اولاً: سن حرف التاء واضح ويرتفع قليلاً عن أسنان حرف السين، وتعتبر هذه قاعدة في كتابة الخط العربي، اي عندما يلي هذا الحرف سين او شين فيجب ان يكون الحرف السابق بسن مرتفع ليظهر تماما أسنان حرف السين او الشين الذي يليه وقد استمر هذا حتى بعد ان اصبح حرف السين يكتب بدون أسنان وخاصة في مجال فن الخط العربي.

أسنان حرف السين وعددها ثلاثة واضحة في الرسم والصورة وكذلك يمكن ان يرى بالعين المجردة، وبذلك لا يوجد حرف آخر بعد حرف السين وقبل حرف العين، ويتضح هذا تماما في الصورة وعند القراءة، حيث ان الحرف الذي يلي حرف السين هو حرف العين الذي خط بشكل واضح لا يقبل التخمين او الشك، لعدم وجود اي حرف بسن يقع بين حرف السين وحرف العين. ومن هنا فان القراءة الصحيحة لهذه الكلمة هي (تسعين) وليس سبعين كما ورد في ما نشر بحولية

أديب أبو شميس: مراجعة في تأريخ قطعة عملة اموية نشرت في حولية دائرة الآثار



٢. شكل يوضح بالرسم وجه قطعة العملة على ضوء الرسم الهندسي والصورة الرقمية.



٣. صورة لظهر قطعة العملة مع الرسم.

مشكورة. كما ساعد في اخراج القطعة من القاصة السيد زهير الزعبي نائب أمينة المتحف وأمين العهدة لهذه المجموعة من النقود الذي تعاون مشكوراً في تسليمها لي للقيام بالتصوير والرسم والمشاهدة لعدة مرات بصبر الباحث. وقد يكون الشكر موصولاً للسيد قتيبة الدسوقي الرسام والمساح الذي بذل جهداً كبيراً في اعداد هذا الرسم والتوضيح لقطعة العملة، بعد المشورة والمتابعة كي يتعرف على طريقة كتابة الخط في العهد الاموي من قبلي وبإشرافي.

أديب أبو شميس

دائرة الآثار. وبما ان هذا العمل والبحث مرتبط بتدقيق المعلومة الواردة وتصحيح ما جاء في تلك الدراسة، فان تأريخ قطعة العملة هذه بعد الدراسة والاضطلاع والمقارنة من حيث القراءة الصحيحة وبعد اعادة رسمها، هي ثلاث وتسعين وليس ثلاث وسبعين كما جاء في دراسة السيد فرح معاينة.

الخاتمة

اعد هذا العمل بالتعاون مع أمينة متحف الآثار الأردني السيدة عايدة نفوي التي قامت بالتعرف على القطعة من المجموعة وساهمت في القراءة

المراجع

١٩٩١ مسكوكات العالمين القديم والاسلامي. عمان: البنك العربي.

حتامله، محمود

Sear, D., Bendall, S. and Ohara, M.

١٩٨٤ النقود العربية في متحف الآثار الاردني. رسالة

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by: London.

ماجستير: ص ١٤-٣٢.

القسوس، نايف والطراونه، خلف

مسكوكات غزنوية من متحف الآثار الأردني*

عائدة نفوي

الأثير ج: ٧-١٩٦-١٩٧)، هذا اللقب الذي عرف به محمود الغزنوي على مدى سنين حكمه، كما منحه القادر بالله لقب سلطان وبذلك فهو أول حاكم غزنوي يحمل هذا اللقب إلا أنه لم يظهر على مسكوكاته. يعتبر محمود الإبن الأكبر لسبكتكين المؤسس الحقيقي للدولة الغزنوية، حيث قام بتوطيد أركان الدولة بغزوه الهند والبنجاب سبع عشرة غزوة مدفوعاً بالعامل الإقتصادي وما جلبه من غنائم ويعامل الجهاد الديني والرغبة في نشر الإسلام على المذهب السني بين الهنود والوثنيين، فاستطاع نشر نفوذه إلى ما وراء البنجاب ولاهور وكان بذلك أول قائد مسلم يغزو الهند. يعتبر السلطان محمود من الشخصيات العظيمة في التاريخ الإسلامي بتوسيعه رقعة العالم الإسلامي وإنجازاته الحضارية والعلمية والأدبية، فقد أنشأ مدرسة في غزنة تأوي العلماء والأدباء (ابن الأثير ج: ٧-٢٤٧)، إضافة لإهتمامه بعمارة القصور والمساجد (حتى ج: ٢-٥٥٨-٥٥٩).

قائمة المسكوكات قيد الدراسة

الرقم المتحفي	العدد الإجمالي	المادة	السلطان / العدد
١٤٠٧٢	٨	ذهب	محمود / ٥ مسعود / ٣
١٤١٣٧	٦	ذهب	محمود / ٦
١٤٢١٨	٥	ذهب	محمود / ٣ مسعود / ٢
١٦٣٨٢	١	ذهب	مسعود / ١
١٥٤٩٨	٢٠	فضة	محمود / ٢٠

يضم متحف الآثار الأردني العديد من مجاميع المسكوكات الإسلامية التي يزخر بها المتحف، ومنها مسكوكات غزنوية ذهبية وفضية تعود لإثنين من السلاطين الغزنويين، محمود بن سبكتكين (٣٨٨-٤٢١ هـ / ٩٩٨-١٠٣٠ م)، وابنه مسعود الأول (٤٢١-٤٣١ هـ / ١٠٣٠-١٠٤١ م). بلغ عدد الدنانير الذهبية عشرين ديناراً، أربعة عشر منها تعود لمحمود وستة لمسعود، أما الدراهم الفضية والتي بلغ عددها أيضاً عشرين درهماً وهي من النوع كبير الحجم ومن طراز السيف (أي الذي نقش عليه شكل سيف) تعود لمحمود الغزنوي. ضرب الغزنويون مسكوكاتهم بشكل رئيس في ثلاث مدن غزنة^١ عاصمتهم وهرات^٢ ونيسابور^٣ وهذا ما تمثله الدنانير قيد الدراسة، أما الدراهم فضربت جميعها في مدينة أندرابه^٤.

من هم الغزنويين؟

الغزنويون هم من الموالي الأتراك الذين رفعهم بنو سامان إلى مراتب الشرف وأسندوا اليهم المناصب العالية، ومن ثم قاموا بإنشاء دولتهم بأفغانستان امتدت إلى الهند والبنجاب وبلاد ما وراء النهر منذ القرن الرابع الهجري ولدة مائتي عام من ٣٦٧-٥٨٣ هـ / ٩١٧-١١٨٧ م (Encyclopedia of Islam II: 1050). إن مؤسس الدولة الغزنوية هو الحاجب سبكتكين (٣٦٧-٣٨٧ هـ / ٩٧٦-٩٩٧ م) مولى ألبتكين وصهره والذي كان عاملاً لخراسان وهرات (زمباور ج: ٢-٤١٦) ومن ثم غزنة.

ولّى نوح الثاني الساماني محمود بن سبكتكين ولاية خراسان عام ٣٨٤ هـ ومنحه لقب سيف الدولة وأقام بنيسابور (ابن الأثير ج: ٧: ١٦٤). وفي عام ٣٨٩ هـ / ٩٩٩ م استولى محمود على غزنة وخراسان وأزال اسم السامانيين وخطب للقادر بالله واستقل بحكمها منفرداً فولاه القادر قيادة جيوش خراسان ولقبه يمين الدولة وأمين الملة (ابن

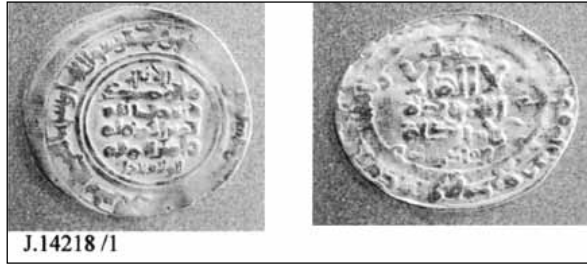
* - شارك هذا البحث في مؤتمر "المسكوكات الكوفية" الذي عقد في مدينة دمشق عام ٢٠٠٧ بإشراف المتحف الوطني الدنماركي.

١. غزنة عاصمة الغزنويين، تقع على الحدود ما بين خراسان والهند وينسب إليها العديد من العلماء (الحموي ج: ١: ٢٠١).

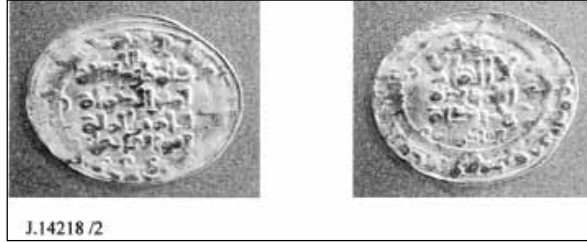
٢. هرات مدينة وإقليم من أقاليم خراسان الأربعة مع نيسابور ومرو وبلخ، ضربت

المسكوكات فيها منذ فجر الإسلام (الحموي ج: ٥: ٣٩٦).
٣. نيسابور عاصمة مقاطعة خراسان تقع إلى الشمال الشرقي من إيران بالقرب من مدينة مشهد، لها اسم آخر هو أبراشهر (الحموي ج: ٥: ٣٣٢-٣٣٣).
٤. أندرابه مدينة تقع ما بين غزنة وبلخ في أفغانستان الحديثة، محاطة بمناجم الفضة (الحموي ج: ١: ٢٦٠)

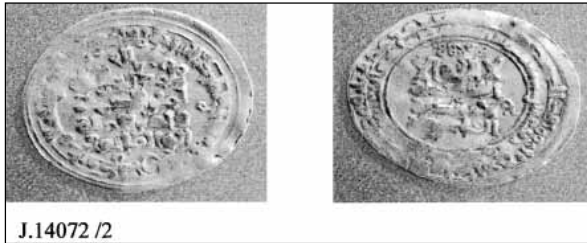
المأثورات الواردة على دنانير السلطان محمود



