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GOLDEN JUBILEE VOLUME

Lancaster Harding, in his inaugural words of the first volume of the Annual of the Department of Antiquities of Jordan in 1951, and in simple words embedded with significant meanings and annotations for archaeologists, historians and philologists, mentioned that "Its aim is to provide a medium for the publication not only for the work of the Department of Antiquities but also for the researches of scholars on all aspects of the archaeology, history and philology...". Since then, ADAJ has become a vehicle for researchers and archaeologists to record the results of their fieldwork, their studies and their readings of the history and culture of Jordan in particular, and the region in general, throughout the ages.

Although ADAJ was intermittently not published during the 1950s, it nevertheless continued regularly afterwards to become a major reference in the library of every scholar, scientific institution and research center interested in the history, archaeology and culture of Bilad ash-Sham, the Arabian Peninsula and the surrounding region. The large number of published studies and researches, in a number of languages in previous volumes, clearly signifies the vast international attention in Jordanian history with its rich archaeological heritage and its role in understanding the history of the region as a whole. As with all of its publications, the Department of Antiquities is proud of the scientific reputation that ADAJ has gained as a result of its specialization, its regular publication and the high scientific standard of the published studies and researches by scholars who spent years in studying the history and archaeology of Jordan. Through the articles published in these 50 volumes of ADAJ, one could learn about the history of exploration of Jordan, and, realize how far archaeology and archaeological research has developed, from the scientific and technical points of view.

It is hoped that colleagues at the Department of Antiquities and elsewhere who are interested in Jordan and its history, would continue to support us in retaining the high scientific standard of ADAJ and of all our publications, whether by publishing their studies and results of their fieldwork, or by providing their valuable feedback about what is being published. Our belief in the importance of these publications, and in accordance with the directives of His Majesty King Abdullah II for Jordan to be first in all aspects of life, we are determined in continuing to raise the standard of all of our publications to become a model for other countries of the region.

On the occasion of the publication of the Golden Jubilee Volume, and in acknowledgement and appreciation of their efforts, the editorial board has the honour of dedicating this volume to all those who worked diligently for the regular publication of this annual.

Dr. Fawwaz Al-Khraysheh
Chief Editor

WĀDĪ ABŪ ṬULAYḤA: A PRELIMINARY REPORT OF THE 2005 SPRING AND SUMMER EXCAVATION SEASONS OF THE AL-JAFR BASIN PREHISTORIC PROJECT, PHASE 2

Sumio Fujii

Introduction

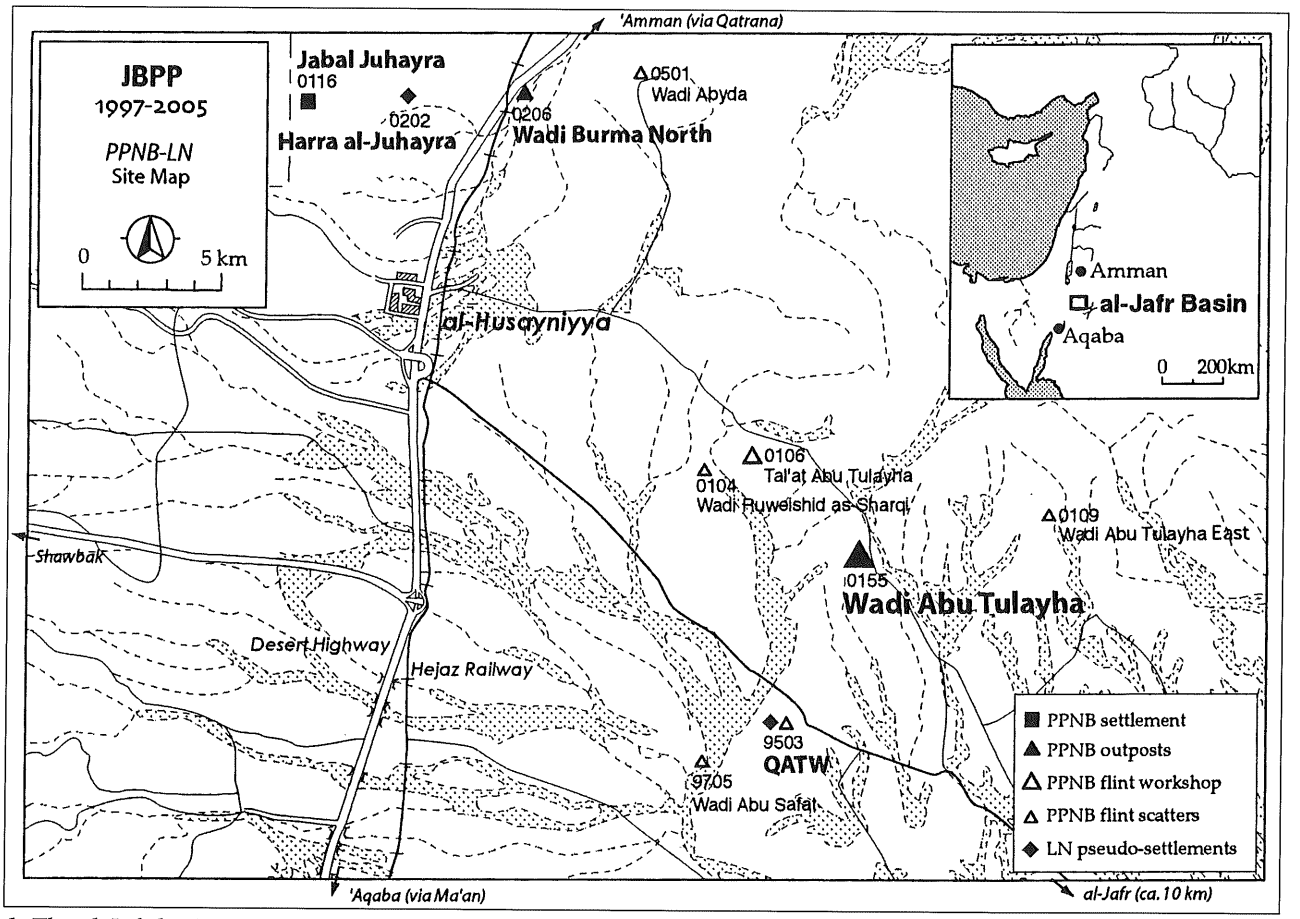
The 2005 spring and summer excavation seasons of JBPP-2 (the Al-Jafr Basin Prehistoric Project, Phase 2) were conducted from March 17 through April 4 and from August 1 through September 30 respectively; with the cooperation of the Department of Antiquities of Jordan. The primary goal of these two seasons was to explore the specific process of the pastoral nomadization in the Al-Jafr basin, tracing that process back to its very beginning. Wādī Abū Ṭulayḥa (JF-0155) was chosen for this project, a small composite site in the northwestern part of the basin. The excavations have revealed that this site included a small settlement dated, on the basis of lithic evidence, to the Late Pre-Pottery Neolithic B (henceforth PPNB) period. Available evidence suggests that this settlement served as a seasonal agro-pastoral outpost connected to a parent settlement probably to the west. It was quite unexpected that such a sizable outpost should have been founded under the harsh environmental condition of *al-Ḥamād* (i.e. flint pavement desert). Interestingly, a few striking similarities — including the settlement form, structure typology, and burial custom — have been noticed between this outpost and Late Neolithic pseudo-settlements. This suggests that the short-range transhumance between the Late PPNB agro-pastoral outpost at Wādī Abū Ṭulayḥa and a parent sedentary settlement, probably to the west, paved the way for the pastoral nomadization that took place in the subsequent period.

The site also included a pair of Early Bronze Age cist enclosures and a barrage system, that have yet to be dated for certain, both of which were briefly examined in connection with the excavation of the neighboring PPNB outpost. This paper summarizes the excavation results of these three components which constitute the composite site of Wādī Abū Ṭulayḥa.

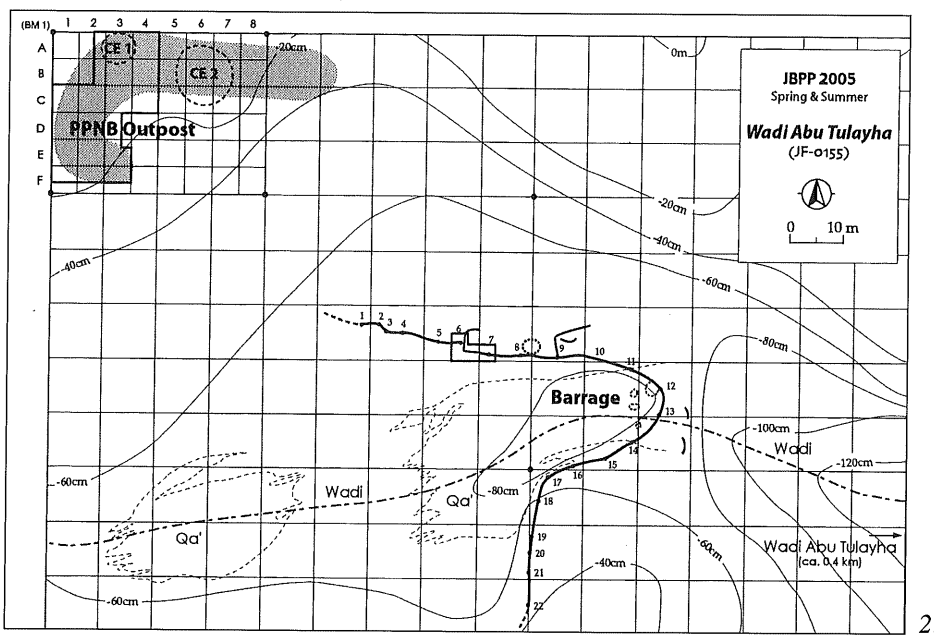
The Site and Site-Setting

The site of Wādī Abū Ṭulayḥa, JF-0155 according to the registration code system of JBPP, was found initially during the 2001-2002 winter season survey and has briefly been referred to elsewhere (Fujii 2002b; Fujii and Abe 2006). This site lies in the middle of *al-Ḥamād* that extends between the two major drainage systems in the northwestern part of the Al-Jafr basin: Wādī Abū Ṭulaḥya to the east and Wādī ar-Ruwayshid ash-Sharqī to the west (**Fig. 1**). Hydrologically, it belongs to the former drainage system through a small tributary flowing eastwards across the southern half of the site. The surrounding natural environment is (and probably was) very harsh and the average annual precipitation is less than 50mm (Jordan National Geographic Center 1984: fig. 114). Thus, no natural perennial water source is available within a radius of a few dozen kilometers around the site. Accordingly the vegetation is very poor, being limited exclusively to wadi beds. No settlements currently exist and even local pastoral nomads are rarely encountered.

To date, two investigations have been conducted, in the spring and summer seasons of 2005. The general land survey conducted in the spring season has proved that this site, covering an area of ca. 1.5 ha, consists of the following three distinct components: 1). a sizable PPNB outpost occupying the northwestern corner of the site; 2). a pair of Early Bronze Age cist enclosures overlying the PPNB outpost; 3). a long, roughly V-shaped freestanding wall (yet to be dated for certain) extending to the southeast of the PPNB outpost (**Fig. 2**). Among the multiple



1. The al-Jafr basin: site map of the PPNB-LN sites.



2. Wādī Abū Ṭulayḥa: site map.

minor elements that constitute each component, Structure H of the first component, Cist Enclosure 2 of the second component, and a short wall segment of the third component were either excavated or sounded respectively. The summer excavation season of 2005 focused on the PPNB outpost, the western half of which was fully excavated. In addition, Cist Enclosure 1 was examined and then removed advance of the excavation of the underlying PPNB outpost.

PPNB Outpost

The excavation was conducted based on a 5m by 5m grid and locus system. The excavated area totals ca. 400 square meters and the volume ca. 200 cubic meters. Although excavated soil from fill layers was discarded without any special treatment that from floor deposit, including hearth contents, was put through a sieve with 3mm mesh nets in order to maximize the precision of the recovery of artifacts and faunal/floral remains.

Since Wādī Abū Ṭulayḥa is essentially a single-period site covered with aeolian deposits, the site stratigraphy was very simple. To list downward from the surface layer, Layer 1 was grayish buff, relatively loose, sandy silt deposit ca. 3-5cm thick; Layer 2 was light brown, slightly compact, silty sand deposit ca. 5-10cm thick, on which a pair of EBA cist enclosures were constructed; Layer 3 was heterogeneous deposits ca. 20-100cm thick that constituted fill deposits of PPNB semi-subterranean structures; Layer 4 was reddish-brown, loose, silty sand deposit no less than ca. 20-30cm thick, into which large foundation pits for PPNB semi-subterranean structures were dug. Layer 3 often faded out at the outer side of PPNB structures, where Layer 2 directly over layed Layer 4. The deposits underneath Layer 4 varied in content depending on loci, but were commonly sterile in an archaeological sense. A limestone bedrock layer was reached at a level of ca. 1.2-1.5m below the present ground surface.

Structural Remains

The excavation has revealed a total of eleven structural remains, Structures A to K (**Figs. 3, 4**). All of these were stone-built, semi-subterranean structures. Typologically, they fall into two types: smaller, shallower, round to oblong structures and larger, deeper, square to rectangular structures. They were arranged roughly in a semi-circle encompassing a communal forecourt to the east, with the former type structures in front and the latter behind. Interestingly, both types of structures were often, if not always, connected to each other by means of a narrow passage, thus forming a cross-species dual unit. In this sense, this settlement can be defined as a lateral development of these dual units; a key to understanding the formation process of this elongate settlement. Owing to limited space, the following description will focus on general traits of these structures, leaving the details to another occasion.

Construction Material

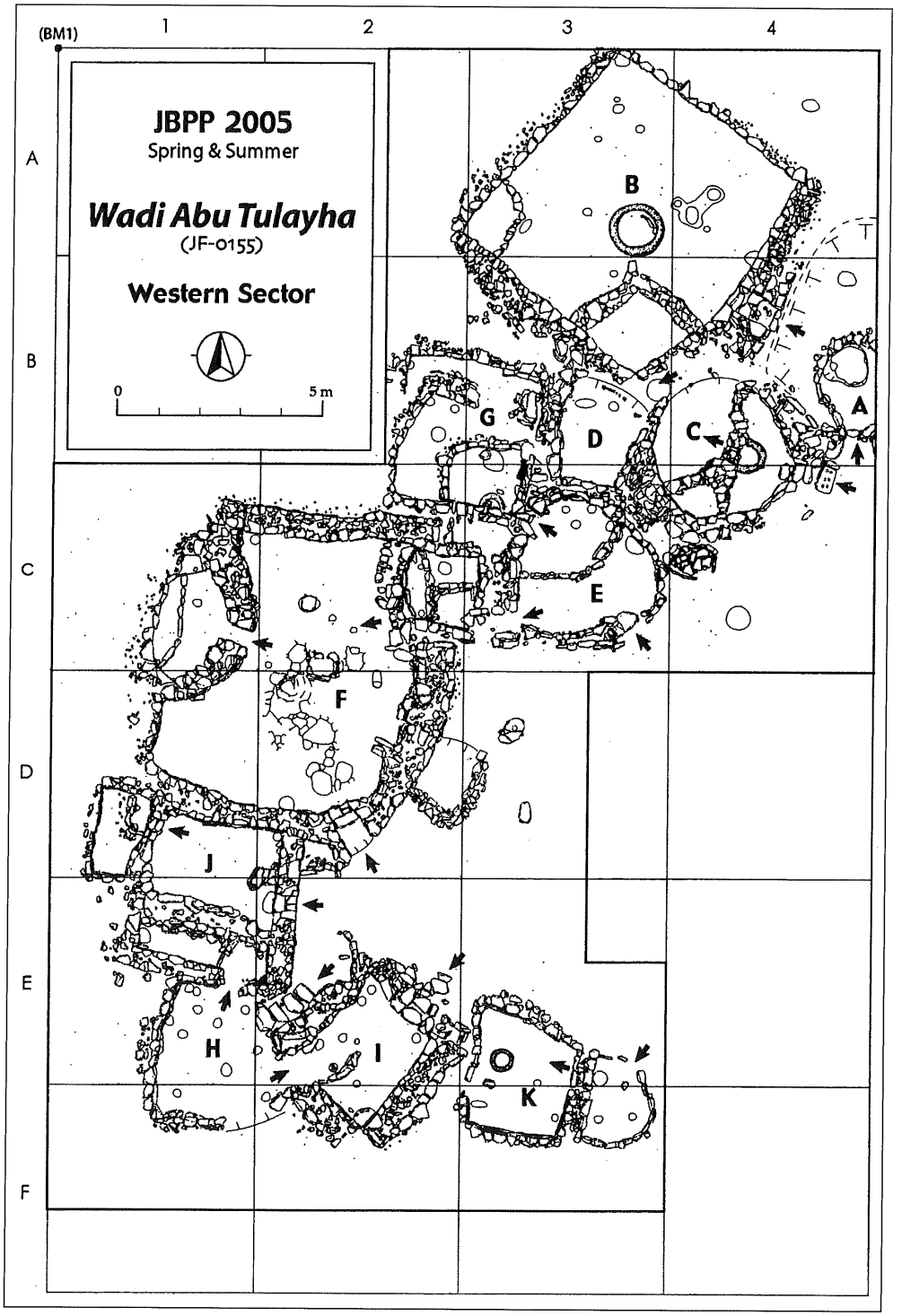
Partly dressed flat limestone cobbles, ca. 30-40cm long on average, were used for main construction material of walls, but larger angular cobbles were used especially for foundation stones often placed in an upright position. Smaller flint cobbles were also included, but to a lesser extent. In addition, flint and limestone rubble was applied to filling and adjustment material. These stones most likely came from the small wadi to the south of the outpost, where similar material is still found in large quantities. Noteworthy is the use of mud mortar, which, along with the use of standardized construction material, contributed to the quality of the masonry walls.

No special material was used for flooring. With the exception of some stone-paved storages and the base of a foundation pit, either stony or sandy depending on both loci and the floor depth, was used as a natural floor. No material for roofing was identified, but it seems likely that soft material such as wood, twig, and reed were used in combination with mud and stones. Mud and stones were also used for bordering some larger hearths.

Typology and Technology

What characterize the structural remains at the Wādī Abū Ṭulayḥa PPNB outpost are that: 1) they are stone-built, semi-subterranean structures constructed on a large foundation pit ca. 0.4-1.2m in depth; 2) they fall into smaller, shallower, round to oblong components (**Fig. 5**) and larger, deeper, square to rectangular components (**Figs. 6-8**); 3) both types of structures are often connected with each other by means of a narrow passage, thus forming a dual unit (**Fig. 9**); and, 4) they developed in lateral direction, forming an elongate, curvilinear settlement.

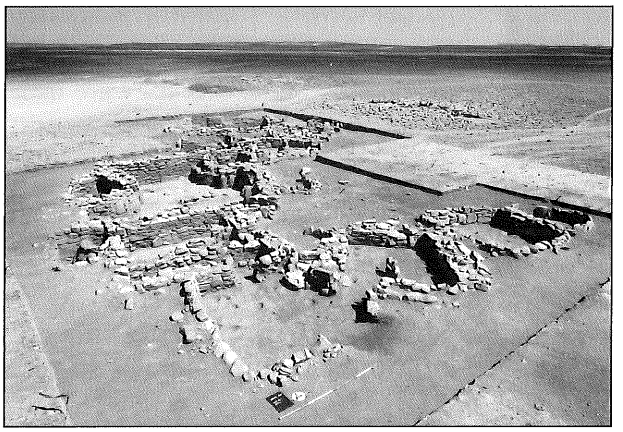
The first item (i.e. the semi-subterranean type of structures) is a key to understanding the architectural properties of these structures, in that a large foundation pit dug beforehand, determined not only the floor depth of a structure but also the other major attributes including its size,



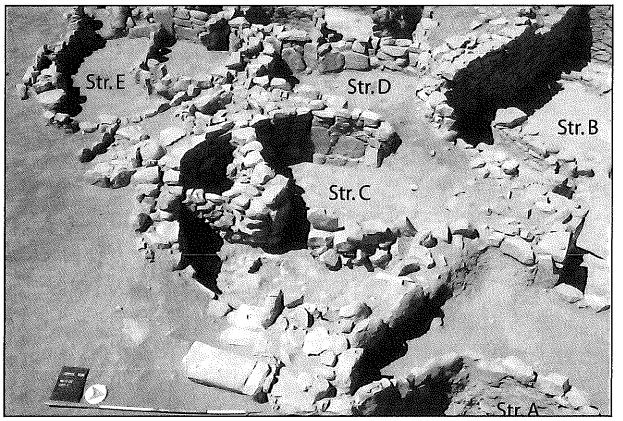
3. Wādī Abū Ṭulayḥa: the western excavation sector of the PPNB outpost.

orientation, and general plan. Nonetheless, this is not to say that it was dug arbitrarily; rather, it seems more reasonable to assume that it was excavated following a given design. It is quite conceivable, however, that the supposed design was subject to some modification in the course of the digging depending on the nature of the underlying deposits, which in turn affected the size and form of the structure.

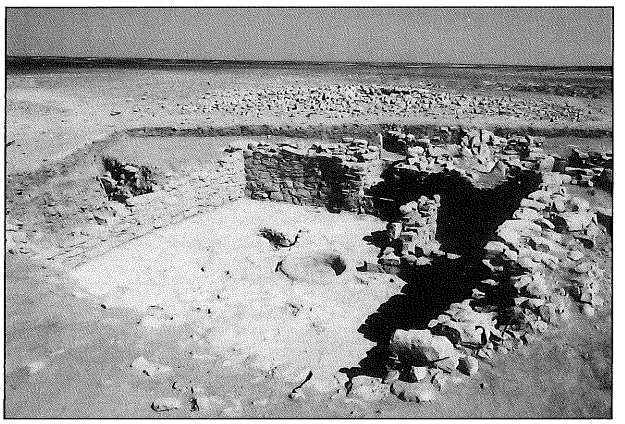
Available evidence suggests that these foundation pits were dug at a relatively steep angle, and that masonry walls were constructed partly leaning on them. (It is for this reason that the profile of a foundation pit is often untraceable). The stone masonry technique varied to a considerable degree depending on loci. Subterra-



4. Wādī Abū Ṭulayḥa: the general view of the PPNB outpost (from SW).



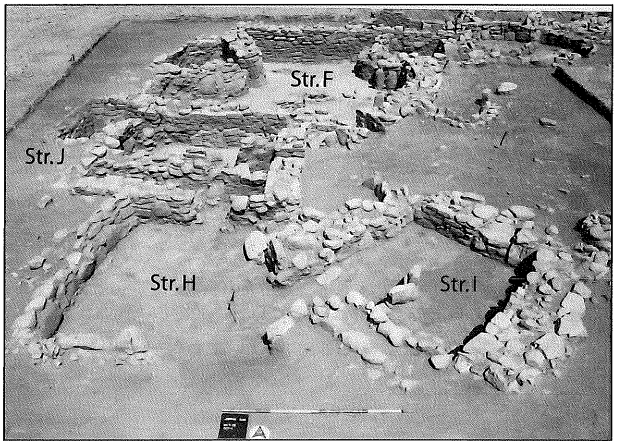
5. Structure A-E: general view (from E).



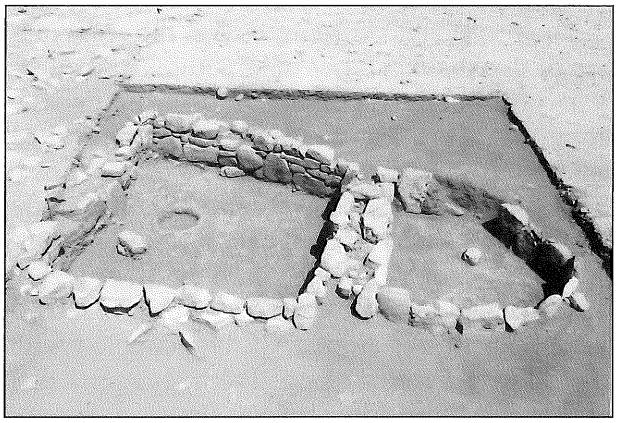
6. Structure B: general view (from SW).



7. Structure F: general view (from E).



8. Structure H-J: general view (from S).



9. Structure K: general view (from S).

nean walls were commonly a single-row wide, whereas aboveground walls, especially those of rectangular structures, were often two-row wide with rubble being packed in between. As for stacking pattern, stretcher bond was the norm of subterranean walls, but header bond technique was often applied to aboveground, two-rowed walls. It should also be added that upright stones were often used for foundations.

Overall, the mason's work was superior in quality and every course was piled up roughly in a horizontal position, using rubble and mud mortar as adjustment material. The use of partly dressed flat cobbles as construction material also contributed to this stability. Another contributing factor is rubble and sand filled into a narrow gap behind the walls, which served as a rear support for the walls especially of large, rectangular structures. Contrary to this were walls of small round structures and shallower

rectangular structures, which were usually built appressed to a flank of a foundation pit without any filling in between. For this reason, the profile of a foundation pit of these structures was less traceable in comparison with that of the larger, rectangular structures.

The wall height varied from one to a dozen courses high depending on the structures. Overall, subterranean walls were well preserved owing to the existence of a rear support and the covering with aelian deposits. In contrast, aboveground walls were poorly preserved due to the lack of such helpful agencies; being preserved up to only a few courses. Nonetheless, the amount of fallen stones around them suggests that they were originally a few courses higher, especially in the case of rectangular structures. It appears, however, that the ceiling height of most of the structures was not enough to allow people to walk around a room without arching one's back. Unfortunately, nothing specific is known about the roofs, but, in view of the general plan of the structures, the arrangement of plinth stones and postholes, it seems most likely that flat roofs supported with wooden pillars and beams were used for the rectangular structures. In contrast, a temporary shed is more plausible for round structures.

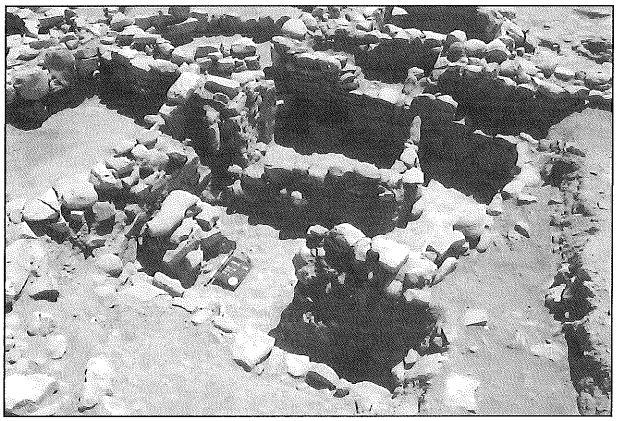
The second and third items (i.e. the combination of two distinct types of structures) are mostly involved in the functional division among the structures. As noted above, round structures are usually smaller in both total size (ca. 2-3m in diameter) and floor depth (ca. 0.3-0.5m), more atypical in general plan, and inferior in construction quality. In addition, they often lack a stone-fringed, stepped entrance, which is substituted by a simple slope. All this, coupled with the relative scarcity of postholes, suggests that they were semi-open spaces under a temporary shed. Of significance is the fact that they are often equipped with a few small compartments and plural hearths, an indication that they were used for domestic affairs including cooking and storing. For this reason it seems probably that they were arranged in a line facing the communal forecourt. The contrary applies to rectangular structures, which are larger in both size (ca. 3.5-6.5m wide) and floor depth (ca. 0.5-1m), more standardized in general plan, and far superior in construction quality. Furthermore, they are equipped with a carefully designed, stone-lined, stepped entrance as well as plural postholes. One may also note that they are usually separated from the communal forecourt with round structures in between. There is little doubt that they served as the living and sleeping space, protected by higher masonry walls and a substantial roof. Considered in this light, it is no wonder that these rectangular main rooms were often connected with round structures, the domestic section in front, to form a cross-species dual unit.

All these observations provide a likely explanation for the fourth point (i.e. the elongate, curvilinear settlement form). The unique profile of this settlement can best be understood as a lateral aggregation of dual structures consisting of a semi-open, round anterior chamber for domestic affairs and a main rectangular room for living and sleeping. It should be noted, however, that the combination of both components varies to some extent from unit to unit. It should also be added that the settlement incorporates a variety of small features including curvilinear windbreak walls and small aboveground storages. The various combinations of these distinct components are responsible for the complicated, heterogeneous appearance of this unique settlement.

Burial Practice

A few special comments should be made about a burial cairn that was found along the eastern wall of Structure G. This structure occupied a narrow space sandwiched between Structure B and F, and, through a narrow passage at the southeastern corner, it was connected with Structure E, a communal anterior chamber shared with Structure F. In comparison with the two neighboring rectangular structures, it was much smaller in size (ca. 3-3.5m on a side and ca. 1m in floor depth) and inferior in construction quality (**Fig. 10**). Nonetheless, this structure is highly important in that it has provided specific information about a unique burial practice at this outpost.

In order to understand the archaeological implications of this burial cairn, it is essential to put it in the context of the occupational history of Structure G. The careful excavation has shown that this structure contained at least three con-



10. Structure G: general view (from NW).

struction phases. The first phase, or the original state of this structure, is represented by the four exterior walls and the lowest floor. Noteworthy is the fact that the northern wall was poorly preserved, and that the western wall diverged on the way. This means that both of these walls partly collapsed due to strong sideways earth pressure. (Contrary to this were the southern and eastern walls, both of which were built leaning against neighboring structures and, for this reason, saved from collapse). The second phase is marked by the abandonment of the northern wall and the reconstruction of the northern half of the western wall. Since no remarkable stratigraphical gap was recognized between the original western wall and the reconstructed part, it is likely that these episodes happened soon after the construction of this structure. What interests us is the fact that, despite the addition of a buttress wall at its northern end, the western wall thus renovated is still remarkably inclined inward. This suggests that the reconstruction of the western wall ended with a failure and the northern half of the structure was left as semi-open space without roofing. The third phase followed this episode, but a certain stratigraphical gap intervened between the two. What took place in this final phase is the addition of a L-shaped partition wall at the southeastern corner, which converted this narrow space into a kitchen equipped with a small, clay-lined hearth. This means, in turn, that the northern, probably unroofed half of this structure was finally abandoned as an indoor space at this stage.

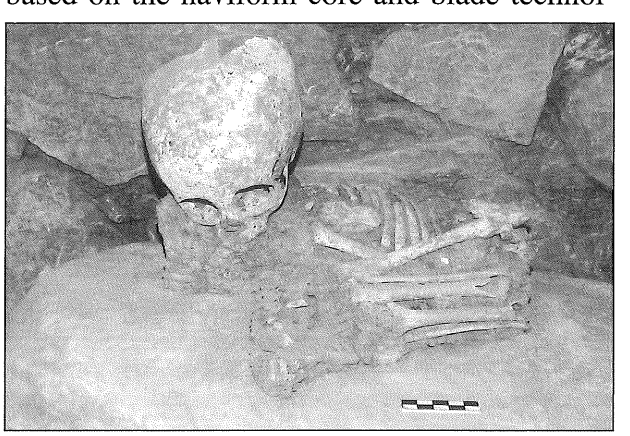
What occurred at roughly the same time as the last episode was the construction of a small burial cairn along the northern half of the eastern wall, where a primary interment of an infant assuming a crouching position was found *in situ* underneath a large capstone (**Fig. 11**). It is possible that this interment triggered the functional conversion of the southeastern corner as well as the final abandonment of the northern half. An alternative interpretation is that the interment took place at the northern half of this structure, precisely because it had already been broken down as a living room. Whatever the case, this burial is highly important in that it is the first to exemplify the facade-side cairn burial leading to (or, possibly, deriving from) the abandonment of a house, a unique funeral practice inherited, though losing its substance, down to Late Neolithic pseudo-settlements mentioned below.

The Finds

The finds from the Wādī Abū Ṭulayḥa PPNB outpost were abundant, consisting of some hundreds of bags of chipped flint artifacts, dozens of ground stone artifacts made of either flint or limestone, several game boards made of limestone slabs, a few dozen bone tools, and a number of miscellaneous objects. In addition, faunal remains occurred in considerable quantity. Since close examinations are still in progress, the following description will be confined to general characteristics of each category.

Chipped Stone Artifacts

Raw material for chipped stone artifacts consisted exclusively of fine-textured, grayish brown to dark gray flint nodules, which were probably brought from outcrops lined along the northern fringe of the Al-Jafr basin. Overall, they were based on the naviform core-and-blade technol-



11. Structure G: close-up view of the interment after removing a capstone (from W).

ogy, a hallmark of the PPNB flint industry, but other types of cores, largely of single platform type, also occurred to some extent. The debitage classes included cortical chunks as raw material, naviform cores (**Fig. 12: 1-4**), crest blades (**Fig. 12: 5**), core tablets (**Fig. 12: 6**), and bidirectionally detached blade blanks (**Fig. 12: 7-11**). It is evident that the inhabitants of this outpost were engaged in on-site tool production utilizing the rich flint resource of the Al-Jafr basin.

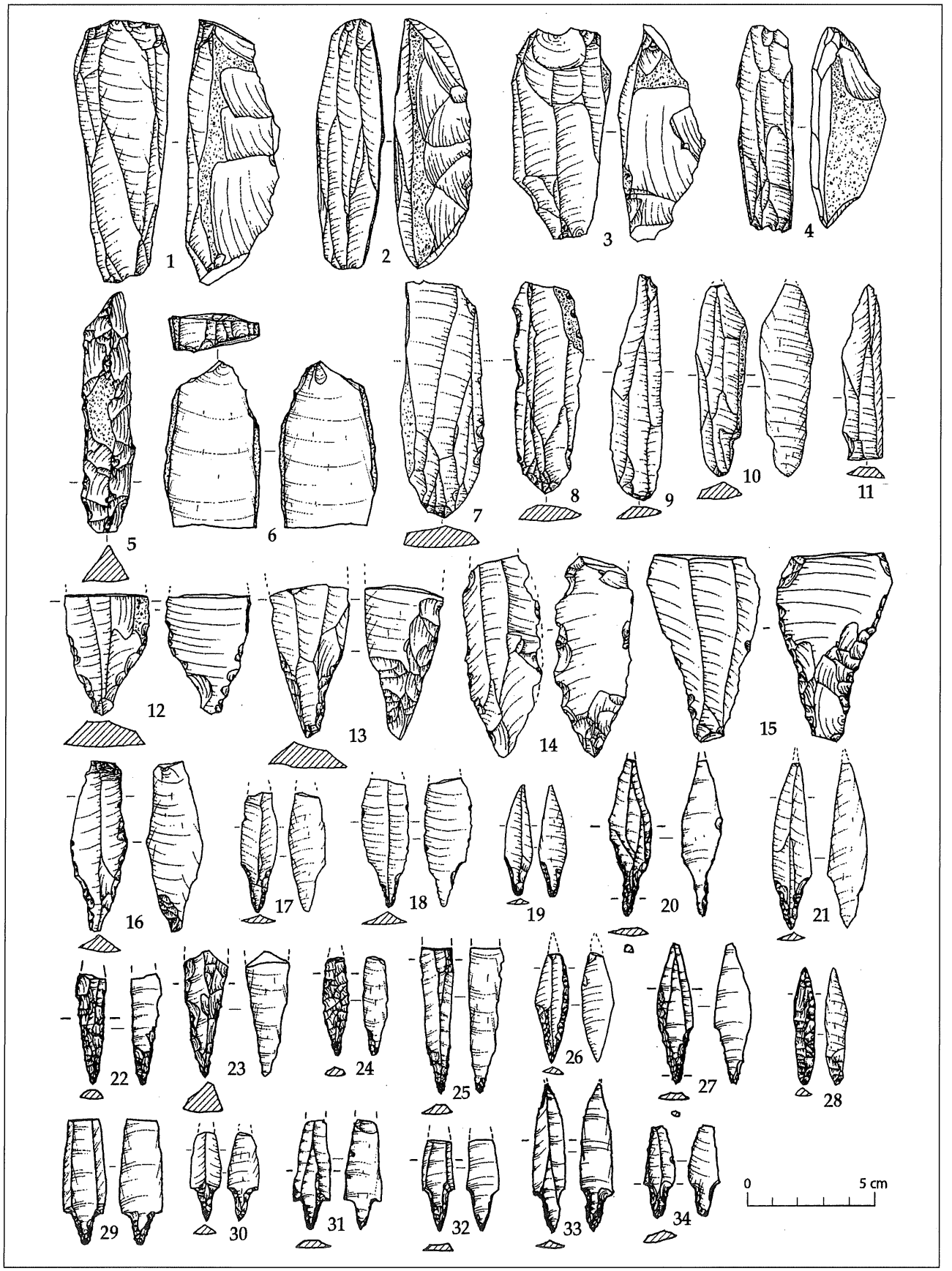
The tool kit is characterized by the predominance of points and arrowheads, which, along with the frequency of faunal remains, points to the importance of hunting activities at this outpost. Typologically, they fall into Byblos (**Fig. 12: 12-21**), Amuq (**Fig. 12: 22-28**), and Jericho types (**Fig. 12: 29-34**), the first of which were the most predominant. Next came the Amuq type points and arrowheads, which are suggestive of a Late PPNB date for this flint assemblage. The tool kit also included finely serrated sickle blades (**Fig. 13: 1-4**), notches and denticulates (**Fig. 13: 5-6**), drills (**Fig. 13: 9-11**), burins (**Fig. 13: 12-14**), side- and endscrapers (**Fig. 13: 15-16**), picks (**Fig. 13: 17**), axes/adzes (**Fig. 13: 18**), and large bifacial knives (**Fig. 13: 19**). The frequency of sickle blades suggests that plant resources, probably including cereal crops, were extensively exploited around the site. Likewise, the existence of axes and adzes implies that wood processing was essential at this outpost where substantial structures were built using pillars and beams. Also of interest are the occurrence of large bifacial knives and the predominance of angle burins, both of which are characteristic of al-Bādiya PPNB-LN sites, among others, in the Transjordan plateau. These observations allow us to define this flint assemblage as an eclectic form sharing the two distinct cultural aspects: the sedentary PPNB to the west and the al-Bādiya PPNB to the east.

Ground Stone Artifacts

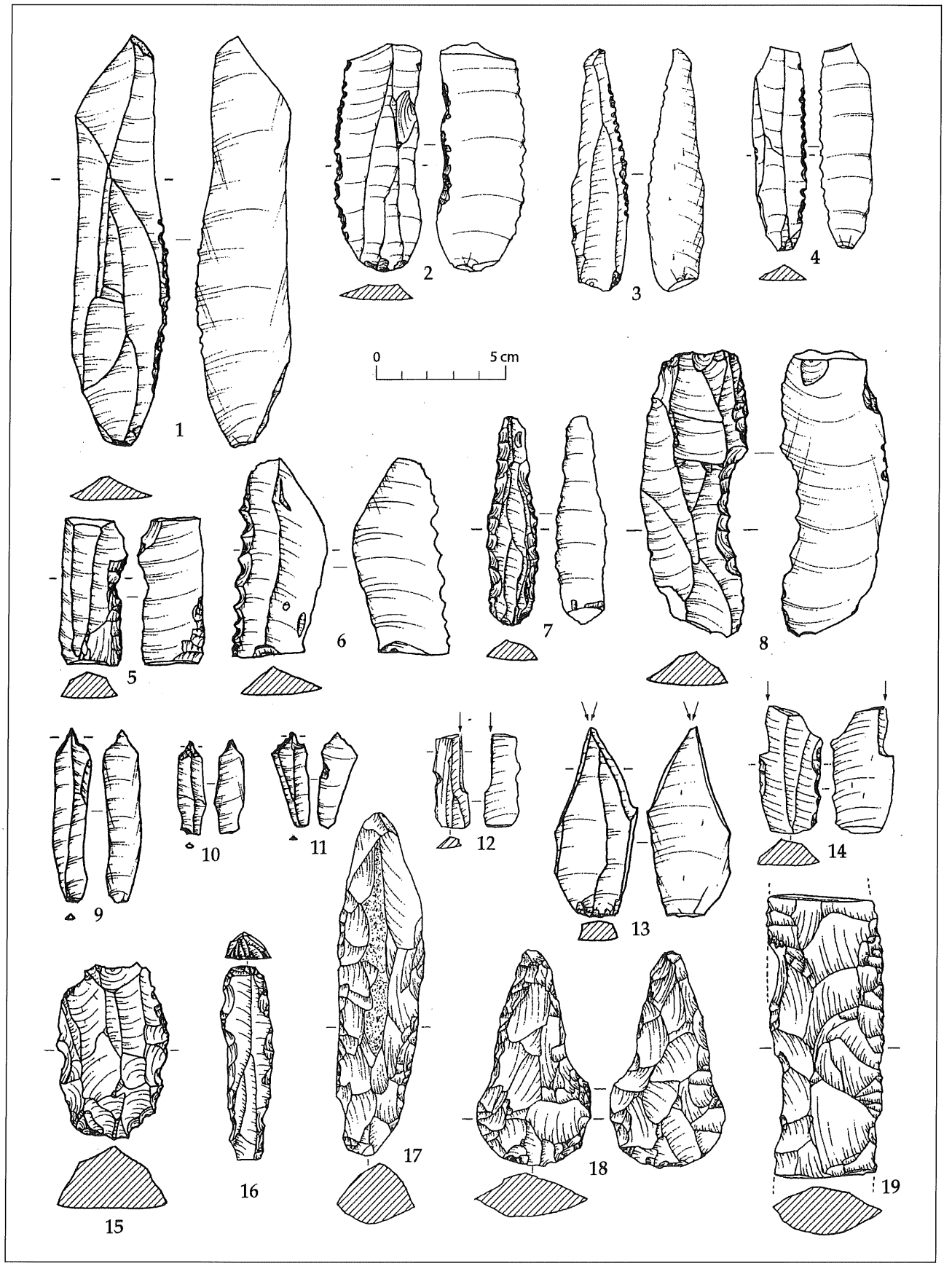
This second largest category included grinding equipments and plinth stones as two major classes. Grinding equipment consisted of upper and lower stones, the former was relatively homogeneous in both size and morphology. In contrast, querns varied from smaller, oblong, flat examples made of cortical flint (**Fig. 14: 1; Fig. 15**) to larger, round, basin-like examples made of fine-textured limestone (**Fig. 14: 2-3; Fig. 16**). Interestingly, basalt products, the norm of grinding tools, were totally absent and, instead, flint products were relatively common. It seems that the unique site location in the middle of *al-Ḥamād* is responsible for this imbalance in material choice. It should be added, however, that upper stones included a few basalt products (**Fig. 14: 4**). The common use of heavy-duty grinding implements, along with the occurrence of sickle blades, strongly suggests that the cultivation of cereal crops played an important role in the subsistence strategy of this outpost. It should be added, however, that a few of the querns, especially of smaller examples, still retain red residue (probably of ochre) on their working surfaces, an indication that they were also used for cosmetic pallets to grind pigment. The occurrence of various pigments mentioned below corroborates this view.

Plinth stones, defined by a flat upper surface and a relatively small yet deep central depression or hole, were made usually of coarse-textured limestone and were amorphous in profile. The only exception to this was a biconical plinth stone that was found *in situ* on the eastern floor of Structure B (**Fig. 14: 5; Fig. 17**). This example stood out in terms of the superior craftsmanship as well as in the use of fine-textured limestone as its raw material. The existence of such a sophisticated pillar base was quite unexpected for us who initially imagined a temporary campsite consisting exclusively of small huts. It should be noted, incidentally, that these plinth stones were rarely found *in situ*; instead, they were often found incorporated into walls as converted construction material. This provides further support for our hypothesis that the cycle of the abandonment and reconstruction at abutting lots, of a single or a few structural unit(s), contributed to the formation of this elongate settlement.

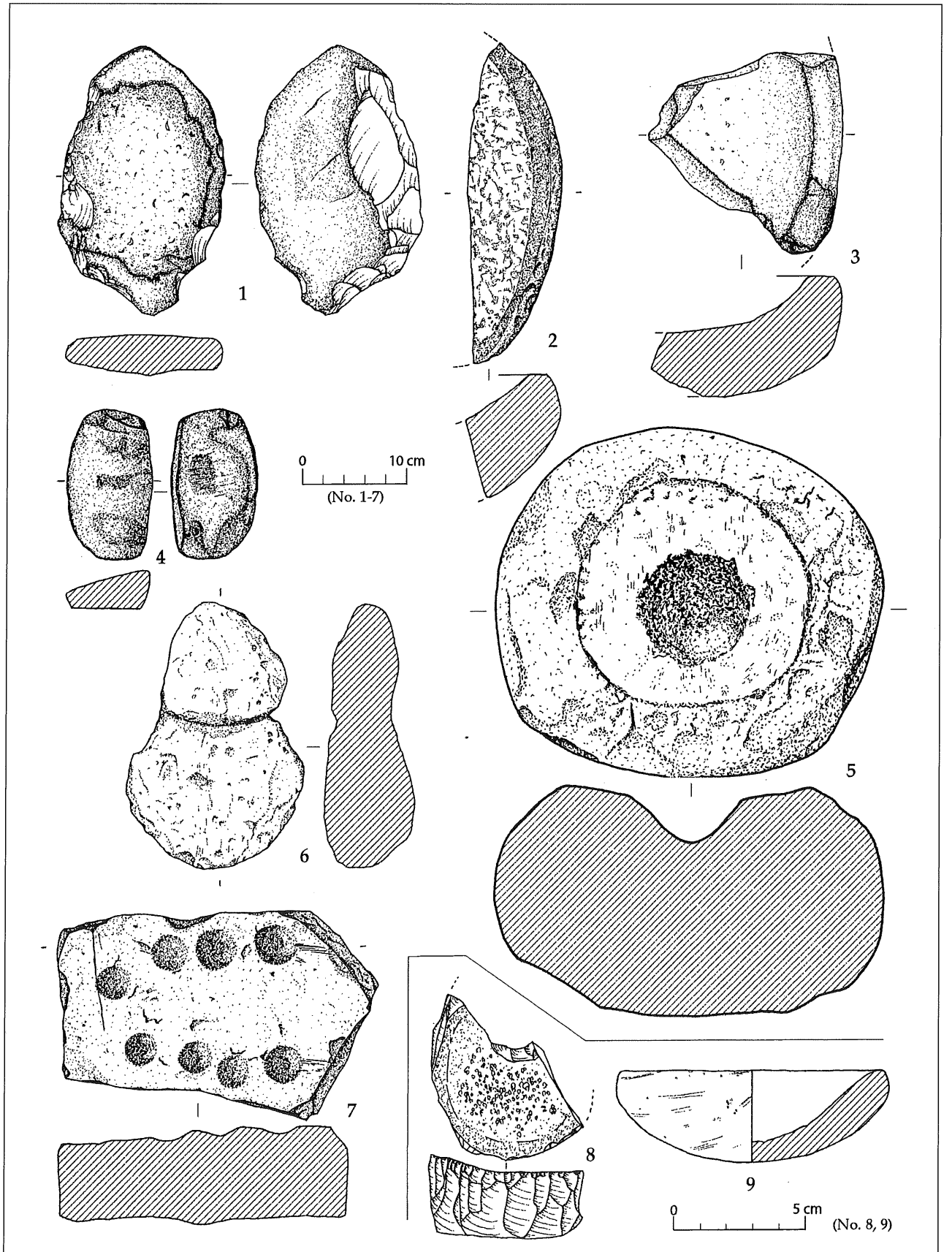
This category also included, as minor components, a few large engraved weights made of coarse limestone (**Fig. 14: 6**), some stone vessels made of either flint or limestone (**Fig. 14: 8, 9**), a grooved whetstone or an arrow shaft straightener made of reddish sandstone (**Fig. 21: 5**), a partially polished small axe made of fine-textured limestone, and several pumice stones possibly used for scrubbing grime off the skin.



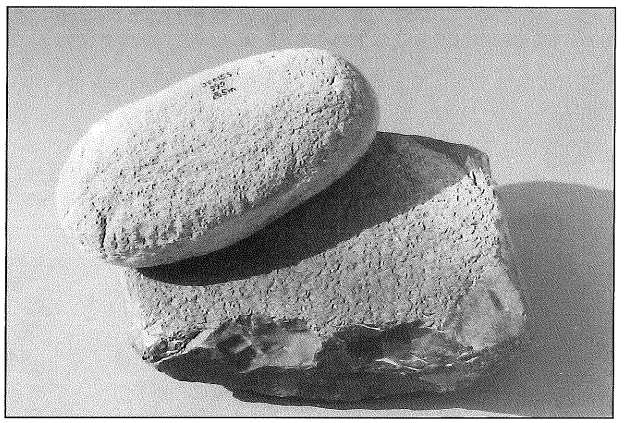
12. The finds from the PPNB Outpost: chipped stone artifacts.



13. The finds from the PPNB Outpost: chipped stone artifacts.



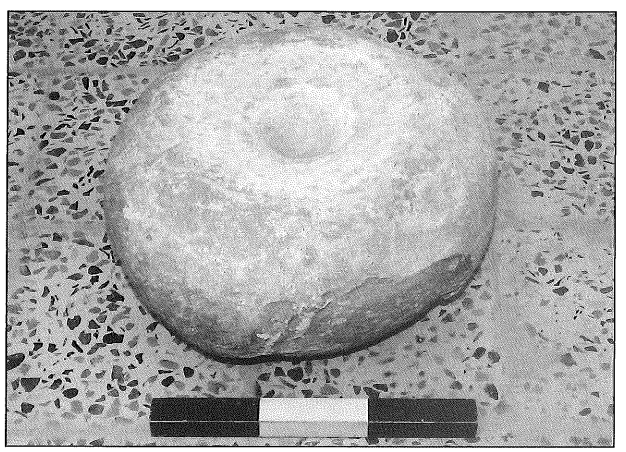
14. The finds from the PPNB Outpost: groundstone artifacts.



15. The finds from the PPNB Outpost: a flat quern and grinding stone both made of flint.



16. The finds from the PPNB Outpost: a basin-like quern made of limestone.



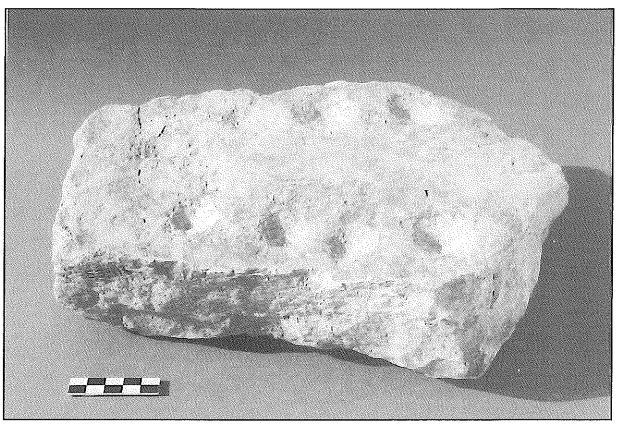
17. The finds from the PPNB Outpost: a plinth stone made of limestone.

In addition, fist-sized hammer stones made of cortical flint nodules, another line of evidence of the on-site flint tool production, occurred in considerable quantity.

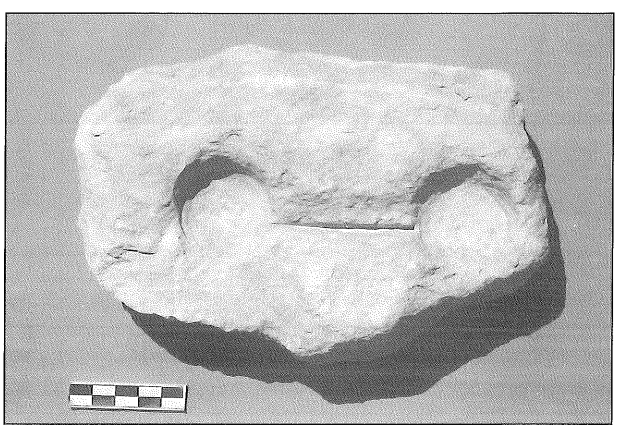
Game boards

It was to our great surprise that several game boards occurred at an outpost isolated in the middle of *al-Ḥamād*. These unique artifacts, all made of relatively fine-textured limestone slabs, fall into two types: boards with six depressions in two rows and those with eight depressions in two rows (**Fig. 14: 7; Fig. 18**). It is interesting to note that the same holds true of samples from al-Bayḍa ca. 50km southwest of this outpost (Kirkbride 1966: fig. 8). Furthermore, the existence of engraved lines connecting any two neighboring depressions is also common to both sides (**Fig. 19**). These observations highlight that there was a close relationship between this outpost isolated in *al-Ḥamād* and sedentary PPNB settlements to the west. Unfortunately, no clear evidence for game pieces was noted, but small, semi-translucent colorful pebbles, found in a considerable number from fill layers, might have substituted for them.

In light of the existence of plural pairs of shallow depressions, it seems that these limestone boards were used for playing a board game analogous to *manqala*, a number-juggling



18. The finds from the PPNB Outpost: a game board made of limestone.



19. The finds from the PPNB Outpost: a game board made of limestone.

game popular throughout modern Africa and Southeast Asia as well as the Near East (Murray 1951: 138-225). Similar examples have been reported from many archaeological sites including al-Bayḍa and Abū ash-Sha'ar, a late Roman fort along the Red Sea coast (Mulvin and Sidebotham 2004). The occurrence of such heavy-duty game boards is suggestive of a relatively long stay at and repeated use of this outpost.

Bone Artifacts

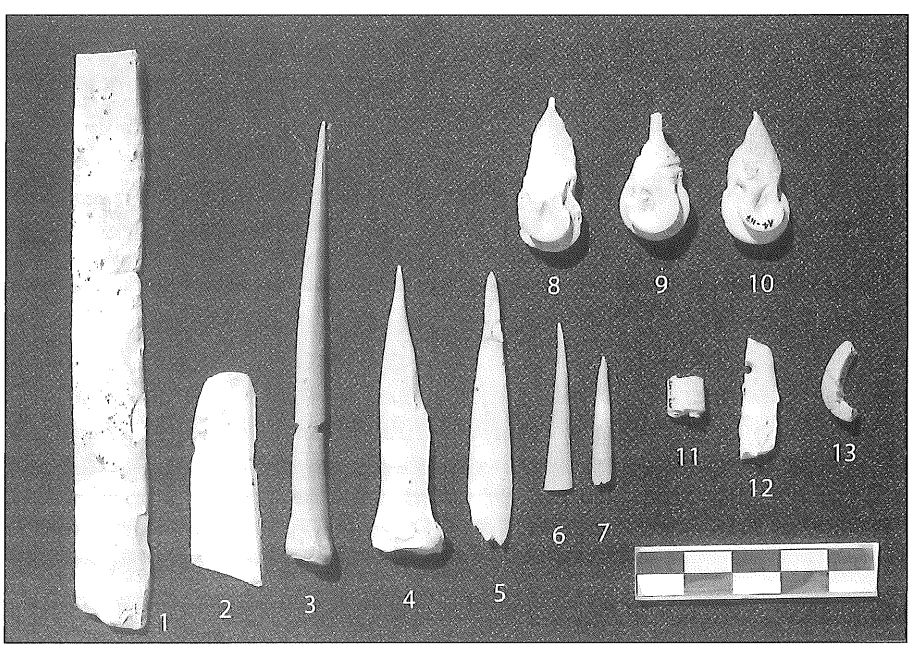
Animal bone artifacts were less common, totaling a few dozen pieces. They included narrow spatulas (**Fig. 20: 1-2**), long points and needles (**Fig. 20: 3-7**), and chunky drills with a short tip (**Fig. 20: 8-10**). In addition, personal adornments such as beads, pendants, and rings occurred in limited numbers (**Fig. 20: 11-13**). A preliminary examination by Dr. Hitomi Hongo, the zooarchaeologist of our team, suggests that these artifacts were made largely of gazelle bones, a conclusion consistent with the excavated fauna referred to below.

Miscellaneous Finds

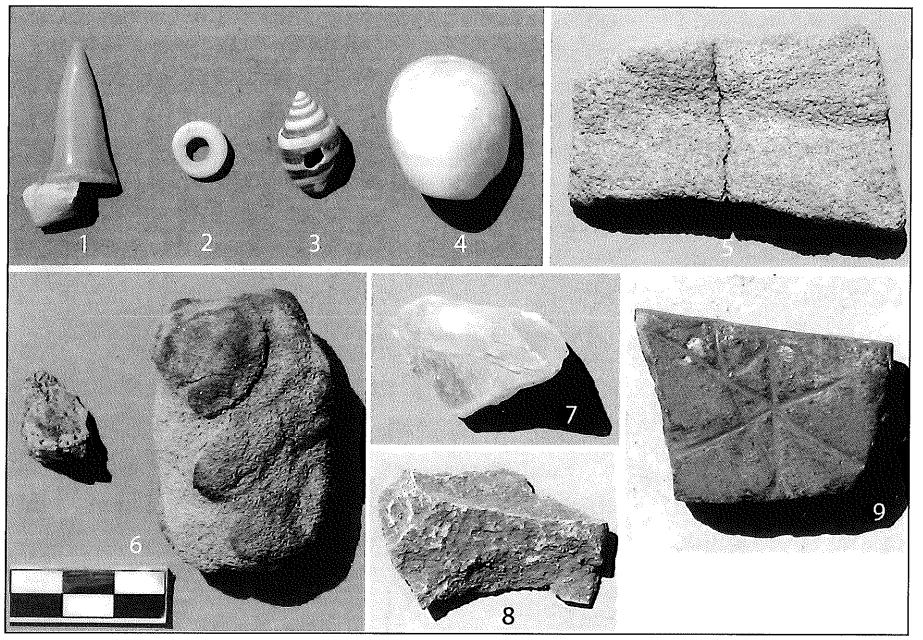
Miscellaneous finds included an unworked shark tooth (**Fig. 21: 1**), some beads and pendants made of sea snail (**Fig. 21: 2-4**), and an engraved plaque made of reddish stone (**Fig. 21: 9**). The finds also included several fragments of malachite (**Fig. 21: 6**), crystal (**Fig. 21: 7**), and reddish sandstone (**Fig. 21: 8**), probably as pigment or raw material for adornments. Since none of these is available in the Al-Jafr basin, it must be conclude that they were imported from outside. A long-distance trade with, or transhumance from the western or southern region can be assumed to be the social background of this material flow. In addition, a number of unbaked or slightly baked clay fragments were found, but nothing specific can be said about their use because of the total absence of complete examples.

Faunal and Floral Remains

Faunal remains were relatively common. A preliminary analysis by Dr. Hitomi Hongo suggests that they consist largely of gazelle, sheep, and goats, the norm of excavated fauna from Levantine PPNB settlements. An important observation is that the gazelle samples include post-neonatal individuals in a relatively high percentage. This probably indicates that the use of this outpost was focused on the few months after their birth season, that is, a term from spring to early summer. Of even further significance is the observation that, mingled with wild individuals, domestic sheep and goats occur to some extent. This means that, along with hunting and cereal cultivation, stock breeding was among the major subsistence strategies of this outpost. Given the seasonal use of this outpost, there is a strong likelihood that the inhabitants were engaged in small-scale transhumance from



20. The finds from the PPNB Outpost: bone artifacts.



21. The finds from the PPNB Outpost: miscellaneous finds.

a parent settlement probably to the west.

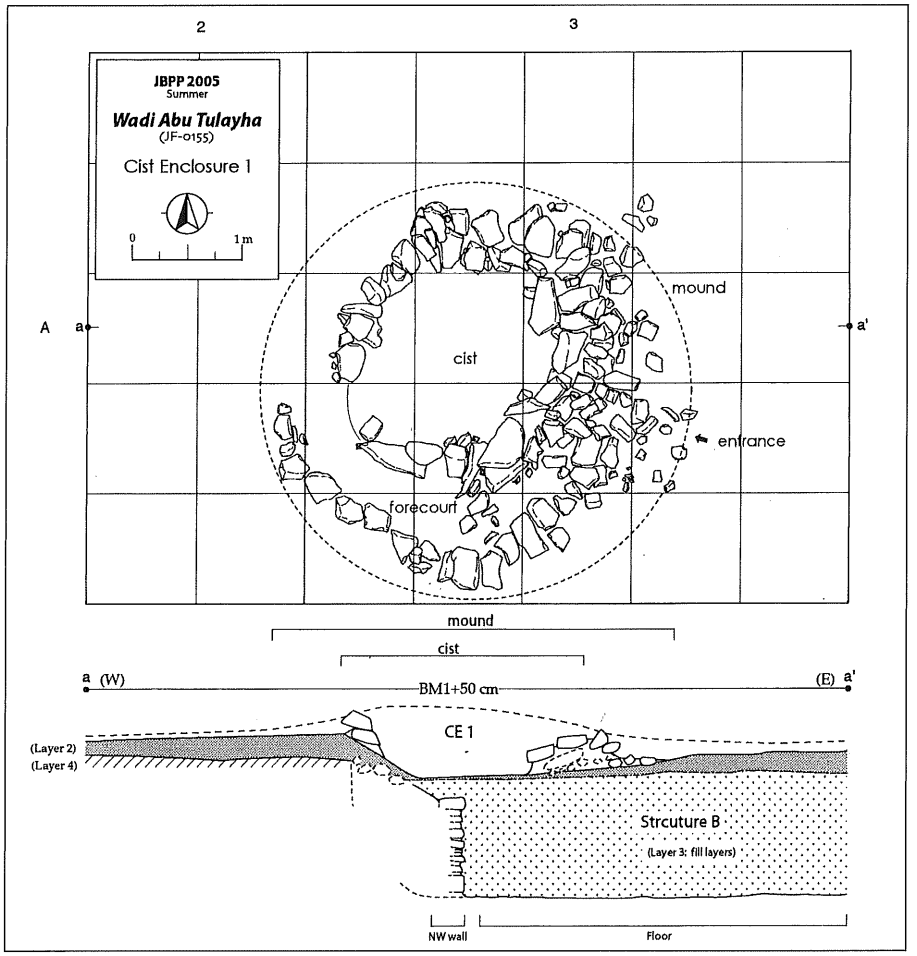
No specific information has been obtained about floral remains. Nonetheless, in light of the common use of reaping and grinding tools, there is little doubt that plant resources were extensively exploited around the site. A few dozen bags of floor soil and hearth contents, now stored in our house at al-Ḥusayniyya, would hopefully provide a key to the plant exploitation strategy at this outpost.

Cist Enclosures

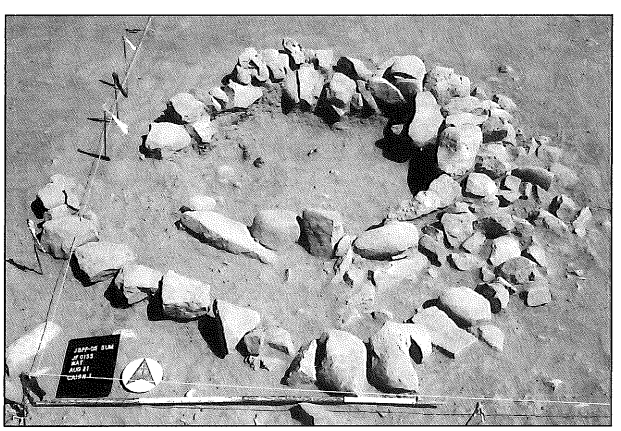
A pair of large burial cairns, or cist enclosures in our terminology, was found overlying the middle part of the PPNB outpost (**Fig. 2**). Stratigraphical observations have proved that both of these were constructed on the upper surface of Layer 2 and separated from the PPNB outpost by thick intervening deposits of Layer 2 and, at some loci, Layer 3. The excavations have also shown that they can be referred to cist enclosures first identified in our previous investigations at Wādī Burma and Tal'at 'Ubyda cairn fields (Fujii 2004a, 2005a). Cist enclosure 1, the smaller example to the west, was fully examined and then removed in advance of the excavation of the underlying PPNB outpost. Cist enclosure 2, the larger counterpart to the east, was briefly examined by means of a 2m wide test trench across the center of the cobble mound. Although no datable *in situ* finds were uncovered, they were tentatively dated to the EB I period on the basis of the typological comparisons with dated examples to the west.

Cist Enclosure 1

This small cist enclosure overlays the northwestern part of Structure B, one of the major components of the PPNB outpost, and, as mentioned above, was separated from it by the thick deposits of Layer 2 and 3 (**Figs. 22, 23**). It is for this reason that it slightly sloped down toward the southeast. The excavation revealed that a round cist ca. 2m in diameter and a square forecourt ca. 2m to one side underlay a cobble mound ca. 3.5m in diameter and ca. 0.5m in relative height. This enabled us to define this feature as a forecourt type cist enclosure unique to the Wādī Burma North and South cairn fields. Both the 45-degree turning angle of the forecourt and the existence of an east-oriented entrance are common to the cist enclosures at the type of sites to the west. Nonetheless, a few minor differences were recognized. First, the forecourt was attached to the core feature from the south, not from the east. Second, neither a cist entrance nor an upright stone just behind it was clearly demonstrated, although this might be due to the poorly preserved state of this cist enclosure. Third, the cist wall was built not on the ground surface in those days but around a shallow pit dug beforehand. These observations led us to the conclusion that this cist enclosure was a local imitation of the proto-type at Wādī



22. Cist Enclosure 1: plan and section/elevation.



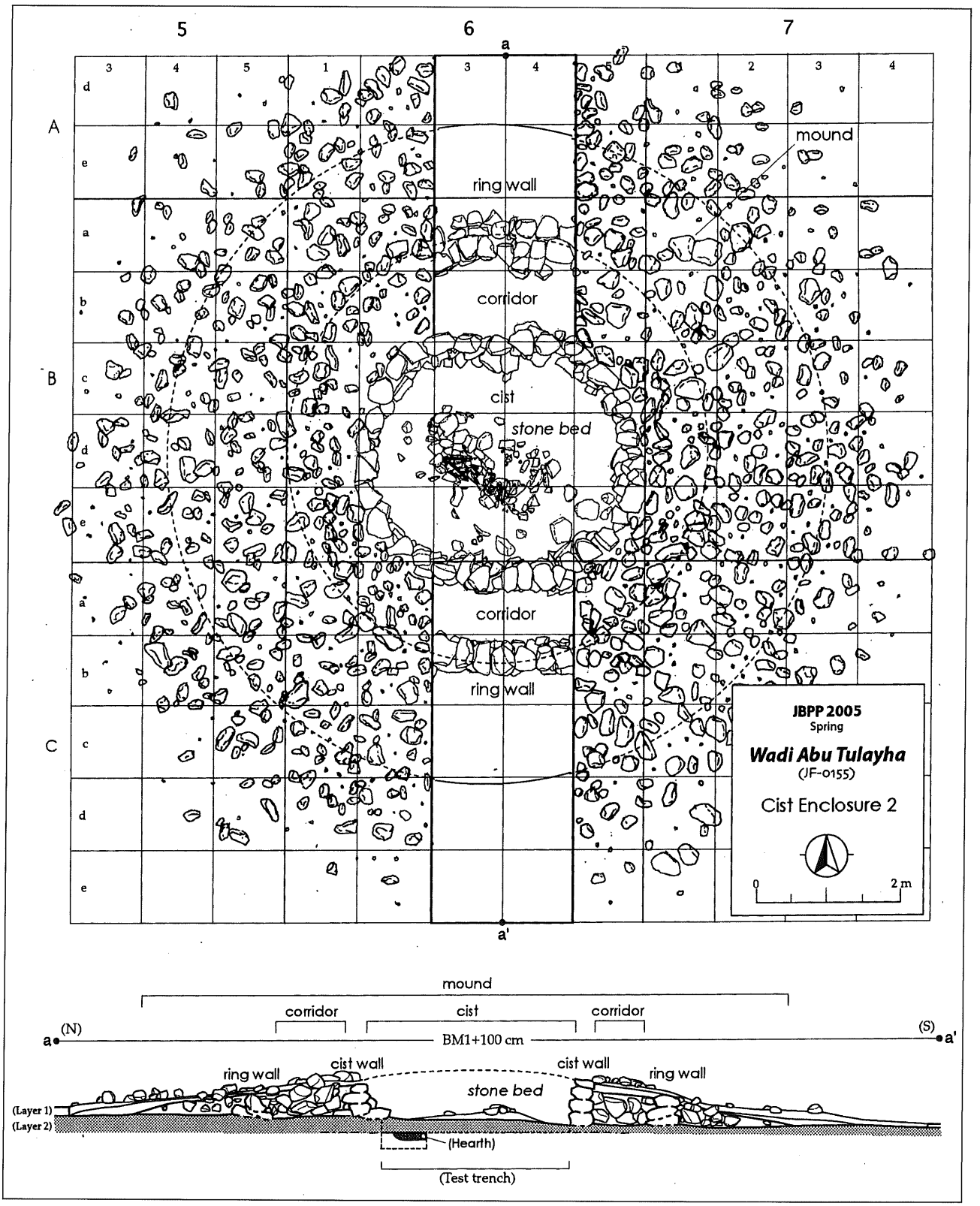
23. Cist Enclosure 1: general view (from S).

Burma cairn fields. Nonetheless, there is little doubt that this feature can be basically defined as a forecourt type cist enclosure and, therefore, probably dated to the EBI period. In light of its smaller size and atypical morphology, it can be referred to in relation to the later stage of the chrono-typological sequence of the Wādī Burma cist enclosure entity (Fujii 2005a).

No burial gifts were found, but a handful of human skeletal remains were recovered from the cist floor, especially from its northwestern corner. It is a tentative conclusion of Dr. Hiroko Hashimoto, the physical anthropologist of our team that they came from a secondary interment of an adult. The sexuality of the skeleton remains uncertain due to the lack of diagnostic bones.

Cist Enclosure 2

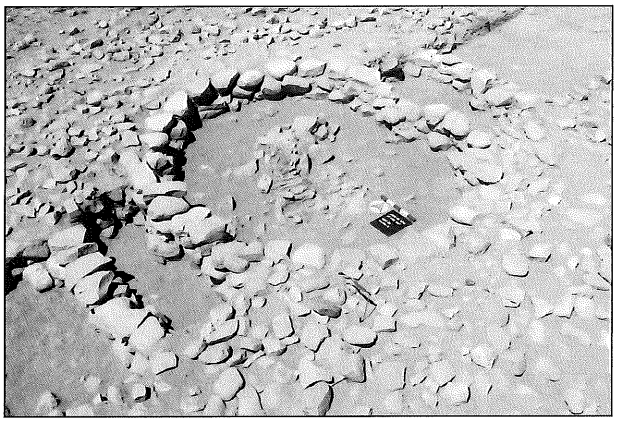
This cist enclosure was much larger in size than the western counterpart, measuring ca. 9m in diameter and ca. 1m in relative height (**Figs. 24, 25**). The limited excavation has proved that it falls within the corridor type non-corbelled cist enclosure represented by Tal'at 'Ubyda Cist Enclosure 116 (TA-CE116) and, therefore, can be dated to a subsequent phase to Cist Enclosure 1 (Fujii 2005a). As its name suggests, this cist enclosure consisted of a non-corbelled, slightly oblong cist ca. 3-3.5m in diameter and a ring wall ca. 6m in diameter encompassing it. No clear evidence for an entrance was attested, but it appears to underlie the cobble mound, prob-



24. Cist Enclosure 2: plan and section/elevation.

ably its eastern part.

Of interest was a stone-paved bed ca. 2m long, that was constructed roughly in the center of the cist floor. There was a shallow depression along its major axis, on which a primary interment of a sturdily-built adult male was found



25. Cist Enclosure 2: general view (from SE).

(**Fig. 26**). The deceased person was buried in a crouching position and faced to the northeast with his left shoulder below (**Fig. 27**). It should be added, however, that a certain number of skeletal remains belonging to other individuals also occurred both on and underneath this bed. Dr. Hiroko Hashimoto has tentatively concluded that a total of four individuals, three male adults and a single infant, were collectively buried in this cist. She also claims that, in view of the lack of some major components including teeth, the three individuals other than the robust male, carefully buried on the stone bed, represent a secondary interment.

Again, no burial gifs were found. Instead, a dozen PPNB flint artifacts including a few Amuq and Byblos points occurred on the cist floor. It is of interest that a small hearth was found ca. 25cm below the cist floor. Both of these observations indicate that this cist enclosure was also constructed over the PPNB outpost, probably converting its construction material.

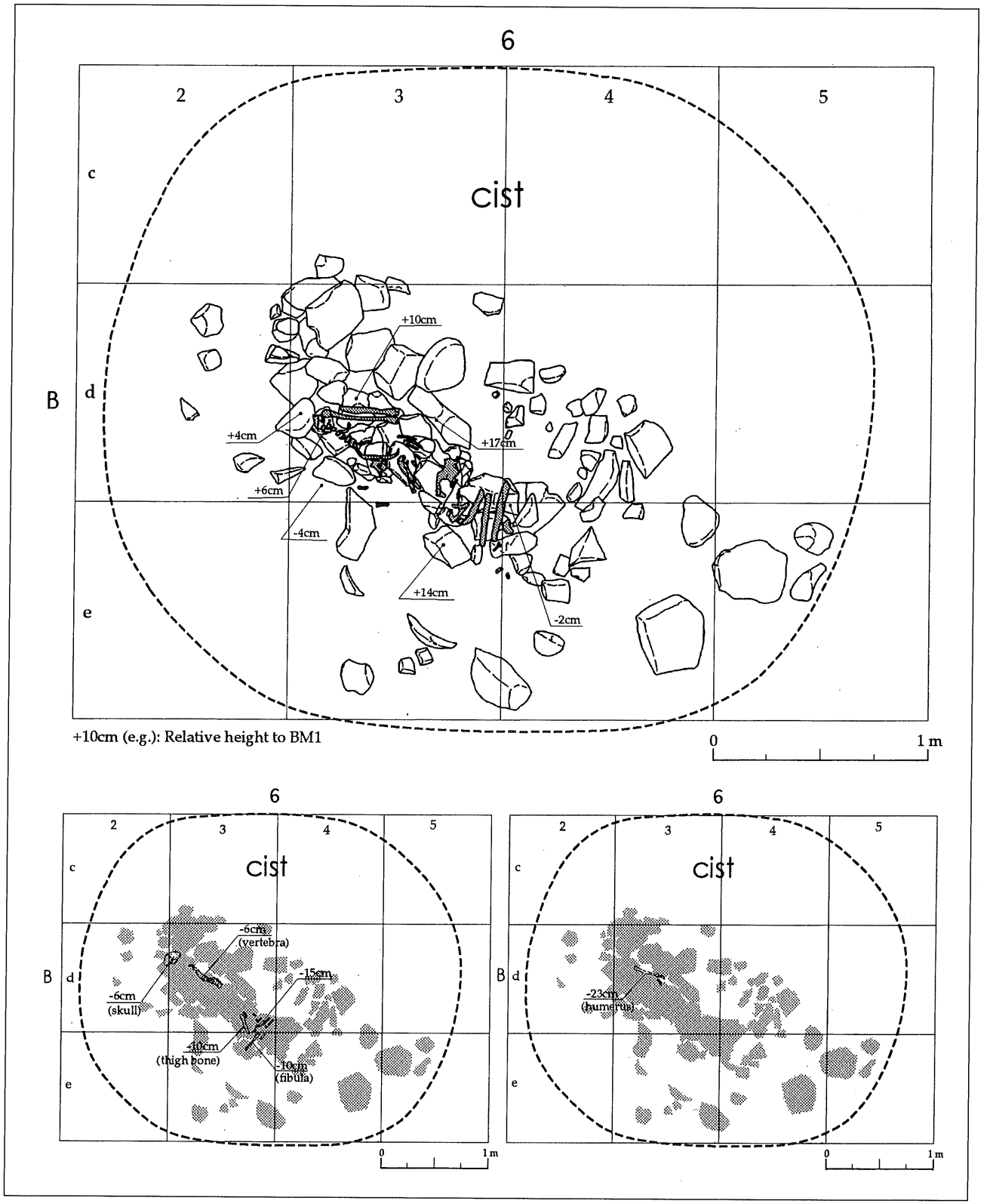
Barrage System

The third component of this composite site — a long (ca. 150m), roughly V-shaped, free-standing wall that sporadically incorporates intermittent wall alignments less than ca. 10m long and several stone concentrations ca. 1-3m in diameter — was situated ca. 80m southwest of the PPNB outpost (**Figs. 2, 28**). The limited excavation at WS-6/7 (the Wall Segment between Point 6 and 7) has shown that it was built with a single row and course of undressed limestone and flint cobbles (**Fig. 29**). No clear evidence for mud mortar or other filling material was attested.

Since no datable *in situ* finds were recovered, nothing can be said about the date of this unique feature. On the other hand, its function is apparent; there is little doubt that it served as a barrage to collect seasonal runoff water from a small wadi that flows eastward across the southern half of the site. First of all, its unique location across a wadi is exceptional in ordinary, domestic structures. The complete absence of *in situ* finds also supports this hypothesis. Second, the V-shaped general plan opening toward the upstream of the wadi is typical of water catchment facilities. The same holds true of the elongated wall which extends roughly in parallel



26. Cist Enclosure 2: a close-up view of the stone bed (from W).

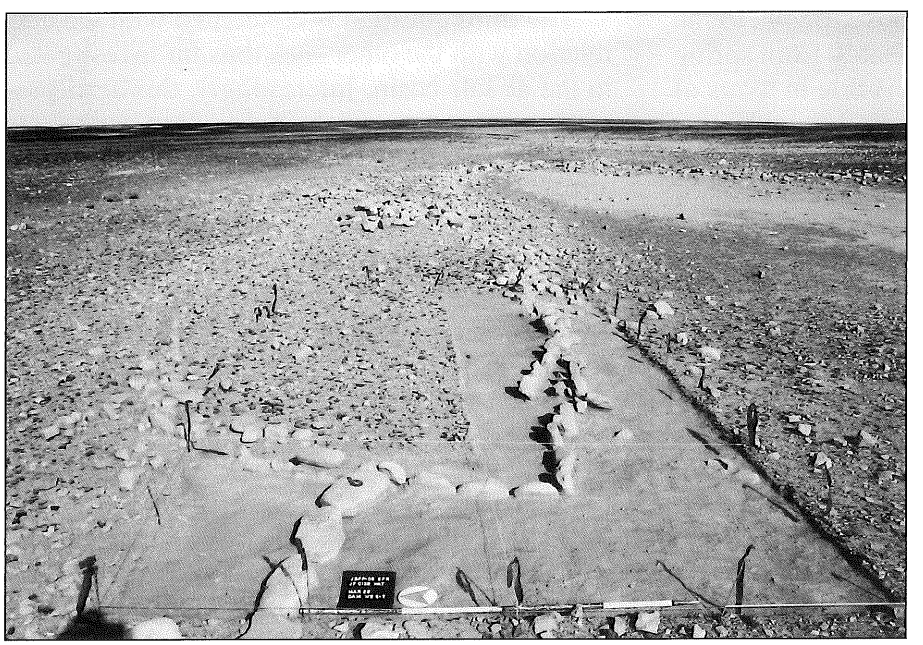


27. Cist Enclosure 2: the stone bed and human skeletal remains found at various levels.

with the contour lines. Third, the use of larger stones around the converging point to the east can be reasonably understood as an essential device to bear sideways water pressure. The formation of a few small playas at the upstream of this core part corroborates this view. Thus, the



28. *Barrage: general view (from E).*



29. *Barrage: Wall Segment 6/7 after excavation (from W).*

use of this feature as a water catchment seems in little doubt.

The significant point is however its specific use. Both the flat topography around this feature and the large evaporation rate in the al-Jafr basin cast doubt on its use as a simple reservoir. Rather, its use as an irrigation installation would be more likely. It is intriguing to hypothesize that optimistic agriculture based on primitive basin irrigation was incorporated into the subsistence strategies of the neighboring PPNB outpost. Nevertheless, this will remain a mere hypothesis until the date of the barrage itself is clearly defined. An excavation focusing on the converging point, scheduled for the spring season of 2006, will hopefully provide a key to dating this unique feature.

Summary and Discussions

The spring and summer excavation seasons in 2005 have proved that the site of Wādī Abū Ṭulayḥa (JF-0155) contains a Late PPNB outpost, a pair of EBI cist enclosures, and a barrage system yet to be dated for certain. Of futher interest to the excavation team was the first component. It was a great surprise that such a sizable

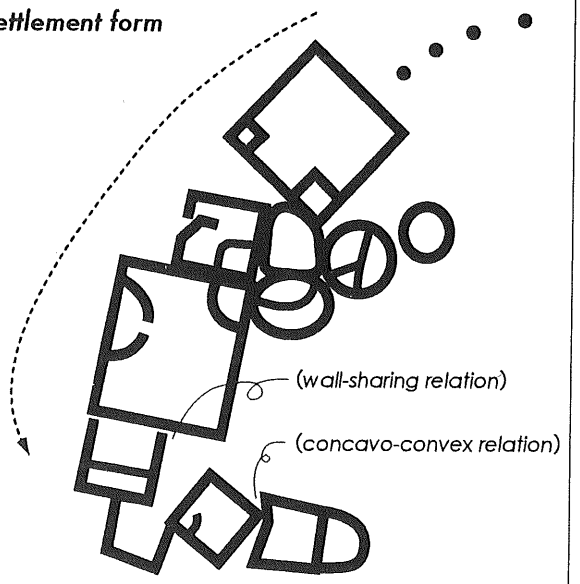
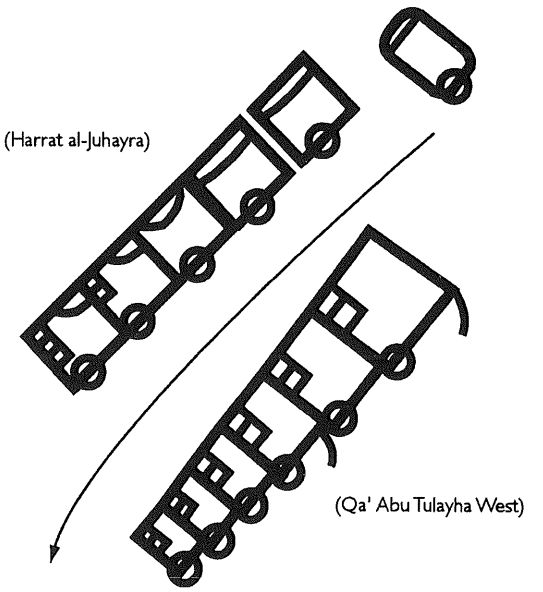
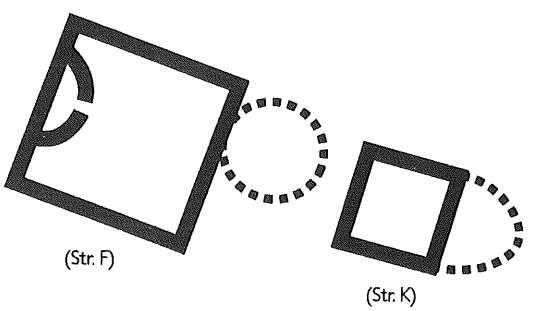
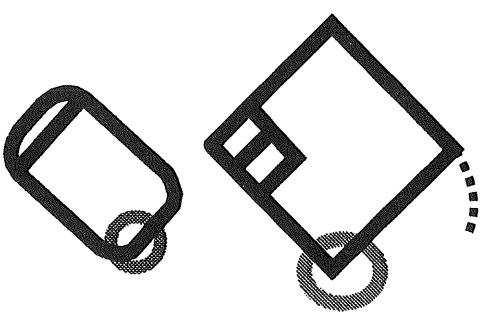
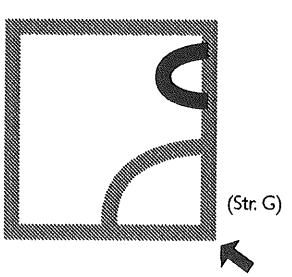
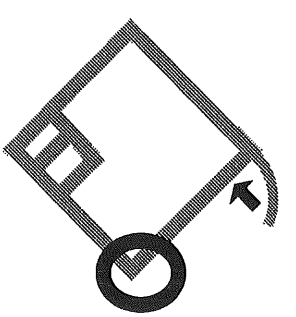
outpost was founded in the middle of *al-Ḥamād* where no perennial natural water source is (and probably was) available. On the basis of excavated evidence, a brief discussion will be made below about the archaeological implications of the PPNB agro-pastoral outpost.

The first question is concerned with the seasonality of this outpost. Was it used all-year round or only on a seasonal basis? This question seems less troublesome, because, in light of the harsh site setting, it is most unlikely that this outpost was used all year round. Both the blockade of entrances and the rarity of burials also cast doubt on the year-round use of this outpost. It is therefore reasonable to suggest that it was used on a seasonal basis. Thus the next question becomes in which season of a year was it used. Noteworthy in this regard is the frequency of postneonatal gazelle bones in the faunal remains, which as mentioned above, points to the limited use of this outpost probably from spring to early summer. This is conceivable in terms of water supply too. Then, for how long was this outpost used in each season? Unfortunately, it is difficult to answer this question on the basis of available evidence. All we can say is that both the durability of the structures and the rich occurrence of heavy-duty grinding tools and game boards are suggestive of a relatively long stay, of at least more than a few weeks. What is of more significance is that, although on a seasonal basis, this outpost was used regularly over a long period, as suggested by the frequent reconstruction and the thick floor deposits. Both the construction of substantial structures and the occurrence of heavy-duty grinding tools and game boards can not be understood until one supposes a relatively long-term stay at and repeated use of this outpost. It is therefore likely that this outpost was used consistently every year, probably for more than a few weeks from spring to early summer.

The next question concerns the subsistence strategy that enabled a sizeable population to survive under the harsh environment. Suggestive in this regard are the predominance of hunting weapons in the tool kit and the rich occurrence of faunal remains. There is little doubt that hunting of wildlife played a major role in the subsistence strategy of this outpost. It seems most unlikely, however, that this sizable outpost was sustained only by such an unpredictable form of subsistence. Noticeable in this respect is the sporadic occurrence of domestic sheep and goats in the excavated fauna, which implies that small-scale transhumance from a parent settlement probably to the west also contributed to the livelihood in *al-Ḥamād*. It is no less important to note that the tool kit also included a large number of reaping and grinding tools. The occurrence of such agricultural utensils strongly suggests that plant resources probably including cereal crops were also extensively exploited around this outpost. One may therefore tentatively conclude that a mixed economy based on hunting (mainly of gazelle), transhumance (focusing on sheep and goats), and cereal cultivation (possibly linked with the barrage system) supported the relatively long stay at and the steady use of this isolated outpost in the middle of *al-Ḥamād*.

The third question is concerned with the correlation with the other sites thus far investigated in the al-Jafr basin. Interestingly, this agro-pastoral outpost has much in common with Late Neolithic pseudo-settlements first identified at Qā' Abū Ṭulayḥa (Fujii 2000, 2001, 2002a, 2002c, 2003) and then re-exemplified at Ḥarrat al-Juḥayra (Fujii 2005b). What attracts attention initially is that these three sites share the elongate settlement form, extending from observers' right to left, or more precisely, from the northeast to southwest (**Fig. 30**). This unique settlement form is also common to the Azraq-Jilāt PPNB-LN entity (Garrard *et al.* 1994) and, at the same time, a critical difference from the Ḥismā-Negev-Sinai PPNB-LN entities; where a beehive-like, conglomerate settlement form is the norm (Kirkbride 1978; Gorring-Morris 1993; Henry *et al.* 2003).

Another similarity is the structure typology. As noted above, Wādī Abū Ṭulayḥa PPNB outpost is marked by a combination of a larger, square to rectangular main room and a smaller, round to oblong anterior chamber. The same is roughly true of the Late Neolithic pseudo-settlements, where a square to rectangular main room is often accompanied by a curvilinear windbreak, probably a deteriorated form of a round anterior chamber, near its entrance (Fujii 2004b). It is highly suggestive in this respect that the anterior chamber of Structure K, probably the last structural unit of the Wādī Abū

Wadi Abu Tulayha (Late PPNB)	**Harrat al-Juhayra** **Qa' Abu Tulayaha West** (Late Neolithic)
Settlement form  curvilinear development from NE toward SW	 linear development from NE toward SW
Structure type  rectangular houses with a round anterior chamber	 rectangular pseudo-houses often with a curvilinear windbreak
Burial custom  facade-side cairn burial at a true house	 facade-side cairn burial at a pseudo-house

30. The comparisons between the Wādī Abū Ṭulayḥa PPNB outpost at and the two Late Neolithic pseudo-settlements.

Ṭulayḥa structural complex, was remarkably reduced in size and, at the same time, simplified in morphology. The arrangement of the main component to the windward side and the minor component to the lee side is also shared between the three. In addition, the presence of a single or a few compartment(s) at a rear wall of a main room is also common to the three. All these observations allow us to conclude that there is an intimate relationship among the three structural complexes.

Of even more significance is that the three sites share the façade-side cairn burial, a unique burial practice related to both the abandonment of a structure and its renewal at an abutting, southwestern lot. This is all the more important because burial practice is among the most conservative of cultural spheres and, for this reason, serves as a telling indicator when tracing the genealogy of a cultural entity. In this sense, it deserves special emphasis that the unique burial custom attested to in the Late Neolithic pseudo-settlements can be traced back to the PPNB outpost in the same area.