J.14218 /1



J.14218 /2

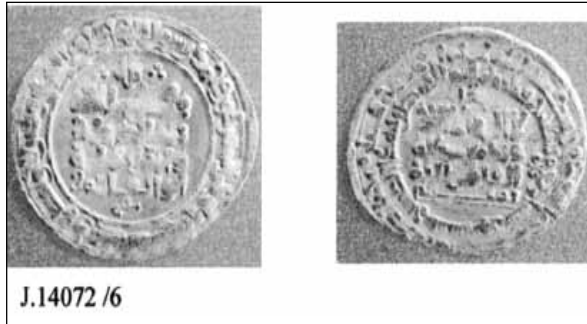


J.14072 /2

مركز الوجه	مركز الظهر
عدل	الله
لا اله الا	محمد رسول الله
الله وحده	يمين الدولة
لا شريك له	وأمين الملة
القادر بالله	ابو القاسم

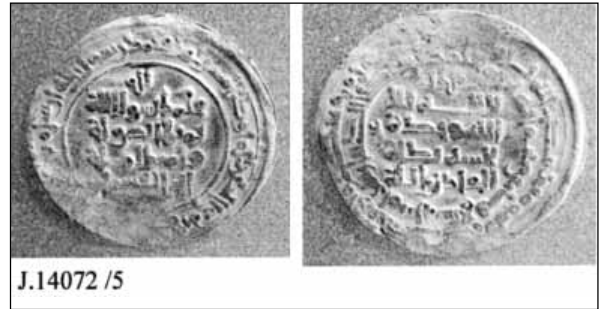
الطراز الثاني :- يمثل دنانير

الرقم المتحفي	القطر	الوزن	تاريخ ومدينة الضرب
٦ / ١٤٠٧٢	٢٥ ملم	٤,٠٦ غم	٣٩٤ هـ / نيسابور
١ / ١٤١٣٧	٢٥ ملم	٣,٦٠ غم	٣٩٤ هـ / نيسابور

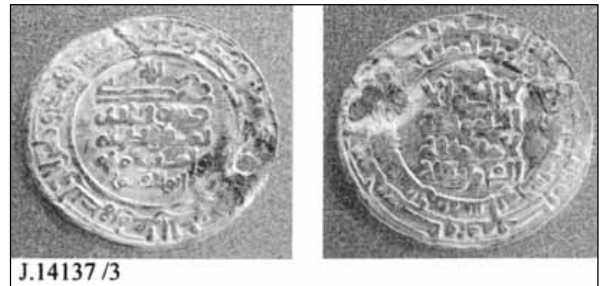


J.14072 /6

الرقم المتحفي	القطر	الوزن	تاريخ ومدينة الضرب
٥ / ١٤٠٧٢	٢٤ ملم	٤,٢٩ غم	٣٨٩ هـ / هرات
٣ / ١٤١٣٧	٢٥ ملم	٤,٦٢ غم	٣٩٨ هـ / نيسابور
١ / ١٤٢١٨	٢٤ ملم	٤,٠٨ غم	٤١٠ هـ / هرات
٢ / ١٤٢١٨	٢٣ ملم	٤,٤٤ غم	٤١٥ هـ / نيسابور
٢ / ١٤٠٧٢	٢٣ ملم	٤,٤٩ غم	٤١٧ هـ / غير واضحة

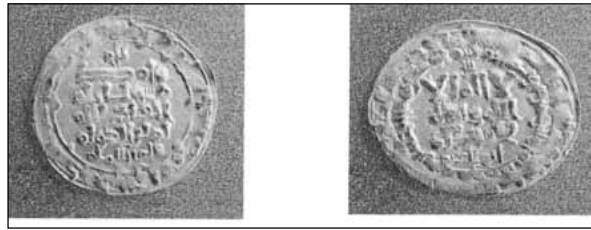


J.14072 /5



J.14137 /3

عائدة نغوي: مسكوكات غزنوية من متحف الآثار الأردني



مركز الظهر

محمد

رسول الله

صلى الله عليه

القادر بالله

يمين الدولة

و أمين الملة

مركز الوجه

(زخرفة)

لا اله الا

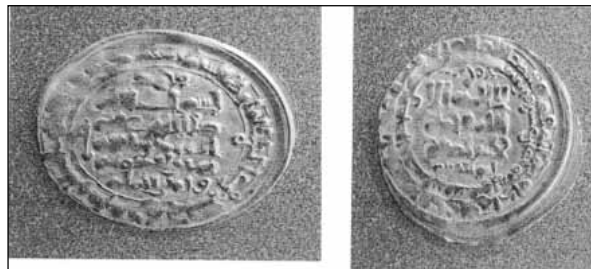
الله وحده

لا شريك له

ابو القاسم

الطراز الخامس:- يمثل دینار واحد فقط مشابه تماماً للطراز الرابع إلا أن عبارة "صلى الله عليه" غير واردة على ظهر الدينار، وسنة الضرب هي ٤١٥ هـ وليست ٤١٨ هـ.

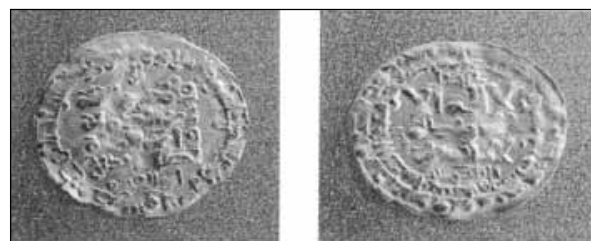
الرقم المتحفی	القطر	الوزن	تاریخ ومدينة الضرب
٧ / ١٤٠٧٢	٢٣ ملم	٤,٧٢ غم	٤١٥ هـ / نيسابور



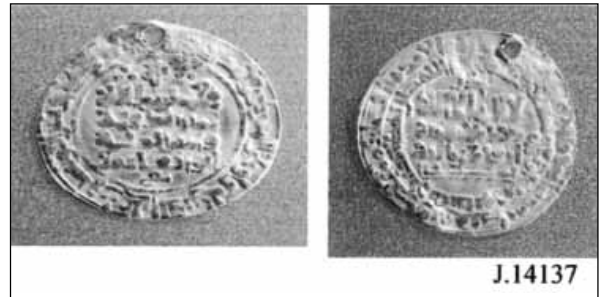
J.14072 /7

الطراز السادس:- يمثل دینار واحد

الرقم المتحفی	القطر	الوزن	تاریخ ومدينة الضرب
٢ / ١٤١٣٧	٢٣ ملم	٢,٦٨ غم	٤١٤ هـ / نيسابور



J.14137 /2



J.14137

مركز الظهر

• لله •

محمد رسول الله

يمين الدولة

و أمين الملة

ابو القاسم

(زخرفة)

مركز الوجه

عدل

لا اله الا

الله وحده

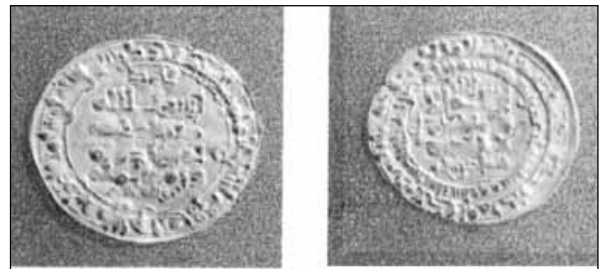
لا شريك له

القادر بالله

يميني **

الطراز الثالث :- يمثل دینار واحد

الرقم المتحفی	القطر	الوزن	تاریخ ومدينة الضرب
٨ / ١٤٠٧٢	٢٢ ملم	٢,٦٧ غم	٤١٨ هـ / نيسابور



J.14072/8

مركز الظهر

محمد

رسول الله

صلى الله عليه

يمين الدولة

و أمين الملة

ابو القاسم

مركز الوجه

(زخرفة)

لا اله الا

الله وحده

لا شريك له

القادر بالله

الطراز الرابع :- يمثل دینار واحد

الرقم المتحفی	القطر	الوزن	تاریخ ومدينة الضرب
٦ / ١٤١٣٧	٢٣ ملم	٣,٢٦ غم	٤١٨ هـ / نيسابور

** هذه الكلمة تشير إلى أن الخليفة يعتمد على صاحب اللقب اعتماده على يمينه (الباشا ١٩٨٩: ٥٤٤).

حولية دائرة الآثار العامة ٥٤ (٢٠١٠)

مركز الوجه، كما نقشت كنيته "أبو القاسم" على وجه الدينار ولقبه
يمين الدولة على الظهر بخط رفيع.

الطراز الثامن :- يمثل دينار واحد

الرقم المتحف	القطر	الوزن	تاريخ ومدينة الضرب
٣ / ١٤٢١٨	٢٤ ملم	٤,٣٨ غم	٣٩٧ هـ / نيسابور



J.14218/3

مركز الوجه	مركز الظهر
(زخرفة)	الله
لا اله الا	محمد رسول الله
الله وحده	يمين الدولة
أبو القاسم	وأمين الملة
يميني	أبو القاسم
	يميني

يلاحظ هنا عدم ذكر اسم الخليفة العباسي (القادر بالله) بينما
ورد لقب محمود (يميني) مرتين على الوجه والظهر^٨.

المجموعة الثانية من الدنانير الغزنوية تعود للسلطان مسعود
الأول بن محمود (٤٢١-٤٣١ هـ / ١٠٣٠-١٠٤١ م) خامس الحكام
الغزنويين الذي حمل لقب ناصر دين الله وحافظ عباد الله. وقد سار
مسعود على نهج والده بالفتوحات الا ان السلاجقة بدأوا بغزو بلاد
ما وراء النهر^٩ في السنة الأولى لحكمه وخسر خراسان في عام
٤٣١ هـ / ١٠٤٠ م، وبعد ذلك بدأت الدولة الغزنوية بالإضمحلال شيئاً
فشيئاً (Encyclopedia of Islam VI: 780).

بلغ عدد الدنانير التي تعود لمسعود ستة دنانير أمكن تصنيفها
إلى أربعة طرز تبعاً لما ورد على مركزي الوجه والظهر، بالنسبة
للطوق الأول والثاني على وجهي الدينار فقد كانت مأثورتهما
مطابقة تماماً لما على دنانير محمود الغزنوي.