Thus, in view of a few major aspects noted above, there is little doubt that the two Late Neolithic pseudo-settlements are directly-descended from the PPNB outpost at Wādī Abū Ṭulayḥa. Given this, the following flow chart will highlight the pastoral nomadization in the al-Jafr basin. That is — *A small agro-pastoral group seasonally moved into al-Ḥamād, bringing along a small number of domestic sheep and goats from a parent PPNB settlement probably to the west. Being engaged in hunting, short-distance transhumance, and optimistic agriculture based possibly on basin irrigation, they stayed at an outpost founded at Wādī Abū Ṭulayḥa from spring to early summer, probably for more than a few weeks. They constructed stone-built, substantial houses consisting basically of a round anterior chamber and a rectangular main room. Since they often abandoned a house (probably following the façade-side cairn burial) and reconstructed it at an abutting, southwestern lot, the outpost was gradually developed from the northeast to the southwest, resulting in the elongate, curvilinear settlement form encompassing the communal forecourt to the east. Nonetheless, a turning point came when the parent settlement was abandoned for some reason at the end of PPNB period. Making use of their past experience as transhumants, they gradually adapted themselves to a new lifestyle, that is, pastoral nomadism, However, a fixed outpost makes sense only in connection with a parent, sedentary settlement. In the course of the lifestyle transformation, they finally abandoned it and, instead, constructed a pseudo-settlement as a large cemetery that inherited the unique burial practice of the direct ancestors.*

Such is a scenario of the pastoral nomadization in the al-Jafr basin retrieved from the excavated evidence. Needless to say, the validity of this tentative perspective is yet to be assessed carefully through further investigations. It leaves no doubt, however, that the Wādī Abū Ṭulayḥa PPNB outpost and the Late Neolithic pseudo-settlements were inseparably linked to each other in many aspects. It is therefore reasonable to assume that the small-scale transhumance attested to at the PPNB outpost paved the way to the pastoral nomadization that took place in the subsequent period.

Concluding Remarks

The excavations at Wādī Abū Ṭulayḥa have enabled us to incorporate the al-Jafr basin thus far taken archaeologically as a *terra incognita* into the southeastern fringe of the PPNB cultural sphere. This site is important in that it fills a large hiatus between the Azraq/Jilat PPNB entity to the northeast and the Ḥismā/Negev/Sinai PPNB entity to the south or southwest, and, in so doing, facilitates the north-south comparative studies of the al-Bādiya PPNB. Not only that, it has also provided a reliable base to trace the pastoral nomadization in the al-Jafr basin as far back as to its very beginning. We can now draw a rough flow chart of this epoch-making episode on the basis of reliable evidence. Nonetheless, two issues still remain to be addressed at this site: the clarification of the overall picture of the PPNB outpost including its eastern half and the dating of the barrage system on the basis of excavated evidence. Further investigation focusing on these two issues is scheduled for the spring and summer seasons of 2006.

Acknowledgements

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THE SECOND PRELIMINARY REPORT OF THE WĀDĪ AR-RAYYĀN ARCHAEOLOGICAL PROJECT[1]: THE FIRST SEASON OF EXCAVATIONS AT AL-KHAWĀRIJ

J.L.Lovell[2], J. Meadows, T.J. Adams, D.C. Thomas, T. Richter, H. Miller, C. Elias, I.K. McRae and M. al Balwaneh (with a contribution from L. Weeks)

Introduction

The site of al-Khawārij is one of two known Chalcolithic sites located in the Wādī al-Yåbis survey (Palumbo *et al.* 1990: 101). Mabry estimates its size to be 20ha (Mabry 1992: 327). The second, smaller site, Jilmat ash-Shariyya, was sounded by Mabry (Palumbo *et al.* 1990: 109-111) and estimated to be 7.5 ha (Mabry 1992: 327) (**Fig. 1**). The Wādī ar-Rayyān Archaeological Project (WRAP) began its work at the larger site of al-Khawārij with a detailed site survey in 2003 (Lovell *et al.* 2005)[3].

As stated in our first preliminary report (Lovell *et al.* 2005), the project is driven by an interest in olive domestication and its implications for Chalcolithic settlement (Lovell 2002, *in press*). As such all excavation was accompanied by a directed sampling strategy for archaeobotanical remains (see below).

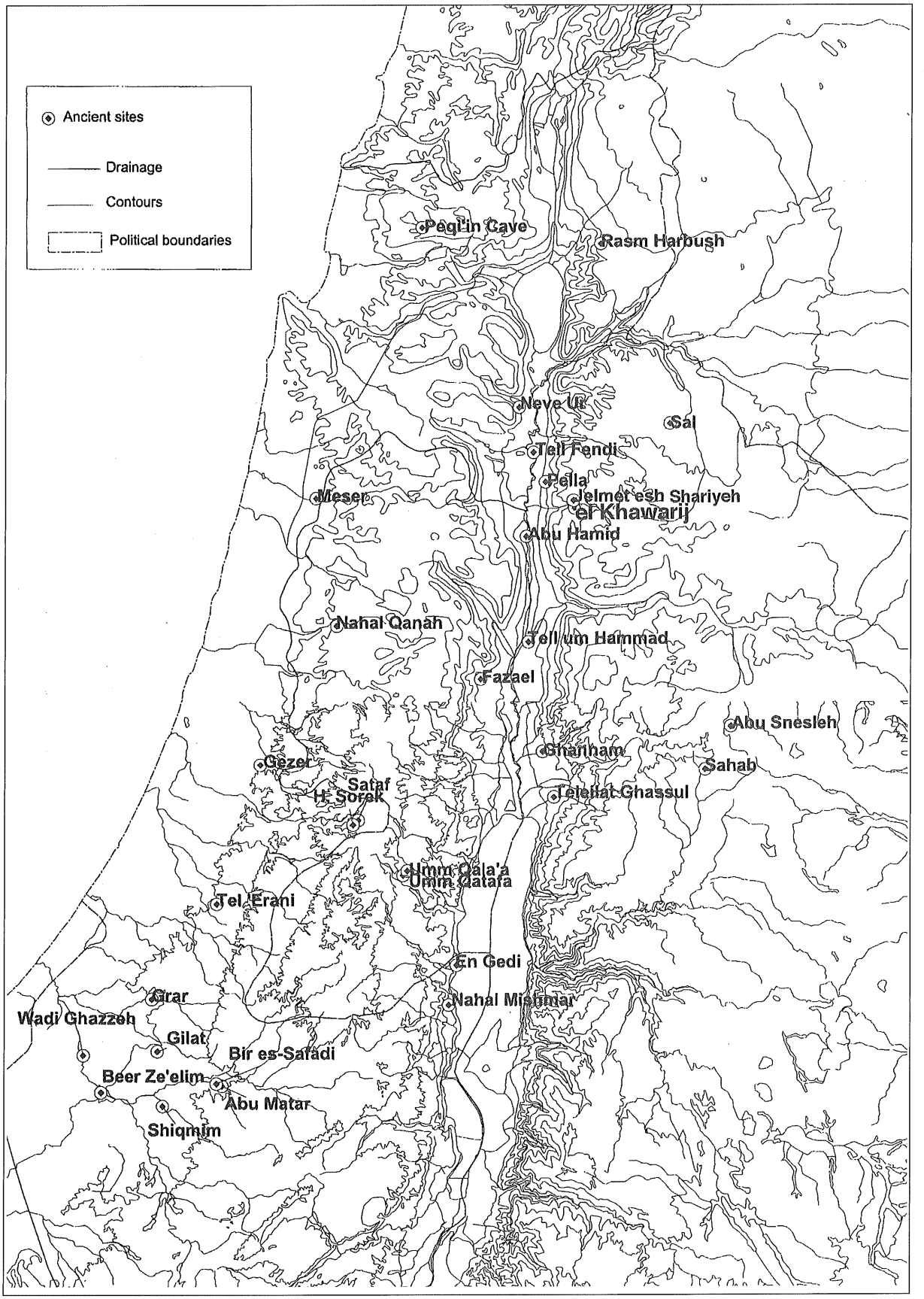
Architecture and stratigraphy (JLL; TJA; DCT)

Following our survey and planning of all surface features, areas for excavation were identified on the basis of extant surface architecture and associated sherd concentrations. The result was six major areas of excavation positioned across the site in order to target areas with archaeological integrity. What follows is a brief outline of our activities in each of these areas (A-F) and their associated finds. The southern area of the site, known as the 'spur', was sounded as Areas A-C[4]: Area A contained some architecture but little in the way of associated finds, while Area B contained some Late Bronze Age material, there was little in the way of good deposits. The finest architecture was found in Area C, which contained a well-preserved domestic structure. The northern sector — the terrace — was sampled as Areas E-F[5]. In Area E we uncovered a large complex of architecture with clear associated floors, while in Area D revealed more fragmentary architecture with excellent and exciting finds. Area F produced clear architecture but little in the way of finds.

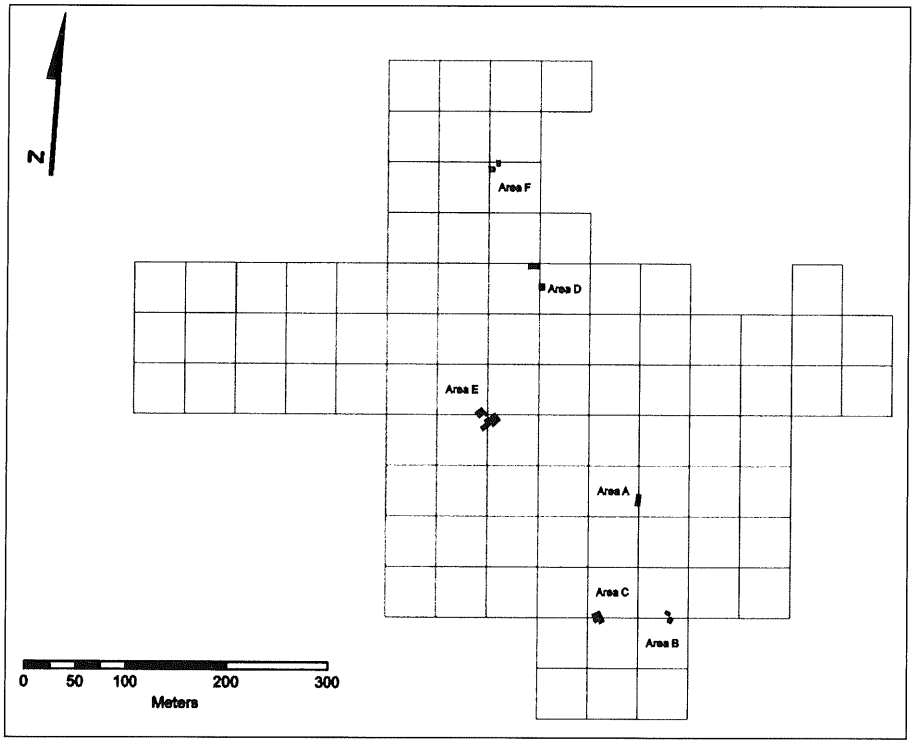
Area A

Area A is located at eastern edge of the site (see **Fig. 2**), at the southern side of the 'spur' that extends NNE and overlooks the wadi itself. This area yielded the highest concentration of artefacts in the 2003 survey (Lovell *et al.* 2005:

1. We particularly thank Dr. Fawwaz Al-Khraysheh, Director General of the Department of Antiquities and his staff in the 'Amman and 'Ajlun offices for generous assistance during our time in Jordan. The Wādī ar-Rayyān Archaeological Project is funded by the *Australian Research Council*. A reconnaissance survey in 2001 was funded by the *Australian Academy of the Humanities*. The research and fieldwork for this project was carried out while J. Lovell was an ARC Postdoctoral Fellow at the University of Sydney and we thank His Excellency, John Tilemann, and his staff at the Australian Embassy in 'Amman, for invaluable logistic support. In addition we thank the site supervisors (J.A. Fraser (Area A), P. Kottaras (Area B), T.J. Adams (Area C); G. Cincunegui (Area D); D.C. Thomas (Area E); I.K. McRae (Areas F and E). I thank I.K. McRae and G. Cincunegui for their help with the plans and P. Kottaras for the photographs produced here.
2. Corresponding author: *Council for British Research in the Levant* (CBRL), P.O. Box 519, Jubaiha, Amman 11941, JORDAN, email: j.lovell@cbrl.org.uk
3. Note that previous publication (Lovell *et al.* 2005: 190) a typographical error occurred. The size of al-Khawārij, as surveyed in 2003, is approximately 20 ha as estimated by the Wādī al-Yābis surveyors — our survey area covered 23.5 ha total.
4. T.J. Adams was field director on the spur.
5. D.C. Thomas was field director on the terrace.



1. Map showing location of al-Khawārij.



2. Plan with location of all areas and trenches.

fig. 5). A large fuul field runs east-west across the base of the spur, *circa* 7m north of Trench A1, and it is probable that the excavated area was also once ploughed. The ploughing activity is partially responsible for the high density of artefacts on the surface, and has damaged large portions of the archaeology. The area on the edge of the plough area includes a concentration of wall-lines, and Trench A1 was opened in the centre of this area[6].

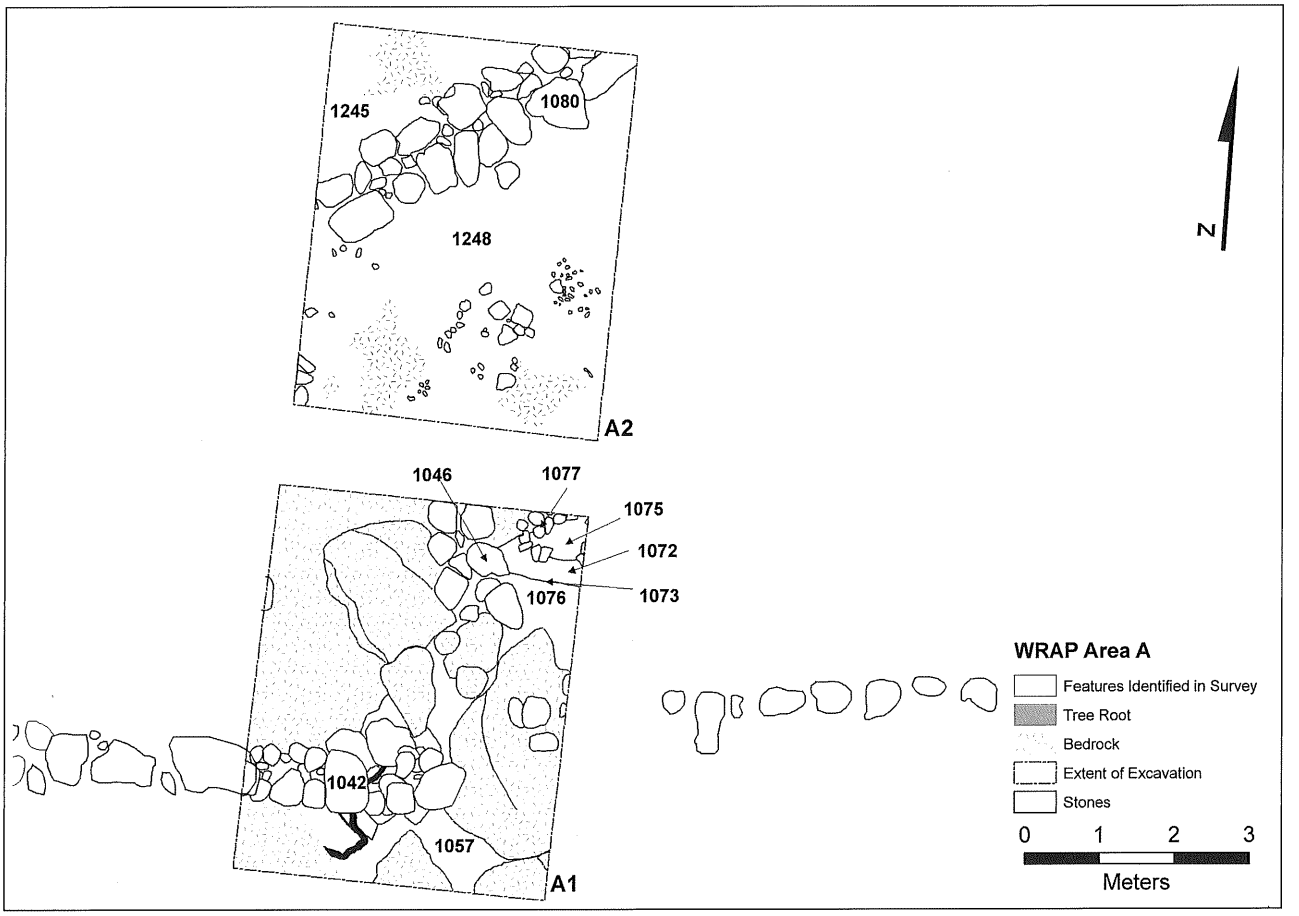
A1 (5 x 4m) encompasses two walls, one recorded in the survey as Feature 417, and another that was not visible in 2003 (**Fig. 3**). Wall 1042 (formerly Feature 417) runs east-west across the southern third of the trench; Wall 1046 runs roughly north-south. A large rock outcrop extends northwest-southeast between these two walls. Wall 1042 appears to have no return, which may suggest that it is a terrace wall.

Wall 1046 may be related to a series of eight large rocks running roughly East-West from just outside the east baulk (Feature 416 from the 2003 survey)[7]. A series of surfaces and fill layers, east of Wall 1046, probably relate to this structure. These deposits were cut by two pits, 1247 and 1243. Pit 1243 cut an earlier, smaller pit in its southern corner that contained a fenestrated stand (see **Fig. 10: 25**).

Bedrock was reached throughout the trench, and occurs on a range of levels. In the southwest corner a channel 0.20m wide and 0.10m deep was found carved into the bedrock, dropping 0.70m at the eastern end. The channel end flares as it hits the drop-off. Bedrock was reached at higher levels in the northwest and southwest, and the rock outcrops appear to form an eastern boundary against a lower area of bedrock, natural or otherwise. It is therefore possible that the bedrock and rock outcrop were used, and possibly altered, in antiquity[8].

A2 is a 6 x 4m trench (located directly to the north of A1, placed to sample any occupation surfaces in association with a curved wall noted in the 2003 survey (Feature 455, and now al-

6. Within survey squares E10 and E11 grided during the 2003 survey (see Lovell *et al.* 2005: fig. 5)
7. Two large rocks, just to the north of Trench A1, aligned with Feature 416, may also form part of a rectangular structure about 4m wide at its western end.
8. Note that two large boulders were located at the northern edge of the southern depression, beneath Wall 1042, although it is unclear whether these relate to the wall or pre-date it (see **Fig. 3**).



3. Plan of Area A showing A1 and A2.

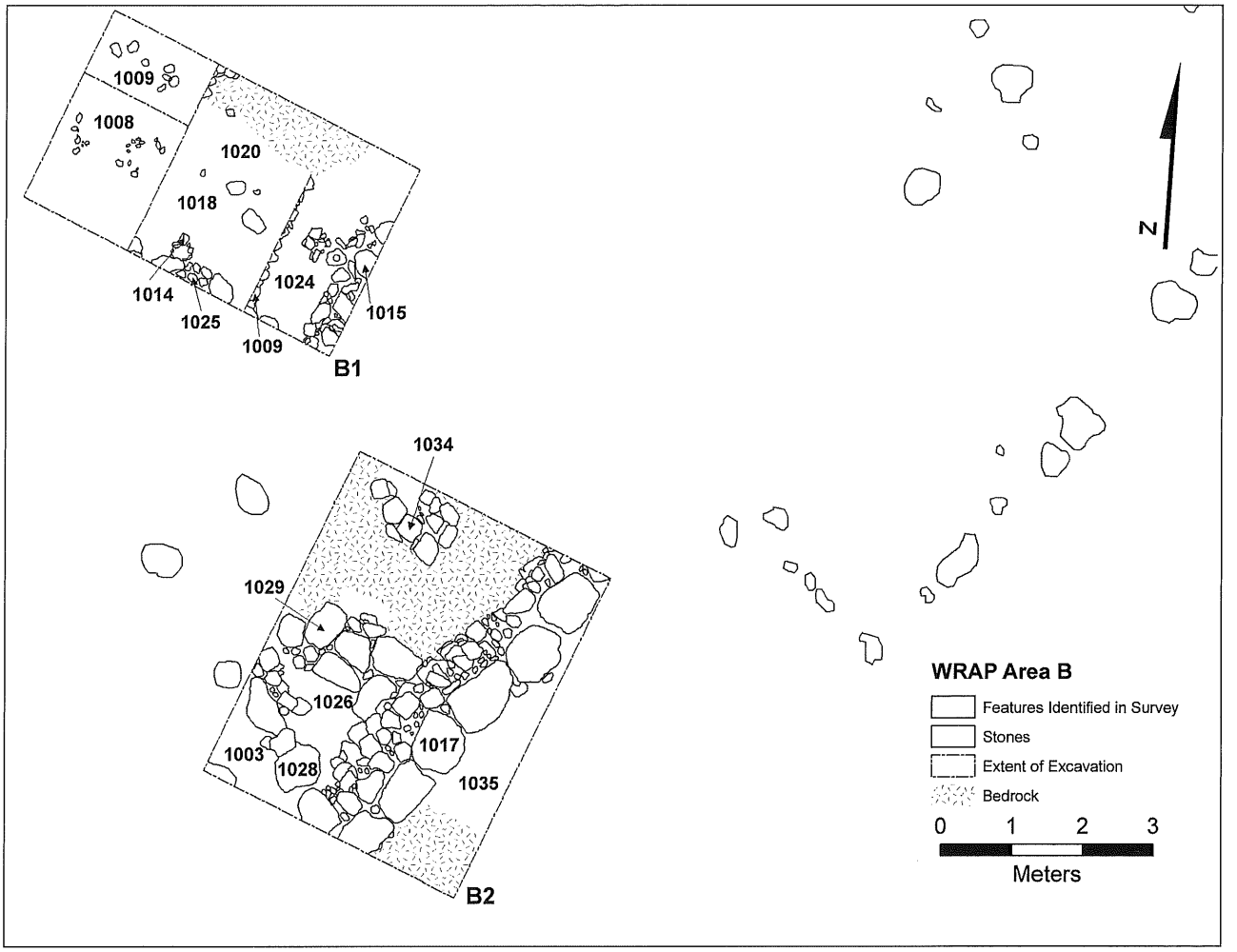
located wall number 1080, see **Fig. 3**). Topsoil was removed as 1242 and 1078. A thin layer of fill deposit (1079) underlay this topsoil and overlay some rock tumble on bedrock. The earliest deposits were sandy silt layers which underlay Wall 1080 and sat on the bedrock, but unfortunately contained very few finds.

Area B

Area B is located at the southern edge of the survey area (**Fig. 2**). Trenches were placed here to examine traces of architecture picked up during the 2003 survey squares G11 and H11 (*see* Lovell *et al.* 2005: fig. 5). The area consisted of two 5 x 5m trenches.

B1 encompassed what appeared to be an architectural feature but soon turned out to be rock tumble. The survey had picked up a number of later period sherds in this area and it was thought that this later material may seal earlier Chalcolithic deposits. Deeper excavation within a 5 x 3m area within this trench continued to produce a mixture of Roman, Byzantine, Late Bronze and Iron Age sherds. There was quite a deep (*circa* 1.5m) deposit of wash which eventually bottomed to some features which may have originally been Chalcolithic, in particular a stone lined pit (1014) and Wall 1015 (**Fig. 4**), however due to the disturbance from wash and erosion very little could be said about these with certainty.

Area B2 was located to the south west of B1 across a wall and a return (**Fig. 4**). This turned out to be the corner of a large structure formed by walls 1017 and 1028 with a paved floor (1029). The packing for this floor overlay bedrock with several pits (*e.g.* 1032, 1033) and/or postholes cut into it. The deposit above the paved floor (1031) yielded largely Late Bronze Age material, although some Iron Age material was found in other deposits. It is evident from the wall lines picked up in the surface survey of 2003 (see **Fig. 4**) that we only revealed the corner of a much larger complex of what might have been a rural farmstead of the Late Bronze and Iron Ages.



4. Plan of Area B showing possible architecture in condensed B1 and structures in B2.

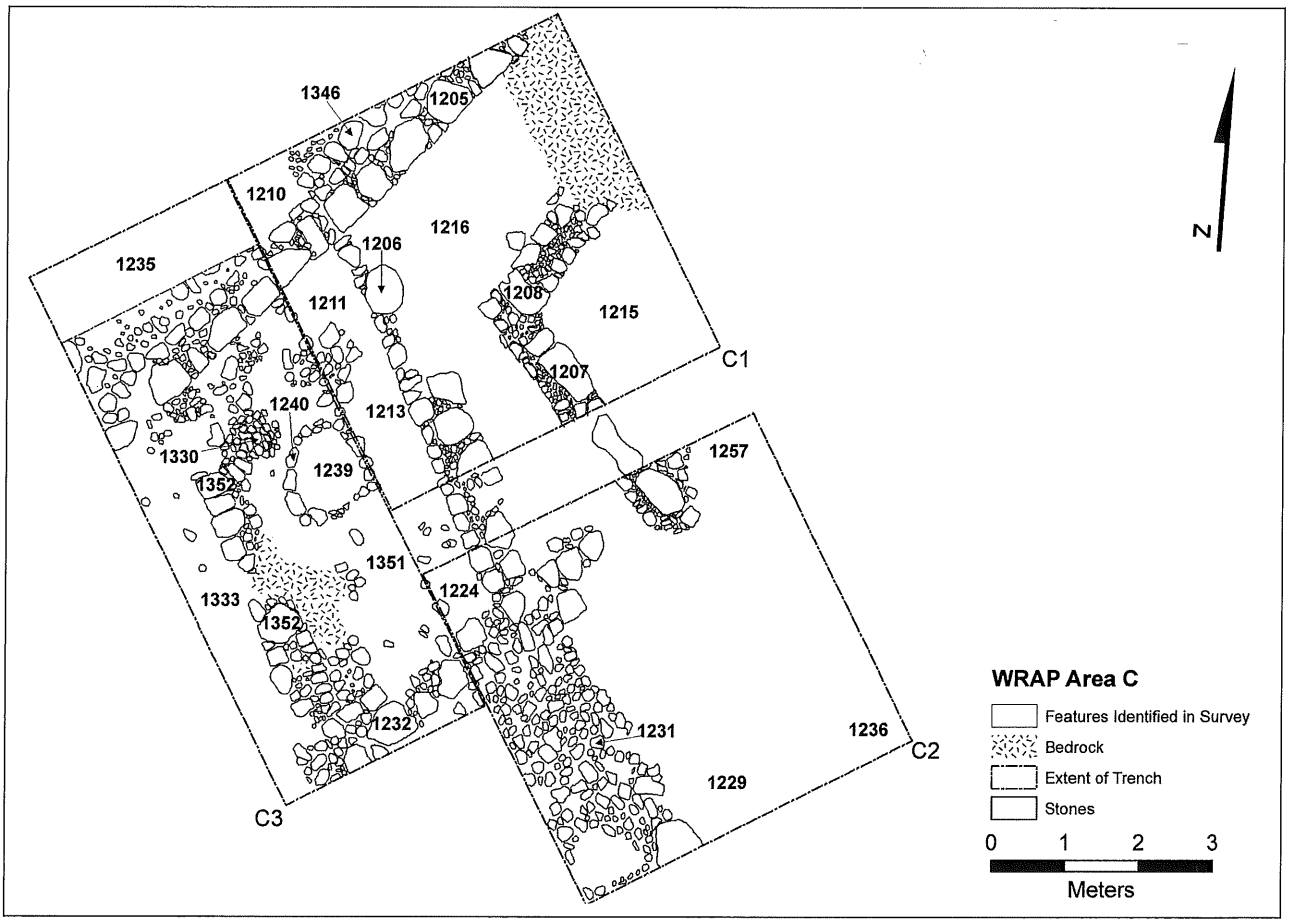
Area C

Area C is located in the southwest area of the site (see **Fig. 2**). It was established to investigate features within grid squares G10 and H10 identified during the WRAP 2003 survey. Trench 1 (5 x 5m) was established to investigate Feature 602 (a wall) and its possible return.

After removal of 10-15cm of topsoil confirmed the line of rough limestone field stones (Feature 602) orientated approximately north-south, assigned context 1205, and two possible additional walls, (1206 and 1207), running north from the southern section (see **Fig. 5**). Wall 1206 abuts wall 1205, which runs east-west and appears to be a boundary wall rather than the wall of a building. Wall 1207, in the southeast of the trench, also appears to have a return, 1208. Bedrock was revealed beneath 1202 against the east section and in the centre of the trench, marking the end of wall 1207 and the start of its return to the east, 1208. The deposits within these two walls overlay patchy and undulating bedrock and two small irregular pits against the east section (1218 and 1220).

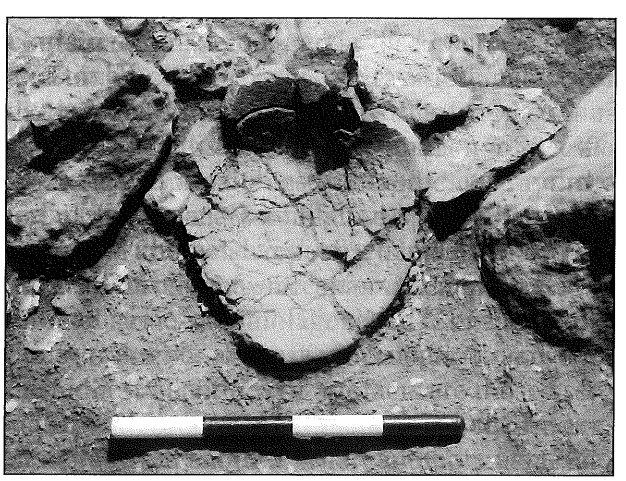
In the central L-shaped area of the trench, bedrock appeared with patches of grey-brown deposit between the higher areas of bedrock. Some of these contexts contained a few ceramic sherds, but otherwise resembled natural. Excavation revealed a channel cut into the rock beneath (1216) leading into rough irregular cuts/ natural dips.

C2, another 5 x 5m trench, was established to the south of C1 separated by a 1m baulk. In the east of the trench relatively flat bedrock was discovered at a depth of *circa* 10cm, in places cut by some 'cup holes'. Wall footing 1207 does not appear to continue far into trench 2, presumably because of the rise in bedrock. Wall 1206 was found to continue south with a return to the west



5. Plan of Area C.

(Wall 1232). It is possible that 1205 forms a later division wall within the large building formed by walls 1205 and 1232, but stratigraphically Walls 1205, 1232, 1207 and 1208 appear to be equivalent. A near complete basalt bowl (**Fig. 6, Fig. 12: 2**), was found in the corner formed by walls 1206 and 1232 on a surface (1224).



6. Reg. # 040743 in situ (Photograph: P. Kottaras for WRAP).

C3 was excavated to further clarify the architectural complex revealed in C2. It was a 7 x 3m trench, with a 3 x 1m extension on the southwestern edge. Here we found the well-preserved remains of a rectangular structure (formed by walls 1205, 1206, 1232 and 1352), complete with installations (1211, 1240, 1350) on a clear surface (1351) which corresponds with 1224 (C2). Removal of the surfaces and fill deposits revealed the same irregular cuts in the bedrock found in the other trenches in Area C.

Area D

Area D is located on the long flat terrace that forms the northern section of the site adjacent to a large bedrock outcrop (**Fig. 2**). A number of installations had been cut into this bedrock and traces of architecture had been located in the 2003 survey. D1 was a 5 x 5m trench placed to examine some of these architectural traces. Removal of topsoil exposed a plough-affected deposit. This topsoil overlay a dark brown loamy silt deposit (1086, 1088) that contained a number

of broken, yet re-constructible, vessels and their soil contents (1085, 1086, 1087). This formed the fill within a room delineated by two walls: 1096 ran north-south along the western section, and 1092 ran east-west along the southern section (**Fig. 7**). In the southwest corner a distinct 'threshold' of re-deposited crushed limestone bedrock (1097) formed the link between these walls.

Removal of Walls 1092 and 1096 revealed the same material underneath which, in turn, overlay 1105, a loamy silt, containing a complete churn (**Fig. 10: 24**) and other finds. A complete diorite mace head was found (**Fig. 13: 13**, see below) adjacent to Wall 1096. In the northeast of the trench we excavated a possible surface (1094) and the packing underneath (1099, 1100) associated with Wall 1096 and a hearth or ashy patch (1095). Large numbers of artefacts were obtained from these deposits.

Removal of 1099 and 1100 revealed a layer of degraded bedrock or crushed bedrock very similar in style to 1097. This crushed/degraded bedrock appears consistently throughout D1. There are two pits cut into this re-deposited bedrock material, both of which bottomed at solid bedrock. Clearance of the trench down to bedrock included removal of reddish brown crumbly deposit in far north eastern corner and removal of two fragmentary structural deposits (wall stubs 1114 and 1115) associated with this. Between these two wall stubs was a pit, or bedrock depression, filled with a dark brown silty deposit.

Trench D2 was separated from D1 by a 1m baulk to the east (**Fig. 7**). Removal of topsoil revealed a complex scatter of walls and a layer of chocolate brown soil (1102). Unfortunately the deposits below this, while associated with definite architecture (Walls 1111, 1118, 1119, 1120), were very shallow. Notably deposits 1104 and 1113, on the western side of the trench abutting walls 1111 and 1119, appear to contain a large amount of debitage. Walls 1111 and 1119 appear somewhat curvilinear, while 1118 and 1120 are rectilinear and may relate to the structure in D1.

Trench D3 was a 6 x 5m trench to the southeast (**Fig. 7**). This trench was located specifically to investigate several features in the outcropping bedrock which may have been rock-cut installations (features 1334, 1337, 1341) and their fills (1332, 1335, 1338 *etc.*). Notably there were traces of architecture associated with these rock-cut installations (Walls 1329 and 1336). The excavation of the largest of these was not able to be completed — the excavator reached a depth of 1.4m before it became too dangerous to proceed.

Area E

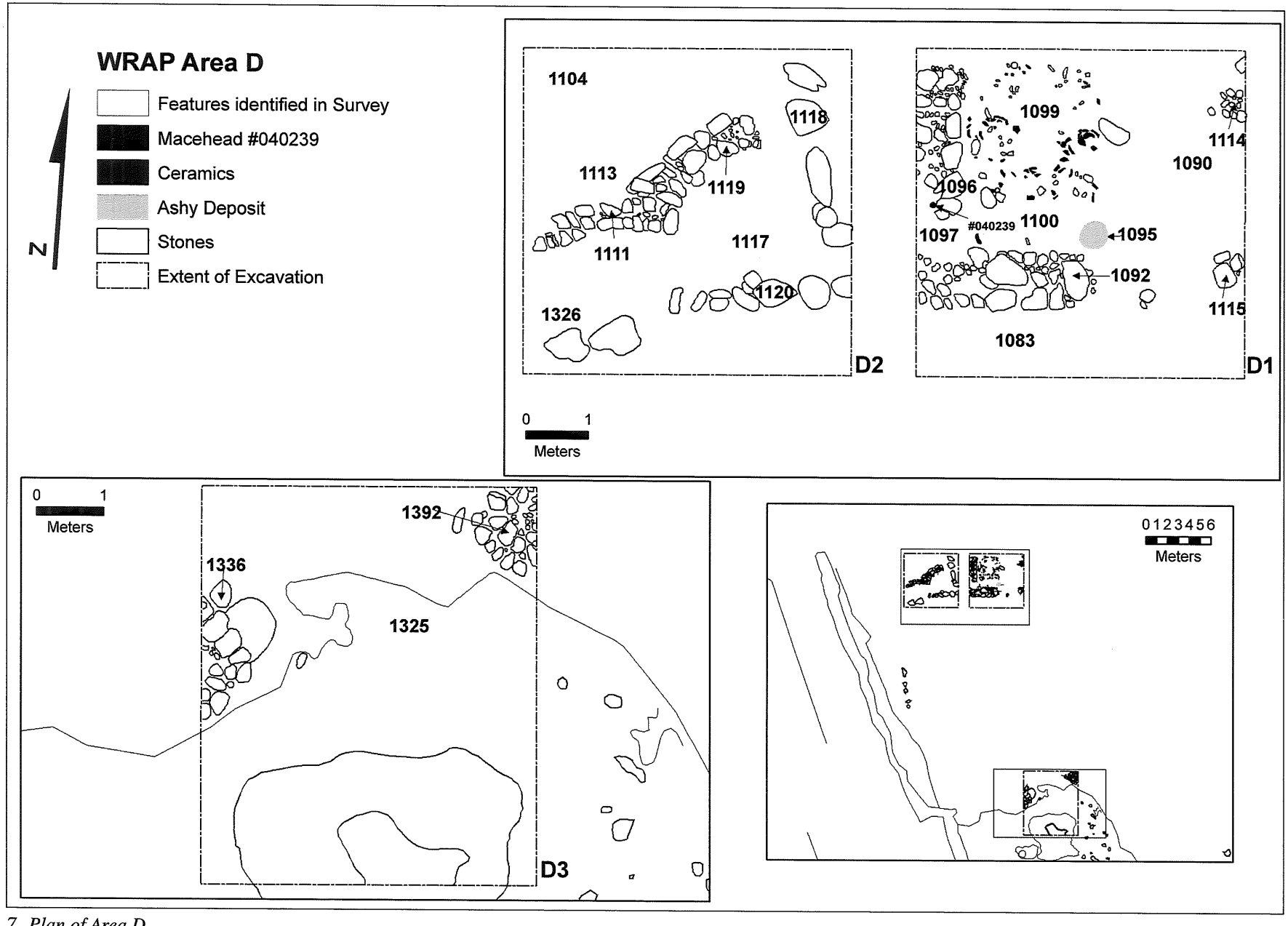
Area E is located on the southwestern edge of the large terrace (see **Fig. 2**). A total of circa 130m^2 was excavated in this area in the form of 6 trenches: E1, E2, E3, E4, E5 and E6. In fact E1 began as a cleared area and was not pursued and so we need only discuss E2-6 here.

E2, 3 and 5 will be presented together, since they formed one large trench with no internal baulks by the time the excavations had ceased. These three trenches revealed a large rectangular building with an additional, adjoining room (see **Fig. 8**). In the main room, bounded by Walls 1141, 1143 and 1144, the removal of surface 1155 exposed sub-surface packing 1157, *circa* 10cm thick. In the southeastern corner of the room an earlier surface was preserved, directly above bedrock, 1282. E5 was begun to complete the excavation of the room, however it was only possible to remove the topsoil (1285) and plan the tops of the walls before the close of the season.

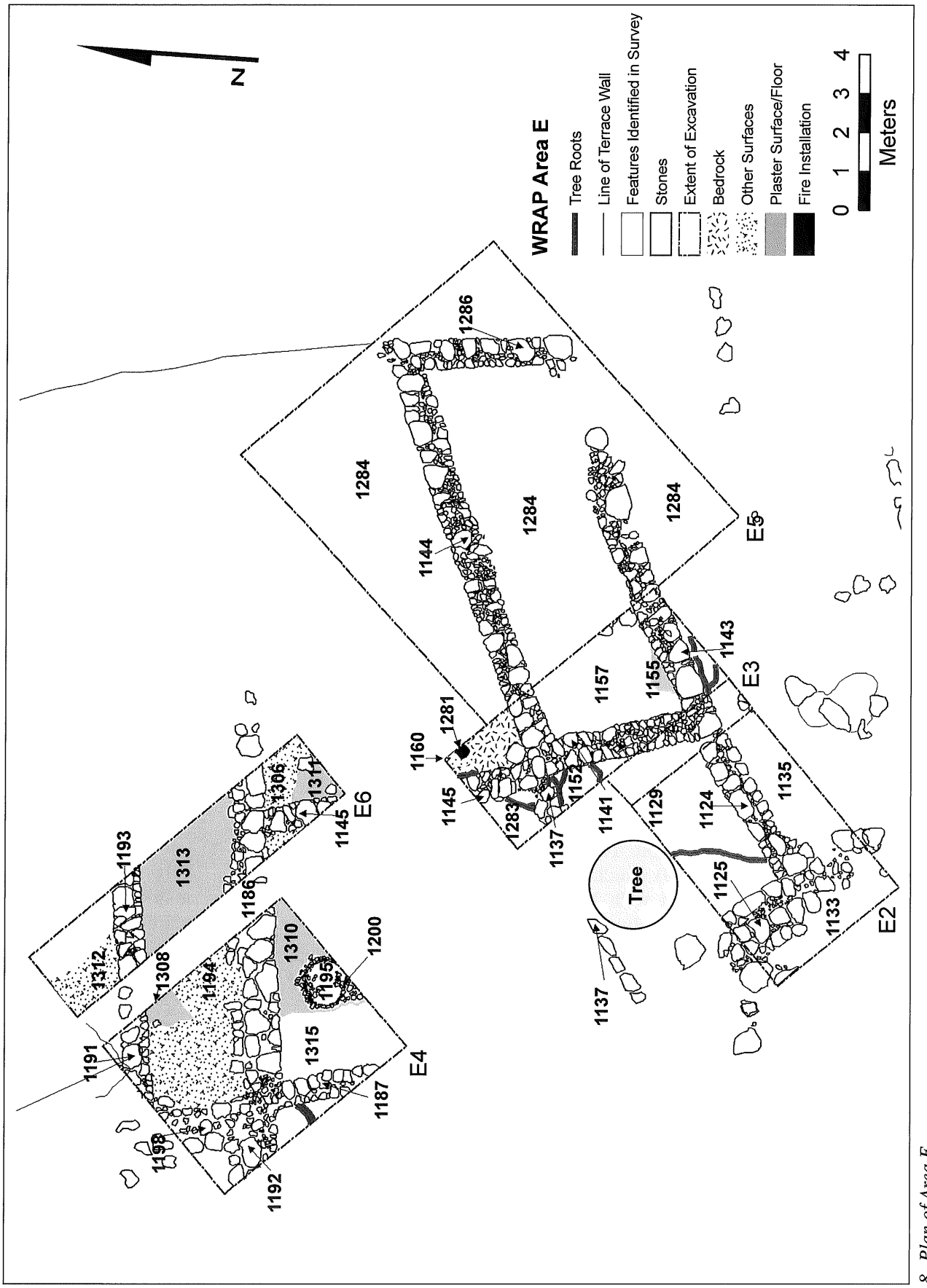
In the room to the north, bounded by walls 1144 and 1145, a small sounding contained a possible surface 1160 and fire installation, Feature 1281, in the northern portion. The fire installation is roughly rectangular, measuring 33 x 30cm and *circa* 8cm deep. It has a central hollow *circa* 15cm in diameter and *circa* 7cm deep. Unlike the surrounding surface/deposits, 1281 is very compact and stony. It appears to be intensely burnt, although it did not have associated ash, nor was it blackened.

It should be noted that Wall 1145 was clearly a later addition. It was not bonded with 1141, evidenced by its slight difference in alignment (see **Fig. 8**). Clearly then the deposits just discussed must relate to a later phase, and this may also apply to walls 1124, 1125 and 1137. Further deposits on this western side were excavated west of wall 1145, but unfortunately there were few deposits with any integrity.

In E2, to the west, an additional room was



7. Plan of Area D.



8. Plan of Area E.

uncovered, formed by Walls 1124 and 1125, and also by its return, 1137 (which lay outside the trench). Unfortunately less secure deposits were available here. Wall 1124 clearly butts against Wall 1125, but they may be essentially contemporary. No junction could be viewed between 1137 and 1125. The fill inside the room was removed as 1129. The deposit came down upon bedrock. The whole complex's external length is 17.5m.

Given that some of the walls appear to be additions the question of internal phasing is very important. Therefore deposits in association with the original long room structure (1141, 1143, 1144 and 1286) appear to be the earliest phase.

Areas E4 and 6 will be discussed together as they were excavated within the same complex. E4 was a 6 x 5m trench placed across a stretch of walling identified during the 2003 survey. Upon excavation it was revealed to be a second long rectangular room with further rooms on the sides. Topsoil was removed revealing the tops of Walls 1186, 1191 and 1198, which formed the basis of the rectangular structure, the fourth return lay outside the excavated area[9].

Note that 1198 appears to be a later wall, and was only partially preserved. A further structural feature, 1192, perhaps represents a collapsed bench, but deposits within this area were disturbed[10]. An additional wall, 1187, ran from the southwest corner of this structure, southwards towards the E3 structure and probably joined with it, forming a later addition. This room included a stone built pit (1200) which appears to have cut surfaces associated with Walls 1186 and 1187 (1310, 1315, 1317), thus this pit and its fill (1195, 1996, 1199, 1307) may date to a later phase. The pit and floor levels were sealed by a grey layer, 1190, that was itself beneath topsoil.

Deposits inside the main long rectangular room were excavated as 1188, light grey loam, 1194 and 1197, a red-brown loam which lay on top of bedrock in some places, but in one area the remains of a yellowish grey surface was preserved 1308. In two places the bedrock was cut by small pits against Wall 1198. In the east of this room, a further trench was opened (E6) which extended the sample of the floor surface (1308). E6 was a long, thin (9 x 2m) trench. Topsoil removal clarified the continuation of Walls 1186 and 1191, and showed Wall 1145 (from E3) abutting the structure. A return between 1186 and 1191, however, was still not in evidence — this must lie much further to the east[11].

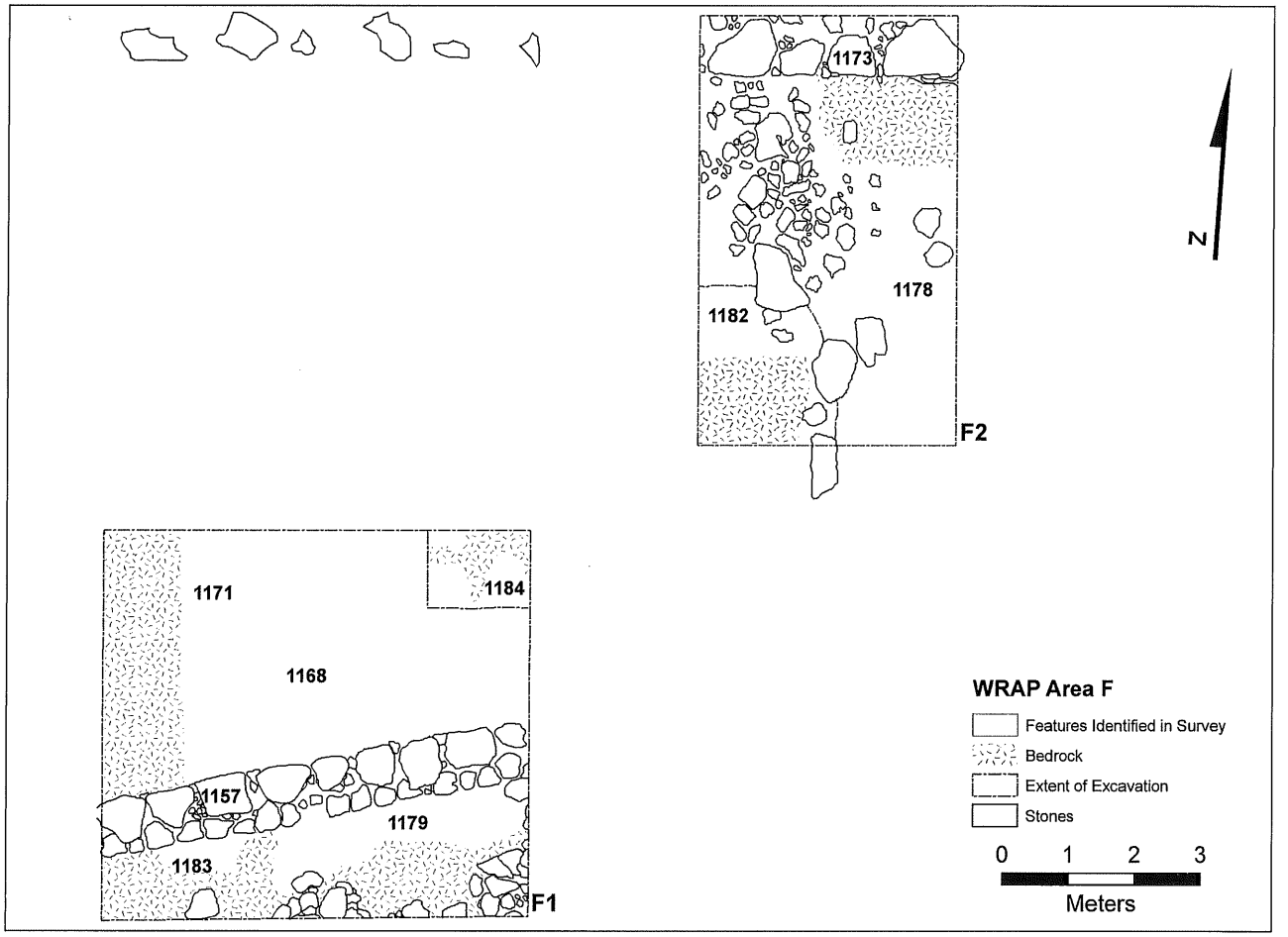
A grey loamy sand was removed from east of 1191 (1304), and within the walls (1305) and this revealed the continuation of the yellowish grey surface excavated in E4 (1309) and a second surface beneath it (1313). A similar surface (1311) was found between 1186 and 1145 underneath 1306, a greyish loam in which a complete V-shaped bowl was found. This surface (again yellowish grey) is associated with wall 1145. North of Wall 1191 a further two yellowish-grey surfaces (1312 and 1314) were located beneath 1304. These overlay bedrock in the eastern portion of the trench and a cut in the bedrock there was filled with an ashy deposit (1316).

Area F

Area F was located in the northern sector of the site in order to test several walls that appeared on the surface (see **Fig. 2**), including Features 176 and 226 from the survey. Two trenches were excavated here, F1 (a 5 x 5m trench) and F2 (a smaller, 3 x 5m trench).

F1 (see **Fig. 9**) was laid out to cross Feature 176 (henceforth Wall 1162) and several layers of topsoil were cleared from around it (1161, 1163-6). Unfortunately no good surfaces or fill layers were encountered. All the deposits in this area contained a good deal of stone rubble. 1167 and 1168 contained burnt ceramic and lithic material concentrated against the wall, but lacked any clear definition as a surface. A large cut in the bedrock appeared underneath 1167, and was sounded as 1183. This large round cut or depression extended well into the north eastern trench, F2 (see below). Small soundings (1169, 1171) were located in the west of the trench north of Wall 1162, in order to ascertain the depth of deposit. 1170, 1176, 1177 and 1179 were further excavated in the southern portion to take the trench to bedrock.

9. Excavation is planned for 2005.
10. Excavations in 2005 will seek to clarify the phasing in this section of the area.
11. Excavation is planned for 2005.



9. Plan of Area F.

F2, located to the northeast, was laid out to test a possible return to 1162 visible on the surface and a further cross wall (1173), running east-west. Topsoil was removed as 1172, 1174 and 1175. A layer of small stones (1178) which may have been related to Wall 1173 was removed, as was a deposit beneath this (1184), but the return wall which might have joined 1173 and 1162 was not in evidence. 1180, 1181 and 1185 formed the fill of the northeastern section of the same cut or depression located in F1.

Ceramics (JL)

The ceramic material from the al-Khawārij excavations shows a classic 'late Chalcolithic' assemblage. A very few sherds of Late Neolithic material were found (*e.g.* **Fig. 10: 22**), as were very occasional EBA sherds in topsoil deposits. Later Bronze Age material was present in Area B[12], but all other areas clearly dated to the Chalcolithic. Full details on fabric selection and break-downs of fabric percentages will be presented in the final report. Fig. 10 provides a sample of the forms encountered. Percentages and other figures given below are based upon the sample of material from good contexts that has been catalogued to date — however we have processed all of the secure contexts.

The Assemblage

The assemblage contains a number of closed vessels (just under 50%) and open vessels (just over 50%). Fabrics are generally similar to other Chalcolithic sites, the main temper being carbonates, with occasional use of basalt or crushed calcite. There are distinct fabric groups within the assemblage, but full characterisation of each group awaits a more detailed study. While the classic red painted decoration characteristic of a Chalcolithic assemblage is present, it is not present in large numbers. This may be partially due to taphonomy in the shallow deposits, but might

12. This material will be discussed in a future report.

also be an expression of regionalism. Thumb and other impression techniques are also in evidence, as are incision and other surface manipulation techniques.

Open vessels — bowls: The bowl repertoire contained the standard round-sided bowls (**Fig. 10: 3**) and a significant numbers of 'v' shaped bowls (perhaps 10% of the bowl repertoire — **Fig. 10: 1, 2, 4**). Paint in red bands (10.2) or trickles (10.3) is present but often not well preserved. The small wheel-fashioned 'v' shaped bowls are also present (Roux and Courty 1997), some with quite thick walls (*e.g.* **Fig. 10: 5**) and evidence of string-cut bases (*cf* Braun 2000: fig. 7.3) and some with the more usual thinner friable walls. Small hemispherical bowls are also noted (**Fig. 10: 7**).

Fenestrated bowls: Bowls on stands are rare but certainly present (**Fig. 10: 25**). This example has scalloping around the rim, and the classic bands of red paint.

Basins: large basins are not common (although there are a number from Area C) but smaller painted bowls are present (*e.g.* **Fig. 10: 23**).

Closed vessels — jars: Of the jar repertoire about 25% are storage jars. These include the large basins (*e.g.* **Fig. 10: 26**) and the tall-necked jars (**Fig. 10: 10, 13** and **14**) which come in a wide variety of morphological forms, including the slightly sinuous tall neck jar, which is probably an indicator of a later Chalcolithic date. In depth study of the jar types will likely reveal important patterns of use of the area, because, if it can be assumed that ceramics were a household production, then the notable variability in jar types may indicate a communal use of the area and its industrial facilities. Many of these jars were handled and the handle repertoire contains both loop and lug handles, but it also has some ledge-like handles (**Fig. 10:15, 17**), but so far we have no wavy-ledge handles as described by Braun (2000: fig. 7.4). Short-necked jars area also present, but less common (**Fig. 10: 11**).

Torpedo vessels: Interestingly we also have one possible torpedo vessel (**Fig. 10: 27**) — these are rare vessels that occur at only a few sites. Burton's work on the torpedo vessels at Jilāt suggests that these may have contained olive oil (Burton 2004: 597) if this is correct it would have interesting implications for this example from al-Khawārij.

Holemouths: Holemouths are present in the form of simple thick rims (**Fig. 10: 8**) or the slightly up-tuned rim common from the middle Chalcolithic phases (**Fig. 10: 9**), as well as pinched or thickened rims, more common in the later Chalcolithic (**Fig. 10: 6, 12**).

Fossil indices: The excavations have not uncovered any cornets, although there are a large number of churns (2.5% of the assemblage) — both large (like those found at Be'er Sheva sites (see **Fig. 10: 18-19**) and some smaller 'bird-shaped' vessels (**Fig. 10: 20, 24**).

Chipped stone (TR and HM)

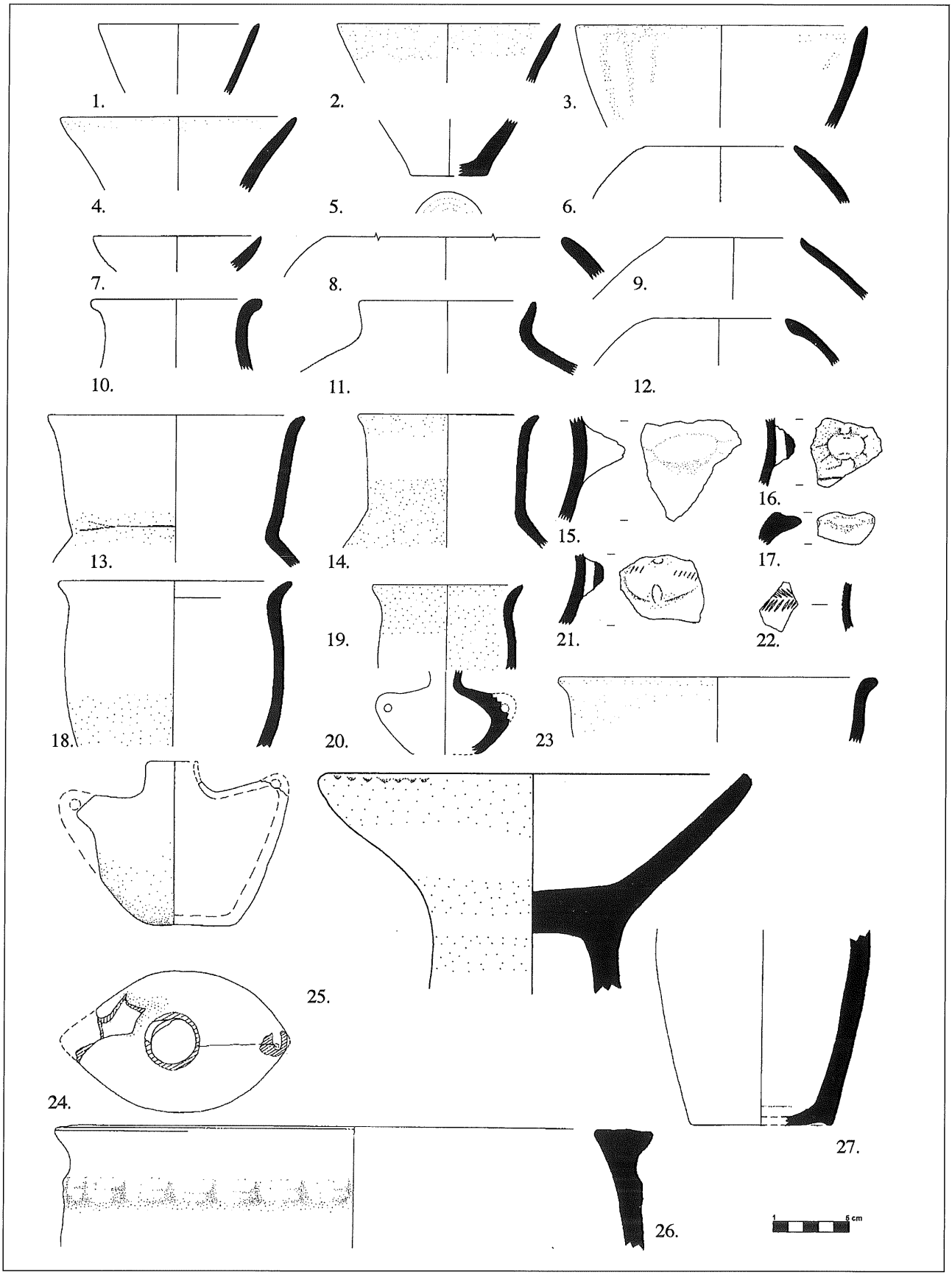
The al-Khawārij chipped stone assemblage comprises *circa* 16,500 individual pieces. Retouched pieces make up the majority of these, followed by flakes, debris, blades, bladelets, cores and core trimming elements. The entire assemblage was sorted and classified according to debitage categories, cores and retouched artefacts. Of the retouched artefacts (n = 4574) a total of 3153 have been typologically analysed to date, concentrating on those from more secure deposits. Artefacts deriving from topsoil or stratigraphically less secure deposits were sampled at 50% for typological analysis. Retouched artefacts were studied using Rosen's (1997: 40) type list[13].

Materials

Knappers at al-Khawārij relied on a range of locally procured raw materials. However, in a number of instances raw materials appear to be derived from a source not immediate to the surrounding area[14]. Local raw materials were used for production of the vast majority of the 'expedient' tool groups, such as retouched flakes, scrapers, notches/denticulates and borers, as well as the more formal celt tool group. This lo-

13. We added further types to Rosen's list including further sub-types amongst the scraper tool class, as well as the borer class, accounting for different types of blanks (*i.e.* blades, flakes or bladelets) used for the manufacture of these types of tools.

14. A brief raw material survey of the immediate region was undertaken in 2004 and 2005 to document the presence of different types of flint, chert and other rocks that were locally available.



10. Ceramics from the 2004 excavations.

Figure 10.#	Catalogue #	Form	Fabric	Decor
1	20040	Bowl, Small Deep 'v' shaped	1aM (var)	
2	20084	Bowl, 'v' shaped	5cM	Red painted band rim ext./int.
3	20090	Bowl, large round sided	1aM	Trickles red paint rim and body ext./ int.
4	20037	Bowl, Medium 'v' shaped, flaring	4bM	Red painted band on rim ext./int.
5	20118	Bowl, Small 'v' shaped (wheel fashioned?)	3aF	
6	20002	Holemouth, simple, pinched rim	6cM (var)	
7	20007	Bowl, Small, round sided	1bM	
8	20010	Holemouth, simple	1bM	
9	20107	Holemouth, fine	11aM	
10	20001	Jar, tall neck, thickened out-turned flaring rim	7aM	
11	20012	Jar, short neck, slightly flared	6aM	
12	20078	Holemouth, medium thickened in-turned rim	1aM (crystalline)	
13	20020	Jar, tall neck, string indentation at bottom of neck ext.	6cM	Traces of red painted band ext.
14	20059	Jar, large tall neck, out-turned pinched rim	6aM (c. basalt & cryst.)	Red painted bands ext.
15	20006	Handle, ledge (?)	7aM	
16	20004	Handle, lug	1aM	Traces red paint ext.
17	20018	Handle, ledge	14aM	
18	20056	Churn, large neck — bulbous with out-flaring pinched rim	3aM	Red painted band int.
19	20121	Churn, neck — bulbous with out-flaring pinched rim	5aM	Red painted ext. and band int.
20	20006	Churn, miniature	7aM	
21	20008	Handle, lug	1aM	Red painted ext. with short parallel incised lines
22	20134	Bodysherd	3aF	Incised herringbone pattern, over which white slip and red painted ext.
23	20047	Basin, round-sided out-flaring pinched rim	1bM	Red painted ext.
24	040504	Churn, small	1cM	Red painted ext.
25	040294	Bowl, fenestrated	1bM	Red painted band ext.
26	20123	Jar, storage, thickened bevelled rim	2aC	Applied impressed ext
27	20132	Jar, torpedo (?)	4cM	

cal material consists of small to medium sized wadi cobbles of largely re-deposited flint. Many of these nodules display repatinated, and often abraded outer surfaces; cortex has been partially removed by re-deposition. The chipping property of these local materials is generally of a medium to poor quality. However, some production drew on a more purposeful selection of fine-grained flints, *i.e.* some more formal tools appear to have been produced on non-local flint and lack of debitage from this better quality material suggests that these tools were not produced on site.

The retouched assemblage

A detailed discussion of technology will appear in the final report. Here we discuss only the basic typological spread of the assemblage in order to provide a sense of the nature and chronological scope of the material.

Glossed Pieces: Backed and truncated blades with gloss are evident (n = 33), (**Fig. 11: 1**). This group is fairly homogenous, both in terms of retouch location, retouch type and general tool shape. We also noted two examples of simple blade segments with gloss (see **Fig. 11: 4**).

Retouched Blades: A few retouched blade segments are suggestive of the Canaanean blade industry (**Fig. 11: 2-3**). However, straight-backed blades (**Fig. 11: 6**) are more common at the site and display a fair degree of homogeneity. Many appear to be unused or spare parts of composite tools, which were possibly sickles. This is supported by the formal similarities between non-glossed backed blades and backed and truncated glossed blades. Arched backed blades are far less common than straight-backed blades, and represent a slightly more diverse tool repertoire. The majority of retouched blades (**Fig. 11: 5, 8**) are made up of simple retouched blades, which display different degrees and types of retouch, ranging from semi-abrupt to invasive varieties. Simple retouched blades occur consistently across the entire site.

Retouched Bladelets: Simple retouched bladelets also dominate the bladelet tool category (**Fig. 11: 7**). Microendscrapers, and retouched, twisted bladelets are rare. The retouched bladelet category accounts for only 50 items.

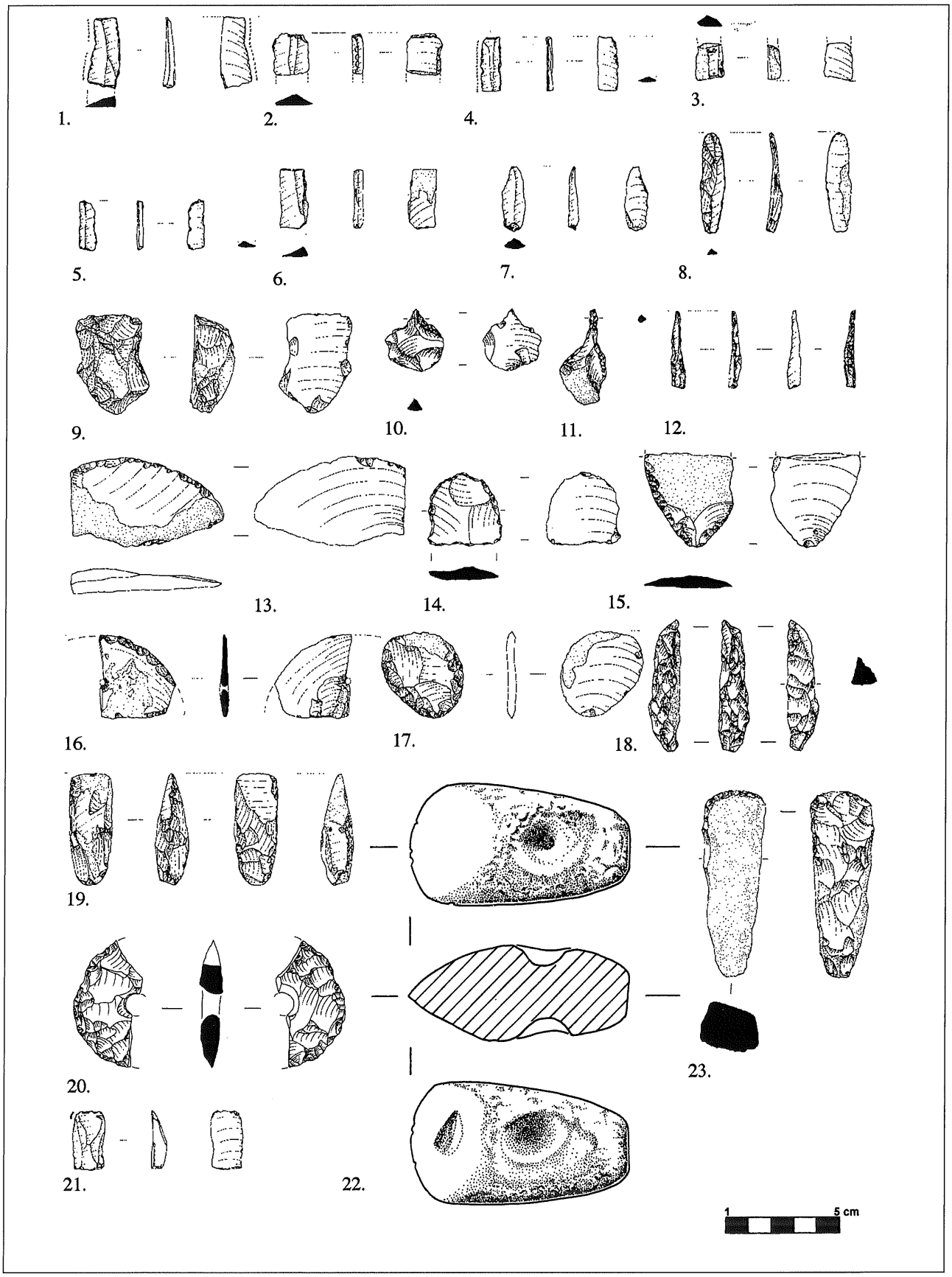
Borers: Awls and drills are predominantly made on flakes. Awls on flakes (**Fig. 11: 10**) (n = 14) are the most common, closely followed by awls made on blades (n = 9). Drills were also predominantly made on flakes (n = 5) (**Fig. 11: 11**), but drills on blades also occur in small numbers (n = 3) (**Fig. 11: 12**). There are no microlithic drills of any kind in the present assemblage, which probably reflects chronological as well as functional tendencies.

Tabular Scrapers and Knives: Although not particularly abundant some tabular knives and few tabular scrapers (**Fig. 11: 15-16**) occur at al-Khawārij. As previously noted many of these were imported, yet some limited local manufacture also took place. The highest concentration of tabular knifes occurs in excavation area E, but trenches A1 and A2 have also produced these artefacts. Thirteen unifacial knifes were recovered[15] (**Fig. 11: 13-14**). They occur in significant quantities in Area B and Area E, and are made on local as well as imported raw materials. The absence of bifacial roughouts suggests that production was not taking place at the site, or at least not within the excavated areas.

Discs: These tools are characteristic of the Chalcolithic (Rosen 1997: 85) and are well documented from other sites in the southern Levant (*e.g.* Noy in Epstein 1998: 282-3). These tools occur principally in Area E, in particular E4, although one disc was found in Area F. Eight examples were recovered, only one of which was holed (**Fig. 11: 20**).

Scrapers: 210 scrapers in all were recovered from the excavation, representing a number of typological forms. Most recall the *ad hoc* nature of the assemblage as a whole (**Fig. 11: 9, 17**), including the simple endscrapers, sidescrapers, massive scrapers and small scraper types. In each of these categories, the flake blank was more prolific than the blade, probably indicating the *ad hoc* technology, rather than a true preference for this form of tool. There are no examples of the more formal tongue-shaped endscrapers[16].

15. Note our discussion of unifacial knives found in the 2003 intensive survey in Lovell *et al.* 2005.
16. This may be due to the transitional nature of the assemblage as these are generally attributed to Chalcolithic sites but do not occur in the Early Bronze Age.



11. Chipped stone from the 2004 excavations.

Figure 11.#	Catalogue #	Registration #	Description
1	1848	040509	Glossed piece
2	1856	040509	Retouched blade - Canaanean
3	1863	040509	Retouched blade - Canaanean
4	1612	040627	Glossed piece
5	1614	040627	Retouched bladelet
6	1855	040595	Retouched blade, semi backed
7	1803	040773	Retouched bladelet
8	1791	040773	Retouched blade
9	1794	040773	Scraper
10	760	040921	Awl on flake
11	448	040321	Drill on flake
12	1242	040035	Drill on blade
13	128	040263	Unifacial knife
14	1543	040601	Unifacial knife
15	809	040823	Tabular scraper
16	701	041060	Tabular scraper
17	702	041060	Scraper
18	435	040321	Chisel
19	170	040769	Clet/Axe
20	1327	040843	Pierced disc
21	539	040150	Threshing tooth
22	040575	040575	Votive axe
23	548	040576	Celt/Axe

Notches and Denticulates: These tools occur relatively frequently and evenly throughout the excavated areas. In frequency they are second only to the retouched pieces which dominate. Steep notches and denticulates occur in almost equal numbers to the flat examples. The steeper types are thought to be particularly common in Chalcolithic and Early Bronze Age assemblages.

Retouched Pieces: Ad hoc tools dominate the assemblage in general and these expedient pieces make up the largest tool group (n = 2090) in every area of the site. Note that many pieces fall under this classification that are closely related to other *ad hoc* tools and can include shattered or broken pieces, errors and retouched chunks. Selection of raw material is as eclectic as the retouch and form of these pieces.

Celts: Amongst the heavy-duty tools, the axes are the most common type, with round edge axes (**Fig. 11: 23**) being more common than straight edged examples (**Fig. 11: 19**). Adzes and chisels (**Fig. 11: 18**) occur as frequently as the round edged axe. Barkai argues that adzes may have been used as hoes (Barkai 2002: 6), while chisels and axes may have been used for tree clearance (Barkai and Yerkes 2004). The relatively large number of heavy-duty bifacial roughouts indicates on-site production of these tools and perhaps the frequency with which they were required. One entirely polished axe (**Fig. 11: 22**), was recovered from Area D, notably these are generally argued to have a ritual function (Rosen 1997: 93).

Miscellaneous: This category comprises a number of tool types including examples of

chopping tools, burins, threshing teeth (**Fig. 11: 21**) and other miscellaneous categories recovered. 2004 excavations have included the recovery of one Amuq point, an el-Khiam point and a retouched blade likely to be of the Pre-Pottery Neolithic period. One Palaeolithic endscraper was also recovered.

Conclusion

Overall, the assemblage contains a large number of the types regarded as being typical of the Chalcolithic period. Notches, denticulates and scraper forms, disc tools, tabular knives and glossed pieces all suggest a late Chalcolithic date, some pieces are indicative of very early Bronze Age forms. In terms of function, these pieces suggest predominantly agricultural and residential activities.

The assemblage as a whole is consistent with other Chalcolithic lithic assemblages from the southern Levant: there is an abundance of 'expedient' flake tools, as well as other, more formal tool types such as discs, tabular knifes, and truncated, straight backed glossed pieces. Although some 'Canaanean'[17] type prismatic blade technology is present on a limited level, at this stage, there is no evidence for glossed Canaanean blades. The presence of these blades may indicate that the al-Khawārij assemblage represents a transitional phase, given that Rosen largely attributes the Canaanean technology to the Early Bronze Age (Rosen 1997: 59-60, 65)[18]. Note that the assemblage contains few intrusive or residual elements, notably a number of Neolithic points from trenches A1, B1, and E4, as well as one probable Palaeolithic sidescraper from area F2. The excavated chipped stone artefacts therefore represent a chronologically homogenous assemblage, with limited contamination.

Ground stone (IKM)

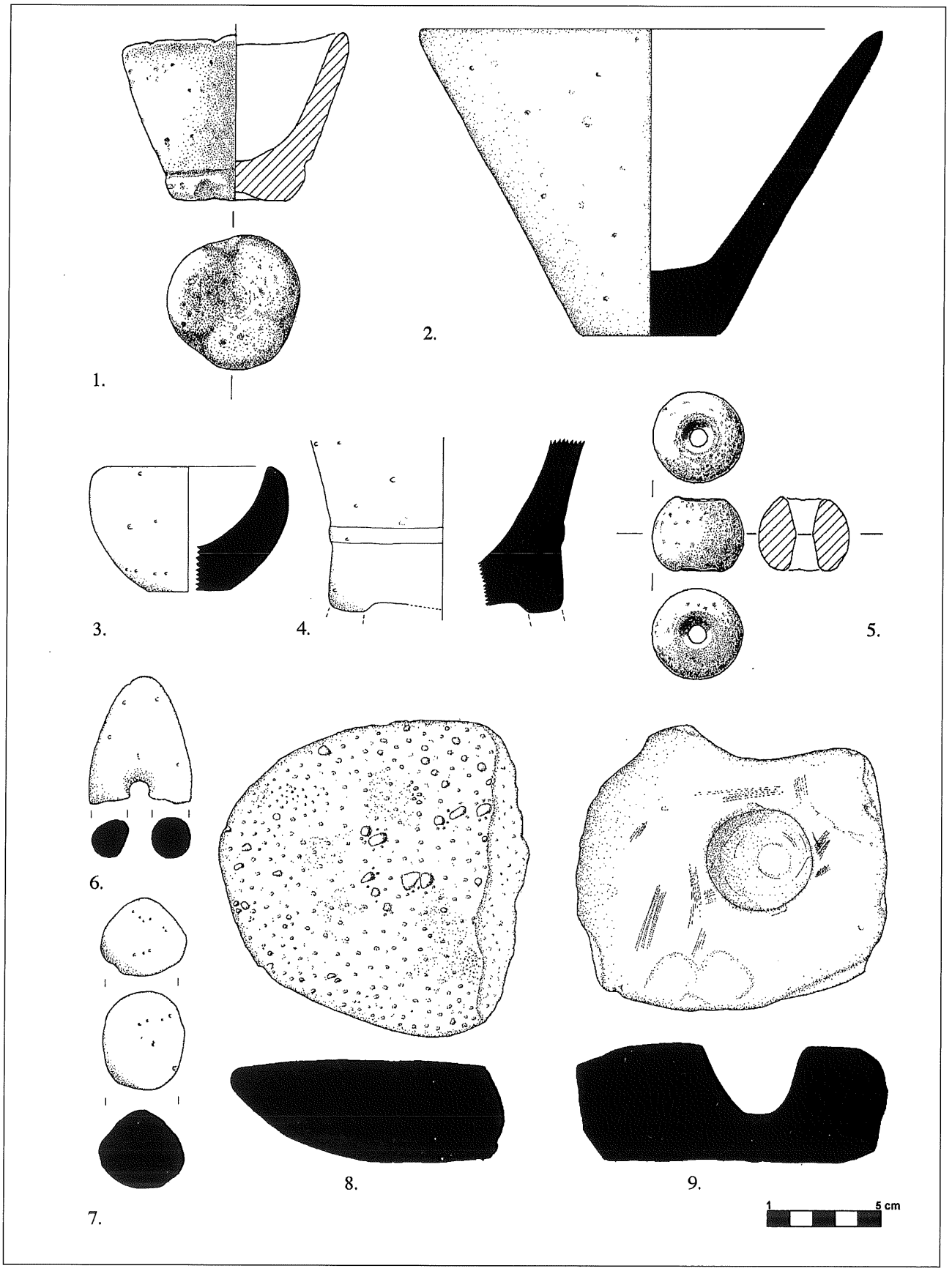
The terminology used here follows well-established definitions developed for other Chalcolithic assemblages[19] and applied by Wright (1991, 1992). Artefacts that are commonly dealt with as "ground stone" include a variety of tool and vessel types, as well as a number of miscellaneous stone pieces that may or may not represent artefacts ground in production. The ground stone assemblage has been divided into seven categories: basalt vessel fragments; fenestrated stands; perforated objects (including items without perforation that appear to be fragments of agricultural tools or stone weights); grinding tools (handstones, pounders and other tools used in processing); querns or grinding slabs; mortars; and miscellaneous items.

The assemblage

The ground stone artefacts from the 2004 excavations (n = 66) exhibit a typical range of raw material, as represented at other Chalcolithic sites (see especially Gilead 1995) in line with the generally accepted view that prehistoric communities located away from outcrops of basalt often used alternative, locally available rocks (Philip and Williams-Thorpe 2001: 14). The main two raw materials in use at al-Khawārij are olivine basalt and limestone. Without geochemical or petrological examination[20] of the material, exact provenance remains uncertain. However preliminary examination suggests there is a relationship between form or function of artefact type and material used.

Basalt vessel fragments (n = 9): All of these are made from fine-grained basalt, typical of Chalcolithic sites (see particularly Epstein 1998: 234; Gilead 1995: 311; Lee 1973: 260; Mallon *et al.* 1934: 67-70; Perrot *et al.* 1967: 216, fig: 13: 1-3) where basalt vessels are restricted to fine-grained rocks (Philip and Williams-Thorpe 2001: 14). Most of these vessels are the classic 'v' shaped bowls[21]. Two examples (e.g. **Fig. 12: 1**, note also the residual trefoil base on this

17. The present authors consider the terminology of 'Canaanean' prismatic blade technologies as problematic. For reasons of consistency and communication, however, we continue to employ the terminology at this stage. Note that Rowan and Levy (1994) claimed a 'proto-Canaanean' industry was operative in the Chalcolithic although this probably requires significant review (Rowan *pers. comm.*).
18. There is other circumstantial evidence building for Canaanean technology in the Chalcolithic, see Milevski *et al.* n.d.
19. Including the Golani sites (Epstein 1998: 229ff), Tulaylāt al-Ghassūl (Lee 1979; Mallon *et al.* 1934: 66ff), Grar (Gilead 1995: 309ff) and Neve Ur (Perrot *et al.* 1967: 216).
20. After preliminary study of the 2005 excavation season materials a representative sample of ground stone material from both seasons will be submitted for materials analysis.
21. See Amiran and Porat 1984; Braun 1990.



12. Ground stone from the 2004 excavations.

Figure 12.#	Registration #	Description
1	040132	'V" shaped bowl with line at base
2	040743	'V' shaped bowl
3	040076	Rounded bowl
4	040040	Fenestrated stand
5	040584	Weight
6	040131	Hoe
7	040624	Grinding stone
8	041005	Quern
9	040786	Mortar

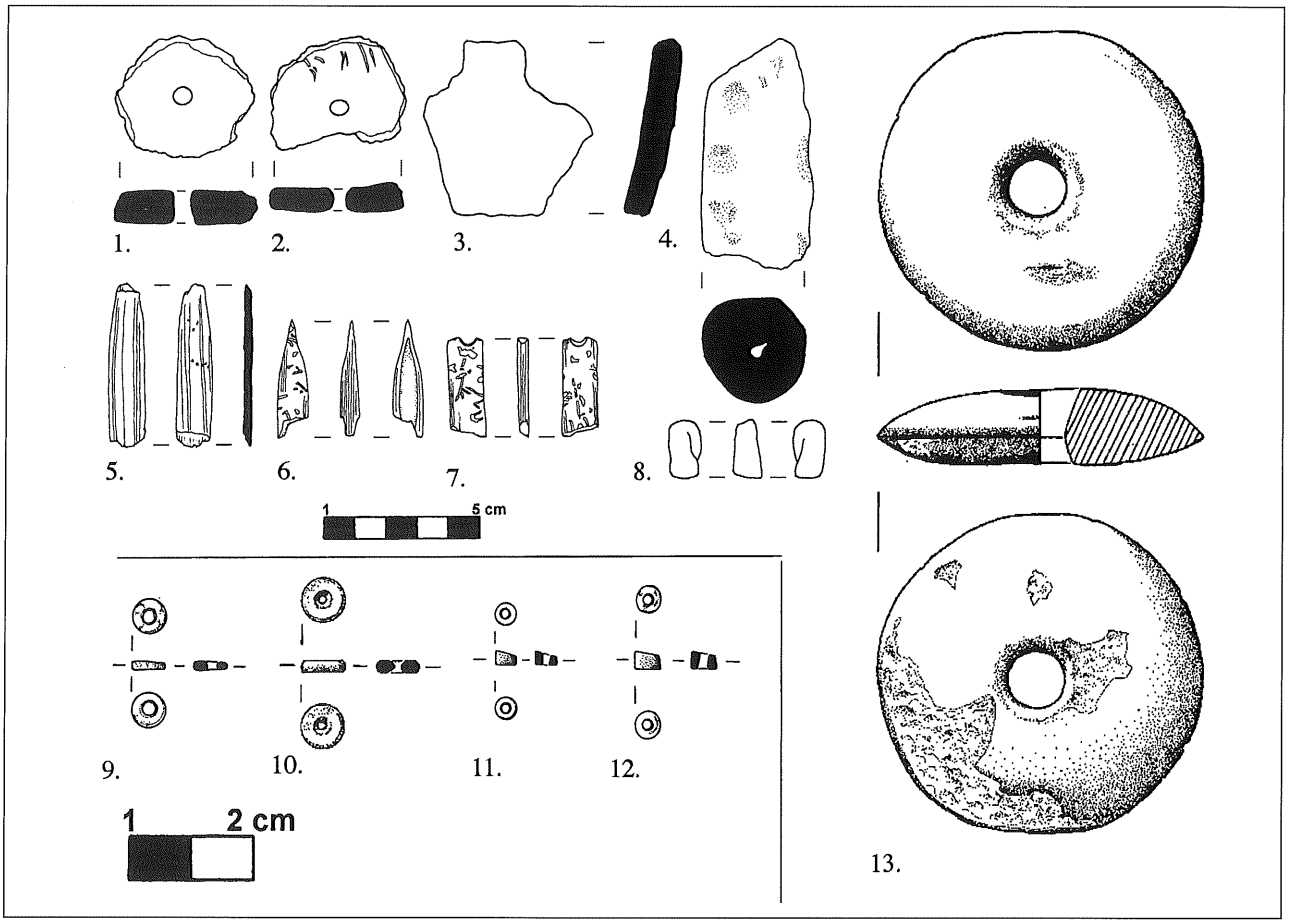
piece) exhibit incised lines around the base of the vessel, a characteristic feature of basalt vessels from the Chalcolithic period (Braun 1990: 87) although it has been posited that this is more common at sites removed from basalt sources (Epstein 1998: 234). **Fig. 12: 2** (see also **Fig. 6**) represents a large 'V' shaped bowl reconstructed from many fragments, and it is possible the vessel is not basalt but phosporite (Braun 1990). Another vessel form is the rounded bowl, known from the Golani sites (**Fig. 12: 3**; *cf* Epstein 1998: 234).

Fenestrated Stands (n = 4): Five fragments of fenestrated stands, two joining, were collected from three areas of the site (A, C and E). Part of the wall, base and knob of a foot are preserved in two of the fragments (**Fig. 12: 4**). Both have a raised relief line along the lower part of the bowl. Parallels for these can be found at a number of Chalcolithic sites, (see, Epstein 1998: pl. 38: 10-14; Gilead 1995: fig 7.1, 10; Lee 1979: 267, LB12e; Perrot *et al.* 1967: fig 13.1-2). The other two fragments appear to represent the base of stands.

Perforated Objects (n = 13): This group includes miscellaneous pierced stones made of un-worked stone with a carefully drilled hole through the stone. The placement of the hole is unsystematic. One example, made of chert, is similar to the perforated ceramic discs (see below). Other items probably represent agricultural tools or stone weights, all but one of which are made of basalt (one is made of sandstone). Other objects include 'stone weights' made of very fine-basalt (**Fig. 12: 5**) or more porous basalt. One of fragment of fine basalt (**Fig. 12: 6**) may be identified as a "hoe" and is made of a fine-basalt.

Included in this category are two polished diorite[22] disc-shaped objects interpreted as mace heads, one complete example from Area D (**Fig. 13: 13**) and a further fragment from Area E. These are circular in plan, lentoid in section, with a circular perforation in the centre. They exhibit limited evidence of wear along outer edge of the perforation and at various places on both surfaces. Diorite maceheads of this type are considered to come from Egypt[23]. The al-Khawārij macehaeds may therefore represent further evidence for a relationship between Egypt and Jordan during the Chalcolithic[24]. Parallels for this particular type do exist in Chalcolithic contexts. Two examples are cited from Tulaylāt al-Ghassūl in 'dolerite', (Mallon *et al.* 1934: 71, fig. 27; Lee 1973: 275, LB42: n). A further close parallel comes from Neve Ur, in 'marbre noir' (Per-

22. We thank Assoc. Prof. Geoff Clarke and Dr Joel Fitzherbert of the University of Sydney's School of Geosciences for assisting with the identification.
23. Interestingly, the majority of the parallels for this type of mace head do not come from Egypt proper, but from the Sudan, with only 2 of the 20 being found in Egypt (Cialowicz 1987: 15-17).
24. Conversely, the association with Egypt could be questioned. Ground and polished stone mace heads are a characteristic feature of the Chalcolithic ground stone assemblage (Hanbury-Tenison 1986: 164). To date the most common forms are oval, piriform, spherical and pear-shaped, and are usually manufactured from stones such as limestone and imported calcite. They can also be made of copper or haematite. Ground stone examples have been found at a number of sites, including Abū Ḥāmid (Dollfus and Kafafi 1986: 595), Tall Abū al-Kharaz (Fischer 2002), Pella (Bourke *et al.* 1994: 91-93), Tulaylāt al-Ghassūl (Bourke *et al.* 2000: 71), and Tubna (Banning *et al.* 1998: 153).



13. Other finds from the 2004 excavations.

Figure 13.#	Registration #	Description	Material
1	040307	Pierced disc	Ceramic
2	040938	Pierced disc	Ceramic
3	040941	'Violin' figurine ?	Ceramic
4	040942	Cylindrical (phallic?) figurine	Ceramic
5	040208	Shuttle or spatula?	Bone
6	040320	Point	Bone
7	041002	Shuttle	Bone
8	040520	'Bird' figurine ?	Ceramic
9.	040610	Bead	Bone
10	040797	Bead	Faience
11	040741	Bead	Bone
12	040028	Bead	Faience
13	040239	Macehead	Diorite

rot *et al.* 1967: 218-220, fig. 13:5). It is unclear whether these stone types were properly identified, if not, they may have been made of a similar material to those from al-Khawārij[25].

25. I thank Christine Elias (registrar) for conducting the preliminary research on these pieces.

Grinding Stones (n = 7): Each of these stones recovered could have been used as pounder/grinders and represents the upper, mobile stone in a pair of grinding, pounding or polishing tools as defined by Wright (1991). These are made in various materials: flint, limestone, basalt (**Fig. 12: 7**) and miscellaneous non-local stones. Some examples show use-wear on one of their sides, and the two flint examples have evidence of chipping.

Querns/Grinding Slabs (n = 17): **Fig. 12: 8** represents one of the larger fragments of grinding slabs, half of a large oval mortar made of very-porous basalt, smoothed on the upper surface and the sides, the lower surface is fashioned but reasonably un-worked. Parallels for this type of quern can be found at a number of Chalcolithic sites, for example the Golani sites (Epstein 1998: 235). Other examples are made of limestone. A number of the smaller quern fragments show no sign of being dressed on the under side, however the sides are notably worked. It difficult to make any assumptions on the typical form in use at this preliminary stage, as so many of the examples from al-Khawārij tend to be small fragments.

Mortars (n = 10): The term mortar is used here for a collection of stone bowls, similar in classification to those of Wright's 'mortars', "the lower stationary stone in a pair of tools used for pounding" (1991: 21, 1993: 65). The examples from al-Khawārij are, for the most part, un-worked externally, but have a worked cavity on the upper surface (**Fig. 12: 9**). Large grinding basins are also represented.

Conclusion

This discussion is merely a brief analysis of the types (forms) of ground stone artefacts uncovered during the 2004 excavations. Specific information pertaining to the types of raw material and an analysis of find-spot will be discussed in the final report when material from all the seasons may be examined. In brief, the ground stone assemblage at al-Khawārij supports a simple, domestic occupation, however the highest quantities of artefacts are those associated with processing (*i.e.* mortars and grinding slabs). Upper mobile grinding implements are also rare, which might suggest that other implements were used for grinding/processing.