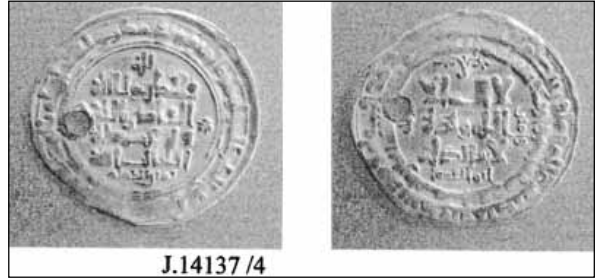
(النقشبدي ١٩٤٧ رقم ٧٣٨٧: ٣٠٥) وآخر مشابه للظهر في المتحف البريطاني
(Lane-Pool 1967: No. 466, p.203)
٨. دينار مشابه في المتحف العراقي (النقشبدي ١٩٤٧ رقم ٧٣٦٩: ٣٠٤ لكن سنة
الضرب ٣٩٤ هـ)، وآخر مشابه للظهر في المكتبة الوطنية بالقاهرة (Nicol et al.
1982: No.4809, p. 159).
٩. ما وراء النهر هي البلاد التي تقع ما وراء نهر جيحان (الموسوعة الإسلامية ج٨:
٢٣١ وج٢: ٥٠٢-٥٠٣)

مركز الوجه	مركز الظهر
عدل	الله
لا اله الا	محمد رسول الله
الله وحده	يمين الدولة
لا شريك له	وأمين الملة
القادر بالله	نظام الدين ^٦
	أبو القاسم

نقش اسم القادر هنا بخط دقيق.

الطراز السابع :- يمثل ديناران

الرقم المتحف	القطر	الوزن	تاريخ ومدينة الضرب
٤ / ١٤١٣٧	٢٥ ملم	٤,٠٦ غم	٤٠٥ هـ / نيسابور
٥ / ١٤١٣٧	٢٢ ملم	٤,١١ غم	٤٠٣ هـ / نيسابور



J.14137/4



J.14137/5

مركز الوجه	مركز الظهر
(زخرفة)	الله
لا اله الا	محمد رسول الله
الله وحده	* القادر بالله *
لا شريك له	ولي عهده
أبو القاسم	الغالب بالله ^٧
	يمين الدولة

تم تكملة لقب محمود "وأمين الملة" عمودياً على جانبي مأثورات

٦. لقب منحه الخليفة القادر بالله لمحمود عام ٤٠٤ هـ (ابن الأثير ج ٧: ٢٧١). دينار
مشابه في المتحف البريطاني (Lane-Pool 1967: No. 468p. p. 206)
وآخر في المتحف العراقي (النقشبدي ١٩٤٧ رقم ٧٣٧٧: ٣٠٦ ولكن سنة الضرب
هي ٤١٢ هـ) ودينار آخر في (Sourdel 1953: No. 133, p. 34) ضرب
هراة عام ٤١٠ هـ.
٧. الغالب بالله أبو الفضل ابن القادر بالله (ولي العهد) ولاء أبوه الخلافة من بعده
عام ٣٨٢ هـ / ٩٩٢ م ولكنه توفي عام ٤٠٩ هـ قبل أن يتولى الخلافة (ابن الأثير ج
٧: ٣٠٢) (الشهابي ١٩٩٥: ٧٤). دينار مشابه للوجه فقط في المتحف العراقي

عائدة نغوي: مسكوكات غزنوية من متحف الآثار الأردني

مركز الوجه	مركز الظهر
عدل	لله
لا اله الا	محمد رسول الله
الله وحده	القائم بأمر الله
لا شريك له	ناصر دين الله
مسعود	حافظ عباد الله

الطراز الثالث:- ويمثله دينار واحد

الرقم المتحفي	القطر	الوزن	تاريخ ومدينة الضرب
٥/ ١٤٢١٨	٢٦ ملم	٤,٥٤ غم	٤٢٩ هـ / غزنة



J.14218/5

مركز الوجه	مركز الظهر
• عدل •	• لله •
لا اله الا	محمد رسول الله
الله وحده	القائم بأمر الله
لا شريك له	ناصر دين الله
مسعود بن محمود	أبو سعيد

(زخرفة)

نقشت الكلمتين "مسعود بن" بأحرف متصلة بينما نقش اسم "محمود" بأحرف صغيرة فظهر حجم الاسم صغيراً مقارنة بكافة الكلمات ولا يظهر النطاق الثاني "لله الأمر من قبل.....الخ" على وجه الدينار.

الطراز الرابع:- ويمثله دينار واحد

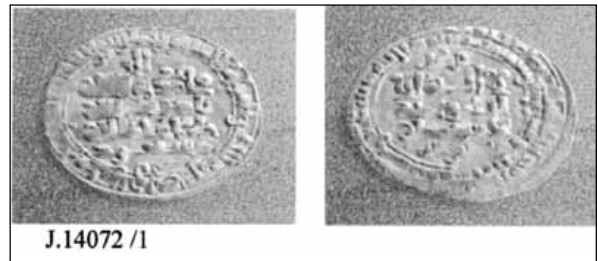
الرقم المتحفي	القطر	الوزن	تاريخ ومدينة الضرب
١٦٢٨٢	٢٥ ملم	٤,٦٧ غم	٤٢٩ هـ / غير واضحة



J.16382

الطراز الأول:- ويمثله دينار واحد

الرقم المتحفي	القطر	الوزن	تاريخ ومدينة الضرب
١/ ١٤٠٧٢	٢٣ ملم	٣,٦٧ غم	٤٢٣ هـ / غير واضحة

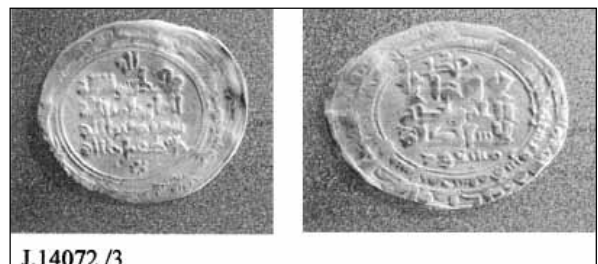


J.14072/1

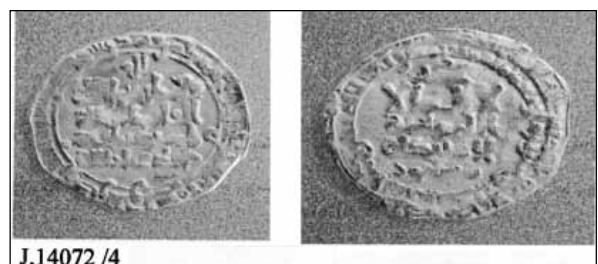
مركز الوجه	مركز الظهر
عدل	لله
لا اله الا	محمد رسول الله
لا شريك له	ناصر دين الله
القادر بالله	حافظ عباد الله
	مسعود

الطراز الثاني:- تمثله ثلاثة دنانير

الرقم المتحفي	القطر	الوزن	تاريخ ومدينة الضرب
٣/ ١٤٠٧٢	٢٣ ملم	٥,١٨ غم	٤٢٥ هـ / نيسابور
١٠/ ١٤٠٧٢	٢٣ ملم	٤,٤٥ غم	٤٢٦ هـ / نيسابور
٤/ ١٤٢١٨	٢٢ ملم	٤,٣٨ غم	٤٢٦ هـ / هرات



J.14072/3



J.14072/4



J.14218/4

(سورديل ١٩٥٣: رقم ٢٥٢).

١٠. تم نشر هذا الدينار سابقا (الطراوة ١٩٨٥: ١٣ العدد ٢٩)، دينار مشابه في



الختامة

- بعد دراسة هذه المجموعة من مسكوكات الغزنويين المتوفرة في متحف الآثار الأردني فقد تم تدوين الملاحظات التالية:
١. وردت كلمة عدل على أعلى كافة مراكز وجوه الدنانير بينما وردت كلمة لله على أعلى مراكز أظهر ثمانية عشر دينارا فقط من أصل عشرين دينارا.
 ٢. حوت معظم الدنانير زخارف متنوعة بشكل دوائر صغيرة أو نقاط نافرة أو شكل قلب أو لفائف العنب على أحد الوجهين.
 ٣. كتبت المآثورات في مركزي الوجهين ضمن دائرة واحدة أو دائرتين.
 ٤. خرجت بعض حروف نهايات الكلمات عن الدائرة المحيطة بمآثورة المركز، مثل حرف النون والقاف في عبارة "دين الحق"، وقد سبق وشوهد ذلك على المسكوكات لمختلف السلالات الإسلامية السابقة.
 ٥. ظهرت الكتابة بالخط الكوفي وبأحرف واضحة ومقروءة.
 ٦. ظهرت الكلمة التي تشير إلى فئة المسكوكة (دينار) بهذا الشكل وليست (دينر) كما كانت عليه في جميع الدنانير الأموية وفي الدنانير العباسية.
 ٧. ضرب الغزنويون مسكوكاتهم في ثلاث مدن رئيسية: غزنة وهرات ونيسابور (Broome 1985: 78).
 ٨. ترواحت أوزان الدنانير ما بين ٢,٦٧ غم-٤,٧٢ غم وكذلك ترواحت الأقطار ما بين ٢٢-٢٦ ملم.
 ٩. ظهر إسمي خليفتي عباسيين على المسكوكات؛ القادر بالله والقائم بأمر الله.
 ١٠. نتيجة لكثرة ألقاب السلاطين الغزنويين ولصغر حجم الدينار فقد اضطر ناقد السك إلى رصها أسفل بعضها البعض وأحيانا تكملة اللقب الوارد على وجه الدينار بشكل عامودي على الوجه الآخر.
 ١١. يبدو أنه ولأول مرة تظهر في هذه المجموعة عبارة "صلى الله عليه" على ظهر الدينار الغزنوي مقارنة بالمجموعات المنشورة من مقتنيات المتحف البريطاني والمتحف العراقي والمكتبة الوطنية في القاهرة. إلا أنها وردت في قازان ص ٤٥٠ مسكوكة رقم ١١٢٤.

مركز الظهر

* لله

محمد رسول الله

القائم بأمر الله

ناصر دين الله

مسعود

مركز الوجه

(زخرفة)

لا اله الا

الله وحده

لا شريك له

الدرهم الفضية كبيرة الحجم^{١١}

يحوي متحف الآثار الأردني عشرين درهما غزنوياً مضاعف الحجم مضروباً على ما يتعارف عليه بطراز السيف- Multiple dir-ham, Sword type وتعود كلها للسلطان محمود والتي ضربت بمدينة أندرابه عام ٣٨٩هـ. كانت أندرابه مدينة الضرب الرئيسية في طوخارستان (أفغانستان اليوم) محاطة بالعديد من مناجم الفضة (Mitchiner 1973: 112) وهذا يفسر كبر الحجم والوزن، إذ تراوحت أقطار الدراهم ما بين ٤٦-٤٩ ملم، كما تراوحت الأوزان ما بين ٧,١٧ غم-١٣,٤٥ غم، علماً أنه بدأ سك الدراهم الكبيرة فيها منذ عام ٣٦٦هـ وحتى ٣٨٩هـ.

الدراهم العشرون تحمل نفس المآثورات والتاريخ واسم مدينة الضرب على وجهيها، الاختلاف فقط بالقطر والوزن كما هو مذكور سابقاً.

مركز الظهر

لله

محمد رسول

الله يمين الدولة

وأمين الملة

محمود

مركز الوجه

٠ ٠

لا اله الا

الله وحده

لا شريك له

القادر بالله

(شكل سيف)

يعتبر السيف أحد الأشكال الإستثنائية التي ظهرت على المسكوكات الإسلامية.

الطوق الأول

بسم الله باندراية سنة (٣٨٩)

محمد رسول الله أرسله بالهدى الخ.

الطوق الثاني

بلكاتكين العباد

عدل الحاجب

بلكاتكين هو والي السامانيين في بلخ منذ ٣٢٤هـ (زامباور ج ٢: ٤١٦) وهو من نفس أصول محمود، والحاجب لقب يعود لسبكتكين والد محمود الذي كان والياً لخراسان منذ عهد السامانيين ثم انشأ دولته في غزنة.

١١. درهم مشابه في (Mitchiner 1973: type AN, p. 117)

عائدة نفوي: مسكوكات غزنوية من متحف الآثار الأردني

الطراونة، خلف

١٩٨٥ المسكوكات الإسلامية العباسية في متحف الآثار الأردني.

حولية دائرة الآثار العامة ٢٩: ٧-١٧.

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١٢. لوحظ عدم ورود دنانير محمود الغزنوي لسني حكمه (٣٨٨ و٣٩٦ و٤٠٤ و٤٠٦ (وردت في قازان مسكوكة رقم ١١١٨) و٤٠٨ و٤١٦ و٤٢٠ (وردت في قازان مسكوكة رقم ١١٢٦). وأخيراً ٤٢١ هـ (وردت في قازان مسكوكة رقم ١١٢٧) كما ذكر الأستاذ ناصر النقشبدي في بحثه بعنوان "الدينار الإسلامي للوك الطوائف" (النقشبدي ١٩٤٧: ٣٠٢).

عائدة نفوي

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حتي، فيليب

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زامباور، إدوارد

١٩٨٠ معجم الأنساب والأسرات الحاكمة في التاريخ

الإسلامي. الجزء الثاني، ترجمة حسن زكي.

الشهابي، قتيبة

١٩٩٥ معجم أرباب السلطان في الدول الإسلامية من العصر

الراشدي وحتى بداية القرن العشرين. وزارة الثقافة،

مكتبة الأسد: دمشق.

قالب لصناعة الحلي والمجوهرات من تل دير علا

زيدان كفاقي

مقدمة

اجتمع الفريق الأردني - الهولندي في شتاء عام ١٩٩٦م من أجل استئناف أعمال التنقيب في تل دير علا. ومن المعروف أن أول من بدأ أعمال التنقيبات الأثرية في التل كان الهولندي هنك فرانكن من جامعة لايدن في عام ١٩٦٠م. ومن ثم تحول المشروع في عام ١٩٧٦م إلى مشروع مشترك بين دائرة الآثار العامة الأردنية ويمثلها الدكتور معاوية ابراهيم، وجامعة لايدن الهولندية ويمثلها هنك فرانكن، ومن ثم خلفه في نهاية السبعينات الدكتور خيرت فان دير كوي. وبعد أن انضم الدكتور معاوية ابراهيم إلى جامعة اليرموك عام ١٩٧٩م، تحول المشروع إلى مشروع مشترك بين المؤسسات الثلاث المذكورة أعلاه. وبعد أن انتقل الدكتور معاوية للعمل في جامعة السلطان قابوس، خلفه في إدارة المشروع من جامعة اليرموك الدكتور زيدان كفاقي.

وكعادة كل موسم من حفريات تل دير علا الأثرية، يتقاطر المشاركون قبل بدء العمل بيوم أو أيام إلى محطة تل دير علا، ومن ثم يوزعون على العمل كل حسب اختصاصه، فالآثاريون يوزعون على مناطق التنقيب للإشراف على عملية الحفر، والرسامون يبقون في محطة الأبحاث الأثرية، التي بنيت قريبة جداً من السفح الجنوبي للتل، وعندما تمطر السماء أو تهب الرياح الشرقية، يخلد الجميع للراحة حتى تتوقف، بعد ذلك يقوم بعض أفراد الفريق بالذهاب والسير على سطح التل وأعينهم ملتصقة إلى الأرض بحثاً عن قطعة أثرية كشفت عنها الأمطار وانحدرت مع المياه إلى السطح. وهنا تبدأ قصة قالب المجوهرات الذي هو محور حديثنا.

كان موسم الحفريات في عام ١٩٩٦م ممطراً، وكثرت فيه الرياح الشرقية. وفي أحد الأيام قرر الرسام هيجو دي ريدو الذهاب إلى سطح التل على خفيف عن نفسه بعض الضجر، لعدم وجود ما يرسمه، وبحثاً عن قطعة أثرية جلبتها الأمطار إلى سطح التل. وكان له ما أراد، عاد إلى محطة البحث يحمل في يده حجراً مسطحاً محفور عليه أشكال زخرفية، عرض الأمر على الآثاريين الذين اكتشفوا أن ما عثر عليه السيد هيجو ما هو إلا قالب لصناعة الحلي والمجوهرات، خاصة الأقراط والخواتم، وقاموا بكتابة الأبحاث حوله (Kafafi 2009). وحيث أن هذه القطعة الأثرية فريدة من نوعها، ولأسباب أخرى نجملها أدناه، فهي بهذا تعد قطعة متحفية تستحق العرض والملاحظة، وللأسباب التالية:

١. ندرة وجود هذا القالب في الأردن والمنطقة، إذ لم يعثر حتى الآن على أمثلة مشابهة له إلا من موقعين في سوريا هما رأس شمرة على ساحل البحر المتوسط بالقرب من اللاذقية، وتل باز في حوض نهر الفرات الأوسط.
٢. عمره الذي يبلغ حوالي ٣٣٠٠ عام.
٣. الاستدلال على أشكال الحلي والمجوهرات التي كانت تلبس في تلك الفترة من خلال معرفة الأشكال المحفورة على القالب.
٤. يدل وجود قوالب مماثلة في مناطق بعيدة عن الأردن على وجود اتصالات حضارية بعيدة لهذا البلد منذ القدم.
٥. المادة المصنوع منها القالب غير متوفرة في الأردن، حسب نتائج التحليل التي تمت في مختبرات كلية الآثار والأنثروبولوجيا في جامعة اليرموك.
٦. تحتاج عملية استخدام القالب إلى أناس متخصصين ومهرة في صناعة المجوهرات، وهذا يعني توفرهم في تل دير علا خلال ذلك الوقت.
٧. لصناعة المجوهرات والحلي المحفورة أشكالها على القالب، لا بد من توفر المواد الخام التي تصنع منها، وهذا يعني وجودها في الأردن.

صناعة المعادن في الأردن

لا نريد في هذه العجالة أن نتحدث بالتفصيل حول صناعة المعادن في الأردن، لكننا أردنا أن نعرف القاريء برؤوس أقلام حول هذا الموضوع، ونترك الأمر للمختصين بعد ذلك ليشرحوا للناس هذا الأمر الهام. كما نود أن ننبه إلى أن القالب قيد الدراسة، واعتماداً على دراسة المقارنة مع قوالب أخرى عثر عليها في مواقع سورية، يؤرخ للفترة الواقعة بين حوالي ١٣٠٠ وحتى ١٢٠٠ قبل الميلاد. كذلك وحتى الآن لم يعثر في الأردن على أية مشاغل لصناعة الحلي والأواني البرونزية في شمالي الأردن تعود للفترة المذكورة أعلاه، لكن التقارير المنشورة حول نتائج الحفريات الأثرية في موقع تل دير علا تؤكد على وجود دلائل على صناعة الحديد في الموقع خلال القرنين الثاني عشر والحادي عشر قبل الميلاد (Ibrahim and van der Kooij 1989; Kafafi 2009). وصرح هنك فرانكن أن سكان الموقع في هذه الفترة كانوا شبه - بدو، أي يمارسون الزراعة إضافة لتربية الحيوانات.

صناعة الحلي والمجوهرات

عرف الناس الحلي والمجوهرات منذ عصور ما قبل التاريخ، لكن موادها الخام وطريقة صنعها وأشكالها اختلفت من فترة لأخرى ومن مجتمع لآخر (Maxwell-Hyslob 1971). وازداد استخدام الناس لأدوات الزينة هذه بشكل خاص بعد أن استقر في قرى، ومن ثم في مدن، واستطاع أن يطور من طرق تصنيعه، وأن ينوع في المواد الخام المصنعة. وعثرنا في الأردن على مجموعات متعددة في مواقع تعود للعصر الحجري الحديث (المجتمعات الزراعية الأولى) في مواقع متعددة مثل عين غزال والبسطة والبعجة (Al Nahar 1993)، وفي معظم الحالات تصنع الحلي والمجوهرات من خامات نادرة وغالية الثمن. لذا، نجد أن لها قيمتان، الأولى جمالية، والثانية مادية.

وحيث أننا نتحدث عن المواد الخام المستخدمة في صناعة الحلي، فإن أول ما يقفز إلى ذهن القارئ معدن الذهب، ومتى استخدم. في الحقيقة أن صناعة الحلي من هذا المعدن الثمين بدأت في مرحلة متأخرة جداً عن استخدام المعادن الأخرى مثل النحاس والبرونز والحديد. والأسباب وراء هذه المسألة معروفة، إذ أن خامات الذهب نادرة جداً، هذا أولاً، وثانياً أن عملية تصنيع الحلي وغيرها من الأدوات من معدن الذهب تتطلب درجة حرارة أعلى من درجة صهر المعادن الأخرى. ونود أن نغتنم فرصة الحديث حول استخدام معدن الذهب في صناعة الحلي والمجوهرات لنذكر أنه عثر في أحد المقابر بشمال فلسطين المؤرخة للألف الخامس قبل الميلاد على مجموعة من الخلاخيل والأساور الذهبية، لكنها لم تكن مصنعة، بل مطروقة طرقة (Gopher et al. 1990)، كما عثر في عدد من المواقع والقبور في الأردن وفلسطين، المؤرخة لنهاية الألف الثاني قبل الميلاد مثل تل وقاص/تل القرح، تل السعيدية، بيسان، أبو حوام، تل المتسلم وتل العجول على مجموعة من الخزف والأقراط المصنوعة من خامات مختلفة (Hamilton 1935; Loud 1948; Hard- ing 1953; Yadin et al. 1961; Negbi 1970; Pritchard 1980).