Other finds (CE)

The other finds from the site include the general repertoire of bone points, shell, holed discs, and occasional figurines. What follows is a brief description of selected examples.

Ceramic Figurine

A small figurine fragment (**Fig. 13: 8**) comes from E2. It is sub-rectangular in plan, and oval in section, with remains of reddish-brown slip. The top section folded over onto itself to form a flattened loop with no gap. The lower section cylindrical, and it has overall dimensions of 1.9 x 1.0 x 0.9cm. The style of this figurine fragment is reminiscent of examples that have been identified as possibly representing birds (Dollfus and Kafafi 1993: 250-2, fig. 4:1-4). Although the 'beak' area on this example is not free from the body as in other figurines, the overall impression is bird like. The remains of slip also suggest that the piece is likely to be a finished object rather than just a piece of clay.

Two other ceramic 'figurines' come from the rock cut features in Area D. One is a roughly recut sherd in a shape reminiscent of the violin figurines known from other Chalcolithic sites (**Fig. 13: 3**). The second is a cylindrical object (**Fig. 13: 4**) which may represent a phallus.

Ceramic Discs

A number of complete and fragmentary examples of circular ceramic discs were recovered. One complete example (**Fig. 13: 1**) and two fragments (see **Fig. 13: 2**) have circular perforations in the centres of the disc. A further seven examples show no evidence of having been pierced. These discs are common on Chalcolithic sites but their exact function is unclear. Suggestions for use include weights, for the larger and heavier examples, and for the smaller discs, spindle whorls or small weights (Bourke *et al.* 1995: 50). Unpierced examples are often designated as counters or gaming pieces.

Beads

A total of four beads were recovered from the site, all of which are circular disc beads. Three of the four come from the complex in Area E, while the fourth comes from a fill context in Area B. Two examples are made from bone (**Fig. 13: 9, 11**) and two made from faience (**Fig. 13:**

10, 12). Unfortunately it is not possible to determine the original colour of the faience beads as the material is weathered and chalky. They range in diameter from 0.3-0.6cm, with small, medium and large thread holes.

Published examples of faience beads from contemporary sites come from Tulaylāt al-Ghassūl (Bourke *et al.* 2000: 74-5) and the Chalcolithic cave at Horvat Castra (van den Brink *et al.* 2004: 146).

Worked Bone

The most common type of bone tool recovered from the site is the worked bone point, (5 of the total 9 pieces, **Fig. 13: 6**). These are of varying length and width; some are more highly polished than others. There are also two fragments of what might be shuttle needles or spatulae (**Fig. 13: 5, 7**). These objects are made from animal ribs that have been smoothed and polished. One example (**Fig. 13: 7**) retains part of the hole that had been made at one end. Examples of such tools have been recovered from Tulaylāt al-Ghassūl (Bourke *et al.* 1995: 49-50, fig. 7.5-6 and 2000: 72-4, fig. 22:3 and an almost complete example was found at Abū Ḥāmid (Dollfus and Kafafi. 1993: 250-1, fig. 3:1).

Shell

Although the shell assemblage is yet to be completely analysed, we present here a brief overview of the shell assemblage.

The shell recovered from the site includes examples of bivalves, gastropods and snail (see **Table 1**). Of the number of shell pieces recovered, snail shell represents 89% (219 from 246 pieces) of the total — no doubt a reflection of taphonomy. The highest concentration of snail shell comes from areas B and E. Snail represents 94% of the total from area B (98 pieces) and 91% of the total from area E (110 pieces). These include complete and fragmentary examples.

Very little shell was recovered from areas A, C, D, and F. Of the 16 pieces recovered from area A, 9 are snail, 2 single bivalves with mother-of-pearl, 1 bivalve fragment, 1 gastropod and 2, as yet, unidentified pieces. Only 1 example of snail shell was recovered from areas C and D and none from Area F. Also recovered from area C was a single, circular bivalve with a circular perforation in its apex. It is unclear whether the perforation was man made or a natural occurrence. Area D only yielded the 1 piece of snail shell; Area F 2 fragments of shell, as yet unidentified.

Table 1: Shell from the 2004 excavations at al-Khawārij.

Classification	Quantity
Complete bivalve shell	1
Single bivalve shell	1
Single bivalve shell (with mother of pearl)	4
Bivalve fragments (with mother of pearl)	3
Gastropod shell	3
Gastropod fragments	1
Snail shell	123
Snail shell fragments	96
Unidentified shell fragments	14

Slag (LW)

Fragments of 'slag' were found in almost every area of the site. The slags are very porous and lightweight, with the heaviest pieces weighing no more than *circa* 7g and being no more than *circa* 4cm in their largest dimension (most pieces weigh less than 2g and are less than 2cm in their largest dimension). The slags vary in colour from light brown to dark grey or black, and often show slight traces of vitrification. Preliminary physical examination suggests that they are most likely fuel-ash slags, *i.e.* the byproducts from high temperature operations in which carbonized fuel reacts with (*i.e.* fluxes) nearby clay-rich soil or furnace lining, forming a lightweight, slightly vitrified material. Fuel-ash slags can be formed in a number of high-temperature contexts, from a simple campfire to more complex installations such as hearths, kilns, and furnaces. The very minimal vitrification of the samples at al-Khawārij suggests that they are more likely to be the byproduct of relatively low-temperature pyrotechnological operations such as campfires or hearths, rather than installations such as kilns or furnaces where significantly higher temperatures are likely to have been achieved. It is possible that the prevalence of such residues at the site relates specifically to

the fire installation found adjacent to one of the larger rooms in Area E (see above).

Archaeobotany (JM)

Sampling strategy

Sampling for archaeobotanical remains was an integral part of the 2004 excavation season at al-Khawārij. Bulk samples of sediment were taken from all securely-stratified contexts, with a notional sample volume of 20L where possible. Ninety-six samples were obtained, and processed by machine flotation. Light fractions (flots) were collected in 1.0mm and 0.3mm mesh sieves. The flots were scanned for archaeobotanical remains and 76 were fully sorted under a binocular microscope at ×10—×45 magnification.

Results

The incidence of plant remains was relatively low, but carbonised specimens were identified in most samples (**Table 2**). As al-Khawārij is an open site in a warm, semi-arid environment, plant remains are rapidly consumed by soil micro-organisms, unless carbonised (charred). The many uncharred remains recovered (roots and seeds) are thus assumed to be modern. The abundance of carbonised grains and chaff may be related to the use of herbivore dung as fuel (Miller 1984). The low incidence of grains and chaff at al-Khawārij might reflect a reliance on wood for fuel, with dung used for other purposes (e.g. manure), but wood charcoal is also scarce, which suggests that the poor preservation of archaeobotanical remains is mainly the result of post-depositional factors, such as:

- ploughing — the site has recently been ploughed to a depth of 0.3-0.5m (although the samples sorted generally came from contexts below the plough zone).
- bioturbation — excavation provided abundant evidence of soil disturbance, down to bedrock, by ants, moles, and tree roots.
- soil expansion and contraction — archaeological strata at al-Khawārij have not been deeply buried for much of the last 6000 years. Preservation is often poor in the upper 0.5-1.0m of deposits, even at sandy sites. The high clay content at al-Khawārij, and the strongly seasonal climate, mean that soil expansion and contraction would have been particularly destructive.

Nevertheless, some samples contained well-preserved specimens, although in these samples the sediment matrix was typically compact and difficult to dissolve, and the recovery rate was correspondingly low. Excellent examples of several species were recovered, however. These included grains of emmer wheat (*Triticum dicoccum*) and hulled barley (*Hordeum vulgare*), the typical cereal crops at Jordanian prehistoric sites; lentil (*Lens culinaris*), also a common cultivar, and several other pulses — pea (*Pisum sativum*) and bitter vetch (*Vicia ervilia*), chickpea (*Cicer arietinum*), and broad bean (*Vicia faba*) — as well as olive (*Olea europaea*), fig (*Ficus* sp.) and possibly a single example of date (*Phoenix dactylifera*) None of these is out of place in a Chalcolithic assemblage. Probable Early Bronze Age introductions, such as grape (*Vitis vinifera*) and durum wheat (*Triticum durum*) are absent. Grape, in particular, is common in Early Bronze Age assemblages in Jordan (Fall *et al.* 2002), and its absence would be surprising if al-Khawārij dated to the late fourth millennium BC.

Furthermore, there are clear spatial patterns in sample composition, which suggests that most plant remains in the richer samples are not residual (reworked). Only Area D samples produced significant numbers of fig (*Ficus* sp.) seeds (nutlets), small-seeded legumes (Fabaceae spp.), or *Lolium* and other grass seeds (caryopses). Of 41 fig seeds recovered in 2004, only 1 was not from Area D. In Area E, samples E6 1309a-c stand out. Pulses account for 80% of plant remains in these samples. This concentration probably stems from a single event, in which a sack or basket of pulses was burnt. The other Area E samples are more diverse, with more cereal grain and chaff in E3 1281, and olive stone fragments and pulses in E4 1196, 1308, and 1314, and E6 1316. E3 samples often contained an appreciable amount of 'slag' (see above), although this material was found in every excavation area. Small fragments of wood charcoal occurred in nearly every sample, but only in C2 1234, which yielded 6.5ml of charcoal, was there anything resembling a concentration. Area A and C samples contained fewer charred plant remains than did samples from other areas.

Olea Europaea

Eight whole carbonised olive stones were re-

Table 2: carbonised plant remains identified in flot samples, al-Khawārij 2004 season.

Excavation area	A	C	D	E	E	total
Trenches	1	1, 2, 3	1, 3	2, 3	4, 6	samples
Samples sorted	12	16	20	14	14	76
Volume of sediment (L)	218	264	211	242	241	1176
Cereals (Triticum/Hordeum)						
emmer wheat (T. dicoccum) grain				••	•••	5
wheat spikelet fork		•		•	•	3
wheat glume base	••	••	••	•••	•••	19
hulled barley (H. vulgare) grain			••		•••	9
barley rachis internode		••	•			3
cereal grain indeterminate		•••	•		•	5
cereal grain fragment	•••	••	•••	•••	••••	33
grass culm node (cf. cereal straw)	•			•		2
Pulses (large Fabaceae)						
lentil (Lens sp.)	•	•••	•••	••	••••	22
broad bean (Vicia faba)			•			1
chickpea (Cicer sp.)					•	1
grass pea (Lathyrus type)			•		•	2
pea/vetch (Viciae)	•	•••	•	••	••••	20
pulse fragment	•••	•••	•••	••••	••••	39
Other food plants						
olive (Olea europaea) stone whole	•			•	•••	7
olive stone fragment	•••	••••	•••	••••	•••••	44
fig (Ficus sp.) seed (nutlet)			•••	•	•	8
acorn (Quercus sp.) cupule		•				1
date (Phoenix dactylifera) stone			•?			1?
Wild/weed seeds						
Aizoon sp.	•				•	2
cf. Picris sp.			•			1
cf. Adonis sp.	•				•	2
Boraginaceae (incl. uncharred)	••	•••	•••	••	••••	*21*
Silene sp.			•			1
Caryophyllaceae indeterminate					•	*1*
Chenopodium sp.				••		2
Chenopodiaceae indeterminate			•	•		2
cf. Medicago sp.		•		•		2
Scorpiurus sp.	•		•		•	3
cf. Trigonella sp.			•		•	2
small-seeded Fabaceae indeterminate			•••		••	*7*
Fumaria sp.				•	•	2
Liliaceae indeterminate				•	•	*2*
Plantago sp.		•••				4
cf. Aegilops sp.			•			1
cf. Avena sp.			•		•?	*2?*
Phalaris sp.					•	*1*
Lolium sp.		••	•••	•••	••	14
large grass seed indeterminate	•	••	•••	•••	••••	21
small grass seed indeterminate				•		1
wood charcoal	•••••	•••••	•••••	••••	•••••	66
slag	••	•••	•••	••••	••••	*35*

Key:
••••• = ubiquitous (found in >80% of samples sorted);
•••• = abundant (50–80% of samples);
••• = frequent (20–50% of samples);
•• = occasional (<20% of samples);
• = rare (found in only 1 sample

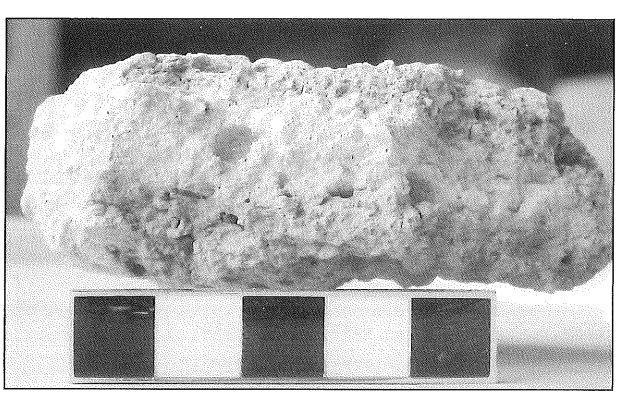
covered in 2004. One stone was found within a plaster surface in E3 1155, which also contained a few voids in the shape of olive stones (**Fig. 14**), suggesting that uncarbonised stones were present when the surface was laid. Olive was the most ubiquitous taxon identified: of the 67 samples with identifiable remains, 44 contained olive stone fragments. Some of these were large enough for radiocarbon dating[26].

Summary

Analysis of 76 flot samples, representing 1.2 cubic metres of sediment, has produced a small but interesting archaeobotanical assemblage. The staple food plants are emmer wheat, hulled barley, lentil and two or three other pulses, and olive. These were found in all excavation areas, and in a majority of contexts sampled. Fig seeds were found almost exclusively in Area D samples. Around 20 other taxa were identified, all of which are potentially weeds of the field crops (cereals and pulses). None of these was particularly common, however, and cereal chaff was also rare and fragmented. Eight olive stones were complete enough to measure, too few to draw any conclusion about the domestic status of the olive at this stage of the project.

Conclusion

Despite the shallow deposits, the site of al-Khawārij clearly has much to contribute. In order to appreciate the full range of Chalcolithic occupation in the southern Levant it is necessary to investigate all ecozones. Excavation in this upland area poses certain difficulties, but can produce extraordinary results. The site of al-Khawārij exhibits a late Chalcolithic material culture which most likely dates to the very transition to the Early Bronze Age. This has broad implications for our understanding of settlement shifts at the very end of the Chalcolithic and the relationship of the region with its neighbours (Lovell in press, *fc*).



14. Plaster floor 1155 from Area E with voids of olive stones (photograph courtesy of John Meadows).

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THE 2004 SEASON OF EXCAVATION AT ABILA OF THE DECAPOLIS

David W. Chapman, Robert W. Smith, Susan Ellis, Chelius Carter, and Maria Deutschmann

Introduction

The fifteenth season of excavation at Abila of the Decapolis-Quwayliba, northern Jordan was conducted from 19 June to 29 July 2004, with W. Harold Mare, Director, and the Abila Archaeological Project, Covenant Theological Seminary, St. Louis Missouri, as principal investigator. Upon the death of Dr. Harold Mare early during the project, the leadership of the project fell to the assistant directors, Drs. David W. Chapman and Robert W. Smith. The site of Abila/Quwayliba consists of two tells adjacent to the Wādī Quwayliba linked by a saddle (total area about 1.5km north-south and 0.5km east-west) located approximately 15km north-north-east of Irbid. Over the years this site has proven itself to be rich in material from the Early Bronze Age through the Umayyad period and later.

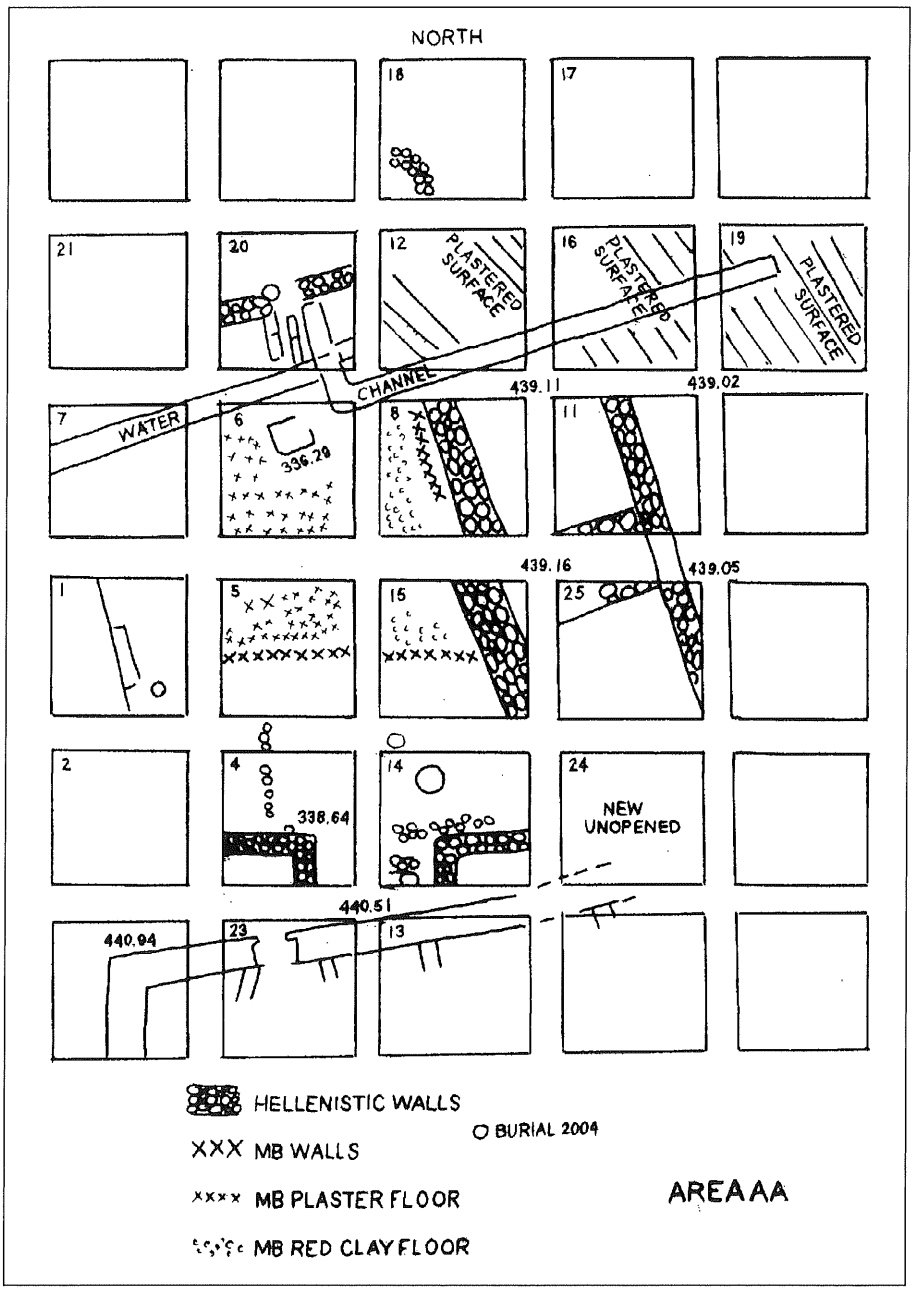
The objectives from this season focused on three main areas (Areas AA, B, and C), though probes were initiated in other portions of the site. In Area AA the central goal was to provide greater horizontal exposure of Iron and Bronze Age strata. Roman and Byzantine road and water systems were further exposed and analyzed in Area B. The principle target in Area C was the possible bath structure. Discoveries in each area exhibited many interesting structural features and some surprising finds.

Area AA: the North Tall/ Tall Abila (Susan Ellis)

Excavation in Area AA focused on Squares 4 and 14 with the intention of bringing the levels of these two squares down to that of adjoining squares 5 and 15 (see **Fig. 1**). We continued to find living surfaces with a great deal of pottery. In both these squares the northern balks are being excavated because of an earlier decision to leave in a Roman/Hellenistic wall, which has cut out a major portion of the square.

Several packed surfaces were evident in Square 4 this season. Surface 4019 (elevation 436.93) was particularly noted for the amount of rock fall upon it. This surface abutted against the wall (4020). A second notable floor was Locus 4025, also abutting against wall 4020, which floor was the end of the excavation this season at 436.92. Pottery from this square was mixed Iron II and Middle Bronze, with a few errant later period sherds (possibly from wall fall or rodent burrows).

The first major discovery in Square 14, the higher of the two squares, was a jar burial in the NW corner (see **Fig. 2**). The upper elevation of this burial was 437.81 and the lower elevation was 437.35. These two elevations fall exactly within the range of a previous burial found in Square 15 (AA15025) at an elevation of 437.60. The remnants of the individual were so fragmentary that it was impossible to determine if it was a primary (the deceased buried directly after death with skin, etc. intact and the bones articulated), or a secondary burial (the deceased is left out to desiccate prior to burial, then the remains — often just disarticulated bones — are placed into the jar and then buried). The only intact bones in this burial were the majority of the cranial bones. The deceased was most likely male, as suggested by a large nuchal crest and rather prominent brow ridges. Age was probably in mid-twenties. Preliminary investigation of the skull suggests the possibility of trephination in the cranium of this man, but further investigation is needed to confirm this. Several stones had been placed around the southern exterior of the jar, which was of the Iron Age style. A second jar, an offering for the deceased, was found



1. Top plan of Area AA indicating relative locations of Squares A4 and A14.



2. Area AA: Iron Age burial containing the disarticulated skeletal remains of an adult male.

12 centimeters to the west of the burial jar. This second jar had a slightly carinated shoulder, and was Iron II in style. Offering jars were also previously found with burials in excavated Square 15.

One concern in excavating this burial was the presence of Roman terra sigilata ware just one meter to the east of the burial. At first this suggested that the dating of the burial was completely askew, but comparing these eastern loci with previous excavation (and further excavation in 2004) suggests that the eastern portion of Square 14 has long been a pottery dump, and

has had major churning because of previous inhabitants pit digging.

Further excavation of Square 14 showed continuous habitation which was particularly evident in the SW corner, where alternating levels of reddish floors and ash layers could be seen easily in the balk. Few seeds were found this season, and those that were found were olive seeds. Another east/west wall emerged (14022) below the burial. This is part of the Middle Bronze levels. Elevation at the top of this rough, poorly built wall is between 437.365-437.345. Excavation in this square ended before we could find the bottom of the wall. However, this wall extends into Square 4 where it is labeled 4020.

Because of the nature of the eastern portion of this square as a pottery dump or digging upheaval, the north eastern section has had its own loci numbers in order to compare the types of pottery found there with the pottery in the western portion of the square. These eastern loci continued to contain pottery from the Umayyad to the Middle Bronze periods. Iron and Middle Bronze Age pottery was found in the western sections of the square.

Area B: Civic Center (Maria Deutschmann and Robert Smith)

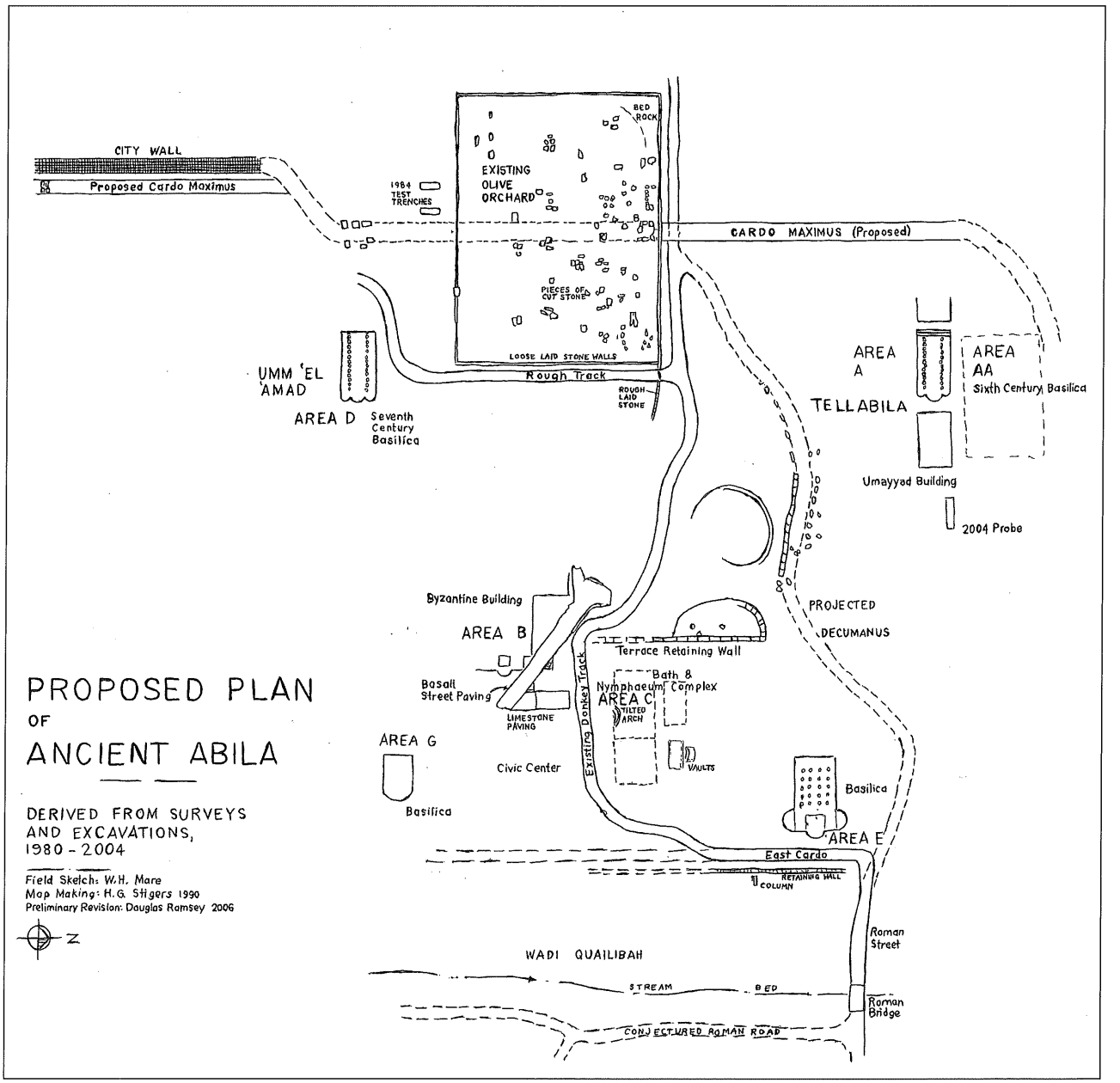
Area B is located at the center of Abila between Tall Umm al-'Amad and Tall Abila. It has broad horizontal exposures dating to the Roman and Byzantine Periods. Earlier seasons of excavation in this area focused on three areas, the first being a basalt road which comes in from the north and curves to the east in order to avoid collision with the northeastern slope of Tall Umm al-'Amad, which provides the southern boundary of Area B. This hill, which has been coined the theater cavea, was the second area of interest and excavation. As it has been excavated over the years, this hillside has revealed a large building structure that is still in need of some continued excavation. In part due to the presence of this large building, it is now somewhat questionable whether a theater cavea of any sort existed here. The third area of excavation is the civic center that exists to the east and north of the basalt road (see **Fig. 3**). Previous excavation revealed a tesserated floor area flanked by the remnants of limestone walls; this may indicate a marketplace/forum area. Excavation through this tesserated floor took place in the 2000 season and a Roman aqueduct was revealed.

Excavations in 2004 focused on this Roman water conduit as well as a part of the area that contained a Roman limestone pavement. The study of the aqueduct is contained in the squares B43, B43x, B44, B46, and B51. The study of the commercial area and the limestone street involved squares B47, B48, B49, and B50.

While pursuing the study of the aqueduct, the excavation of the northeast quadrant of Square B43 identified a drainage trench (Locus 025). This trench, which was covered by cut stones, paralleled the east/west water conduit. The fact that the north side of this conduit was plastered indicates that this trench was a sluiceway used as an overflow drain. Pottery, bone, lamp fragments and other artifacts were found by sifting the soil found in this trench. The secondary base drain, located below the sluiceway base in the northeast quadrant, was possibly placed there to assist below-street drainage flow around a preexisting wall intersecting the aqueduct structure. To support this further, there is a horizontal drain hole cut through the base of this wall at the north balk, which would serve to relieve water pressure by directing water flow into the secondary base drain.

With a probe in the southwest quadrant of Square B43, the expected original construction trench for the aqueduct system was located. Artifact evidence found in this undisturbed layer of construction debris indicated both Early and Late Roman; it was agreed to apply a construction period of "mid-Roman" to this significant aqueduct system. All artifacts found in the sluiceway along the north face of this aqueduct structure ranged from Late Roman to Early Byzantine, thus dating the period of abandonment for this sluiceway system; with a still later repair to the potable water conduit portion of the aqueduct structure.

The question still remained as to the exact length and directions of this conduit. On its westward course, in the west balk of square 43, we unearthed a portion of the water conduit with the potable water pipe still intact. At this point, the water conduit turned northward at a ninety-degree angle. Further investigation showed that this northward trend continued for three meters before turning westward once again in square 38.



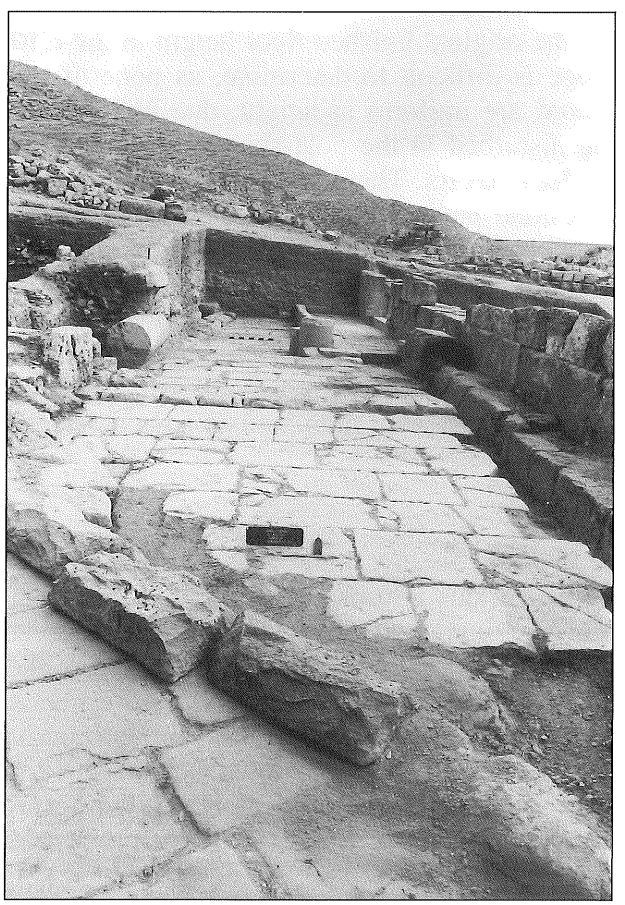
3. Plan of Abila.

The sluiceway was also present in the northwest corner of this square. Architect Chelius Carter determined that the conduit in this corner lined up diagonally with the water channel found beneath the basalt street to the southwest. These basalt pavers were pulled up in the 1988 season (B5 and B7) and revealed a below-street water channel. It is most likely that a water source will be found at the end of this water channel.

On the eastward course of the water conduit (in square 44) an obvious debris/dark soil fill trench was found around the water conduit and some later limestone steps were cut through. Someone, at some point in time, had performed a massive undertaking to repair the aqueduct system. A probe (designated Square 51) was also opened further east to determine if, at this juncture, the aqueduct made a ninety-degree turn north to Area C. However, in this square the water system clearly continued eastward and the decision was made that further excavation eastward from that point should be halted and that a probe should be put in during a future season; at a place parallel to the location of the water cistern in Area C.

The other goal for Area B in 2004 was to fur-

ther expose a Roman era limestone paver street west of the Civic Center. A portion of this pavement had already been exposed, to the south of and .7 meters into Square 47, due to the prior excavation of the area. This prior investigation had assumed that a basic limestone street continued to the north. However, in this season, excavation further into Squares 47 and 48 to the north determined that thoughts of a simple paved street had been too simplistic (see **Fig. 4**). In the south of Square 47 was a row of raised limestone blocks, put into place at the time of construction, that had been the base of a large door frame. The pavers showed no wheel markings at all. Furthermore, there was an intentional, decisive split in the level of the limestone pavers — the pavers in the east of the square (locus 47010) continued at the same level while the pavers in the west were placed approximately 25cm lower (locus 47011). Due to the narrowness of both levels of pavement (approximately 3 meters), they were most likely for pedestrian use.



4. Area B: Basalt road (foreground) with limestone causeway showing split in level of limestone pavers into squares B47 and B48 (balk removed).

Based on the further excavation done to the north in Square B48, it is possible that locus 47010 was a walkway leading into a marketplace. On the east of this walkway these pavers are flanked by an exterior limestone wall standing 1.3 meters in height with a doorway cut into it. This doorway is constructed of secondary carved basalt pieces (deemed secondary in nature because the cornice overhangs the wall; another indication is a large rosette carved into the frame). The floor of this door frame is composed of a basalt rock carved with channels that would have allowed large doors to open and close. This doorway has limestone steps (of the same type as the pavers) leading down east toward the top of a tesserated forum area. Perhaps this was an exit and entry into this market area.

Along the west balk of square B47 and in the balk of square B48 (as indicated by a test probe) a covered water/sewage channel existed. The inside of this channel is plastered. This channel runs in a south/southwest direction. Future removal of the balks should be done in order to ascertain the nature of this water/sewage channel. Further to the west of squares 47 and 48, squares B49 and B50 were opened up. Although no limestone pavers were found, these squares, as well as squares 47 and 48 in the layers above the pavers, indicate many levels of habitation with numerous floor levels, ash lenses, and a variety of bone, glass and pottery dating from Roman to Umayyad times. It is definite that this section of the city was a well-trafficked and occupied part of the city.

Area C: North of the Civic Center (Jack Lee and Chelius Carter)

In Area C, excavation of the bath complex was continued, and a number of balks and some tertiary structures (including a small ceramic *ṭābūn*) were removed to allow for greater exposure of the monumental building. At the entrance of the domed chamber a large kiln made of recycled circular bricks and square ceramic tiles was exposed at a level above the newly discovered hypocaust.

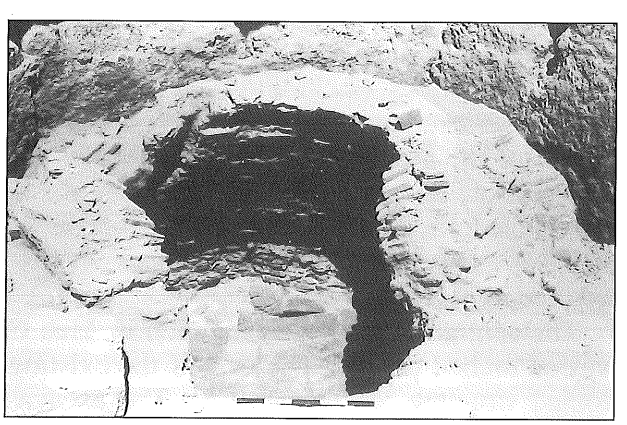
The central target of investigation in Area C was an arched portal at the east of the existing domed structure (designated C8). The excavators determined to redefine the original parameters of squares C10 and C15, immediately in

front of the primary structure to the east, and to expand these squares both west and north, along the east façade of the structure (the expansion being labeled as C10X and C15X, respectively).

Additionally, two attempts were made to further investigate safely the inside of the domed structure (C8) and connecting passages. After much labor was expended in removal of debris from the crevasse southwest of the dome (C30), it was found only to lead back into the domed structure, not into the targeted south passageway beyond the rubble fill. Due to the immense amount of debris still remaining in one square (C11), coupled with disappointing results from C30, work in these squares was abandoned for the season.

Among the most interesting finds from this season included an ancient kiln (see **Fig. 5**), which was discovered in the excavations in C10. Much to our dismay, this rather intriguing kiln construction was built in the middle of the arched portal we were seeking to expose, preventing any further excavation there, for now. At the end of the season, the kiln area was filled with sand for preservation purposes.

A small area east of the ancient kiln discovered in C10 was found to be clear of debris, allowing a probe to go down deep. Finally, after several years of seeking confirmation for the Area C "bath" designation, the ever-so-elusive *hypocaust* floor system was found with a grid of *pillotti* intact and *in situ*. While it was fully expected that we would eventually find this system, what was not expected was where it was found, since it was located in an area heretofore considered as "outside" the building envelope. In any case, the existence of a bath in Area C is now certain.



5. Area C: Excavation in progress of the early Islamic era kiln located under the domed arch of the bathhouse.

For dating purposes, a quantity of soot (residue from the downdraft flow of heated gases emanating from the fire box below the finished floor) was retrieved in C10 for future Carbon-14 analysis. Additional probing was done in the north balk of the probe in the debris level, which encased the sub-floor area. Several shards of pottery were found here, all Late Byzantine, possibly identifying the period of abandonment as Late Byzantine.

In clearing out C10 of later settlement rubble walls and intervening balks, there was exposed in the south balk, a "flat arch" of finely crafted *voussoir-cut* stones, indicating a doorway. This portion of wall incorporating this opening appeared to be contemporary with the east façade of the monumental structure in Area "C". The doorway was thought odd until the discovery of the *hypocaust* floor in the same square. It is now proposed that the domed room comprises the interior center of a much larger and more formal bath structure.

The original finished floor height in the C10 probe is difficult to determine, as none of the *pillotti* are uniform in height, due to their being disturbed in the post-abandonment mining of floor pavers. There is what appears to be a limestone paver in the north balk of the C10, possibly *in situ*. If this is in its original position (to be verified in future excavation) then, its finished floor height is .06 meters below the finished floor height in C8, which is approximately correct for a transition threshold expected to be between the domed room and an adjacent *hypocaust* floored room.

Probes

In order to investigate the connections between various portions of the site, a variety of investigative probes were employed at different locations. Two squares were opened near the intersection of Areas A and AA. Also a trench probe was employed on the eastward portion of Area AA. Furthermore, some structural features were examined below the church in the northern part of Area G. Finally a trench probe was launched in Area R.

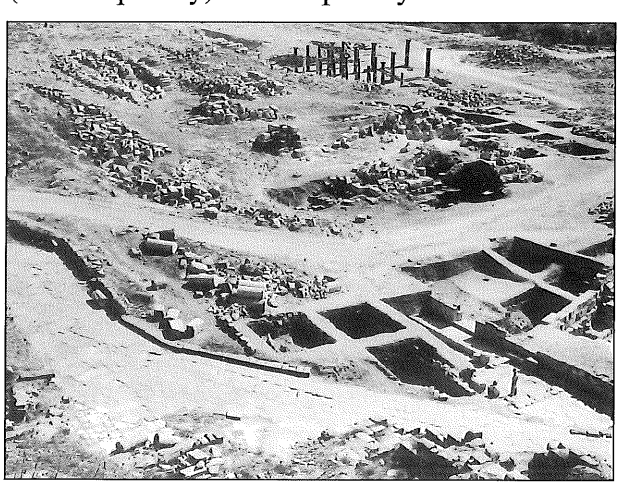
1. Area A Northern Squares

Under the direction of Susan Ellis two squares

(A58 and A59) were opened along the north side of the Area A church; in order to clarify more of the water collection system. The rubble base below the Byzantine church was penetrated and pottery was discovered from Byzantine to Iron II. Looking at this area, in conjunction with two previously excavated squares, we can see that an extensive water collection system was in existence at the time the church was in use. At this point in the excavation, it appears that this area, including the "Umayyad" Building, Byzantine Church, and water collection area were all public spaces. Excavation reveals that these structures are built on top of earlier habitation, much of which is major construction, if not monumental architecture.

2. Area AA Eastern Probe

As part of Susan Ellis' work in Area AA, a series of test probes were put in on the sloping area east of the double arches on the eastern side of AA (see **Fig. 3**). The probes were numbered AA52-57. Each began as a 1 meter (N/S) by 4 meter (E/W) trench. Two of these, Squares 56 and 57 were opened into full squares. Most trenches came down on various pavement layers, with the middle trenches exhibiting more carefully laid pavers in comparison to the worked rubble stones to the west. The trench furthest to the east ran into a north/south wall abutted by an east/west wall. Each of the trenches/squares consistently exhibited Byzantine, Umayyad and (less frequently) Roman pottery sherds.



6. The Civic Center (Area B) from the south. In the foreground is a large residence, the basalt street, and the limestone paved street. In the background is a five-aisle church (Area E) and further excavation squares past the domed structure (Area C).

These probe trenches indicated that, during the time that the arch on the eastern side of AA was an active gateway, there was also a paved surface with well-cut limestone blocks. After abandonment, some of the area was destroyed, and in other areas rubble was deposited upon this paved surface. Further excavation is needed to determine the relationship of this paved surface to other features discovered this year, and the relationship of this pavement to lower features. It seems likely that there should have been a walkway from the lower areas up to the arch and the monumental architecture on AA (church and building).

3. Area G Excavation

In Area G on the north side of the single apsed martyr's church is the terminus to one of Abila's water channels from 'Ayn Quwayliba. In the year 2000 a collapse of the subterranean vaults at the terminus of the water channel was noted. This summer one square was opened (G7), to begin exposing this structure as a part of the water delivery infrastructure of Abila. This water system appears to provide water at a juncture in the main basalt road through the site.

4. Area R Trench Probe

In Area R, on the east side of the Wādī Quwayliba (almost due east of Area G), investigations were made to study the possibility of this as the location of the theater of Abila. These investigations proved inconclusive. The line of stones on the surface suspected to be part of the *skene* proved to be early Islamic structures in which an ornate Byzantine capital was found.

In Memoriam

Dr. W. Harold Mare, Emeritus Professor of New Testament at Covenant Theological Seminary and Director of the Abila Archaeological Project 1980-2004, who founded our work and led it through twenty-five successful years. He is survived by his five children and many grandchildren.

Acknowledgments

This excavation was undertaken under the gracious supervision of Dr. Fawwaz Khraysheh, Director-General of the Department of Antiquities of the Hashemite Kingdom of Jordan, and

assisted by Mr. Wajeeh Karasneh, Irbid District Inspector of the Department of Antiquities. Our capable and helpful Department Representatives were Mousa Melkawe and Abd Al-Raouf. The 2004 Abila Staff used the facilities of the Secondary Girls School in Ḥarthā, through the kind arrangement of the Department of Antiquities and the Ministry of Education. Our Abila Staff of 22 much appreciated the kindness and diligence of our more than 30 local workers and the many others who opened their homes and hearts to our crew. A significant thanks is due to the doctors and nurses of Annoor Hospital in al-Mafraq, Jordan, who looked after Drs. Mare and Chapman and who helped arrange matters for Dr. Mare's family.

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THE WĀDĪ AS-SIRḤĀN PROJECT: NOTES ON THE 2002 ARCHAEOLOGICAL RECONNAISSANCE OF WĀDĪ ḤUDRUJ AND JABAL ADH-DHARWA, JORDAN

Alexander Wasse and Gary Rollefson

This report describes the results of a short archaeological reconnaissance of two areas in the greater Wādī as-Sirḥān basin, the Wādī Ḥudruj gorge in the south and the Jibāl adh-Dharwa in the north. This resulted in the discovery of over twenty new sites, ranging in date from the Middle Palaeolithic to the Early Bronze Age. Analysis of the results exposed significant differences between the two areas. Although northern parts of the Wādī as-Sirḥān basin were clearly exploited throughout much of the late Pleistocene and early Holocene, its more arid south-western margins appear to have remained largely unoccupied until the Chalcolithic / Early Bronze Age.

Introduction

In June 2002 the authors, assisted by a representative of the Department of Antiquities of Jordan and two students from Whitman College, Walla Walla, undertook an archaeological reconnaissance, with a prehistoric focus, of two areas in the greater Wādī as-Sirḥān basin (**Fig. 1**). Despite the short duration of this reconnaissance — just six full days were spent in the field — more than twenty new sites, ranging in date from the Middle Palaeolithic to the Early Bronze Age (EBA), were identified. As these contribute to our understanding of the prehistoric archaeology of the Wādī as-Sirḥān basin, an area which is not well known archaeologically (but see Adams *et al.* 1977; Fujii 2000; Garrard *et al.* 1996; Parr *et al.* 1978; Rolston and Rollefson 1982; Betts 1992; Whalen 1999), it was felt worthwhile to describe them in some detail.

The Survey Areas

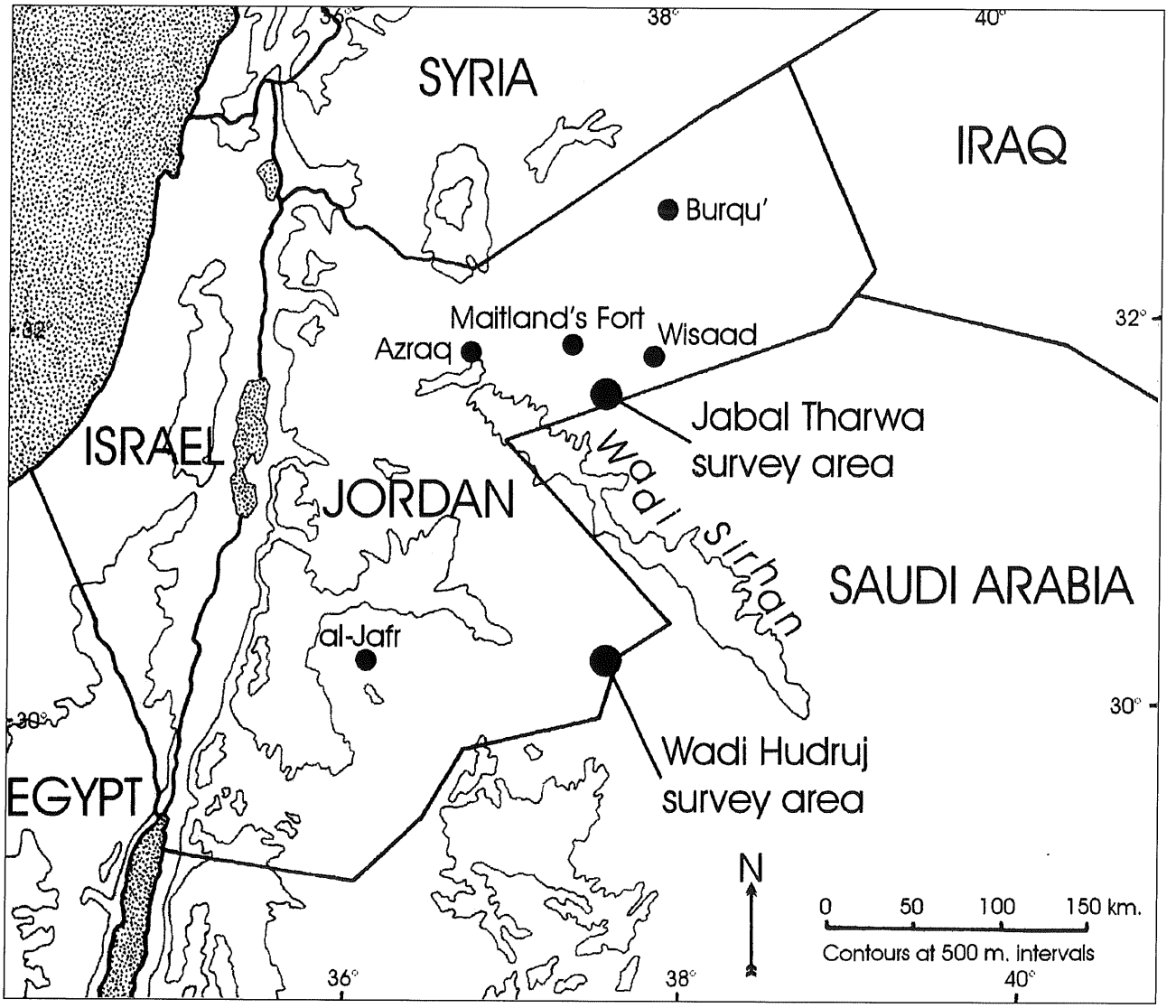
Although the greater part of the Wādī as-Sirḥān basin is located in Saudi Arabia, its northern extremities and the upper reaches of the tributary wadis which drain into it from the west are located in Jordan. Earlier camping trips to these areas had identified a number of locations which looked as though they might repay closer examination, of which two were selected as the focus of the archaeological reconnaissance described here.

The first was the Wādī Ḥudruj gorge (**Fig. 1**), a tributary of the Wādī as-Sirḥān which eventually drains into it from the west. It is located approximately 140km east of al-Jafr, immediately adjacent to Jordan's border with Saudi Arabia. It is the southernmost part of the greater Wādī as-Sirḥān basin that lies within Jordanian territory and was selected on that basis. The second location was the Jabal adh-Dharwa area (**Fig. 1**), located approximately 80km east-southeast of al-Azraq oasis, close to the western edge of the *ḥarra* which delineates the Wādī as-Sirḥān to the east. It was selected because it is the only part of the (relatively) better-watered east side of the basin lying within Jordanian territory. Thanks to the support of the Department of Antiquities of Jordan, permission to carry out an archaeological reconnaissance of the two survey areas was soon obtained.

Methodology

Given the limited time available and the preliminary nature of the work to be carried out, the methodology employed was unashamedly unsystematic. The two survey areas were reached by Land Rover, traversing country that has hitherto received little archaeological attention.

Once the survey areas had been reached, they were explored on foot and by Land Rover, targeting obvious vantage points and the edges of mudpans (*qā'* pl. *qī'ān*) which experience has



1. Regional map showing survey areas and sites mentioned in text.

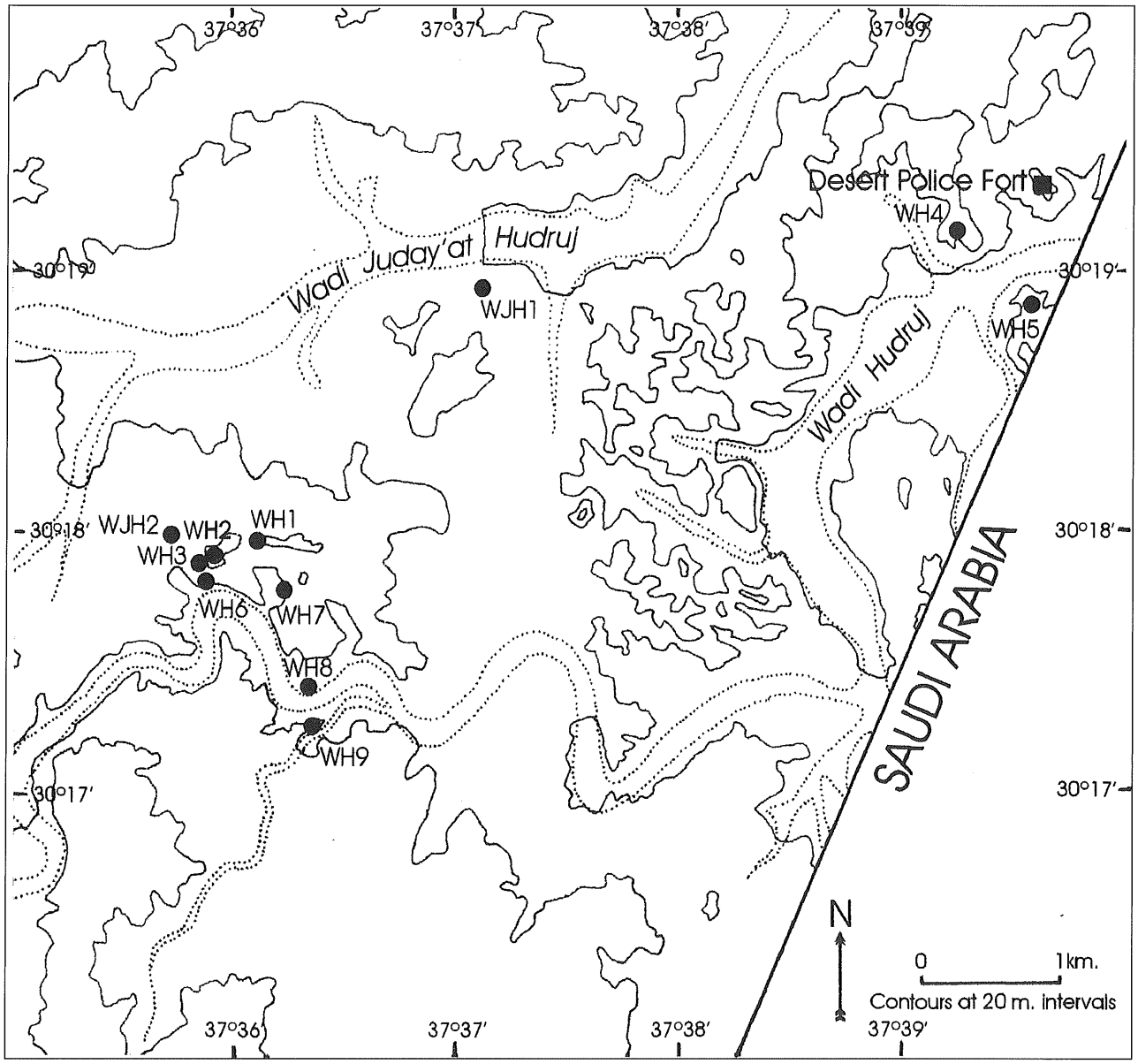
shown were favourably regarded by humans in the past. When sites were identified, detailed records were made on standardised survey forms and timed collections of surface artefacts were carried out. Often the discovery of one site resulted in the discovery of several more, as the team fanned out across the landscape from the initial find-spot. Washing, sorting and recording of the artefacts was subsequently carried out at the American Centre for Oriental Research (ACOR) in 'Amman. Finally, the results from the two survey areas were compared and contrasted.

Sites were named on the basis of the nearest topographical feature. Where more than one site was identified in the vicinity of a single topographic feature, a number was added to the toponym (e.g. Wādī Ḥudruj 1, 2, 3 etc.). If it was necessary to differentiate between zones within a 'site', a letter would simply be added to the sequence (i.e. Jabal adh-Dharwa 1a, b, c etc.). In addition, each site was given a unique WS (Wādī as-Sirḥān Project) survey number, by which it was known until toponyms could be ascertained.

No attempt was made to achieve total area coverage within the two rather loosely defined survey areas; many more sites undoubtedly remain to be identified within and beyond them.

Wādī Ḥudruj: Physical Description

The Wādī Ḥudruj gorge (**Fig. 2**) is located in the extreme south-east corner of Jordan 140km east of al-Jafr, just before the Wādī Ḥudruj cross-



2. Map of Wādī Ḥudruj survey area.

es the Saudi Arabian border en route to the Wādī as-Sirḥān basin approximately 50km downstream to the east. A Jordanian Desert Police fort, Mushāsh Ḥudruj, is located on a bluff overlooking the wadi where it crosses the border.

The area is dominated by small marl and limestone *mesitas* rising from the undulating gravel plains, into which the Wādī Ḥudruj has cut a meandering gorge around 30m deep and 100 to 300m across. Although no reliable rainfall data could be obtained for the area, local informants assured us that it was drier than the Jordanian 'panhandle' some 150km to the north in which the Jabal adh-Dharwa survey area is located, which receives an average of around 50 to 100mm rainfall per year (Betts 1998: fig: 1.7). This would be in accordance with the general trend across Jordan, which sees average annual rainfall dropping off from north-west to south-east.

Wādī Ḥudruj: Results

The results of our archaeological reconnaissance of the Wādī Ḥudruj gorge area are described below.

Wādī Ḥudruj 1 (WS1)
37°36.058'E 30°17.880'N

Wādī Ḥudruj 1 is located on the western end of a long, slightly curving butte, ca. 800m north of the Wādī Ḥudruj gorge. The site covers ca.

4500m^2 and comprises several diffuse clusters of chipped stone tools and debitage, as well as a number of low, dry stone structures of unknown date. These include a cairn ca. 5m in diameter and a roughly heaped linear feature ca. 45m long. The site provides excellent, almost 360°, views of the lowlands and wadi drainages below. Most of the chipped stone material was non-diagnostic typologically, but in terms of technology the broad platforms on the flakes and blades suggest a Chalcolithic or EBA origin. One cluster near the centre of the site included a sparse distribution of Middle Palaeolithic Levallois flakes and blades. There were also occasional Upper Palaeolithic or early Epipalaeolithic materials scattered in several places on the top of the butte.

Wādī Ḥudruj 2 (WS2)
37°35.856'E 30°17.810'N

Wādī Ḥudruj 2 is located ca. 350m west of Wādī Ḥudruj 1, on the western end of a small butte across a deep saddle in the same formation. The site comprises a scatter of chipped stone tools and debitage around a number of apparently recent dry stone structures. These include a cairn ca. 2m in diameter and ca. 1.5m high, and a rectilinear feature ca. 2.5m across. The site provides excellent, almost 360°, views of the lowlands and wadi drainages below. The area of lithics scatter was much more confined than at Wādī Ḥudruj 1, and the corresponding density of artefacts much higher. Nevertheless, individual episodes of use appear to be represented at this site, in the form of four clearly defined artefact clusters ca. 2 to ca. 6m in diameter (designated, from north-east to south-west, as Clusters A to D). The predominant presence at Wādī Ḥudruj 2 is Chalcolithic / EBA, which is found all over the area, although there is a particular concentration at Cluster C. Upper Palaeolithic / Epipalaeolithic presence (most likely Upper Palaeolithic) is focused at Cluster B, whilst Chalcolithic / EBA and Upper Palaeolithic / Epipalaeolithic material are equally present in Clusters A and D. There is also a small amount of Middle Palaeolithic Levallois debitage and tools at Cluster A.

Wādī Ḥudruj 3 (WS3)
37°35.874'E 30°17.744'N

Wādī Ḥudruj 3 is located immediately below and to the south-west of Wādī Ḥudruj 2, on a terrace sloping down towards a great bend in the Wādī Ḥudruj gorge. The site comprises a slope scatter of chipped stone debitage and a few tools, mostly dating to the Chalcolithic / EBA, although one Middle Palaeolithic Levallois flake core was also found. The presence of chipped stone artefacts here is undoubtedly related to the occurrence of flint nodules exposed on the slope, the source of raw material not only for Wādī Ḥudruj 3, but potentially also for Wādī Ḥudruj 1 and 2. Of note here are several flake cores attributable to the Chalcolithic / EBA Jafr Industry (Quintero *et al.* 2002), used for the production of cortical flakes for the manufacture of fan / tabular scrapers.

Wādī Ḥudruj 4 (WS4)
37°39.215'E 30°19.066'N

Wādī Ḥudruj 4 comprises a scatter ca. 50m in diameter of chipped stone artefacts located on a broad, open hilltop ca. 650m south-west of the Desert Police fort at Mushāsh Ḥudruj. The relatively high hilltop has excellent views in all directions, especially over the torrent bed of Wādī Ḥudruj immediately to the south. Although there are some Chalcolithic / EBA tools and flakes/ blades on the surface, this almost completely deflated flint 'pavement' includes much higher proportions of Middle Palaeolithic Levallois flakes, points, blades and cores. Tools include scrapers and denticulates. Artefact density was estimated at two artefacts per square metre.

Wādī Ḥudruj 5 (WS5)
37°39.482'E 30°18.824'N

Wādī Ḥudruj 5 is located on a broad, mid-level ridge immediately south of Wādī Ḥudruj. This ridge slopes gently down from south to north towards a small cairn of recent date and is located ca. 800m south of the Desert Police fort at Mushāsh Ḥudruj. The site comprises a broad distribution of chipped stone artefacts covering several thousand square metres. The most striking feature of the site, notwithstanding the fact that it is clearly deflated, is the presence of a number of shallow, round depressions that have been cleared of surface debris and may represent hut/tent circles. Many of these features are surrounded by relatively dense clusters of Chalcolithic / EBA debitage, cores and tools (scrapers, burins, bifacial knives). The site extends

down slope as far as the south bank of Wādī Ḥudruj. Here the lithics become much more varied, including Middle Palaeolithic, Epipalaeolithic, Late Pre-Pottery Neolithic B (PPNB), Late Neolithic / Chalcolithic and Chalcolithic / EBA debitage (some naviform blades), cores (with one naviform blade core) and tools (including a fan scraper).

Wādī Ḥudruj 6 (WS8)
37°35.836'E 30°17.707'N

Wādī Ḥudruj 6 is located ca. 170m south of Wādī Ḥudruj 2, on a sloping terrace immediately above a great bend in the Wādī Ḥudruj gorge. The site lies between the cliff edge and a prominent modern east-west track. The sloping terrace is littered with eroded cores, flakes and tools over an area of ca. 3000m^2. The material is dominated by Lower / Middle Palaeolithic Levallois material (it seems older than that from Wādī Ḥudruj 4) similar to that described by Whalen (1999), characteristically patinated to a reddish colour. This is in contrast to the dark brown 'desert varnish' of the Chalcolithic / EBA artefacts which occasionally occur across the site. The number of cores suggests that this was probably a relatively important site during the Late Pleistocene period.

Wādī Ḥudruj 7 (WS9)
37°36.150'E 30°17.731'N

Wādī Ḥudruj 7 is located in a wide gully, sloping gently down to the north-east, immediately below a shallow exposure of eroding flint nodules and just above a small drainage. It is ca. 320m south-east of Wādī Ḥudruj 1 and ca. 150m south-west of a small butte. The site comprises three discrete nodes, defined by low, circular 'walls' of Jafr Industry flake production. The northernmost, Node A, consists of three circular clusters of nodules, debris and debitage: the first cluster has three Jafr flake cores, the second has four, and the third has just two. Node B, a few tens of metres to the south, is also composed of three circular artefact clusters: the first cluster has 39 Jafr flake cores, the second has 10, and the third has five, as well as one Jafr blade core. Node C is a single cluster adjacent to the exposed nodules. It is the most impressive, as it is ca. 7m in diameter and includes 47 Jafr flake cores, some up to 50cm across. Overall these three nodes suggest three visits to the flint outcrops, with one person (perhaps more) working Node C, but three people each exploiting the nodules at Nodes A and B. It should be added that a fourth 'area' of the site occurs to the south-west of Node C along an erosional feature, where dispersed Jafr flake cores and debitage were found.

Wādī Ḥudruj 8 (WS10)
37°36.319'E 30°17.288'N

Wādī Ḥudruj 8 is located over the hill and ca. 700m south of Wādī Ḥudruj 7, on a flat, low-level terrace just above the torrent bed of Wādī Ḥudruj. The terrace is on the north bank of the wadi, where it forms the inside of a pronounced bend, and is sheltered to the south by prominent bluffs and cliffs on the opposite bank. The site is typical of those exploited by modern Bedouin camping along the Wādī Ḥudruj during the contemporary winter months. Five circular, dry stone structures, ranging from ca. 3.5 to 16m in diameter, and a number of rectangular, dry stone platforms are clearly visible on the surface. The largest circular structure has interior features that suggest it served some function relating to penning animals; the other four may have been temporary domestic structures. Chipped stone artefacts cluster around the circular structures and are relatively broad in scope, including knives, scrapers and denticulates. There were also three Jafr flake cores. Taken together, the architectural features and chipped stone artefacts are highly suggestive of a Chalcolithic / EBA camp used by pastoral nomads involved in Jafr flake production. It is conceivable that the same group was also responsible for the Jafr Industry activities at Wādī Ḥudruj 7 and Wādī Judayyat Ḥudruj 2.

Wādī Ḥudruj 9 (WS11)
37°36.605'E 30°17.320'N

Wādī Ḥudruj 9 is located ca. 200m south-east of Wādī Ḥudruj 8, beyond the bluffs and cliffs to its south. There is tributary wadi here, with a steep slope on its northern bank. Lying on this slope is a single structure consisting of an oval ring of limestone blocks, ca. 6m across in its longest dimension, with an east-facing opening ca. 1.5m across. Two Chalcolithic / EBA Jafr flake cores form part of the wall. A smaller mound of

stones inside the oval structure may represent a primitive platform or perhaps a burial.

Wādī Judayyat Ḥudruj 1 (WS6)
37°37.084'E 30°18.857'N

Wādī Judayyat Ḥudruj 1 is located on a long, low *mesita* top overlooking Wādī Judayyat Ḥudruj to the north, with a prominent dry stone cairn at its western end. The Desert Police fort at Mushāsh Ḥudruj is visible from the site, approximately 4km away on a bearing of 078°. The site comprises two diffuse but recognisable clusters of chipped stone artefacts, one located around the cairn and ca. 25m in diameter, the other located approximately 140m to the east and ca. 15m in diameter. More recent visits to the site are indicated by three 'desert mosques', consisting of rectangular areas cleared of stone debris with arcs in the centre of each southern edge to represent *a miḥrāb*. The site provides extensive views in all directions, especially over Wādī Judayyat Ḥudruj immediately to the north. Both clusters of chipped stone artefacts are Late Neolithic / Chalcolithic / EBA in character and include cores, debitage, and a fan scraper and sidescrapers.

Wādī Judayyat Ḥudruj 2 (WS7)
37°35.695'E 30°17.897'N

Wādī Judayyat Ḥudruj 2 is centred on a small, very shallow watercourse running from south-west to north-east in a broad pavement of natural flints ca. 320m north-west of Wādī Ḥudruj 2. A modern track runs through the middle of the site. The site comprises a concentration of Jafr Industry flake cores and blade cores ca. 40m in diameter. Jafr Industry cores and cortical flakes were found throughout the scatter, but blades were restricted to the south-eastern quadrant, suggesting that the site retains a certain degree of spatial integrity. The site is a smaller version of the more extensive Chalcolithic / Early Bronze Age quarry and manufacturing sites along the northern and north-eastern uplands around the Jafr Basin (Quintero *et al.* 2002). However, Wādī Judayyat Ḥudruj 2 is not only smaller than the sites around the Jafr Basin, but the cores and products are smaller as well. This is clearly a reflection of the smaller flint nodules in this vicinity. Several other cores suggest that this exposure of flint nodules may have been exploited on a more casual basis by Epipalaeolithic and possibly PPNB hunting groups.

Wādī Ḥudruj: Discussion

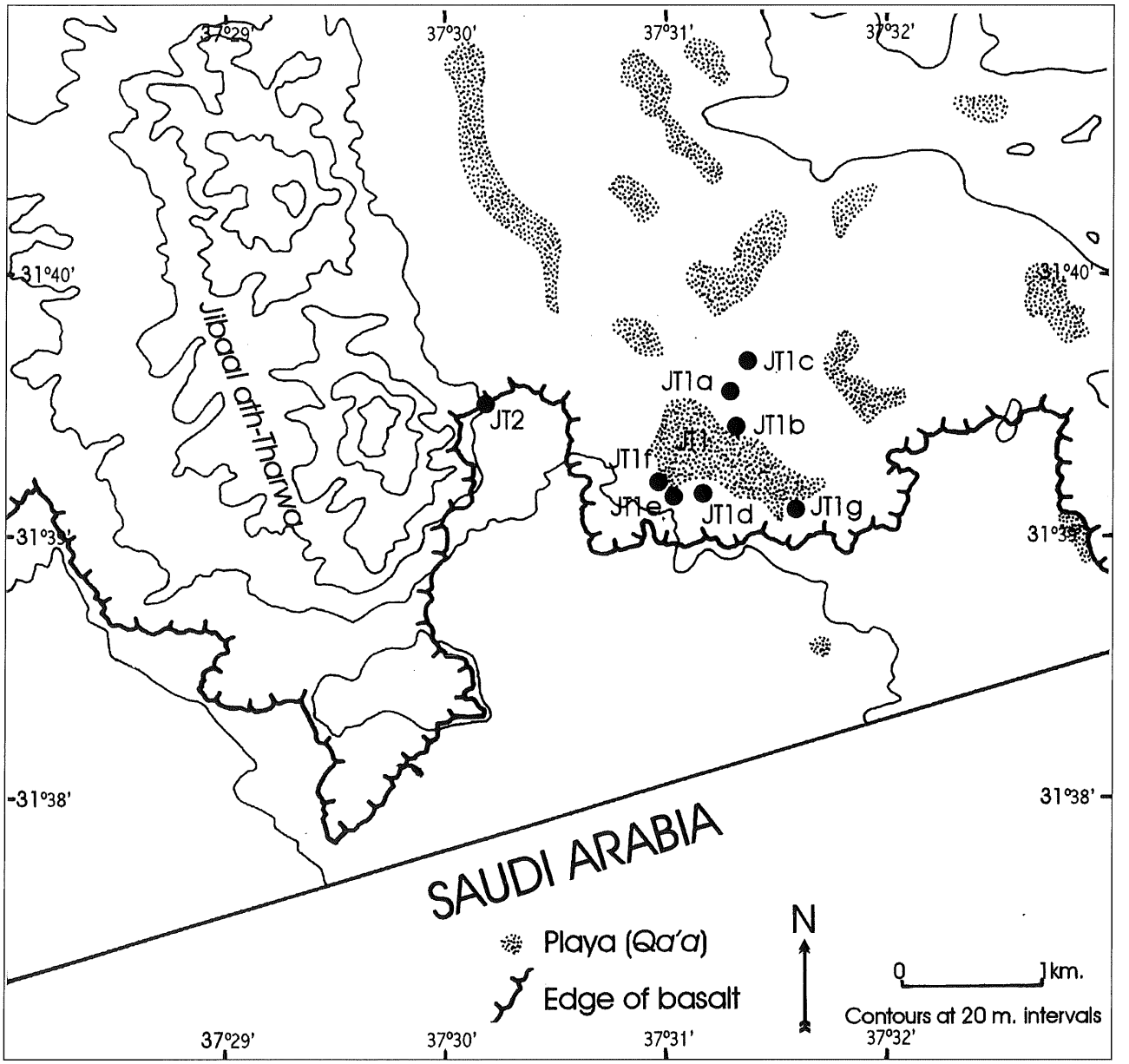
The most striking aspect of the sites identified around the Wādī Ḥudruj gorge is the prevalence of Chalcolithic / EBA material. Not only was this found at every site, it was also numerically predominant, except at Wādī Ḥudruj 4 (overwhelmingly Middle Palaeolithic) and, possibly, Wādī Ḥudruj 5 (which has the broadest array of archaeological periods represented).

Periods Represented

In comparison with other areas of the Jordanian steppe and desert, the relative paucity of evidence for Epipalaeolithic hunter-gatherers around the Wādī Ḥudruj gorge is somewhat curious. In similar vein, it is also remarkable that the Late PPNB period is represented solely by a small sample of naviform blades and core (along the gently sloping wadi bank at Wādī Ḥudruj 5). However, there is strong evidence for periods of increased precipitation, compared to today, during the middle of the Chalcolithic (Levy 1995: 241) and during the Early Bronze 1 period (Goldberg and Bar Yosef 1982: 404). This would certainly explain the prominence of the Chalcolithic / EBA presence in the Wādī Ḥudruj area (and indeed south-eastern Jordan as a whole), although it may well have been the case that the area was not intensively exploited even during this period.

Jabal adh-Dharwa: Physical Description

The Jabal adh-Dharwa survey area (**Fig. 3**) is located approximately 80km east-southeast of Azraq oasis, close to the western edge of the basalt desert (*ḥarra*) that delineates the eastern side of the Wādī as-Sirḥān. Average annual rainfall in the area is in the region of 60mm (Betts 1998, fig. 1.7). The twin basalt peaks of the Jibāl adh-Dharwa ("Mountains of Riches") overlook, to the east, an area of mudpans (*qī'ān*) separated by low basalt ridges which was the focus of our archaeological reconnaissance. It should be noted that a remarkable concentration of structures and enclosures of various shapes, sizes and — undoubtedly — dates is preserved immediately north of the Jibāl adh-Dharwa but, although interesting discoveries are undoubtedly waiting



3. Map of Jabal adh-Dharwa survey area.

to be made in this area, lack of time meant that we were unable to make more than a cursory inspection.

Jabal adh-Dharwa: Results

The results of our archaeological reconnaissance of the Jabal adh-Dharwa area are described below.

Jabal adh-Dharwa 1 (WS12)
37°31.219'E 31°39.215'N

Jabal Dharwa 1 is a small mudpan (*qā'*), just over 1km long (north-west / south-east) and 300 to 500m wide. It is located ca. 3km east of the Jabāl adh-Dharwa and ca. 2km north of Jordan's border with Saudi Arabia. Jabal adh-Dharwa 1 was the focus for repeated occupations between the late Pleistocene and mid Holocene. A series of sites, dating to the late Epipalaeolithic (Natufian), Pre-Pottery Neolithic, Late Neolithic and Chalcolithic / EBA periods, were identified around the edges of the *qā'* and on the surrounding ridges. These sites were designated Jabal adh-Dharwa 1a to 1g.

Jabal adh-Dharwa 1a (WS12a)
37°31.290'E 31°39.520N

Jabal adh-Dharwa 1a is located on level

ground ca. 150m north-east of the *qā'*. The site is ca. 350m north of Jabal adh-Dharwa 1b (see below). It comprises a single oval structure ca. 7m in diameter formed by an oval of small (ca. 15-25cm) basalt boulders set one to three stones wide and standing just one stone high. There are indistinct interior spaces set off by other stone alignments and a possible central feature that may be a hearth. Not a single artefact was found inside the structure, and in the near vicinity there was only very rare, non-diagnostic chipped stone material. For this reason the structure is difficult to date, but there are many close similarities with circular 'tent' foundations from the last Yarmoukian occupation at 'Ayn Ghazal (cf. Rollefson and Kafafi 1994: fig. 7; Rollefson and Simmons 1987: 105). It is therefore tempting to assign Jabal adh-Dharwa 1a to the Late Neolithic on that basis (see also below in the description of Jabal adh-Dharwa 1g "The Village").

Jabal adh-Dharwa 1b (WS12b)
37°31.314'E 31°39.303N

Jabal adh-Dharwa 1b is located on a long, low ridge which runs for ca. 300m along the north-eastern edge of the *qā'*. The site comprises an agglomerative architectural feature, which incorporates linear, curvilinear and sub-rectangular elements, situated at the south-eastern end of the ridge (i.e. at its highest point). This structure is constructed of large basalt boulders, some up to ca. 0.75m across, and, notwithstanding recent disturbance, is ca. 0.5cm high and ca. 8m across at its maximum extent. A scatter of chipped stone artefacts is centred around the structure and extends, with decreasing artefact density, to the north-west and south-east for almost the full length of the 300m long ridge. The chipped stone scatter clearly retains a high degree of spatial integrity; at least 16 distinct artefact clusters ranging from 0.4m to ca. 8m in diameter were observed and separately recorded. Both the Pre-Pottery Neolithic and Late Neolithic periods are represented at the site. The Pre-Pottery Neolithic appears to be restricted to within ca. 50m of the structure; this assemblage includes projectile points, drills and an exhausted naviform core. The projectile points include both Abu Ghosh and Amuq types, suggesting that the Middle PPNB and Late PPNB / PPNC periods are represented. The Late Neolithic has a much wider distribution along the ridge, typically in much smaller clusters (under 1m diameter); the assemblage is dominated by burins and occasional arrowheads. Additional finds included a thin red basalt grinding slab, broken into three pieces and measuring 0.6m by 0.35m with a perforation in one corner, and a broken piece of mother-of-pearl from within the structure.

Jabal adh-Dharwa 1c (WS12c)
37°31.373'E 31°39.621'N

Jabal adh-Dharwa 1c is located on a prominent north-west / south-east basalt ridge which overlooks the *qā'* ca. 400m to the south-west. The site comprises an extremely extensive complex of ridge-top architectural features, including cairns and curvilinear and rectilinear structures, which extends for at least 300m north-west and 300m south-east of the grid coordinates provided above. The cairns average ca. 2 to 4m in diameter and stand up to 0.8m high. They are often in close association with the curvilinear structures, and may represent the stone clearance necessary to create the buildings. The curvilinear structures, possibly animal pens, vary enormously in shape and size. They range from ca. 4m to 10m in diameter, are relatively free of boulders on the inside and sometimes have rectangular structures / platforms up to 3m across attached to the outside (usually in the north-western quadrant). The walls are typically constructed of a single ring of basalt boulders, ca. 0.2 to 0.4m across. The rectilinear structures are similarly variable. Their size ranges from ca. 12m by 12m to ca. 3m by 6m; some also have internal subdivisions, entrances, and internal and external platforms and 'bins'. Artefacts are extremely sparse across the entire area, but occasional flakes with broad, steep platforms, a Canaanean blade fragment, a microradial flake core and occasional wheelmade pottery all suggest a Chalcolithic / EBA date. Overall, the architectural features at Jabal adh-Dharwa 1c are highly reminiscent of those at Maitland's Hill-Fort (Maitland 1927; Betts 1983), roughly 30km to the north-west, which supports their attribution to the Chalcolithic / EBA period.

Jabal adh-Dharwa 1d (WS12d)
37°31.124'E 31°39.131'N

Jabal adh-Dharwa 1d is located on a low

ridge immediately above and extending down to the south-western edge of the *qā'*, ca. 440m south-west of and on the opposite side to Jabal adh-Dharwa 1b. The site consists of at least five to six circular or semi-circular structures, ca. 2m to 8m in diameter, in single cluster. These are constructed of large basalt boulders, some up to 0.6m across and standing ca. 0.1m to 0.2m high. Of particular interest is the associated chipped stone artefact scatter, which extends for ca. 70m east-west by ca. 40m north-south. This has very few blades, but many bladelets, two endscrapers, one drill, one endscraper burin, and one nibble-retouched (interior) arch-backed bladelet. All this indicates a late Epipalaeolithic, most likely Natufian, date, although there was also one Late Neolithic arrowhead on the surface, and is highly suggestive of a seasonal camp of up to 2800m2.

Jabal adh-Dharwa 1e (WS12e)
UTM 359 288 E 3502 786 N

Jabal adh-Dharwa 1e is located ca. 200m west of Jabal adh-Dharwa 1d, on a low ridge overlooking an 'inlet' in the edge of the *qā'*. The 'site' comprises a spot-find of a Yarmoukian-like arrowhead found in a tumble of basalt boulders and cobbles that may represent a one time structure of Late Neolithic date.

Jabal adh-Dharwa 1f (WS12f)
UTM 359 317 E 3502 942 N

Jabal adh-Dharwa 1f is located ca. 200m north-west of Jabal adh-Dharwa 1d, on a low ridge overlooking the *qā'* to the north-east. The site comprises a series of possible structures in a jumble of basalt boulders that covers an area of ca. 100m north-south by ca. 40m east-west. The sparse scatter of chipped stone artefacts is suggestive of an Epipalaeolithic, Late PPNB, Late Neolithic and Chalcolithic / EBA presence in this area, with the Late PPNB being focused on its northern end.

Jabal adh-Dharwa 1g "The Village" (WS12g)
UTM 360 415 E 3502 604 N

Jabal adh-Dharwa 1g is located at the south-eastern end of the *qā'*, and consists of around 20 seemingly contemporary circular structures (dubbed "The Village") covering an area measuring ca. 100m north-south by ca. 200m east-west. Flakes and blades with broad, steep platforms were found in association with all of these structures, indicating a Late Neolithic to Chalcolithic / EBA date. One structure, located at UTM 360 365 E 3502 604 N seems to be a circular 'proto-Bedouin tent' foundation. It consists of a single-stone 'wall' ca. 7m in diameter with an interior hearth ca. 1m in diameter, two platforms or stone-lined pits in the south-eastern quadrant and a possible 'bin' in the western quadrant.

Jabal adh-Dharwa 2 (WS13)
37°30.271'E 31°39.498'N

Jabal adh-Dharwa 2 is located on and around a prominent flat-topped basalt peak on the lower, east-facing, slopes of the southern part of the Jibāl adh-Dharwa, just over 1km west of the *qā'* at Jabal adh-Dharwa 1. The site provides excellent views in all directions, especially over the *qā'* to the east. The flat summit measures ca. 90m north-south by ca. 60m east-west. It is covered with cairns up to ca. 5m in diameter and ca. 1m high, curvilinear structures (possibly animal pens) of dry stone basalt boulder construction up to ca. 8m in diameter, and numerous other enclosures and structures, all of which are highly reminiscent of those at Maitland's Hill-Fort (cf. Maitland 1927: Plate II). A number of large curvilinear structures, up to 15m in diameter, some with obvious entrances, can be found on the lower slopes of the peak. The highest point of the summit area is crowned with a large cairn, ca. 6 to 7m in diameter and preserved to a height in excess of 1.5m, which seems originally to have been almost vertically sided. Recent robbing of this cairn has thrown up human bone and a large quantity of ostrich egg shell. This has exposed a stone-lined cyst, originally roofed with flat slabs and at least 1m deep, 0.6m wide and more than 1m long, within the cairn. Artefacts are sparse, but seem to be predominantly of Chalcolithic / EBA date, including a small amount of pottery and rather more chipped stone, typified by broad, steep platforms. In addition, the lower slopes of the peak yielded a few Epipalaeolithic bladelets, a Late Neolithic knife and drill, and a handful of Late Roman or Byzantine pottery.

WISAD

Once our reconnaissance of the Jabal adh-

Dharwa area was complete, we decided to continue to the east through the red sands of the Shumaysāniyyat area with the intention of intersecting the TAP (Trans Arabian Pipeline) line at Wisad and returning to al-Azraq via the TAP line track. This was to enable us to visit a number of early prehistoric sites (e.g. Jabal Subḥi, Duwayla) adjacent to the TAP line which had previously been described by Betts (1998) for comparative purposes. During this diversion, a brief visit was made to the pools (ghudrān) at Wisad, which are of significance as one of only three reliable open water sources in the *ḥarra* –the others being at Burqu' and al-Ghirqa' (Lancaster and Lancaster 1991: 128; Alan Rowe: pers. comm.). This resulted in the discovery of two Neolithic sites which are briefly described below, although no collection of artefacts was carried out.

Wisad 1
37°57.979'E 31°54.246'N

This large complex of circular and sub-rectangular enclosures and structures, ca. 200m across, seems to date almost entirely to the Late Neolithic on the basis of the projectile points (variants of Betts' Badia point) and bifacial knife fragments observed on the surface.

Wisad Pools
37°57.579'E 31°54.828'N

The enormous complex of Late Neolithic animal pens, cairns and other structures associated with the pools at Wisad may have been re-used, renovated and added to by later Chalcolithic / EBA groups. However, what is of more particular interest here is the relatively dense surface indications of Late PPNB occupation immediately around the edge of the pools, possibly from buried *in situ* deposits that might rival Duwayla in depth and importance.

Jabal adh-Dharwa: Discussion

The southern part of the Jordanian 'panhandle' is densely littered with the remains of visits to the temporary water sources, represented by modern *qi'ān*, by hunting groups during the Late Epipalaeolithic (Natufian) and Early Neolithic, and by some herders on a larger scale during the Late Neolithic and well into the Chalcolithic / EBA.

Late Epipalaeolithic

The Natufian camp at Jabal adh-Dharwa 1d is impressive in terms of the architecture that is preserved there, and if all of the structures were simultaneously used (which cannot be demonstrated by the survey itself), there may have been a band of six or seven smaller social units participating in this seasonal hunting venture, possibly as a 'macroband' when water was sufficient for many people and when conditions for hunting and plant gathering would have been optimal.

Early Neolithic

By contrast, all of the Early Neolithic (and some of the Late Neolithic) locations appear to have been very sporadic and short-lived, although there seem to have been frequent visits to the area. Some of the Pre-Pottery Neolithic lithic concentrations may be associated with structures, e.g. at Jabal adh-Dharwa 1b and possibly 1f, but the general character of the artefact densities and distributions suggest brief maintenance areas used by a couple of hunters rather than herding families. The exception to this observation might be the situation at Wisad Pools, where possible Late PPNB artefacts appear to be dense in number and possibly stratified in relation to natural pools that attracted hunters and possibly herders for an appreciable time.

Late Neolithic

The Late Neolithic (and probably later Chalcolithic / EBA) presence at Jabal adh-Dharwa 1f and Wisad 1 seem to be associated with animal enclosures as well as probable domestic structures, all of which represent considerable effort on the part of the pastoral groups who stayed in these locations for considerable amounts of time, probably during the winter and early spring when seasonal rainfall made these parts of the desert productive for grazing and browsing animals.

Chalcolithic / EBA

Late Neolithic stays at Jabal adh-Dharwa 1c cannot be ruled out, but it seems that this part of the survey area was more heavily used by Chalcolithic / Early Bronze Age groups, who likewise expended significant effort in the construction of pens and living quarters. Contemporary Jabal

adh-Dharwa 2 is very different in character, despite similar architectural features being found there, by virtue of its location on a flat-topped basalt peak that overlooks the *qā'* at Jabal adh-Dharwa 1 but which is without a water source of its own. Its location may have been defensive, however the construction of a prominent burial cairn on the highest point of the summit area suggests that Jabal adh-Dharwa 2 may have had an equally important geographical and social role as a major focal point in the landscape (cf. Maitland's Hill-Fort) for the Chalcolithic / EBA pastoralists who occupied the intervisible Jabal adh-Dharwa 1c below.

Comparison of the Two Survey Areas

It seems patently clear that exploitation of the Wādī Ḥudruj region was of a very different nature from that around Jabal adh-Dharwa. Although Chalcolithic / EBA pastoral groups visited both areas, the Wādī Ḥudruj utilisation was probably of a very ephemeral nature by one or a few family groups over a brief time span, associated at least in part with the production of Jafr Industry cortical flakes to exchange as tabular scraper blanks with other groups in southern parts of the Jordanian landscape. Around Jabal adh-Dharwa in the Jordanian 'panhandle', the condition of exploitation was much more intensive and included the construction of extensive animal pens and domestic structures that were evidently used for prolonged periods of time. The Chalcolithic / EBA pastoral pattern here appears to have grown out of a similar model elaborated earlier in Late Neolithic times.

Another major distinction between the two areas is the relative presence of Neolithic groups of any age (although it is possible that some Late Neolithic artefacts were confused with Chalcolithic / EBA in the Wādī Ḥudruj area). The Pre-Pottery Neolithic populations of hunters (and possibly herders in the Late PPNB or PPNC) appear to have found the Jabal adh-Dharwa area more productive and perhaps more hospitable. It is likely that the wider al-Azraq region was wetter than the Wādī Ḥudruj region in the 10th to 6th millennia BC, so that seasonal water would have been more predictable in northern parts of eastern Jordan.

An additional reason for the relative absence of Neolithic material in the Wādī Ḥudruj region may be linked to the distribution of water sources within the greater Wādī as-Sirḥān basin. Today these are restricted to the eastern side of the Wādī as-Sirḥān, along the edge of the basalt, e.g. the Saudi oases of al-Kaf and Ithra. As a result, the western side of the Wādī as-Sirḥān, including the Wādī Ḥudruj area, may have been virtually uninhabitable until the Chalcolithic / EBA climatic amelioration (see above) or until the emergence of relatively sophisticated pastoral economies based on milking which would have made exploitation of such a marginal area possible.

Epipalaeolithic and Upper Palaeolithic sites are rare in both survey areas, although Epipalaeolithic sites are generally frequent in other parts of the wider al-Azraq region (e.g. Betts 1998). The Jabal adh-Dharwa survey area revealed no Middle or Late Palaeolithic sites, although the region east of al-Azraq has produced such assemblages in other surveys (Quintero and Wilke pers. comm.). On the other hand, these periods are hardly frequent in the Wādī Ḥudruj region, but what has been found during the 2002 reconnaissance reflects outliers of Late and Middle Palaeolithic exploitation of the south-eastern parts of Jordan around the Jafr Basin (Quintero and Wilke 1998) and the Mudawwara border sector (Abed *et al.* 2002).

Conclusions and Future Work

Despite being in the field for just six full days, this archaeological reconnaissance of the Wādī Ḥudruj gorge and Jabal adh-Dharwa areas has contributed to our understanding of the little known archaeological record of the greater Wādī as-Sirḥān basin. Over twenty new sites, ranging in date from the Middle Palaeolithic to the Early Bronze Age, have been discovered. Furthermore, analysis of the results has exposed significant differences between the two survey areas. Although northern parts of the Wādī as-Sirḥān basin were clearly exploited throughout much of the late Pleistocene and early Holocene, its more arid south-western margins appear to have remained largely unoccupied until the Chalcolithic / Early Bronze Age.

One is left with assessing the potentials of further research in each of the survey areas. It seems unlikely that there are any *in situ* (*sensu stricto*) deposits among the Wādī Ḥudruj sites,

although a detailed collection and mapping of the pastoral camps at Wādī Ḥudruj 8 and 9 would provide valuable information about activity distributions in such sites.

In the Jabal adh-Dharwa area several sites are more promising. Certainly the Natufian camp at Jabal adh-Dharwa 1d would be worth investigating, since it is likely that *in situ* sediments still exist there. In view of the absolutely rare occurrence of Natufian presence this far into the desert, this site should be considered as a major priority for at least preliminary testing.

The work by Betts at Duwayla (e.g. Betts 1998) has shown that Late PPNB and Late Neolithic groups used some areas in the *ḥarra* on an extensive basis. The perhaps unsurprising Wisad Pools discovery, given the scarcity of water sources in the *ḥarra*, promises to add to what so far is a very isolated set of recovered information, and a campaign of test excavations in the Wisad Pools area seems very likely to improve our understanding of the desert region during the Early Neolithic period.

The extent of some of the Late Neolithic (e.g. Jabal adh-Dharwa 1f "The Village", Wisad 1) and Chalcolithic / EBA (e.g. Jabal adh-Dharwa 1c) installations in the Jabal adh-Dharwa area also deserves more intensive examination. Many of the structures seem to be obvious animal pens, but there is also a great deal of structural variability in the settlement areas themselves that demand more clarification as to structural functions.