قالب تل دير علا لصناعة الحلي

ذكرنا أعلاه أن هذا القالب وجد عن طريق الصدفة، واعتماداً على دراسة المقارنة مع قوالب أخرى وجدت في موقعي رأس شمرة وتل باز في سوريا، فإنه يؤرخ للفترة بين حوالي ١٣٠٠ - ١٢٠٠ قبل الميلاد. تبلغ أبعاد قالب تل دير علا ١٢,٥ سنتيمتراً في الطول، و ٦,٥ سنتيمتراً عرضاً. وعند العثور عليه كان في حالة جيدة، إلا أن بعض أطرافه جاءت مهشمة بفعل عاديات الزمن (الشكل ١). كما لوحظ وجود ثقب فيه ربما عمل لتثبيت غطاءه (هذا إن كان له غطاء)، أو ربما لتعليقه. وللتعرف على المادة التي صنع منها هذا القالب ومكوناتها، تم دراستها وتحليلها في مختبرات كلية الآثار والأنثروبولوجيا في جامعة اليرموك باستخدام طريقة (X-Ray). وبعد التحليل، تبين أن القالب مصنع من مادة غير متوفرة في الأردن هي السرينتينيت (Serpentinite). وباعتقاد

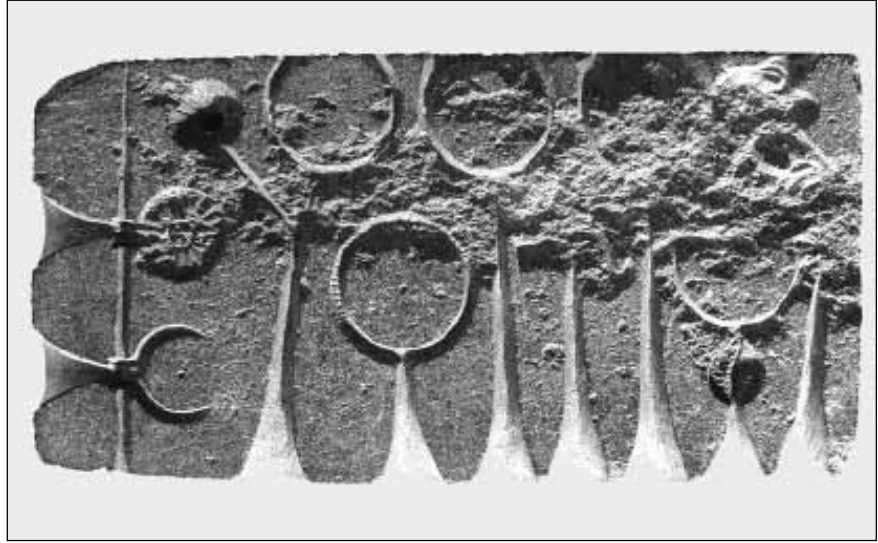
تحتاج صناعة وتصنيع الأدوات المعدنية جهداً ومهارة تختلف عن الصناعات الأخرى. فأولاً يجب توفر المادة الخام، حيث تبدأ عملية استخراج المعدن من محجره (التعدين)، وبعدها يصهر بعد أن يتم وضعه في بوتقة أو فرن لتصل درجة الحرارة المطلوبة، وهذا يتطلب وجود مواد اشتعال من حطب أو غيره، وبعد هذا يطرق أو يصب في قالب حتى يتم الوصول لشكل الأداة أو الإناء المطلوب، وبالإضافة لهذا، فإن الوصول للمبتغى يتطلب أيضاً توفير التمويل اللازم، والأيدي الماهرة لذا رأى بعض الباحثين أن مثل هذه الأمور لا تتوفر إلا في مكانين هما: المعبد والقصر (Philip 1991).

ولا يفترض بنا الإعتقاد دوماً بأن العثور على أدوات معدنية في مكان ما أنها صنعت في نفس المكان، بل يجب أن تتوفر في الموقع أماكن وتجهيزات التصنيع. كذلك على الباحث الأخذ بعين الاعتبار أنه وفي كثير من الحالات فإن مصانع الأدوات المعدنية قد تكون في مناطق بعيدة، وأن ما يكتشف منها في بعض المواقع يكون قد جلب بوسائل متعددة منها التجارة، والهجرات البشرية.

وإذا ما عدنا بالحديث حول صناعة المعادن في الأردن، نستطيع القول أن خامات النحاس تتوافر بكثرة في منطقة وادي عربة، مثل وادي فينان. أما خامات الحديد فهي متوافرة في جبال عجلون في منطقة مغارة الوردية. ويقوم بالتنقيب في الموقع الأخير فريق من متحف الأردن بإشراف الدكتور يوشع العمري. وربما يعتقد بعض الناس أن صناعة النحاس شاعت خلال العصر الحجري النحاسي (حوالي ٤٥٠٠ - ٣٥٠٠ قبل الميلاد)، لكن هذا الإعتقاد غير دقيق. إذ أنها عرفت في هذا العصر وعثر على عدد قليل من الأدوات المصنعة من هذا المعدن، وأن أفضل الأمثلة من منطقة جنوبي بلاد الشام جاءت من موقع اسمه وادي محرس (أو بالإنجليزية Nahal Mishmar). إنه من المتداول بين الباحثين أن صناعة النحاس شاعت وازدهرت خلال العصر البرونزي القديم (حوالي ٣٥٠٠ - ٢٠٠٠ قبل الميلاد)، وهذا الأمر ينطبق على صناعة البرونز، حيث أن معرفة خلط النحاس مع القصدير لاستخراج معدن البرونز عرفت في نهاية الألف الرابع قبل الميلاد، إلا أن صناعة البرونز ازدهرت خلال العصر البرونزي المتوسط خلال النصف الأول من الألف الثاني قبل الميلاد.

وحيث أن قالب الحلي قيد الدراسة يؤرخ للقرن الثالث عشر قبل الميلاد، أي نهاية العصر البرونزي المتأخر، إذن أين نجد أفضل الأمثلة على الصناعات المعدنية سواء الحلي أو الأسلحة أو الأواني. لقد عثر على حلي ومجوهرات في مواقع متعددة في الأردن تعود للمرحلة الأخيرة من العصر البرونزي المتأخر، ومنها، تل السعيدية، تل أبو الخرز، دير علا في غور الأردن، سحم في محافظة إربد وأم الدنانير في حوض البقعة/شمال عمان. وبعض هذه المعثورات معروضة في المتاحف الأردنية، ومن أهمها مجموعة معبد مطار عمان/ماركا، والمعروضة في متحف الآثار الأردني/جبل القلعة في عمان.

زيدان كفاقي: قالب لصناعة الحلي والمجوهرات من تل دير علا



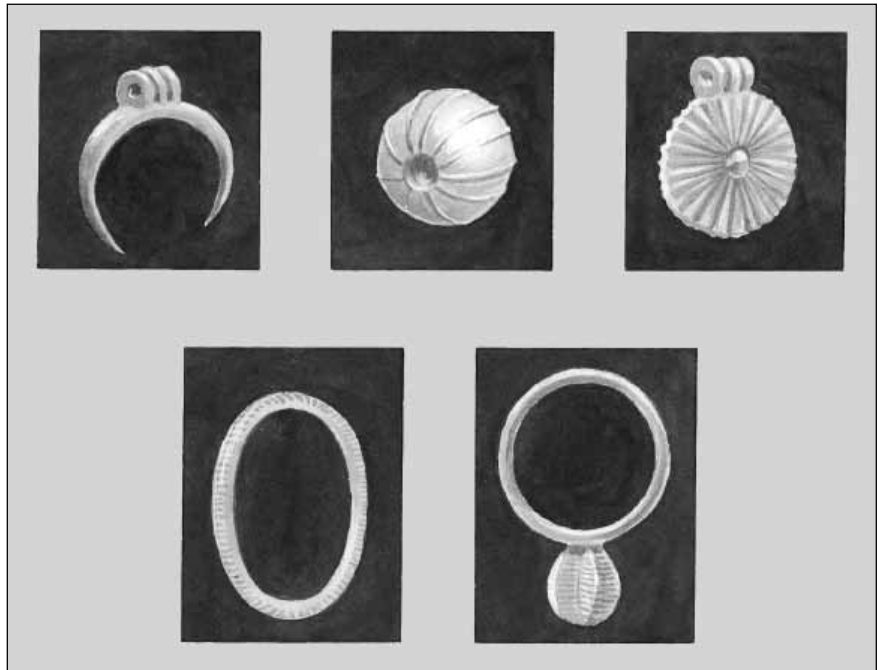
١. قالب لصناعة الحلي من تل دير علا (تصوير يوسف الزعبي).

أشكالاً محلية، لها ميزات الخاصة بها (Sass 1997: 242). ونقدم أدناه دراسة مختصرة لكل شكل من الأشكال التي تم التعرف عليها في القالب. **الخواتم:** عثر على خواتم مشابهة لتلك المحفورة على القالب في عدد من المواقع في الأردن، نذكر منها: سحم/بالقرب من مدينة إربد، وكانت مصنوعة من الفضة المعروف أن أقرب مصدر لخامات الفضة للأردن هو جنوبي تركيا. كما عثر في بلدة أم الدنانير في حوض البقعة شمالي عمان على عدد من الخواتم الملبسة بمعدن النحاس وتؤرخ للفترة الانتقالية بين العصر البرونزي المتأخر والعصر الحديدي (حوالي ١٣٠٠ - ١٢٠٠ قبل الميلاد) (McGovern 1986: 248, pl. 31).

الدكتور مصطفى النداف أن هذه المادة متوفرة في بلاد اليونان. ومن هنا نتساءل: هل صنع هذا القالب في بلاد اليونان؟

أشكال الحلي المنحوتة على القالب

تكونت أشكال الحلي والمجوهرات المنحوتة على سطح القالب قيد الدراسة، من الأقراط والخواتم والدلايات والخرز (الشكل ٢). ويرى بعض الباحثين والمتخصصين في دراسة العصور البرونزية المتأخرة أن أشكال الحلي والمجوهرات المصنوعة خلال هذه الفترة تأثرت كثيراً بأشكال ما يماثلها في البلدان المجاورة خاصة مصر (Dothan 1979; Andrews 1990). هذا مع العلم أنه كانت هناك



٢. أشكال الحلي المحفورة على قالب تل دير علا (رسم هيجو دي ريده).

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الأقراط: عثر في قبر في بلدة سحم على أقراط مصنوعة من الذهب والفضة والبرونز، شكلها هلالى حيث تنتفخ في الوسط وتستدق عند الأطراف. ويلتصق في وسطها، في بعض الأحيان، معدن مشكل على هيئة تاج (Fischer 1997: figs. 29-30, pls. 41-42). وعثر على هذا الشكل من الأقراط في مواقع فلسطينية متعددة (Negbi 1971) كما نود أن نذكر هنا أن الحفريات التي أجراها هنك فرانكن في موقع تل دير علا خلال ستينات القرن الفائت، كشفت النقاب عن قرط مصنوع من الذهب (Franken 1992: 32, fig. 3-10: 14)، كذلك عثر في أم الدنانير على أقراط ملبسة بالنحاس وتعود للفترة الانتقالية بين العصر البرونزي المتأخر والحديدي الأول.

الدلايات: أثناء عملية التنقيب في معبد تل دير علا المؤرخ لنهاية العصر البرونزي المتأخر، وجد المنقب مجموعة من الدلايات والخرز، بعضها مصنوع من الزجاج (Faience) (Franken 1992). وجاء شكل بعض الدلايات هلالياً، وهو بهذا يطابق الشكل المحفور على القالب قيد الدراسة.

الخرز: تصنع الخرز في العادة من خامات مختلفة مثل الأحجار الكريمة والنحاس والبرونز والعظم والأصداف البحرية وغيرها. ولا يخلو موقع أثري من هذا النوع من الحلي والمجوهرات. وإذا جاز لنا أن نذكر مواقع تعود لنهاية العصر البرونزي المتأخر، ووجد فيها خرز، فإننا نذكر: تل دير علا، تل السعيدية، طبقة فحل، أم الدنانير ومعبد مطار عمان/ماركا. وجاءت أشكال كثير منها تشابه تلك المحفورة على القالب.

الخاتمة

أن دراستنا حول قالب الحلي والمجوهرات الذي عثر عليه في موقع أردني في غور الأردن، واستقر فيه الانسان من حوالي ١٧٠٠ وحتى حوالي ٣٣٠ قبل الميلاد، أثبتت ان سكان هذا الموقع كانوا على درجة من الرقي الفني، وأنهم كانوا على تواصل مع المجتمعات الأخرى القريبة منها والبعيدة. وبرأينا أن مثل هذا النوع من الصناعات لا يكون حكراً على جنس بشري أو عرق واحد، بل هو ملك للإنسان الفنان بغض النظر عن جنسه أو مكانه. أما القالب الذي بين أيدينا فهو تحفة اثرية تستحق أن تعرض في أي متحف، للأسباب التي ذكرناها أعلاه.

شكر وتقدير

يشكر الكاتب كل من الدكتور مصطفى النداف /كلية الآثار والأنثروبولوجيا بجامعة اليرموك لقيامه بتحليل المادة المصنوع منها القالب، وتزويدنا بالمعلومات الضرورية حولها. الشكر موصول أيضاً لكل من السيد هيجو دي ريده لقيامه برسم القالب، والسيد يوسف الزعبي لتصويره القالب.

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في رثاء المرحوم، الأخ الدكتور فواز الخريشه

رافع حراحشه



للموت هيبّة وجلالٌ أيها الراحل، ولنا من بعد الراحلين انتظارٌ
في رحلة العمر قد يطول وقد يقصر، حتى يقدمُ بلا جلال وبلا هيبّة
وبلا ترددٍ يختارُنا الواحدُ تلو الآخر، فعليك يا أبا محمد سلامُ الله مني
تحيةً، وعليك السلامُ من كل غيثٍ صادقٍ البرقِ والرعدِ.

أبا محمد !

عندما خطرَ لي أن أرثيك في بعضِ كلامٍ من بعضٍ ما في نفسي،
هاجت في النفس ذكرياتُ البداياتِ في قسمِ النقوشِ في معهدِ الآثار
عندما كنتُ أنا طالباً وكنتُ أنتُ أستاذاً وأخاً، نتحاورُ في قاعةِ الدرسِ
ونتدارسُ الآراءَ والأفكارَ، فإذا ما أشكلَ أمرٌ علينا نحنُ الطلابُ، لم
يُفتكِ الإدلالُ على الصوابِ بعلمك وسعةِ إطلاعك، فلا عجبٌ فقد درّ لك
ضرعُ العلم، ونبضُ فيك عرقه.

وعرفتُك أيضاً معلماً وأخاً في الميدانِ وأنت العارفُ بمفاصلِ أوديةِ الباديةِ والحرّةِ وجنّياتِها، وعندما تتشعبُ فينا الدروبُ وهي كثيرة،
وتتشابهُ الوهادُ والسُهوبُ، كنتُ دليلنا في وادي سلمى، وسارة، والجثوم، ووادي راجل، والقطافيات، وباير...، وكنتُ تقولُ في رفاقك في
البريةِ قولٌ من يعرفُ حقَ الرجالِ، ومن أخطأَ توجهه تصريحاَ حيناً، وحيناً تعريضاً حسبَ المقامِ والمقالِ.

واتفقَ أن خبرتُك أبا سفر، فقد كنتَ لطيفَ المعشرِ، دمثَ الخلقِ، تبذلُ ما في يدك من غيرِ منّةٍ، وفي أحاديثك تتحفنا بكل خيرٍ ونادرة،
وأشهدُ الله أني كنتُ أتمنى أن يطولَ السفرُ وأن ينصرفَ العقلُ والقلبُ بعيداً عن التفكيرِ بكدرِ الحياةِ.

وتشاءُ الأقدارُ ثانيةً بعد إنقطاعِ لبضعِ سنين، أن نكونَ رفقةً في العملِ في دائرةِ الآثارِ لعقدٍ من الزمن، فلم تتوانَ عن القيامِ بمسؤولياتك،
فكثيراً ما كنتُ تُفاجئُ زملاءك في الميدانِ فتُمضي معهم لحظاتٍ مرشداً وموجهاً وناصحاً، وفي الاجتماعاتِ أراك تلتقطُ الفروقَ بين الآراءِ
فتلتئمُ عندك في رأيٍ واحدٍ يسرُّ به المجتمعونَ، ودائماً تطرحُ الجديدَ من العملِ والأفكارِ والمبادراتِ فقد كنتَ تملُ تكراراً ما كنتَ تعملُهُ، فتسعى
إلى غيرهِ بعنفوانٍ مِعطاءٍ، وجهدٍ دؤوبٍ، وأذكرُ أنني كنتُ معك في مكتبك بعد إنتهاءِ الدوامِ، ورأيتُ الإرهاقَ بادٍ عليك من يومِ عملِ أضعافك،
فرجوتُك: إلا أنك استدعيتِ إيداً ليُحضِرَ لك بعضَ طعامٍ لتتقوّى به على عملٍ لم ينتهِ، فعرفتُ أنك لن تبرحَ مكتبك حتى تُنهيَ عملك. وكنتُ أثناءَ
مسيرتكِ في دائرةِ الآثارِ كلما تطاولتَ عليك السنةُ علوجاً، أدرتَ لهم ظهرك، ومضيتُ في عطاءك وجدك، لا يُضيرُك منهم قولٌ مكلومٌ ولا رأيٌ
مأزومٌ.

كثيرةٌ هي الذكرياتُ، ومؤثرةٌ جداً حدُ الوجعِ، ولقد تركتَ فاجعةً رحيلك غصةً في الحلقِ، وحُرقةً في القلبِ، وانكساراً لصحبةِ نبيلةٍ
بدانها منذ عقدين ونيفٍ، وأوقفَ ومضها موتٌ محتومٌ لم تتوقعه مبكراً، ولنا عزاءٌ، أنك تركتَ إرثاً لم يتحصّلَ عليه من الرجالِ إلا قليلٌ، وأشهدُ
الله أن فيك نبلاً إنسانياً، وعلماً، وحزماً، وحلماً، وفضلاً، وصدقاً، وصبراً، واحتمالاً، وكرامةً في النفسِ، وجراًةً في قولِ الحقِ، فمن رحلَ عن
الدنيا وهذه فيه فقد تركها وهو زائدٌ فيها، ولم يكن زيادةً عليها.

للموت هيبَةٌ وجلالٌ ورهبةٌ أيها الراحل، ومرُّ في فَمِي طعمُ تلك اللحظة التي نَعَاكَ فيها إلي ولَدُكَ محمد عند الثالثة من فجرِ يوم رحيلك، ومرُّ في فَمِي طعمُ رؤيتِكَ مُسجى لتجهيزِكَ لرحلةِ البقاء، ومرُّ في فَمِي لحظة أوسدوك مَلحود قَبْرِكَ في دارٍ وحشة قُبالة دارِ الفناء، فلا الحزنُ يخفُّ أَلَمَ الرحيل، ولا الوجعُ الذي سَكَنَ في قاعِ النفسِ يَحْجُبُ الأسى، فقد جازَ الجرحُ حدَ الاحتمال، ورحلتَ وقد نيفتَ على الخمسين، ولم تدرُجَ قَدَمَاكَ نهاياتِ العمرِ، فكان الجزعُ عند أهلك وأصدقائك ومحبيك أكبرُ وأشدُّ.

كلا! إن الصبرَ أجملَ وأيمن، والتجلدَ مطيةٌ من اتقى وسلَّم، ومن حقِّ الموت علينا أمانة الرضا بتسليم الوديعة، فجميعنا في قبضة المالك.