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PRELIMINARY REPORT ON THE EXCAVATIONS AT KHIRBAT AL-BADIYYA, 1998

Zeidoun Al-Muheisen

Introduction

The first excavations of Khirbat al-Badiyya were conducted in the summer of 1998 under the direction of Zeidoun al-Muheisen, from the Institute of Archaeology and Anthropology, Yarmouk Univerity. The site of al-Badiyya is located 15km SW of 'Ajlūn and 3km SE of Kufranja (PGE: 217.900; PGN 186.900) (**Fig. 1**).

The name al-Badiyya is of Arabic origin, probably referring to an earlier olive oil press, but there is no definitive evidence for its meaning. This site was first mentioned in 1925, in an account about the 'Ajlūn area (Steuernagel 1925: 322-324). The next reference to it was not until 45 years later (Mittmann 1970: 84).

The site was surveyed and a contour map drawn; then the NE sector of the site was divided into many areas, designated Area A, Area B, Area D and E (**Fig. 2**).

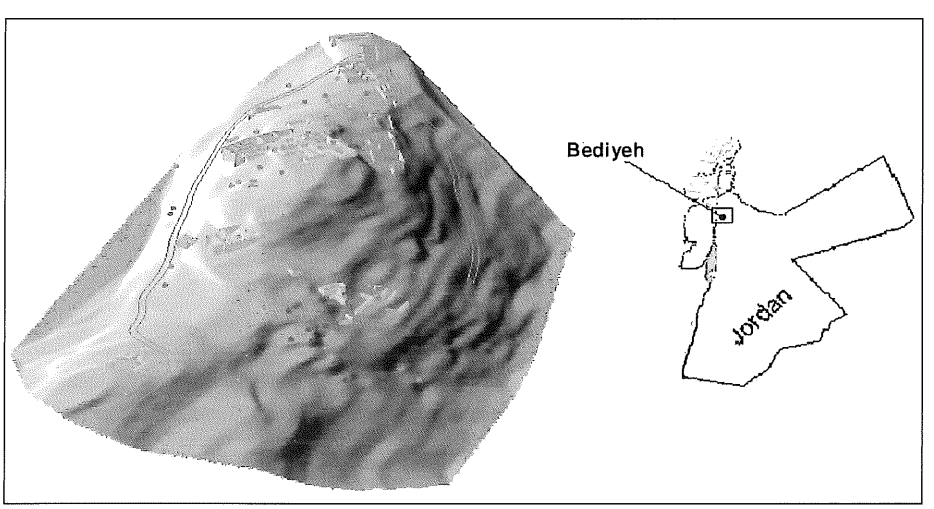
AREA (A)

Area (A) was comprised of 28 squares, each 5.0m^2, and was 890m above sea level. Various architectural remains were excavated, representing at least three occupational phases. A Byzantine occupational phase was discovered, represented by two Basilica churches and a chapel (**Fig. 3**). One of the churches was in the center of this area; the other was of a later date, and abutted the northern wall of the earlier church. The chapel was adjacent to the southern wall of the earlier church. During the Islamic period, the churches were used as residential buildings, and the internal spaces were altered.

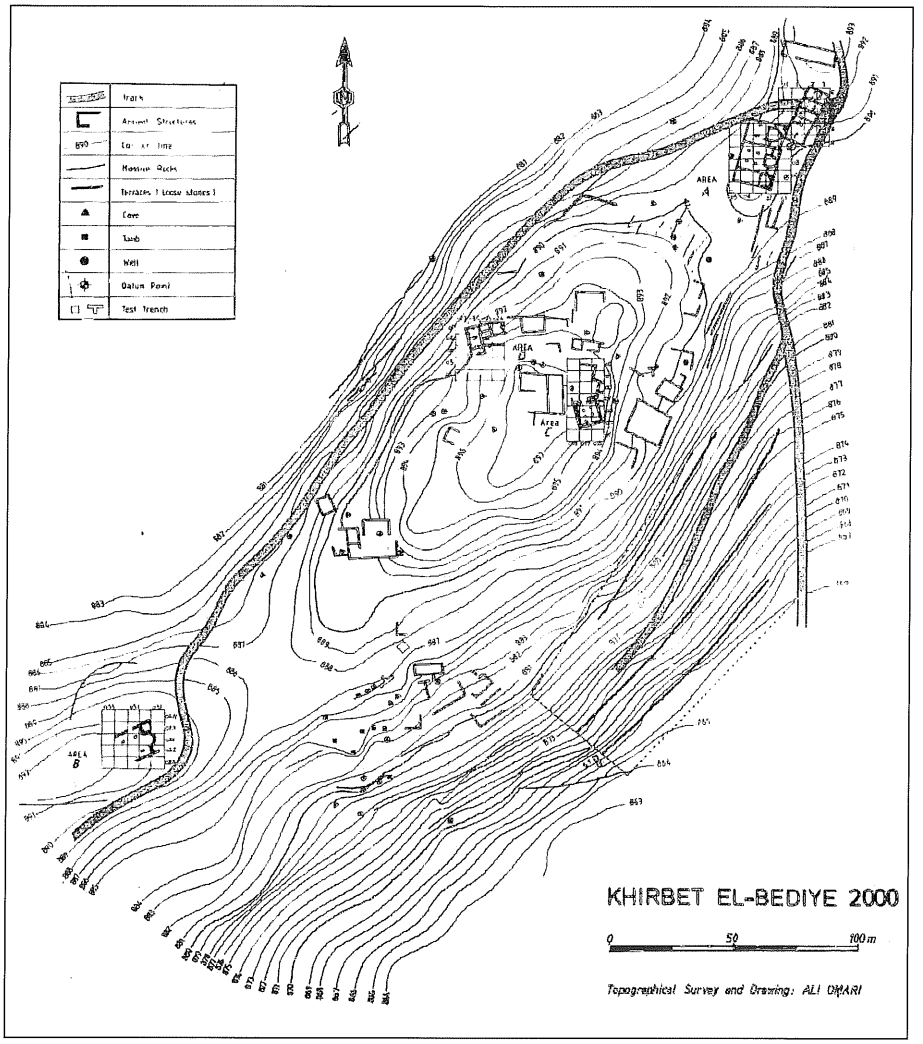
Phase 1

The First Church

The Basilica was comprised of a 3.8m apse on the eastern nave, separated from the aisles by two rows of four columns. This unit represents the first occupational phase of this area. The exterior measurement is 11.7m x 17.3m, with an interior measurement of 9.7m x 15.3m. The church also has two small rooms, the Diaconicon and the Prothesis, adjoining the apse, in addition to a nave and two aisles, with an entrance on the east side. The structure cannot be dated precisely, but can probably be placed in the 6th



1. The location of the Khirbat al-Badiyya site.



2. *Contour map of the Khirbat al-Badiyya site.*



3. *General view of the first and second Churches, and the chapel.*

century AD, possibly Justinian.

The Outer Walls: There was a 0.92m wide, and 11.7m long wall alongside the east baulk of Square 0B02, oriented N-S; double faced from dressed stones, with small stones in between. The exterior was constructed with very large stones, whereas the interior was of smaller dressed stones, each with a projected boss and clearly defined margins. It continues into Square 0C02.1 and into Square 0A01.17. Three courses to a height of 1.10m were preserved. There were two layers of plaster at the base of this wall, and it appears to continue below the mosaic floor.

An E-W oriented, massive stone wall was uncovered in Square 0C02.6, extending into Squares 0C03.6, 0B03.2, 0B04 and 0B05.1. It is bonded with the above mentioned N-S wall, forming a right angle, and was built by the same technique. It is 17.30m in length and the height ranges between 0.90m and 1.20m. At a height of approximately 0.80m, a carved stone extended the width of the wall; it is possibly the ledge for a window.

In Square 0B05, this wall is bonded with another N-S oriented wall, forming a right angle. It extends into Squares 0A05 and A04, and is parallel to the east wall of the earlier church. It meets another wall on the north side of the church, and is bonded with both walls at east and west, forming the plan of the church.

The main entrance to the church was located in this wall, and was uncovered in Square 0A05. It is ca. 1.60m wide, with door sockets dug in the threshold. There is evidence that it was blocked with hewn stones, and then a new entrance above it was rebuilt in a later phase. The later entrance is ca. 0.90m wide, including the threshold. Another two smaller entrances were discovered, facing the north and south aisles.

The Apse: The apse was double faced, of dressed stones with small stones in between. At the center, it abutted the main straight eastern wall of the church, which gives this apse a thick end. It extends into Squares 0B02.1 and 0A01.17 in the center of the church and into Square 0A02.16. It is 4m wide (N-S) and 5m long (E-W).

The chancel steps were located in Squares 0A02.11, 0A03.15, 22 and 0B03.28. They enclosed the west side of the apse at both ends. They were constructed from large, dressed limestone; rectangular grooves were employed to hold the marble slabs of the screen. There was a 0.83m wide entrance in the center of the chancel, with squared holes, probably used to fix two columns.

The entrance extended between Squares OAO3.022 and OBO3.28. It lead to the bema, located at the end of the nave. In Square OBO2.23, and extending into Square OAO2, there were remains of a row of dressed stones, 0.4-0.45m wide; possibly representing a bench inside the apse. This feature may possibly be the synthronon, or seat for the priests.

There are two small rooms flanking the apse. One is located at the SE corner of the church, within Squares OBO2 and OCO2.1 and 6 from east and south. It measures 2.5 x 1.60m, and represents the Diaconicon of the church. The other room is of the same size, located on the NE corner of the church, within Squares OAO1 and OAO2, and probably represents the Prothesis of the church.

The Nave and Aisles: The church has a nave and two aisles, with an entrance on the west facing the apse. The main entrance was ca. 1.60m wide, with door sockets dug in the threshold. This door was blocked at a later date, and a narrower door in the same place, measuring 0.90m wide, gave access to a residential house.

Four column bases of rectangular form were discovered in this area. They are of rectangular dressed stones, and located in Squares 0B03.033, 0B04, 0A04 and 0A03. They are oriented parallel to the west side of the chancel, and parallel to each other. Each base measured 0.50m x 0.40m. These bases possibly represent the lowest course of the church pillars, which form the basilica design. The aisle hall measures 10m in length and 1.60m in width.

The Mosaic Floors

The mosaic covered the church floor completely; unfortunately, it was badly preserved. The best-preserved sections of mosaic were those located under the walls of the later phase. Due to the weight of the walls over the floor, it sank 0.10-0.30m in some sections. The tesserae were not attached to the base and were easy to remove. The mosaic floor was constructed from

marble tesserae, each 0.015m^2, and was decorated with multicolored geometric designs, fruit and birds.

The Mosaic Floor Inside the Apse: This mosaic was in poor condition, due to the weight of the later period walls and the pressure of fallen stones. The multicolored (white, red, orange and black) mosaic covered the interior of the apse. A band of crow step decoration was placed between two lines of orange color, surrounding a decoration of crossed lines forming a rhomboid measuring 0.40m. A smaller rhomboid with the sign of the cross was in the center.

The Mosaic Floor inside the Diaconicon: This mosaic was badly preserved on both the western and southern sides, with different levels because of the pressure and weight of the wall above it. It was multicolored, of white, black, red, orange and yellow. The decoration was similar to that in the apse, excluding the crow steps inside a black frame. The mosaic floor did not bond with the wall plaster, therefore the wall plaster was earlier than the mosaic floor, and an earlier floor may possibly exist under this floor.

It had been disturbed during later occupation phases. In the NE corner, it was cut in the shape of quarter circle; this area can probably be interpreted as a fireplace, due to the large amount of ash which was found around it.

The prosthesis room had very fragmentary remains of mosaic floor, with the same decoration found within the Diaconicon room.

The Mosaic Floor in the South Aisle: This was also badly damaged, particularly on the east and west sides. It used white, black, red and orange tesserae, but predominantly black and white. The design included a geometric decoration of three intersected circles, repeated four times, forming a large cross. The largest circle is 0.64m in diameter, whereas the smallest one is 0.32m. These decorations were within a narrow border, depicting different types of birds and fruit, belonging to the same area.

The Mosaic Floor of the Nave: This floor suffered almost complete destruction, as a result of continuous use through later phases. Most of the remaining mosaic floor was hidden under walls or concentrated in corners; only some small patches were intact. This multi coloured geometric mosaic was constructed with small cubic tesserae of 0.015m^2.

The most important part of this floor is the area in front of the chancel steps, which consists of a framed panel of five lines of Greek inscription, including the date of construction, 710AD. The panel was surrounded by a continuous frame of medallions and repeated rosettes, with different themes such as birds, grapes, themes from the surrounding environment, and geometric patterns.

The Second Church

The second church was constructed alongside the northern side of the first church; its plan is a standard basilica (with an apse and nave that was separated from the aisles by two E-W rows of two columns). It was located in Squares A01 - A04, B01 - B04, and parts of 0A01, 0A02, C02, C03, and C04.

This church had almost the same dimensions as the first, with the walls continuing from the first to the second; however, it appears that this church was constructed hastily. For example, the north wall of the first church is used as the internal southern wall of the second, in spite of its roughness, and the northern part of the eastern wall belonged to an earlier building, connected by a partial wall to the NE end of the first church, and was not straight with the original line of the building.

The exterior measurements of this church are 17.4m on the north side and 16.2m on the south side, whereas the interior measurements are 15m on the north side and 14.1m on the south side. The exterior measurement of the west wall is 10.6m, with an interior measurement of 9.6m, minus the width of the north wall of the first church.

The Apse: Although the stones had been robbed and reused in later phases, this apse had the same dimensions as the first church; this could be discerned from a few stones of the foundation still *in situ*, together with parts of the chancel steps, and remains of the mortar mattress under the mosaic.

The Nave and Aisles: The nave has only two

columns in front of the chancel steps, there is only one rectangular column base formed by three stones, on the south side of the nave center. One column of the second church was removed, leaving a hole in the floor of the nave parallel to the south column, towards the western end of the screen.

Both aisles were distinguished by the remains of a mortar line on the Diaconicon and Prothesis. The Prothesis had a cistern at its NE corner, probably belonging to an earlier structure.

The entrance was on the east wall, 1.6m wide, and directly in front of the nave. All the mosaic floors of this church had been removed; only the mortar mattresses were left. However, a lot of tessarae were discovered on the mattress, covered by a layer of large fallen stones.

The Chapel

This is an elongated structure with an apse on the eastern end. It was added to the earlier church by building three walls against the east side of the church at the same time as the construction of the second church.

The apse abutted the eastern end of the south wall of the earlier church and is 4.2m in diameter. Its construction is very similar to the apse of the first church; however, it is narrower than that of the first church. The exterior face of this wall and the interior curved section of the apse appear to have been constructed at the same time. Only a narrow part at the front of the apse was visible; the rest of the chapel was covered by later occupational phases. There is a mosaic floor 1m under the upper surface of the apse height, located in Square OBO3; it has white, black, red and gray cubic tesserae of 0.01-0.015m. It has geometric designs, consisting of red and black crosses, black and red lines, and concentric circles.

The southern/northern wall of this chapel was constructed in the same manner as the church walls, oriented E-W, parallel to the south wall of the first church and bonded to the east wall. This wall and the parallel wall of the first church were the highest, probably because the area in between them was filled by structural remains of later occupational phases.

The eastern wall was built opposite the apse of the chapel, parallel to the western wall of the church, with a 0.80m entrance.

An E-W oriented staircase, consisting of six steps, (each tread 0.5m wide, 0.25m deep and 0.22-0.25m high), connected with a lower staircase carved in the bedrock, also oriented E-W, with treads 0.22m high and 0.6m wide. These steps lead to the entrance of a cave.

The Cave

After descending the staircase, an E-W oriented cave, with the entrance on the eastward side, was discovered. The entrance was 2.2m high, and 0.6m wide. It appeared to be a natural cave and used as a store. The excavation did not go beyond cleaning the entrance, which was filled with debris and large stones, ca. 1.5m wide. Inside the cave were three entrances leading to a series of caves extending southward; some local inhabitants said there were tombs underneath.

Phase II

Both of the Basilica churches were later altered during a residential occupation phase; many walls were added inside the churches to accommodate the new occupational needs, particularly in the earlier church and the south side of the later one. The second phase can be divided into two main sub-phases, but it was hard to discern differences in construction and stratigraphy. The occupational phases were dated by means of finds, such as ceramic and other artifacts, that were dated to the Byzantine Period (Phase I) and Umayyad and Abbasid Periods.

This complex appeared to have had more than one entrance, used in different phases. The main entrances of both churches had evidence that they were closed by stones at some point, with a new entrance opened in a later phase; this later entrance is about 0.90m wide, including the threshold. Many new walls overlay the mosaic floor, creating residential rooms measuring 2.50 x 3.50m. The walls were 0.70-0.90m thick.

The floors were covered by a pavement, comprised of stony slabs, pebbles, cobbles and boulders; sometimes the pavement was built over the mosaic floor. From this, we can deduce that the mosaic floors were in use in the later phases, without mending. As a consequence of the weight of the new walls, the floor was depressed in parts. Soil was laid over these to create a level surface. Numerous *ṭābūn(s)* were found in many of the rooms which measured

2.50 x 3.20m. Some of the walls in these rooms were preserved to a height of 1.10m. Ceramic analysis dated the artifacts in this phase to the Umayyad and Abbasid periods.

Phase III

The third phase was weakly represented in this area, and concentrated in the southern side of the first church, and over the chapel area. Many reused stones from previous phases were observed. This phase was represented by a single row of wall stones, covered with a thick ash layer, including many pieces of slag, which indicates that this was an industrial area, (probably for ceramic or metal industry). Ceramic analysis suggests that this phase belongs to the Ayyubid and Mamluk periods, but it may possibly continue through to the Ottoman period. Some samples of slag were sent for analysis.

AREA (B)

Located on a mountain to the west of Area A, the southern part of this area was badly damaged recently by a bulldozer. A lot of pottery sherds and tesserae were found, which are probably the remains of a church. Six squares were opened; 0AY/052, 0AY/053, 0AY/0054, 0A2/052, 0AZ/053 and 0BA/052; another three were partly excavated to follow the extension of the structure.

This church has a basilica design, but only the first course was extant for most of the structure. It was divided into three parts: the nave in the center, the south aisle and the north aisle. The foundation was constructed of undressed lime and chert stones, each 1-0.9m in width. Four walls of 1-0.75m widths bonded each other in Squares OA/O54 and OAY/O52, forming a square room and representing the original exterior walls of the church. The Diaconicon was situated on the northern side of the apse, projecting eastward. It was 3.2m x 3m; the entrance faced west. The floor of this room consisted of compact soil with pebble inclusions. A pit in the N-W corner contained a 0.60-0.80m storage jar, dated to the Byzantine period.

The Prothesis was situated at the southern side of the apse, towards the SE aisle. It was constructed from a double faced stone wall, with the dimensions of the Diaconicon. Part of the Prothesis floor and small sections of the south aisle and the nave were covered by geometric colored mosaic. Due to the bulldozing work here, most walls of both rooms and both aisles and the nave were in a poor state of preservation or missing, particularly the west side of the church, which was completely bulldozed. The preserved length of the church was 15m, and the width was 15m.

Between both small rooms, a curved wall was constructed from medium size stones, forming the apse; only the two lower courses were still extant. This apse extended into Squares 0AY/052 and A02/052 on the eastern side of the building, and was 5.2m in diameter. The whole building was built directly on the natural bedrock.

The nave is located in the middle of the church. Four column bases comprised of two stones were found in Squares 0AY/054, 0AY/053 and OAY/052. These bases were situated along both sides of the nave, with a distance of 4 meters between them. Some of them are of rectangular form, one 0.65 x 0.30m and the others 0.70m. The preserved length of the nave is 7m. Part of the left aisle is in Square OAY/O53, and possibly is the original extent of the church, but this is not certain.

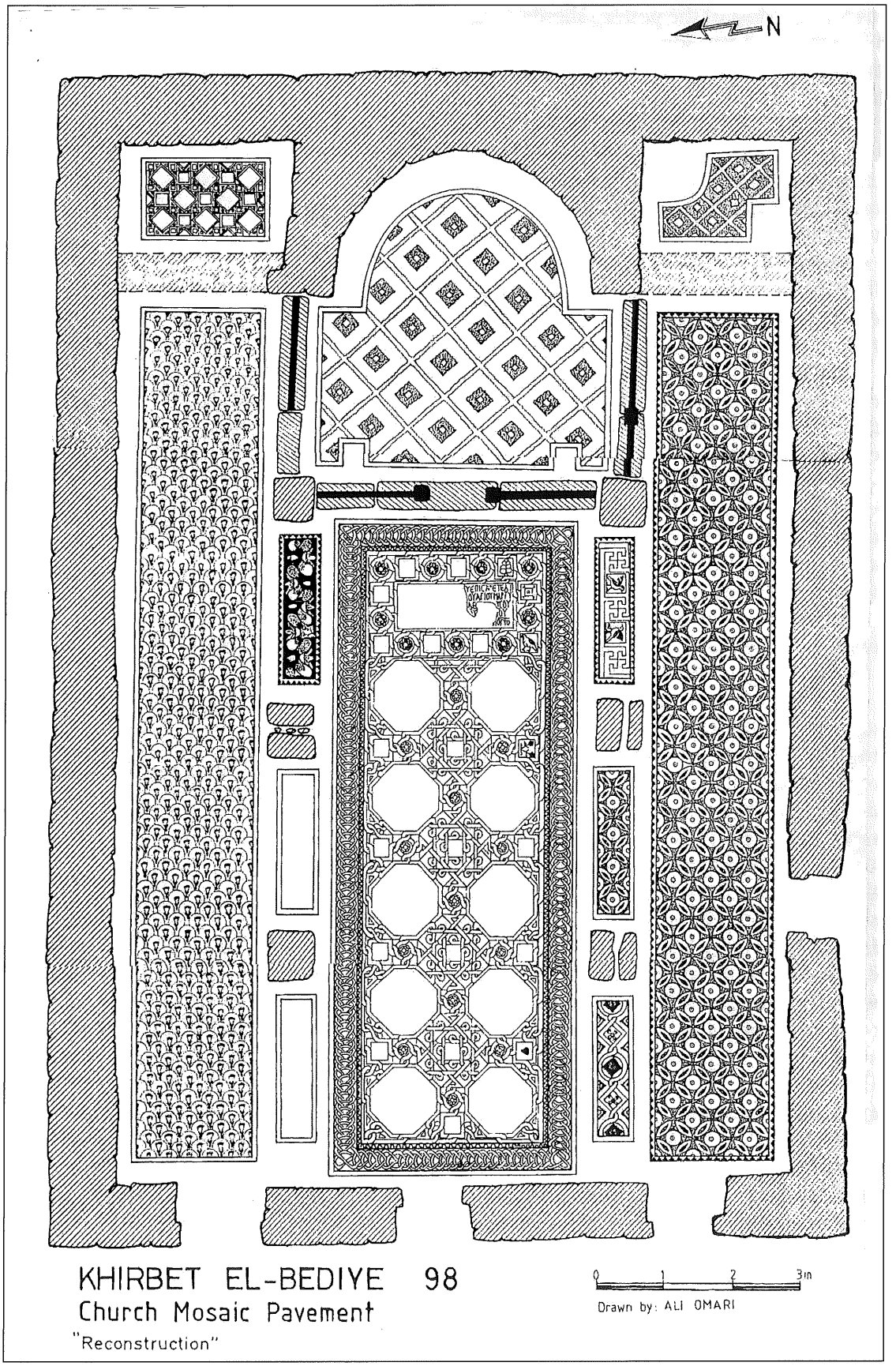
The Cemetery Area

The cemetery is located westward of Area A; it has tombs which indicate that it is indeed a cemetery, and the following probe trenches were opened:

One probe trench measured 4.5m x 1.5m, was 0.65m deep and oriented E-W. Another formed a right angle with the first probe. A third, measuring 2m x 1m was opened, and then all the probes were expanded, forming a $4m^2$ trench. A threshold stone was found at the center of the square, and a stone wall and the remains of a plaster floor were discovered on the bedrock.

No tombs had been uncovered in this area. Therefore, the excavation was moved to the NW sector of the site, where some tombs were observed. More than ten probe trenches were made, but unfortunately, no archaeological evidence was obtained. It was then decided to clean the tombs (all had been previously robbed) on the NW side (**Fig. 4**), classify them, and try to determine their function by studying their internal details.

The first tomb was full of soil, pottery sherds, human bones (including a damaged skull), and



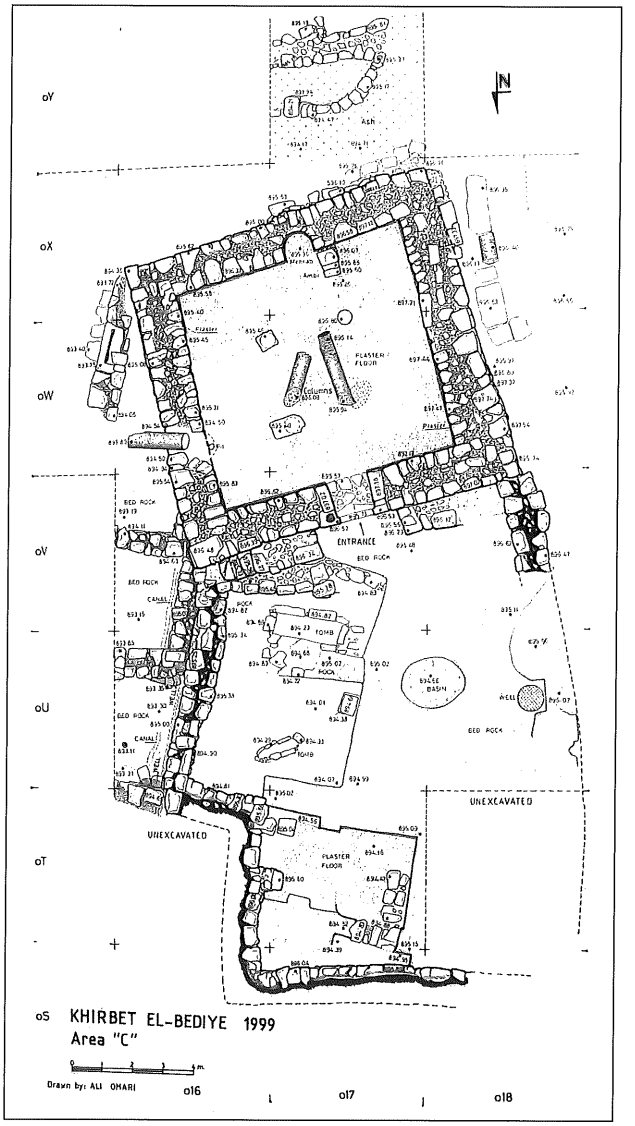
4. A horizontal chamber tomb, dated to the Roman/Byzantine period.

glass fragments. Most of the pottery sherds were from the Roman and Byzantine periods. The entrance to the tomb was 0.82m high and 0.51m wide. It was 1.4m in length and 1.58-1.35m in height. Two tomb chambers discovered next to each other appeared to be dug into the bedrock on the right side of the tomb entrance; each of these tomb chambers was 1.87m x 0.60m, with a depth of 0.80m.

The second tomb was situated to the west of the first. Some bones and many sherds were collected after the fill soil was removed from the entrance. The tomb plan originally was designed for 3 niches; the east and north chambers were complete, but the south side remained un-worked. Both the finished chambers were disturbed by robbers, but the human remains were found. The interior dimensions of the cave were 1.65m x 1.50m. The center of the cave was sunken by two steps, and four sided seats like a square were positioned on the lower part. The cave was plastered, with the remains of the plaster discovered in the corners. The entrance dimensions were 0.56m wide, 0.76m high and 0.23m thick, with a small hollow of 0.06 x 0.09m, which was probably used as a locker (al-Muheisen and al-Shorman 2004: 177-189).

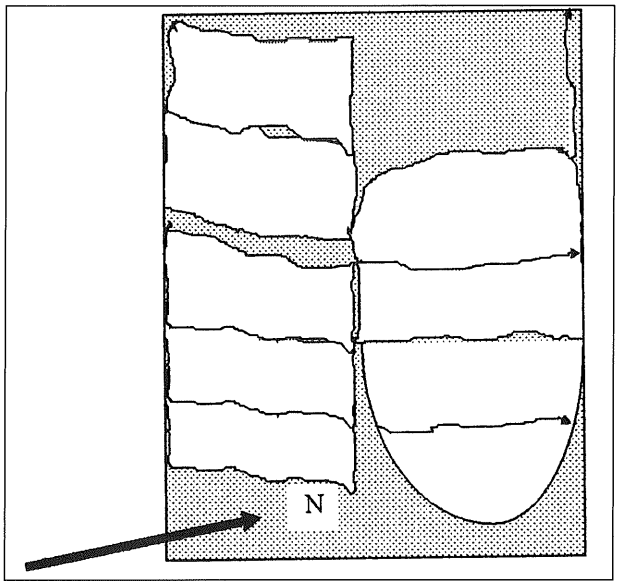
During the 1999 excavation season, the remains of a unique mosque were completely uncovered (**Fig. 5**). It has a plaster floor and four columns at the center, supporting the ceiling, which probably had a central dome. The walls were still extant to a height of 2.0-2.5m on its west and north sides, the internal walls covered with plaster. A *Miḥrāb* was found inside the mosque, oriented south towards Mecca; next to it on the west side was a *Minbar* of three steps, constructed from stone and covered also with plaster on both sides. The northern wall includes a wide entrance, with a ca. 1.0m bench with narrow steps from the eastern side for the call to prayer. A large yard with a beaten earth floor and a water cistern has been uncovered on the north side of the northern wall. An absolute date for this monument cannot be determined, as treasure hunters have dug a large hole in the center and through the plaster floor, where the top of the columns was previously visible.

The excavations continued working on the southern part of the earlier church under the chapel, where there is an E-W oriented cave con-



5. General plan, showing the Mosque area.

taining a wine press west of the apse, with a wall measuring 3.25m in length and 0.8m in width. This wall was built in a later occupation phase, with an entrance at its northern end, leading into a narrow E-W oriented space enclosing a stone staircase with six steps, connected with a lower staircase carved in the rock (**Fig. 6**). The cave consists of three rooms connected to each other by two entrances carved in the bedrock. The first room is roughly rectangular in form, and could be reached by an entrance at the northern end of the east side of this room. This entrance consisted of six steps carved in the bedrock, the treads of different height ranging between 0.2-0.3m, which descended down to the room from a small platform. The second entrance on the SE side of this room was blocked, probably due to its nar-



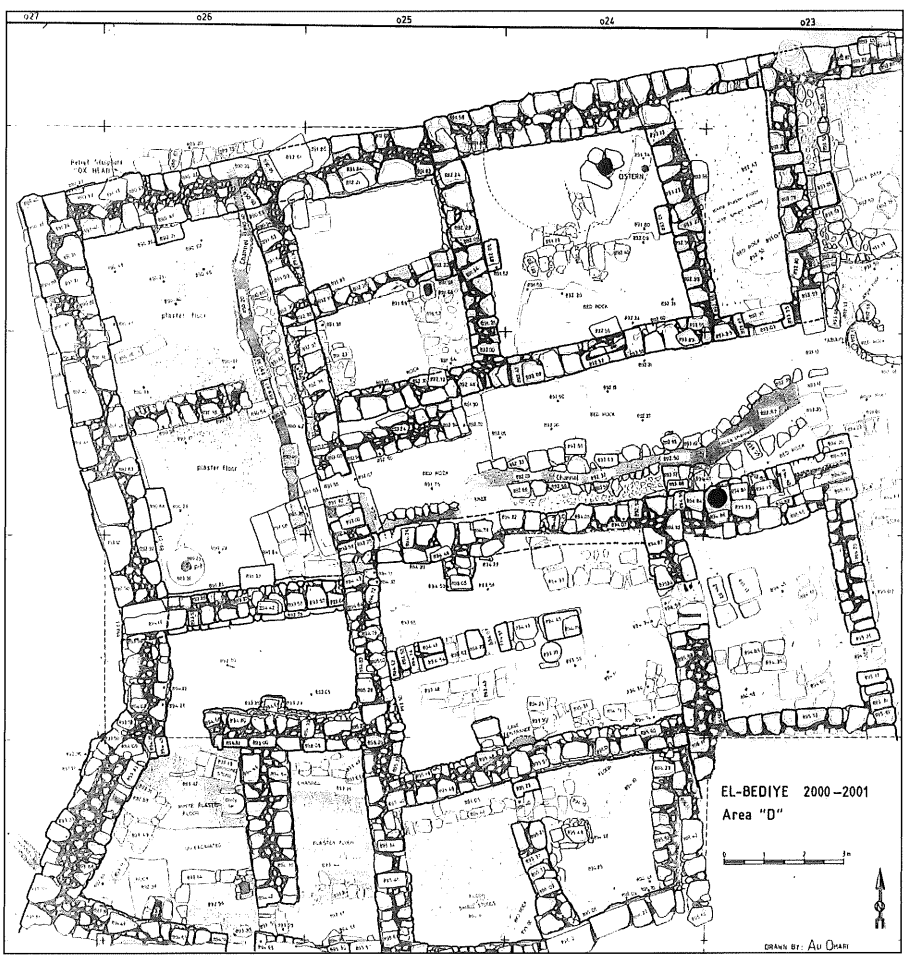
6. A scetch for the staircase.

rowness; traces of three eroded steps could be seen, with a difference in level of about 1.15m. Part of the ceiling of this entrance was covered with stone slabs after it had been abandoned, and reused as a niche; this can only been seen from inside at the top of the stairs.

At the center of the room there is a shallow circular basin; 1.1m diameter and 0.1m deep. On the SE edge of this, a narrow channel (0.12m wide and 0.3m long), connected with a circular storage pit; the mouth of this was 0.55m in diameter and depth was 1.15m, and the interior diameter ranged from 1.5-1.15m. There were two small rectangular basins of different sizes, one south and the other north of the storage pit. These small basins may possibly be postholes; this pit is probably for wine processing, and the mill stone would probably have been supported on posts. There is also a cylindrical hole in the bedrock ceiling in the NW part of this room, with a 0.15m diameter; this also was probably used for wine processing, possibly to bring water from the roof.

AREA (D)

During the 2000 and 2001 seasons, the work was concentrated in the central part of the northern area of the site, Area D (**Fig. 7**). The initial



7. General plan of Area D.

decision to work here was based on structural remains; the corner of a Hellenistic period building, ca. 2m high, was observed. This building was constructed of large, well-shaped stones, with a relief sculpture of an ox head on the western edge of the northern wall. It was decided to excavate in this area, to learn more about the function of this building. The excavated area shows many structural elements on the surface, with wall lines scattered over the entire area. There are remains from the Hellenistic, Roman and Byzantine periods; the area was densely populated in the Islamic period, with stones of earlier buildings reused to build houses. Pottery sherds dated to these periods show a tremendous use of the site during Ayyubid and Mamluk periods, particularly the upper levels.

Architectural evidence of the ca. 2m high Hellenistic building shows that the exterior walls remained constant, with the lower course unchanged. The interior of the structure had changed; walls had been repaired or rebuilt using a different technique, and many additional walls constructed to make small rooms or spaces. In the third course of the northern wall (that with the relief sculpture of an ox head), there is a gap between the seventh and the eighth stones; this is probably a water channel leading to cistern outside the building. This cistern is not yet excavated, but is connected to a long, wide water channel running E-W inside the building under the floor. It is located along the southern wall of the interior structure, where it extends for a length of 8.8m outside the two rooms, and ca. 10m inside the two rooms. Outside the structure, the water channel connected with a niche and a rectangular hole carved in the bedrock; this was probably used as a strainer, and the channel then divided into two branches. The first branch went under the south side of the entrance and under the steps. The second branch turns in front of the entrance to run under the E wall of the room. The channel was constructed by digging a groove in the bedrock, and was covered by stone slabs.

One of the internal rooms of the Hellenistic period structure was excavated; the finds from a depression filled with medium sized stones mixed with grayish brown dirt were from the Hellenistic and Early Roman periods. Three complete Hellenistic lamps were found, close to the cut of the bedrock at the room center. A water cistern was found in the NE corner of the room, under the stone fill, which was probably laid to level the floor. The cistern depth was ca. 7m, with an internal diameter of ca. 5m. The internal surface was well plastered. The bottom of the cistern was filled with soil, stones and pottery sherds; the ceramic finds were all dated to the Hellenistic period.

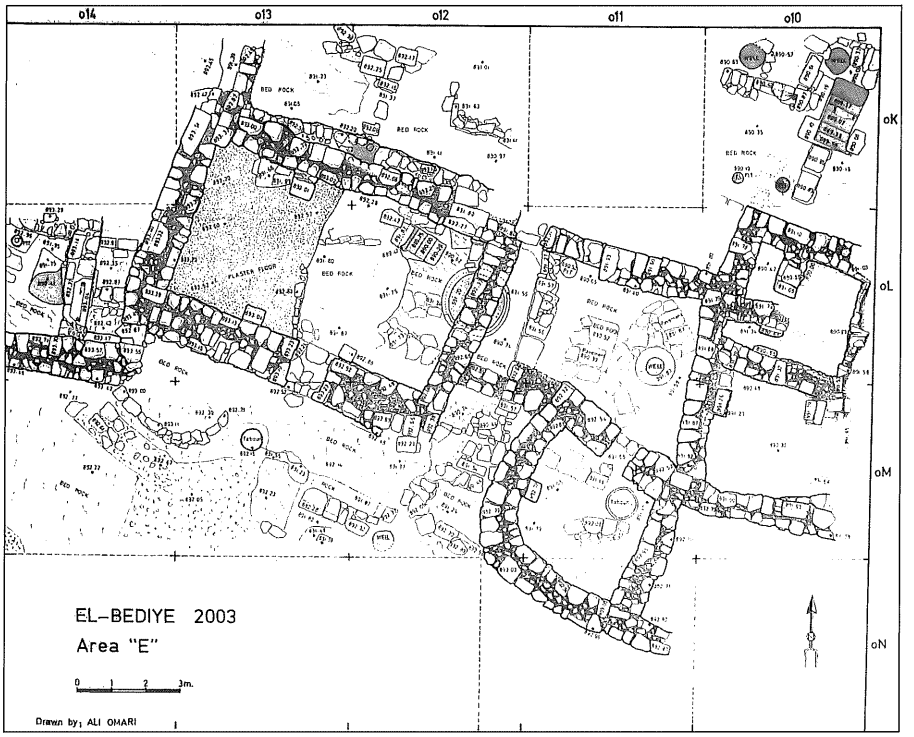
AREA (E)

The 2003 excavation season concentrated in Area E, situated to the SW of the churches, where some structures were clearly observable on the surface (**Fig. 8**). Fifteen squares of 5m^2 were opened, uncovering a fragmentary structure of several occupational phases, belonging to the Ayyubid, Mamluk, Umayyad and probably Roman periods (**Table 1**).

A large rectangular room (oriented SE-NW), was excavated, measuring 10m in length and 7.5m in width. The entrance in its southern wall

Table 1: Distribution of Squares in Area E.

	OK013	OK012	OK011	OKO10
OL014	OL013	OL012	OL011	OL010
OM014	OM013	OM012	OM011	OM010
			ON011	



8. General plan of Area E.

was 0.8m wide. The room was located within Squares OK012 and OK013, OL012, OL013 and OL014 and OM013. The walls were built with reused stones from earlier structures. The south and west walls were constructed on the bedrock. The north overlay an earlier wall; it was narrower than the earlier, with the edge of the earlier stone visible along the whole of the northern face. The eastern wall overlay a large stone basin, which is probably associated with the wine press under the large room.

The walls are not well built; wall widths range from 0.75m- 0.95m for the SE wall, ca. 0.80-0.85m for the NE wall, 1m-1.2m for the NW wall and 1.4m-1.55m for SW wall. The NE and the SW walls are joined by two spring arch bases, dividing the space of the room into three equal parts, each 5.15m from the corner. The floor of this room was not the same throughout. The NW half of the room, from the west side of the entrance, was raised by 0.95m with a single row of stone. This had a plastered floor over the bedrock surface, and part of the northern wall was also plastered. The floor in the central area of the room was of bedrock; this had an irregular edge ca. 2.7m east of the plaster floor. The remainder of the floor surface was of stone pavement and dirt; and filled the entrance to the wine press. The door in the SW wall opened toward the south; it measured 0.8m in width and 1m in height above the door threshold, which was a pavement of small stones. Outside the entrance was an open yard, located in Squares OM012-OM014. This yard appeared to be used for daily activities; a 0.65m diameter *ṭābūn* was found within a small enclosure built from one single line of stones, which was possibly used for fuel storage. In the SW corner of Square OM012 was a SE-NW oriented water channel, preserved for 2.2m, which led to a cistern.

The wine press was constructed inside a cave ca. 2.49m below the bedrock surface (**Fig. 9**). It was reached by four curved steps oriented



9. General view of the wine press in Area E.

E-W, ca. 0.25-0.29m high and ca. 0.66m wide. The inside of the cave was rectangular in form, 2.7m wide, 3.44m long and 1.9m high. A circular basin (1m in diameter and 0.2m deep), was dug into the bedrock. It was connected to a strainer storage pit by a narrow channel to the SE, 1m in length and 0.15m wide. This storage pit was situated close to the SE corner of the cave; it has a cylindrical form, and is 0.5m in diameter and 0.8m deep. Within this pit there is a smaller hole, 0.15m deep. There were also two rectangular holes dug into the bedrock on the north and south sides of the basin. Deeper than the basin bottom, they are 0.62m long, 0.34m wide and 0.3m deep. There is a niche in the NE corner of the cave. The base is on the floor, and it measures 0.84m high, 0.6m wide and 0.42m deep. It was interpreted as a storage area, possibly for tools.

Another smaller cave of sub square form was excavated on the SE side of the cave, which was accessed by means of three narrow steps. The tread of the first step was 0.2m high and 0.4m wide, the second 0.34m high and 0.2m wide, and the third 0.34m high and 0.27m wide. The cave measured 1.8m on the west side, 2.3m on the east side; it was 1.58 m in height and 1.58m deep. This cave was also interpreted as a storage area.

Another large stone basin was discovered, with an exterior diameter of 2m, an interior diameter of 1.7m and a depth of 0.35m; this feature was interpreted as a grape press. A row of a stones extended from the west side of the basin towards the edge of the bedrock, probably forming a sort of channel It was not possible to excavate the area below this basin, as the N-S oriented eastern wall of the above mentioned room was still extant, and crossed the center of the basin. It was therefore not possible to explain the relationship between the stone basin and the grape press.

A fragmentary structure was uncovered in Square OL014. SW of the rectangular room, it retained features from two occupational phases. The first was part of a wall extending from the south end of the west section, contrary to the structure of the rectangular room but not connected with it; it measured 4.14m in length, 1m in width and 0.75m in height. The second was the corner of an earlier structure which extended from under the first wall. It consisted of a N-S oriented wall (3.57m in length, 0.7m in width and 0.27m in height) which bonded with a small E-W oriented wall (1.4m in length, it was not possible to determine the width, because it was overlain by the first wall). This structure appears to be related to an earlier building, but most of the stones had been removed and reused in later occupational phases. To the west of this fragmentary structure is a cave, possibly used as a cistern, but it was not possible to excavate it during the dig season.

To the east of the rectangular room was a fragmentary structure, (located in Squares OL011 and OL012, OM011 and OM012, and ON011), with remains from at least three phases of occupation. The first phase was represented by a 1m wide curved wall in Squares OM011 and ON011 which links with two other walls. The first is oriented E-W, is 4.14m in length and 1m wide. There is an entrance in the center, 0.75m wide and 0.88m at the preserved height, with a threshold made from medium sized flat stones. The second wall is oriented N-S, and measures 3.2m in length and 0.94m in width; it links the curved wall and the first wall, forming a room. Inside this room was a compacted earth surface; two *ṭābūn(s)* were found on the surface, together with many pottery sherds belonging to storage jars, which suggest that this room may possibly have been used as a kitchen. The entrance opened towards the north, leading to a sub-rectangular room formed by stone walls. The western wall had one course, measuring 3m in length and 0.75 in width; it was removed because its position on the edge of the section meant it was not stable, and the northern part of it was missing.

The second phase was represented by reuse of the exterior of the N-S oriented eastern wall; it is constructed from well shaped stones on the western part while the eastern part is constructed from small, rough stones. It measures 4.77m in length and 0.90m in width.

The third phase was represented by the northern wall; it measures 3.3m in length and 1m in width. It appears that the northern end of the east wall was built against its south face. The northern wall appears to overlay an earlier wall; 1.85 m in length and 0.71m in width, only a small part of it was visible, with an entrance at its west end. A stone pavement was associated with this wall; laid over bedrock, it surrounded a stone

cistern, with an exterior diameter of 1.14m, and an opening of 0.5m. Another wall belonging to this phase was revealed; aligned with the west wall but at a lower level, it measured 3.25m in length and 0.75m in width. This wall sealed the cistern and the pavement.

The eastern wall had been shared by two structures at least; as mentioned above, its western side was reused in a later structure, while its eastern side was originally constructed on a lower level. Its height measured 1.44m and it has an arch base, approximately at its center, which measured 1.28m in height and was 0.75m wide. This wall represented the western wall in an adjoining rectangular room.

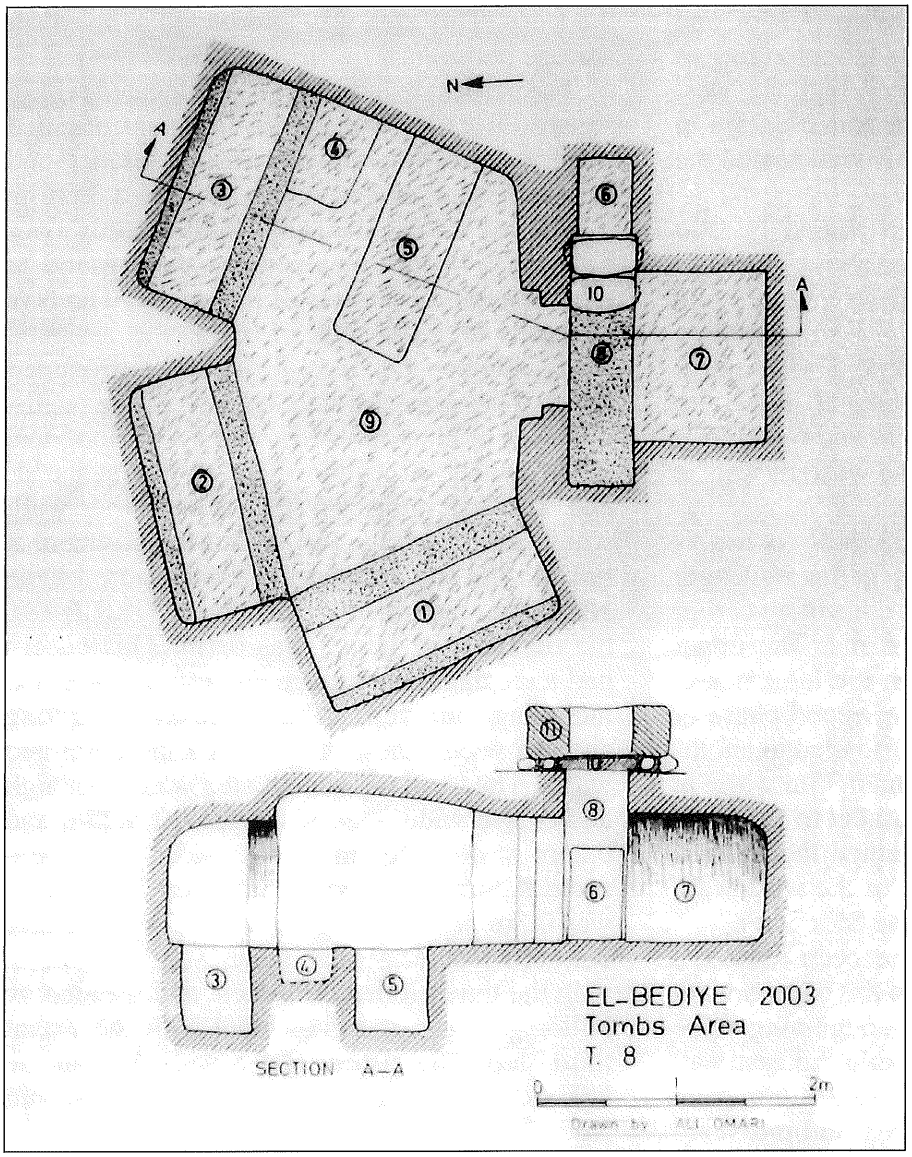
The southern wall of this adjoining room was oriented E-W, and measured 3.85m in length and 0.8m in width; the eastern edge of an earlier wall was visible at its eastern end. The upper courses of the wall were from the later phase, whilst the lower were from the second phase of occupation. The southern wall bonded to another wall (which was 5m long and 0.75m wide) at the edge of Square OM010, parallel to the western wall. This wall also contained the base of a spring arch, parallel to that in the west wall, 0.68m wide and 2.14m from the SE corner.

This room appeared to have been reused; a stone wall was built parallel to the eastern wall, linking the east and west walls, beginning at the north side of the arch base within the east wall and abutting the west wall at a point 3.28m from the SW corner of this room. This wall measured 3.5m in length and 0.75m in width, representing an additional phase in this part of the structure. This wall divided the area into two areas; the eastern 0.7m wide, and the other on the northern side, (where a part of the original wall still stood), 1m in length and 0.75m in width. It is bonded with the northern edge of the west wall, oriented E-W N-S, where a narrow room has been formed on the southern side; this was possibly used as a storage room. The corner formed by these two walls was observed to be partially constructed over the corner edge of an earlier structure on the northern side of this wall, within Square OL010. The second room was square, measuring 2.85m$^{2;}$ there was a 1.7m x 1.4m raised area in the NW corner, with two stone steps toward the east, where a medium size storage jar was found broken on the south side of the steps. This area was interpreted as used for storage purposes.

The earliest feature found was located within square OK010; a stone wall fragment oriented NE-SW, one row of well shaped header and stretcher stone blocks, which measured 3.6m in length and 0.65m in width, built directly over bedrock. Two cistern openings were found at the NE and NW corners of the square. The NW cistern, with a diameter of 0.7m, was assigned locus number OK010.14; it was surrounded by an enclosure formed by two stone walls. One was oriented NW-SE, was 2.85m long and 0.55m wide, with a threshold visible at its SE end. It overlay the NW end of the other wall, which was 1m long and 0.55m wide, where it linked with the circular stone enclosure of the NE cistern (assigned locus number OK010.18), the diameter of which was 0.7m. This cistern had a rectangular entrance cut into the bedrock, including four steps, which measured 2m long and 1m wide. These steps varied in height and width. The tread of the first step was 0.6m high and 0.25m wide, that of the second 0.25m and 0.25m wide. The third was wider, and measured 0.54m high and 0.26m wide. The fourth was 0.3m high and 0.25m wide. The excavator believed that originally there were five steps, with the third eroded or broken, and mended by building a row of stones level with the extant third step. The cistern had a widening on the NW side, and measured ca. 0.45m x 0.65m with a depth of 0.09m.

This cistern appeared to be situated outside the building, and available for communal use; possibly this is the reason for the existence of the steps. The inside of the cistern and the entrance to the steps was covered with a thick layer of fine plaster. The cistern was partially emptied this season, but many large stones and soil still remain; this may be completely emptied in later seasons. Many questions were raised by this season's work, which can only be answered after further excavation.

Part of the fieldwork in 2003 was devoted to analyzing the constructed landscape, that is, the creation and erection of monuments, tombs (**Fig. 10**), buildings and other structures. Geographic Information System was used to perform the landscape analysis using Viewshed. One of the constructed elements at the site are the three



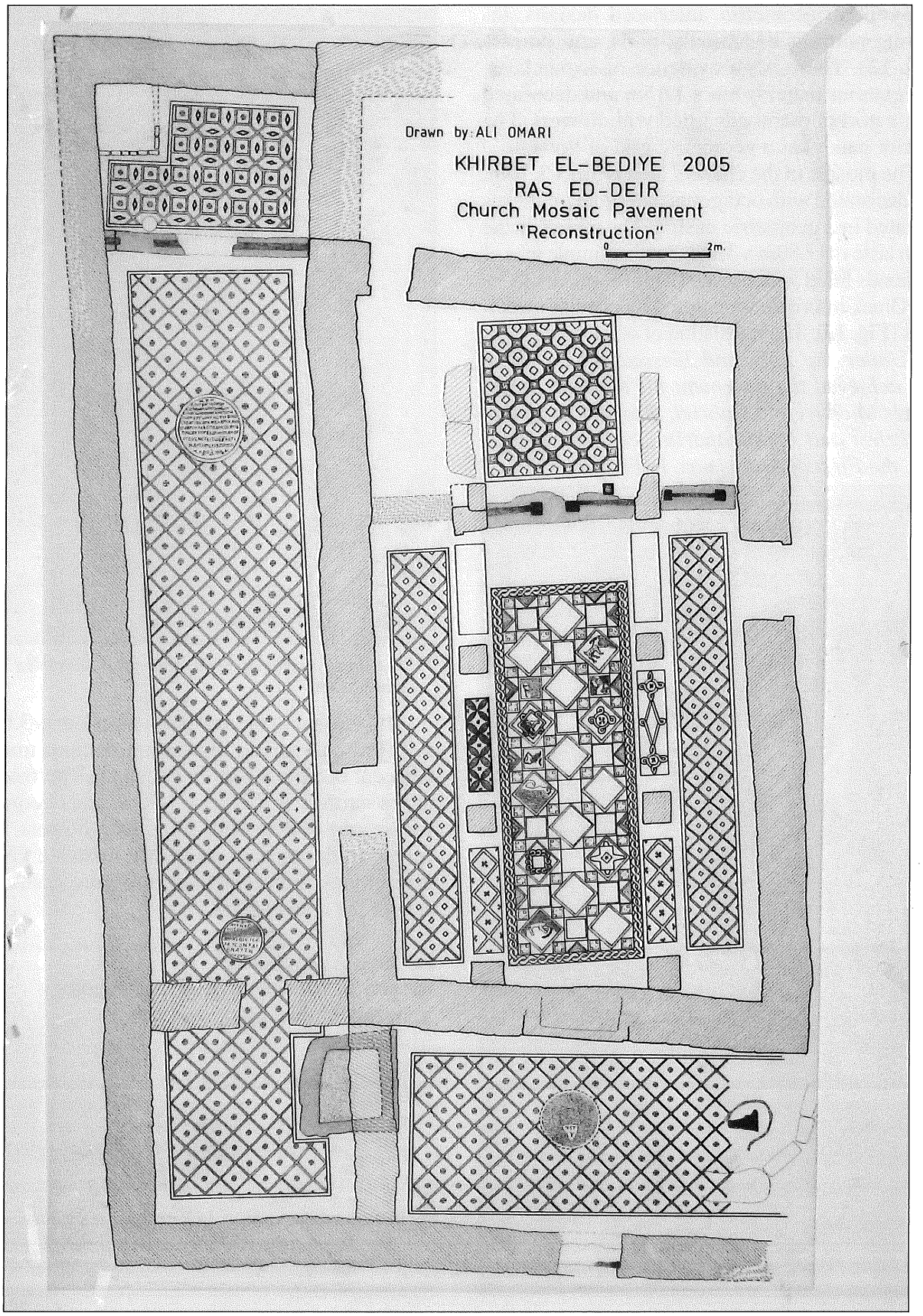
10. A horizontal chamber tomb, dated to the Roman/Byzantine period.

cemeteries that were dated to the Late Roman/ Early Byzantine periods; the western cemetery has chamber tombs with arcosolia, the southern cemetery has single horizontal shaft graves and the eastern cemetery has horizontal shaft graves, vertical shaft tombs and chamber tombs. Based on tomb typologies and artifact assemblages recovered from these tombs, tomb reuse was clear as well as social stratification. A predictive model was constructed using GIS to predict further tombs at the western cemetery that are believed to have housed people of higher social class. The performance of the model was 0.82, which is theoretically accepted and is going to be tested during the excavations of 2004 (al-Muheisen and al-Shorman 2004: 177-189).

Excavation in the 2005 season took place in an area called Rās ad-Dayr in Khirbat al-Badiyya. This area is located to the SE of the site of Badiyya. The church excavated was located in the heart of the hill of Rās ad-Dayr (**Fig. 11**). The building is a standard basilica, with the nave divided from the aisle by two E-W oriented walls.

The Mosaic floors

The mosaic floors in the church were well made and featured geometric, botanic and faunal designs; however, many of them had been partially destroyed by tree roots. The nave floor is divided into two separate panels and a larger central area. The central area is 7.25m x 2.60m, enclosed by a guilloche, and is decorated with a geometric pattern, rows of large diamonds alternating with squares. The diamonds and squares

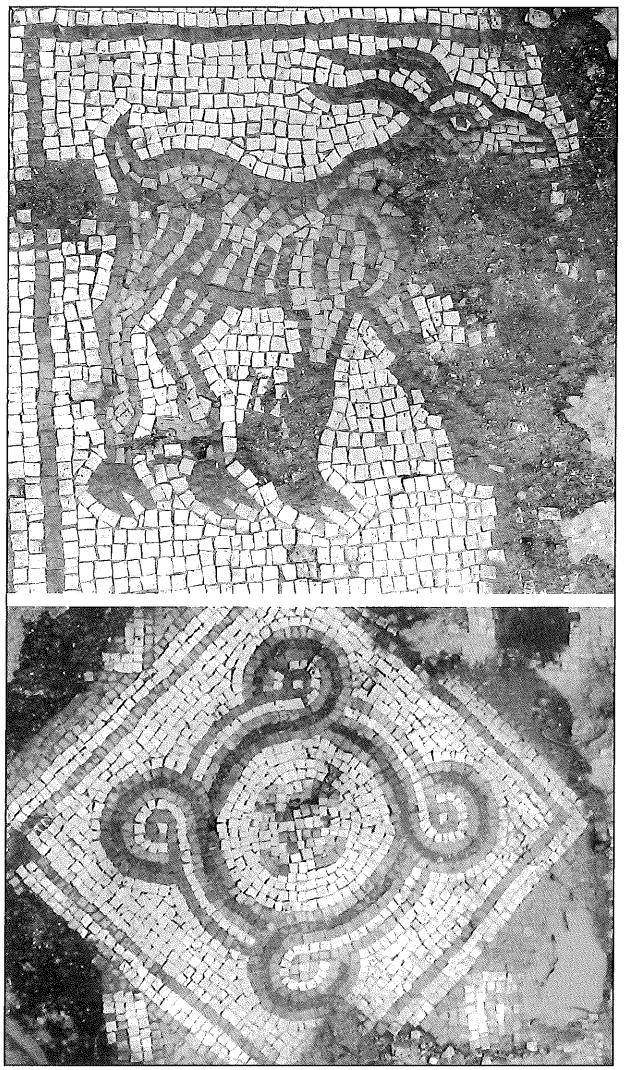


11. Plan of the Rās ad-Dayr church.

also contain geometric, interlaced designs, including portraits of animals, birds, and flowers (**Fig. 12**). There is no evidence of iconoclasts. The exterior panel is 8m x 1.15m and decorated with a grid of diamonds filled with flowers. The interior panel has a geometric grid of flowers.

The mosaic in the chancel area is 3m x 2.70m, and decorated with octagonal and square patterns repeated in a geometric design. The mosaic in the north aisle is 17.80m x 3.15m, with a simple grid of diamonds filled with flowers. This mosaic includes two Greek inscriptions enclosed by circular medallions (**Fig. 13**). The translation of one reads:

"*Under the holy and blessed Bishop John was achieved the pavement for the Holy Archangels Michael and Gabriel, through the zeal of the Priest and Archimandrite Serge in the year 662, the First of Artemisios, Indication 4*".



12. Detail of the mosaic floor found in the Rās ad-Dayr church.



13. The Greek inscription in the center of the north hall, Rās ad-Dayr church.

The mosaic in the northeastern room is 3.60m x 2.40m and has an interesting composition of adjacent octagons forming squares. The mosaic in the narthex is 7.70m x 3.50m, and decorated with a grid of diamonds filled with flowers. The center of the mosaic originally included Greek inscriptions; however these are now destroyed except for a few letters.

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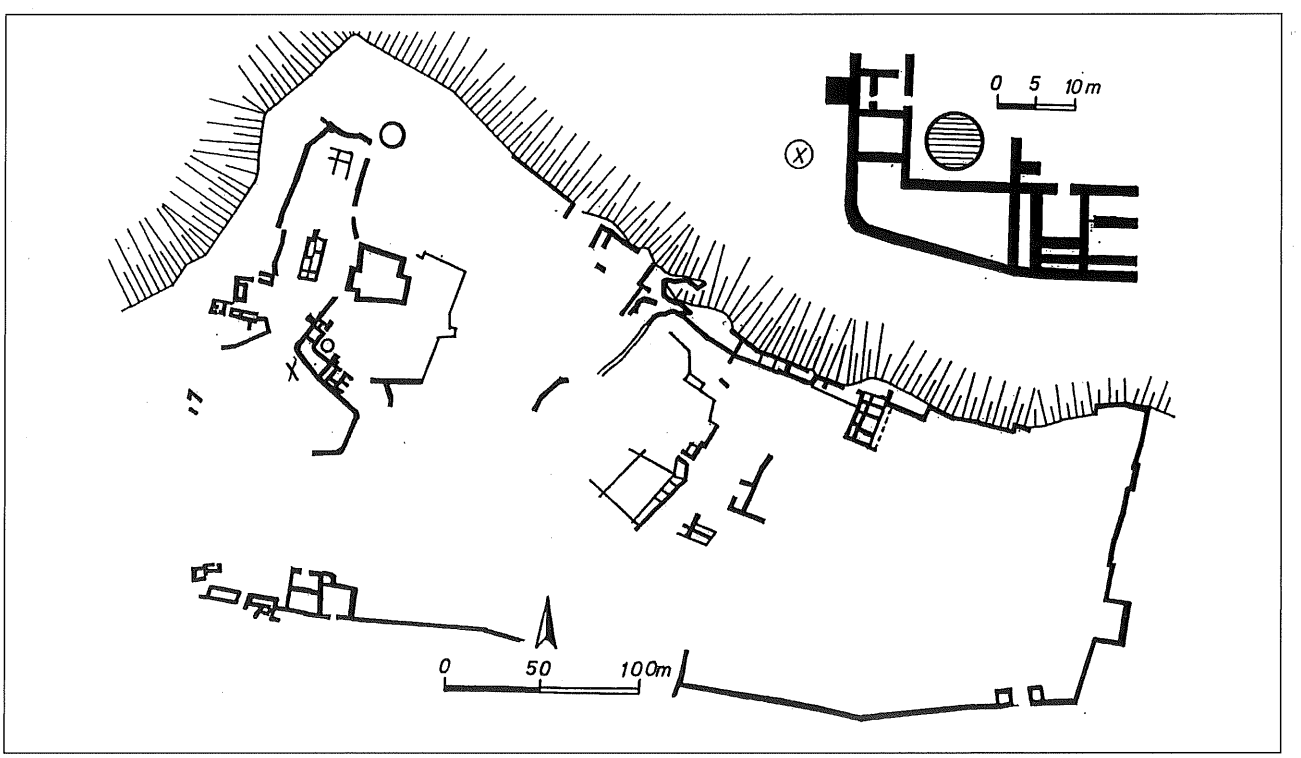
AN INSCRIPTION FROM AL-BĀLŪ‘ (ARḌ AL-KARAK)

Udo Worschech

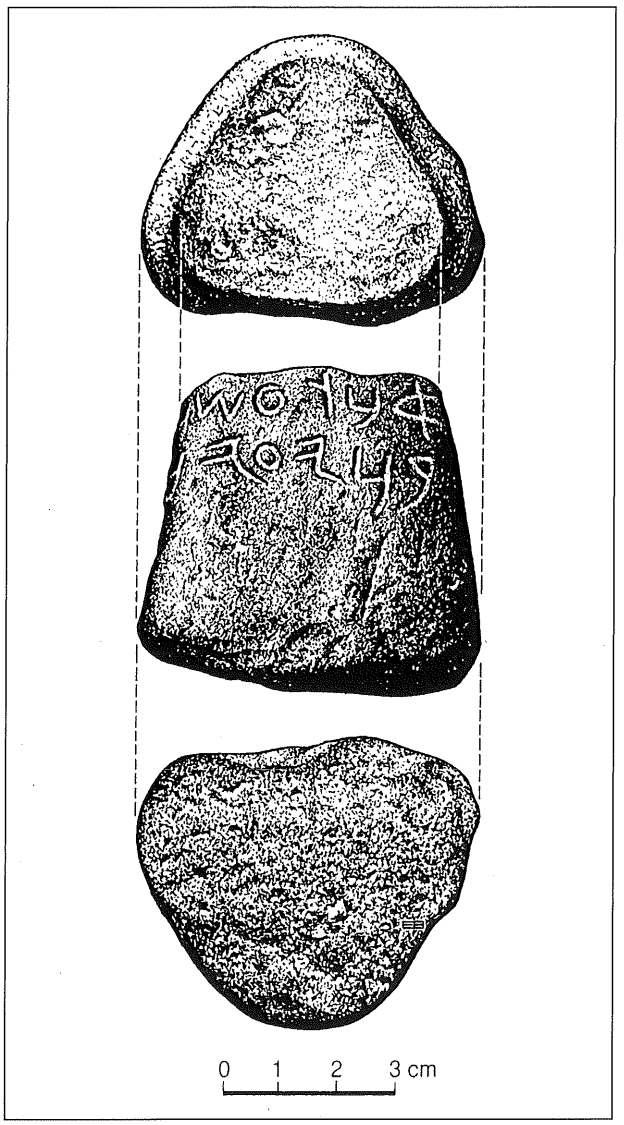
The excavation campaign in al-Bālū‘ in the summer of 2003 concentrated on an area covered with many wall lines and stone heaps south of the impressive Qaṣr al-Bālū‘. This area had caught my attention before during the surveys of the vast ruin. Here a wall-line can be traced, running about 50m from the south side of the qaṣr from east to west. In its western section it suddenly turns to the north where it continues until it meets the southwestern corner of the qaṣr. From this circumferential wall smaller wall-lines of about 0.80-1.00m in width can be traced at nearly right angles from the main wall inwards, i.e. in a northerly direction toward the qaṣr. It is therefore clearly apparent in rooms or sections of rooms which are protected by the impressive outer wall (**Fig. 1**). A room was cleared in the eastern square of this area, from which a pestle of basalt with a two-lined inscription came to light.

Truncated Pestle: Description and Dimensions (Fig. 2)

The letters of the inscription are all very legible with two exceptions (see below). They were probably incised with a metal pencil into the basalt surface. Whether the truncated pestle was the original piece for the inscription or had its upper part broken off cannot be said with certainty. However, its present form shows a trian-



1. Sketch of Area G in al-Bālū‘ (2003).



2. *Pestle.*

gular plan of 6.2 x 5.6 x 5.6cm with rounded corners. The length of the side walls of the pestle totals about 5.8cm. If the slightly inwards inclined exterior surfaces were extended upwards the possible entire height of the pestle would be about 22-24cm. It remains unclear whether the original pestle was pointed, rounded or flat at the top. At the current break line there are no indications of incisions from possible letters above the present top line of letters.

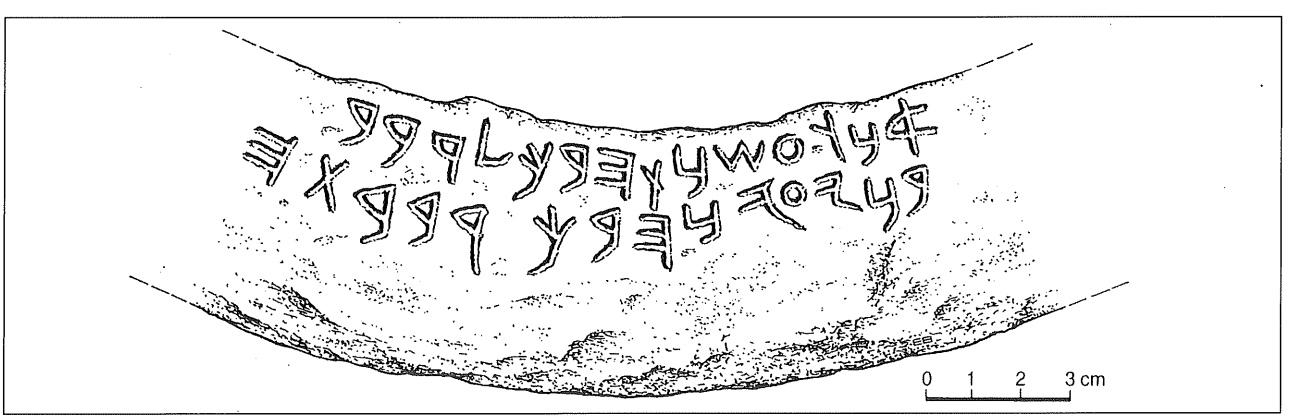
The size of the inscription letters varies from 7 to 12mm. The depth of the incised letters lies between 0.2 and 0.4mm. The coarsely finished and hence rough and porous surface of the basalt stump inhibits a clear reading of the letters in two places. However, this does not seriously compromise the orthography and the reading of the inscription. Since there are no word dividers such as dots or strokes my interpretation of this inscription is still open for discussion.

Letters of the Two-Lined Pestle-Inscription (Fig. 3)

Of the 22 letters of the Canaanite alphabet and the characters known from Palestinian inscriptions, only 12 are found in our inscription. For a comparison with other Moabite inscriptions see **Fig. 4** (see also Kooij 1987: 107-121; Hoftijzer, Jongeling 1995: passim; a new Moabite inscription published by Ahituv 2003: 3-10).

'Aliph corresponds to the classical form, which S. Timm (1989: 277) designated as Type C of the Mesha' inscription (MI). Indeed, the point of the horizontally recumbent corner is slightly rounded. The thighs diverge at what also corresponds to forms of the *'aliph* in the MI. The three *'aliph* of the Karak fragment also have a pointed corner form (Timm Type C, 1989: 277) which is present in our inscription as well.

The *bet* of the inscription is found several



3. *Letters of the pestle inscription.*

Pestle Inscription el-Bālū'	Mesha Stone	El-Kerak Fragment	Rim Inscription el-Bālū'	Dibon Fragment	Incense stand Mudeneh eth-Themed

1966: 328-330; Kooj 1987: 107-121; Timm 1989: 269-277) this type of *bet* can also be found in this form.

The *he* of the pestle inscription appears in three variants which are also found in the MI. In each case three horizontal beams lead away from the vertical downstroke with differing spaces. In one instance the vertical downstroke reaches beyond the upper horizontal beam and in another the upper horizontal beam extends beyond the downstroke. In contrast to the MI the *he* of our inscription always has a vertical stance. The vertical stance of the *he* has been interpreted by M. Abu Taleb (1985: 25) as typical Moabite. The Moabite seals he published show without exception the vertical stance of the *he*. In contrast with Timm (1989: 282 and note 12) one will have to assume from this that the vertically standing *he* is indicative of the typical Moabite *he*. The *he* of the Karak fragment is striking because of its four (!) crossbeams. It stands vertically in one instance; otherwise it is inclined to the left.

The letter *waw* appears twice in the inscription. Instead of the usual 'u' or 'v' type head of the MI on top of the vertical downstroke, a short line is attached here at the left side of the downstroke at an angle (cf. also the Ammonite form of the *waw*; Herr 1980: 26, fig. 1a no. 16). The 'v' form is therefore maintained here. The identification of the other *waw* is less unequivocal, however, and is explained by the word formation (s.u.). The *waw* of the Karak inscription, however, has a 'u' type head on top of the downstroke.

Both instances of the *yod* show a remarkable peculiarity: they do not have at the foot of the downstroke the kicking upstroke to the right which is typical of the MI and the Karak fragment, as well as for other Palestinian inscriptions from the Iron Age. Instead the vertical downstroke runs out in a weak curve down to the right. The two *yod* have an inclined head and show both the typical parallel running crossbeams, which extend from the downstroke to the left.

The two *kaf* of the inscription have as a characteristic the downstroke swinging to the left. Herr (1978: figs. 50 and 70; 1980: 28) calls this characteristic of the lower part of the downstroke swinging to the left "conservative in both Hebrew and Moabite". Both types of *kaf* of in pestle inscription are also found in the MI. However, the three *kaf* of the Karak inscription have the center line as the main downstroke to which the other two lines are added at an angle. The *kaf* of the Dhībān fragment points to the same execution, although the downstroke is relatively vertical. The *kaf* of the Rim-inscription of al-Bālū' has an elegant swing of the downstroke, which is likewise the right head line to which the other small lines are attached (Zayadine 1986: 303).

The *lamed* is only represented once in our inscription. It bears the so-called "open" form opposite the otherwise more usual, almost closed form resembling a '6' (further differentiations are not relevant here, S. Timm 1989: 289f). The almost vertical downstroke with an angular rather than circular curve is remarkable. However, this "deformity" probably lies with the porous and somewhat rough surface of the basalt stone. The *lamed* of the Rim-inscription of al-Bālū' has the closed form (Zayadine 1986: 302-304).

The *nun* appears in the inscription four times. It resembles the *mem* without the central middle line. Remarkable is the relatively wide rectangular head of which the right downstroke branches off to the left directly at the head or runs out as a branching-off line to the left. The forms of the *nun* of the Moabite seals discussed by Timm also appear in our inscription. Therefore, the differentiations made by Timm between early and late forms of a "rounded" and "breaking off" *nun* must be taken with discretion (1989: cf. discussion of nos. 5, 7, 38 p. 294).

The two *'ayn* in our inscription are consistent with the MI and are also represented as a closed circle on the Karak fragment.

The letter *resh* is found in the inscription twice. Both times a slight left inclination is clearly recognizable. Owing to the porous and irregular surface of the basalt pestle, a pointed head of the letter could not be rendered.

The letter *shin/sin* has the typical form of the 'w' as demonstrated in many Canaanite inscriptions. It appears in our inscription only once. The higher right upstroke of the 'w' is typical and common in other inscriptions as well. Four *shin/sin* are also found in identical execution on the Karak fragment, and the lower part of a *shin/sin* is recognizable on the Dhībān fragment.

The *taw* consists of two crossing beams

which do not stand vertically atop each other, but rather have the form of an 'x'. The stroke leading down on the right is longer in our inscription than usual. Different executions of this letter are also known from the MI with the cross beams forming different angles. Clear 'x' form has the *taw* of the Dhībān fragment and the *taw* of the Rim-inscription of al-Bālū' (Zayadine 1986: 302).

The forms of the letters discussed here also vary within the inscription and the parallels cited do not allow for exact dating of the inscription. There are at present not enough Moabite inscriptions from the Central Moabite territory (Arḍ al-Karak) to derive a suitable chronological classification. However, the letters of the pestle inscription described here are close to the known Moabite inscriptions and are probably also within their chronological horizon. The inscription may date no later than the 8th/7th century BC. A cursory comparison, especially of the letters b, h, w, y and k with Hebrew inscriptions, permits a roughly similar date (cf. Renz and Röllig II/1995: 103-177 passim).

Text of the Pestle Inscription and Comments

The absence of word dividers complicates not only access to this text, but also the question of the function of the inscribed pestle in everyday use or ritual practice. The find context does not allow any conclusions about the use of the pestle. After careful inspection of the written lines, I suggest reading the inscription beginning after the widest gap between letters (18 mm) and the beginning of the possible subject: *'nw*. The sequence of the letters would hereby be as follows:

'nw'snwhbklrbbhbny'ynhbkrwbth

According to this arrangement of letters I suggest the following separation of words and reading:

'nw 'snw hbk lrbb
bny 'yn hbkr bbth

we made the pestle for the chief [of]
[the] sons of the spring, the firstborn with his house

[*'nw 'snw* – we made]

The verb 'sh with the prefixed personal pronoun is emphatic. The pronoun *'nw* was formed after the first person singular (otherwise it should be *'nhnw*, cf. Bauer, Leander 1965: 249). This form of *'nw* is found once in the MI where it is marked as Ketib (Jer. 42.6).

[*hbk*[*n*] – mortar club; pestle]

In Aramaic and late Hebrew it is known as *buk(ā)nā* mortar club, bobbin, handle or pestle, as well as in the Akkadian-Babylonian *bukannu*. The word appears here without *n* (writer error or abbreviation?). Our object and its inscription are reminiscent of the mortar clubs or cones made from clay which have been found in the area of the obelisk temple at Byblos, where neither the find context nor the writings on the cones indicate any function of these objects. A ritual use cannot be excluded there as well as here. For another possible parallel, although from faraway Persepolis, see also Bowman 1970: passim, where about 70 pestles or cones with inscriptions are published.

[*lrbb* — for (the) chiefs]

With preposition *l* and West Semitic *rbb*: "to be great/many/big". In Ugaritic, *rb* designates the "chiefs of the leaders" as in the Akkadian-Babylonian *ra-bu-ú-um*: "commander about areas, inspector (of craftsmen, priests, officials etc.)". The doubling of the *b* is probably meant as an intensive (cf. Bauer, Leander 1965: 481), which can be compared with the Arabic *rbb* as an epithet for Allah. A similar meaning is given by the Aramaic *rbb*, which designates the "chief, chairman, president" and the "teacher" (Jastrow 1967: 1439).

[*bny* – [the] sons of ...]

Common Semitic root of *bn* in the status constructus pluralis.

[*'yn* – spring or eye]

Common Semitic root whose meaning in this context may be "spring". Hence, the sons of the spring for whose leader/chief the pestle was made were probably responsible for the supervision of the springs, wells and cisterns which are so numerous at al-Bālū'. The expression "the sons of the spring" may even be the name of a responsible family or clan in al-Bālū'. Our archaeological work at al-Bālū' has uncovered

two large water basins in the town vicinty, as well as more than 20 cisterns and two upways from Wādī al-Bālū' into the town. It is therefore likely that the sons of the spring were designated as overseers of the water supply for al-Bālū'.

[*hbkr* – firstborn]
Common Semitic root of *bkr* with article.

[*bbth* – with his house]
Preposition *b* before *bt* with suffix third person masculinum, which corresponds to the use in the MI. The *h* as 3rd person masculinum shall be regarded as an early Canaanite suffix which was later replaced in Hebrew by *waw*. Indeed, there are also occasions of older forms of writing of this ending in the MI (Gen. 9, 21; 2Kgs. 19,23; cf. KAI II: 173; Dearman 1989: 107).

Type or Genre of the Pestle Inscription

Given the absence of comparative Moabite texts of this kind, not much can be said about the genre of this inscription. However, in the following discussion I suggest that this inscription is closely related to the genre of dedicatory inscriptions. The basic elements of this genre are: object — relative pronoun — verb — subject (manufacturer) — indirect object (owner). Although the pestle inscription contains all the elements except the relative pronoun, direct identification is not possible because complementary elements, such as family allocation, position and "house" are absent in our inscription. Nevertheless, the basic elements of dedicatory inscriptions are also often found on so-called labelling inscriptions which do not follow an obvious pattern, but have the following elements: object — owner and purpose — verb and manufacturer — purpose. For the pestle inscription a combination of the elements of dedicatory and labelling inscriptions can be assumed:

In affiliation or dedicatory formulae the title (*rbb*) of the relevant person can stand, instead of the name, for the person for whom the object was produced, but it can also be complemented with a patronymicon such as *bny 'yn*. It is also possible that our text is a simple dedication formula (Renz/Röllig call this form an affiliation formula) which dedicates the object to somebody. An example of this is found in Kuntillat 'Ajrūd (Renz/Röllig 1995 II/1: 26), but there is no blessing formula in the pestle inscription. However, this is not compelling. From the formula elements quoted here I would understand the pestle inscription as a combination of affiliation and dedication formulae. The absence of both the name of the god as well as the dedicatory and blessing formulae assigns this inscription to the profane realm.

Conclusion

The unexpected find of an unusual inscription from al-Bālū' leaves open the question of the use and meaning of this object. The particular feature of this find is the fact that it concerns a non-religious matter and therefore allows a brief insight into the social context of al-Bālū' of the 8th/7th century BC. It appears that organized supervision of important water resources existed at al-Bālū' in the Iron Age with responsibilities laid in the hands of the "sons of the spring". The "commander" or "chief" of this clan was probably, as the "firstborn", the receiver of the pestle whose meaning or use cannot be determined exactly. While the study of this object has not yet concluded at the time of this publication, the importance of this object compelled me to discuss and publish it quickly.

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Subject	Predicate	Object	Indirect Object	Complementary title/label
'nw	*'snw*	*hbk[n]*	*lrbb*	*bny 'yn* *hbkr* *bbth*

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THE AYL TO RĀS AN-NAQAB ARCHAEOLOGICAL SURVEY, SOUTHERN JORDAN – PHASE 2 (2006): PRELIMINARY REPORT

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Introduction

The first season of "The Ayl to Rās an-Naqab Archaeological Survey, Southern Jordan" (ARNAS) took place in 2005 (MacDonald *et al.* 2005) while the second infield season was held between May 10 and June 20, 2006. Team members for the second season were: B. MacDonald, director; L. G. Herr, ceramics; S. Quaintance, photography and GPS; M. Tremblay, GIS, GPS, and mapping; J. Corbett, GIS; and Ammer Bdour, representative of the Department of Antiquities. The team was housed in the town of aṭ-Ṭayyiba, located to the northwest of the survey territory and to the south of Wādī Mūsā.

The report on the first season of work sets forth the objectives, geographical, environmental and archaeological contexts, and methodology of the project (MacDonald *et al.* 2005). Thus, it is necessary only to summarize these matters here.

The main objective of the work is to discover, record, and interpret archaeological sites within the Ayl to Rās an-Naqab region, an area comprising approximately 860 square kilometres. Other objectives include a study of the settlement patterns of the area from the Lower Paleolithic (ca. 1.4mya) to the end of the Late Islamic period (1918 AD); to examine the Pleistocene lakes in the area; and to investigate further the *Khaṭṭ Shabīb* or "*Shabīb's* Wall" (MacDonald *et al.* 2005).

The territory of the survey is part of the southern segment of the Transjordanian Plateau. It is ca. 26 (N-S) x 39 (E-W) — at its widest — kilometres.[1] The western extremity of the territory is the 1100m elevation line while the eastern extremity extends to the 1200m elevation line towards the city of Ma'ān (**Fig. 1**).

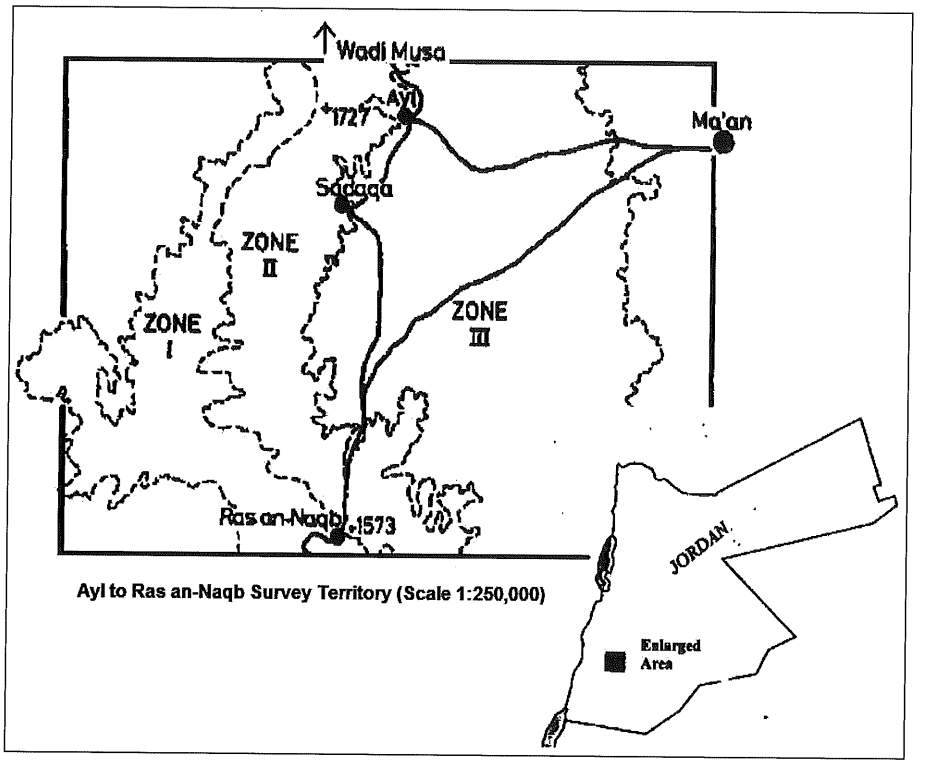
The ARNAS survey territory consists of three topographical zones (**Fig. 1**). These zones are of particular importance for the 2006 infield work:

Zone I is the western segment of the territory. It lies in an area where elevations range from 1100m on the west to 1500m on the east. It is the western extremity of the Highlands east of the Rift Valley, i.e., the Wādī 'Araba-Dead Sea-Jordan Depression (Bender 1974, 1975). West and southwesterly flowing wadis cut deeply into the terrain. The vegetation in this zone is Mediterranean and the present-day climate is arid, with annual precipitation as low as 50 millimetres.

Zone II is the central segment of the territory, i.e., the mountainous region where elevations range from just over 1700m in the north to 1500m in the south around Rās an-Naqab. This geographical zone is frequently referred to as the Mountain Ridge and Northern Highlands east of the Rift Valley (Bender 1975). Both its western and eastern boundaries are defined by the 1500m line. The main N-S highway and the watershed are located in this zone. Wadis flow from it to both the west and southwest on the one hand and to the east and southeast on the other, i.e., into Zone I and III respectively. Here, a Mediterranean climate dominates and annual precipitation is around 300 millimetres.

Zone III is the area from the 1500m line on the west to the 1200m line, i.e., towards the city of Ma'ān, on the east. It is the area between the "sown" and the "desert" ('Amr and al-Moumani

1. The survey territory, as a glance at Figures 1 and 2 indicates, is not rectilinear. Rather, it follows the 1100 and 1200m contour lines on the west and east respectively. The east-west dimension given here is a correction of what appears in MacDonald *et al.* 2005: 277.



1. Ayl to Rās an-Naqab Survey Territory (Scale 1:250,000).

2001: 275) and is at the western extremity of the Central Jordan Pediplain or Central Desert Area of Jordan (Bender 1974). The climate in this zone, as in Zone I, is arid and the vegetation is Irano-Turanian (MacDonald 2000: 36-38, esp. fig. 6).

As set forth in MacDonald *et al.* (2005: 278-279) previous surveys have been carried out in the Ayl to Rās an-Naqab area. None of them, however, has been both comprehensive and systematic. In addition, Hart excavated one site, namely, Ghurayra (1988, 1989), and carried out five soundings at other sites in the survey territory (1987a-b). Moreover, the Department of Antiquities has excavated four sites within the area (Waheeb 1996; see also Bisheh *et al.* 1993).

Phase 1

During the 2005 season of the project, ARNAS team members carried out a comprehensive and systematic examination of the greater part of Zone II, the area in which the majority of present-day villages and farms are located. In addition, team members examined in Zone III Pleistocene lakes noted, for the most part, on the "Geological Map of Ma'an (3150-III)" (Tarawneh 2004) and the "Geological Map of Jabal a-Batra (Jibal Thlaja) (3149-IV)" (Moumani 2002). As a result of the 2005-season's work, team members surveyed 209 sites, including eight Pleistocene lakes (MacDonald *et al.* 2005: 280-283, Table 1). Cultural-temporal units represented at these sites span the Lower Paleolithic to the Late Islamic period (MacDonald *et al.* 2005: 288, fig. 7). However, some cultural-temporal units are poorly represented or not represented at all among the collected lithics and sherds. Finally, the sites surveyed served a wide range of different functions (MacDonald *et al.* 2005: 284, Table 2).

Phase 2

During Phase 2 of the ARNAS project, ARNAS team members concentrated their efforts on transecting and recording the archaeological remains found in the randomly-chosen squares (see below) of the three topographical zones of the survey territory. As well, we surveyed the sites encountered within, adjacent to, or on our way to them.

The investigation of these random squares (500 x 500m), which cover about 5 percent of each of the three topographical zones, has a threefold purpose.

First, the units "provide a baseline against

which pottery collected from archaeological sites in the region can be compared".

Second, these units "force the researcher into all areas of the project region".

Third, "recording random squares has proven to be an effective means of discovering new sites, both within and adjacent to the squares.... In essence, the recording of random squares provides access to a statistically valid sample of archaeological sites and ceramics" (Herr and Christopherson 1998: 52).

The stratified random sample units for the ARNAS project are based on the Map Series K737, Sheets 3049 I (El Quweira), 3050 II (Ras en Naqb), 3149 IV (Jibal el Batra), and 3150 III (Ma'an) (Scale 1:50,000); created in Arc/INFO GIS software; projection and coordinate system UTM Zone 36N; European Datum 1950; database development by G. L. Christopherson and P. O. Leckman; and cartographic development also by Christopherson (**Fig. 2**).[2]

The 2006 season's work resulted in the transecting and recording of the archaeological remains in 82 of the random sample units: 27 in Zone I; 25 in Zone II, and 30 in Zone III (**Table 1** — List of Random Squares). While carrying out this work we also recorded an additional 115 sites (210-324) (**Table 2** — List of Sites). For each of the random squares transected and the archaeological sites "discovered", we filled out a sheet in the field that provides its initial description. All collected materials, either from the squares or the sites, were labeled as to their provenance before they were put into the vehicle. Moreover, photographs were taken of what team members considered to be the square's and/or the site's most important features. At base camp, square and site sheets were updated on a daily basis, entries were made to the project's database, the location of each square and site were plotted with the aid of co-ordinates obtained in the field with the aid of a Global Positioning System (GPS), on maps using an ArcGIS database, and preliminary cultural-temporal units were assigned to the materials collected. Following the infield season, further research is being done on the cultural remains of the survey territory; selected sherds and lithics, with the permission of the Department of Antiquities, were shipped to Canada for further analyses, e.g., sawing, drawing, colour coding, and the preparation of plates for publication purposes; and work on preliminary reports and a final report are underway. Again, this season, we are providing a list of the archaeological sites that we consider to be the best candidates for excavation (**Table 3** — List of Candidates for Excavation).

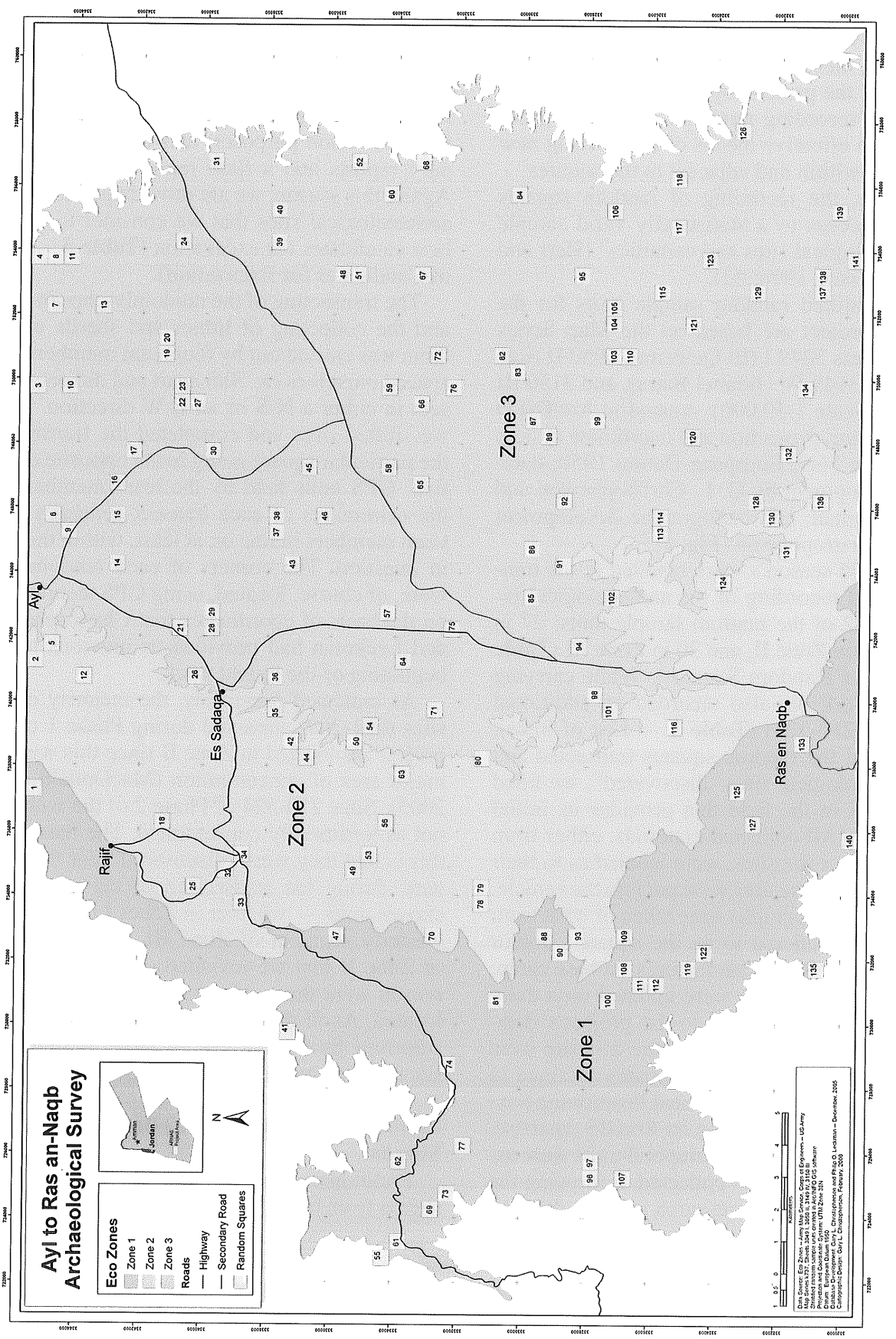
The transecting of the randomly-chosen units and the collecting of lithics and sherds within them was carried out by four team members. We spaced ourselves ca. 70m apart and did one transect in either a N-S or an E-W direction. Then we shifted over and completed the transect of the particular square going in the opposite direction. GPS units held by the team members on the extremities of each transect generally kept team members in line or, at least, within the unit in question. The corners of each random unit were, of course, located, using GPS technology, on the basis of coordinates that Christopherson and Leckman had provided us previous to the beginning of the infield work.

As indicated previously, the majority of the sites (001-209) surveyed during Phase 1 of the project are located in Zone II since this was our major area of concentration (MacDonald *et al.* 2005). Sites 210-324 of Phase 2 of the work are not as territorially concentrated. The reason for this is that they were "discovered", for the most part, during the transecting of the randomly-chosen units — whether in Zones I and II or the westerly segment of Zone III. The only areas of Zone II that we revisited during the second season were those where random squares were located. As in the 2005 season, we were again surprised by the number of large architectural sites that we encountered and documented.

Preliminary Analyses of Collected Lithic and Sherds

Preliminary analyses of collected lithics and sherds from both the stratified units and the sites

2. The most westerly-indicated road alignment, i.e., the one that cuts through the western segment of topographical Zone I, in Figure 2, follows the Old Turkish Road (*Darb* ar-Raṣīf), especially from Kh. Dulāgha (Site 208) southward. From Kh. Bīr Ḥamad (Site 248), at the modern, water- pumping station, it goes in a more westerly direction, than the modern asphalt road, to Wādī 'Araba.



2. Topographical Zones and Random Squares of the ARNAS project (Scale 1:250,000).

Table 1: List of Random Squares Transected during Phase 2 (2006) of the Project.

Zone I: 1; 41*; 47; 55*; 61*; 62; 69; 74; 77; 81; 88; 90; 96; 97; 100; 107*; 108*; 109; 111; 112; 119; 122; 125; 127; 133; 135; and 140 (n=27).
Zone II: 2; 5; 12; 18; 25; 32; 33; 34; 35; 42; 44; 49; 53; 56; 63; 70; 78; 79; 80; 93; 116; 124; 130; 131; and 136 (n=25).
Zone III: 9; 14; 15; 16; 21; 26; 28; 29; 36; 37; 38; 43; 46; 50; 54; 57; 64; 71; 75; 85; 86; 91; 92; 94; 98; 101; 102; 113; 114; and 128 (n=30).
* Because of the ruggedness of the terrain, ARNAS team members were unable to transect completely five squares in topographical Zone I. This is due to the fact that the transecting of a segment of these units, because of deeply-cut wadis within them, was considered too dangerous. In addition, we were unable to transect any of Random Square 73, also in Zone I, for the same reason.

Table 2: List of ARNAS Phase 2 (2006) Sites.

Site #	UTM Coordinates*	Site Name	Function**	
210	741128/3345258	-		Seasonal farmstead (?)
211	741007/3344928	-		Road
212	732568/3332480	-		Knapping site
213	736482/3341240	-		Farmstead – seasonal (?)
214	736405/3341630	-		Agricultural village
215	734911/3338678	-		Farmstead
216	734040/3339014	-		Agricultural station – seasonal; quarry (?)
217	733507/3338867	-		Farmstead – seasonal
218	732677/3332761	-		Agricultural installation
219	732872/3335863	-		Farmstead (?)
220	733056/3335825	-		Defensive installation (?)
221	733837/3331519	-		Farmstead
222	730789/3330418	Kh. Quray'a	Agricultural village	
223	730427/3331119	Kh. al-Juhayr	Agricultural village	
224	731416/3332107	-		Agricultural administrative centre (?)
225	732201/3331621	-		Agricultural village
226	732234/3330965	-		Monitoring/defensive (?)
227	733045/3330986	-		Agricultural village or hamlet
228	733163/3330720	-		Agricultural village or hamlet
229	732889/3328483	-		Agricultural village or hamlet (**Fig. 3**)

230	732225/3328761	-		Watchtower or small fort (?)
231	732694/3328692	-		Seasonal camping (?)
232	733179/3328132	-		Lithic scatter
233	733643/3328937	Kh. Khalīl	Administrative centre (?)	
234	733319/3328769	Rujum Khalīl	Agricultural village or hamlet	
235	733823/3335948	Rujum Abū Rumān Watchtower (?)		
236	726967/3332621	-		Agricultural hamlet or farmstead
237	726385/3333315	-		Farmstead (?)
238	726897/3333676	Kh. ash-Shallāl	Agricultural hamlet or farmstead	
239	727410/334819	Umm Ḥaṣā		Fort
240	727819/3331113	-		Cemetery
241	727931/3331184	Bīr Ḥamad Village	Agricultural village	
242	733502/3336455	Qaṣr al-Kufūr	Villa (?)	
243	723107/3333302	-		Lithic scatter
244	724676/3334037	-		Circular structure; seasonal campsite
245	725433/3333248	Turkish Road	Curb stones along roadway	
246	725230/3333143	-		Farmstead (?)
247	726161/3333420	-		Seasonal campsite (?)
248	727876/3332081	Kh. Bīr Ḥamad	Agricultural village and/or	
249	727651/3330906	-		Winnowing area
250	727600/3331078	-		Agricultural, seasonal (?)
251	727308/3330494	-		Agricultural village and watchtower
252	727796/3331016	-		Seasonal campsite (?)
253	728985/3331155	Kh. Abū Rā'id Agricultural village		
254	728400/3330824	-		Agricultural village
255	727770/3328769	-		Waystation along Wādī Bīr Ḥamad
256	732921/3329915	-		Farmstead – seasonal

257	731237/3328487	-		Agricultural village
258	730651/3328356	Kh. Umm Naṣra	Agricultural village	
259	734411/3327349	-		Watchtower (?) and tomb (?)
260	734831/3327157	-		Fort (?)
261	735065/3327944	-		Farmstead
262	731639/3327443	-		Seasonal campsite
263	730669/3327089	-		Seasonal campsite
264	725525/3326925	-		Seasonal campsite
265	727550/3329840	-		Farmstead
266	728034/3325768	Rujum ath-Thughra	Agricultural village	
267	728326/3326840	Kh. ath-Thughra	Agricultural village	
268	731462/3324913	-		Seasonal campsite
269	731722/3321012	-		Aqueduct
270	736729/3322305	-		Seasonal campsite
271	736398/3322519	-		Seasonal campsite
272	736015/3322845	-		Seasonal campsite
273	736652/3322814	-		Function unknown
274	735379/3327217	-		Farm or waystation on road (?)
275	735246/3325894	-		Watchtower
276	735056/3326472	-		Farmstead
277	735273/3325669	Kh. ʻAṭiyya	Farmstead (**Fig. 4**)	
278	735622/3325428	Kh. ʻAyn al-Qanā	Farmstead	
279	738774/3321524	-		Seasonal campsite
280	746694/3320580	-		Farmstead
281	745222/3321745	-		Water catchment facility
282	745304/3322014	-		Water catchment facility
283	745664/3322278	-		Seasonal campsites
284	743978/3320620	-		Watchtower (?)
285	743452/3321290	-		Agricultural village
286	744574/3322238	-		Water catchment facilities
287	744614/3321563	-		Water catchment facility
288	744193/3323590	-		Water catchment and winnowing area
289	744222/3323908	-		Seasonal campsite
290	738714/3325242	Kh. al-Ḥayyāḍ	Agricultural village	
291	739404/3324564	-		Farmstead
292	739615/3324424	-		Seasonal campsite

293	740838/3321313	-		Watchtower
294	736962/3325715	Dār ar-Rāṭūzī	Farmstead (?)	
295	737542/3326191	Kh. ar-Raṣīf	Fort and watchtower	
296	737303/3326566	-		Major roadway
297	734490/3328004	Kh. ʻAlāwa	Agricultural village	
298	734291/3327766	-		Farmstead
299	734833/3329232	Kh. Umm Zaʻrūra	Farmstead	
300	737050/3325352	-		Seasonal campsite
301	736387/3324897	-		Winnowing/water catchment facility
302	736232/3326786	-		Agricultural village
303	734482/3328688	Abu ʻAli Inscription		
304	734920/3330282	-		Watchtower/way station on roadway
305	733293/3330927	-		Agricultural village (**Fig. 5**)
306	734118/3338410	-		Wathctower (?)
307	733784/3338268	Ghurayra	Agricultural village	
308	741050/3340272	-		Rectilinear structure; unknown function
309	742525/3333504	-		Farmstead (?)
310	740827/3333103	-		Farmstead
311	744682/3331052	Kh. Umm Qaṣīr Waystation along *Khaṭṭ Shabīb* (**Fig. 6**)		
312	743964/3329134	-		Waystation along *Khaṭṭ Shabīb*
313	741713/3328343	-		Agricultural village
314	742988/3327163	-		Circular enclosure – seasonal
315	742580/3327189	-		Farmstead
316	742009/3326854	Kh. al-Ghuzlān	Agricultural village	
317	744100/3326247	Kh. al-Daʻūq	Agricultural town	
318	740250/3327785	-		Fort (?)
319	741015/3328127	-		Seasonal agricultural farm (?)
320	733471/3337520	-		Watchtower
321	733789/3337223	-		Farmstead
322	733775/3337450	-		Farmstead (**Fig. 7**)
323	745380/3335808	-		Robbed tombs (?) and lithic scatter

324	745114/3338554	-	Watchtower (?) adjacent to *Khaṭṭ Shabīb*

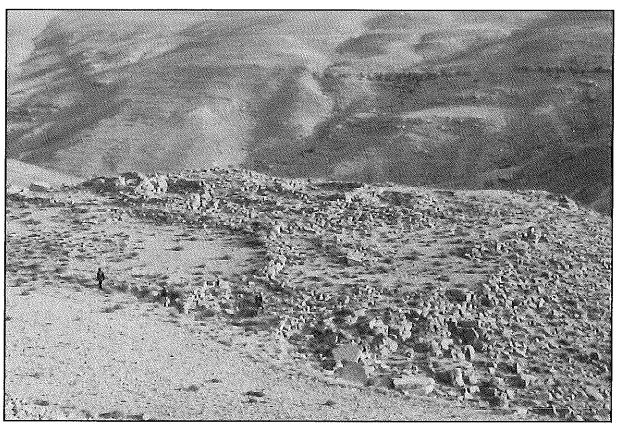
* UTM Coordinates are European Datum 1950. It ought to be noted that the coordinates given in MacDonald *et al.* (2005: 280-283) for Sites 001-209 of Phase 1 (2005) of the project are World Geodetic System 1984 (WGS 84). The change from WGS 84 to European Datum 1950 was made because the coordinates that G. L. Christopherson provided for the stratified random sample units are European Datum 1950 (see Fig. 2). They are the coordinates used on Map Series K737, Sheets 3049 I (El Quweira), 3050 II (Ras en Naqb), 3149 IV (Jebal el Batra), and 3150 III (Ma'an) (Scale 1:50,000).

** Of course, the determination of "function" on the part of ARNAS 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).

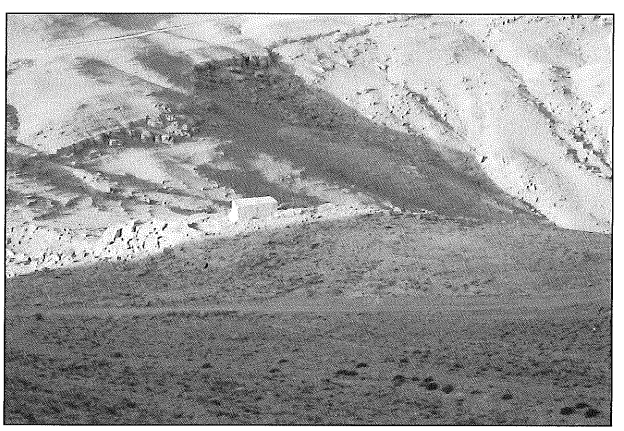
Table 3: ARNAS Phase 2 (2005) Sites that are good Candidates for Excavation.

Site #	Name (if known); Reason(s) for Excavation
222	agricultural village spread over a large area; excavations could reveal its plan;
225	large agricultural village with a great deal of potential for excavation;
238	Kh. ash-Shallāl; a "modern" agricultural village that has ancient remains and is lived in during the winter months;
239	Umm Ḥaṣā; probably a fort in a very isolated setting; could have intact architecture under the rubble;
240	cemetery that could have some intact ancient remains;
241	Bīr Ḥamad; an agricultural village with a great deal of potential for excavation since parts of it are still lived in during the winter months but it has a past that could go back centuries;
242	Qaṣr al-Kufūr; probably a villa that could reveal a great deal about such structures and their date;
251	an extremely impressive site because of the monumental character of its remaining walls, its caves, and its winnowing areas - with flagstones *in situ*;
254	due to the danger of further damage from wadi flooding this site ought to be excavated as soon as possible; however, there would be the necessity to remove a great deal of rubble before getting down to *in situ* material;
257	a good deal of silting that probably preserved ancient remains; could tell a great deal about life in an agricultural village at a particular period or periods;
258	Kh. Umm Naṣra; remnants of remains of buildings from at least two archaeological periods; could provide information on an agricultural village's development/evolution;
267	Kh. ath-Thughra; remnants of an agricultural village that shows a great deal of deposition;
275	this is a watchtower that has been illicitly excavated; nevertheless, it still warrants further investigation;
276	a farmstead that could reveal, on the basis of the foundation walls, a great deal about habitation in an isolated area;
285	good deposition at this agricultural village or hamlet site; moreover, there appears to be two modes of construction and excavation would hopefully reveal the reason(s)/periods;
290	Kh. al-Ḥayyāḍ; a major agricultural village with different periods represented; appears to be a good deal of deposition;
295	Kh. ar-Raṣīf; a small fort and associated watchtower near a major roadway; one may be able to get a great deal of information because of what appears to be the remnants of most of the main structure;
297	Kh. 'Alāwa; a large and impressive agricultural village that appears to have a lot of *in situ*

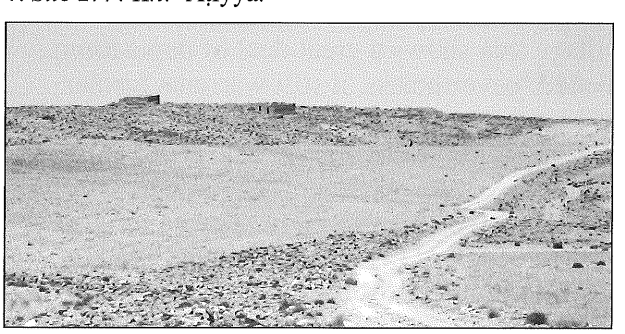
material; could reveal a great deal about village life during the period(s) during which it was occupied;
304 the main outline of this structure appears clear and excavation could determine its purpose;
317 Kh. al-Da'ūq; an extremely impressive and large site that could reveal a great deal about
agri cultural town/village life on the southern Transjordanian Plateau;
318 there is some good wall preservation at what may be an Iron Age II fort (?) and there may
be good deposition in the interior; this area is relatively clear of rubble.
324 this is what appears to be a watchtower, and possibly much more, immediately west of the *Khaṭṭ Shabīb*, Site 050; there is a great deal of well-preserved architecture at it.



3. Site 229: Farming village.



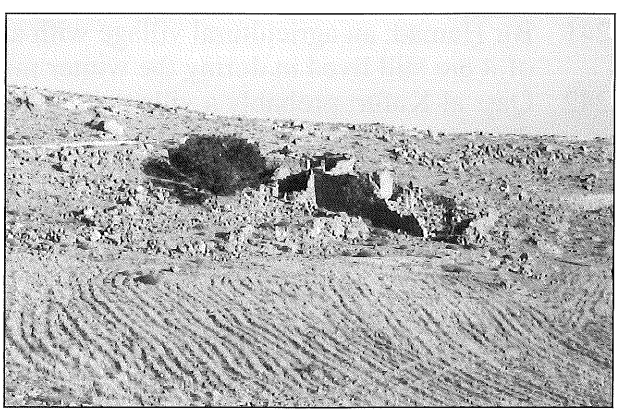
4. Site 277: Kh. 'Aṭiyya.



5. Site 305: Agricultural village.



6. Site 311: Kh. Umm Qaṣīr, Waystation; with Khaṭṭ Shabīb.

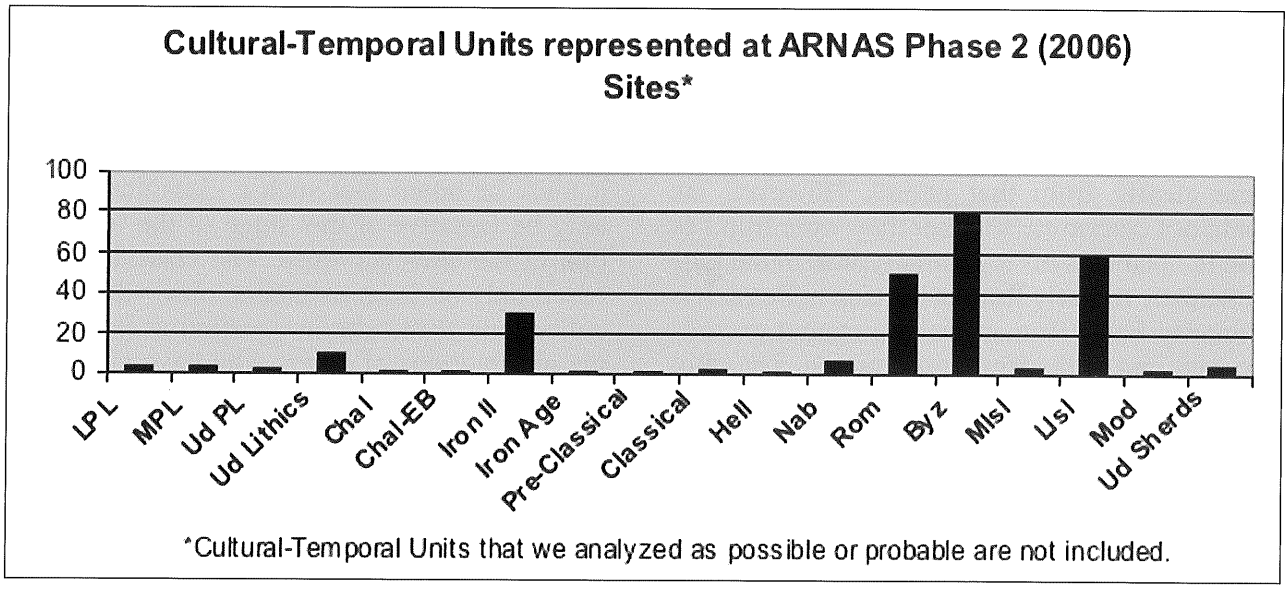


7. Site 322: Farm.

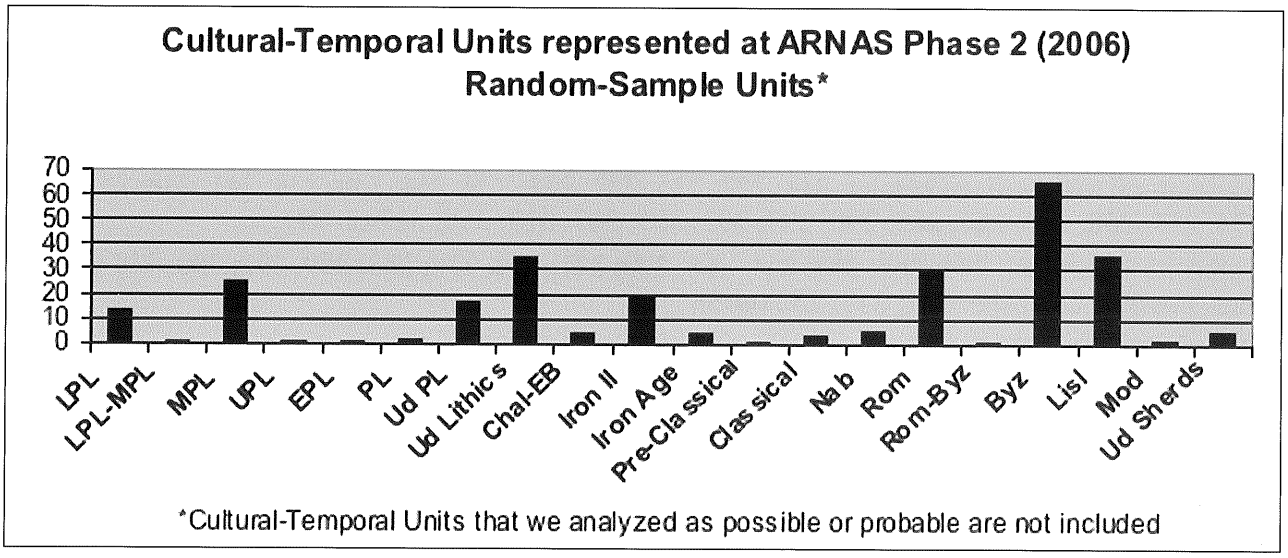
indicate the cultural units present in each (**Fig. 8 and Fig. 9** respectively).[3]

Relative to Figure 8, cultural-temporal units at the randomly-sampled squares, the Lower and the Middle Paleolithic are the best represented from the pre-ceramic periods. The Upper and Epipaleolithic are poorly represented while the Neolithic is not represented at all among the collected materials. As far as the ceramic periods are concerned, the Iron II, Roman, Byzantine,

3. Since G. A. Clark could not join us in the field this season, M. P. Neeley, Montana State University, Bozeman, did the preliminary analysis of the lithics on June, 13. Lithic materials collected after that date are not included in Figures 8 and 9.



8. Cultural-Temporal Units represented at ARNAS Phase 2 (2006) Stratified, Random-Sample Units.



9. Cultural-Temporal Units represented at ARNAS Phase 2 (2006) Sites.

and Late Islamic periods are best represented. However, the Bronze periods are either poorly represented or not represented at all. This is also the case for the Persian, Hellenistic, and Early and Late Islamic periods.

Relative to Figure 9, cultural-temporal units at Phase 2 sites, here again both the Lower and Middle Paleolithic are best represented. There is no identified material from the Upper Paleolithic, Epipaleolithic, and Neolithic periods. As for the ceramic periods, no sherds from the Middle Bronze, Late Bronze, Persian (however, see below), or Early Islamic time-frames were identified in the preliminary analyses. However, the Iron II, Roman, Byzantine, and Late Islamic periods are well represented, while the Hellenistic and Middle Islamic periods are poorly represented.

What Figures 8 and 9 clearly point out is the close correspondence between the cultural-temporal units represented among the collected lithics and sherds from both the random squares and the sites. It must be kept in mind that where a site is within or adjacent to a particular random square it would be normal to have many of the same cultural-temporal units represented in the collections from both.

The high density of lithics collected in RSs 61 and 69 in Zone I and in RSs 64 and 71 in Zone III is noteworthy. Although the areas where

these squares are located are mostly barren presently, such would not have been the case in all of the Paleolithic periods.

Some of the pottery readings need to be explained. "Iron Age" readings were sherds that were clearly from that period. However, we could not determine whether they were Iron I or Iron II. "Nabataean" is pottery typical of the Late Hellenistic to Early Roman horizon at Petra. It is primarily Early Roman, but we cannot exclude the very end of the Hellenistic period. The "Roman" readings were probably Late Roman, but may include some Early Roman sherds as well. They could also include sherds that span most of the Roman period (MacDonald *et al.* 2005: 288). Finally, it must be noted that sherds that we are calling Iron II could very well continue into the Persian period.

Site Types of Phase 2 (2006) Season

ARNAS team members assigned functions to most of the sites surveyed during the second season of infield work (**Table 4** — Types of Sites). Here, again, as for the list of sites in **Table 1**, it must be noted that such a classification can only be tentative at this stage of the investigation of the sites surveyed. The classification is based only on team members' observations and collections at the site in question as well as on the observations of others who have visited the site. A more definite determination of a particular site's function(s) can usually be determined by excavation. And, of course, a site may have served a particular function or functions in one archaeological period and a different one or ones in others.

What **Table 4** clearly points out is the number

Table 4: Site Types of ARNAS Phase 2 (2006) Season.

Aqueduct: 269.
Agricultural administrative centre (?): 224; 233.
Agricultural town/village/hamlet: 214; 222; 225; 227; 228; 229; 234; 236; 238; 241; 248; 251; 253; 254; 257; 258; 266; 267; 285; 290; 297; 302; 305; 307; 313; 316; 317 (n=27).
Campsite – seasonal: 244; 262; 263; 264; 268; 270; 271; 272; 279; 283; 289; 292; 300; 314 (n=14); plus, possible campsite: 231; 247; 252 (n=3).
Cemetery: 240; 323 (?).
Defensive installation, e.g., fort, watchtower: 239; 293; 295; 320; (n=4); plus possible defensive installation: 220; 226; 230; 235; 259; 260; 275; 284; 306; 318; 324 (n=11).
Farm: 215; 217; 218; 221; 223; 256; 261; 265; 276; 277; 278; 280; 291; 298; 299; 310; 315; 321; 322 (n=19); plus, possible farm: 210; 213; 216; 219; 237; 246; 250; 274; 294; 309; 319 (n=11).
Inscription: 303.
Lithic scatter: 212; 232; 243 (n=3).
Road: 211; 245; 296 (n=3).
Villa (?): 242.
Water catchment facility: 281; 282; 286; 287; 288; 301 (n=6).*
Waystation: 255; 304; 311; 312 (n=4).
Winnowing area: 249; 301.**
* Not all the water catchment facilities that survey team members noted are labeled sites. Some of them are noted as features within or in association with random squares, e.g., the descriptions of RS 77, RS 91, and RS 131 in Zones I, II, and III respectively note their presence.
** Of course, ARNAS team members noted many more winnowing areas in the survey territory. However, their presence is generally noted in both the random square and site descriptions rather than assigning separate site numbers to each one of them. Moreover, water catchment facilities could have been used seasonally for winnowing purposes.

of agricultural towns/villages/hamlets among the 115 sites surveyed during Phase 2. Some of these sites are large and impressive, e.g., Site 317 (Khirbat al-Da'ūq). In many cases, the architectural preservation is good. And the majority of them have not been reported in the scholarly literature.

Besides the above-described type of site, there are a large number of farms. These farms consist of the remnants of one-three structures. Many of them are still in use, especially as places to store farm equipment and/or to pen sheep and goats. Moreover, some of the inhabitants of the area told us that some of these farm buildings are used during the winter months while they are abandoned for tent-dwelling during the period from May to November.

The impression is that many of the areas in both Zones I and II surveyed during the 2006 season were once important as sources of agricultural products. This is in keeping with the findings during Phase 1 of the project.

Khaṭṭ Shabīb

As noted previously, an investigation of the *Khaṭṭ Shabīb* (ARNAS Site 050) (Kirkbride 1948; Kennedy 1982: 163-66; Abujaber 1995; Kennedy and Bewley 2004: 138-39), a north-south "running" stone wall, is one of the objectives of the project (MacDonald *et al.* 2005: 277). ARNAS team members first encountered it during the 2005 infield season in the area to the east of Kh. Ayl (Site 001) in the northern segment of topographical Zone III. During Phase 2 of the project, it was encountered throughout this zone. In places, e.g., in association with RSs 37, 43, 91 and 102, and Sites 311 (Kh. Umm Qaṣīr), 312, 317 (Kh. al-Da'ūq), and 324, it can be followed in clear and unbroken lines as it "snakes" over the undulating terrain. In fact, it can be followed throughout Zone III from northeast of RS 16 in the north to RS 102 in the south (**Fig. 2**). Parts of it have been removed, possibly for its available stone or because it impeded field clearance. In some places it is cut by modern farming roads and in many places a dirt road runs parallel to it. In no place did we see it more than ca. 0.50m in height and in these places its height is due to the fact that some of the stones that constitute it are standing on their ends. However, in some places, its rubble covers an area of ca. 2m in width. In any case, it could hardly have served, at any time, as a defensive wall. It was most probably erected as a boundary line between the "desert" to the east and the "sown" to the west, i.e., between the nomadic and semi-nomadic people, on the one hand, and farmers and settlers, on the other. The latter would have erected it!

The *Khaṭṭ Shabīb* is noted on the Series K737 Map, Sheet 3150 III (Ma'an) (Scale 1:50,000), as a "wall". In fact, there may be more than one such north-south "wall" line or, at least, branches of it.

Conclusions

Phase 2 of the project proved to be one in which ARNAS team members were continually surprised and delighted by the archaeological richness of the materials collected and recorded in both the 82 random squares transected and the 115 sites discovered. It is the hope of team members that the publication of these discoveries will open up for future researchers an area of Jordan that is barely taped as far as its archaeological remains are concerned.

Acknowledgements

ARNAS team members wish to thank Dr. Fawwaz al-Khraysheh, Director General of the Department of Antiquities, and his staff for permission to carry out the infield work and for their support of the project. Among the department's staff members, a special thanks is owed to Ammer Bdour, the project's representative. Barbara Porter, Director of ACOR, and her staff helped in all requested ways, in getting the team in the field and supplying us with what was needed to carry out a successful season. Pierre Bikai, former ACOR director, was instrumental in getting the team into the field again this year. ACOR was, once again, a home-away-from-home for team members. Finally, M. P. Neeley graciously conducted a preliminary analysis of the lithic materials.

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WEST IRBID SURVEY (WIS) 2005, PRELIMINARY REPORT

Lamia El-Khouri ,Wael Abu-Azizeh, Tara Steimer-Herbet
With Contribution by Maher Tarboush

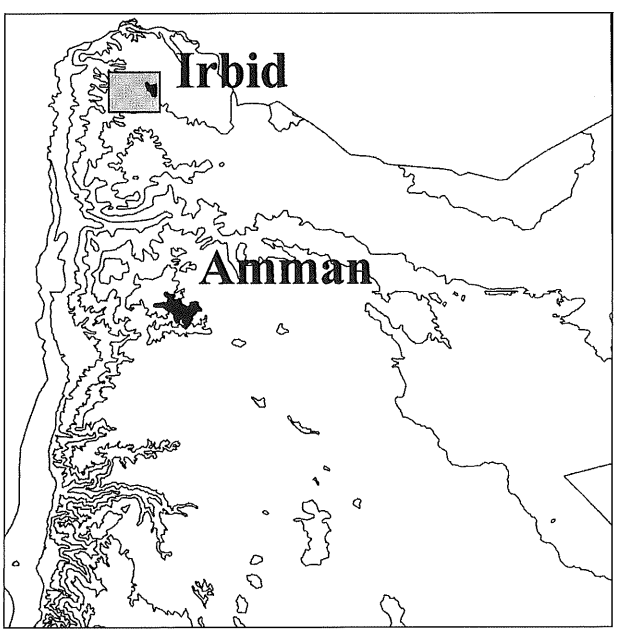
Introduction

The survey was carried out between September 4 and 29, 2005 in an area located west of Irbid in north-western Jordan. It was commissioned by Yarmouk University, the French Institute of Oriental Research (IFPO) and the Department of Antiquities of Jordan. The surveyed area consists of numerous villages that belong to the municipality of West Irbid (Dawqara, Jijjīn, Sūm, Kufr Raḥtā, Zaḥar, Jamḥa, Kufr Yūbā, Bayt Yāfā, Hām and Nāṭfa), and two villages belonging to the municipality of al-Wusṭiyya (Kufr ʻĀn and Dayr as-Siʻna). This area extends between Wādī al-ʻArab in the north and the old pipeline in the south, Wādī al-Ghafar in the east and the villages of Kufr ʻĀn and Dayr as-Siʻna in the west. In total the area is 71 sq km (**Fig. 1**).

The team members were Dr. Lamia El-Khouri, Dr. Tara Steimer-Herbet, Mr. Maher Tarboush (archaeologist), Mr. Wael Abu ʻAzizeh (archaeologist), Mr. Ali Omari (draftsperson), and Mrs Alia Khasawneh representing the Department of Antiquities of Jordan[1].

The survey had three main objectives. The first was to register the main and secondary archaeological sites, among them the "Dolmen" monuments, and to understand the relation between them and the nearby Chalcolithic and Bronze Age settlements. The second was to gain some insight into the rural nature of the Classical period settlements and on their social and economic context; as well as their relation to the nearby Decapolis. The third was to describe, photograph and collect artifacts, and prepare an accurate geographical map using GIS (Geographical Information System), to show the distribution of archaeological sites during each period of occupation.

Parts of this area have been surveyed previously by scholars. Important surveys were made by N. Glueck in 1942 (1951) and S. Mittmann, in the years between 1963-1966 (1970). They did not extend to anything more than an examination of the major sites and some areas were excluded. The surroundings of the village of Sūm were surveyed more recently in 1983 (Hanbury-Tenison 1984) during the archaeological survey of the Wādī al-ʻArab. Some parts of the region have been visited by J. Burckhardt



1. A general map of the region of survey, located west of Irbid.

1. We would like to thank Dr. Nizar al-Turshan and Mr. Nabil al-Qadi (Department of Archaeology, Yarmouk University) for their kind efforts in reading and dating the pottery. Many thanks to Mr. Wajih Karasneh, head of the office of Antiquities of Irbid, for his valuable comments and support, and providing for data about previous unpublished archaeological work in the region of the survey.

and G. Schumacher at the end of the 19th century (Burckhardt 1822; Schumacher 1890). A few sites were also examined by C. Lenzen and A. McQuitty during a survey made in 1984 to the region of Irbid and Bayt Rās (Lenzen and McQuitty 1988).

Geographical Context of the Region

The surveyed region is located on the north-western part of the highlands of the Trans-Jordan plateau. It ranges from a 300m elevation in the east to 700m in the most western part of the surveyed region, 5km south of Irbid. The plateau is very heavily dissected by the succession of wadis which drain steeply down to the Jordan Valley. These valleys, deeply incised, have cut across the geological soil of the limestone plateau. They are all oriented following the slope with a south-east/north-west direction and have been used in this work to define the general presentation of the sites as these valleys constitute the major characteristic of the local topography.

Being part of the Mediterranean climatic eco-zone, this region lies within the xeric moisture regime and receives about 480mm of annual rainfall, so that it constitutes one of the most fertile soils of Jordan. Apart from cereal production, tree crops such as olives and also irrigated agriculture for vegetables and fruits is important in most of the valleys, where springs assure a secure water supply (Ministry of Agriculture 1993, National Soil Map and Land Use Project: The Soils of Jordan).

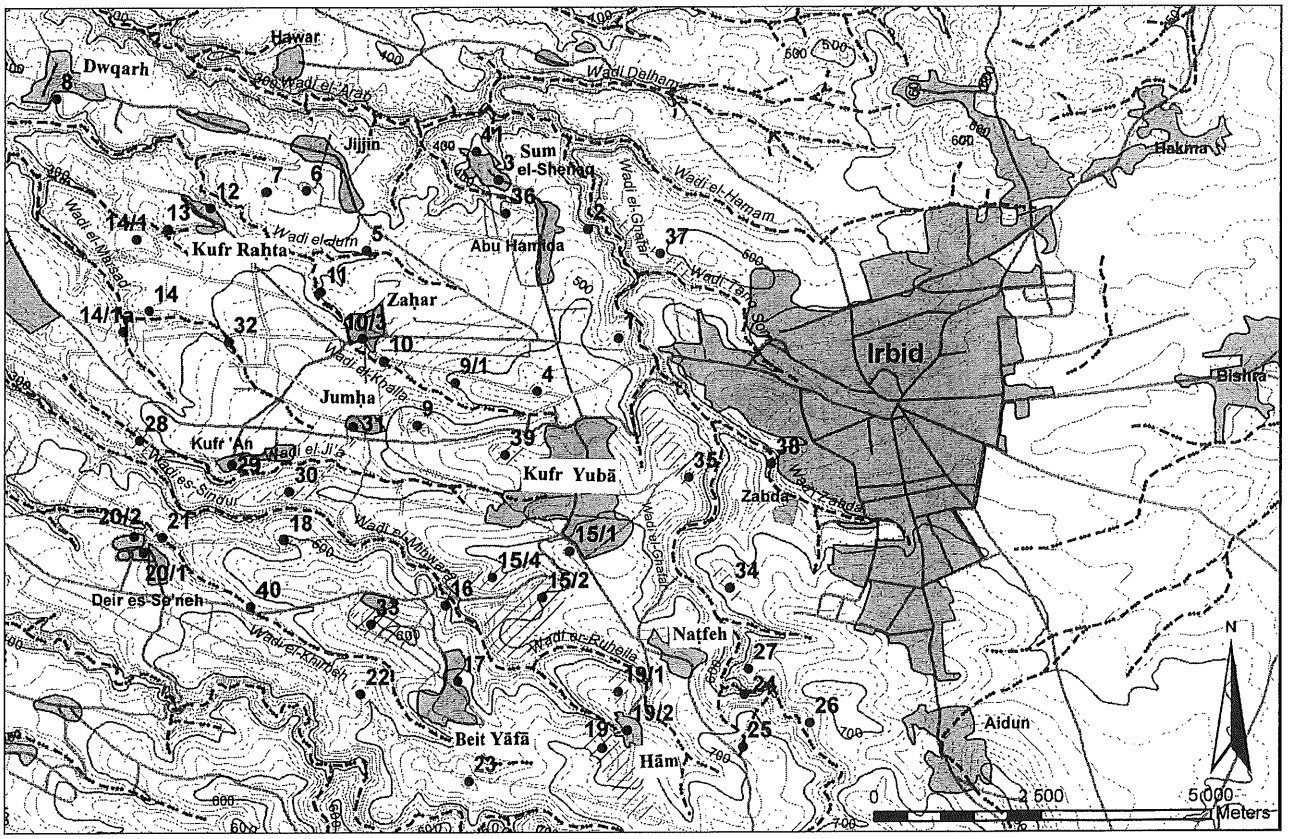
Description of Sites (Fig. 2)

1- Wādī al-Ghafar including Wādī Nāṭfa and Wādī Tariq Sūm Settlements

Site 1 (Bīr Ṣādiq / *al-Waqf):* Located on the western slope of the Wādī al-Ghafar. This site was mentioned by Schumacher (1890:136). The area with its flat agricultural fields has been settled during many periods. Collected pottery sherds date to the Chalcolithic, Middle Bronze, Late Bronze, Late Roman, Byzantine, and Ayyubid/ Mamluk periods. The majority of pottery sherds derive from the Byzantine periods. A few structures built with small and medium sized stones and reused in modern times, were recorded. Two shelters for shepherds, a cave, an ancient wine or olive press carved in the bedrock, quarries, and cup-holes were also discovered. A large well, with a rounded open stone covering its entrance, has been reused during present times. Two groups of dolmens were found at the top of the slope; here traces of six dolmens were recognized, and flint tools were collected.

Site 2 (Kasāyir): Located about 2km north of site 1, on the western side of Wādī al-Ghafar, less than 1km south east of Sūm . A small site with no traces of structures, but some pottery sherds

Site no.	Name of site	Period of occupation
1	Bīr Ṣādiq / *al-Waqf*	Chal, MB, LB, LR, Byz, E-Byz, Ayy, Mam
2	Kasāyir	Hell, LR, E-Byz, Byz
3	Sūm	Byz
41	Abū ad-Dardā'	R, LR, L-Byz, Umm, E-Umm, Ayy/Mam
24	Wādī Nāṭfa	LB, LR, Byz, L-Byz, Umm, Ayy/Mam
25	Rujum al-Ghurābiyyāt	Chal, EB, MB, LB, Iron I, LR, L-Byz, Umm
26	al-Ghurābiyyāt al-Muqawwara	LB, R, LR, L-Byz, Umm, Ayy/Mam
27	Wādī Nāṭfa, N	MB, LB, Byz
34	Wādī al-Ghafar, S-W Zabda	LR, L-Byz, Ayy/Mam
35	Abū az-Zayt	ER, LR, E-Byz, L-Byz, Umm, E-Umm
36	Umm al-Buwāb	ER, LR, E-Byz, L-Byz, E-Umm
37	'Abān	ER, LR, E-Byz
38	Qaṣr al-Ghūl	R, LR, L-Byz



2. Map of the "West Irbid Survey" sites.

dated to the Hellenistic (very few), Late Roman, and Early Byzantine periods. Amongst the collected objects were also a basalt weight and a part of a grinding stone. This site was mentioned previously in the Wādī al-'Arab survey (Hanbury *et al.* 1984, sites 75 (2259-2211)).

Site 3 (Sūm): (JADIS 2222041) Mentioned previously by Schumacher (1890: 142), Mittmann (1970, site no. 70) and in the survey of Wādī al-'Arab (Hanbury *et al.* 1984, site no 78 (2250-2219)). Traces of a structure, foundations of a wall and a decorated piece of limestone, perhaps part of a door lintel, and an underground cave burial were found in the centre of the village. It seems that the modern houses were built over the ancient structures. Collected pottery is attributed to the Byzantine period.

Site 41 (Abū ad-Dardā'): (Muqa'am Abu Derda JADIS 2222015) Mentioned in previous surveys (Mittmann 1970, site no. 70; Hanbury 1984, site no. 79 (2248-2219) Located on the northern side of the village Sūm on a small hill, on which is located the shrine of Abū ad-Dardā'. An ancient and recent cemetery mixed with traces of ancient structures. Fragments of rounded column bases and capitals decorated with acanthus leaves were discovered. The site was settled in different periods according to collected pottery sherds dated to the Late Roman, Late Byzantine, Early Umayyad, and Ayyubid/Mamluk periods.

A few meters west of Abū ad-Dardā' is a Roman chamber tomb also mentioned by Mittmann (1970: 173-174), on which a bilingual inscription was found and dated to the Roman Period. The interior walls of the tomb are decorated with fresco and are still in a good condition (Wagner-Lux 1986: 289).

Site 24 (Wādī Natfa): Located about 1km southeast of Naṭfa. This site was visited by Burckhardt (1822: 288). Along the wadi there are many natural caves and water tunnels. Water still seeps inside two tunnels. The slopes of the wadi contain rocky places with regular cuts. They might have been entrances for cave tombs or quarries. Some pottery sherds have been collected in one of the caves next to the water tunnel and dated to Late Byzantine, Early Umayyad and Ayyubid/

Mamluk periods. Flint tools and pottery sherds were also collected from a cave and dated to the Late Bronze, Late Roman and Umayyad periods. Along the wadi, were Byzantine and Ayyubid/Mamluk pottery sherds were collected.

Site 25 (Rujum al-Ghurābiyyāt): Along the same wadi, to the south, on top of the mountain, south west of Naṭfa, two square — and one rounded-structures built of undressed stones were found, the foundations of which are still noticeable but the upper courses are newly reconstructed. Two hundred meters north of these structures there were two huge structures with fenced walls and perhaps fortifications. Some walls are about 3 meters high. The entire structure was built of undressed stones of different sizes. A large amount of pottery sherds were collected, dated mainly to the Chalcolithic, Early Bronze, Middle Bronze, Late Bronze, Iron I, a few sherds have been dated to the Late Roman, Byzantine, Late Byzantine and Umayyad periods.

Site 26 (al-Ghurābiyyāt or al-Muqawwara): A Roman/Byzantine settlement located along Wādī Naṭfa, about 2km south-west Naṭfa. A Byzantine church with a mosaic floor was recorded here. The mosaic floor was completely destroyed by looters. The settlement is close to the church, only some rows of small walls and terraces are still to be seen. On the other side of the wadi, there are a large number of well-cut tombs, we were able to recognize 19 of them. These tombs vary in both shape and size, some are large burials, while others are perhaps individual ones. Nothing can be identified from the outside, as they are full of fill and collapse. The largest tomb was n° 5 (7 L × 6.5 w × 4 h meters) (**Fig. 3**), it contained 14 *loculi* hewn into the walls and dug into the floor. *Arcosolia* are visible in the central part of the front wall. The stone doorway of the tomb has been destroyed and some parts were found inside. However, the lintel is in place and was decorated with floral leaves and vines (**Fig. 4**). Some *loculi* are two-storied. This tomb had room for at least 32 corpses.

The site is a Roman/Byzantine village, it seems that the cliffs around the settlement are full of burial tombs. Pottery sherds were collected from the area around the church and date



3. Roman/Byzantine tomb, site 26, al-Ghurābiyyāt, al-Muqawwara (Wādī Nāṭfa).



4. Lime-stone door of a Roman/Byzantine tomb, site 26, al-Ghurābiyyāt, al-Muqawwara.

to the Bronze, Late Bronze, Roman, Late Roman, Byzantine, Late Byzantine ,Umayyad, and Ayyubid/Mamluk periods, but mainly Late Byzantine and Umayyad. Locals said that, in this area, they had collected beads, gold earrings, stone door-lintels decorated with animal heads, pottery objects and glass vessels.

Site 27 (Wādī Naṭfa, N): Located at the northern end of Wādī Naṭfa, a wine press, a cave, a well

and some cup-marks were found. Pottery sherds were collected in a small area filled with a special type of grey soil. The scarce pottery sherds date to the Bronze and Byzantine periods. A few flint tools were also found.

Site 34 (Wādī Al-Ghafar, S-W Zabda): Located on the east side of Wādī al-Ghafar, south-west of Zabda. A large area of agricultural fields. Collected pottery dates to the Roman, Late Roman, Byzantine, Late Byzantine, and Ayyubid/Mamluk periods. Most of the pottery is Late Byzantine. The remains of what were probably six tombs (circular heaps of stones surrounded by a circle) were documented, yet the type of these structures could not be ascertained. A complete dolmen and well-preserved rectangular and oval structures were found. They were most probably part of a cemetery.

Site 35 (Abū az-Zayt): (Ghafar JADIS 2221011) Located on the west side of Wādī al-Ghafar. Mentioned previously by Glueck (1951, site no. 83). This is a large area of agricultural fields overlooking Wādī al-Ghafar. Two destroyed dolmens and ten oval or circular structures were found. They were built of undressed large-sized stones. Three platforms and six walls were registered as well. Few pottery sherds were scattered over a large area, which date to the Early Roman, Late Roman, Early Byzantine, Late Byzantine, and Early Umayyad periods. The site extends to the north where there seems to be a field of dolmens that extends to the site no. 1. Two dolmens were excavated previously by the Department of Antiquities of Jordan in 1990[2].

Site 36 (Umm al-Buwāb): Located south-east of Sūm. An ancient house hewn in the rock and reused recently, two caves, quarries (**Fig. 5**), and one press (**Fig. 6**) were discovered. Collected pottery dates to the Early Roman, Late Roman, Byzantine, Early Byzantine, Late Byzantine and Early Umayyad periods.

Site 37 ('Abān): (JADIS 2222057) Located north of al-Bariḥa, on Wādī Ṭarīq Sūm. The wadi is deeper in the junction where it connects Wādī al-Ghafar. The site has been mentioned by



5. Quarries at site 36, Umm al-Buwāb, S-E Sūm.



6. Press at site 36, Umm al-Buwāb, S-E Sūm.

Schumacher (1890: 177). A rectangular structure overlooking the wadi, built of undressed large-sized stones, three courses can still be seen in some places. Beside this structure there is a cave used perhaps for storage, associated with a press; a test pit is seen on the top. On the edge of Wādī al-Ghafar and inside a farm there is a big cistern cut into the rock, with a large rounded entrance. Collected pottery dates to the Early Roman, Late Roman, and Early Byzantine periods. The area is now cultivated, and planted with olive trees.

Site 38 (Qaṣr al-Ghūl): Located on the eastern side of Wādī Zabda. A square tower-like structure built of undressed large stones. Seven courses are still standing to a height of more than 2m, but the upper part is destroyed. The structure has been previously mentioned by Schumacher (1890: 74,179) and Glueck (1951, site 84) and dated to the Iron II period.

2. Unpublished report in the Department of Antiquities by Wajih Karasneh and Hekmat Taani.

On the other side of the main road leading to ash-Shūna, and not far from Qaṣr al-Ghūl, in the region called al-Ki'bir, there were a number of tombs: two single rectangular graves cut in the rock, in different directions. Few pottery sherds were found next to them, dating to the Late Roman and Late Byzantine periods.

2- Wādī al-Jurn and Wādī al-Khalla, and wadi al-Marṣad

Site 4 (Tall al-Ushay'ir): (Ashiar JADIS 2221012) The site was previously mentioned by Schumacher (1890: 180) and previous surveys (Glueck 1951, site no. 80; Lenzen and McQuitty 1988: site 009: 270). Parts of the tall have been excavated by the Department of Antiquities (unpublished report). The site is located on a round-shape hill, 90m in diameter. Collected pottery dates to the Late Bronze, Iron I, Iron II and Byzantine periods.

Site 4/1 (Taṣārīf): Located 900m west of Tall al-Ushay'ir. A dolmen field with huge slabs (megaliths) scattered around. Most of the dolmens' slabs were moved aside for agricultural purposes. Two shaft tombs cut into the bedrock with stone-built entrances and a structure consisting of few rows of undressed stones have also been uncovered. No pottery sherds were found.

Site 5 (al-Wu'ayra or Bayyārat ash-Shumar)

Site no.	Name of site	Period of occupation
4	Tall al-Ushay'ir	LB, Iron, Iron I, Iron II, Byz
4.1	Taṣārīf	Dolmens[3], end of Chalcolithic-MB
5	al-Wu'ayra / Bayyārat ash-Shumar	R, LR, Byz, E-Byz, Umm
6	Jijjīn	LB, Iron, Iron I, Iron II, Hell, L-Byz, Ayy, Mam
7	N-W Jijjīn	Iron, Byz, L-Byz, Umm, E-Umm
8	Dawqara	Byz, Umm, Ayy, Mam
9	Khirbat 'Awwār	ER, LR, E-Byz, L-Byz, E-Umm, L-Umm
9.1	N-W Khirbat 'Awwār	Dolmens
10	Wādī al-Khalla, S-E Zaḥar	ER, LR, L-Byz, E-Umm, Ayy/Mam
10.3	Zaḥar	LR, Byz, Umm, Abb, Ayy, Mam
11	Wādī al-Khalla, N-W Zaḥar	Byz
12	Kufr Raḥtā	B, MB, LB, Iron, R, LR, E-Byz, L-Byz, Umm, Abb, Ayy/Mam
13	Jamūlta, Zuhriyya	EB, MB, LB, Iron, R, LR, Byz, Umm, Ayy/Mam
31	Jumḥa	MB, LB, Iron, LR, E-Byz, L-Byz, Umm, Abb, Ayy/Mam, Otto

Wādī al-Marṣad

Site no.	Name of site	Period of occupation
14	Wādī al-Marṣad-East	
14.1	al-Kanīsa	LB, Iron, ER, LR, E-Byz, L-Byz, E-Umm, L-Umm, Abb, Ayy/ Mam, Otto
14.1a	Umm al-Buṭum	ER, LR, E-Byz, L-Byz, E-Umm, L-Umm, Abb
32	Umm Ḥnnā	Iron I, Iron II, ER, LR, E-Byz, L-Byz, Umm, E-Umm, Ayy/ Mam, Otto

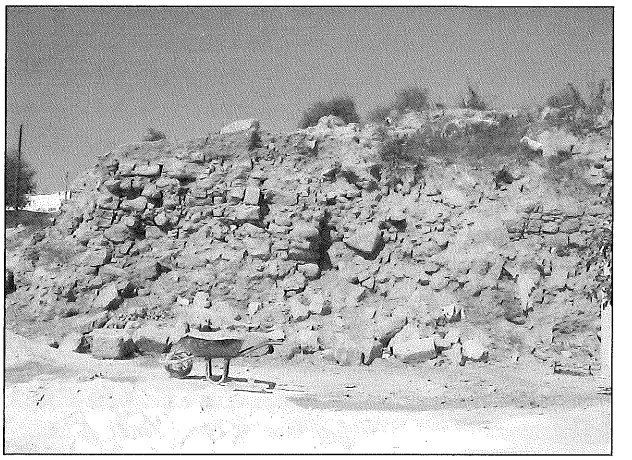
3. No pottery sherds were found but dolmens in the Levant appears at the end of the Chalcolithic period and during Early Bronze I (3500-3200 BC) then disappear at the beginning of the Middle Bronze age.

Located on both sides of a small wadi, a branch of Wādī Jurn, about 1km north of the village of Zaḥar. The region was mostly rocky; a number of stone quarries, post holes, and some deep pits (either square or circular in shape, some more than 1m deep) were encountered. There was a double-room cave with a shaped entrance inside, used most probably for domestic purposes, and traces of stone walls. A number of pottery sherds were collected, which date to the Late Roman, Early Byzantine and Umayyad (mainly Byzantine) periods. A round-shaped limestone cylinder (broken), used most probably as a roller for compacting floors in ancient times and a wine or olive press were uncovered. Agricultural lands were in the hinterlands beside the wadi.

Site 6 (Jijjīn/ ad-Dibba): (JADIS 2222053) Located inside the village of Jijjīn (**Fig. 7**). A huge site mentioned by Schumacher (1890: 136) and in Mittmann's survey (1970, site no.71). Many stone walls and pottery sherds were apparent, and the latter were attributed to the Late Bronze, Iron I, Iron II, Hellenistic, Late Byzantine and Ayyubid/ Mamluk (mainly Bronze and Iron) periods. The site has a strategic location, as it overlooks Tall al-Ushay'ir, Capitolias and other surrounded settlements. Foundations of ancient structures are widespread under the present structures of the village, and some ancient building stones were reused later by the locals.

Site 7 (N-W Jijjīn): located about 300m north-northwest of the village of Jijjīn. An area of ancient stone quarries, wells and cup-marks. Traces are still found everywhere. Pottery sherds and a grinding basalt stone were recorded. Pottery sherds date to the Iron, Late Byzantine and Early Umayyad periods.

Site 8 (Dawqara): mentioned by Schumacher (1890: 90) and in Mittmann's survey (1970, site no. 78). A small wadi runs through the village, Wādī Dawqara. Both sides of the wadi were settled in ancient periods. There were traces of ancient walls, seen in section, Caves on both sides of the wadi, a shaft tomb, pottery sherds date to the (mainly) Byzantine, Umayyad, and Ayyubid/Mamluk periods. Some pieces of *tesserae*, and part of a basalt bowl were also collected. There are more than 6 natural caves, some are very large with wide entrances, perhaps used for settlement in ancient times, and reused recently for agricultural purposes.

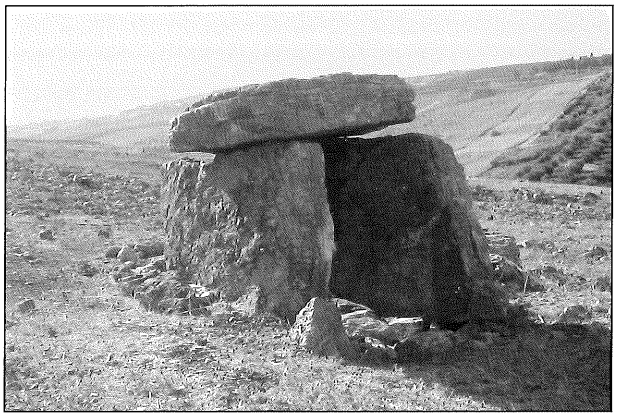


7. Tall Jijjīn/ ad-Dibba.

Site 9 (Khirbat 'Awwār): Located 1.3km west of Tall al-Ushay'ir, east of Jumḥa, on a hill of about 15 dunums in surface area. The settlement overlooks a large area of agricultural land. A number of structural remains, a column-drum about 35cm high, well-cut stones, a basalt grinding stone with a handle, a large amount of pottery sherds dating to the Hellenistic, Early Roman, Late Roman, Early Byzantine, Late Byzantine, Early Umayyad, and Late Umayyad periods were collected. A water cistern, wells, and settlement caves were also found. North of the site and on the ridge above the Wādī al-Khalla there were some quarries and natural caves as well.

Site 9/1 (N-W Khirbat 'Awwār): A field of dolmens, located north and northwest of site no. 9, as well as on the other side of the Wādī al-Khalla. 12 dolmens were recognised, yet only one is still standing (**Fig. 8**), the others destroyed. Some slabs were moved to other locations to use the land for agricultural purposes. No pottery was found on site.

Site 10 (Wādī al-Khalla, S-E Zaḥar): A rocky area, called locally al-Hawwash, located on the northern ridge of Wādī al-Khalla, contained many remains carved into the rock. A number of well-cut limestone slabs, a rock-cut rectangular grave, quarries, natural caves, large wells, some with rounded cap-stones on top. Collected pottery sherds date to the Early Roman,

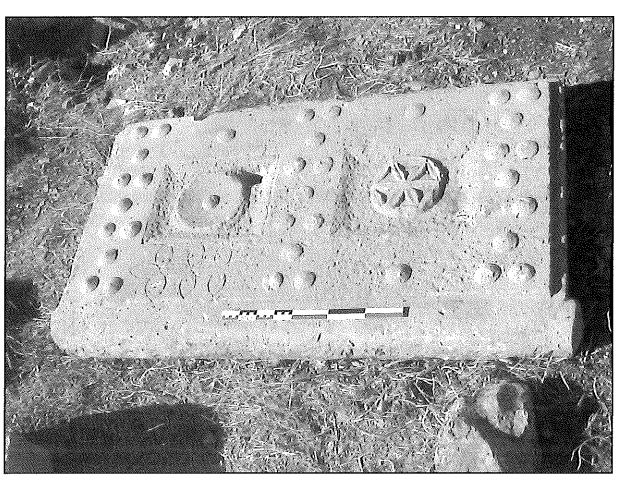


8. Dolmen, site 9/1 N-W Khirbat 'Awwār, Wādi al-Khalla.

Late Roman, Early Byzantine, Late Byzantine, Early Umayyad and Ayyubid/Mamluk (mostly Byzantine and Umayyad) periods. Among the finds were an intact limestone door socket (95 × 40 × 65cm), and a limestone door (145 × 85 × 20cm) (**Fig. 9**), belonging to a Roman tomb decorated with rosettes, frames and protruding small rounded shapes. These have been removed from their original place and kept in the courtyard of one of the village houses. Closer to the center of the village and also on the ridge of the Wādī Khalla were a number of large caves. One was reused by covering its walls with plaster; the plaster does not seem to be very ancient and includes a mix of large sized pottery sherds. The cave has three entrances; one from above and two from the sides. Collected pottery sherds date to the Early Umayyad period. Another cave was hollowed out by looters and ran under a house. *Tesserae*, and pottery sherds dated to the Late Roman and Byzantine periods were collected. The cave might have been a chamber tomb, judging from the few bones uncovered in the fill dumped by looters in the front part of the cave.

Site 10/3 (Zaḥar) (Zahar en-Nasara JADIS 2221008) Previously mentioned by Schumacher (1890: 181) and Mittmann (1970, site no.72). Well-cut stones are scattered in the center of the village. Ancient abandoned houses are still standing. Large quantities of glazed and painted pottery were collected in the neighborhood, and these were dated to the Late Roman, Byzantine, Late Umayyad, Abbasid, and Ayyubid/Mamluk periods. This is a large medieval settlement, as most of the collected pottery can be attributed to the Ayyubid/Mamluk period. Traces of more ancient walls, most probably Byzantine and Umayyad can still be seen; they appear under the still standing monuments. In addition to the walls, there was a capital and a number of well-cut stones. East of the settlement in the Islamic cemetery of the village individual rectangular graves cut into the bed-rock were discovered (**Fig. 10**); four of them were carved in direction East-West and one North-South. These graves seem to be ancient (perhaps Byzantine), and not in secondary use. Beside the tombs, there was a column-drum of 135 X 50cm, a natural cave used previously for domestic purposes, and small cup-marks cut into the bed-rock.

Site 11 (Wādī al-Khalla, N-W of Zaḥar): Natural shelter, shallow caves, quarries, wells, and a shaft tomb were recorded. Collected pottery is dated only to the Byzantine Period.



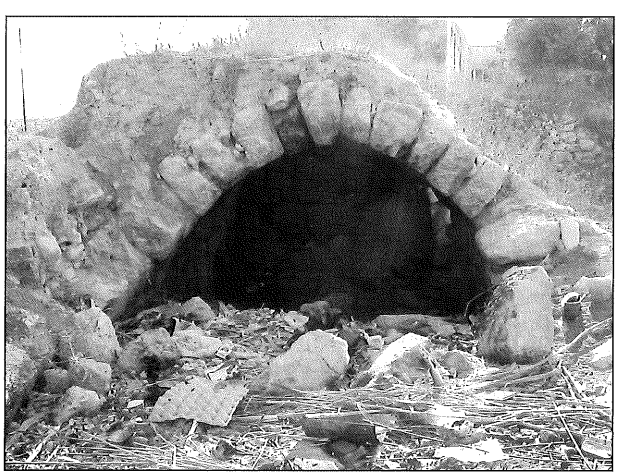
9. Lime-stone door of a Roman/ Byzantine tomb, site 10, Wādī al-Khalla, S-E Zaḥar.



10. Individual rectangular graves cut in to the bed-rock, site 10/3, Zaḥar.

Site 12 (Kufr Raḥtā) (JADIS 2222054) A large medieval settlement with a still standing structures beside some modern houses. The site has been mentioned by Schumacher (1890: 137) and Mittmann (1970, site no. 75). Local people mentioned that there are deep caves under the village houses. Among the ancient buildings is a still standing mosque with a *miḥrāb* and a collapsed vaulted ceiling. Close to the mosque there are a number of barrel-vaulted rooms (**Fig. 11**). Pottery sherds and *tesserae* were scattered everywhere. Collected pottery dates to the Late Roman, Byzantine, Umayyad, Abbasid and Ayyubid/Mamluk periods. Few sherds are dated to the Middle Bronze, Late Bronze, and Iron periods. Some Ayyubid/Mamluk sherds were imported, others were local. Pottery is mostly attributed to the Early and Late Byzantine periods, while Bronze Age sherds were very few. A Middle Bronze plate, four Roman and one Byzantine pottery lamps were offered for sale by the locals. These objects were collected from tombs to the north-west of the village. Pottery sherds gathered in the neighborhood were ascribed to the Bronze, Early Byzantine and Late Byzantine periods, mostly Early and Late Byzantine.

Site 13 (Jamūlta or Zuhriyya): (Jamulta JADIS 2222055) Located west of Kufr Raḥtā. Previously mentioned by Mittmann (1970, site no.76). A rocky area, where two stone quarries,



11. Barrel-vaulted room, site12, Kufr Raḥtā.

a number of walls, and three caves were found. The area is called Zuhriyya by locals. The first cave might be a chamber tomb with a rectangular well-cut entrance, the second is an individual burial, and the third is a shaft tomb dated to the Bronze Age. A rounded shrine of special shape has been carved in the rock facing in a southern direction. A large amount of pottery sherds were collected there and attributed mainly to the Late Roman, Byzantine and Umayyad periods. The few collected pottery sherds date to the Bronze, Iron and Ayyubid/Mamluk periods. Close to this location a large ruined structure with many well-cut stones, a slab with some incised decoration, a well, and individual graves were discovered, pieces of *tesserae*. This structure might be the remains of a Byzantine church.

Site 31 (Jumḥa) (JADIS 2221009) An ancient medieval village. Some of its ancient houses are still standing at the center of the village. This site has been mentioned by Burckhardt (1822: 188), Schumacher (1890: 178) and Mittmann (1970, site no. 73). Many pottery sherds were collected, mostly glazed Ayyubid/Mamluk. Close to the houses lies an ancient cemetery still used at present, inside the cemetery there are foundations of an ancient mosque. Pottery sherds from the site date to the Middle Bronze, Late Bronze, Iron (very few), Late Roman, Early Byzantine, Late Byzantine, Late Umayyad, Abbasid, Ayyubid/Mamluk (local and imported), and Ottoman (village ware) periods. A number of ancient large wells are still in use.

*Site 14 (Wādī al-*Marṣad *East):* Located on the eastern slope of Wādī al-Marṣad, about 2km southwest of the Byzantine structure (site 13). There is a rocky area with stone quarries on the ridge overlooking the wadi.

Site 14/1 (al-Kanīsa)[4]*:* Located on the eastern ridge overlooking Wādī al-Marṣad, above Kufr ʻĀn. Rock-cut tombs, small pits or holes above bedrock, a cave, stone quarries or perhaps a number of stairs, a large deep cave consisting of four rooms: one shaped as a tunnel, about 15m in length, ending in three stairs and a closed en-

4 There is a site mentioned in the survey of Mittmann (1970), site no. 45 el-Knese (al-Kanīsa), 500 m away from Ibdar, dated to the Mamluk period. It is an Arabic name means (the church).

trance. The area was thickly settled in ancient periods, as demonstrated by the large quantity of pottery sherds scattered everywhere. The pottery sherds date to many periods, from the Bronze Age to the Ottoman period (Late Bronze, Iron, Early Roman, Late Roman, Early Byzantine, Late Byzantine, Early Umayyad, Late Umayyad, Abbasid, Ayyubid/Mamluk, and Ottoman periods). Most of the pottery sherds were Byzantine and Umayyad. Structures were found inside the cave, and collected pottery mostly included sherds of large storage jars. These date to the Late Roman and Umayyad periods. The settlement extends quite far.

Site 14/1a (Umm al-Buṭum): On the western side of the Wādī al-Marṣad, a number of burial — and natural-caves, wells, well-cut stones, many *tesserae* of different sizes and colors and large amount of pottery sherds. Worthy of attention is a Roman/Byzantine tomb. It was the only tomb with 9 *loculi* within its walls (**Fig. 12**). Collected pottery dates to the Late Byzantine, and Umayyad periods. Another large cave, with two rooms, two entrances and one window, were located next to the previous tomb. The latter might be a collapsed Roman/Byzantine tomb with *loculi* dug into the ground. Opposite the above-mentioned area is the main settlement of Umm al-Buṭum. There were also a number of burial-caves, well cut stones, traces of structures and a large quantity of pottery sherds dated uninterruptedly from the Roman to the Ayyubid/Mamluk periods. Among the pottery sherds were pieces of imported Ayyubid/Mamluk and local Roman *terra sigillata.*



12. Roman/ Byzantine tomb, site 14/1a, Umm al-Buṭum, Wādī al-Marṣad.

Both sides of Wādī Marṣad were settled in ancient times, i.e. mainly in the Roman and Byzantine periods. Most of the finds were burial — and natural-caves. Remains of structures, well-cut stones, large amount of pottery sherds and *tesserae* were nevertheless encountered and provide substantial evidence for a large settlement mostly through the Roman, Byzantine and Umayyad periods.

Site 32 (Umm Ḥannā) (JADIS 2221010) A site located about 2km northwest of Jumḥa, in a small wadi, a branch of Wādī al-Marṣad. Previously mentioned by Schumacher (1890: 144) and Mittmann (1970, site no. 74). The site was littered with pottery sherds and many structures were apparent, spread over an area of about 4692 m2. The structures are all destroyed, due to the fact that the land has been cultivated in recent times. Well-cut stones, door lintels and parts of a floor made of large *tesserae* were found. This type of *tesserae* is typically Umayyad. Most of the pottery sherds are fragments of storage jars. Collected pottery dates to the Iron I, Iron II, Early Roman, Late Roman, Early Byzantine, Late Byzantine, Early Umayyad, Late Umayyad, Ayyubid/Mamluk (local and imported), and Ottoman (village ware) periods. Along the wadi, there were number of burial and natural-caves distributed along a distance of more than 1km. One of the large caves was dated to the Byzantine and Umayyad periods, according to pottery sherds.

3- Wādī al-Ji'a, Wādī as-Sindūr / Wādī al-Miḥwara and Wādī Ruḥayla

Site 15/1 (Tall Kufr Yūbā*)* (JADIS 2221025) The site were previously mentioned by Schumacher (1890: 180) and Glueck (1951, site no. 81, 82). The tall was cleared for agricultural purposes. However, we were able to collect pottery sherds and stone objects. A section in the north side of the tall has been recently made for modern construction. In the section two rooms built of undressed stones were visible; one of them was still intact, with an entrance and a roof (**Fig. 13**). The building type is typical of the Early Bronze IV-Middle Bronze, and can be compared with some structures found in southern Syria (Braemer *et al.* 2005). Another section appeared in

Site no.	Name of site	Period of occupation
15.1	Tall Kufr Yūbā	Chal, EB, MB, LB, Iron, LR, E-Byz, L-Byz, Ayy/Mam
15.2	Al-Qaṭāṭīm / Rujayla	Iron, LR, Byz, L-Byz, Umm
15.4	Kufr Yūbā, S	Dolmens, end of Chalcolithic-MB
16	Nukhayla	L-Byz, E-Umm
18	Barsīnya	Iron, Hell, R, Byz, Umm, Abb, Ayy/Mam, Otto
19	Hām	EB, MB, LB, Hell, LR, E-Byz, L-Byz, E-Umm, Abb, Ayy/Mam
19.1	al-'Arīḍ	Dolmens
19.2	Tall Hām	EB, MB, LB, Iron, Ayy/Mam
28	'Isrīn	Chal, EB, MB, LB, few Iron, Iron I, ER, LR, L-Byz, Umm, E-Umm, Ayy/Mam
29	Kufr 'Ān	EB, LB, Iron, LR, E-Byz, L-Byz, Umm, Ayy/Mam
30	Al-'Abar ash-Sharqī, at-Taṣārīf	MB, LB, Iron, E-Byz, L-Byz, Umm
39	Al-Ghawāyib	LB, ER, LR, E-Byz, L-Byz, Umm, Ayy/Mam



13. EB IV- MB structure, site 15/1, Tall Kufr Yūbā

the western part of the site, where the main road has cut the tall's western extension, a few meters away from the mound. Similar structures can be observed there, a number of walls built of medium-sized undressed stones. These structures were perhaps attached to the main settlement located on the tall. Collected Pottery dates to the Chalcolithic, Early Bronze, Middle Bronze, Late Bronze, Iron, Late Roman, Early Byzantine, Late Byzantine, and Ayyubid/Mamluk periods.

Site 15/2 (Al-Qaṭāṭīm / Rujayla) Located 300m south of the tall of Kufr Yūbā, on the left side of the road that leads to Bayt Yāfā, lies a field of dolmens. About 57 dolmens have been registered, few of them are still standing. The dolmens were of different types. In association with the dolmens a number of structures and walls were recorded. Within this large group of dolmens, a number of flint and stone tools were discovered. In addition, there were few pottery sherds dated to the Iron, Late Roman, and Early Byzantine periods. A single ruined structure built of undressed stones consists of two rooms with a round northern wall, and a large wall to the south (8 × 4.6m). This might have been a Byzantine structure, according to the collected pottery.

Site 15/4 (Kufr Yūbā, S): A field of Dolmens, located to the south of Kufr Yūbā overlooking the burial ground of dolmens 15/2, on the right side of the road between Kufr Yūbā and Bayt Yāfā. This site was mentioned by Burckhardt (1822: 287) and Schumacher (1890: 33, 168-177). 25 dolmens have been registered so far, some are associated with long lines of stones (tails), other ones were surrounded by circular walls. No surface pottery was found.

Site 16 (Nukhayla): Located on the left side of the road leading to Bayt Yāfā, south of site 15/4, west of 15/2. A cave and small amount of pottery sherds was discovered. This was perhaps a cave settlement. Some other caves in the bed of the wadi were reused by the army as ammunition dumps. Collected pottery dates to the Late Byzantine, and Early Umayyad periods.

Site 18 (Barsīnya) (Barsina JADIS 2221030) Located about 1.5km east of Dayr as-Si'na. Mentioned by Schumacher (1890: 127-129) and Glueck (1951, site no.117). A site rich in surface finds, with a large quantity of pottery sherds. The site consists of many chamber and shaft tombs, some recently robbed, sarcophagus fragments, large wells, structures (walls), a Byzantine church, parts of cylindrical columns, fragments of grinding basalt stones, a large number of *tesserae*, as well as large natural caves. Collected pottery was ascribed to the Iron (few), Hellenistic, Late Roman, Early Byzantine, Late Byzantine, Early Umayyad, Late Umayyad, Abbasid, Ayyubid/Mamluk (local and imported), and Ottoman periods. The majority of pottery sherds are nevertheless Byzantine.

Site 19 (Hām): The site has been surveyed previously by Lenzen and McQuitty (1988, site 007: 270). It is located along a small wadi called Wādī Hām. A large medieval settlement is still visible. The wadi was settled during many periods, as demonstrated by the pottery sherds and *tesserae* scattered along its course, in addition to caves and ancient wells. Some still-standing abandoned houses in the wadi were in good condition. Collected pottery dates to the Early Bronze, Middle Bronze, Late Bronze, Hellenistic, Late Roman, Early Byzantine, Late Byzantine, Early Umayyad, Late Umayyad, Abbasid, and Ayyubid/Mamluk (mostly Ayyubid/Mamluk) period.

Site 19/1 (al-'Arīḍ): A field of Dolmens located north of Hām, overlooking Wādī Ruḥayla. 11 dolmens were recorded, most of them were destroyed by ploughed. Two of the dolmens were still standing *in situ*. No surface pottery was found. Two structures were found in this area as well. These structures were built of huge stones and were rounded in shape.

Site 19/2 (Tall Hām) (JADIS 2221001) Previously surveyed by N. Glueck (1951, site no. 9) and later in the Irbid Bayt Rās survey (Lenzen and McQuitty 1988, site 007: 270). Located at the center of the village of Hām. The tall is destroyed in some places, thus sections are obviously apparent. A number of stone walls and a large amount of pottery were collected and dated to the Chalcolithic, Early Bronze, Middle Bronze, Late Bronze, Iron, and Ayyubid/Mamluk periods. Structures are strikingly obvious in the section. In the southern side of the Tall is a large cave located under a house, of about 25 m^2. There were also other inhabited caves and chambered tombs. One Roman/Byzantine tomb with a well-cut entrance, containing *loculi* and sarcophagi had been excavated by the Jordanian Department of Antiquities in 1984[5].

Site 28 ('Isrīn) (JADIS 2221031) Previously surveyed by N. Glueck (1951, site no. 109). Located east of Kufr 'Ān, on a small hill overlooking two wadis: Wādī Abū Hilāl to the north and Wādī as-Sindiyān to the south. Traces of ancient structures, 10 large wells and at least 4 caves were found here. Pottery sherds were found on the edges of ancient structures dated to the Late Byzantine period. The area is full of large wells, caves, water-basins, areas with cut-marks in the rock, a wine press and cave burials. Pottery sherds were mostly date to the Chalcolithic, Bronze ages, some to the Iron I, Early Roman, Late Roman, Late Byzantine, Late Umayyad, and Ayyubid/Mamluk periods. Pieces of grinding basalt stones, chamber- and shaft-tombs were found on both sides of Wādī Abū Hilāl.

Site 29 (Kufr 'Ān) (Kufr An JADIS 2221043) Mentioned by Schumacher (1890: 137,181). Located in the center of the modern village of Kufr 'Ān, next to the main mosque. As described by local people, a marble statue, barrel vaults and about 3 meter wide stairs had been previously found there. The site is now completely destroyed and a modern mosque has been built in its place. As attested to by pottery

5 Unpublished report in the Department of Antiquities by Wajih Karasneh.

sherds, the settlement dates to the Early Bronze (Khirbat al-Karak ware), Late Bronze (Chocolate-on-White), (few) Iron, Late Roman, Early Byzantine, Late Byzantine, (few) Umayyad, and Ayyubid/Mamluk periods. To the south of this location, 12 cave tombs, one containing 17 *loculi* and remains of a stone door, one shaft tomb and a well, were all found along Wādī al-Ji'a.

Site 30 (Al-'Abar ash-Sharqī / at-Taṣārīf): located south of Kufr 'Ān, overlooking Barsīnya (site 18) to the south on the other side of the Wādī Miḥwara. The site has been mentioned by Schumacher (1890: 178,186). Three ancient structures built of undressed stones were found. Two of them are rectangular in shape. To the east of the site in the direction of Bayt Yāfā there are at least 14 recognizable dolmens, 2 of them are in fairly good condition, the others are destroyed. Collected pottery sherds date to the Middle Bronze, Late Bronze, Iron, Early Byzantine, Late Byzantine, and Umayyad periods.

Site 39 (Al-Ghawāyib): located west of Kufr Yūbā. A group of 44 dolmens, most of them are destroyed (**Fig. 14**). The other side of the wadi is called Qlā' ar-Rās. Small amounts of pottery sherds were collected and date to the Late Bronze, Early Roman, Late Roman, Early Byzantine, Late Byzantine, Umayyad, and (local and imported) Ayyubid/Mamluk periods. There are also two walls, 3 cave tombs, one shaft tomb and one cup-mark.

4- Wādī Dayr as-Si'na and Wādī al-Khirba

Site 17 (Tall ash-Shiqāq): (JADIS 2221018) Surveyed previously by Glueck (1951, site 10). Collected pottery was attributed to the Middle Bronze, Late Bronze, Iron, Late Roman, Early Byzantine, and Late Byzantine periods. Most of the pottery was dated to the Iron and Late Byzantine periods.

Site 20/1 (Tall Dayr as-Si'na): (JADIS 2221032) The Tall has been mentioned by Schumacher (1890: 130) and surveyed later by Glueck (1951, site no. 112). It was excavated by the Department of Antiquities in 1996[6]. A complex of two Byzantine churches and a number of attached rooms were uncovered, small and medium size *tesserae* were collected. The tall was settled in different periods, the pottery dates to the Middle Bronze, Late Bronze, (few) Iron, Late Byzantine, Early Umayyad, Late Umayyad, Abbasid, Ayyubid/Mamluk, and Ottoman (Village Ware) periods.

Site 20/2 (Dayr as-Si'na) An ancient large settlement mentioned by Schumacher (1890: 129-130). Some abandoned houses are still standing in the village. Pottery was collected from a section under the ancient houses and from a dump in the wadi, and has been dated to the Late Byzantine, Umayyad, Ayyubid/Mamluk, and Ottoman periods. A door lintel was placed over the entrance door of one of the houses. A number of Roman and Islamic coins were also found there (by local people).

Site no.	Name of Site	Period of Occupation
17	Tall ash-Shiqāq	MB, LB, Iron, R, LR, E-Byz, L-Byz
20.1	Tall Dayr as-Si'na	MB, LB, Iron, L-Byz, E-Umm, L-Umm, Abb, Ayy/Mam, Otto
20.2	Dayr as-Si'na	L-Byz, Umm, Ayy/Mam, Otto
21	Wādī Dayr as-Si'na	
22	N-W Tall Bayt Yāfā	LB, Iron, LR, Byz
23	Tall Bayt Yāfā	LB, Iron, Iron II, R, LR, L-Byz, L-Umm
33	Dhahrat Sawqa'a	LB, Iron, Iron I, LR, E-Byz
40	Wādī al-Khirba	LB, LR, E-Byz, L-Byz, E-Umm, L-Umm

[6] Unpublished report in the Department of Antiquities by Salameh Fayyad.



14. Dolmen, site 39, Al-Ghawāyib, north of Kufr Yūbā.

Site 21 (Wādī Dayr as-Si'na): Located east of the village of Dayr as-Si'na. An area with numerous caves and wells; no cultural remains occurred, except for a cave with a well-cut entrance, but not well-cut on the inside. No *loculi* or *sarcophagi* were found. Huge wells were uncovered in the same area. No surface pottery.

Site 22 (N-W of Tall Bayt Yāfā): A wide wall with two lines of blocks filled with small stones and rubble in between (perhaps an ancient terrace), two wells, one cup-mark and a cave, were surveyed. Flint tools and few pottery sherds were collected and date to Late Bronze, Iron, Late Roman and Byzantine periods.

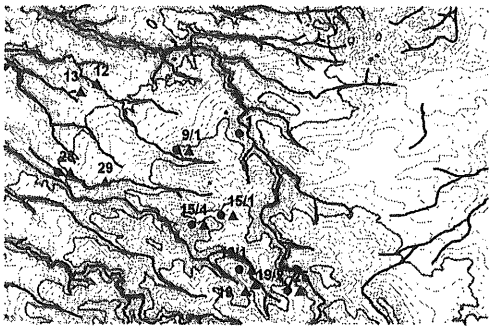
Site 23 (Tall Bayt Yāfā): Located on the pipeline, south of Bayt Yāfā. The tall was previously surveyed (Glueck 1951, site no. 11). A small mound, 50m in diametre. Two ancient wells were found below the tall. Collected pottery sherds date to the Late Bronze, Iron II, Late Roman, Late Byzantine, and Late Umayyad periods.

Site 33 (Dhahrat Sawqa'a): (Zaharet Soqa'ah JADIS 2221023) The site was previously surveyed by N. Glueck (1951, site no.116). The ancient settlement has been completely destroyed. Structures and pottery sherds were still visible. One of the walls is 7.5m long. Collected pottery was dated to the Late Bronze, Iron I, Late Roman, and Early Byzantine periods. A few meters to the South of this site, there were 9 dolmens in a wadi, most of them destroyed and reused for building stone terraces.

Site 40 (Wādī al-Khirba): Located on Wādī Dayr as-Si'na, on the right side of the main road, about 1km SE of the village of Dayr as-Si'na. Previously surveyed by Glueck (1951, site no. 115). Well-cut stones, two caves, and a large quantity of *tesserae* were discovered. Pottery sherds date to the Late Bronze, Late Roman, Early Byzantine, Late Byzantine, Early Umayyad, and Late Umayyad periods.