وما المالُ والأهلون إلا وديعةٌ فلا بدَّ يوماً أن تُردَّ الودائعُ

رحم الله أبا محمد رحمةً وسعها السموات والأرض، وسقى قبره من كلِّ وابلٍ هطالٍ،

وجعلَ فسيحَ جناته مأواه، وعزاءَ أهلك فيك، إرثك الذي تركت، والمعزَّون من كلِّ الأمكنة، وإنا لله وإنا إليه راجعون.

أهلك، وذووك، وأصدقائك، ومحبيك.

عنهم: الدكتور رافع حراحشه

سلامُ الله عليك يا أحمد

جهاد هارون



امتزج فيها الامل بالوهم، فهي المشيئة الربانية والحقيقة الثابتة، فكان التسليم إلى الباري بتاريخ ٢٦/٦/٢٠١٠، واطفئت ذاكرتي عند الأمل والابتسامة والطموح، و لازلت مستذكراً لحظات الحب والحزن ولكني أراك في أيهم وليث والبتول، فسلام الله عليك يا أحمد.

جهاد هارون

دائرة الآثار العامة

سلامُ عليك فقد رحلت بسلام، وعلى غير عادتك لم تثر ضجة، اعتقدت انك كعادتك تدخل الأزمة وسرعان ما تخرج سالماً. في العام ١٩٨٨ التقينا في رحاب الجامعة الاردنية التي أحببناها، وهمست بأذني لالتحاق بقسم الآثار، ليس الا لعشقك للتاريخ والآثار، تحول العشق إلى طاقة حُب للعلم والمثابرة، فكان التفوق بالعلم والخلق، وفي لحظات التخرج من المرحلة الأولى كان الإصرار للسير نحو الدرجات العُلى، فهي عادتك لاترضي العيش الا فوق رؤوس الجبال. فبدأت رحلة الماجستير فوفقت وأكملت رحلة الإيداع التي ترافقت مع التطبيق العملي للحلم، بالاقتران مع دائرة الآثار التي بدأت العمل بها عام ١٩٩٢، فكانت نعم الزميل في قسم التسجيل ومكتب آثار العاصمة إلى أن حطت بك الرحال في متحف الآثار الأردني ذاك المبنى الشامخ، والحلم لازال يراودك بل ويؤرق مضجعتك، فبدأت مرحلة تحقيق الحلم الآ وهي درجة الدكتوراة، فتحقق المخاض العسير من خلال بعثة الجامعة الهاشمية، وتجاوزت الصعاب ورحلة الاغتراب وتقاسمنا الهموم، ولكن ايمانك بالله العظيم كان دافعاً لإتمام المسيرة. وتنقلت ما بين جامعة سيراكوز/ امريكا وجامعة ليستر في بريطانيا، إلى أن تحقق الحلم وجلسنا نحتفل بالنجاح، وعدت تحمل درجة الدكتوراة في علم المتاحف في العام ٢٠٠٨.

وفي الجامعة بدأ الاتصال ونقل العلم ما بين الاستاذ والطالب، فسطع النُجم سريعاً، وارتقيت خشبة المسرح متألقاً كعادتك، عارضُ صحيٌ بسيطٌ تبين أنه صعب وطويل!!!!!! ورحلة جديدة ومحطات

رحلت أبا أيهم دون وداع على غير العادة فسلام عليك

أحمد جمعة الشامي

الأبحاث والتسجيل في مشروع جاديس لحوسبة المواقع الأثرية مع كوكبة من الزملاء الأوفياء وكأننا أسرة واحدة متألّفة متحابّة.

فمن أين أبدأ معك أبا أيهم؟.. من الميدان أم من المكتب أم من المكتبة.. أم من قبل ذلك كله ومن بعده.. فأثارك لا بل ذكراك باقية في كل مكان التقينا به وفي كل طريق سلكناه وعند كل باب طرقناه ولا تفارقني تلك الاحلام التي حلمنا بها معاً في منزلك أو في منزلي. وتمر الأيام وتطير بنا رحلة العمر إلى مشروع رأس النقب (العقبة) في العام ١٩٩٥ ونقضي اشهرًا جميلة مع نخبة رائعة من الزملاء لنغوص في عمق التاريخ، ننقب عن الآثار ونكشف عن حضارات هذا الوطن ما نكشف، ولكنك تحلم دوماً بالعمل بالمتاحف وتدور عينك صوب متحف المسكوكات في البنك المركزي فتحاول وتحاول. ما زلت أذكر عندما كنا نغادر السكن ليلاً من مكان اقامتنا في بلدة المريغة نجوب طرقات رأس النقب نتجاذب الحديث على ضوء القمر رغم ما لازمنا من عناء في الميدان وقهر الصحراء ووحشة المكان وغربته؟؟؟ تحدثني بفرح غامر وحلم كان يراودك وبأن الفرصة قد تأتي أخيراً.. لكن أبا أيهم حتى هذه لم تأتي.. وكأنها سراب.. لكنك تواصل المسير مفعماً بالأمل وتنقل لمتحف الآثار الأردني في قلب عمان النابض بالحياة في جبل القلعة - عمان التي أحببتها وأحبتك - وتحدثني دائماً عن أسرة المتحف وتلك العلاقة الحميمة مع الشخصوس والزمان والمكان وكأنها رواية خيالية. وتدور بنا الأيام وتأتي فرصة الجامعة الهاشمية إنه الحلم! وننتقدم معاً للمنافسة - كعادتك تهوى المنافسة - للترشح للإبتعاث وتفوز بها بجدارة، ونرسل الأوراق مرة تلو مرة وتضيع في ردهات تسجيل الجامعة، وتعاود الكرة مرة أخرى يا الله وكأنك لا تعرف لليأس طريق!!!!!! وتواصل المسير بخطى ثابتة كرسوخ الجبال، وترسو بك الرحلة في أمريكا وفي جامعة سيراكوز بالتحديد ويتواصل بنا اللقاء تلو اللقاء ولكن عبر الهاتف لا أقول لدقائق بل لساعات تسأل عن الجميع كعادتك، رغم أنك تعاني في الغربة ما تعاني وأعلم علم اليقين حجم تلك المعاناة، وفي غمرة الأحداث وفي انهماكك العميق بالدراسة في قاعة المكتبة تصاب بغيبوبة..



هكذا هي الحياة تمر بنا مسرعة وكأنها برق خاطف للأبصار..... لم نهني بك بعد!!!! لكنك أسرعت الرحيل وكأنك على موعد لتقرير المصير، وأي مصير تختار يا أحمد؟؟؟
يا الله منذ متى التقينا وبدأنا معاً رحلة طويلة وكأنها رحلة الوداع، وعلمي بك أنك تكره تلك اللحظة، وها قد جاءت بغير استئذان. نعم بدأنا معاً قديماً قدم تلك الرحلة الشاقة الممتعة العجيبة التي قضيناها بحلولها ومرها.

كان ذلك في العام ١٩٨٦م، في الجامعة الأردنية التي عشقناها معاً فكانت محبوبتنا، فلکم تجاذبنا الحديث في ردهاتها وتحت ظلال أشجارها، وفي كلية الآداب قضينا أجمل لحظات العمر ولطالما حلمت بالمستقبل ولكن أي مستقبل كنت تحلم به!!!!!!
هكذا أحببنا دراسة الآثار وتجولنا كثيراً كثيراً عبر محطات التاريخ والمواقع.. ويمر بنا قطار العمر ونودع الجامعة ونخرج منها. لكنك تصر على العودة، وتهمس في أذني سأكمل دراسة الماجستير فوراً وكأنك تقول: لا وقت لدي سامضي إلى هناك وكأنك لا تعلم إلى أين؟.. لله درك كم كنت متفوقاً جاداً! وتدور بنا الأيام ونلتقي مرة أخرى في عمق التاريخ وهوية الوطن وذاكرته- في دائرة الآثار- في العام ١٩٩٢م، لنبدأ رحلة العمل معاً في قسم

وتخبرني بها بعد انقضائها لكنك تواصل السير بخطى ثابتة وتعود لعمان حاملاً معك درجة أخرى في الماجستير بعلم المتاحف. ولأنك لا تعرف المستحيل تحول المسار هذه المرة صوب بريطانيا وإلى جامعة ليستر بالتحديد. وتعود مسرعاً من هناك بشهادة الدكتوراة في علم المتاحف فلسان حالك يقول لم يعد كثير من الوقت لإضاعته!!! وتبدأ حلماً كان قد راودك وتصبح أستاذاً في الجامعة الهاشمية وتبدأ الحياة معك وحولك وبك بالإستقرار.

ها قد نلت ما سعت وأجتهدت وتمنيت!!!!!! وادخلت فرحاً لا حد له إلى قلب أمك التي تاقَت لتلك اللحظة وكانت تنتظرها بشوق غامر.. وقد كانت تحدث جاراتها من نساء الحي عن عودتك تحمل بيدك شهادة الدكتوراة وتفتخر بأن ابنها أحمد سيعود دكتوراً قريباً، وبأنها ستقيم له حفلاً يتغنى به القاضي والداني.. ولكن هيهات هيهات أبا أيهم فأنت تريد وأنا أريد والله يفعل ما يريد.

لم تنفخ عنك غبار السفر.. لم ترتج بعد.. لكنك أخذت ترسم دربك بريشة فنان بثقة وثبات واتزان، وكنا نظن أنك وضعت رحالك وأنخت راحلتك وأستقر بك الحال وبدأت بالإستقرار ففرحنا بك كثيراً فسلام عليك أينما حلت وأينما رحلت. وتبدأ رحلتك مع المرض ولسانك ذاكرة شاكرة الحمد لله وتعاني ما تعاني وتطول بك الرحلة في ردهات المشفى وأقسامه والأمل بالله كبير. يا الله كم كنت صابراً محتسباً لم أرك لحظة ساخطاً أو شاكياً وأشهد أنك كنت راضياً بقضاء الله وقدره ومستسلماً له، والعجيب تبدأ مشوارك الأكاديمي في هذه المرحلة الصعبة وتصارحني دائماً وتقول: يلازمني ألم في راسي لا ينفك عني وتساءل دوماً ما هو؟ وتصبر على إكمال العام الدراسي الأول في الجامعة متذرعاً ما ذنب الطلبة!!! وتقول سأكمل العام وانشغل بعلاجي بعدها. وتُردد دوماً ما أصابني أمر سهل سيزول بأمر الله وساعود أحسن من ذي قبل بقدرة الله!؟

ماذا أصابك أبا أيهم.. ها قد طالت رحلة العلاج طالت معاناتك.. يا الله هجم المرض على المخزون.. أتى على الكنز ومر على الذاكرة وأصاب منها ما أصاب.. عدو غاشم هاجم ملف الذكريات الجميلة وما اجتهدت تكنزه منذ سنين وأنت صابراً تحاول جاهداً بكل ما أوتيت من عزم أن تسترجع شريط الذاكرة المليء بالمحطات والأحداث ولكن هيهات هيهات..

ألا ترى يا صديقي أننا لم نعد نلتقي كما كنا!!! ماذا أصابك يا أحمد؟ أنسىتنا؟؟؟؟ ربما!!!! فقد طال الغياب فنحن نعذر فلو أن الأمر بيدك ما غبت عنا وما تركتنا في شوق حارق متقد لرؤياك ولسماع صوتك، لا أظنك تبخل علينا بطلتك البهية وابتسامتك التي

تخفي وراءها حزناً كامناً وهموماً تسير بها أينما رست بك الرحلة. نم قرير العين أبا أيهم واسكن هنيئاً القلب فغرسك ثمراتاً يانعاً بابنائك فأراك فيهم وبهم أراك فرعاً يمتد من الأصل، فيستمد الأيهم منك صورة تشبهك وتذكرنا بك دوماً.. والليث أراه بجرتك وفطنتك شعلة متقدة.. والبتول كأجمل الفصول بإبتسامتها تطول وتخط بخطك الجميل.. ها قد رحل أبي وغاب لكن في القلب سكنه فمن شابه أباه ما ظلم.. وتلك الأم المكومة التي ما اكتملت فرحتها بك.. أعلم أن أحلامك كانت كبيرة وأمانيك أكبر فداهمك الموت فجأة.. وتركت أمك وحيدة باكية وأنت وحيداً.. لم يعد لها أحد!!!!!! من سيطرق بابها من بعدك؟ عاشت لأجلك وأنت أملها وحلمها الجميل الذي غاب.. تراها تتفقد في كل لحظة وأظنها تتفقد فراشك هل عدت للبيت لتنام؟؟؟؟ لا تزال منتظرة قدومك.. وأما والدك فلم يحتمل أن يراك سقيماً وظلت عيناه تذرف حزناً وكمداً حتى مرض.. وكلما توغل فيك الوهن توغل فيه المرض وأثر أن يودعك قبل أن تودعه فمات حزناً على ما أصابك..

وما بال الصابرة المحتسبة أم الأيهم تلك المكافحة التي رأفتك في أحلك لحظات العمر.. فحسبها أن يجازيها باريها خير ما صبرت وأحتسبت.. فعذراً أم الأيهم كنتُ وأحمد نسرق وقت الجميع نلتقي في كل الأحيان ونجتمع على غير موعد في كل مكان وزمان.. نعم كنا نبوح لبعضنا بالضرر والغضب الذي كنا نسببه لأسرتينا من حجم اللقاءات والاتصالات التي مضت وأنقضت وأظنها لن تعود.. وهذا العصام الشهم الهمام رعيته صغيراً أبا الأيهم.. تتلمذ على يديك وأكتسب منك الكثير.. وفي مرضك عمل من أجلك وسهر على راحتك ورد الجميل بالجميل وفاءً وإخلاصاً منقطع النظير..

أبا الأيهم إني أراك فيهم قلباً نابضاً بالحياة وفجراً واعداً بغد أجمل.. فبغياك ما نسيناك ولا فارقنا ولا غاب عنا محياك.. فأنت معنا وبيننا، ففي مجالسنا نذكرك فمن هنا مررنا.. وهنا جلسنا.. وهنالك سهرنا وعزأؤنا أننا نراك بألقهم ونجاحهم فسلام عليك وسلام لروحك - التي أحسبها ولا أزكيها على الله - محلقة في سماء الجنان وأملتي بالله كبير أن تنعم وتنهأ في رحلة الدار الآخرة وترتاح.. فلقد تعبت كثيراً وتحملت كثيراً وعانيت وعانيت في رحلة الدنيا.. فأرجو ربي أن يكافئك أجرها وينير قلبك ودربك بالإيمان.. اللهم أغفر له وأرحمه وأسكنه فسيح الجنان وأجعل قبره روضة من رياض الجنة وأثر له وأفسح له فيه أمين أمين وامنحنا من بعد فراقه الصبر الجميل.

توأمك أخوك أحمد جمعة الشامي



المملكة الأردنية الهاشمية

حولية دائرة الآثار العامة

المجلد (٥٤)

عمّان

٢٠١٠

حولية دائرة الآثار العامة

تصدر عن دائرة الآثار العامة، ص.ب. ٨٨، عمان ١١١١٨ - المملكة الأردنية الهاشمية

رئيس التحرير

المدير العام

هيئة التحرير

هنادي الطاهر

سامية الخوري

قام بمراجعة النصوص الانجليزية

الكسندر واس

الاشتراك السنوي:

٢٠ دينار أردني (داخل المملكة الأردنية الهاشمية)

٦٠ دولار أمريكي (خارج المملكة شاملاً البريد)

الآراء المطروحة في المقالات لا تمثل رأي دائرة الآثار العامة بالضرورة

تقبل المقالات حتى ٣١ أيار من كل عام حسب التعليمات الواردة في هذا المجلد وترسل على العنوان التالي:

حولية دائرة الآثار العامة

ص.ب: ٨٨

عمان ١١١١٨ - الأردن

فاكس: ٩٦٢-٦-٤٦١٥٨٤٨+

تعليمات نشر البحوث في حولية دائرة الآثار العامة

تعني حولية دائرة الآثار العامة بالبحوث المختصة بالتراث الحضاري للأردن والمناطق المجاورة، بما في ذلك تقارير التنقيبات الأثرية ونتائجها.

ترسل البحوث في موعد أقصاه ٣١ أيار (مايو) من كل عام للنشر في مجلد العام نفسه إلى العنوان التالي: حولية دائرة الآثار العامة، ص.ب ٨٨، عمان ١١١١٨ - الأردن (هاتف ٤٦٤٤٣٣٦).

ويمكن الاستفسار عن طريق الفاكس رقم ٤٦٥٨٤٨-٦- (٩٦٢) أو البريد الإلكتروني

Publication.doa@nic.net.jo

- لغة البحث: العربية أو الإنجليزية.

- مسودات البحوث: يجب ألا تتجاوز مسودة البحث ١٥,٠٠٠ كلمة (٣٠ صفحة تقريباً) ولا يشمل هذا قائمة المراجع، والمواد التوضيحية (الأشكال). ويرجى تضمين اسم الباحث (أو الباحثين) وعنوانه في نهاية المسودة، ويكون ترتيبها كالآتي:

١- عنوان البحث واسم الباحث (الباحثين).

٢- النص الكامل للبحث.

٣- عنوان الباحث (الباحثين).

٤- قائمة المراجع.

٥- الهوامش إن وجدت.

٦- قائمة شروحات الأشكال.

- تسليم النصوص: يُسلم النص على قرص حاسوب، إضافة إلى نسخة مطبوعة تباعد الأسطر فيها مزدوجاً، والرجاء إضافة نسخة محفوظة على شكل Rich Text Format على قرص الحاسوب. كما يجب أن تكون المسودة بشكلها النهائي دون إجراء تغييرات كبيرة لاحقاً.

- الصور والرسومات والمخططات: يجب أن ترفق مع النسخة الأصلية عند التقديم. ويجب الإشارة إلى جميع المواد التوضيحية سواء كانت صوراً أم رسومات أم مخططات باستخدام مصطلح (الشكل) في متن النص، وترقيمها حسب تسلسل ورودها في النص (الشكل ١، الشكل ٢، ... الخ). ويجب ألا يزيد حجم الشكل عن ١٧*٢٢ سم. وبالإمكان تقديم الأشكال إلكترونياً jpg (ولا تقبل الأشكال المحملة على Word)، بحيث تكون حجمها 250 pixels/in للصورة الفوتوغرافية و 600 pixels/in للرسومات والمخططات.

- الهوامش: يفضل الابتعاد عن الهوامش قدر الإمكان. وتوضع مصادر البيبلوغرافيا بين قوسين ضمن المتن، مثلاً (الفلاحات ٢٠٠١: ٦٥-٦٧) أو (Brown 1989: 32-35) للمراجع الأجنبية.

- قائمة المراجع: يجب أن تكون ضمن جدول في نهاية البحث وحسب التسلسل الأبجدي. واتباع النموذج الآتي:

١- في حالة المقالات المنشورة في دوريات:

النوافلة، سامي

٢٠٠٠ تقرير عن حفرة الجي (جايا) في وادي موسى / ٩٩٩١. **حولية دائرة الآثار العامة** ٤٤: ٧١-٤٢.

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٢- في حالة المقالات المنشورة في مجلدات:

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٢٠٠١ فترات التاريخ العربي، نظرة شاملة. ص ٤٣-٥٩ في **أبحاث ودراسات في التاريخ العربي، مهداة إلى**

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٣- في حالة الكتب:

عباس، إحسان

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الفهرس

٧ في رثاء المرحوم، الأخ الدكتور فواز الخريشه رافع حراحشه
٩ سلام الله عليك يا أحمد جهد هارون
١١ رحلت أبا أيهم دون وداع على غير العادة فسلام عليك أحمد جمعة الشامي
١٣ قالب لصناعة الحلي والمجوهرات من تل دير علا زيدان كفافي
١٩ مسكوكات غزنوية من متحف الآثار الأردني عائدة نعوي
٢٧ مراجعة في تأريخ قطعة عملة أموية نشرت في حولية دائرة الآثار أديب أبو شمس
٣١ تحليل لختم روماني ذو نقوش يونانية من مدرج طبقة فحل (الوديوم) إسماعيل ملحم وعبد القادر الحصان
٣٥ مشروعات التنقيبات الأثرية في تل العميري الشرقي الموسم الأول ٢٠٠٩ أحمد جمعة الشامي
٤٣ ترميم وتأهيل وتشغيل أول نموذج لمعصرة زيتون اثرية في منطقة الشرق الاوسط- كهف المعصره في لواء الكورة أمجد البطاينة
٥١ حفريات سمر الإنقاذية وجيه كراسنة
٥٥ مدفنان في ظهر السرو / جرش محمد ابو عبيلة