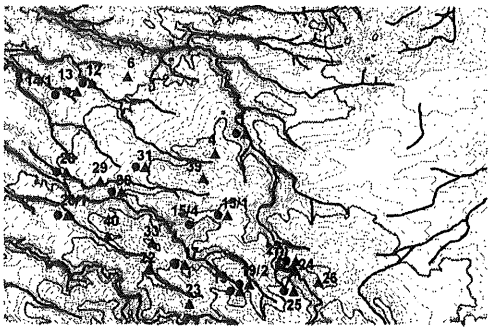
Periods of Occupation (Figs. 15, 16)

Chalcolithic	
Site 1	Bīr ṣādiq al-Waqf
Site 15.1	Tall Kufr Yūbā
Site 25	Rujum al-Ghurābiyyāt
Site 28	'Isrīn
Bronze Age	
Site 1	Bīr Ṣādiq / al-Waqf
Site 4	Tall al-Ushay'ir
Site 6	Jijjīn / ad-Dibba
Site 12	Kufr Raḥtā
Site 13	Jamūlta / Zuhriyya
Site 14.1	al-Kanīsa
Site 15.1	Tall Kufr Yūbā
Site 17	Tall ash-Shiqāq
Site 19	Hām
Site 19.2	Tall Hām
Site 20.1	Tall Dayr as-Si'na
Site 22	N-W Tall Bayt Yāfā
Site 23	Tall Bayt Yāfā
Site 24	Wādī Nāṭfa
Site 25	Rujum al-Ghurābiyyāt
Site 26	al- Ghurābiyyāt or al-Muqawwara
Site 27	Wādī Nāṭfa, N
Site 28	'Isrīn
Site 29	Kufr 'Ān
Site 30	al-'Abar ash-Sharqπ
Site 31	Jumḥa
Site 33	Dhahrat Sawqa'a
Site 39	Al-Ghawāyib
Site 40	Wādī al-Khirba
Iron Age	
Site 4	Tall al-Ushay'ir



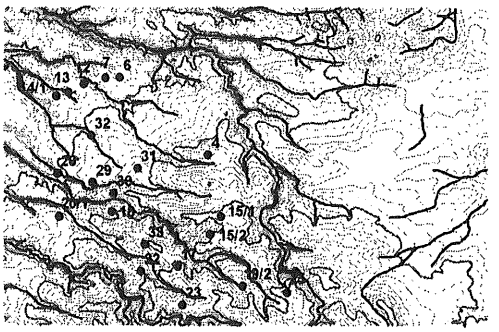
• Chalcolithic

▲ Early Bronze

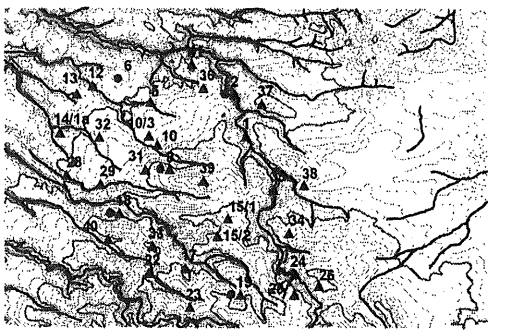


• Middle Bronze

▲ Late Bronze

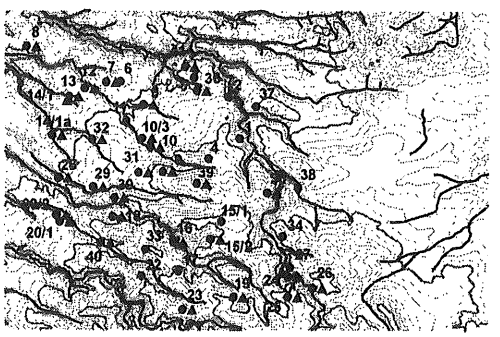


• Iron Age



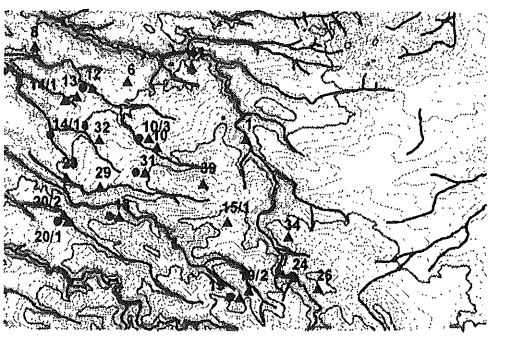
• Hellenistic

▲ Roman



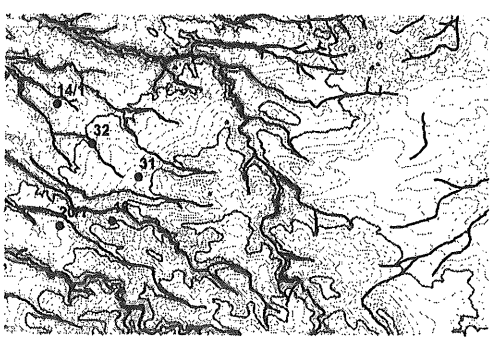
• Byzantine

▲ Ummayad



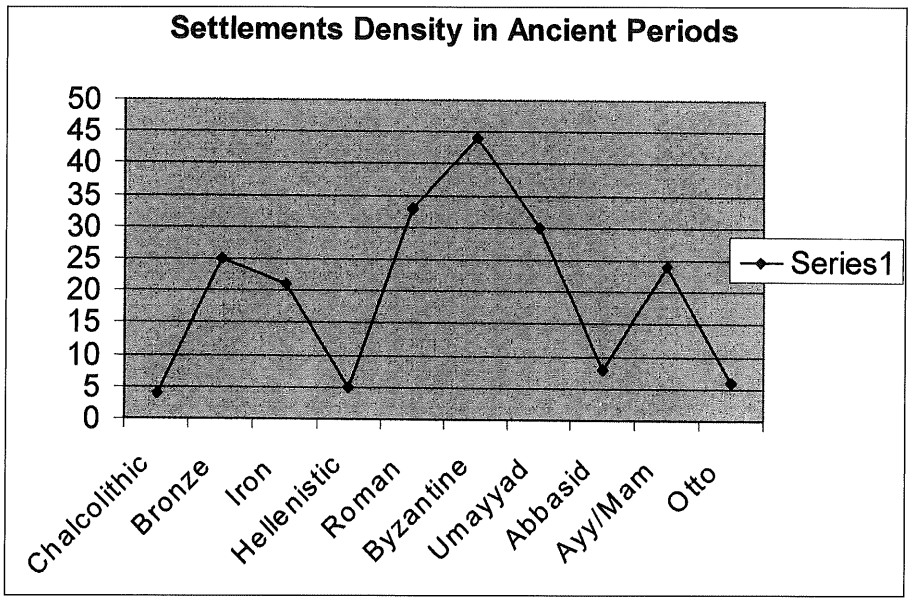
• Abbassid

▲ Ayyubid/Mamluk



• Ottoman

15. Chronological maps of the "WIS" showing site numbers for each main period.



16. The Density of settlements in different periods.

Site 6	Jijjīn/ ad-Dibba
Site 7	N-W Jijjīn
Site 12	Kufr Raḥtā
Site 13	Jamūlta / Zuhriyya
Site 14.1	al-Kanīsa
Site 15.1	Tall Kufr Yūbā
Site 15.2	Al-Qaṭāṭīm and Rujayla
Site 17	Tall ash-Shiqāq
Site 18	Barsīnya
Site 19.2	Tall Hām
Site 20.1	Tall Dayr as-Si'na
Site 22	N-W Tall Bayt Yāfā
Site 23	Tall Bayt Yāfā
Site 25	Rujum al-Ghurābiyyāt
Site 28	'Isrīn
Site 29	Kufr 'Ān
Site 30	al-'Abar ash-Sharqī
Site 31	Jumḥa
Site 32	Umm Ḥannā
Site 33	Dhahrat Sawqa'a
Hellenistic	
Site 2	Kasāyir
Site 6	Jijjīn / ad-Dibba
Site 18	Barsīnya
Site 19	Hām
Site 9	Khirbat 'Awwār
Roman	
Site 1	Bīr Ṣādiq / *al-Waqf*
Site 2	Kasāyir

Site 5	al-Wu'ayra or Bayyārat ash-Shumar
Site 9	Khirbat 'Awwār
Site 10	Wādī Khalla, S-E Zaḥar
Site 10.3	Zaḥar
Site 12	Kufr Raḥtā
Site 13	Jamūlta / Zuhriyya
Site 14.1	al-Kanīsa
Site 14.1a	Umm al-Buṭum
Site 15.1	Tall Kufr Yūbā
Site 15.2	Al-Qaṭāṭīm / Rujayla
Site 17	Tall ash-Shiqāq
Site 18	Barsīnya
Site 19	Hām
Site 22	N-W Tall Bayt Yāfā
Site 23	Tall Bayt Yāfā
Site 24	Wādī Nāṭfa
Site 25	Rujum al-Ghurābiyyāt
Site 26	al-Ghurābiyyāt or al-Muqawwara
Site 28	'Isrīn
Site 29	Kufr 'Ān
Site 31	Jumḥa
Site 32	Umm Ḥanna
Site 33	Dhahrat Sawqa'a
Site 34	Wādī al-Ghafar, S-W Zabda
Site 35	Abū az-Zayt
Site 36	Umm al-Buwāb
Site 37	'Abān
Site 38	Qaṣr al-Ghūl
Site 39	Al-Ghawāyib
Site 40	Wādī al-Khirba

Site 41	Abū ad-Dardā'
Byzantine Period	
Site 1	Bīr Ṣādiq / *al-Waqf*
Site 2	Kasāyir
Site 3	Sūm
Site 4	Tall al-Ushay'ir
Site 5	al-Wu'ayra or Bayyarat ash-Shumar
Site 6	Jijjīn / ad-Dibba
Site 7	N-W Jijjīn
Site 8	Dwqarh
Site 9	Khirbat 'Awwār
Site 10	Wādī Khalla, S-E Zahar
Site 10.3	Zaḥar
Site 11	Wādī Khalla, N-W Zaḥar
Site 12	Kufr Raḥtā
Site 13	Jamūlta / Zuhriyya
Site 14.1	al-Kanīsa
Site 14.1a	Umm al-Buṭum
Site 15.1	Tall Kufr Yūbā
Site 15.2	Al-Qaṭāṭīm / Rujayla
Site 16	Nukhayla
Site 17	Tall ash-Shiqāq
Site 18	Barsīnya
Site 19	Hām
Site 20.1	Tall Dayr as-Si'na
Site 20.2	Dayr as-Si'na
Site 22	N-WS Tall Kufr Yūbā
Site 23	Tall Bayt Yāfā
Site 24	Wādī Nāṭfa
Site 25	Rujum al-Ghurābiyyāt
Site 26	al-Ghurābiyyāt or al-Muqawwara
Site 27	Wādī Nāṭfa, N
Site 28	'Isrīn
Site 29	Kufr 'Ān
Site 30	al-'Abar ash-Sharqī
Site 31	Jumḥa
Site 32	Umm Ḥannā
Site 33	Dhahrat Sawqa'a
Site 34	Wādī al-Ghafar, S-W Zabda
Site 35	Abū az-Zayt
Site 36	Umm al-Buwāb
Site 37	'Abān
Site 38	Qaṣr al-Ghūl
Site 39	Al-Ghawāyib
Site 40	Wādī al- Khirba
Site 41	Abū ad-Dardā'

Umayyad	
Site 5	al-Wu'ayra or Bayyārat ash- Shumar
Site 7	N-W Jijjīn
Site 8	Dawqara
Site 9	Khirbat 'Awwār
Site 10	Wādī Khalla, S-E Zaḥar
Site 10.3	Zaḥar
Site 12	Kufr Raḥtā
Site 13	Jamūlta / Zuhriyya
Site 14.1	al-Kanīsa
Site 14.1a	Umm al-Buṭum
Site 15.2	Al-Qaṭāṭīm / Rujayla
Site 16	Nukhayla
Site 18	Barsīnya
Site 19	Hām
Site 20.1	Tall Dayr as-Si'na
Site 20.2	Dayr as-Si'na
Site 23	Tall Bayt Yāfā
Site 24	Wādī Nāṭfa
Site 25	Rujum al-Ghurābiyyāt
Site 26	al-Ghurābiyyāt or al-Muqawwara
Site 28	'Isrīn
Site 29	Kufr 'Ān
Site 30	al-'Abar ash-Sharqī
Site 31	Jumḥa
Site 32	Umm Ḥannā
Site 35	Abū az-Zayt
Site 36	Umm al-Buwāb
Site 39	Al-Ghawāyib
Site 40	Wādī al- Khirba
Site 41	Abū ad-Dardā'
Abbasid	
Site 10.3	Zaḥar
Site 12	Kufr Raḥtā
Site 14.1	al-Kanīsa
Site 14.1a	Umm al-Buṭum
Site 18	Barsīnya
Site 19	Hām
Site 20.1	Tall Dayr as-Si'na
Site 31	Jumḥa
Ayyubid / Mamluk	
Site 1	Bīr Sādiq / *al-Waqf*
Site 6	Jijjīn / ad-Dibba
Site 8	Dawqara

Site 10	Wādī Khalla, N-W Zaḥar
Site 10.3	Zaḥar
Site 12	Kufr Raḥtā
Site 13	Jamūlta / Zuhriyya
Site 14.1	al-Kanīsa
Site 14.1a	Umm al-Bufm
Site 15.1	Tall Kufr Yūbā
Site 18	Barsīnya
Site 19	Hām
Site 19.2	Tall Hām
Site 20.1	Tall Dayr as-Si'na
Site 20.2	Dayr as-Si'na
Site 24	Wādī Nāṭfa
Site 26	al-Ghurābiyyāt or al-Muqawwara
Site 28	'Isrīn
Site 29	Kufr 'Ān
Site 31	Jumḥa
Site 32	Umm Ḥannā
Site 34	Wādī al-Ghafar, S-W Zabda
Site 39	Al-Ghawāyib
Site 41	Abū ad-Dardā'
Ottoman Period	
Site 14.1	al-Kanīsa
Site 18	Barsīnya
Site 20.1	Tall Dayr as-Si'na
Site 20.2	Dayr as-Si'na
Site 31	Jumḥa
Site 32	Umm Ḥannā

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ARCHAEOLOGICAL SURVEY AND EXCAVATIONS AT THE WĀDĪ AL-YUTUM AND AL-MAGAṢṢ AREA-AL-'AQABA (ASEYM): A PRELIMINARY REPORT ON THE EXCAVATIONS AT TALL ḤUJAYRAT AL-GHUZLĀN IN 2006

L. Khalil and R. Eichmann
With contributions by: A. Abar, A. al-Manaseer, S. Ayyoub, I. Fayoumi, G. Heindle, C. Keller, F. Klimscha, R. Maier and K. Pfeiffer.

Introduction

The ASEYM project was established in 1998 as a joint Jordanian-German project with the aim of studying the Prehistory of al-'Aqaba region, especially the Wādī al-Yutum area (Khalil *et al.* 2003; Bruckner *et al.* 2003; Khalil and Eichmann 1999).

During the previous excavations at Ḥujayrat al-Ghuzlān, several stone and or mud brick walls were revealed, at least three building complexes (A-C) were exposed (Khalil *et al.* 2003: 162-164), they consist of rooms and storage installations, few floors were recovered during the previous season.

The excavation this season took place between February 4th and March 16th 2006. The project is sponsored and funded by the Deanship of Research, the University of Jordan, 'Amman and the Orient-Abteilung of the Deutsches Archäologisches Institut in Berlin, in cooperation with the Department of Antiquities, Jordan. In addition, the Deutsche Forschungsgemeinschaft (Germany) and the Higher Council of Science and Technology (Jordan) funded the project.

The team included the above mentioned authors and contributors. In addition, S. Dressler was the ceramic specialist, D. Bodenmüller and U. Siegel were the architects, M. Khader and A. Wittner were the photographers, D. Depolasky worked as a foreman and field technican and S. al-Fakhri acted as the representative of the Department of Antiquities.

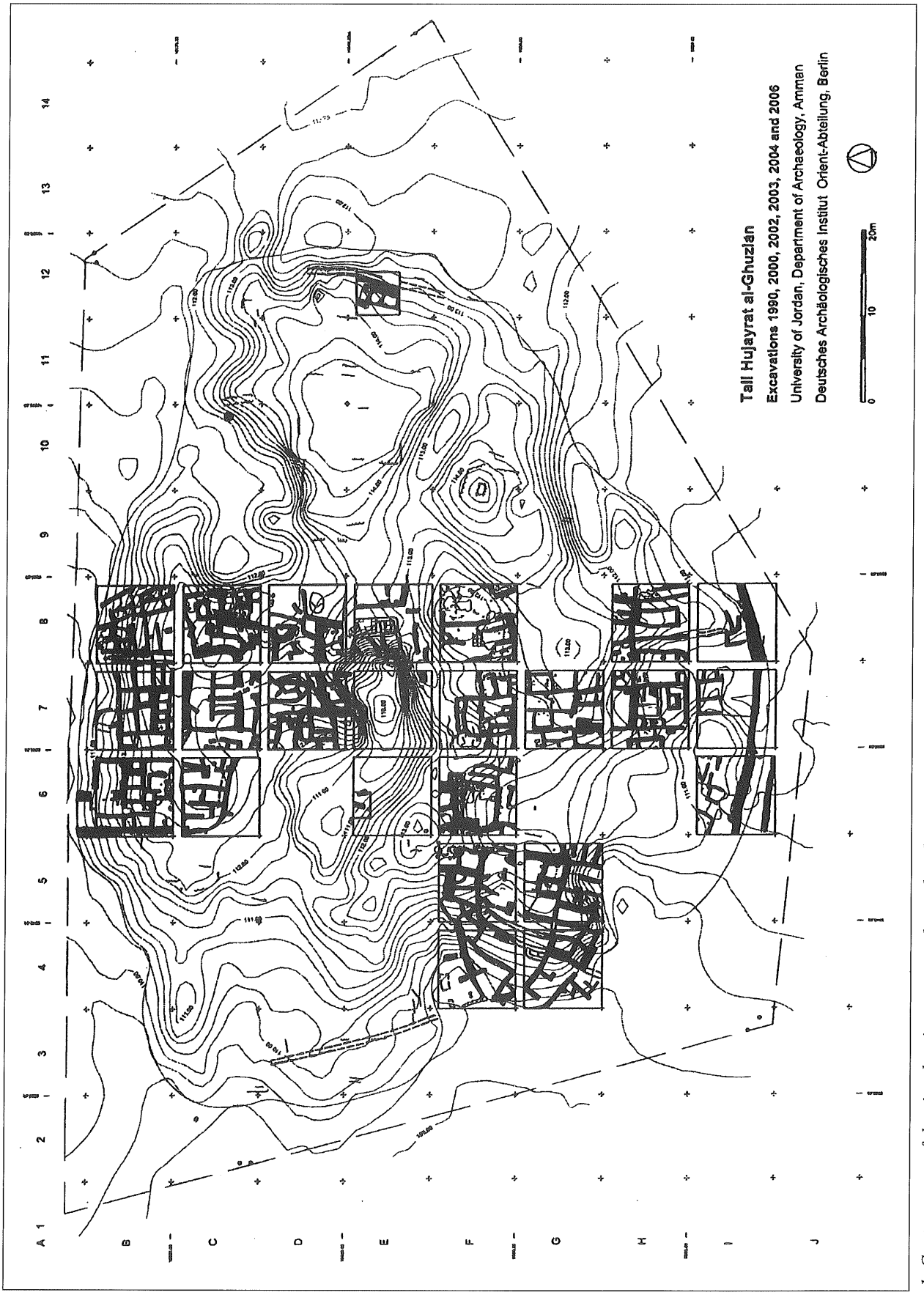
During the season, work was conducted in eight squares (9 x 9 meters each) and two deep soundings (**Fig. 1**), three trenches F8, H8 and G5 were excavated in the south-west sector of the tall, to investigate any possible stratigraphical information through the north-south section of the site. The work was continued in four trenches from previous seasons such as squares C8, E7, G5 and F6, to excavate any floor of the rooms and to determine the deepest occupation layers; especially in C1 and E7. In addition, two deep soundings in squares I6 and J6 were excavated to examine what is supposed to be the "city wall".

Architecture and Stratigraphy

The square C8 is located in the north-west sector of the site (**Fig. 2**), it was first excavated during 2002 season, when many mud-brick walls were revealed. When removing ashy layers between mud and mud-brick walls, a depth of more than four meters was reached, approximately 40cm above the natural alluvial sand of Wādī al-Yutum (Virgin soil).

Walls which are constructed either from mud or mud-bricks are preserved up to a height of four meters, architectural features such as an entrance, two windows and a column were revealed (**Fig. 3: A and B**). It can be suggested that those features represent an early phase of occupation, when the mud-brick walls were built on a foundation of stones. This phase of the walls was heavily damaged by an earthquake, which was accompanied by fire, which resulted in the collapse of the wall and many of the rooms being filled with multiple layers of ash.

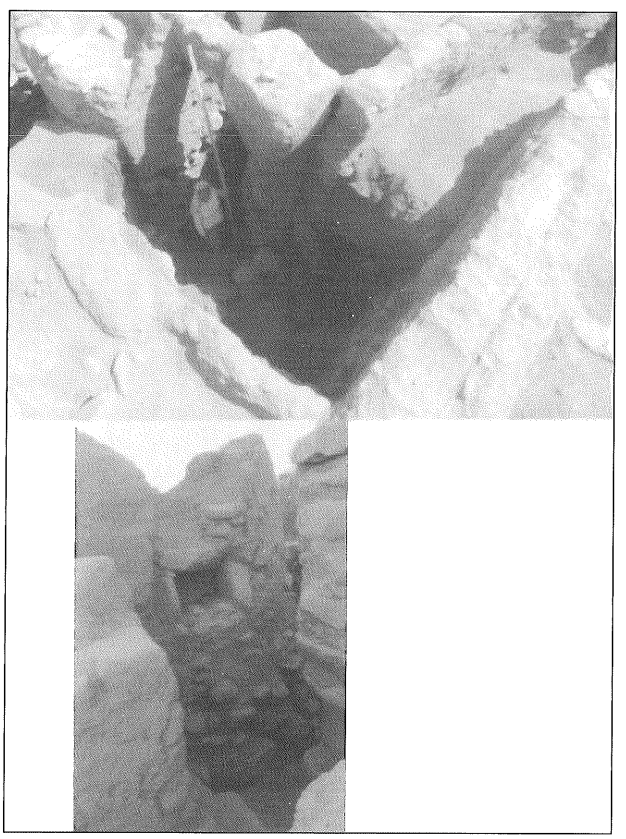
The remaining architectural elements of the early phase were integrated in to the architecture of the latter phase, where floor levels of this phase are located approximately three meters above the foundation stone of the early stage. Standing pottery vessels were associated with the floor level which corresponds to the foundation of the mud-brick wall (loc. 6). Between the walls, thick layers of ash were excavated, the



1. Contour map of the site showing excavated trenches during various seasons and the discovered architectural features.



2. *Ḥujayrat al-Ghuzlān from above, looking south.*



3. *Square C8.*

disturbance in the alignment of the walls and the thick ashy layers illustrate that the site had been abandoned by the second earthquake.

Square E7 lies almost in the middle of the tall, where it was heavily bulldozed, and a large pit was located (**Fig. 4**).

A: Architectural features measure ca. 4m height.

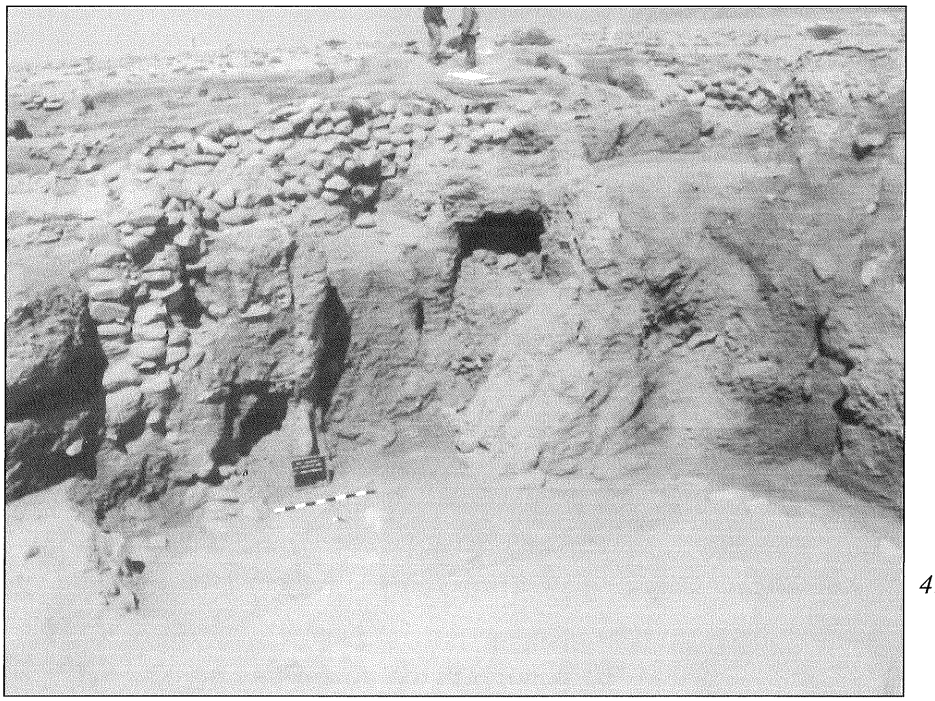
B: Window in the stone wall Loc. 32.

It was essential to continue digging in this part of the site for three main reasons, as follows:

1. To reach the lower stratigraphy at the middle of the site.
2. To find out the nature of the relation between the stone walls of what is called "Building A" and the mud and mud-brick walls in the area.
3. To clean up the dump and beautify the center of the site.

The northern, eastern and southern sections of the pit were cleaned, its depth measured in some parts approximately four meters. Many ashy layers and eleven walls can be seen in both the northern and eastern sections, especially, where both sections are connected. In the eastern section, a large platform is located, this platform is flat and built with mud-bricks, it is clear in this section that it was constructed on top of walls and layers of debris. This construction is related, from the stratigraphical point of view, to the stone foundation of "Building A".

Square G5 is divided into two parts; northern and southern by the wall (loc. 8), they represent two different levels such as the northern part is 111.05 meters a.s.l., meanwhile, the southern part is 111.07 meters a.s.l. The wall (loc. 8) is built by using a mixture of stones and mud bricks, it is still well preserved and it continues its alignment in squares G4 and F4.

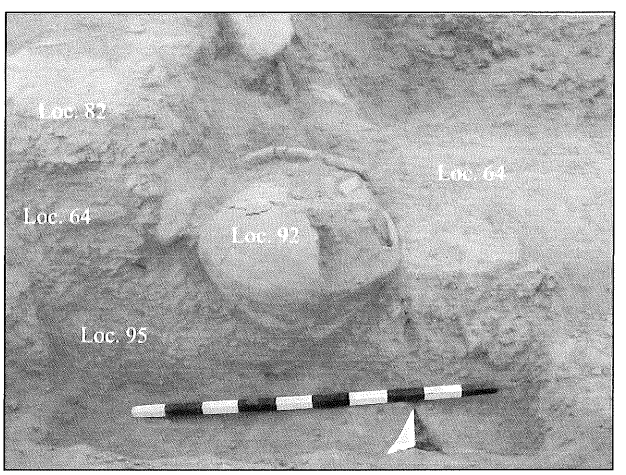


4. Square E7, a large pit was caused by destruction, looking north, shows stones and mud-brick walls and layers.

The foundation of the above mentioned wall have not yet been reached, but all the walls in the square G5 are joined to this wall, therefore, it can be suggested that they belong to the latest phase of occupation at the site.

The layers on both sides of wall loc. 8 were separately excavated; at the northern part, a floor made of whitish calcareous mortar was revealed, on top of the floor various artifacts were found. The colour and the material of the floor in the southern part is different from the northern; it is hard brownish mud. The two floors are not at the same level; the northern floor is 110.99 meters and the southern is 108.60 meters a.s.l., this may due to the fact that each floor belongs to a different building, which might be contemporary or of different dates.

Square F6 had been excavated in previous seasons, during this season, a subsidiary balk was excavated in order to study the stratigraphy between a complete pottery pot, the debris inside a room in the center of the square, a mudbrick structure and the stone wall (loc. 85). Three soil layers (loci 64, 82 and 95) had accumulated inside the room, all those loci are later than the mudbrick walls of the room, as well as the complete pottery vessels (**Fig. 5**). At the eastern part of the square a layer of ash debris was excavated, the layer is very rich in charcoal and copper metallurgical remains, such as fragments of pottery crucibles and moulds; beneath the above mentioned soil layers a mud floor was revealed. The excavation in the southern part discovered three mudbrick walls, they might date to the same phase as the room in the center of the square.



5. Square F6, complete pottery jar in its stratigraphical context.

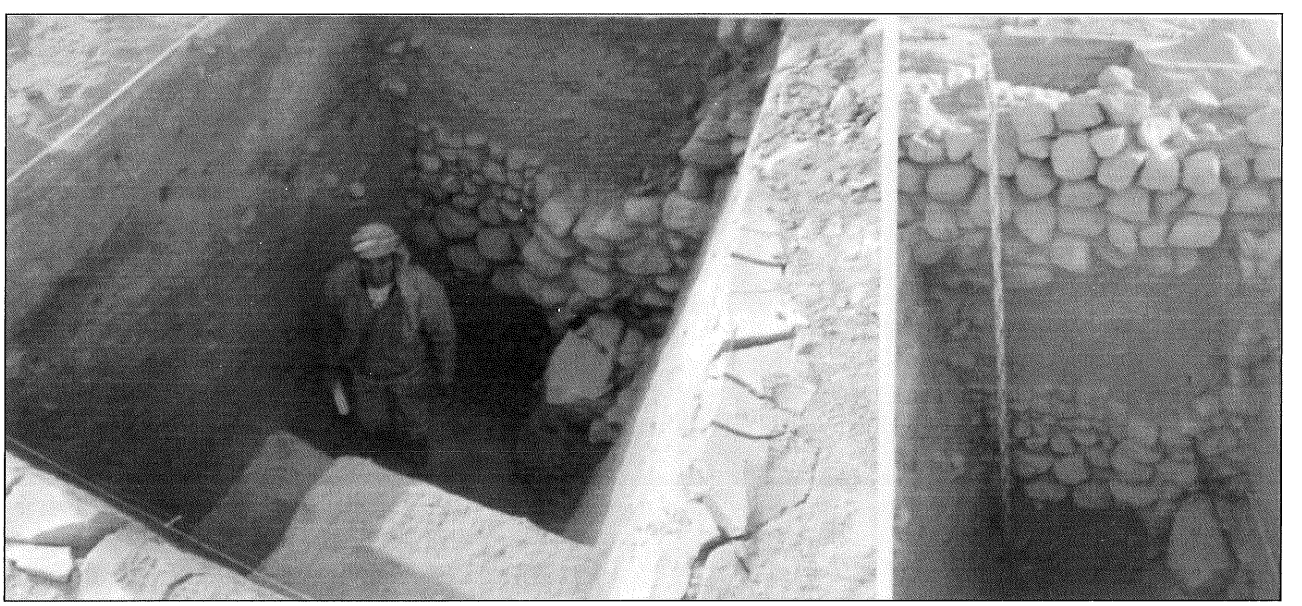
Square F8 was excavated this season in order to expose more architectural features horizontally and to complete the picture of the north-south section through the site and to connect the squares E8 and F7. The excavation at the north-western part of the square revealed a number of mudbrick walls, they are in parallel, orientated east to west and form three rectangular rooms,

they are also in line with rooms discovered during previous seasons. The excavated layer between the mudbrick walls contained many pottery sherds, lithic artifacts, copper metallurgical remains, shell and bone artifacts and animal bones.

Square H8 is located east of square H7 where the wooden beam of the ceiling was discovered during a previous season[1]. A number of mudbrick walls were revealed, they formed two different sized rooms, the type of rooms found in the northern part of the square are smaller than the rooms of the southern part. The walls of the northern rooms continue underneath the balk and towards the square F8. At the southern part five rooms were excavated, only one room (loc. 28) is completely excavated, meanwhile, the walls of the other rooms continue to extend in to the balks; those rooms measure on the average 6 x 1.40 meters. The walls of the rooms are constructed of mudbricks, sometimes they are plastered on both sides. One wall shows different methods of construction, its two lowest courses are built of medium sized stones and above that a mixture of stone and mudbrick was used to continue building the wall. Two holes (loci 31 and 32) curved into the mudbrick wall loc. 11, indicate that wooden beams were used for the ceiling of the room; as was excavated in square H7. Many finds were collected, they include pottery, flint artifacts, a shell bracelet and copper metallurgical remains.

Squares I6 and J6 are located on the southern foot of the tall, two trenches (2 x 2.5 meters each) were excavated to examine what is called the "city wall" from both sides. Excavating in I6 revealed five courses of the "city wall", and beneath the wall a number of clay and sand layers were accumulated above another wall. The lower wall was built using two sizes of stone and seven courses were constructed. It was built on mixed layers of sand and clay, they contain numerous artifacts (**Fig. 6: A and B**).

The architectural features at squares C8 and E7 make it possible to suggest at least two phases of occupation at the site. It is recognizable that the later phase is represented by buildings which are mostly constructed by undressed stones and sometimes by mudbricks, e.g. "Building A". The buildings of the earlier phase are mostly constructed from mudbricks and their walls stand on stone foundations.



6. A and B are two views showing deep soundings.

1. The beam was subjected to dating analysis; three rings were sampled and dated by the Leibniz Labor für Altersbestimmung und Isotopenforschung of the Christian-Albrechts-Universität Kiel. The suggested date for the beginning of the tree is ca. 4200BC, and the last ring dates to ca. 3850BC. A paper prepared in title: "Radiocarbondates from Prehistoric 'Aqaba and other related sites from the Chalcolithic Period" by F. Klimscha, is to be published in the forthcoming book: "Prehistoric 'Aqaba I" edited by L. Khalil and K. Schmidt.

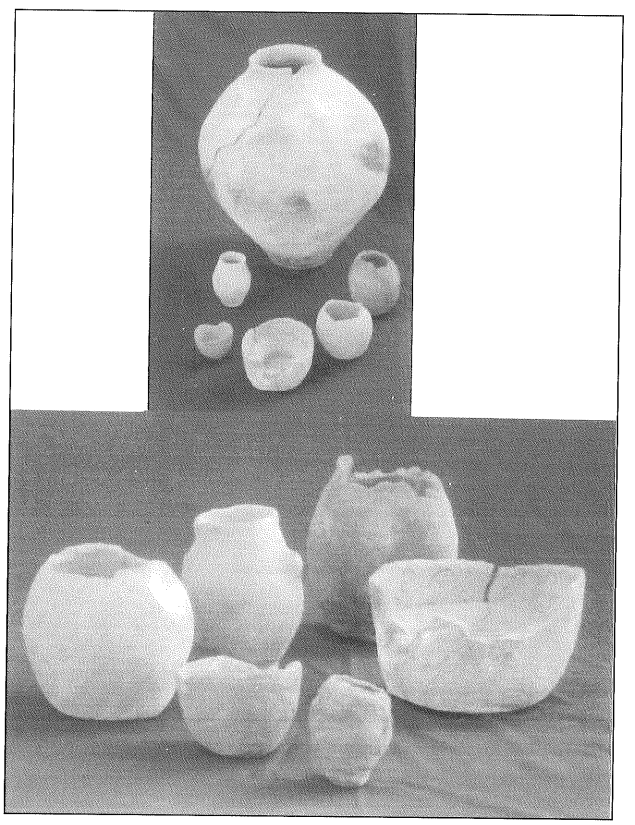
It is still early to draw an outline and distinguish an unambiguous plan for each phase, this is due to the fact that the walls of the late phase are cut into and built on top of the destroyed and collapsed walls of the early phase. In addition, more excavation of the early phase is essential for a better understanding this phase.

Finds

A number of complete vessels and a large quantity of sherds were uncovered during this seasons excavation (**Fig. 7: A and B**). The pottery is handmade and mostly of a coarse ware, there are few burnished vessels and the most common decoration is incising.

The fabrics and the forms of the pottery from this season, are almost similar to the fabrics and forms of the pottery which was discovered in the previous season (Kerner 2003: 175-182). The forms include: open form - such as different types of bowls, cups and platters; closed form - consisting of hole-mouth jars and the common type of jars and a jar with a short neck.

It might be possible to recognize the difference between the pottery in association with the suggested two phases of occupation, above. For example, at square C8, the fabric A15 is of coarse ware and the fabric N is of fine ware, both wares were found at the layers belonging to the later phase, but at the lower strata which represent the earlier phase, e.g. loci 91-116, a new fabric was found which is an intermediary between fabrics A15 and N. However, further investigations will no doubt clarify our understanding of the relationship between the phases of occupation and the pottery fabrics at the site.



7. A and B showing different types of pottery vessels.

The flint artifacts are mostly made of flint of mid-brown and darker colours, they have a dorsal cortical cover; "cortex tools" are typical flint tools during the Chalcolithic and the Early Bronze Age in the Levant (Herling 2002: 257-269). The blades show large variations in shape and size and were widespread. The tabular-like scrapers were also common tools at the site, they are of different forms; such as oval, oblong or fan. In addition, borers were also found during the excavation; they were used for various functions and are of different shapes and sizes. In general, the flint collection discovered this season is similar to the collections discovered during previous seasons at the site.

Various types of stone tools and vessels were uncovered, they are made of different raw materials, and include mace heads, hammers, grinding stones and few fragments of stone vessels.

The excavation discovered other artifacts which are similar to those found during previous seasons; such as copper metallurgical remains, bones, shell artifacts and ornaments. The cultural assemblage of the different finds at Ḥujayrat al-Ghuzlān can be dated between the Chalcolithic period and the early Bronze Age I.

Hydrology of Wādī al-Yutum

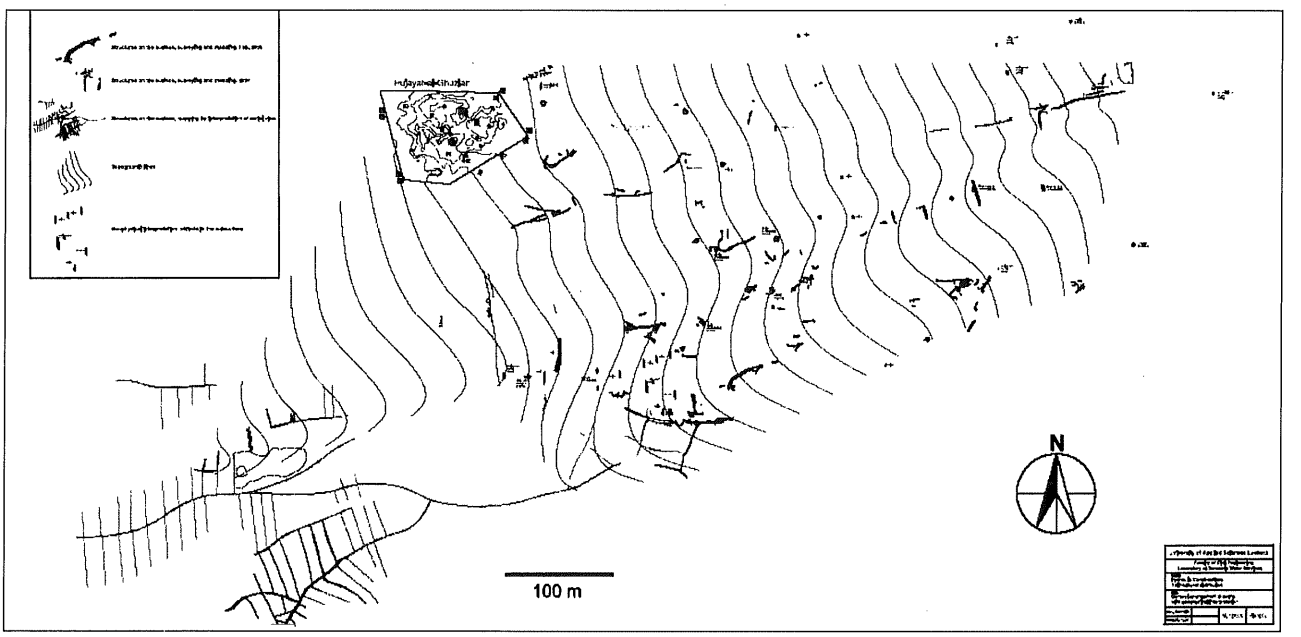
During the 1998 season of ASEYM, a survey to the east, southeast and south of Ḥujayrat al-Ghuzlān was conducted. Eleven locations were recorded, various shapes of structural features were observed; such as horseshoe shapes, circular and boat shapes and a drainage system (Khalil and Eichmann 1999: 507-509 and **Fig. 7**).

A team from the ASEYM project excavated two areas south of Ḥujayrat al-Ghuzlān in the years of 2004 and 2005. Four squares (A68-A69 and O268-O269) are located to east, and eight squares (AF26-AF33 and AE28) are located to

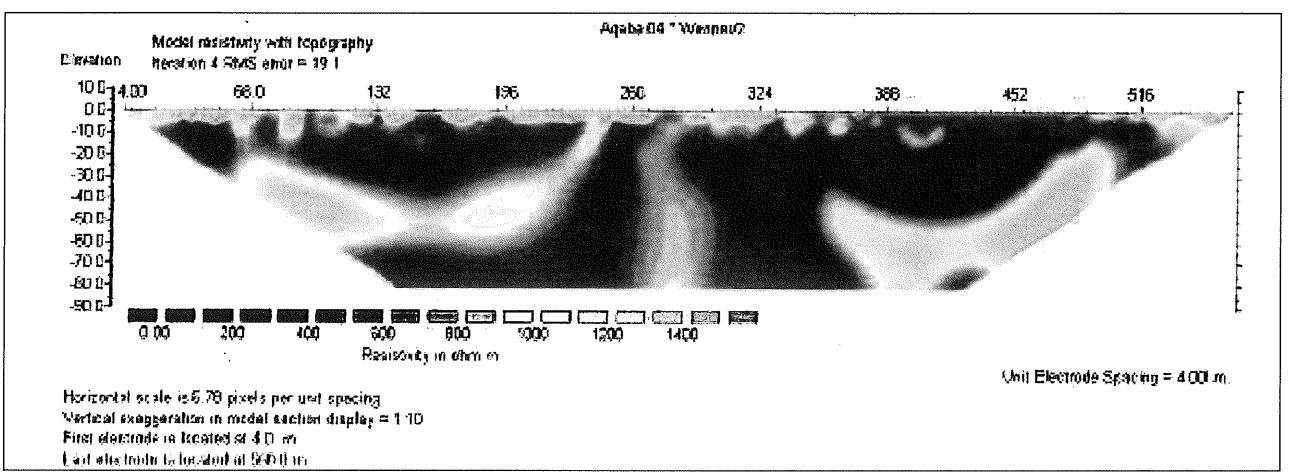
the south[2].

The construction of the walls and the shape of the structure indicates that these structures belong to a developed irrigation system. The features include channels, basins and the enclosure walls of a "*Hafayir*", which is a hole dug into the ground to obtain and retain water. As part of ASEYM, an archaeological and hydrological survey of the above mentioned areas surrounding Ḥujayrat al-Ghuzlān, took place during 2004, 2005 and 2006, conducted by a team from the University Applied Sciences, Lübeck (FHL) (**Fig. 8**).

A geophysical examination to determinate the level of the underground water was conducted this season at Wādī al-Yutum. It indicated that the groundwater probably could have reached the surface in the ancient times, especially, at the area nearby the site (**Fig. 9**). In addition, several stone structures of the basins have bright white-yellowish residue. This material is probably sinter, which is a siliceous or calcareous rock, formed by deposits from springs or by flowing water[3].



8. Contour map of the area surrounding Ḥujayrat al-Ghuzlān with the location of the hydrological features.



9. Geo-electrical resistance of the underground in Wādī al-Yutum and nearby Ḥujayrat al-Ghuzlān. Different colours demonstrate the level of the groundwater, e.g. yellow means the water is close to the surface.

2. A full report in title "Excavations of the Hydrological features at Wādī al-Yutum" by G. Heindle and K. Pfeiffer, is to be published in the forthcoming book: "Prehistoric Aqaba I" edited by L. Khalil and K. Schmidt.
3. A detailed report: "Investigation of the Hydraulic System at Tall Ḥujayrat al-Ghuzlān" is in preparation.

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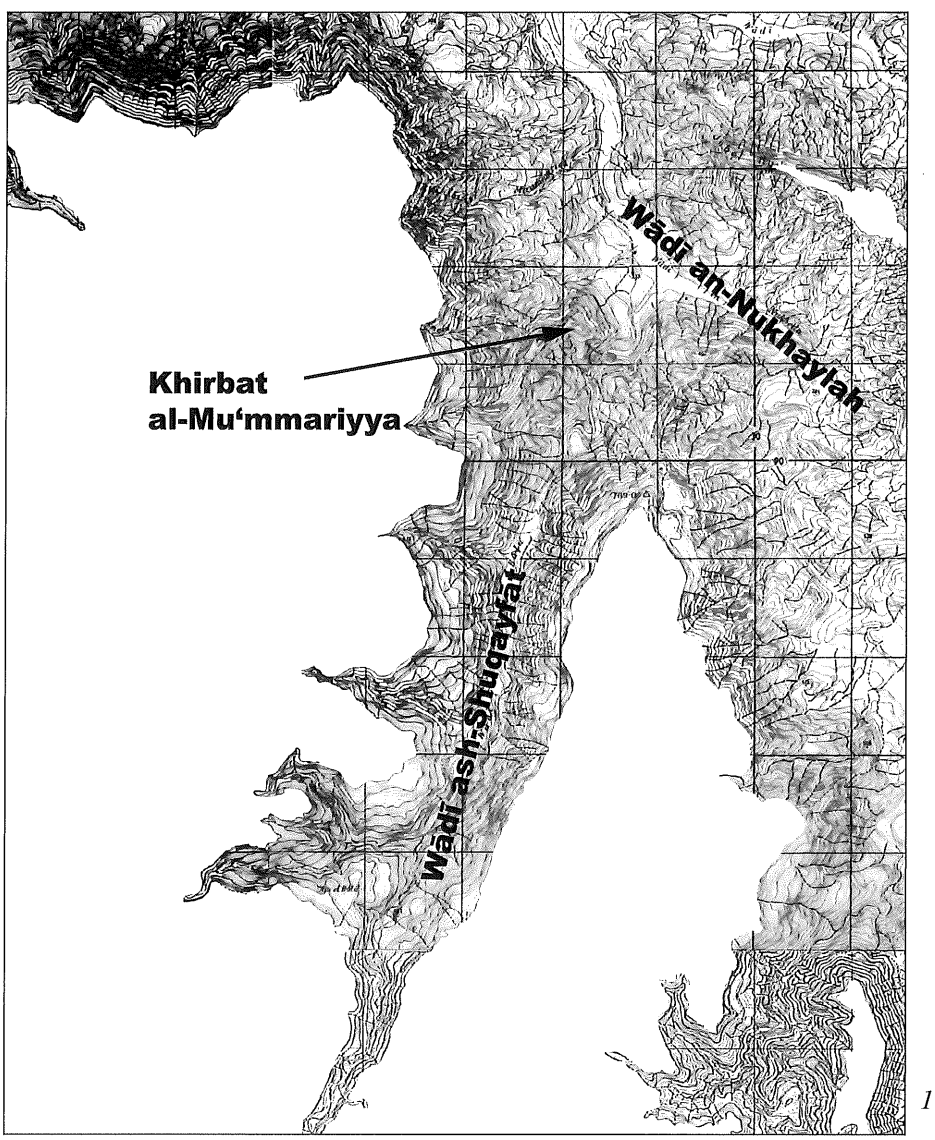
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THE 2005 SOUNDINGS AT KHIRBAT AL-MU'MMARIYYA IN THE GREATER WĀDĪ AL-MŪJIB AREA

Friedbert Ninow

During the month of August 2005 a team from Theologische Hochschule Friedensau carried out further soundings at Khirbat al-Mu'mmariyya in the vicinity of Wādī ash-Shuqayfāt which is one of the major southern tributary wadi system of Wādī al-Mūjib. Khirbat al-Mu'mmariyya is situated near the point where Wādī ash-Shuqayfāt empties into the major southern branch of Wādī al-Mūjib, Wādī an-Nukhayla. The site is situated on a hillside overlooking both Wādī ash-Shuqayfāt and Wādī an-Nukhayla (see **Fig. 1**; PG E249400/N186600; UTMG E787600/



1. Khirbat al-Mu'mmariyya above Wādī an-Nukhayla.

N357470; one can get a good overview of the site from the northern tip of the Khashm as-Sanīna plateau southeast of Khirbat al-Mu'mmariyya). Toward NW one can see the newly erected dam and the reservoir which is quite full even during the summer time.

During the 2002 and 2003 soundings at Khirbat al-Mu'mmariyya we investigated the main citadel of the site on top of Jabal al-Mu'mmariyya (472m above sea level). Our main goal was to get an overall idea of the ground plan of the site and especially the citadel on the upper hill. Several squares were opened —in particular the gateway that lead into the citadel. In addition to our investigation of the citadel we opened two other squares beneath the citadel: one about 25m SE of the citadel and another square near the line where the plateau of the upper site ends and the steep slope of the lower site begins (see Ninow 2004a, 2004b).

This year's soundings concentrated on a round tower-like structure to the south of the site (see **Fig. 2**). This tower is situated on a small path leading into Wādī ash-Shuqayfāt that provided a perennial source of water for the people living on the site. Furthermore, the last room of the southern casemate wall was opened. It formed the corner of the casemate wall that runs from the citadel down to the base of the site and then turns in a northern direction. In addition, we opened some rooms that are situated adjunct to the casemate wall.

T

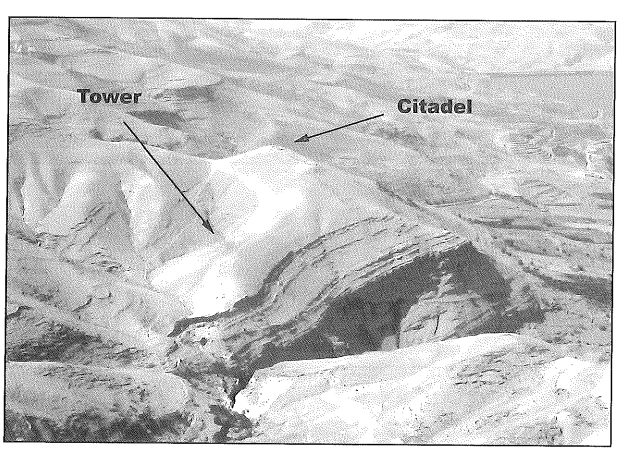
On a natural descent from the main site down into Wādī ash-Shuqayfāt a tower with adjacent walls is situated. The structure forms a circle (wall RW) of about 5.50m in diameter (inner side of the walls). The width of the wall is ca. 1.30m. The circle itself and the width of its wall is pretty much regular. Judging from the existing remains it is unclear from where access to the tower was situated. If there was a door it must have been on the south eastern side of the tower. Possibly, the tower was accessed by a ladder.

From the round tower like structure two wall lines extend in a northern direction (W10 and W20). These wall lines have about the same width as the round wall line of the tower (see **Fig. 3**).

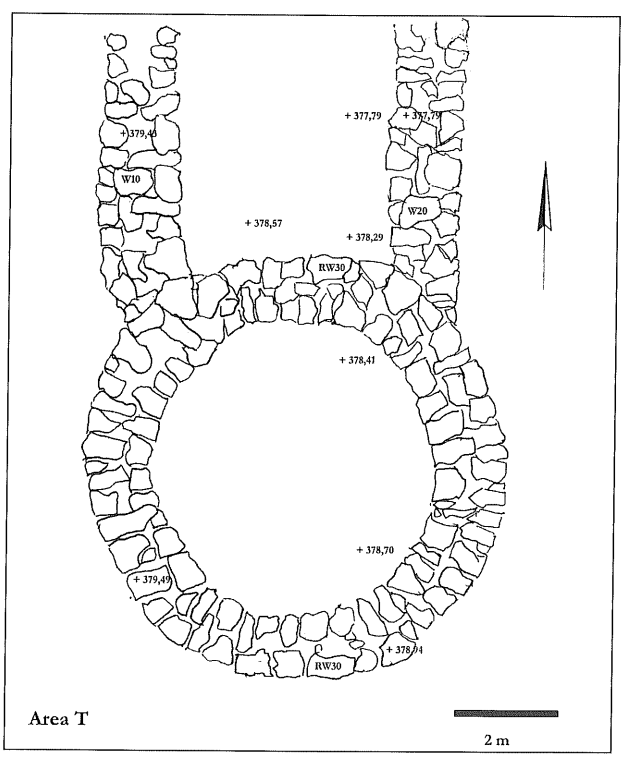
The inside of the tower was covered by a carefully laid pavement of flat stones. To get an even foundation for building the tower, the uneven surface of the bedrock was cut or respectively filled to achieve an even surface.

The two wall lines running in northern direction form an area with a breadth of about 3.50 to 4.00m. It is unclear how far these walls extend to the north. While near the tower the wall lines are visible on the surface, further to the north they become invisible. The immediate area in front of the tower has a pavement. There was relatively little pottery to be recovered.

From the pottery that was recovered it be-



2. Khirbat al-Mu'mmariyya as seen from the Khasm as-Sanīna plateau.



3. Area T: Tower.

comes clear that this structure has to be associated with the main site of Khirbat al-Mu'mmariyya. All the forms of pottery recovered are also represented at the main site and date this tower to Iron I. The occupation of the site was rather limited over a period during the early Iron age period (for some pottery examples, see **Figs. 4** and **5**).

F1

Where the southern casemate wall reaches its upper end and turns northward to form the base of the site, a small room was excavated which formed the southeastern corner of the fortification, whilst at the same time being the lowest point of the site (see **Fig. 6**).

This room is formed by the three main casemate walls W1000, W2000, and W5000. This room forms roughly a square of 5.00 x 5.00m (see **Fig. 7**). The average width of the walls is 1.00m. The surface of this room was cut into the bedrock (especially in the upper half of the room). The lower part of the room follows basically the form of the bedrock. The room is sloped due to steep slope that drops into the wadi (see **Fig. 8**).

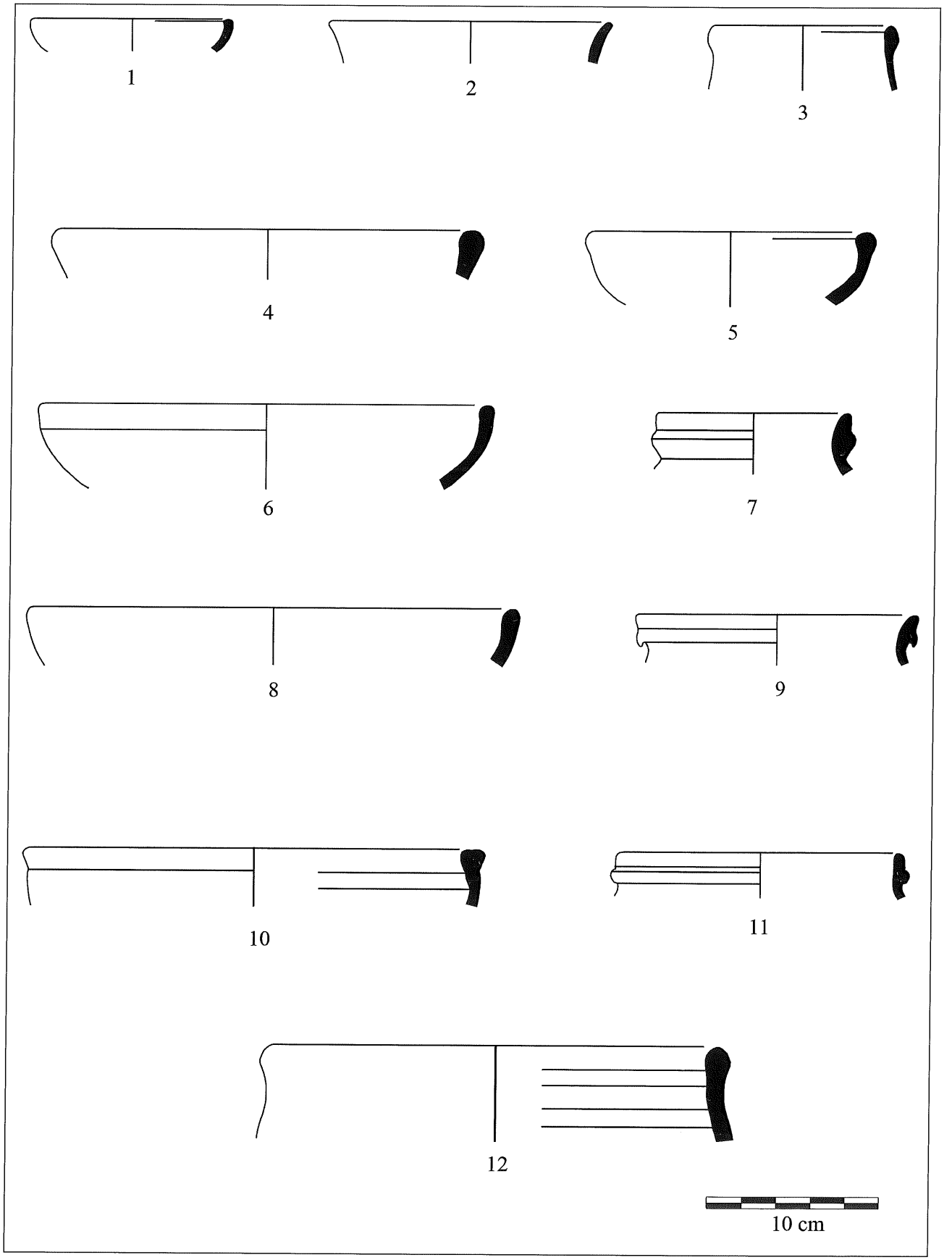
Area G

This area is situated on the slope of the lower site adjacent to the southern casemate wall W1000/W2000. It consists of the casemate, several rooms, and an open area respectively (see **Fig. 9**). In order to achieve an even foundation the bedrock was cut (in the upper portion of G4/G5) or filled with silt to compensate for the sloping surface of the site. This led to a huge amount of filling in Rooms G1 and G2. Once an almost even level was reached with G4/G5 the rooms were given a floor. The floor in G1 consisted of solid beaten earth/silt; G2 had a pavement. G1 was a square room of about 2.30 x 2.30m. It could be entered from G4/G5 by a doorway that was in the southwestern corner of the room. In G2 two different phases could be distinguished. G2 consisted in its first phase of a kind of open room with an entrance way in its northeastern corner. The western side of the room was limited by two pillars that are characteristic for the site. In a later phase the western side was blocked; the pillars were used as part of this new wall (see **Figs. 10 and 11**). This modification could well be due to intensified food processing that took place in the area of G4/G5. Two big grinding stones were found *in situ* with several working stones nearby (see **Fig. 12**). A complete jar was recovered near W620 (**Figs. 13** and **14**). From area G4/G5 the casemate G3 could be entered through a passageway. This passageway consisted of cut bedrock. The surface of this casemate corresponds roughly to the natural surface of the bedrock. Inside the casemate many fragments of various storage jars were discovered. Unfortunately, none could be recovered intact or complete.

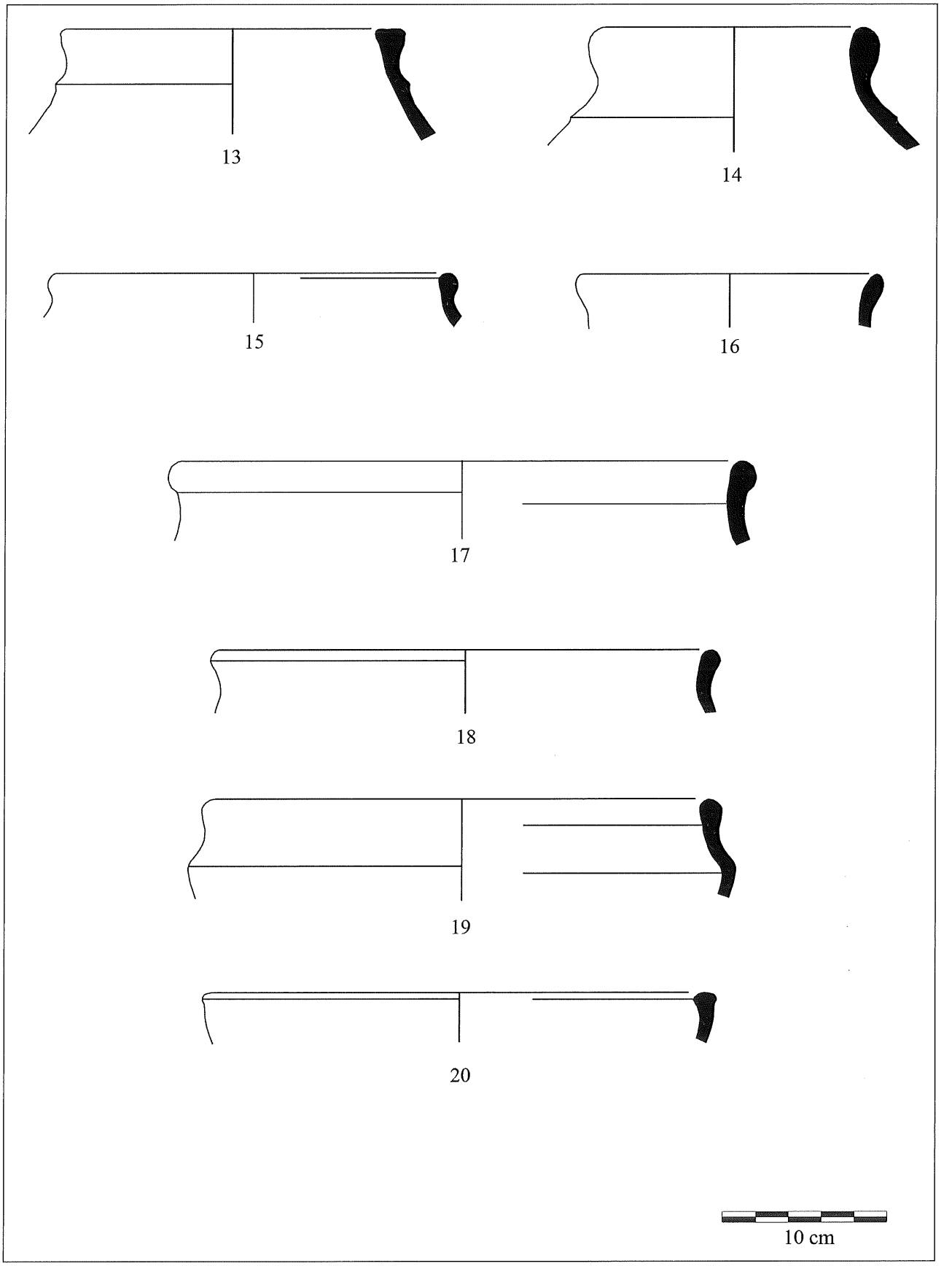
It appears that where the site sloped down steeply, it consisted of several units that were built on an even level; W610 and W620 would delimit such a unit. Within these units the surface was leveled (either by cutting the bedrock or filling in the difference with packed silt). Thus the site can be seen to have the characteristics of terraced living levels. Within the upper city this building strategy was not necessary due to the relatively slight sloping of the site. The lower city needed a different building strategy. Thus, the builders employed a terrace type structure of single living units that were delimited by long walls that led across the site.

Conclusion

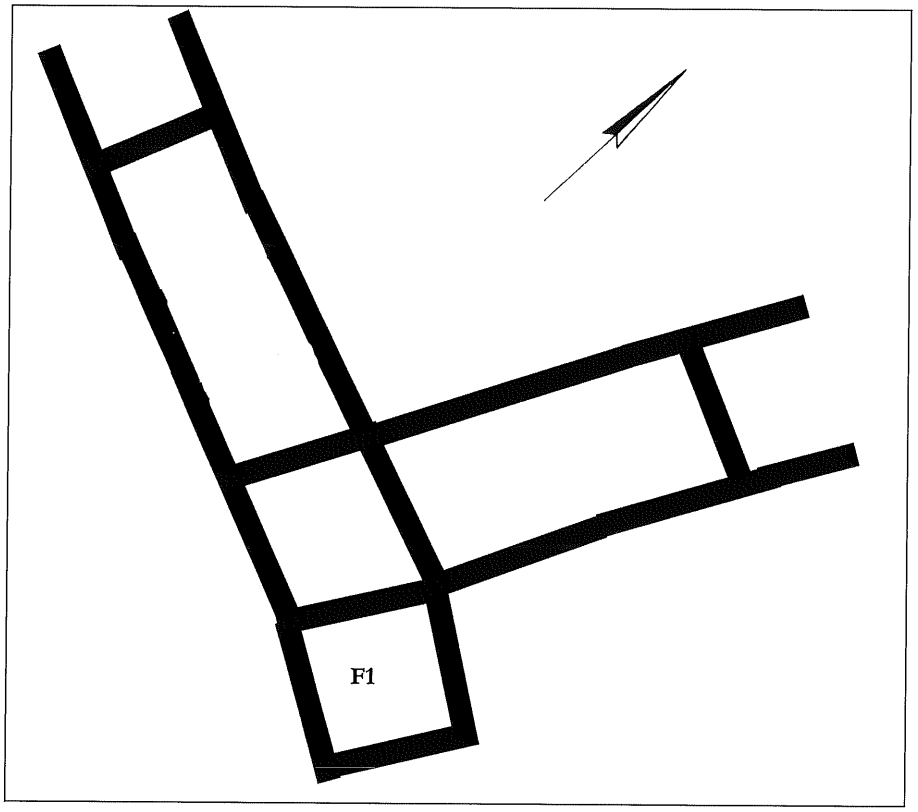
The 2005 sounding at Khirbat al-Mu'mmariyya revealed further insight into the architecture of the site, as well as insights into the tower structure to the south of the site. The excavated pottery supports the preliminary conclusion that Khirbat al-Mu'mmariyya is most probably contemporary with sites such as Khirbat al-Mudayna al-'Āliyā and other Iron Age I sites in the wider vicinity of the northern Arḍ al-Karak plateau (see Routledge 2000, 2004: 87-113). The analysis of the pottery of the tower shows that it must have been be connected to the main site; i.e. its contemporary. The sounding has further revealed that the people of Khirbat al-Mu'mmariyya employed a particular building strategy to cope with the steep slope of the site. They formed small terraces to build various small living and working units. The pottery reveals a broad spectrum of Iron I pottery that testifies to food production and food processing as a main occupation of the inhabitants of Khirbat al-Mu'mmariyya.



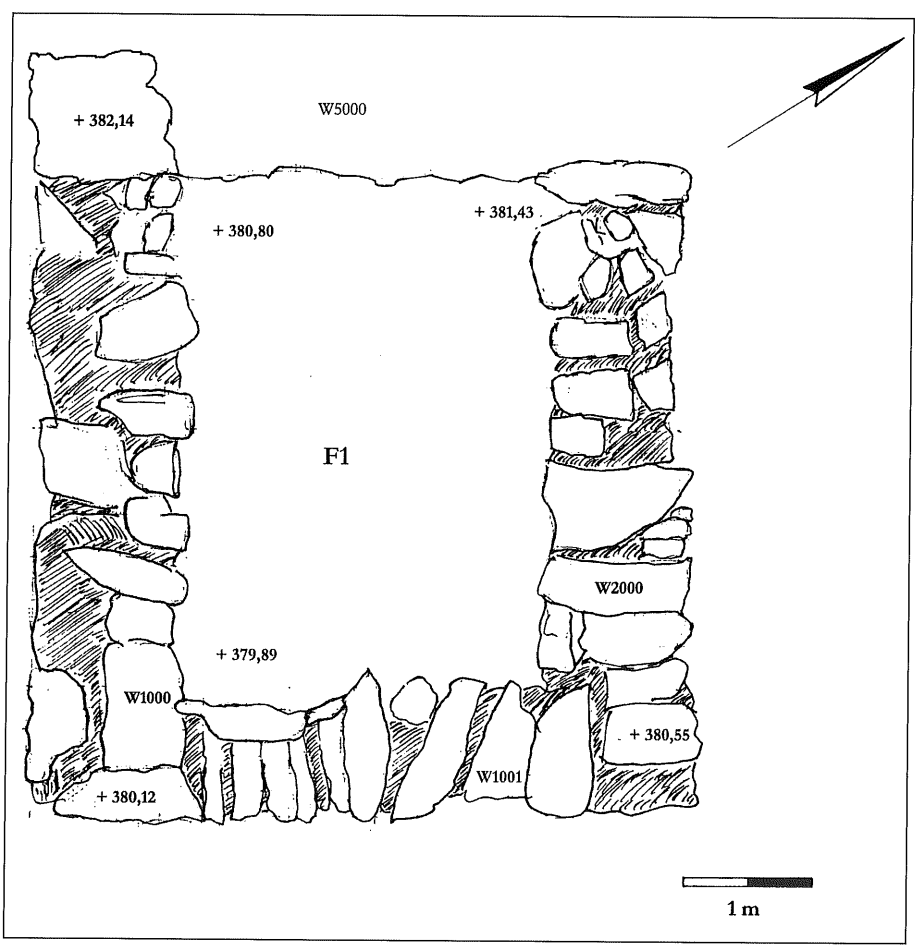
4. Ceramics from Khirbat al-Mu'mmariyya – 1.



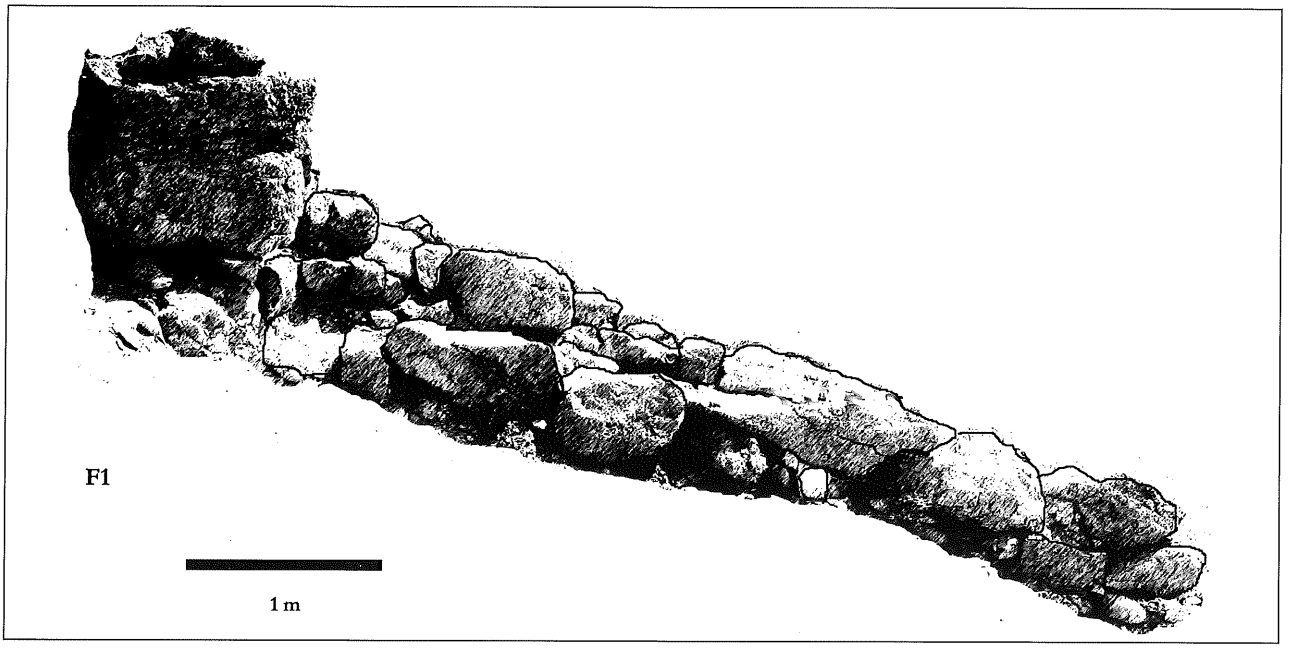
5. Ceramics from Khirbat al-Mu'mmariyya – 2.



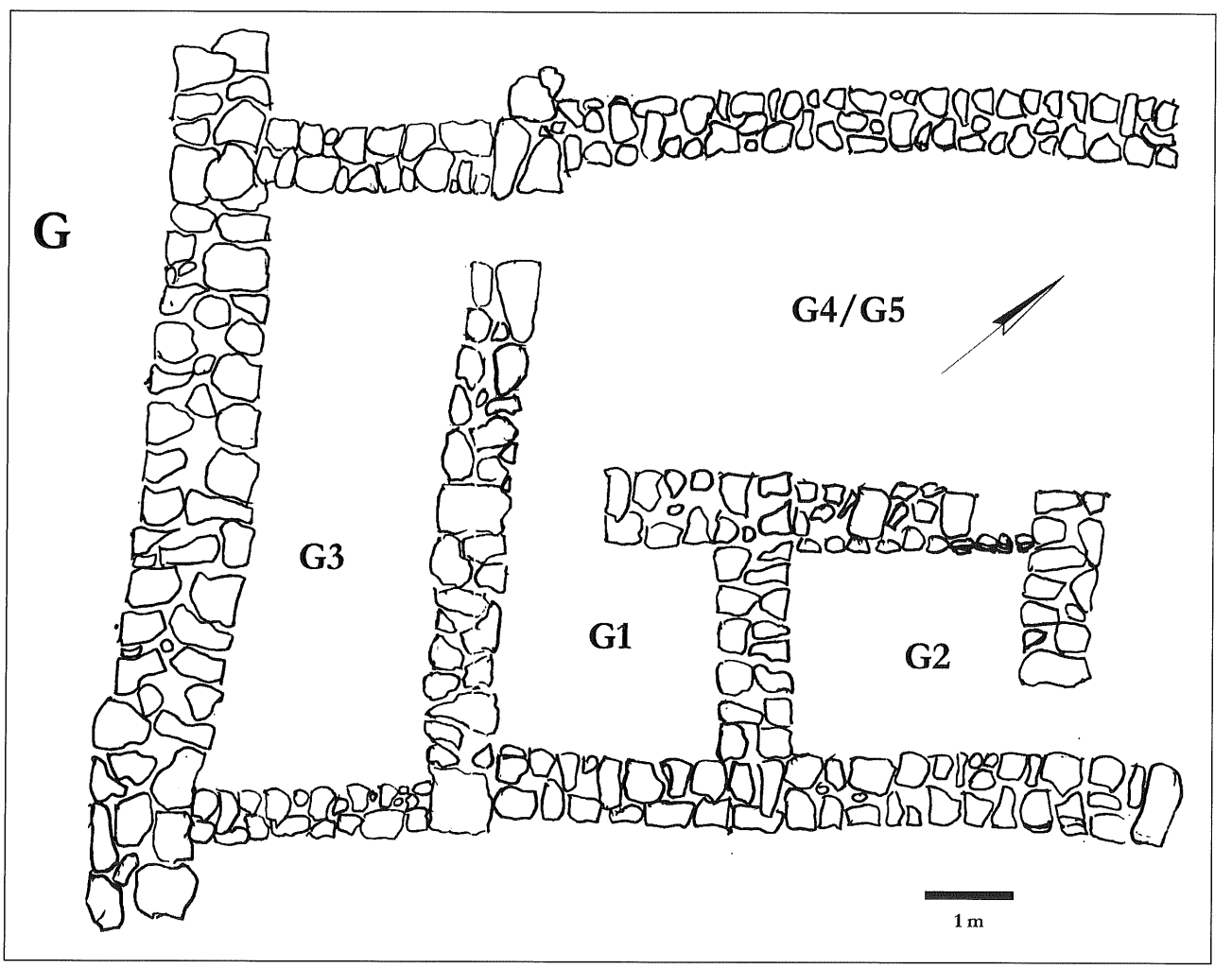
6. Area F.



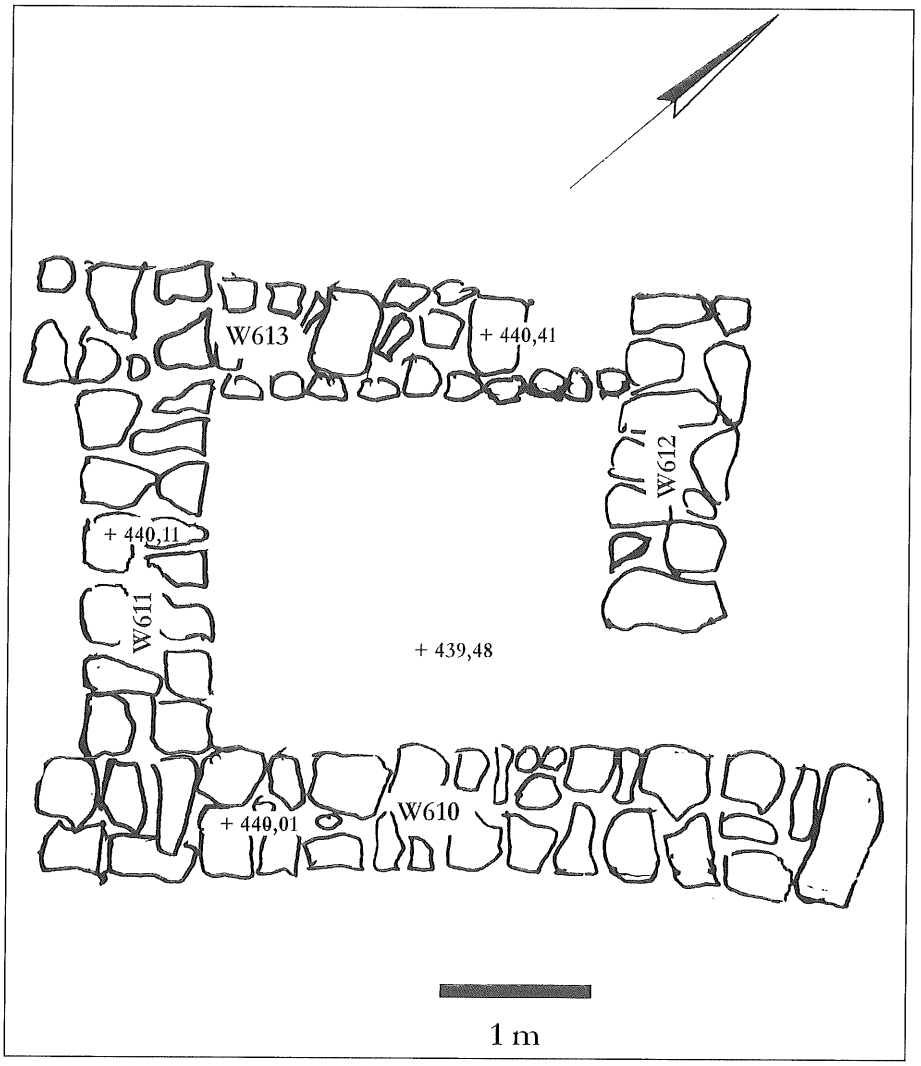
7. Top plan F1.



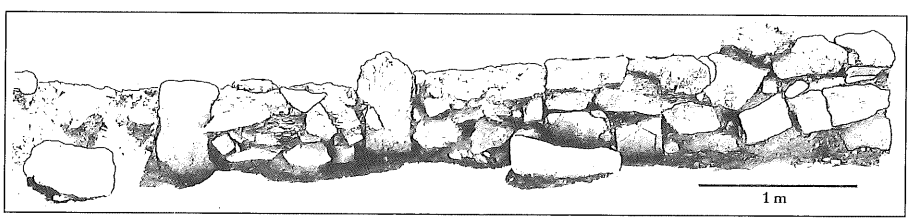
8. F1 - W1000 from S.



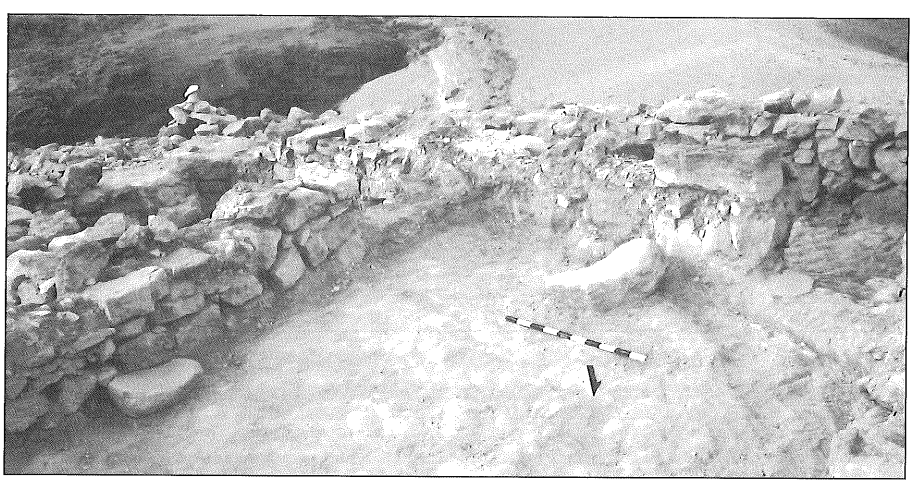
9. Area G.



10. Top plan G2.



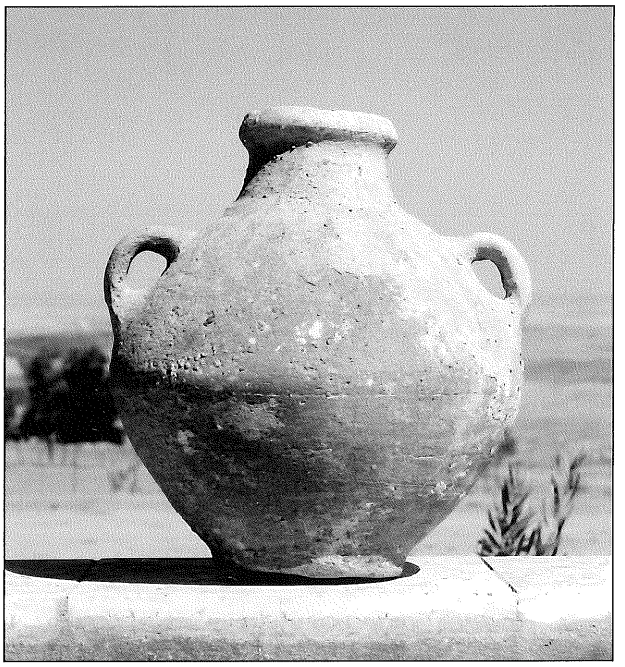
11. G4 - W613 from W.



12. Grinding Stone Installation.



13. Jar in situ.



14. Jar.

Acknowledgments

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THE 2005 WĀDĪ RAMM GPR SURVEY

Megan A. Perry, Geoffrey L. Jones

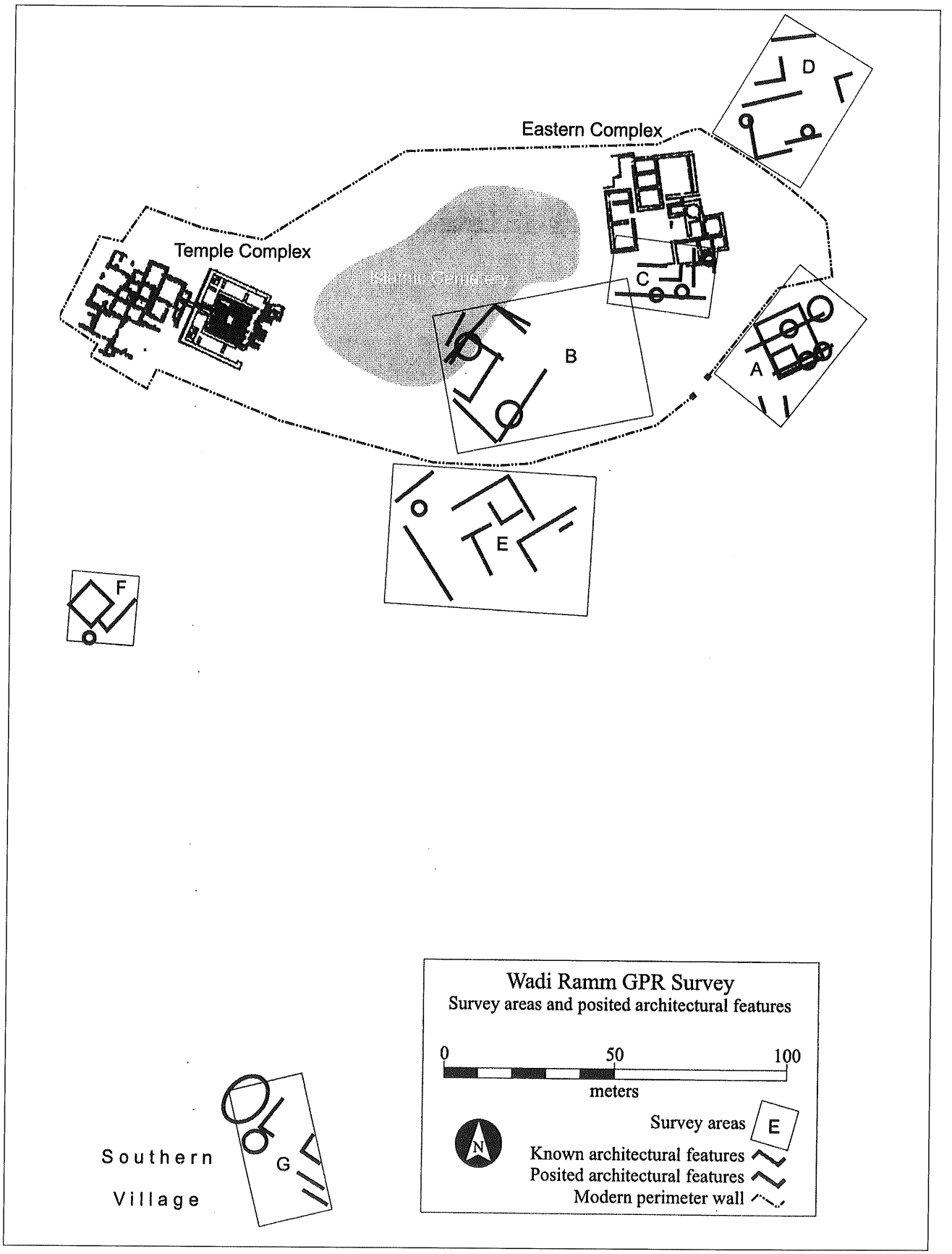
During the 1960s, the Department of Antiquities of Jordan (DoA) conducted preliminary excavations in the Nabataean temple and related structures at Wādī Ramm. During these explorations they discovered and excavated a Nabataean-period communal tomb within the vicinity of the present-day Ramm village. The records of this excavation unfortunately have been lost. In 2005, efforts to locate the cemetery associated with Nabataean and Roman period occupation at Wādī Ramm commenced using ground penetrating radar (GPR). This report details the results of the GPR survey conducted from June 25-30, 2005 and plans for future fieldwork at the site[1].

Background

Wādī Ramm (ancient *Iram*), situated in the desert Ḥismā region of southern Jordan, served as a religious and population hub, on trade and migration routes between northern Saudi Arabia and the Nabataean kingdom. Previous archaeological explorations at Wādī Ramm have focused primarily on the Nabataean temple complex (Kirkbride 1960; Savignac 1932, 1933, 1934; Sauvignac and Horsfield 1935; Tholbecq 1997, 1998), the "southern village" (Tholbecq 1998), and a hypothesized bath and domestic complex (Dudley and Reeves 1997). Numerous archaeological and epigraphic surveys in the environs of Ramm have fleshed out data provided by archaeological excavations through documenting numerous Thamudic inscriptions, shrines, water catchment systems, and other ancient structures (Farés Drappeau 1996; Farés Drappeau and Zayadine 2001, 2004; Graf 1978, 1983, 1992; Grimme 1936; Harding 1952; Jamme 1971; Kirkbride and Harding 1947; Savignac 1932; van den Branden 1950; Winnett and Reed 1970; Zayadine and Farés Drappeau 1998).

The 1960s DoA explorations of Wādī Ramm and its Nabataean temple also included excavation of a Nabataean period communal tomb somewhere in the vicinity of the site. Documentation of this excavation however was destroyed during flooding that inundated DoA records storage. No information therefore was available to pinpoint the location of the Nabataean tomb (perhaps part of a larger cemetery) beyond identifying likely locations based on site geomorphology and the location of other ancient structures. Discovery of a cemetery associated with Wādī Ramm can illuminate human migration patterns and the level of social and economic interaction among ancient communities in southern Jordan and northern Saudi Arabia. Examination of human skeletons recovered from *Iram* would address these questions through bone chemistry and population genetic analysis and assessment of health, disease, and diet. These bioarchaeological data can provide information on the interconnectedness of Nabataean communities,

1. The 2005 season of the Wādī Ramm Cemtery Survey was made possible by a permit from the Department of Antiquities of Jordan. The project staff would like to thank Dr. Fawwaz al-Khraysheh, Director-General of the Department of Antiquities of Jordan and Dr. Pierre Bikai, former director of the American Center of Oriental Research for their assistance. The 2005 project staff included: Project PI Megan A. Perry (East Carolina University), Geophysicist Geoffrey L. Jones (Archaeo-Physics, LLC), and field staff Robert Patterson, Lisa Leone, Tina Greene, and Joshua Fairchild (East Carolina University). The Department of Antiquities representative was Amer Bdour. Funding was provided by an East Carolina University Research and Development Grant, a grant from the Joukowsky Family Foundation, and a Kenneth Russell Fellowship from the American Center of Oriental Research.



1. Map of the survey areas and posited architectural and mortuary features.

population movement between Nabataea and other regions, the migration patterns of nomadic tribes, and the local impact of Roman annexation. We employed GPR as a cost-effective, time saving method for identifying ancient features at the site, including graves. In addition to identifying the location of a cemetery at Ramm, our efforts focused on exploring the possibility of other ancient architecture at the site and by including a few Islamic graves, determining the qualities of grave-related reflections at the site.

GPR Survey Methodology

Selection of survey areas addressed the goals outlined above. Site topography and layout of the visible complexes and Islamic cemetery influenced the areas selected for exploration in 2005. Seven survey areas (Blocks A-F) were chosen within the environs of the Nabataean Temple complex excavated by Tholbecq (1998) and the Department of Antiquities, the "eastern complex" (a bath and related villa) excavated by Dudley and Reeves (1997), and the "southern village" explored by Tholbecq (1998) (**Fig. 1**). Two grids were placed within open areas surrounding the Islamic cemetery and eastern complex. Block B (1800m^2) was located directly south of the main concentration of Islamic graves and within the recently constructed site perimeter wall. Block C (600m^2) was laid out in between Block B and the eastern complex. Additionally grids were established along the slopes to the north, south, and west of the main site structures. Block A (1000m^2) was placed immediately east of the modern perimeter wall surrounding the site, Block D (1200m^2) on the slope north of the eastern complex and modern perimeter wall, and Block E (2400m^2) to the south of Block B and the modern perimeter wall. Two other areas some distance from the temple and eastern complexes were also explored. Block F (400m^2) was established adjacent to two suspected tombs, on a small rise below the Jabal Ramm escarpment in between the "southern village" and the temple complex. Block G (900m^2) was placed near the "southern village".

The general survey procedure was to divide each survey area ("Block") into a series of square or rectangular survey "grids". Each grid was surveyed by taking readings at regular intervals along regularly-spaced, 1m transects. Ropes marked at regular 1m intervals were used to control transect spacing, and a trailing odometer wheel controlled the recorded position along each transect. Successive transects were surveyed in a zig-zag pattern until the grid was completed. The GPR survey method employed at Wādī Ramm involved dragging the transmitter and receiver antennae together on the ground at a fixed rate, called fixed offset reflection mode. The GPR survey was performed using a Sensors and Software pulse EKKO 1000 radar system. GPR's effective depth of investigation depends upon the matrix through which the signal travels and the GPR signal frequency. Selection of the signal frequency must compromise between depth of investigation and resolution. After staking out the seven survey blocks (Areas A-G) with a Sokkia Set 5a total station, they were surveyed in transect intervals of one meter using 450 mega Hertz (mHz) frequency antennae. Blocks A and D also were surveyed using 225mHz antennae, but these were less effective in spite of their deeper penetration. Conditions at the site were generally well suited to GPR survey and signal penetration was good. The relatively high frequency of 450mHz was found to be effective to a depth of 2 meters and provided much better resolution of subsurface reflectors than a lower 225mHz frequency. For a more complete and technical discussion of the methods see Annan and Cosway (1992) and Conyers and Goodman (1997). An overview of the geophysical approaches to archaeology can be found in Gaffney and Gater (2003).

Initial examination of the site indicated that geophysical methods, such as GPR, could be used to identify the cemetery and other features. A successful GPR survey depends largely upon soil and other field conditions. The Wādī Ramm soils were composed mainly of aeolian, colluvial, and alluvial fine sands deriving mainly from the local sandstone bedrock. The sands generally provided a good medium for propagation of the GPR signal. Rocks present at the site can result in culturally-significant anomalies (such as walls or cist tombs) in addition to non-cultural "clutter" and signal scattering. It is difficult to determine whether the majority of rock found on the site, excepting dressed local sandstone used in Nabataean and Roman architecture, is naturally-occurring or has been culturally trans-

ported. Islamic graves and other recent cultural features have employed rock from local sources, including re-used dressed sandstone. Ancient architecture primarily utilizes dressed sandstone, although foundations and rubble-and-mortar wall fill consist mainly of other undressed local rock.

All of the survey areas had varying amounts of modern metal debris on and near the surface. Metal objects near the GPR antenna array can cause a strong response known as "ringing" that can obscure phenomena of interest. Cans, wire, and other metal debris were cleared from the path of the GPR, but some instances of metal-related ringing were noted in all of the survey areas.

A field laptop computer controlled data collection and allowed real-time display of the data as a two-dimensional vertical profile. Data from multiple adjacent transects were used to construct planview maps of a surveyed area with a technique known as time slicing. Time slicing not only makes interpretation of the horizontal data much more intuitive, but also allowed for isolation of specific depths (i.e., the two-way travel times of reflected waves) for examination (see Conyers and Goodman 1997). The initial processing and time slicing of GPR data used Sensors and Software EKKO Mapper software, which utilizes Fortner Transform software to plot the data array as planview maps. Geoscan Research GEOPLOT software was used for further processing. The processing of GPR data utilized different gains and filtering techniques, such as median filtering, to increase signal strength and enhance certain data characteristics. Golden Software Surfer was used for final display of data plots.

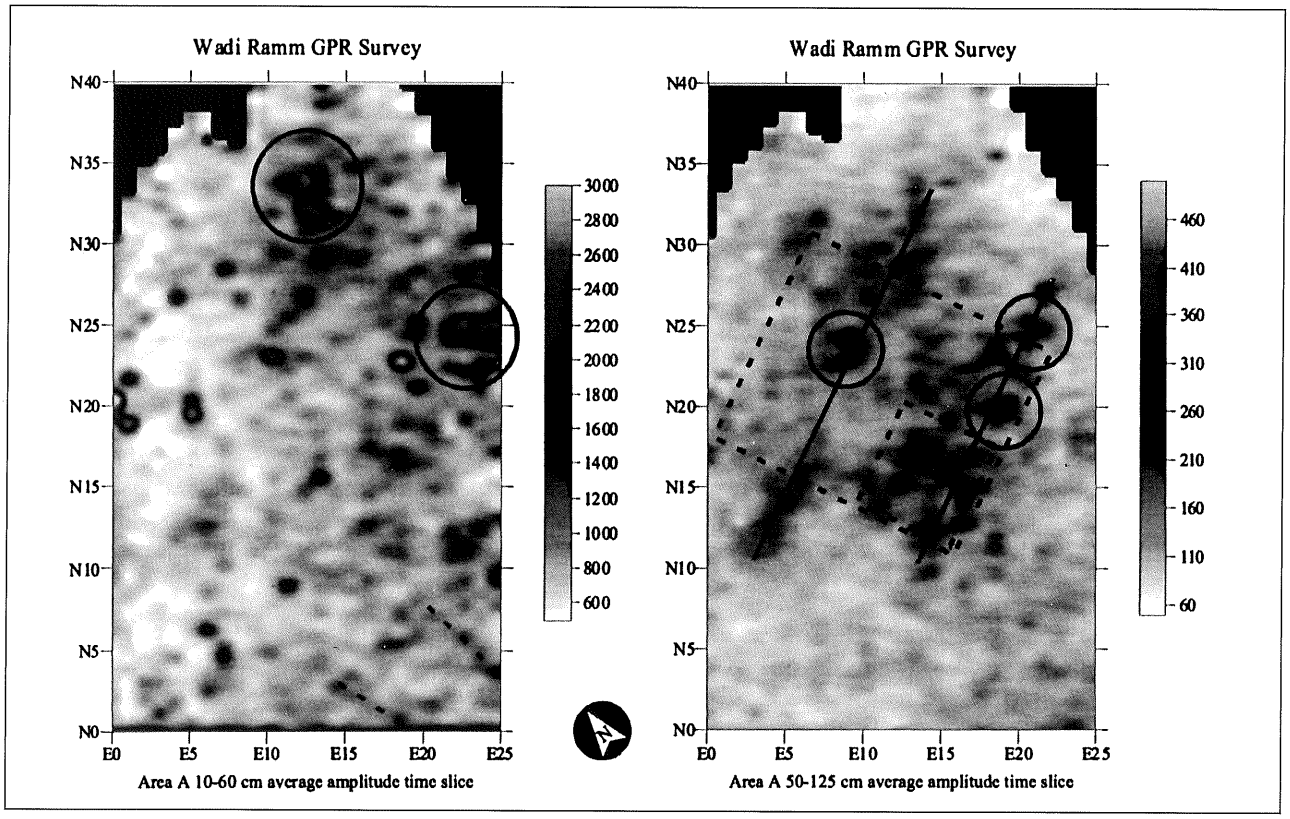
This analysis generated two planview maps of each survey area that represent two estimated depth ranges (10-60cm and 50-125cm). Sectional (profile) views also illustrate phenomena as expressed in vertical (i.e., signal travel time) dimension. The lack of detailed topographic information for the survey areas meant that data plots are presented without topographic correction. Depths in survey plots thus indicate nominal depth below the surface rather than elevation. An estimated velocity of 0.1 meters/nanosecond was used for depth calculations; actual depth however may vary from the nominal depth due to changes in topography or differences between nominal and actual signal velocities.

Results

The geophysical survey at Wādī Ramm identified many phenomena of archaeological interest, including possible ancient architecture and tombs. All seven blocks had linear patterning indicative of ancient architecture. Six out of seven blocks also contained more distinct areas of interest possibly indicating graves. Block A, located ca. 15m to the east of the eastern complex, contains fairly well defined linear/rectilinear patterning and several discrete reflectors of interest (**Fig. 2**). Block B on the other hand contained weaker indications of architecture (**Fig. 3**). This area, situated in between the temple and eastern complexes, included part of the historic/modern Islamic cemetery in order to discern the reflection pattern of these tombs and whether they could be mistaken for ancient graves. These Islamic graves tended to be expressed only in the near-surface and thus could not be misidentified as Nabataean tombs. Other discrete reflections possibly indicating non-Islamic tombs appeared in the section data views but they were generally weak, making any interpretation of patterning tenuous.

Block C, directly south of the eastern complex, contained well-defined linear/rectilinear patterning oriented slightly differently than the exposed architecture of the complex (**Fig. 4**). Block D on the other hand, ca. 20m to the north of the eastern complex, had weak linear patterning approximately paralleling walls in the complex (**Fig. 5**). Block D also contained a very strong linear anomaly in the northwest corner associated with a wall visible on the surface. The antiquity of this wall is unknown.

Block E, located on the slope to the south of the eastern complex and Block B, contains generally well-defined linear/rectilinear patterning suggestive of substantial architecture oriented slightly differently than reflections in Block B (**Fig. 6**). An area of high-amplitude response also extends across the northern portion of the survey area (roughly north of N30), apparently caused by fill on top of a horizontal stratum below the modern top of the landform. Furthermore a very well-defined anomaly appearing in isolation at approximately N27.5/E8 is consistent with the



2. Block A survey results.

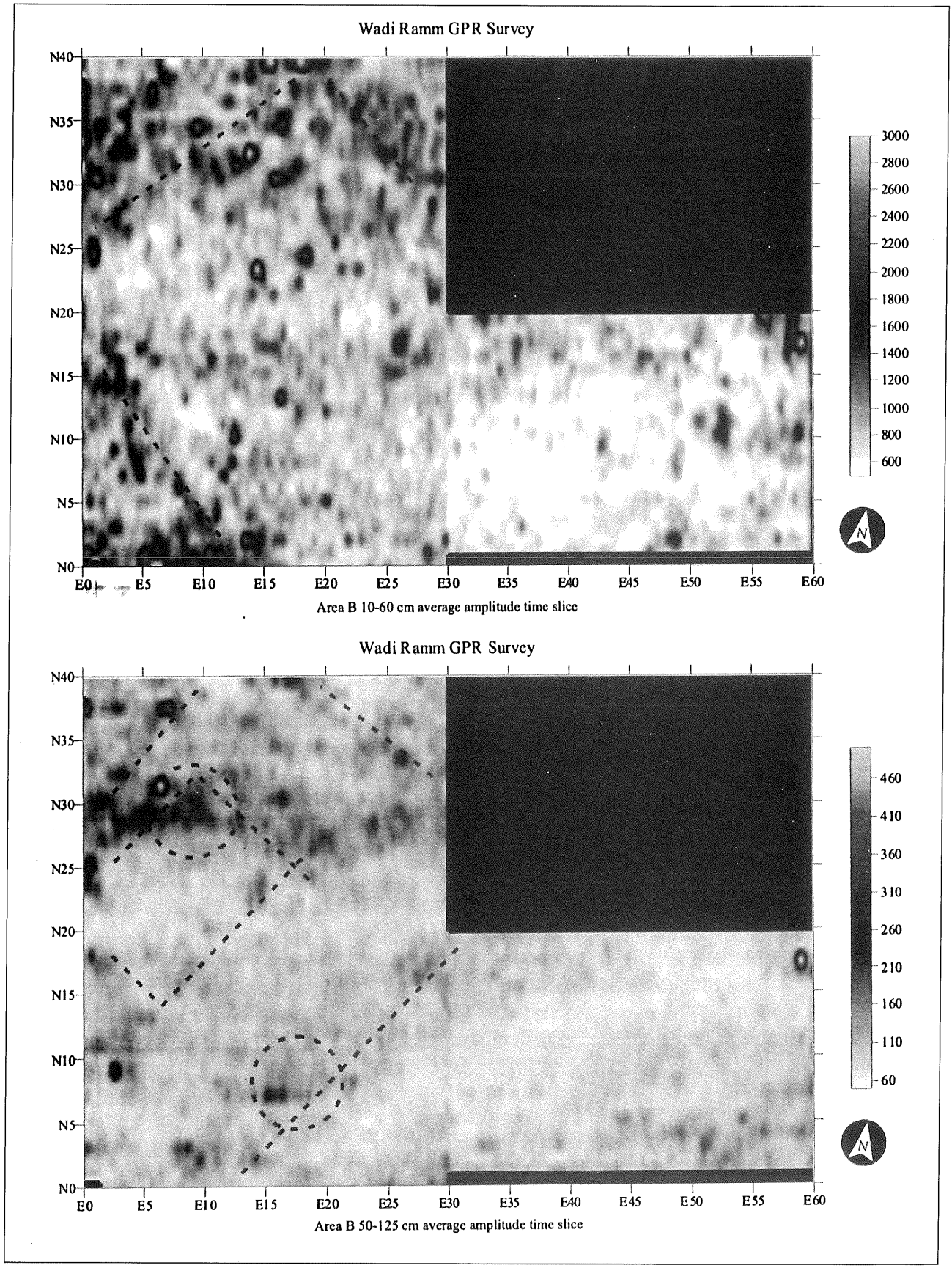
response anticipated from a Nabataean tomb.

Finally, the two southern-most areas explored contained additional areas of interest. Block F to the south of the Temple complex had strong but poorly defined rectilinear patterning in both the shallower and deeper time slices (**Fig. 7**). Area G, situated within the "southern village", contained considerable modern metal causing "ringing" responses throughout the survey area (**Fig. 8**). A number of linear/rectilinear anomalies appear despite the resulting clutter. The presence of many ancient walls visible at the surface, including the features excavated by Tholbecq (1998), suggests that these features represent ancient architecture.

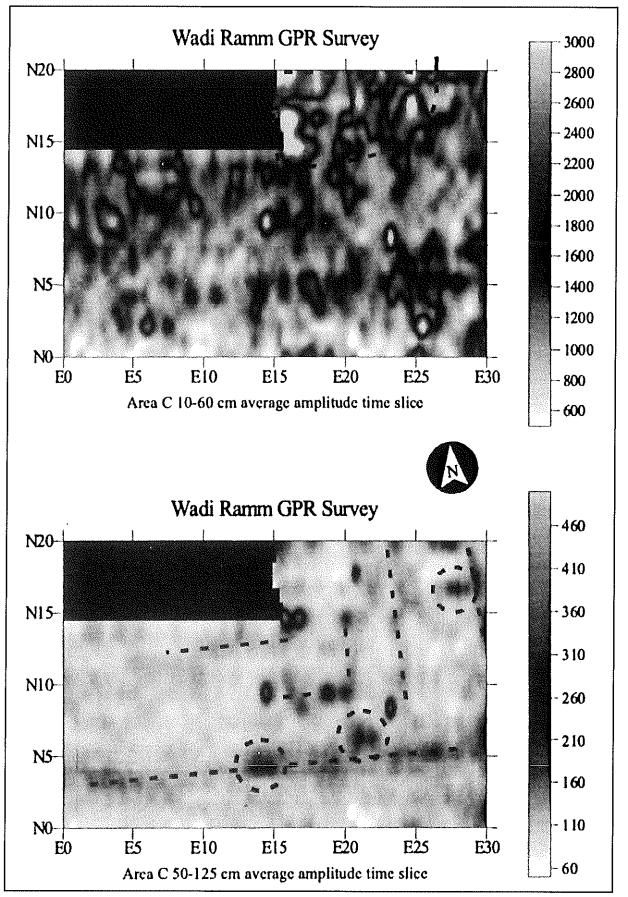
Discussion

The GPR survey at Ramm sought to identify the extent of ancient architecture and the location of the Nabataean cemetery. The patterning within the seven surveyed blocks indicates that architecture exists in the environs of the already-excavated structures. The linear/rectilinear patterning in Blocks A-E essentially displays two different orientations. Blocks A, C, D, and E share an ENE/WSW alignment similar to the eastern complex, although Block C immediately next to the complex deviates a few degrees clockwise. The orientation of possible wall features in Block B on the other hand is situated along a NE/SW axis more similar to the temple and related complexes. This deviation may stem either from variation in the site plan between different periods or from the lack of a unified grid pattern at the site during one period. Dudley and Reeves (1997:98-99) dated the bath portion of the eastern complex to the first century BC to the first century AD based on architectural and ceramic evidence. Presumably the other rooms in the complex associated with the " villa" are contemporary with the bath. Tholbecq (1998: 243) additionally dates the initial construction of the temple to the late first century BC to early first century AD and noted no changes in orientation during subsequent phases. A first century BC to first century AD date of the linear/rectilinear features identified in the GPR survey would therefore suggest the varied orientation of buildings did not result from construction during multiple time periods, but instead a lack of unified orientation during one period.

A number of possible "tomb-like" features



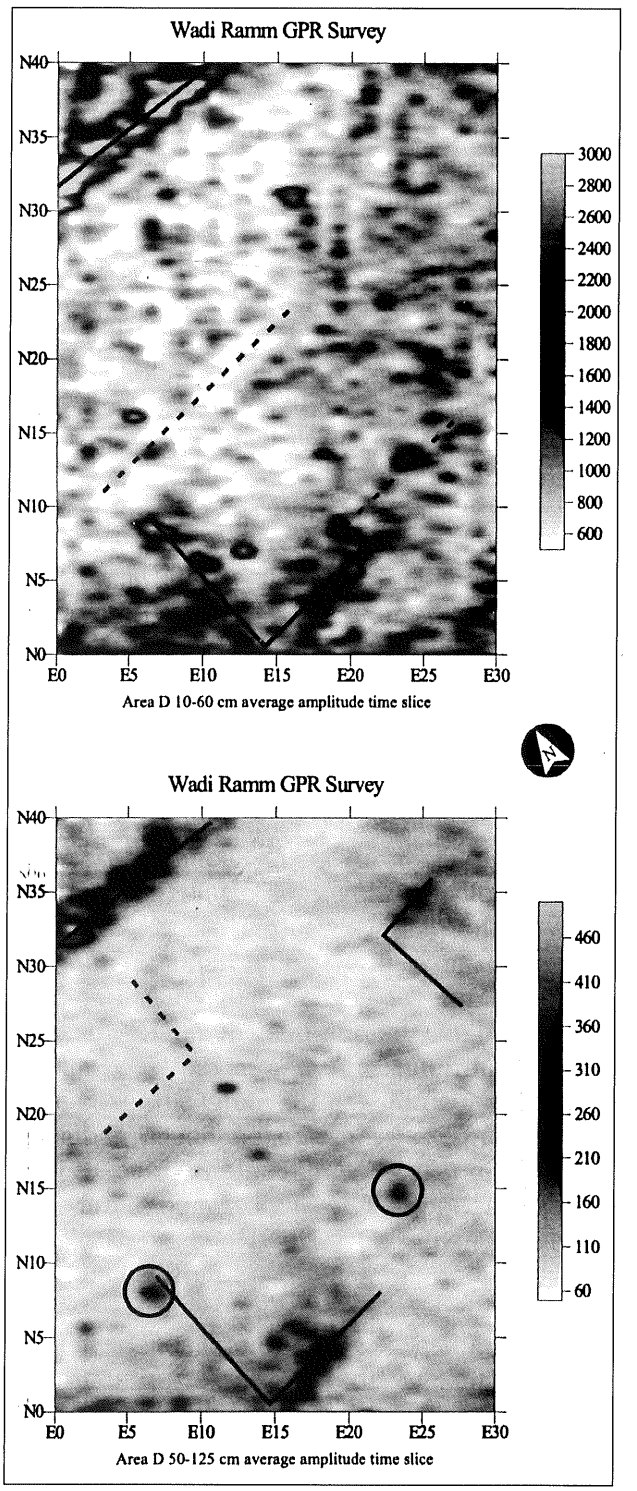
3. Block B survey results.



4. Block C survey results.

were noted during the GPR survey in all blocks surveyed. The isolated nature of these anomalies, that lack the patterning of multiple tombs more suggestive of a cemetery, makes them indistinguishable from a boulder or mass of rubble. Marked Islamic graves within the cemetery generally were expressed only in the near-surface and thus distinct from suspected Nabataean graves. The probability that these reflections, not associated with Islamic tombs, denote Nabataean tombs is weak in the absence of suggestive patterning, and thus ground truthing of these anomalies is necessary.

The presence of possible contemporary architecture in the same survey blocks as discrete "tomb-like" reflects is not unexpected. Evidence from excavated Nabataean villages, such as Khirbat adh-Dharīḥ in Jordan and Mampsis in the Israeli Negev, indicates that Nabataeans variably preferred to bury their dead near the family homestead (Lenoble *et al.* 2001; Villeneuve and al-Muheisen 2000) or outside of the main settlement (Negev 1971). Residents of Petra also built domestic and public structures near monumen-

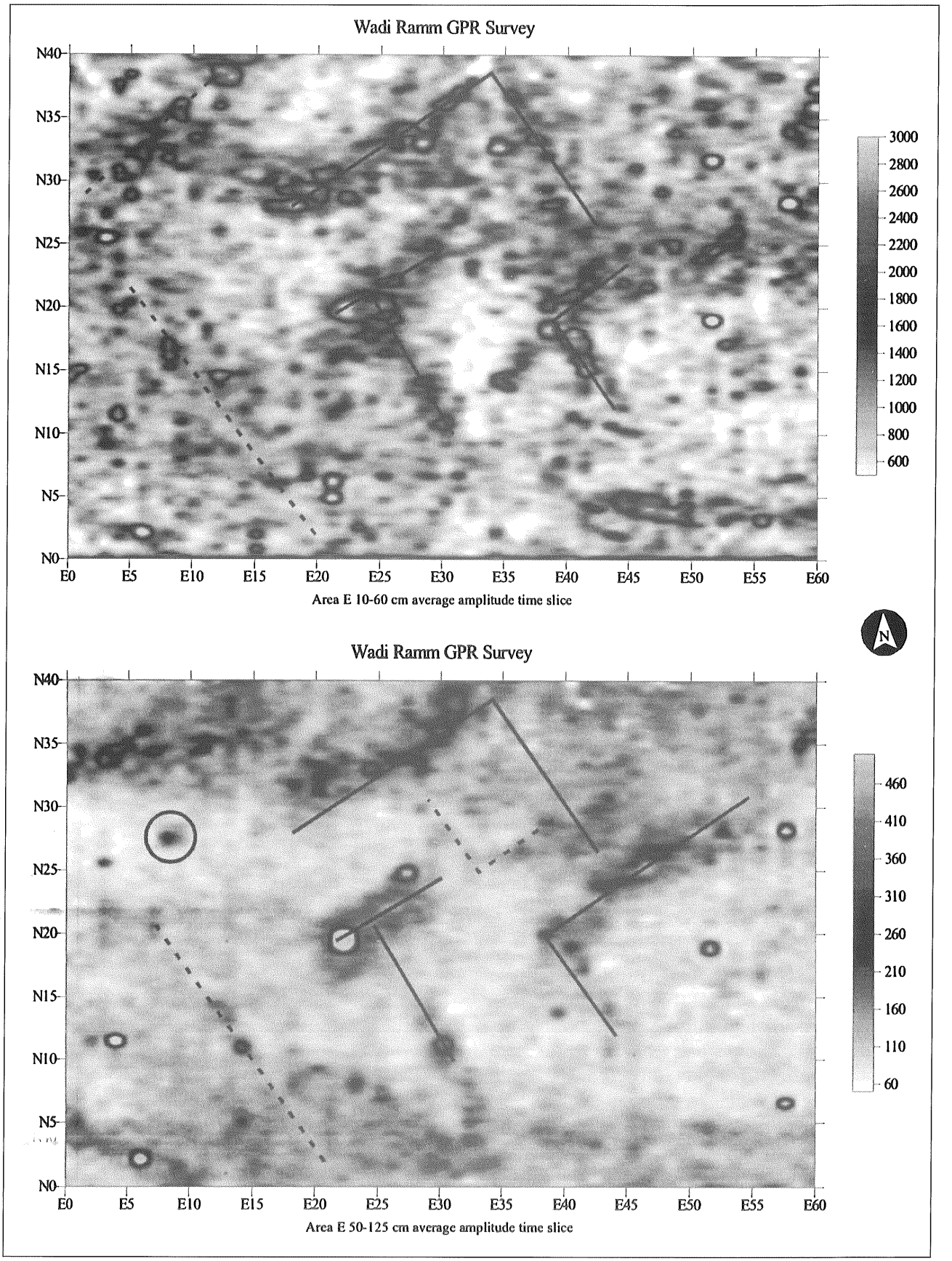


5. Block D survey results.

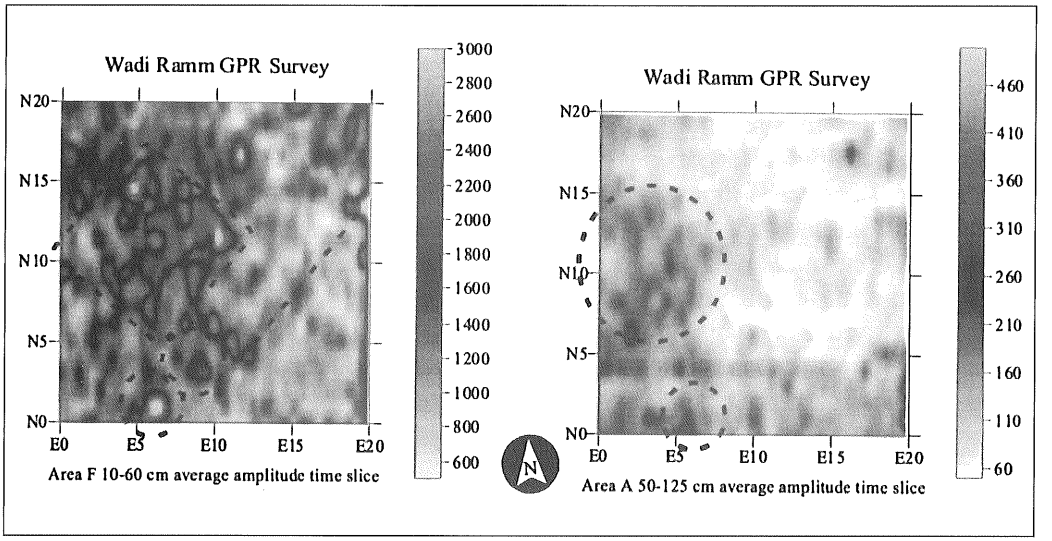
tal and rock-cut chamber tombs, although many of these tombs may have been out of use by the time the structures were constructed.

Conclusions and Further Research

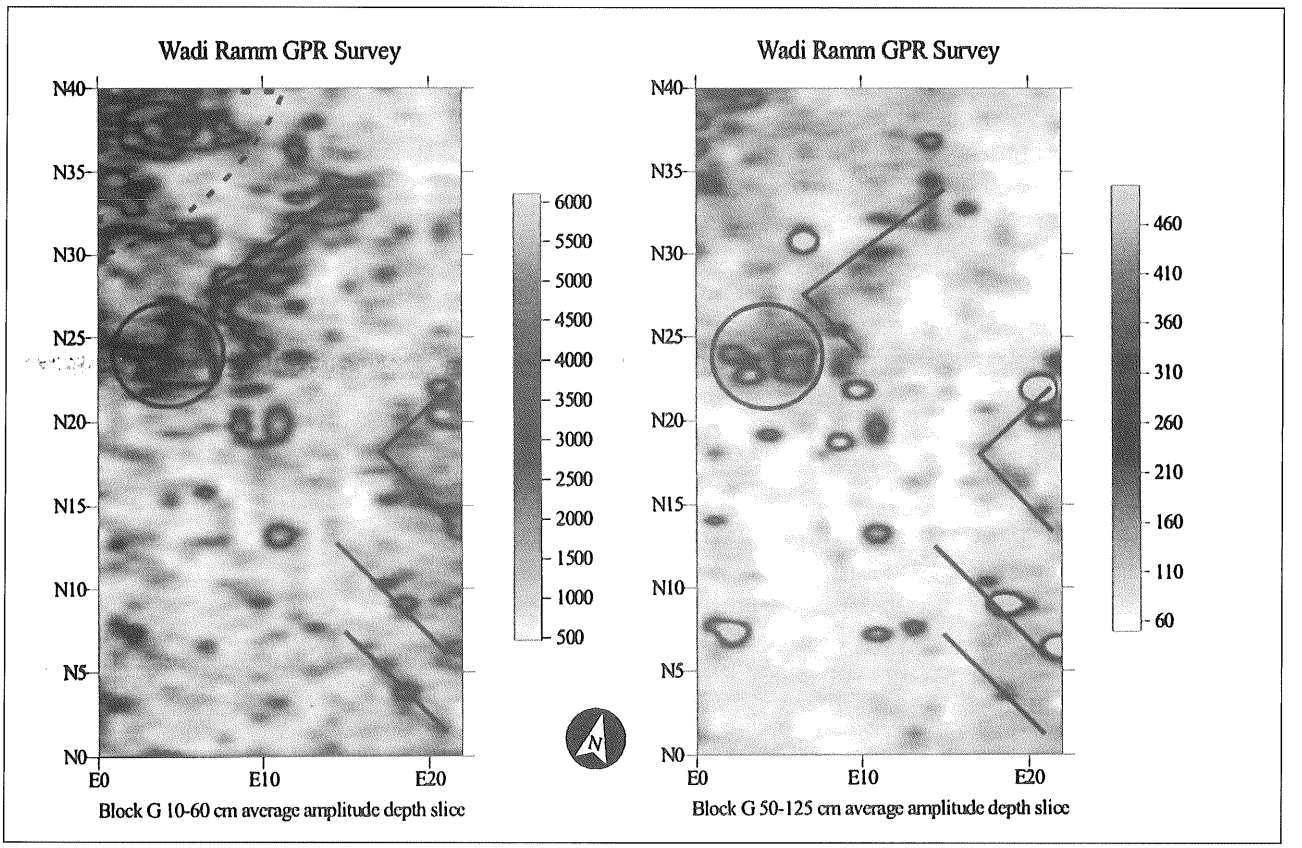
All of the survey areas explored during the 2005 season showed linear and rectilinear hori-



6. Block E survey results.



7. Block F survey results.



8. Block G survey results.

zontal patterning indicative of architectural features and discrete reflections consistent with isolated Nabataean tombs. The presence of architectural features, while not the object of this investigation, assists in our interpretation of other GPR evidence and site layout. First, GPR responses can vary dramatically under different conditions, and the reaction to stone architectural features can inform our identification of tombs or other less obviously patterned stone features. Mapping previously unknown architecture provides additional insight into intra-site patterning, providing context for the interpretation of more ambiguous anomalies.

The GPR results suggest that architectural features likely associated with the already exca-

vated Nabataean structures exist at Ramm. The presence of linear and rectilinear patterning to the north, south, and east of the Nabataean temple complex and bath/villa complex implies that built structures at the site occupy a much larger area than initially surmised. Possible walls identified in between the temple and bath/villa complexes also indicate greater occupational density than suggested by the exposed architecture. No strong evidence however exists for a large Nabataean cemetery within the surveyed areas. The scattered reflections, possibly indicating isolated Nabataean graves, on the other hand may be associated with other graves not easily detected through GPR survey, such graves lacking built architecture such as capstones or a cist.

Ground truthing through archaeological excavation of exploratory trenches would greatly increase our interpretation of these data. These test trenches will allow verification (or refutation) of preliminary interpretations and add insight into feature composition and geology. Careful spatial control kept during the GPR survey will allow accurate relocation of each anomaly and correct placement of the excavation trenches. The source of the anomaly will generally be discovered within a one meter radius in the horizontal plane, and at the same depth or shallower than the nominal depth in the data plots, which varies due to the velocity of the signal in that location.

Ground truthing scheduled for summer 2007 will focus on a sample of linear and rectilinear signals in each area to confirm the presence of architecture, the method of construction, and if possible, the date and function of the feature. A number of isolated anomalies possibly indicating graves also will be explored focusing on those in Blocks A, C, D, E, and F. Small soundings will also explore the two possible grave-related surface features associated with Block F.

Further research at Ramm also should include expanding the geophysical survey through investigating more areas via GPR and including a magnetic gradiometer survey. A GPR survey additionally should be conducted near the southern village and along the escarpment of Jabal Ramm to the west. In addition, further information on the location of the DoA's explorations at Ramm during the 1960s emerged after the 2005 field season. One of us (M. Perry) was informed by M. Barbara Reeves in June 2006 that she and Denine Dudley interviewed a local resident of Ramm village in 1996 regarding the previous DoA tomb excavation. The resident, Mohammed Abu Abdallah, noted that he witnessed excavation of a communal tomb by the DoA near the school in the Bedouin village. Mr. Abu Abdullah described the tomb as having a circular central chamber with radiating loculi, although he could not remember the date of the tomb. It is unclear whether the tomb was constructed or cut into the surrounding bedrock. Therefore further GPR survey should be employed in this area, in addition to expanding coverage near the ancient village. Finally, the magnetic gradiometer survey can map features containing igneous rock present in many of the walls and foundations observed at the site. Magnetic gradiometers can rapidly map large contiguous areas and may detect features not identified with GPR, although the "clutter" from metal debris and non-cultural igneous rock makes magnetic methods problematic at Ramm.

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AN INFANT JAR BURIAL FROM THE PETRA GREAT TEMPLE[1]

Megan A. Perry and Martha Sharp Joukowsky

In 2001, exploration of the East Perimeter Wall[2] of the Petra Great Temple's Upper Temenos uncovered an infant jar burial within Room B (**Fig.1**). The jar was recovered from deposits attributed to Roman period reuse of the temple complex and its subsequent abandonment prior to the 363 AD earthquake. Infant jar burials, while rather commonplace in the Neolithic, Chalcolithic, and Bronze Age Levant, are a rare component of the Classical-period or Islamic Near Eastern mortuary program. Discussion of the stratigraphic context and other examples of infant jar burials place this find into temporal and geographic perspective.

Archaeological Context

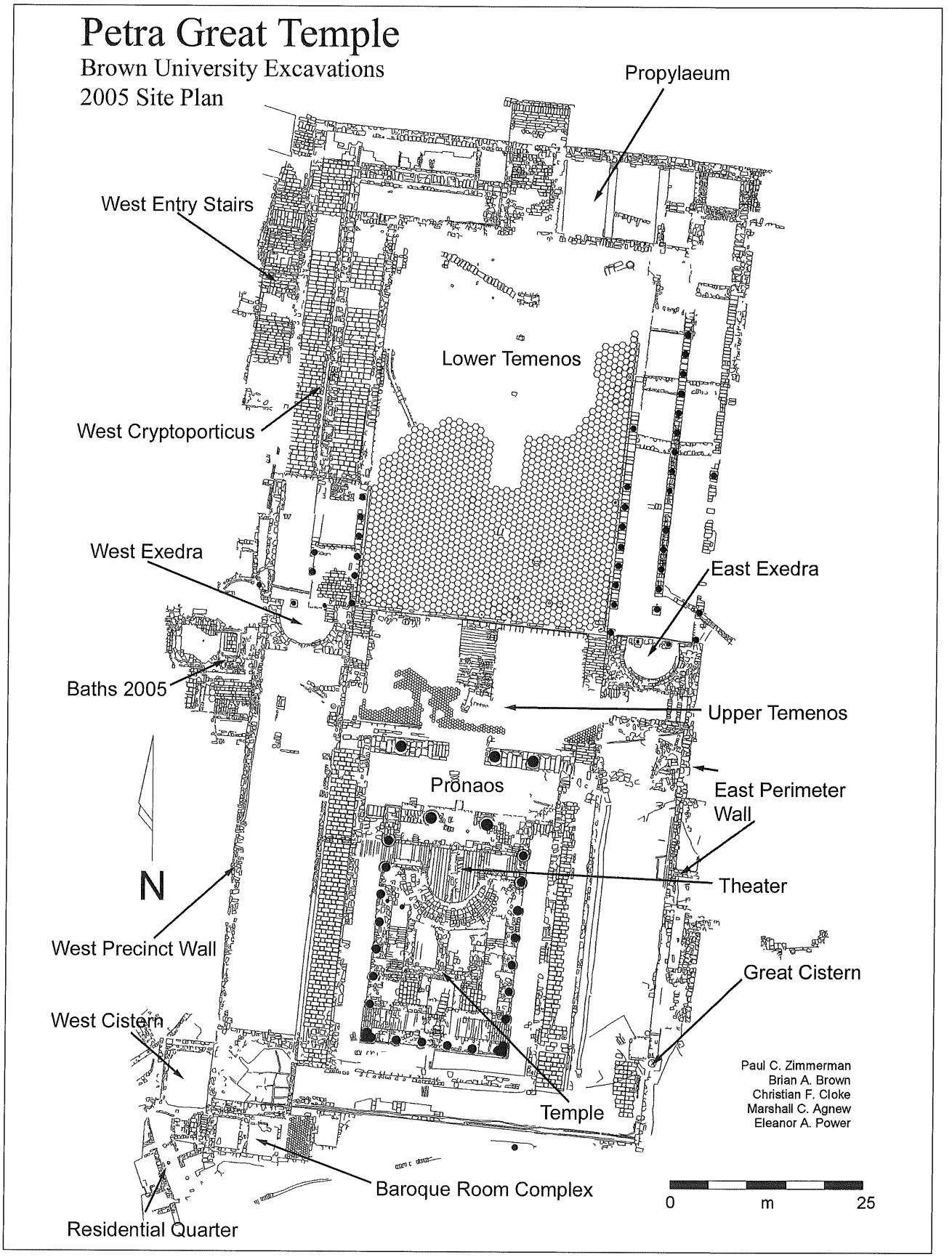
The jar containing human skeletal remains was discovered in Trench 84 Room B Locus 10, just above the Locus 35 floor bedding (elevation = 908.370m). Excavated by José Ignacio Fusté in 2001, Room B was a dead end corridor measuring 8.75m N-S by 2.50m E-W (**Fig. 2**). Subdatum control point C, located at 910.140m, served as the point of reference for the excavation.

Excavation of Trench 84 served to examine the accumulated fill inside the casemate East Perimeter Wall. The long, narrow corridor located between the parallel interior and exterior East Perimeter Walls, south of the earlier discovered small water reservoir adjacent to the north, was excavated to better understand the area's functional and architectural relationship both to the wall itself and the site as a whole.

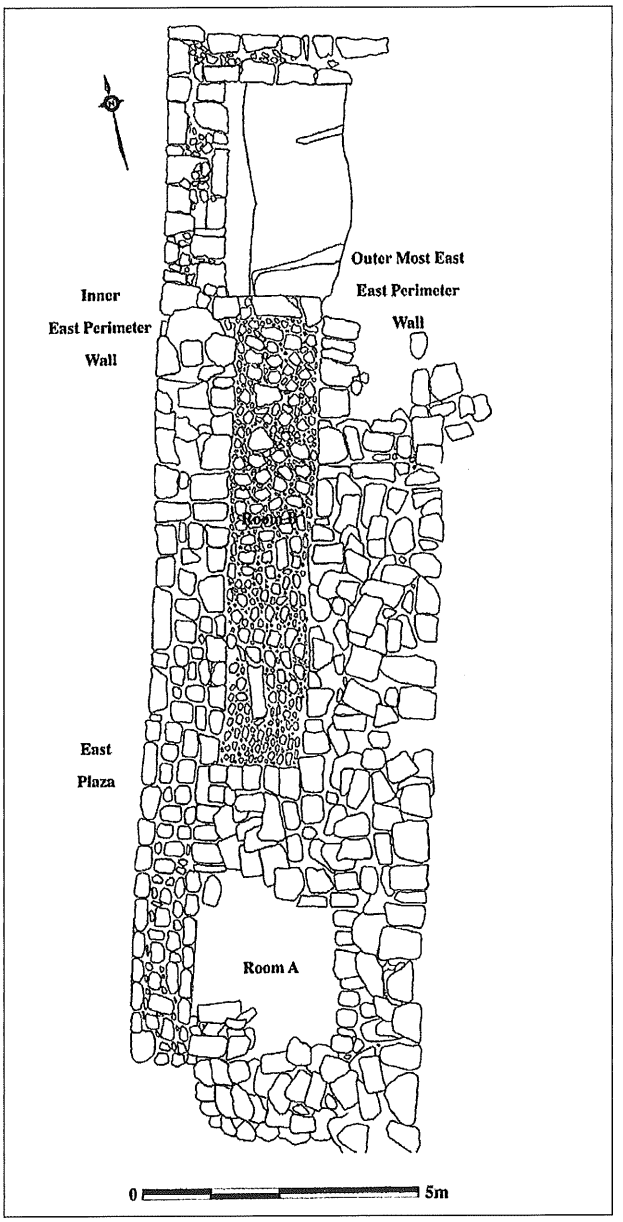
Room B and its Artifacts

The interior walls of Room B (**Fig. 3**) were plastered and painted (traces of which still remain *in situ*) and some of the stucco was gilded. The walls were appointed with two niches[3]. Located just above the bedrock floor, Room B locus 35 floor bedding was contemporaneous with the Great Temple dating to Site Phase IV[4] of the

1. The final publication of the Petra Great Temple is underway. The importance of publishing detailed analyses has intriguing implications for our understanding of both the type of burial and the infant associated with it.
2. What we do know about the Upper Temenos East Perimeter Wall is that it was endowed with well-constructed rooms inside massive walls that delineated the eastern extent of the Great Temple precinct. These colossal walls have sustained multiple earthquakes throughout the past two millennia, and yet they still tower over the site.
3. Both of these niches (Loci 43 and 44) are set into the east face of the west wall of the East Perimeter Wall system. Locus 43 measures 0.62m by 0.44m and Locus 44 measures 0.77m by 0.44m. Found in the Great Temple Propylaeum and in other parts o the Petra Valley, including the Siq, twin niches are tradition among the Nabataeans for representing their deities in pairs. The evidence suggests that Room B originally served as a small religious or cultic space. These room B niches however cease to serve their primary function during the first century BC.
4. Fifteen phases of activity have been identified through excavation of the Great Temple precinct (see Joukowsky 1998). Beginning in the second or first centuries BC is Pre-Site Phase I. Site Phases I (preparation of the site) and II represent construction of the *distyle in antis* temple dating to the first century BC. These phases are followed by Site Phase III which is represented by minor damage, that is not well-defined in the Upper Temenos area. Site Phase IV is the Nabataean "Grand Design" when the *tetrastyle in antis* Great Temple façade is erected in the first century BC. During this phase Room B is constructed in the East Perimeter Wall and the adjacent East Reservoir is constructed. After collapse and repair during the first century AD (Site Phase V) is a Nabataean redesign of several features. In Site Phase VI, ca. 106 AD. more collapse and damage occurred. Site Phase VII, dating to the mid-second century AD, contains further repair and configuration, including insertion of the theater into the Great Temple. This probably occurs after 95BC, or concurrent with build-

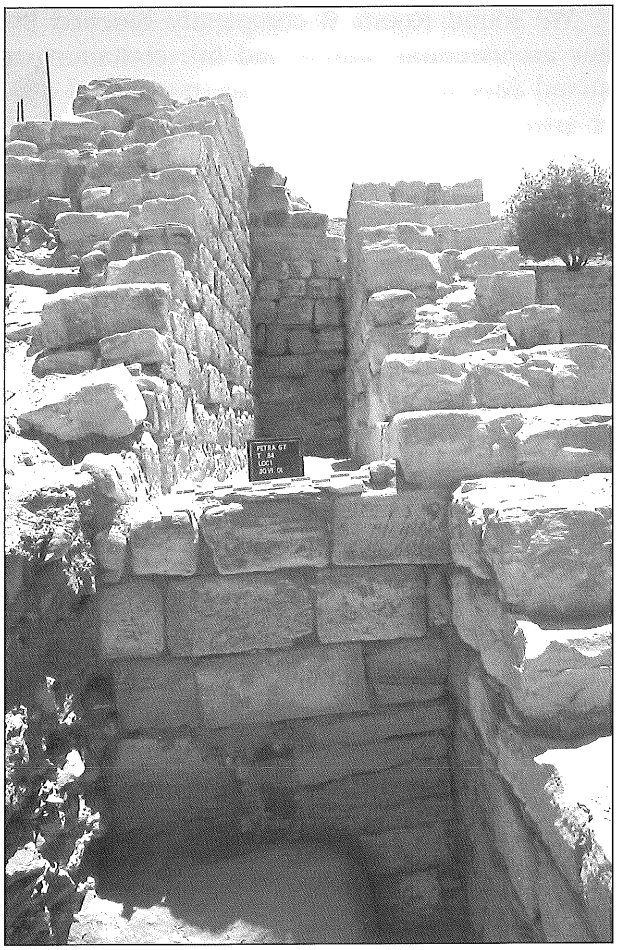


1. Site Plan of the Petra Great Temple. Drawing: P. Zimmerman, B. Brown, C. Cloke, M. Agnew, E. Power.



2. Petra Great Temple, Plan of Room B along East Perimeter Wall. Drawing: J. I. Fusté, Drafted by M. S. Joukowsky.

Nabataean Grand Design from the first century BC to the first century AD. Room B was used as a "special place" throughout Site Phase IV, but in Site Phase V it may have served a domestic function. At some point between Site Phases



3. Petra Great Temple, Trench 84 to south. Photo: A. W. Joukowsky.

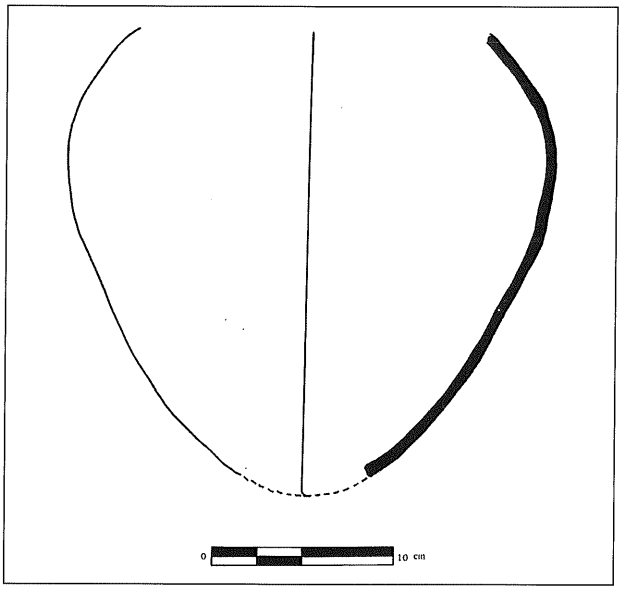
VI and VII, the Room B pavement was robbed, and sometime during Site Phase VIII, a period of Roman mid-second century AD collapse and repairs, the jar burial was apparently inserted. Subsequently the rooms behind the East Perimeter Wall were abandoned. The architecture thereupon collapsed, probably during the fourth century AD earthquake, and the rooms filled with architectural detritus, wash, and wind-blown debris. The fill also was full of rocky inclusions of every size from small stones to large ashlars that fell from the upper courses of the wall or from the az-Zanṭūr site located high on the southern ridge behind the Great Temple.

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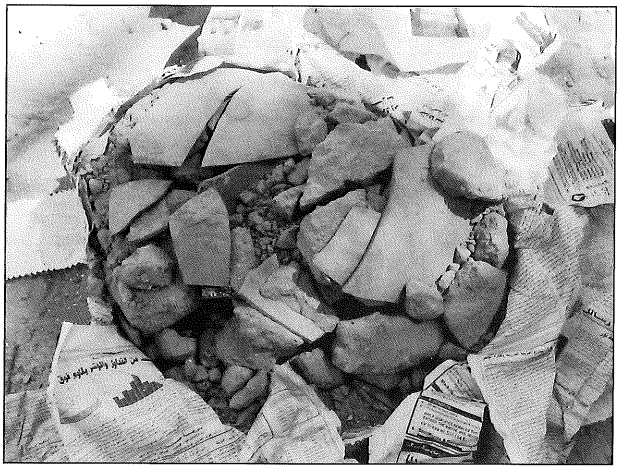
ing of the Roman Road, until the mid-second century AD. Site Phase VII is a brief period of abandonment predating the mid fourth century AD. This is when we hypothesize the infant jar burial is deposited in Room B. The major 363AD earthquake and collapse of the upper courses of the South and East Perimeter Walls characterizes Site Phase IX. After this, during Site Phase X from the fourth to fifth centuries AD, the site is all but abandoned. Further collapse occurs during Site Phase XI, possibly the result of the 512AD earthquake. Site Phase XII represents more site looting and abandonment, and during Site Phase XIII, Room B as well as the rest of the site is abandoned and building collapse continues to accumulate. Site Phase XIV dates to the modern period, characterized by localized activities prior to the inception of our excavations.

We found Room B completely blocked by this architectural tumble and fill; containing a mixed deposit of pottery, glass, metal, and other artifacts. These include an inscribed lamp,[5] coins,[6] and collapse from the 363 earthquake. We cannot, however, assume that any of these artifacts are contemporary or associated with the jar burial. The soil consisted of a fine, compacted strong brown (Munsell 7.5 yr 4/6) deposit; no significant change in color or content of the deposit was discerned during the excavation.

Collapse from the 363 AD earthquake may provide a *terminus ante queum* for the jar burial. The jar was discovered on top of the Locus 35 floor bedding and surrounded by Locus 10 fill.[7] The jar's location at the bottom of the fill and on top of the floor bedding indicates that it was placed in the room after the floor paving stones were removed but before the fill accumulated. The jar may postdate the Roman and Byzantine periods assuming a burial shaft was dug through the fill for placement of the jar, although no shaft was noted during the excavation.



4. Profile of the storage jar containing the infant burial. Drawing: C. Tuttle and M. S. Joukowsky



5. Jar burial after removal of plaster gauze. Photo: M. Perry.

The Jar and its Contents

The rimless jar containing the infant is shown in Figure 4. During excavation the jar was removed *en bloc*, wrapped in plaster gauze, boxed, and safely stored in Petra to await analysis. In 2004, the protective plaster was removed (**Figs. 5 and 6**) and the skeletal remains analyzed. The fragmented jar, 0.26m in height, was restored and drawn by Christopher A. Tuttle and drafted by Martha Sharp Joukowsky.

The storage jar contained a single individual apparently interred without any grave goods. The skeleton may have originally been a primary burial, although destruction of the pot by falling debris in antiquity and inadvertent removal of some of the skeletal elements during excavation resulted in mixing of the remains. Examination of the skeleton included an inventory, assessment of age, sex, and skeletal pathologies using

5. Nabataean inscribed lamp base fragment (Seq. No. 84207) with the letters "RAYT," meaning, "I saw," within a double base ring with splashes of red slip on either side of the base (Khairy 1990: 10 and 11). This lamp probably was deposited in the room during Site Phase XI or post fifth century AD, possibly due to the 512AD earthquake. This room probably represents a secondary context of the lamp.
6. Half of a Nabataean bronze coin (Seq. No. 84211), with two jugate busts to the right on the obverse and the letter, Sh, in the right field. On the reverse are two crossed cornucopiae with an inscription in to lines: First line , [HR]TAT; Second line, SHAQUI/; Third line, LAT. (Meshorer 1975:112, 114). Dated between 18 and 40 AD.
   Bronze coin (Seq. No. 84226). On the obverse are two jugate busts to the right with no traces of an inscription of letters in the field. On the reverse are two crossed cornucopiae and a legend in three lines: HARETAT/ SHAQUI/[LAT] (Meshorer 1975: 112, 114). Dated between 18 and 40AD.
   Bronze coin (Seq. No. 84228), minted in Rome dating to Constantine I (312-320AD) (Waage, Antioch, No. 1407). On the obverse is the bust of Constantine laureate with a mantle and circle of dots with the legend IMPCONSTANTINVSPFAVG. On the reverse is the sun standing with its right hand raised, holding a globe and the legend, SOLIINV-I-CTOCOMITI.
7. The Locus 10 fill measured 2.93m in depth.



6. Interior of jar showing infant remains (indicated by arrows) within soil matrix. Photo: M. Perry.

the protocol outlined in *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994). The skeleton was approximately 2/3rds complete and did not include most of the pelvis and the lower limbs. Age of the individual was estimated as birth to 9 months based on stage of epiphyseal union, dental eruption, and long bone length (Fasekas and Kósa 1978, Krogman and İşcan 1986; Ubelaker 1989, Moorees *et al.* 1963a, 1963b). Additionally, the left and right orbital sockets displayed porosity and coalescence of diploë indicative of *cribra orbitalia*. This condition, along with porotic hyperostosis, is usually attributed to iron-deficiency anemia (Aufderheide and Rodríguez-Martín 1998; Ortner and Putschar 1985), although other factors have recently been implicated (Sullivan 2005; Wapler *et al.* 2004). The frequency of *cribra orbitalia* and porotic hyperostosis in Jordan and Israel during the Nabataean, Roman, and Byzantine periods ranges from 0% to 50% (Perry 2002). Its presence in this child therefore is not unusual.

Discussion

Jar burials in antiquity have a wide geographic and temporal range. Archaeologists have recovered jars containing human skeletal remains from prehistoric southeast Asia (Andrews and Glover 1986; de Beauclaire 1972/1973; Dizon 1979; Fox 1970; Fox and Evangelista 1957; Hanawa 1999; Källén and Karlström1999; Soeroso 1997; Stamps 1983), Neolithic, Chalcolithic, and Bronze Age Levant (Blackham *et al.* 1997; Dessel *et al.* 1988/89, 1989; Dothan 1955; Dunand 1968; Eisenberg *et al.* 2001; Epstein 1984; Kahila Bar-Gal and Smith 2001; Kempinski and Niemeier 1993; Mallon *et al.* 1934; Nakhai *et al.* 1987/88, 1988; Pritchard 1980; Riis 1948; Yassine 1984), Chalcolithic Turkey (Grauer 1994; Stein and Misir 1994), and Punic Carthage (Bénichou-Safar 1991; Brown 1991; Lee 1994; Picard and Picard 1968; Stager and Wolff 1984). A few scattered examples of infant jar burials also have been recovered from Medieval Levantine contexts (Stern 1978; Toombs 1985). A primary difference between the jar burials from southeast Asia and those from the Mediterranean region is the age of the interred individuals: jar burials from southeast Asia contain individuals from all age categories, while those from the Mediterranean, with the exception of Bronze Age Hama in Syria (Riis 1948: 29) and Chalcolithic Byblos in Lebanon (Dunand 1968:43), are mostly of infants and very young children. In addition, the human infant and animal skeletal remains recovered from Punic Carthage (Bénichou-Safar 1991; Lee 1994; Stager and Wolff 1984) and human infant and adult skeletons from Hama (Riis 1948) were cremated, unlike a majority of Levantine examples.

No evidence supports a pre-Iron Age date for the infant jar burial. This jar burial likely dates to the Roman or medieval Islamic period based on stratigraphic context and paltry parallel examples. Dating the jar used in the burial using ceramic chronology is difficult due to the lack of diagnostic features on this vessel. If the jar burial dates to the Roman period, it provides the only evidence of human inhumation at Petra between the well-known first century BC–first AD century tombs (see Bikai and Perry 2001) and Byzantine period burials. Scattered burials have been recovered from Byzantine-period deposits in other areas of the Great Temple (Joukowsky 2001: 336), the area around Qaṣr al-Bint (Renel personal communication 2000; Zayadine 1982: 380, 2003: 96), and near the Temple of the Winged Lions (Hammond 1987/88: 82-83). Some archaeologists working in this sector of the site feel that many of the structures were irreparably damaged after the 363 AD earthquake (Hammond 1996: 6; Joukowsky 1998: 139; Zayadine 2003: 96), and most of these burials apparently post-date the earthquake destruction. Byzantine occupants of Petra thus turned to the

destroyed western sector of the city center for burial of their dead.

The possibility remains however that this jar burial has a later date. Infant jar burials have been recovered Islamic-period contexts at from Tall Mevorakh (Stern 1978: 4-5) and Tall al-Hesi (Toombs 1985: 39-40), tentatively dated to the 12-15th centuries AD based on ceramic evidence (Toombs 1985:107). Medieval-period occupation in Petra and its environs has been well documented archaeologically (Bikai 2004; Brown 1987; Fiema 2001; Frösén *et al.* 2001; Hammond 1970; Schmid 2001; Schmid and Barmasse 2004; Vannini and Desideri 1995). No evidence for early Islamic burials has been discovered beyond tombstones recovered from a secondary context in Wādī Farasa (Schmid 2001; Schmid and Barmasse 2004). The possibility exists that Islamic-period mourners buried the jar by digging a burial shaft into the Roman and Byzantine tumble and fill not noted during excavation. If the burial dates to the Medieval period, it provides further evidence for human occupation in Petra's city center during the period.

Scholars have sought to identify unique characteristics of the infants from jar burials versus the remaining skeletal sample that may explain their anomalous method of interment. In the prehistoric Near East, no clear explanation exists for differential burial practices of some infants. Infants from jar burials do not display divergent levels of disease or violence (Kahila Bar-Gal and Smith 2001:169) nor have a different age and sex distribution (Smith *et al.* 1999:73) than the rest of the young subadult sample. In addition, both jar burials and regular interments were used contemporaneously (Smith *et al.* 1999: 73). Gopher (1995: 219) suggests that social identity of infants in children simply shifted during the Neolithic period, resulting in the incorporation of jar burials into the Neolithic mortuary program. This practice then continued in the Levant through the Bronze Age.

In Punic Carthage, however, the cremated infants and animals buried within jars were victims of sacrifice. Classical and Biblical sources describe the sacrifice of children to the god Ba'al Hammon and the goddess Tanit from the eighth-second centuries BC, descriptions confirmed by the excavation of the sacrificial burial ground at Carthage (Bénichou-Safar 1991; Lee 1994; Picard and Picard 1968: 46-47; Stager and Wolff 1984). These sacrifices were to fulfill a vow or, some believe, were in response to population pressure or strife (Stager and Wolff 1984). The arrival of the Romans and subsequent plundering of Carthage led to a cessation of this ancient rite.

The similarity between the jar burial from Petra and earlier examples, particularly those from the prehistoric Levant, must remain coincidental. The practice of interring infants within storage jars seems to have fallen out of favor after the Iron Age and never regained popularity in the Near East. It thus is unlikely that Roman- or Medieval-period residents looked to prehistoric residents of the region for mortuary rituals and adopted any possible ritual significance these earlier burials may have represented. Instead a group of mourners in Roman or Islamic Petra simply chose to utilize a storage jar for this infant's burial.

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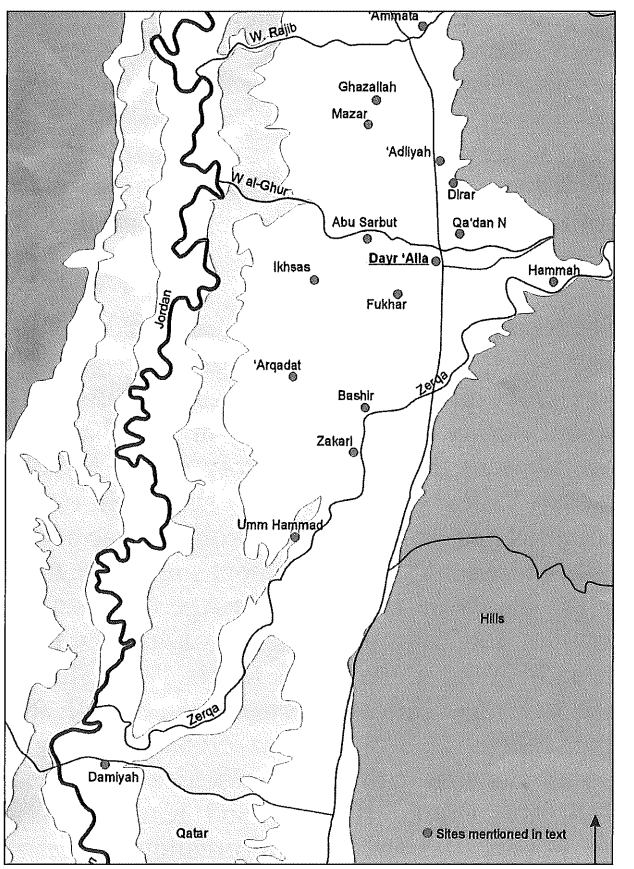
DAYR 'ALLĀ REGIONAL PROJECT: SETTLING THE STEPPE SECOND CAMPAIGN 2005[1]

Lucas Petit, Eva Kaptijn, Fuad Hourani,
Omar al-Ghul, Ellis Grootveld and Gerrit van der Kooij

Introduction

The Dayr 'Allā Regional Project *Settling the Steppe,* directed by Gerrit van der Kooij (Leiden University) and Omar al-Ghul (Yarmouk University), conducted its second field campaign from 12 September to 30 October 2005[2]. The first field season in 2004 (Kaptijn *et al.* 2005), and preliminary results from the long-term archaeological study of Tall Dayr 'Allā[3] (*e.g.* van der Kooij 2001), have resulted in a view of the complicated varying intensity of use of the Middle Jordan Valley during the Bronze and Iron Ages. As precipitation is usually not sufficient for rain fed agriculture, the maintenance of a society in such an arid region involves large efforts, in the form of irrigation and other water management systems. Yet, the area has been almost continuously settled, though with varying intensity and diversity. This second season's fieldwork reflects the project's general search for a better and coherent understanding of these occupation cycles. By focusing on the landscape and settlement sites, several complementary studies cover the scientific tasks of the *Settling the Steppe* project (*e.g.* systematic survey work, detailed stratigraphic excavations, geographical-geophysical research and archaeobotanical analyses).

The research area is situated in the Jordan Valley between the Wādī Rājib in the north and the az-Zarqā' River with Tall Dāmiya in the south, comprising approximately 72km^2 (**Fig. 1**). This



1. Map of the Dayr 'Allā region.

1. Funding was provided by the Netherlands Organization for Scientific Research (NWO), the Yarmouk University, the University of Leiden and the Department of Antiquities of Jordan.
2. This second season, a team of 21 people took part in this interdisciplinary research project. The senior staff members were: Gerrit van der Kooij (LU director), Omar al-Ghul (YU co-director), Lucas Petit (LU Excavation), Eva Kaptijn (LU Survey), Nabil Qadi (YU excavation), Fouad Hourani (LU Geoarchaeologist), Muaffaq Batainah (YU surveyor) and Mariette Grimbergen-Driessen (House keeping and registration). The representatives from the Department of Antiquities were Ziyad Ghnaimat and Aktham Abbadi. Other team members: Jitske Blom, Fardoos Bardaghawi, Laura Crowley, Wafa Abu al-Hassan, Mohammad Jaradat, Annelies Koopman, Lizzy Polman, Samya Abed al-Rahman, Jeroen Rensen, Jonathan Sela, and Max van de Wiel.
3. It is a Joint Project of Leiden University (LU), Yarmouk University (YU) and the Department of Antiquities of Jordan (DoA).

region is usually regarded to be the southernmost extension of the regularly settled part of the Middle Jordan Valley. The two eastern tributaries of the Jordan River have been the only perennial water source for occupants settling the valley floor and are together with the non-consolidated alluvial sediments of the Ghawr, the main focus for describing and investigating irrigation systems and agricultural activities. Previous survey teams (Glueck 1951; Ibrahim *et al.* 1976, 1988) have presented overviews of the different tall sites in this region. No emphasis has, however, been placed on less obtrusive archaeological remains present within the countryside, nor on the relation between settlement sites and their catchment area. The current research therefore incorporates a systematic survey that focuses on a smaller region, making it possible to cover the area in greater detail. Note that the geographical division used in this article is clearly artificially defined and should not be considered as a representation of the past, in any form what so ever.

Settlement History of the Middle Jordan Valley[4]

Before presenting preliminary results collected during the field season in 2005, a brief overview of the settling history of the Middle Jordan Valley will be given to shed light on its complex and diverse nature. Probably one of the oldest archaeological settlement sites in the area is the dispersed Early Bronze Age (EB) settlement of Tall Umm Ḥammād, excavated by Betts and Helms in the 1980s (Betts 1992; Helms 1984, 1986). This site forms together with the excavations at Tall Abū az-Zīghān/Ḥandaquq South, located within our research area, and Tall Abū Ḥāmid (Dollfus and Kafafi 1988), an important source of information concerning Early Bronze Age occupation in the Jordan Valley. The results of these sites, together with the location of several other somewhat smaller settlements of the same period (Tall an-Nukhayl North, Tall al-Kharāba, Katārat as-Samrā) lead to the conclusion that this period contained well developed and organised farming communities, which made use of the available water sources in the close vicinity.

The situation changes completely during the Middle Bronze Age, as is illustrated by the absence of building features or infrastructures and by the camp-like dispersion of scattered pottery sherds (Katārat as-Samrā I, II, IV, al-Musaṭṭara, Dāmiya al-Jadīda). Large areas of the Jordan Valley seem to have been the home of more mobile groups. There is, however, one exception: Tall Dayr ʻAllā. Although only limited excavation has taken place, a relative large settlement was in use during the Middle Bronze Age IIc Period (van der Kooij and Ibrahim 1989). The character of this community, with hardly any other sedentary villages in its direct proximity, is puzzling.

The Late Bronze Age started with an increase in the number and intensity of settlements in the Middle Jordan Valley. Arts and crafts flourished and the influx of contacts and interactions seems to have made the Jordan Valley into a highly appealing area for settlers. The for the most part newly founded sites were dispersed randomly over the research area; near the foothills (Tall al-Ḥamma, Tall ʻAmmata, Tall Qaws), on the valley floor (Khirbat Buwayb, Tall Dayr ʻAllā, Tall Qaʻdān, Tall Abū Nijra, Tall Mazār, Tall Ghazāla) and on the Katār hills (Tall al-Kharāba, Tall an-Nukhayl South, Katārat as-Samrā I, III). The position of some of these farming sites in the Ghawr, not directly near a perennial water source, seems to point to the presence of some kind of irrigation system.

This settlement distribution pattern is similar to the situation in the succeeding Iron Age, though more and more sites were founded or resettled as time progressed (Tall Dāmiya, Tall Dayr ʻAllā, Tall Ikhṣāṣ, Tall Bashīr, Tall Zakārī, Tall ʻAdliyya, and Tall ʻAmmata, to name but a few). At the end of this period, the Iron Age rural society collapsed, due to political instability after the retreat of large entities like Assyria and Babylonia, and the area was now used chiefly by mobile pastoralists. It has been attested, in the few excavations of this area, that during the Persian and Hellenistic Period people used the higher summit of existing talls only for stocking their animals. For some time the valley seems

4. Most of the information presented here was taken from the survey work of Glueck (1951), the East Jordan Valley Survey (Ibrahim *et al.* 1976, 1988), van der Steen (2004) and settlement surface surveys carried out by the authors in May 2004. Please note that this overview should be considered as schematically and preliminary.

to be the backyard of the Levant, as shown by limited archaeological evidence of settling activities.

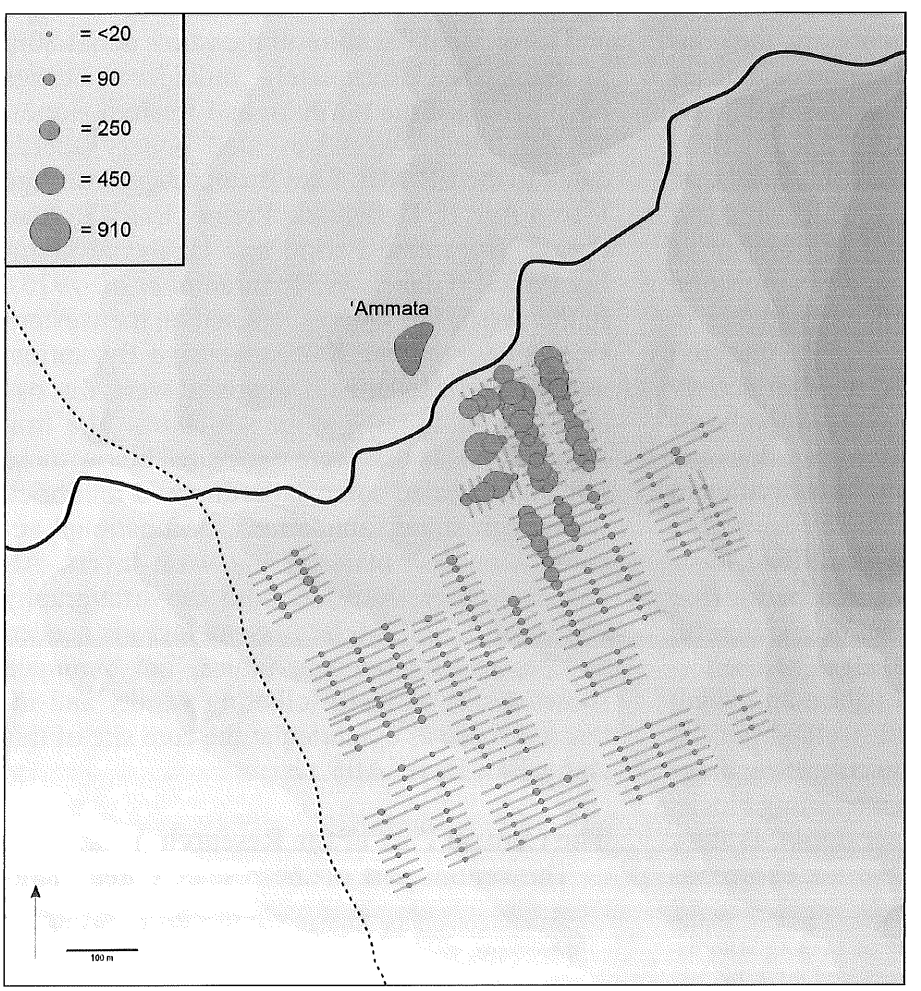
This situation changed at the moment the well developed agricultural and water management systems of the Romans were introduced. It caused an immediate increase in number of settlements in the Middle Jordan Valley (Tall 'Adliyya, Qa'dān South, Tall Abū Sarbūṭ, Tall al-Fukhār, Tall Shu'ba, Maflūq west, Tall an-Nukhayl and Tall al-Kharāba, Tall Dāmiya). However, there is a settlement gap between the flourishing Early Roman and the Byzantine Period, which is difficult to understand. The end of the Byzantine existence can be explained by desiccation between the 5th and 8th century AD. The limited annual rainfall could coincide with the collapse of the agricultural, water-harvesting Byzantine society and the Arab expansion into these areas (Enzel *et al.* 2003: 268).

Around the 9th century AD the region recovered and until the Ottoman Period many sites flourished and increased in size. Notable is the importance of sugar industry during the Ayyubid/ Mamluk Period. The remains of numerous water-driven mills were discovered, often associated with large quantities of sugar pot fragments (Tall Qaws, Tall 'Adliyya, Abū 'Ubayda, Tall Qa'dān, Dayr 'Allā village, Tall Abū Sarbūṭ, Baṣṣāṣ al-'Aqīl, Tall Abū Nu'aym, Tall Zakārī, and Tall al-Dūlātī).

The Northern Part of the Research Area

In the 2005 season work was started in the northern part of our research area. The excavations concentrated on Tall 'Ammata and the survey started just south of the tall on the southern banks of the Wādī Rājib (see **Figs. 1 and 2**).

Similar to the first season in 2004, the survey was executed by walking lines of 1m wide that were spaced 15m apart. Each line was divided into plots of 50m and all artefacts present on the surface were collected (see for methodological approach Kaptijn *et al.* 2005).



2. Plan of northern concentration showing sherd densities.

On the very first workday of the 2005 season the survey team immediately stumbled upon a significant concentration of pottery sherds. In one of the plots an astounding 906 sherds were found, giving 18 sherds per m^2. During the work it became clear that the sherd density decreased towards both the South and West (see **Fig. 2**). In the East, we were stopped by planted fields, before a noteworthy decrease in number of sherds could be seen. As the Wādī Rājib is located in between this concentration and Tall 'Ammata it is impossible that these high densities represent some sort of run off from the tall. Research of the local geography has corroborated this conclusion. It was therefore concluded that this concentration reflects the remains of a mother population buried in the subsoil.

Preliminary analysis of the pottery has dated the majority of the pottery to the Byzantine and Early Islamic Period. Significantly smaller quantities of sherd date to the Roman and Early Byzantine Periods. Few sherds could be dated to the Hellenistic Period and a handful stemmed from the Iron Age[5]. Apart from pottery, the concentration also yielded other material categories mainly in the form of mosaic stones and glass fragments. These finds show the same distribution pattern as the pottery. The flint artefacts, however, were found in a much wider area and did not show any clustering. The number of flints discovered and the ratio between tools and waste was, nevertheless, significantly higher in this extended area than elsewhere in the research area away from sites. Presently, the flint collection is being analysed in order to test hypotheses on this deviating flint distribution, *e.g.* does the flint distribution reflect agricultural activities in the fields?

Just west of the concentration described, there was an area that recently saw some bulldozing activity; two shallow holes were dug and earth and rocks were pushed to the edges of the terrain. Because of the damaged nature and small scale of the area, no plots were walked but the area was surveyed by randomly collecting diagnostic finds. Several large, hewn building blocks were embedded in the bulldozer dump. Pottery was discovered in significant but not enormous quantities. Furthermore, roof tiles were abundantly present, whereas they are virtually absent in the other survey areas. A few small slabs of polished marble and a small, geometrically sculpted piece of marble were found. Quite large quantities of small mosaic stones were found in comparison to the generally large mosaic stones of the concentration described above. The surface finds were complemented by the discovery of fragments of plain white mosaic floor *in situ* in the bulldozer cuts and a fragment of multicoloured tesserae in a geometric design still cemented together. The abundance and nature of the finds and the architectural features point to some kind of building, most likely dated to the Byzantine Period.

The important findings south of the Wādī Rājib were complemented by small excavation work at Tall 'Ammata, a settlement mound located on the other bank of the wadi. The site overlooks the fields to the south. It can be assumed that this higher location was contemporary with the lower city. Tall 'Ammata is oval in shape and its original flat summit measures about 80m in diameter. Unfortunately, bulldozer cuttings have damaged the northern and western slopes. Former survey work revealed pottery sherds dated to the EB-MB, Late Bronze Age, Iron Age I, Iron Age II, Hellenistic Period, Early Roman Period, Byzantine Period and Umayyad/Mamluk Period (Glueck 1951; Ibrahim *et al.* 1976). In the two 5x5m squares, opened on the western slope in September 2005, extensive Byzantine, Roman and Hellenistic deposits were discovered, including large stone structures. The Iron Age II deposits that were excavated below these remains revealed some superimposed mudbrick walls with stone foundations, occupational accumulation, ash material and wash layers. Although further study on both the stratigraphy and the different artefact assemblages is needed and planned for the near future, Tall 'Ammata shows a similar fast oscillating variety and intensity of use as exhibited at the core site of this study: Tall Dayr 'Allā.

The Central Part of the Research Area

The central part of the research area incor-

5. The utmost gratitude must be expressed to Drs. Philip Bes from the Catholic University of Leuven who assisted in the analysis of the pottery and gave his expert opinion on the Roman and Byzantine imports and tableware.

porates two zones dynamically different from a geomorphologic point of view. The first comprises the flat lands that are located between the bases of the escarpments and the Zawr; the escarpments and its wadi systems act upon this zone. The second zone is the az-Zarqā' main bed and its banks, which is subject to discharges of the river and its basin. Previous paleogeographical investigations in this region have shown that during the early Holocene both zones were interconnected (Hourani 2002). They formed large flooding plains, with marshlands in the lower areas of the central Ghawr. According to Hourani's investigations, the separation of the two systems occurred around 8000BP, when the az-Zarqā' incised itself deeper into the plain. However, occasional over bank depositions of the az-Zarqā' system and major wadis in the flat lands continued until around 4500BP.

On the basis of these results, we have started current geo-archaeological investigations in the zones connected to the az-Zarqā' system in order to investigate the paleogeographical development of the region during the second half of the Holocene. The natural profiles of the az-Zarqā' and of its small tributaries were thus surveyed from the entrance point of the river into the Jordan Valley Plain down to the site of Dāmiya, where the az-Zarqā' enters the River Jordan. This geological survey has preliminary identified two phases in the Holocene period: a younger terrace of yet unidentified age; deposits of this terrace were observed in several places, *i.e.* to the East of the village of Dibbab, down below the Early Bronze Age site of Tall Umm Ḥammād ash-Sharqī and near the confluence of the az-Zarqā' and the Jordan. And a middle terrace, stratigraphically located between the sections of the major incision of 8000BP and the occupational levels of Tall Umm Ḥammād. The same terrace can also be observed at certain locations along the western section of the az-Zarqā' between Umm Ḥammād and Dabbāb. Deposits of this terrace are stratigraphically equivalent to the red-brown loams that cover most parts of the middle Ghawr. However, the dark deposits dating to the early Holocene that can be found underneath the red brown loams in several parts of the central Ghawr, are completely absent in the az-Zarqā' system. They could have been entirely demolished by the 8000BP incision and the subsequent flooding episode.

Tall Dayr 'Allā is both thematically and geographically the centre of the project. The survey has at first concentrated on the surroundings of Tall Dayr 'Allā. It was attempted to cover this region as completely as possible in order to get detailed information on this area. In addition to a circle of ca. 1km around Tall Dayr 'Allā the vicinities of other talls were surveyed as well. Where possible a direct connection with Tall Dayr 'Allā was made by surveying the area in between. In this way the fields around Tall Ḥamma, Tall al-Fukhār, Tall 'Adliyya, and part of the surroundings of Tall Abū Sarbūṭ, Tall Bashīr, Tall Mazār, Tall Ghazāla, and small parts around Tall 'Arqadat and Tall Ikhṣāṣ were surveyed. As a result, the area in between Tall Abū Sarbūṭ, Tall al-Fukhār and Tall Ḥimma with Tall Dayr 'Allā at its centre was investigated in a more or less continuous fashion. In these surveyed fields a few areas with significantly higher artefact densities than the overall density have been discovered. These large concentrations chiefly belong to three periods; *i.e.* the Late Chalcolithic, Early Bronze Age and the Mamluk era.

About 800m to the Northeast of Tall Dayr 'Allā and immediately north of Tall Qa'dān North a concentration of pottery was discovered. The sherds were distributed over a large area with the densest concentration of sherds extending over an area of ca. 200x150m. In some cases the sherds were of a significant size, yet their ware was quite brittle leading to the conclusion that they did not originate far away and had not been on the surface for long. In fact the field had been ploughed recently; for the first time since it was planted with citrus trees in the early 1960's.

Closer examination of the pottery led to the conclusion that the sherds must be dated to the Late Chalcolithic Period. Beside pottery fragments, also flint artefacts and several pieces of ground stones were found. More analysis needs to be done on the artefacts and their distribution pattern, but even before the research has been finished it is warranted to state that this distribution reflects a significant mother population, buried in the soil that most likely must be interpreted as a settlement.

A second concentration is located 800m to the West-southwest of the Chalcolithic site and

800m northwest of Tall Dayr 'Allā on the North bank of the Wādī al-Ghawr. Although its size is a little bit smaller, *i.e.* 220 x100m, the density of finds is just as high, with a maximum of approximately 100 sherds per plot, leading to an average of 2 sherds per m^2. By preliminary comparison of the pottery to the published material of Tall Umm Ḥammād several of the bowls correspond to genre 50. This genre occurs in stage 3 and the start of stage 4 of Tall Umm Ḥammād, which dates to the EB Ib and the start of the EB II Period (Helms 1992: 34/35+79/80). Few artefacts other than pottery were discovered. Again some flint scrapers and a sickle blade with gloss were found, but no grinding stones or other artefact types. Currently the pottery analysis is carried out and will hopefully provide us with more insights into what this distribution represents.

About 1700m north-northeast of this EB concentration and 250m southwest of Tall 'Adliyya another EB concentration was discovered. This concentration is significantly smaller, about 60-80m, and has a maximum of 60 sherds per plot, *i.e.* 0.8 sherds per m^2.

It is both archaeologically and historically well attested that the Jordan Valley was a major sugar producer in the Mamluk era. Sugar cane was grown in the valley and in water driven mills sugar was extracted. Several sugar mills have been discovered in the Jordan Valley (Ibrahim *et al.* 1988: 183, 203). The abundance of pottery from this period has been reported by other surveys, but sugar pot sherds have not been separated from other Ayyubid/Mamluk sherds. It is therefore impossible to distinguish between remains of sugar industry and other types of activity.

The survey has discovered large quantities of sugar pot sherds at two locations that previously had been reported to contain sherds from the Ayyabid/Mamluk Period, *i.e.* Tall Rikābī (Glueck 1951: 314; Ibrahim *et al.* 1988: 203) and Dirar (Ibrahim *et al.* 1988: 203). The majority consisted of both sugar bowls and syrup jars, with only a very limited number of other vessel types. The large number of sugar pot sherds indicates the presence of some form of sugar industry.

Within the modern village of Ḍirār the survey discovered the remnants of a water mill, still standing several meters high (see **Fig. 3**).



3. Mill of Ḍirār.

Villagers informed us that this mill was in use until the 1970's as a bread mill. It was supplied with water by the Shiqāq channel. This channel was the northern main irrigation channel of the sub-recent irrigation system that was in use until the installation of the East Ghawr Canal, in the late 1960's. The surface around this modern mill was, however, littered with sugar pot sherds. Again the villagers were able to help and recounted that there used to be a tall immediately west of the mill, aptly called Tall aṭ-Ṭāḥūna, but that it had been partly covered by a road and partly removed in the 1970's. Examination of the damaged parts resulted in the discovery of more sugar pots mixed with limited amounts of other Late Islamic vessel types. The Location of the modern village of Ḍirār can therefore also be identified as a Mamluk sugar mill.

A few hundred meters east of Tall Dayr 'Allā, just south of the Wādī al-Ghawr a previously undetected concentration of Ayyubid/Mamluk pottery with a predominance of sugar pot sherds was discovered. Again it was interpreted to reflect the presence of sugar industry. As many of the sugar mills were later reused for other types of grinding, it may be possible that this sugar mill is the same as the mill the village of Dayr 'Allā that was taxed in the Ottoman Daftari of 1525/6 until 1596/7 AD (Hütteroth 1977: 168). It is likely that water was tapped from the Wādī al-Ghawr, which today is only a small brook, but carried much more water before modern irrigation and water management activities started. The excavated Mamluk sugar mill of Tall Abū Sarbūṭ is located 2km downstream on the Wādī al-Ghawr (De Haas *et al.* 1989).

Concentrations of sugar pot sherds without

any structure can of course also reflect the presence of a kiln producing this type of sherds. The presence of sugar industry must have generated a high demand for sugar pots. The concentrations discussed cannot be interpreted as kilns, as they did not reveal any examples of misfiring. The survey did however discover the remains of a kiln used for firing sugar pots at another location.

On the North-northeast edge of Tall Zakārī a large recently dug hole with a diameter of ca. 2.5m was found. About a third of the edge of the hole was vitrified and a mudbrick lining was visible behind this vitrification. In the dump around this hole, sugar pot sherds were discovered. It has been interpreted as a kiln for firing pottery, dating to the Mamluk Period; judged by the amount of sugar pot sherds. More attention must be paid to this feature next season in order to draw more precise conclusions.

The presence of at least 4 Mamluk sugar mills between the Wādī Rājib and the Wādī az-Zarqā', combined with the Ayyubid/Mamluk remains discovered by previous surveys on tall sites, points to the conclusion that this area was heavily occupied and cultivated during this period. The cultivation of sugar cane requires a lot of water. Moreover running water is needed to drive the mills. Both these features point to the conclusion that irrigation and some sort of water management must have been practiced in this period to make the arid Jordan Valley suitable for this kind of activity.

The Southern Part of the Research Area

The confluence of the az-Zarqā' and the Jordan River is the most prominent feature of the southern part of the research area. Both rivers have penetrated the Ghawr with incised flood plains as the result, revealing enormous profiles with Late Pleistocene and Holocene deposits. These deposits bear a lot of geomorphologic information about the formation of the Ghawr and the Zawr and ease the reconstruction of the Palaeo-landscape of the Lower Jordan Valley. It is on the active floodplain of the Zawr that the site of Dāmiya is located. In order to understand the landscape before and during the occupation on Tall Dāmiya, two deep trenches were opened close to the northern and southern foot of the settlement mound. Both trenches were dug down to about 3.80m below the surface. The exposed sequences of both trenches show several superimposed layers of alluvial sand and sandy-clayey silt separated, at different intervals, by clear discontinuities. Detailed examination, both macroscopically and by thin-sections, of these depositions revealed two different developments, despite their relatively close distance.

At the base of the northern trench is a layer of light red to light brown fine sandy silt with small patches of grey-green clayey material. This deposit, visible down to 0.6m, also contains a number of small terrestrial shells and gravels and presents some dark patches as well as a fissural soil structure. All of these features indicate a regime of sedimentation characterised by periods of slow flooding in a seasonally water-saturated milieu, and by episodes of torrential flows, with lateral contribution from the marly banks of the Zawr. This environmental setting seems to be terminated by a major period of erosion. This was followed by the deposition of a 0.1m thick bed of gravels and a 0.8m thick layer of light brown to light grey fine silty sand, mixed with lumps of marl and lenses of gravels. These deposits include a lot of pottery sherds, fragments of construction material and lenses of charcoal indicating a local reworking of archaeological artefacts. A progressive diminution of the sand grain size, in an almost 2.3m thick light brown to yellowish sandy silt accumulation, shows a slowing down of the energy of flows. As opposed to the basal layer, signs of seasonal water saturation are absent in the last two sedimentary bodies. Instead, features such as lenses of gypsum crystals, fragments of surface crusts, pulverised microstructure and open inter-aggregates porosity point to a weak pedological development under drier conditions.

The southern trench shows a succession of at least eight layers, varying in thickness between 0.2 and 0.8m. Mineralogical compositions of these layers diverge between red-pinkish fine sandy materials and light brown to brown grey/green sandy silt, mixed with a well homogenised marly component. These deposits have an either prismatic or a grumular to columnar structure. In some rare cases, they are massive and very compact. Terrestrial shells and micritic nodules are often observed in different quantities. Except for the upper 0.6m, lenses of gypsum crys-

tals are almost absent. Similar to the northern trench, pottery sherds were observed down to three meters below the surface. These sedimentary and post-depositional features argue for environmental circumstances similar to the one inferred from the basal deposits of the northern trench: alternating periods of slow streaming and episodes of torrential flows with soil development in a seasonally saturated medium.

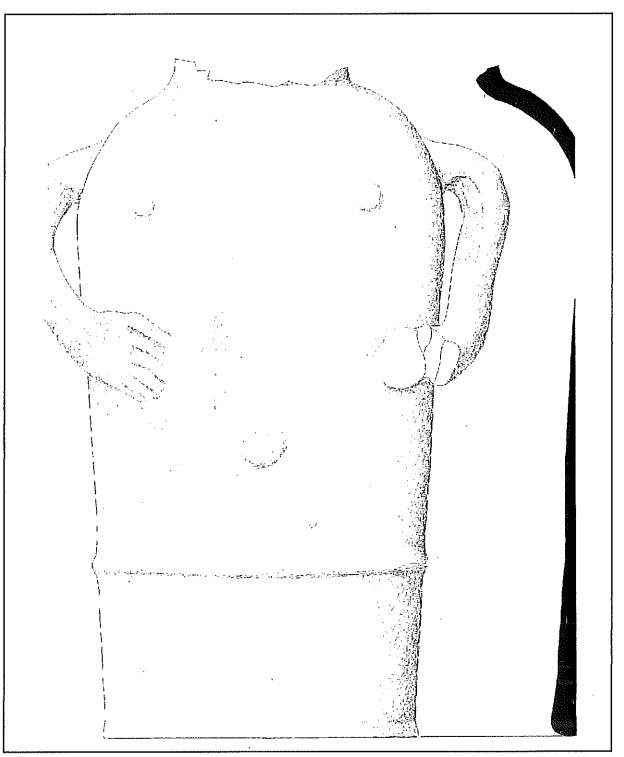
The first result to be deduced from these two sequences concerns the initial landscape configuration, upon which the settlement was established. The representative quantities of pottery sherds retrieved in lower levels were exclusively of Iron Age date. This suggests that the ancient landscape was about three meters lower than the present walking surface. The inhabitant of the site then took advantage of a hydrographical network slightly less incised than today, of a soil moister that lasted for a longer part of the year and of frequently renewed soils caused by frequent surface flooding. The contrasting palaeoenvironments of the southern sequence and the major part of the northern one can be connected to the erosional episode recorded on the top of the basal layer of the latter. This erosion may be connected to the opening of a deep, wide channel on the northern edge of the site occasioned by a sudden change in the direction or velocity of the az-Zarqā' main stream or of one of its member. In all cases, the time of this incision appears to be later than the formation of the southern sequence and most probably later than the abandonment of the site. This chronological question should, however, be clarified by further investigations.

The archaeological survey has covered a considerable number of fields in the Zawr. However, the number of artefacts discovered in this area was extremely low. In most fields an average of less than 0.5 sherds per plot was found. Higher densities were only discovered in the direct surroundings of Tall Dāmiya, near the modern but now deserted village of Dāmiya and on the supposed trajectory of the road leading to the old bridge over the Jordan. This bridge was most likely built in 664AH /1265AD by Sultan Bibars and connected Nablus to as-Salṭ (Kareem 2000: 11). Considering the occupation history of Tall Dāmiya (see below) and the presence of a ford crossing the Jordan River, this east-west route was probably much older[6]. The human activity attested for at least some periods, as evidenced by the tall and the bridge, forms a discrepancy with the low number of artefacts discovered. However, this area is part of the Zawr and was until recently, submerged annually as both Jordan and az-Zarqā' burst their banks in the wet season. In this way artefacts on the surface were either washed away or covered by sediments.

The medium sized settlement mound of Tall Dāmiya rises abruptly out of the flat fertile lands of the Zawr and is located not far from the remains of the medieval bridge. In 2004 three soundings were conducted directly on the edge of a recent bulldozer's cutting on the southern side of the mound's top. The excavation gave us tantalizing clues about settling cycles at the site during the late Iron Age (Kaptijn *et al.* 2005). However, more stratigraphic excavation work was needed to contribute to the general research aims of the *Settling the Steppe* project. With the intention to uncover more and older Iron Age strata, the excavation was expanded to the eastern slope in 2005, though with a direct stratigraphic relationship to the previously excavated trenches. The earliest deposits excavated at Tall Dāmiya consisted of a series of occupation and debris layers accumulated against a 1.5m wide surrounding wall. This mudbrick wall, with a construction date somewhere in the 9th century BC, did most likely protect the domestic households on the summit and shows only small alterations and restorations up to its destruction at the end of the 9th century BC. Around 800 BC several settlements in the Jordan Valley, including Tall Dayr 'Allā, Pella, Tall Abū al-Kharaz and Tall Dāmiya exhibit evidence for a devastating earthquake, that not only destroyed most sites but the after-effects of which are archaeologically visible well into the following century. Many settlement sites in the Jordan Valley, including Tall Dāmiya, show rather poor squatter occupation in the beginning of the 8th century BC, following that particular earthquake. In the middle of the 8th century, the Dayr 'Allā regions

6. The ford is mentioned in the Old Testament (Joshua 3:16) and seems to be pictured on the Madaba Mosaic Map from 565SAD.

seems to recover from these difficulties. Tall Dāmiya was rebuilt and reveals material culture that can be linked to the Neo-Assyrian Empire. The gradual process of the Assyrian conquest of the Levantine society is also visible at other sites in the Middle Jordan Valley, like Tall Dayr 'Allā, Tall 'Adliyya and Tall as-Sa'īdiyya. Not only the increase of Assyrian Palace Ware, but also the discovery of a clay bulla, inscribed with cuneiform writing, shows the presence of Akkadian-reading people at Tall Dāmiya. Other finds include a large part of an anthropomorphic ceramic statue (**Fig. 4**). A huge conflagration ended the Assyrian Period and it seems that this fire completely chased away any 'foreign' presence. The pottery assemblage of the following village occupation reveals only local household types and wares, without any traces of inter-regional contacts. The late 7th and most of the 6th century BC is archaeologically hardly evidenced. The Middle Jordan Valley reveals only a few sites, like Tall Dayr 'Allā, with architectural features and sedentary occupation. The other sites contained thick deposits of courtyard layers and food-storing pits; possible traces of a more mobile and pastoral lifestyle.



4. Anthropomorphic ceramic statue, found in the Neo-Assyrian Period at Tall Dāmiya.

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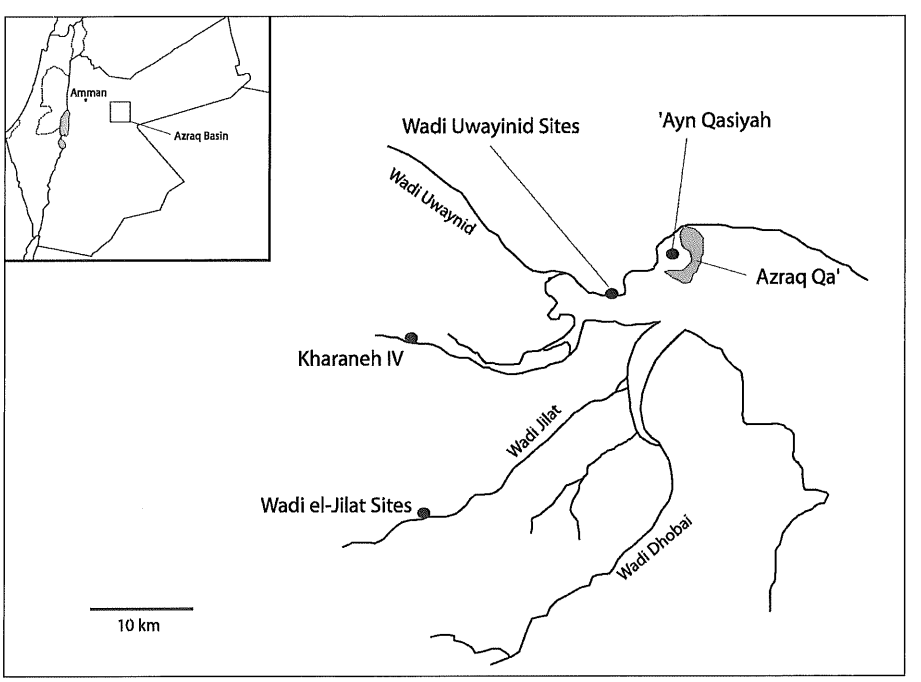
RESCUE EXCAVATIONS AT EPIPALAEOLITHIC 'AYN QASSIYYA: REPORT ON THE 2005 SEASON

Tobias Richter and Constanze Röhl

Introduction

This report presents the results of the 2005 excavation season at the early Epipalaeolithic site of 'Ayn Qaṣiyya, which is situated in the Azraq Wetlands Reserve in eastern Jordan (**Fig. 1**). The site was first described by Gary Rollefson, Leslie Quintero and Philip Wilke (Rollefson 2001). It features rare organic preservation conditions, which can potentially provide important insights into subsistence and settlement patterns, palaeoclimatic conditions around the last glacial maximum in the al-Azraq Basin and the nature and speed of socio-cultural changes during the early Epipalaeolithic period.

Prehistoric research in the al-Azraq Basin has a long history, beginning with Waechter's expeditions to the Wādī Dhubāyy (Waechter 1938), which was followed by more cursory investigations later on by Zeuner (Zeuner 1957) and Field (Field 1960). Since the late 1970s and early 1980s a number of key research projects have investigated a range of prehistoric sites in and around the al-Azraq Oasis (Byrd 1988; Copeland and Hours 1989; Garrard 1998, Garrard *et al.* 1988, 1994, 1996; Garrard and Byrd 1992; Rollefson 1983; Rollefson *et al.* 1997, 2001), as well as in the Wādī Kharrāna (Muheisen 1988a, 1988b) and further east in the basalt desert (Betts 1988, 1991, 1998). This work demonstrated that the al-Azraq Basin was an attractive location for human groups throughout the Pleistocene. The late Pleistocene in particular is represented by a fairly high density of larger and smaller Epipalaeolithic sites; some of which are unusual in comparison to Epipalaeolithic occupations elsewhere in southwest Asia (Byrd 1988; Garrard and Byrd 1992; Muheisen 1988a, 1988b). Some of these, such as Kharrāna IV (Muheisen



1. The al-Azraq Basin with associated Epipalaeolithic sites.

1988a, b) and Wādī Jīlāt 6 (Byrd 1988; Garrard 1991, 1998; Garrard *et al.* 1988, 1994) are large, open-air occupations which, although deflated, have been recognized as particularly important Epipalaeolithic camps representing localities in the late Pleistocene landscape that were repeatedly revisited. A number of smaller Epipalaeolithic sites were also documented in the Wādī 'Uwaynid ('Uwaynid 14, 'Uwaynid 18) and the al-Azraq Oasis (Azraq 17, Azraq 18, Azraq 32; Garrard 1991, 1998; Garrard *et al.* 1988, 1994, 1998), while sites further east along the Basin periphery date to the late Epipalaeolithic (Betts 1991, 1998). The chronological range and relative wealth of Epiplaeolithic sites in the al-Azraq Basin has produced a long and almost continuous history of the use of this landscape owing to the geographical importance and centrality of the al-Azraq Oasis. Although climatic conditions in the late Pleistocene, and particularly around the last glacial maximum, differed significantly from the modern day situation (Garrard 1998; Garrard *et al.* 1985, 1988), the al-Azraq Oasis's permanent supply of water and the lush micro-environmental situation seem to have provided an important focus point for human settlement in eastern Jordan. This special ecological situation provides an interesting area for prehistorians to test theories regarding the evolution from hunter-gatherer to farming communities in southwest Asia (Garrard *et al.* 1988: 311), in particular the long dureé of socio-cultural changes in 'marginal' or special ecological situations.

Since the last major research into the Epipalaeolithic in the al-Azraq Basin was undertaken, our understanding of the role of early Epipalaeolithic communities in the evolution of food procurement practices in southwest Asia has significantly altered by the discovery and investigation of Ohalo II (Kislev 1992; Nadel 2002; Piperno 2004). This terminal upper Palaeolithic/ early Epipalaeolithic gatherer-fisher-hunter open-air site, on the western shore of Lake Tiberius, demonstrated that certain traits, which were previously thought to emerge with the late Epipalaeolithic (Natufian), were already to some degree present just after the last glacial maximum. Due to extended periods of water logging a rich prehistoric plant record was preserved at Ohalo II, which demonstrated the exploitation of a wide range of cereal and fruit species by early Epipalaeolithic groups at the site (Kislev *et al.* 1992; Nadel 2002). In turn, this showed that unilineal models of cultural evolution, were difficult to maintain. Archaeologists had suggested a progression from early Epipalaeolithic hunter-gatherers with an immediate return economy, to late Epipalaeolithic (Natufian) gatherer-hunters with a delayed return economy, needed to begin to think differently about the nature and speed of socio-cultural changes during the late Pleistocene.

Although research in the al-Azraq Basin has demonstrated that 'marginal' (from a modern perspective) areas of the southern Levant featured more prominently in the cultural landscape of the late Pleistocene, the Epipalaeolithic evidence has so far rarely been contextualized with respect to the findings from Ohalo II. This is partially due to the generally poor preservation conditions prevalent in this now semi-arid and arid region. Micro- and macro botanical plant remains are almost totally absent from the archaeological record of the early Epipalaeolithic in the al-Azraq Basin. Only the early Epipalaeolithic levels of the upper phase of Wādī Jīlāt 6 (dated between 16,700 to 15,470BP, Garrard *et al.* 1994) have produced the fragmented remains of chenopods, sedges and grasses (Colledge 2001; Garrard 1998; Garrard *et al.* 1988, 1994). Our current understanding of the plant exploitation strategies, during the early Epipalaeolithic phase in the al-Azraq Basin, is therefore still somewhat limited. It is therefore difficult to assess the nature of plant economies during the last glacial maximum in the region. This situation, in turn, makes it uncertain how similar or dissimilar procurement strategies, settlement patterns and socio-cultural developments in the al-Azraq Basin were to other parts of the southern Levant. Although it seems obvious that Wādī Jīlāt 6 and Kharrāna IV, as well as other early Epipalaeolithic sites, are the result of short-term, perhaps seasonal, occupations — which probably relate to seasonal cycles on annual rounds — it is not clear how long, how specialized and how related these occupational events were. Therefore, much more research can be done in the al-Azraq Basin, particularly if undisturbed Epipalaeolihic sites are discovered, with better preservation conditions, favorable to the preservation of mi-

cro-botanical plant remains.

During a survey of the Azraq Wetlands Reserve in 2000 (Rollefson *et al.* 2001), a substantial prehistoric occupation was encountered along the northern wall of 'Ayn Qaṣiyya, one of the former artisan springs in the Azraq ash-Shīshān area (**Fig. 2**). The site was contained in a dark carbonaceous palaeosol, which was very rich in organic matter, mainly made up of decayed plant remains, as well as high concentrations of material culture and animal bone. Rollefson *et al.* (2001) recognized the site in two localities where it was exposed in section. Chipped stone artifacts collected from the eastern part of the site suggested a likely date of ca. 19-16,000BP, while the western part of the site produced materials dating ca. 22-19,000BP The carbonaceous nature of the deposits at 'Ayn Qaṣiyya as well as the preservation of abundant animal bones, including small avifaunal remains, suggested that the site had a high potential for the preservation of organic remains, such as seeds, phytoliths and organic material culture. These observations led Rollefson to conclude that " 'Ayn Qasiyah offers a lucid understanding of the exploitation patterns of the el-Azraq marshes by Epipalaeolithic groups" (Rollefson *et al.* 2001: 79).

In 2004 the directors of the Azraq Wetlands Survey project, Gary Rollefson, Leslie Quintero and Philip Wilke, revisited 'Ayn Qaṣiyya and found that the sections where the site was exposed were partially eroded and dried out. Ongoing water extraction from al-Azraq area had increased rates of desertification, contributing to accelerated erosion. 'Ayn Qaṣiyya's naturally protected organic preservation conditions, as well as the integrity of the archaeological deposits were now threatened. Meaning that the opportunity to understand more about the exploitation of the Azraq marshes by Epipalaeolithic groups, through the study of preserved organic remains was endangered. The project, that is the subject of the present report, was set up as a research driven rescue excavation, to understand the use of the al-Azraq Oasis landscape by early Epipalaeolithic hunter-gatherers in more detail before this information is lost. In October 2005 the first stage of this project began its investigations at 'Ayn Qaṣiyya, undertaking recording work and some small-scale rescue excavations. The chance to recover micro-botanical plant remains, small mammal and avifaunal remains, a wealth of associated environmental data and perhaps organic material culture, in conjunction with abundant chipped stone artifacts, other faunal remains and abundant materials for radiometric dating from an *in situ* early Epipalaeolithic site situated in the Oasis, represents a unique opportunity in the context of late Pleistocene research in Jordan and across the southwest Asia. The findings of the 2005 season have strengthened the belief that the site does have a high potential for providing these sets of data.



2. *'Ayn Qaṣiyya looking Northwest across the site. To the left is the pool of the extinct 'Ayn Qaṣiyya spring.*

Aims of the 2005 Field Season

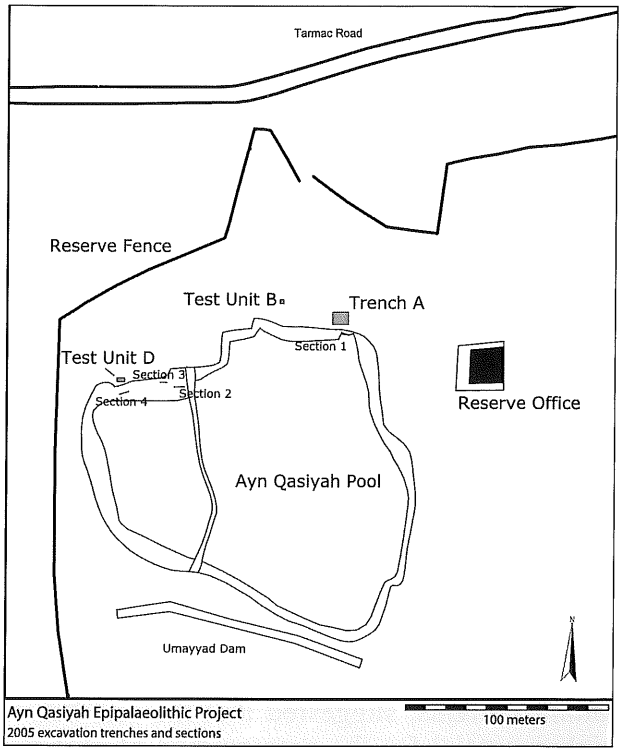
The 2005 field season was designed as a preliminary test season, aiming to assess the site's preservation conditions, which would enable us to plan further fieldwork seasons. While previous fieldwork had preliminarily documented and described the areas in which the site was already exposed, detailed drawings and photographs of these exposure had yet to be made. In addition, an effort was to be made in the 2005 season to record further areas in which the site may be visible along the northern edge of the 'Ayn Qaṣiyya pool.

Due to the previously described disintegration of the archaeological deposits at the site, a further aim of the 2005 season was to understand the current state of the organic preservation of the site and to verify the horizontal extent of the archaeological deposits. Although the site had been recognized by surface finds that had eroded from the exposed sections, the understanding of the horizontal extent of the Epipalaeolithic occupation could only be estimated based on other sites in the al-Azraq Basin. The anticipated good preservation conditions also offered a chance to recover organic remains suitable for an initial radiometric dating of the site.

Lastly, while surface collections had produced chipped stone artifacts in rich quantities, an increased sample size, derived from controlled excavations, would further allow the site to be placed into a relative chronological horizon based on a comparison with the lithic material from other early Epipalaeolithic sites in the area.

Fieldwork Strategy and Methods

The fieldwork strategy had a double emphasis, focusing on the one hand on the already exposed stratigraphic sequence, as well as the excavation of small areas to the north of these exposures (**Fig. 3**). Two sections found during the 2000 survey were carefully cleaned, photographed, drawn and described to gain a full record of the exposed stratigraphy (**Figs. 4 and 5**). The use of water sprayers dramatically increased the visibility of the deposits and allowed us to delineate various archaeological and natural deposits in better detail. In addition to the two identified exposures two further sections were cleaned and recorded between what were

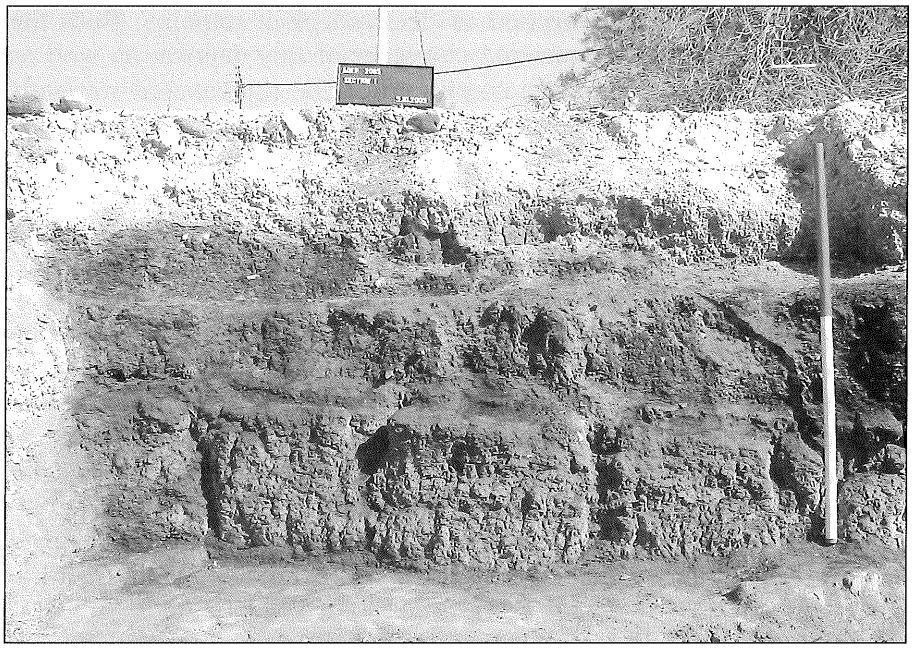


3. Plan of the 2005 excavations and recorded sections.

termed by Rollefson *et al.* (2001) locality I and locality II (**Fig. 3**). Although not continuous, the four recorded sections provided a fairly good cross-section through the geo-archaeological situation at 'Ayn Qaṣiyya.

In addition to the recording of these four sections three areas of excavation were opened. Trench A was placed immediately to the north of section 1 (locality I) and was the largest excavation area of the 2005 season, measuring 3x4 meters. This excavation trench targeted an area where particularly high concentrations of animal bone and material culture were noted in section 1.

Two further test units (Test Unit B and Test Unit D) were opened to the west of trench A. Test unit B was a small sounding of 1x1 meters, while test unit D measured 2x1 meters. Test unit D was placed close to section 4 (locality II) to verify the depth of the overburden and test the nature of the archaeological deposits in this part of the site. Both test units were also used to verify the extent of the Epipalaeolithic site and to understand the conditions of the deposits lying under the topsoil. It was hoped that the exposure of the underlying carbonaceous palesol could verify the condition and state of organic



4. Section 1, camera looking north.



5. Section 3, camera looking north.

preservation in these deposits.

Following the removal of the topsoil, excavations proceeded using a 1x1 square meter grid system as the basis for plotting finds distribution and controlling micro-stratigraphic excavation units in arbitrary spits. The recoding of definable archaeological layers and features and their description relied on the conventional system of single context recording, following the system established by the Museum of London Archaeology Service (Westman 1994), using minor alterations. A total station was used for a more thorough plotting of the distribution of finds, as well as the general mapping of the site and the excavated areas. All excavated soil from deposits below the topsoil was wet sieved using 5mm and 2mm screens. Soil samples were taken from every square meter for flotation, micro-stratigraphic and chemical analysis.

Geoarchaeological Sequence

From our observations of the deposits visible in sections #1-4 a basic stratigraphic sequence could be delineated, which provides us with an

initial understanding of the establishment of the Epipalaeolithic site and the nature of the prehistoric occupations (**Figs. 4, 5, and 6**). The simplified, basic stratigraphic sequence, based on individual stratigraphic units (summarized in **Table 1**), at 'Ayn Qaṣiyya as visible in sections #'s 1-4 can be outlined as follows:

Topsoil

Either composed of a very cemented breccia deposit or an aeolian silty sand deposit. In both cases material culture indicates a fairly recent deposition. Modern glass and metal is mixed with classical pottery fragments and prehistoric chipped stone artifacts. This horizon is between 20 and 40cm strong.

Carbonaceous Paleosol/ Peat

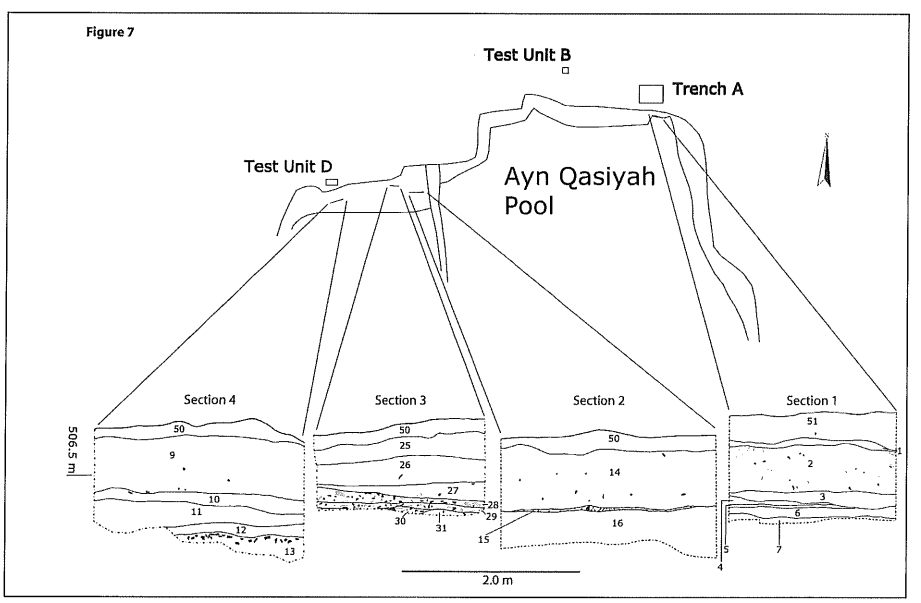
Below the topsoil follows a dark brownish-black deposit which is rich in organic matter, composed of decayed plant remains. Both the colour and character of this deposit, as well as modern conditions in the rejuvenated wetlands area, suggest that this deposit was waterlogged for extended periods of time. This deposit is between 40 and 50cm thick and is present in all of the section.

In section 1 this layer contains numerous chipped stone artifacts and fragments of animal bone, but in sections 2, 3 and 4 this layer displays much lower concentrations of finds; to the extent that it can be described as almost sterile. In sections 2 and 3 in particular the absence of finds in relation to the underlying deposits (unit 3) is very characteristic. The materials recognized in this layer in section 1 do not display any clear order or sorting, but appear to be fairly 'jumbled up'.

This deposit is a highly valuable resource for the collection of abundant palaeoenvironmen-

Table 1: Summary table of the stratigraphic contexts into major stratigraphic blocks.

Major stratigraphic unit	Stratigraphic Unit Type	Context No.
1	Topsoil	50, 51, 1
2	Carbonaceous paleosol/ peat	2, 14, 25, 26, 27, 9
3	Surface horizon/ occupation areas	15, 28, 29, 30, 31
4	Marsh/ standing water deposit	3, 4, 5, 6, 16, 10, 11
5	Basin marls	7, 12
6	Shore deposit	13



6. The section drawings leveled at 506.5 meters and correlated with the site.
plan. Fig. 3: 'Ayn Qaṣiyya section locations and section drawings. Sections levelled at 506.5 meters.

tal information ranging from carbonized seeds, pollen, and phytoliths, to micro-faunal and sedimentological data.

Surface Horizons

In sections 2 and 3 further layers are distinguishable underlying the paleosol (unit 2). In section 2 a thin, straight band of chipped stone artifacts runs through the section directly overlying the marsh/ standing water deposit below (unit 4). This appears to be a surface horizon, which indicates an *in situ* situation of the Epipalaeolithic site. In section three a series of overlapping layers with high concentrations of chipped stone artifacts and animal bones were recognized, which seem to represent a number of different occupational events, as well as episodes of erosion. The surface in section 2 averages 3-4cm in thickness, while the concentrations of material culture and animal bones have a maximum thickness of about 30cm in total.

Marsh/ Standing Water Deposit

Below layer #3 in section 2 and 3, as well as below the palaeosoil in section 1 and 4, follows a mid-greenish grey fine silty clay which results from standing water formation. It indicates the presence of marshy, wet conditions on top of which the Epipalaeolithic occupations were established. A gradual incline of this deposit, visible in the sections, suggests a recession of the marsh from west to east, which probably reflects contractions of the pool/ marsh in prehistory. It is likely that micro-stratigraphic analysis of this deposit will reveal a series of micro-scale depositional processes, which will also provide vital environmental information regarding the depositional history and prevailing climatic conditions. It is likely that these deposits also contain other microscopic and macroscopic remains, such as molluscs, pollen or phytoliths, which may provide further sets of palaeoenvironmental data.

Basin Marls

Most recognizable in section 1 and 4 this medium brown fine sandy silt lies below the marsh deposit. It consist of a series of bands, which would have been deposited as part of a low-energy, slow aggregational process, typical of lake/ pool bottom situations. The fine sub-division of this deposit can provide vital information about rates of deposition and rates of precipitation, providing vital sets of climatic data. The thickness of this deposit reaches about 30cm in section 4, but is probably much thicker further east.

Shore Deposit

This deposit was only recognized in section 4. It consists of a series of thickly packed medium and small sized rocks, which are of an angular and sub-angular nature. The deposit reaches ca. 20cm in depth. Given the nature of the overlying deposit, which was interpreted as a basin accumulation horizon, it seems reasonable to suggest this layer represents a shore deposit where higher energy erosion has contributed to the deposition of fairly large clasts and rocks. This layer is mixed with Middle Palaeolithic Levallois artifacts, which are residual.

The differences noted between the composition of the carbonaceous paleosol in section 1 and those in section 2 and 3 suggests that the presence of material culture and animal bones in the peat deposit in section 1 is the result of erosion. This is supported by the unstructured appearance of the material culture in section 1. In sections 2 and 3 the situation is somewhat different, as it seems that *in situ* surfaces and areas are present, although erosion events can also be recognized in section 3. It is unclear at present where the materials in section 1 have been eroded from, but the fresh (sharp) nature of the chipped stone artifacts suggests that lateral movement has been minimal. A correlation of the four recorded sections indicates a fairly clear and continuous geo-archaeological sequence. Several Epipalaeolithic occupations were established on top of a wet, marshy ground that succeeded a prehistoric standing body of water, which was probably analogous to the modern deposition processes encountered in the wetlands reserve today. An incline of the deposits can be noted, with a gentle slope falling from the west towards the east, which suggests a gradual lateral movement of the marsh edge from west to east. Although the typology of the chipped stone artifacts from section 1 (locality I) and section 4 (locality II) and their suggested time range from 19-16,000BP uncal. and 22,-19,000BP uncal. (Rollefson *et al.* 2001), is only a coarse dat-

ing indicator, they nevertheless seem to support this view. The vertical stratigraphic sequence is therefore further informed by a horizontal stratigraphy.

Excavations

Trench A

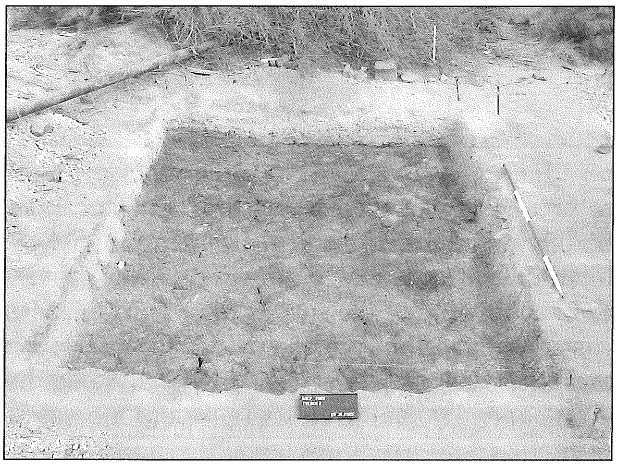
Excavations in trench A exposed the top of the Epipalaeolithic site across a 12m^2 area (**Fig. 7**). Following the removal of a very firm, concreted breccia deposit, the underlying dark brown carbonaceous paleosol was encountered 30-40cm below the modern surface. This peat horizon produced rich quantities of chipped stone artifacts and animal bone, but no modern material culture, suggesting that the Epipalaeolithic deposits have remained more or less sealed. Again, no clear structure or orientation could be noted in the finds distribution; mirroring the situation observed in section 1. It seems therefore even more likely that finds in this area are eroded from a different part of the site. However, the chipped stone artifacts are fresh with sharp edges suggesting limited lateral movement. No features such as hearths, post-holes or pits could be recognized in the excavated area. It was recognized during excavation that the exposed paleosol remained fairly firm and was difficult to excavate. The clay content of this deposit appeared to be fairly high, and it seems plausible that the exposed area is a transitional horizon between the topsoil and further layers of peat below. It appears that the overlying breccia deposit may have leached out into the underlying deposits resulting in a fairly cemented and firm compaction. A much softer and loose deposit was recognized in squares E984/ N1004 and E985/ N1005, which was more reminiscent of the deposits found in section 1. Crucially, in these square meters the topsoil was not a breccia deposits, but by an Aeolian sand-silt deposit, which may be responsible for the softer composition of the paleosol in this area.

Test Unit B

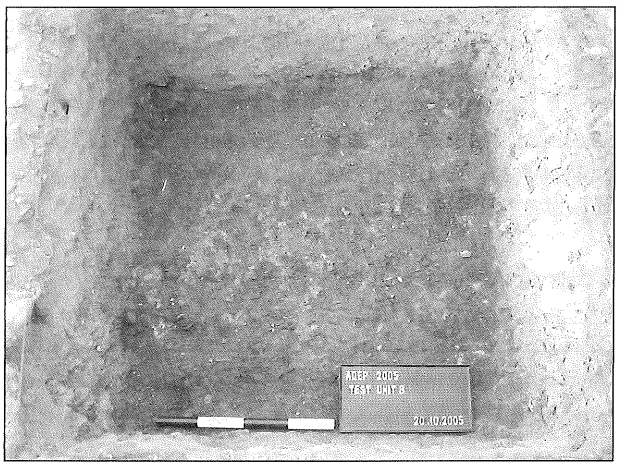
This 1x1 meter test trench was situated ca. 10 meters to the west of trench A (see **Figs. 3, 8**). It was excavated down for a depth of 0.5 meters until the paleosol was encountered. Numerous chipped stone artifacts as well as animal bone fragments were recovered from this excavation. In this test unit the peat/ paleosol was iron stained and in a very fresh condition. The patchy iron-staining, which was dark reddish brown in colour, suggested a high lepidocrocite content in this deposit, indicating anaerobic conditions. However, this assessment is awaiting further chemical testing for verification

Test Unit D

Test unit D was situated at the western edge of the site, atop section 4 (see **Fig. 3**). It targeted the area that was labeled 'locality II' by Rollefson (Rollefson *et al.* 2001), to verify the nature of the peat horizon here. The unit measured 2x1 meters and was excavated to a depth of ca. 0.4 meters. Concentrations of chipped stone artifacts and animal bone were much lower compared to trench A and test unit B. A fairly loose version of the paleosol was encountered at a depth of 0.4 meters. The much lower artifact concentrations in this location and the nature of the sub-surface



7. Trench A after the removal of the topsoil.



8. Detail of the carbonaceous paleosol in Test Unit B.

deposits suggested that the site was either buried deeper here or that the site did not extend this far west. Root disturbance in this unit was substantial.

The three small-scale excavations at 'Ayn Qaṣiyya demonstrated that the site has a width of at least 10 meters extending north of the 'Ayn Qaṣiyya pool and that the nature of the sub-surface deposits generally displayed a rich organic and humic content indicating anaerobic conditions. Given this assessment it appears that the preservation conditions at the site are exceptional, although dryness does appear to begin to affect the buried paleosol. Chipped stone artifacts appeared almost exclusively fresh and not rolled, suggesting that they were either *in situ* or at least redeposited very close to their original place of deposition. Although no features such as hearths, pits or post-holes were encountered during excavation, it seems that the presence of a number of surfaces in section suggests that in other locations such features are likely.

Finds

Section cleaning and the excavations produced an assemblage of material culture which is dominated by chipped stone artifacts. Below we provide a brief summary of an initial assessment of the assemblage.

Chipped Stone Artefacts

A total of 5,259 artefacts were recovered from the excavations. The vast majority (4,778, 90.8%) were recovered from Trench A. As the materials from trench A represent the most abundant sample and are therefore the most diagnostic assemblage they will be the focus with in this report. **Table 2** indicates the subdivision of the Trench A assemblage according to basic debitage classes.

Table 2: Basic categorization of chipped stone artifacts from trench A.

Debitage Category	No.
Flakes	3645
Blades	147
Bladelets	212
Core Trimming Elements	21
Cores	6
Chunks	386
Retouched Pieces	391

Knappers at 'Ayn Qaṣiyya appear to have relied on a fairly restricted range of locally available flint sources, which are all of very good quality. The most abundant raw material is a black flint with a white cortex, which is very fine-grained and of very good quality. The dark colour of this raw material is, however, altered due to chemical weathering, which is the result of long-term deposition in water logged conditions. Grey and brown flint varieties also exist in the spectrum and are also frequently used. They also have good or even very good knapping qualities.

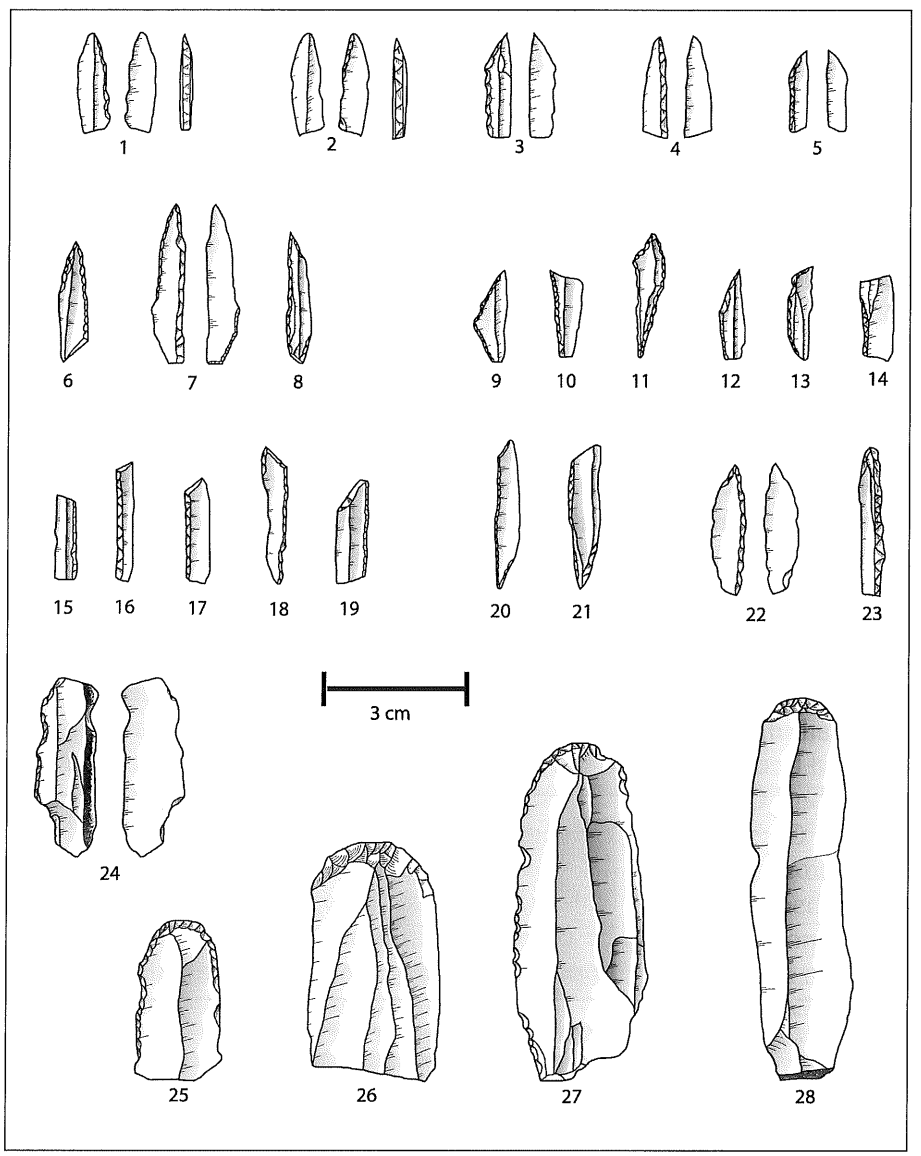
Although a high number of flakes were recorded in the 'Ayn Qaṣiyya trench A assemblage, most of these were micro-debitage (**Table 2**). They are likely to relate to core maintenance procedures, preparation strikes, debris from grinding and shattering during the knapping process, rather than being an intentional product. From the presence of blades and bladelets it is clear that in most cases the reduction strategy was geared towards the production of small blades and bladelets. This is further supported by the intentional selection of blades and bladelets for retouched tools. Different reduction sequences for different types of tools have been described on other upper Palaeolithic and Epipalaeolithic sites in Jordan (Coinman 2004; Goring-Morris 1995: 151; Olszewski 2004). Some of these reduction sequences also produced discreet flake debitage relating to these core reduction procedures. It is therefore not unreasonable to assume that some of the larger flake debitage present in the 'Ayn Qaṣiyya assemblage may relate to the production of non-microlithis artifacts. In general this precursory view of the technology of the 'Ayn Qaṣiyya assemblage suggests that it is very similar to other early Epipalaeolithic industries found elsewhere in the Levant (Byrd 1988, 1994; Goring-Morris 1995), on a general level. Variations in the knapping procedures need to be considered in more detail once more secure deposits and larger samples are available.

The 391 retouched chipped stone artifacts (7.4% of the total AQ assemblage) recovered from trench A were categorized according to basic tool types (see **Table 3**). The most abundant types of artifacts were retouched flakes and non-

Table 3: List of basic tool categories in the chipped stone assemblage from trench A.

Tool Category	No.	%
Scrapers	21	5.3
Burins	16	4.1
Notches and Denticulates	10	2.5
Retouched Flakes	130	33.2
Retouched Blades	76	19.4
Truncations	6	1.5
Geometric Microliths	13	3.3
Non-Geometric Microliths	113	28.9
Varia	5	1.2
Total	391	100%

geometric microliths. Because the retouched flakes category included items that were not formally retouched but showed traces of utilization retouch, the non-geometric microlith class is more indicative of the purposeful shaping of flint into tools. Amongst the non-geometric microliths pointed bladelets with fine backing (**Fig. 9**, No. 1-8) and La Mouillah points dominate (**Fig. 9**, No. 15-19). There is some degree of variation amongst the pointed, backed bladelets and La Mouillah points, as pieces with basal modification and other minor variations exist. The vast majority of pointed bladelets and La Mouillah points correspond to the 'robust type' described by Byrd (1988, see also Garrard *et al.* 1994), which appears to relate to a slightly later phase in the early Epipalaeolithic.



9. Chipped stone artifacts from trench A. 1-2: backed bladelet, 3-6: pointed, backed bladelet, 7-8: poined, backed bladelet with basal modification, 9: atypical triangle, 10: asymmetrical trapeze, 11: scalene bladelet with basal modification, 12-13: irregular lunates, 14: asymmetrical trapeze, 15-19: La Mouillah point, 20-21: La Mouillah point with basal modification, 22: curved, pointed bladelet, 23: backed bladelet, 24: notch, 25-26: endscrapers on blades.

Comparisons to the non-geometric microliths recovered from trench A can be found in the materials from Kharrāna IV phase B (Muheisen 1988), Wādī Jīlāt 6 middle phase (B), and 'Uwaynid 14 upper phase (Byrd 1988; Garrard *et al.* 1994). Double truncated bladelets, present in the assemblages from 'Uwaynid14 upper phase and Wādī Jīlāt 6 middle phase, appear to be much less common at 'Ayn Qaṣiyya, whereas burins are more common at 'Ayn Qaṣiyya than at 'Uwaynid14 upper phase or Wādī Jīlāt 6 middle phase ('Ayn Qaṣiyya: 4.1%, Wādī Jīlāt 6 middle phase: 2.7%, 'Uwaynid14 upper phase: 2.5%, see Byrd 1988). The higher ratio of burins at 'Ayn Qaṣiyya may at this stage simply be regarded as a sampling issue, although the higher level of their abundance could potentially relate to a more intense reutilization of waste materials as cores for the production of microlithic burin spalls. One AMS date from Wādī 'Uwaynid14 upper phase dates this assemblage to 18,900 +/-250 BP (OxA-865), and generally confirms Rollefson et al.'s (2001), estimation of the age of locality I as falling between 19-16,000BP uncal.

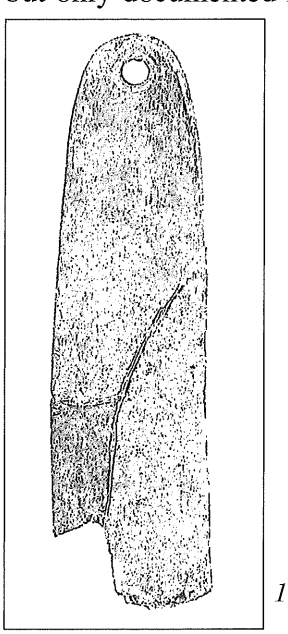
Amongst the other tool classes scrapers are quite common (5.3%), with end-scrapers made on blades or bladelets being particularly evident. Many are distinctive Epipalaeolithic end-scraper forms, often made on long blades with very regular abrupt scraper retouch.

The presence of some geometric microliths is not generally surprising. Almost all are 'proto-geometric' forms (Bar-Yosef 1972). Although we cannot at this stage exclude the possibility that some of the geometric forms may be intrusive, from later phases of occupation at or near the site. It seems highly probable that the geometric microliths found in trench A are part of a more continuous fluidity between microlith forms, perhaps reflecting the limits of our typological classification schemes (Neeley and Barton 1994; Olszewski 2001).

Altogether the chipped stone assemblage from 'Ayn Qaṣiyya is similar to many other early Epipalaeolithic occurrences documented across the al-Azraq Basin, although the assemblage probably does not date to the final upper Palaeolithic/ early Epipalaeolithic phase in the region; at least not in the case of Trench A. Unfortunately, insufficient samples of materials, in particular microliths, were obtained from Test Unit D and sections 2-4, to confirm the date of the western part of the site as terminal Upper Palaeolithic/ early Epipalaeolithic as suggested by Rollefson (Rollefson *et al.* 2001). Differences between 'Ayn Qaṣiyya and other al-Azraq Basin sites can be noted in the slightly less common occurrence of microliths in the assemblage, although the vast majority of the assemblage is microlithic (truncations and many retouched flakes are very small). Before assuming that the relative absence of microliths at 'Ayn Qaṣiyya is evidence that hunting was of less importance than at other sites adjacent to the Oasis (Byrd 1988), micro-wear analysis of a sample from the assemblage should first be undertaken.

Bone Artefacts

Bone artifacts are fairly rare on early Epipalaeolithic site across southwest Asia. Considering that the excavated area at 'Ayn Qaṣiyya is comparatively small the recovery of two bone artifacts in the 2005 season has to be seen as an indicator of the well-preserved nature of this site. One bone 'spatula' was recovered from the surface horizon (context 15) in section 2 during cleaning (**Fig. 10**). A broken bone point was found in square E985/ N1004 in trench A, deriving from the carbonaceous paleosol. The date of the bone 'spatula' cannot at present be confirmed as early Epipalaeolithic, as the context from which it derives has not been excavated but only documented in section; nevertheless it



10. Bone 'spatula' found during the cleaning of section 2.

appears that this a fairly rare item for an early Epipalaeolithic site. Bone spatulae are known from the late Epipalaeolithic (Natufian) at Kebara cave layer B (Phillips 1998) and from 'Ayn Mallaha (Valla). Should the date of the surface in section 2 be confirmed as early Epipalaeolithic by excavations, the 'Ayn Qaṣiyya bone spatula would be an unparalleled example of early Epipalaeolithic bone manufacture. The bone point on the other hand is a fairly conventional, if stubby, specimen, which has parallels at many other early Epipalaeolithic sites.

In the al-Azraq Basin bone artifacts have been recovered from the middle Epipalaeolithic levels at Kharrāna IV and at from the middle and lower occupational phase at Wādī Jīlāt 6. The recovery of bone artifacts from 'Ayn Qaṣiyya suggests that further excavations may recover a fairly rich and perhaps diverse collection of bone artifacts in the future.

Ground Stone Tools

Two pieces of ground stone were found in association with the site, but none were recovered from deposits that would situate them securely within the Epipalaeolithic. The first piece was found in front of section 1 and perhaps fell there from the dark-brown site deposits further up in the section. It is a flat, small basalt slab with a slight hollow on the top. The other piece of ground stone derives from topsoil deposits in trench A and therefore can also be judged to be insufficiently stratified to allow it to be placed into the Epipalaeolithic time-frame. This piece consists of a small cupped piece of basalt.

Animal Bone

Numerous animal bone remains were recovered during the excavations and from the section cleaning. The vast majority of the bone is fragmented and was collected from the wet sieve. The fragmented nature of animal bone on the Epipalaeolithic sites in the al-Azraq Basin has been noted during the al-Azraq Basin Early Prehistory Project (pers. com. Louise Martin). At the time of writing, the analysis of the animal bones has not yet begun, but will be taken up in due course.

Botanical Remains

Extensive flotation of the excavated deposits was conducted during the season, whenever deposits were deemed sufficiently secure. A number of samples were collected from the flotation, which will be analyzed by Sue Colledge in the course of 2006. Given the well-preserved nature of the animal bone and other finds at the site, as well as the anaerobic nature of the deposits, it seems likely that at least some micro-botanical remains can be extracted. It is likely, however, that the 2005 excavations did not reach a sufficient depth of deposit to ensure that uncontaminated deposits were reached.

No sizable quantities of carbonized seeds or charcoal were noted during the excavations, which also accounts for the lack of radiometric dates for 'Ayn Qaṣiyya at this stage.

Summary, Conclusions and Future Prospects

The 2005 rescue excavations at 'Ayn Qaṣiyya have shown that this Epipalaeolithic site consists of a series of overlapping occupations, which were probably a fairly short term affair, situated on the edge of a marsh and/or pool. The study of the exposed sections at the site appears to indicate that the occupations followed the lateral recession of the al-Azraq marshes, occupying a position relatively close to the edge of the marsh. Such a position in the marsh landscape would ensure access to a variety of resources, being situated perhaps at a transitional habitational zone. Reeds, water and waterfowl may have been procured from the nearby marsh and lake edge, while abundant game, wood and a variety of other plants occupied the shore-zone and those areas behind. In any case, it is clear that the wetlands would have provided a lush and rich environment for gatherer-hunters to exist in. It can be anticipated, however, that further studies of the geo-morphological situation will reveal a slightly more complex settlement history.

Judged by the nature of the documented deposits, the freshness of the lithic artifacts and the presence of two well preserved bone artifacts, it seems reasonable to suggest that the preservation conditions at 'Ayn Qaṣiyya are exceptional in the context of early Epipalaeolithic sites in southwest Asia. Although micro-botanical plant preservation at the site remains to be studied in detail, it seems probable that micro-botanical plant remains can be recovered from the 'Ayn

Qaṣiyya sequence. Marsh deposits and lake marls found below the paleosol in some of the sections provide ample opportunities to study the environmental record of the al-Azraq Wetlands in more detail and to further the understanding of the climatic and ecological context of human settlement in the al-Azraq marshes.

Although no suitable samples for radiocarbon dating could be obtained during this season, some occupations of the site can be provisionally dated based on the recovered chipped stone artifact assemblage. The microlithic component suggests a likely date of the assemblage from trench A as around the 19-18th millennium BP Detailed technological and functional studies of the chipped stone artifacts in the future will produce further evidence regarding the use and making of stone tools in the al-Azraq Basin during the early Epipalaeolithic. The organic preservation at 'Ayn Qaṣiyya raises the potential of tying such studies in with fairly tight radiometric dating cluster, providing more insights into the evolution of late Pleistocene lithic and organic technologies.

Future work at 'Ayn Qaṣiyya has to concentrate on exposing the site in large open-area excavations to understand the spatial set-up of this hunter-gatherer camp in more detail. Such excavations will ideally target areas where *in situ* deposits were recognized in the recorded sections. This will be supplemented by more detailed palaeoenvironmental work which can reconstruct past ecological and climatic conditions, as well as the exploitation of plants and animals in the Oasis. Overall, further work at 'Ayn Qaṣiyya will be able to produce many important insights into the evolution of late Pleistocene hunter-gatherer groups in southwest Asia. Due to the good organic preservation at the site it may be possible to reveal a rich and distinguished micro-botanical assemblage, which can help us to explore the gradual evolution of plant economies in southwest Asia in a much more nuanced way.

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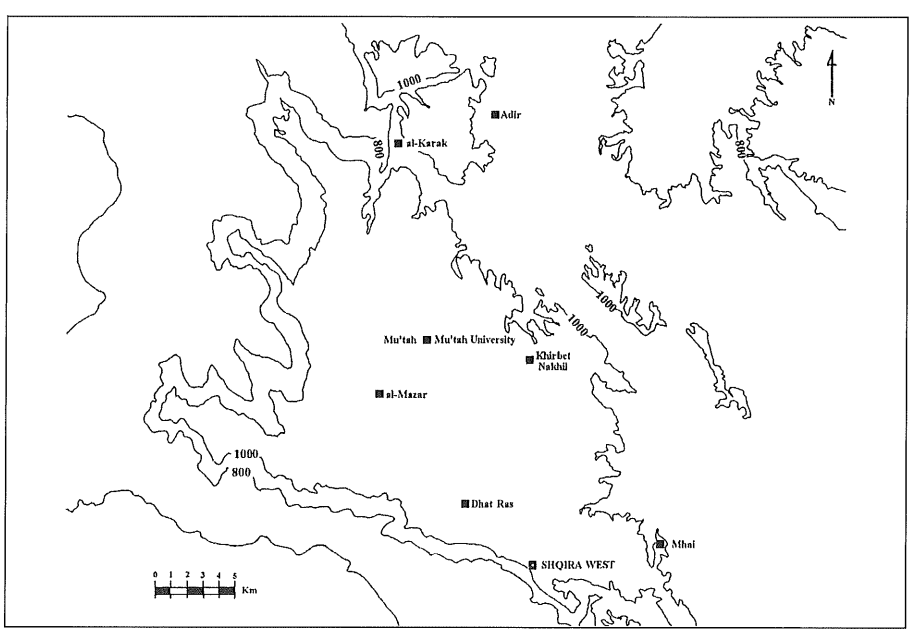
MU'TAH UNIVERSITY EXCAVATIONS AT SHUQAYRA AL-GHARBIYYA: PRELIMINARY REPORT ON THE 2005 SEASON

Younis Al-Shdaifat, Khalaf Al-Tarawneh and Zakariya N. Ben Badhann

Introduction

The 2005 season of Mu'tah University excavation at the site of Shuqayra al-Gharbiyya was in the field from July, 10th till August, 23rd 2005. The excavation was part of the summer field school of the Department of Archaeology and was undertaken under the supervision of Khalaf Tarawneh and Younis Shdaifat. The Department of Archaeology at Mu'tah University selected the site of Shuqayra al-Gharbiyya[1] in the vicinity of Dhāt Rās to conduct its summer field school. The site is located ca. 15km south-southeast of Mu'ta, and ca. 25km south-southeast of al-Karak (PGC 224.600 E, 043.500 N, at an elevation of ca. 1122m above sea level) (**Fig. 1**). Shuqayra al-Gharbiyya is in the western half of the modern village of Shuqayra, the other half is known as Shuqayra ash-Sharqiyya. Administratively, the modern village of Shuqayra belongs to the Municipality of New Moab.

The Archaeological Survey of the Karak Plateau (ASKP) indicates that three ancient places are within the boundaries of the modern village of Shuqayra: Khirbat al-Quṣba (Qusubah), Khirbat ash-Shuqayra and Shuqayra (Miller 1991: 161-163). The site under investigation used to be known as Khirbat al-Quṣba. No excavation had been conducted at the site before Mu'tah University started to investigate it in 2002[2]. Shuqayra al-Gharbiyya was visited by several explorers including Musil (1989: 80, 321), Glueck (1934: 63, 79-80) and Miller (1991: 161), all of whom referred to the site as (Khirbet al-Qusubah or Naqb al-Qusubah). These toponymies



1. Contour map of the al-Karak Plateau showing the location of Shuqayra al-Gharbiyya.

1. Jordan Antiquities Database and Information System site number 2204.045, defined as Khirbat al-Qaṣaba (Palumbo 1994).

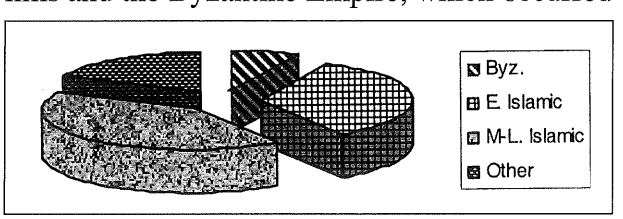
2. The 2002-2004 excavations at the site were supervised by the LateDr. Tayiseer Atyat who invesigated the southern part of the site, mainly Area C.A report on

are no longer used and the site is conventionally known as Shuqayra al-Gharbiyya. The site does not appear in the Arab chronicles or the Ottoman Tax Registrars (*dafters*) under any of these names (al-Khudaimi 2005; Hütteroth and Abdulfattah 1977: 171-172).

The ancient remains of Shuqayra al-Gharbiyya perch on a protrusion of the southern rim of the Karak Plateau. To the west, north and east the landscape is almost level, while to the south, the site commands a view of Wādī al-Ḥasā, and the terrain slopes sharply. The area is agriculturally productive, characterized by the Mediterranean red soil that resulted from chemical and mechanical weathering factors that took place during the Holocene Period (el-Eisawi 1985: 50; al-Buhairi 1997: 64; Green 2004: 195). This red Mediterranean soil has a high clay content and is always associated with areas of annual rainfall higher than 250mm. This type of soil is opaque and usually stores a lot of moisture. It is also rich in potassium, ideal for cultivating cereals (Burdon 1959: 20-21; Bender 1974: 187). Cretaceous limestone sedimentary rocks are common in and around Shuqayra, this type of rock was used in preference to other types of rock in construction at the site (Bender 1974: 173). A Mediterranean climate, with long winters and summers and short springs and autumns characterizes the region. This part of the plateau receives precipitation ranging between 325-350mm annually

Archaeological surveys conducted here (e.g., ASKP) indicated that the site's architectural features are associated with pottery dating from the early through the late Islamic Period (**Fig. 2**).

Al-Karak, as part of the southern Levant, is close to Islamic religious centers of Arabia, Makkah and Madinah, and to Palestine where the first *Qiblah* (al-Quds) is. Also, in the southern part of the al-Karak plateau, near the site, is the site of the famous battle between the Muslims and the Byzantine Empire, which occurred in Mu'ta during the time of Prophet Muhammad (8AH\629AD) (al-Tabari 1997: 152-160). Based on these facts one would assume that the area has had a certain importance during this time period. Excavations at Shuqayra al-Gharbiyya are aimed at reconstructing the nature of Islamic presence in this part of the country, which has largely been considered a *terra incognita* during the concerned periods.



2. Percentage of pottery sherds collected at Shuqayra al-Gharbiyya by period (based on Miller 1991: 161).

Excavation was concentrated on the central and east part of the site, in Areas A and D. Sixteen squares were excavated employing the Wheeler-Kenyon digging method.

Area A

Eleven squares were opened in Area A (A D1, A E2, A E3, A F2, A G1, A G2, A G3, A G4, A H1, A H2 and A H4). Parts of a large building were uncovered in these squares and was called Building A (**Fig. 3**). Four main phases were identified: Nabataean (first century AD), Early Islamic (first-second centuries AH\ eight century AD), Middle-Late Islamic (15th – 18th centuries AD), and modern (20th Century).

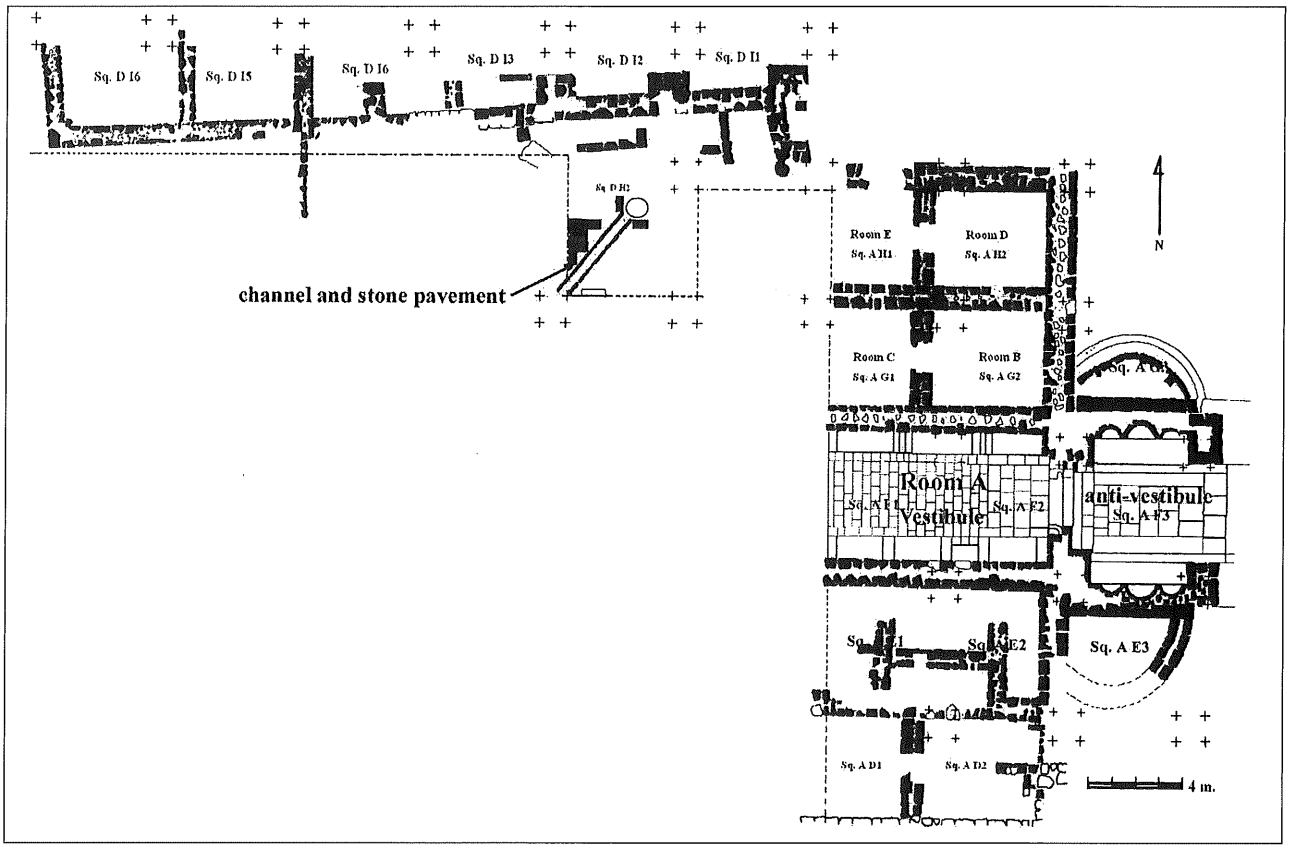
Phase I (Nabataean)

Excavations in Square A G2 reached Nabataean levels in Loci 11 and 19-21, which were pits and earth layers filled with ash. Stratigraphically, Loc. 11 and Loc. 17 (an Early Islamic stone pavement) are at the same elevation, while Loci 19-21 were discovered below Loc. 17. Elsewhere at the site, a good Nabataean presence is indicated by several horned-capitals, of which one was reused in a bench found in square A H1.

Phase II: Early Islamic

The main phase of occupation in Area A is during the Early Islamic period. Of the retrieved pottery, 78% is assigned to this phase. There seems to be an eighth century structure, designated Building A.

Building A: The features thus far clarified in Building A include a protruding anti-vestibule entrance delineated with hemispherical towers, part of a vestibule (Room A) and a system of interconnected rooms (Rooms B, C, D, and E). Ceramic and numismatic evidence collected to date suggest an Umayyad date for the building.



3. Building A; top plan of Phase III (Early Islamic remains).

The towered-entrance: The entire building was built of ashlar limestone blocks. The entrance, located along the east wall, is 3.5m wide, with a square anti-vestibule measuring 4.20 x 4.20m, reached by two descending stone steps. On either side of the anti-vestibule are bench-like features below niche-like installations at a height of ca. 1.70m. The side-benches were plastered. On the north side of the entrance there are three recesses, roughly 1.60m high, a big one flanked by two smaller ones. Having suffered only some erosion, all are in a good state of preservation. The south side has witnessed some erosion, but is presumed to have been identical to the north one. The preserved height of the anti-vestibule walls varies from 1.70 to 2.10m. The floor of the anti-vestibule was paved with tightly aligned flagstones (average dimension 0.30 x 0.40m).

Delineating the protruding walls of the anti-vestibule are two hemispherical towers built of well-dressed lime stone blocks. The northern tower is preserved to a height of 1.50m and consists of five courses (Loc. 02 in Sq. A G3). Only two courses of the southern tower are still *in situ* (Locus 04 in Sq. A E3).

The Vestibule: Only parts of what appears to be a vestibule west of the anti-vestibule have been exposed. This is separated from the anti-vestibule by a wall (1m wide), and includes a 1.80m-wide door. The vestibule is rectangular in plan and the excavated area measures 8.40 x 4.50m. The vestibule (Room A) has 0.60m high benches along its north and south sides. The bench along the north side was divided into three parts by stone pillows. The southern bench was divided in the same way, but into four parts. The floor is flagstones slabs, resembling, in terms of size and alignment, those of the anti-vestibule.

Room B: Room B is located to the north of the vestibule, and separated from it by a 1m thick wall. It is rectangular in plan measuring 4.50 x 2.35m. The western wall (Loc. 06), which includes a door, and the out (eastern) face row of the eastern wall (Loc. 03) were built of limestone ashlars. While the inner (western) face of the eastern wall was built of roughly worked

boulders and chips. The northern wall (Loc. 04) and southern wall (Loc. 02) were built of only roughly worked boulders and chips, some of which were well dressed, an indication that builders may have used stones originating in another older structure. Excavations uncovered two stone bins (Loci 14 and 16) along the southern wall, yet there was no identifiable deposit. Along the western wall, in front of the door (Loc. 22) connecting this room with Room C, was a terrace (Loc. 13), made up mainly of hard mud outlined with semi-dressed boulders. The eastern part of Room B is paved with rough stones. This pavement (Loc. 18) seems to have once covered the whole room, yet partial destruction occurred, probably produced by a cut during the late Islamic period. Parts of the walls were covered with stucco bearing incised chevron designs executed in various orientations. Two amorphous shallow pits (Loci 19 and 20), with pottery dating mainly from the first-second centuries AD, were exposed beneath a destruction in the paving stones.

Room C: West of Room B lies Room C, and the two are connected by an 0.80m wide door. The western wall of room C has not yet been exposed. The floor is stone-paved (Loc. 11). A square stone bin (0.50m long) was uncovered in the northeastern corner.

Room D: North of Room B lies Room D, which is connected to Room E (see below) by a door (0.98m wide, 2.00m high). Room D measures 3.20 x 4.50m Parts of the walls were covered with a chevron incised plaster. The floor is plastered, mostly degenerated, except in the northwestern corner (Loc. 16). Along the south and west walls the lower parts of this plaster is covered by a stone bin and a bench (Loci 10 and 19). Room D has a stone pavement of medium-sized, flattened stones (Loc. 26). The northwestern corner was plaster-coated (Loc. 16). The occupational layer just above the stone pavement (Loc.25) yielded an Umayyad fils, which, along with the ceramic evidence, dates this layer to the eighth century AD.

Room E: West of Room D lies Room E and connects to it through a door. Room E is identical to Room C and shows evidence of later reuse as does Room D.

A foundation trench is planned along the eastern wall of Building A in the 2006 field season, which will help establish the initial phase of construction of this building.

Phase III: Middle-to-Late Islamic

Occupation at Shuqayra al-Gharbiyya seems to have dwindled during the mid-late Islamic Period, at least, this is what was noted during the 2005 season. Only 11% of the retrieved diagnostic pottery sherds are attributed to this phase. In architectural terms, features assignable to this phase consist mainly of some stone bins and roughly built benches along the bases of rooms dating from the early Islamic period. Phase II is well represented in Sq. A H1 "Room E" and Sq. A H2 "Room D". In Room E, a stone bin (Loc. 03, 60 x 65cm), which is composed of three stones, was built against the eastern wall. This bench is bonded to Loc. 14, a stone bench (2.20 x 1.40m) roughly built of undressed stones along the southern wall. One of the stones used in the bench is a Nabataean horned-capital. Loci 03 and 14 abut the eastern and southern walls and consequently they covered lower parts of the plaster that covered the walls of Building A during the early Islamic period. In the eastern corner of Room D a stone bench was constructed (Locus 10) that is plastered in some areas. Only a few pottery sherds were associated with these installations. In the stone bins what appears to be straw was found, probably an indication that these installations functioned as troughs. One important find is a layer of burning detected throughout the excavated squares. The level at which this layer was found varied from one square to another. The date of this fire is still unclear.

Phase IV Modern

Residents of Shuqayra had been living on top of the site of Shuqayra al-Gharbiyya until the early 1970s. The upper levels of almost all excavated squares belong to this phase. Cement pavements separate 20th century use of the site from earlier levels. In some areas, modern walls follow old ones, and in other places old walls were integrated into modern houses and were covered with a cement layer. Generally speaking, walls belonging to this phase were roughly built with

stones taken from older structures on the site. In most squares remains of the 20th century use of the site were removed (e.g., Loc. 05 in A G2, a wall stretching north-south) to expose ancient ones. Architectural remains found on the upper levels of Squares A E1 and A E2 (e.g., Loc. 03 in A E2, a wall running east-west), however, were left in place. During this time, indeed until now, part of the population of Shuqayra al-Gharbiyya was practicing some sort of transhumance, mainly nomads practicing part time agriculture (personal observations). During this phase, earlier remains suffered much destruction; noted almost in all squares. People dug through lower levels and their garbage can sometimes be found close to the floor of Building A.

Area D

Eight squares were opened in Area D in the northwestern part of the site (Sqs. D I1-D I7 and D H2). Squares A I1 and D H1 will be excavated in a future season to establish the relation between buildings uncovered in Area A and Area D.

Phase III

Area D yielded architecture remains dating, based on the ceramic evidence, to Phase III, the Early Islamic period. Yet, the architecture here seems to have undergone three construction phases, all of which most likely occurred during the eighth century.

Phase IIIa

Wall traces running east-west protruded above the surface and were easy to follow before excavations started. The part of this long wall exposed in Squares D I1 (Loc. 01), D I2 (Loc.01) and D I3 (Loc.01) is built of medium-to-large-sized, roughly- dressed facing blocks (0.25-0.75m long). The wall, which is of 2m average height, had several windows, two of them easy to recognize. Locus 09 in Square D I2 yielded a remarkable find, an ostracum inscribed with Kufic letters, which are part of a large text, probably a letter. The style of the calligraphy indicates a date late within the eighth century (Shdaifat, in preparation).

Phase IIIb

A series of what appear to be three arch springers (Loc. 02 in A D1, Loc. 04 and Loc. 09 in D I2) made of well-dressed, medium-sized limestone blocks was unearthed against the northern side of the wall exposed in Squares D I1, D I2 and D I3. Unlike the wall, however, the three features were built according to the ashlars-fit technique. The fact that they are abutting the wall and of such a different construction style, indicates that they may represent a latter addition, yet, most probably during the eighth century. These features could have functioned as springers for an arched room that was added to Building A. The windows of the wall were blocked, something which could have coincided with the construction of this room in order to give the wall greater strength. Excavations stopped here before foundations of any of these springers were reached but the lowest levels were yielding only eighth century pottery. Excavations in the area north of these features will help establish the nature, function and date of these features as well as their relation to Building A.

Phase IIIc

In Squares D I5 (Loc. 01) and D I6 (Loc. 01) the wall continues but is built of smaller boulders. No springers were exposed here; rather, parts of three north-south walls were unearthed (Loc. 02 in D I4, Loc. 02 in D I5 and Loc. 04 in D I6). Each of these walls is 0.45m wide and built of rough medium-to-small-sized stones. The walls abut the above-mentioned long east-west wall. The lowest levels along the walls yielded only sheer eighth century pottery. Excavations stopped before foundations of theses features were reached. Further investigation is needed to establish the temporal and spatial relationships between these features. A canal (Loc. 01) running diagonally, associated with a stone pavement (Loc.04) was uncovered in Square D H2. This channel terminates in a pit (Loc. 05), probably a cistern. These features are also associated with eighth century pottery. Tentatively, one can argue that they were mainly in use during this period, yet, further field work is necessary to identify the date of the foundation.

Pottery

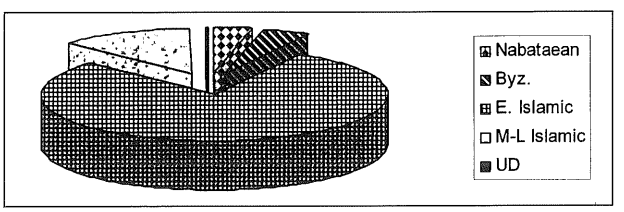
The chronology of the excavated features at Shuqayra was established by ceramic evidence. Eighteen squares, with an average depth of

2.5m, opened during the 2005 season yielded a total of 1513 sherds of which 465 were saved as indicators. The density of sherds varies from one square to another. Some squares produced only a single sherd (Squares A F2 and A G1). Squares A G2, A H2 and D I1 exposed more loci and they yielded almost 52% of the diagnostic sherds unearthed during this season. Preliminary analysis indicates that the collected pottery belongs mainly to three cultural phases: the first century AD "Nabataean", the eighth century AD "Umayyad-Abbasid", and the twelfth-seventeenth centuries AD "Ayyubid-Mamluk-Ottoman". The intensity of pottery representing these phases varied dramatically (see **Fig. 4**). Of the pottery, 79.50% was assigned as Umayyad, Umayyad-Abbasid or Abbasid. 8.30% indicated pre-Umayyad occupation, mostly from the Nabataean (3.53%) and Byzantine eras (4.5%). Yet, the few Byzantine sherds were found out of context, and they could not be associated with architectural features. The late Islamic period (Ayyubid-through Ottoman periods) is represented by 12.27% of the pottery.

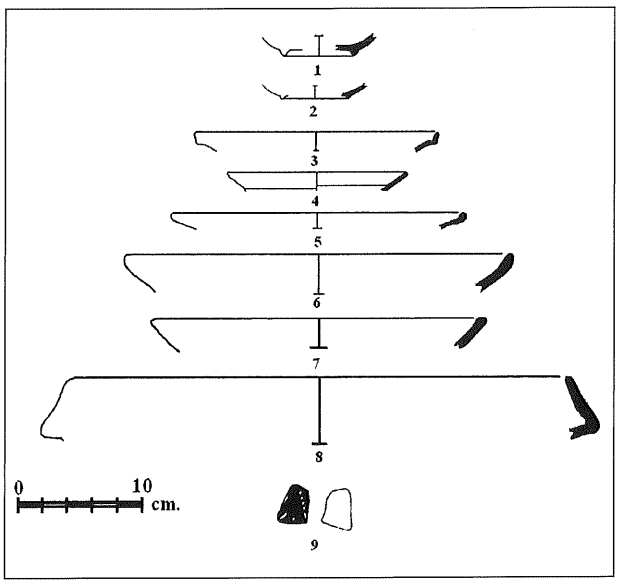
Nabataean Pottery (**Fig. 5**)

Only 16 potsherds were identified as Nabataean (3.53 % of the whole diagnostic sample). Twelve sherds, mostly rims and bases of bowls, came from Loci 11 and 19-21 in Square A G2. The sample fits well with typical Nabataean pottery documented in the area of south Jordan. Sherds attributed to this phase are well levigated, with predominating fine grit, and evenly fired.

One sherd (part of a plate) of the Nabataean insignia egg-shell ware was found. It has brown-painted geometric designs on a red background. Petra is thought to be the production center of this late first century AD type of ware (Homes-Fredericq and Franken 1986: 191). The Shuqayra sample has several sherds of the plain ware from shallow undecorated plates with vertical or sloping rims and rounded lips. Plain Nabataean



4. Percentage of pottery uncovered in Shuqayra al-Gharbiyya by periods.



5. Nabataean pottery from level I.
- *5.1. Square A G2; locus 11*
  F. bowl: Des. Ring base, C: light reddish-brown (5YR. 3\6), ST. burnished, tempered with tiny lime grits, MT. wheel made
- *5.2. Square A G2; locus 11*
  F. bowl: Des. Ring base, C: reddish-brown (2.5 YR. 4\4) ST. burnished, tempered with sand grits, MT. wheel made.
- *5.3. Square A G2; locus 11*
  F. bowl: Des. Rim, C: red (2.5.YR.4\6) ST. slip, tempered with sand grits, MT. wheel made
- *5.4. Square A G2; locus 11*
  F. bowl: Des. Rim, C: Reddish brown (2.5 YR. 5\4); ST. slip, tempered with fine quartz grits, MT. wheel made.
- *5.5. Square A G2; locus 11*
  F. bowl: Des. Rim, C: Red (2.5 YR 5\8); ST. red painted fruits on interior, tempered with very fine grits, MT. wheel made.
- *5.6. Square A H2*
  F. bowl: Des. Rim, C: Pink (5YR.7\3) ST. slip, tempered with very fine grits, MT. wheel made.
- *5.7. Square A G2; Loc. 21*
  F. bowl: Des. Rim, C: Pink (5YR.7\3) ST. slip, tempered with calcite grits, MT. wheel made.
- *5.8. Square A G2; Loc. 21*
  F. bowl: Des. Rim, C: Pinkish gray (7.5YR. 7\2) ST. slip, tempered with quartz grits, MT. wheel made.
- *5.9. Square A G2; Loc. 21*
  F. bowl: Des. Rim, C: Light reddish brown (2.5YR.6\4) ST. slip, painted fruits in dark reddish-brown; tempered with fine grits, MT. wheel made.

pottery is dated from the first and early second centuries AD. A few sherds of *Terra Sigillata*, mainly bases of what are probably drinking bowls, were found in Loc. 11 in Square A G2. They were lightly burnished, probably an indication that they belong to the eastern *Terra Sigillata* A of the first century AD. The Shuqayra *Terra Sigillata* examples are well levigated, with fine grit, and well fired.

Early Islamic (Umayyad-Abbasid) Late Seventh-Eighth Century

Nearly 80 % of pottery excavated in Shuqayra 2005 is dated to the eighth century. From a historical point of view, Jordan was ruled by two Muslim dynasties during this century, the Umayyads with their capital in Damascus during the first half and the Abbasids with their capital in Baghdad during the second half. At this stage of research on Shuqayra is difficult to isolated Umayyad from Abbasid remains because we have not excavated a sealed context. Approximately 33.9 % of the diagnostic sherds saved from this season were assigned Abbasid, an indication that the Abbasid presence on the al-Karak Plateau was well attested. Mention has been made of the architectural modifications that took place in Area D. We hope that future field work in this area will help elucidate a correlation between the cultural and political activities.

*Umayyad pottery (***Fig. 6***)*

Umayyad pottery represents 43.2 % of the excavated pottery and comprises a narrow range of domestic forms including tableware, cooking pots and jars. Generally speaking, the repertoire fits well with the corpora of Umayyad pottery known from other sites in Jordan.

Tableware at Shuqayra al-Gharbiyya consists mainly of bowls. Wheel-made deep bowls with straight sides and rounded or flattened rims are common. Temper consists mainly of calcite and basalt. Firing is even and decoration consists of wavy or horizontal light red designs on a white background. Self slip occurs infrequently. Fine ware bowls from Shuqayra are well levigated and fired, pink-to-buff in color and bear a decoration consisting of red-painted geometric (spiral, wavy...etc) lines.

Red-ware pottery with white-painted multiple wavy lines, swirling circles and angles typical of the late seventh century is well attested in the Shuqayra collection. This ware shows shallow ribbing particularly on the lower part of the vessels. Most forms are jars and juglets. Jars are mostly hand made of fine clay. Buff is the common color, and the vessels are well-fired, and although sometimes a vessel might be 1.5cm thick, core is rare. Shallow ribbing appears on the upper half of the vessel, on the neck above the loop handle. Quartz and calcite are the most frequent temper. Straw is rare in Umayyad pottery. An intact Umayyad lamp was found in Loc. 04, Sq. D I5. The lamp is mould made and it carries geometric designs of straight lines and herringbone-like motives on both sides.

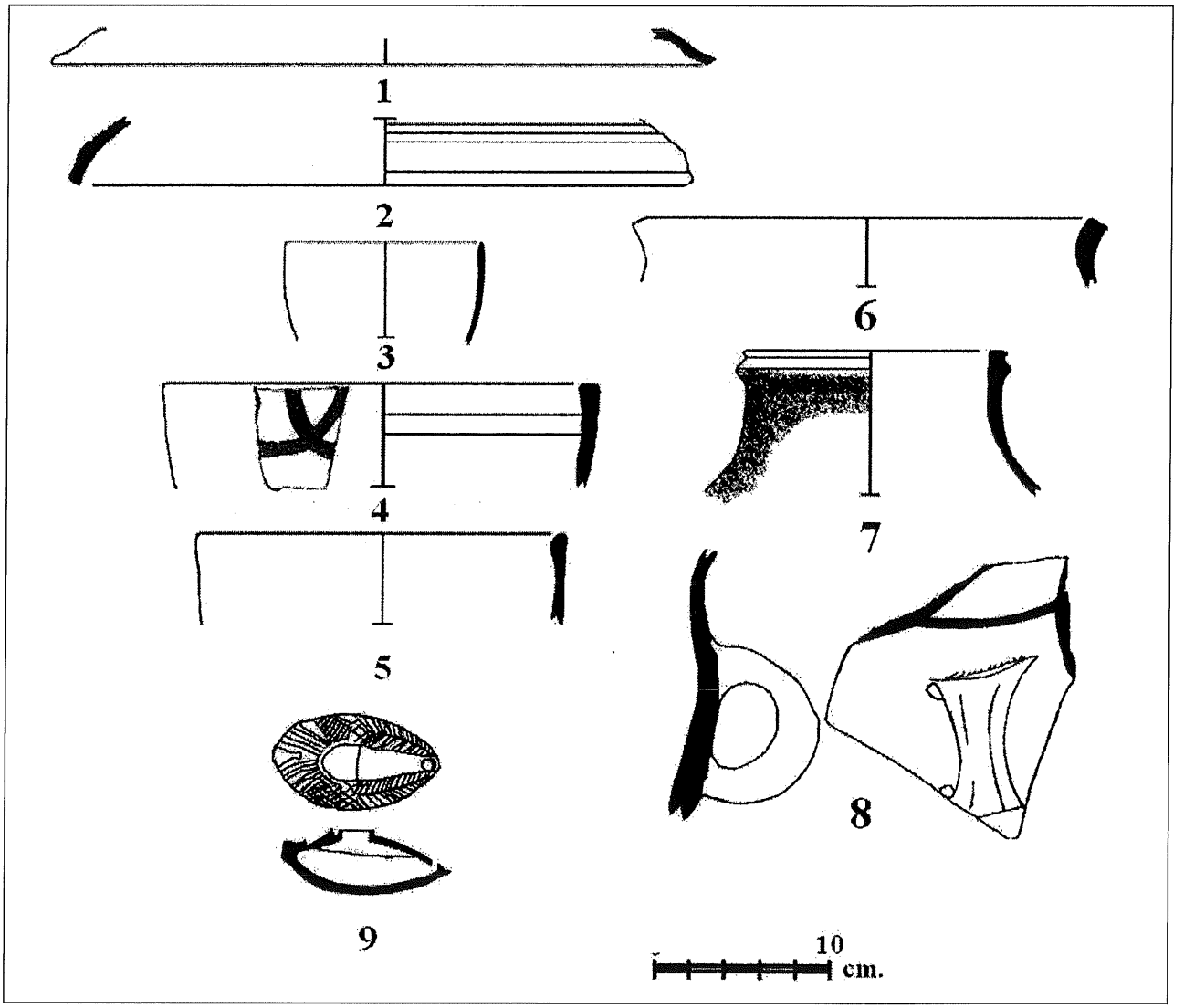
Kitchenware included cooking pots (casseroles). These vessels are dark gray in color and their temper consists of quartz and calcite. In profile, casseroles have a sloping side and grooved rim in order for the lid to rest. Horizontal push-up loop handles are set on the upper extremity of the vessel, rising above the rim. Cooking pots with out-turned rim and nearly square stance do also occur. The upper part of the vessels may carry a shallow ribbing. Ribbing is clearer on the lower parts of the lid that usually have tarbush-like (domed) handle.

Abbasid Pottery (**Fig. 7**)

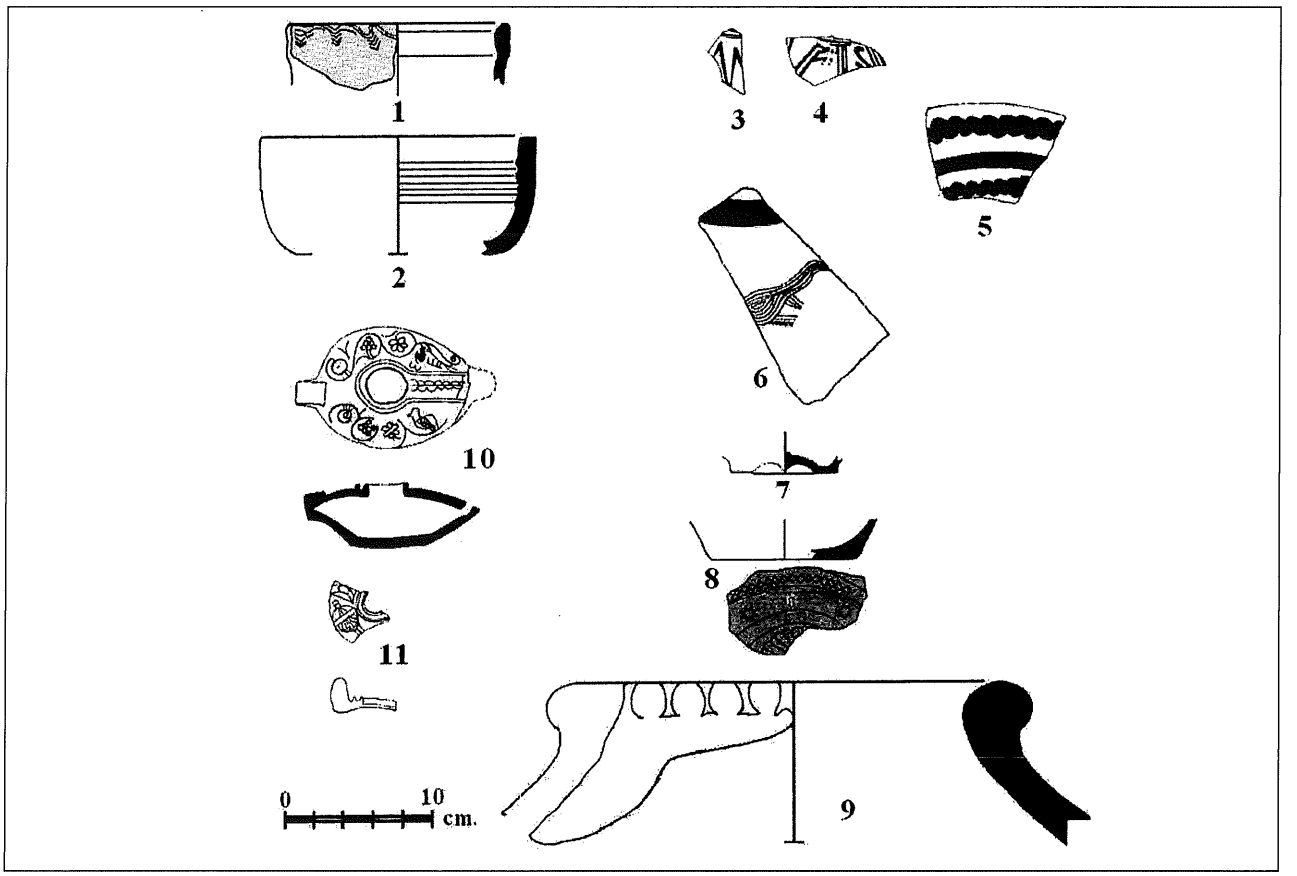
Abbasid pottery comprises 33.8 % of the assemblage, which is second after the Umayyad in the Shuqayra collection. The corpus includes tableware, medium-sized jars, storage jars and a group of lamps. Abbasid pottery was made of well prepared fine paste with inclusions hard to identify optically, thrown on a wheel. Core is almost absent in Abbasid ware which is thinner than the Umayyad. Light-colored ware is dominant. The vessels are evenly fired, and colors include white, yellow-white, tan, and black.

Abbasid wheel-made bowls have vertical sides with flattened and thickened rim stance. Colors range from pinkish to white. These vessels are mostly calcite-tempered. Decoration includes wavy incision on the exterior of the vessel below the rim and sometimes interior ribbing-like straight lines. Craters, gray in color, with flattened rim-stance have dotted decoration restricted in triangles just below the rim. Casserole lids have a turban-like handle in this period.

Diagnostic sherds belonging to jars are the most frequent in the Abbasid pottery corpus. Large pithoi are of white color, and tempered with large grit. Decorations include a band of thumb impressions on the outer side of the inverted-thickened rim. This group includes juglets with ring base and medium-sized opened forms with simple out-turned rim and bow-shaped neck. Some types of jars bear combed or painted decoration of wavy and braided lines on



6. Umayyad pottery from Level II (early Islamic).
- 6.1. Square A H2; Loc. 5.
F. lid: Des. C: Grayish brown (10YR. 5\2), ST, tempered with coarse grits, MT. wheel made.
- 6.2. Square D I1; Loc. 21
F. lid: Des. C: Reddish brown (5YR. 4\4), tempered with straw and quartz grits, MT. wheel made.
- 6.3. Square D I5; Loc. 8.
F. bowl: Des. Slightly rounded rim, C: Light gray (5YR. 7\1), ST. self slip, tempered few basalt and calcite grits, MT. wheel made.
- 6.4. Square D I2; Loc. 7.
F. bowl: Des. Flat-thickened rim, C: Pink (7.5YR. 8\4), ST. red-painted lines, Tempered with basalt grits, MT. wheel made.
- 6.5. Square A H2; Loc. 10.
F. bowl: Des. thickened rim, C: pinkish gray (7.5YR.6.2); ST. red-painted geometric patterns, Tempered with quartz grits, MT. wheel made.
- 6.6. Square D I3.
F. jar: Des. Wide-mouth jar, C: Dark gray (5YR. 4/1), Tempered with quartz grits, MT. hand made.
- 6.7. Square D I2; Loc. 19.
F. jar: Des. Thick-flattened rim, C: Brown (7.5YR. 5\2); Tempered with quartz grits, Ridge below rim. MT. hand made.
- 6.8. Square D I3.
F. jar: Des. Loop handle on shoulder, C: Gray (7.5YR. 5\2); strip of red paint on neck; Tempered with calcite and straw grits, MT. hand made.
- 6.9. Square D I5; Loc. 4
lamp, 6omm. wide, 98mm. long, perforated filling hole 21mm wide, wick hole 6mm wide, sooty wick hole, applied decoration of herring bone design on both sides. light red (2.5YR 6\8). Tempered with basalt and calcite grits. Mould made.



7. Abbasid pottery from Level II.

- *7.1. Square A H2; locus 8.*
  F. bowl: Des. Thickened rim, C: Pinkish white (5YR.8\2), wavy incision on exterior below rim; tempered with quartz grits, MT. wheel made.
- *7.2. Square D I2; locus 8.*
  F. bowl: Des. Flattened straight rim C: Pinkish gray Hue (5 YR. 6\2) ribbing-like on interior; tempered with calcite grits, MT. wheel made.
- *7.3. Square A H3; locus 8.*
  F. jar: Des. Decorated body sherd; C: Pinkish white (7.5.YR. 8\2); red painted wavy lines; tempered with quartz and basalt grits, MT. wheel made.
- *7.4. Square. Square A E3.*
  F. jar: Des. Decorated body sherd C: Pink (5YR. 7\4); Painted lines and dots (pinkish gray 5YR.5\) on cream background; tempered with calcite grits, MT. wheel made.
- *7.5. Square. Square A H2. Locus 5.*
  F. jar: Des. Decorated body sherd C: Pinkish white (5 YR. 8\2); red-to-light brownish (5YR. 6\4) wavy and straight lines on cream background; tempered with calcite grits, MT. handmade.
- *7.6. Square. Square D I2. Locus 8.*
  F. jar: Des. Decorated body sherd C: Pink (7.5 YR.7\4); wavy incision; tempered with quartz grits, MT. handmade.
- *7.7. Square D. I7. Locus 1.*
  F. jar: Des. Ring-concaved base; C: Pink (7.5 YR. 8/4); tempered with calcite grits, MT. handmade.
- *7.8. Square A H2. Locus 5.*
  F. jar: Des. Flat base; C: White (10 YR.8\2); tempered with calcite grits, applied decoration of floral and geometric designs; MT. handmade.
- *7.9. Square D I1; Locus 11.*
  F. jar: Des. Out-turned, thickened rim; C: Light gray (10YR.2\7): tempered with quartz grits, band of thumb impression on the rim; MT. handmade.
- *7.10. Square D I2; Locus 14.*
  F. Lamp: Des. Intact; light gray (7.5YR.7\7); 62 wide, and 87 long. Filling hole 18mm wide, wick hole broken, sooty traces on the front part, birds and flower motifs on both sides, channel surrounds filing hole and descends to wick hole. Almond-like base; tempered with calcite grits, band of thumb impression on the rim MT. Mould made.
- *7.11. Square D I3.*
  F. Lamp: Des. broken, C. Pinkish (5YR. 7\4); floral decoration, channel surrounds filing hole. Tempered with calcite; tongue handle. MT: mould made.

a cream ware. One unique sherd, a jar base, with applied floral and geometric motives, is dated from the late eighth century.

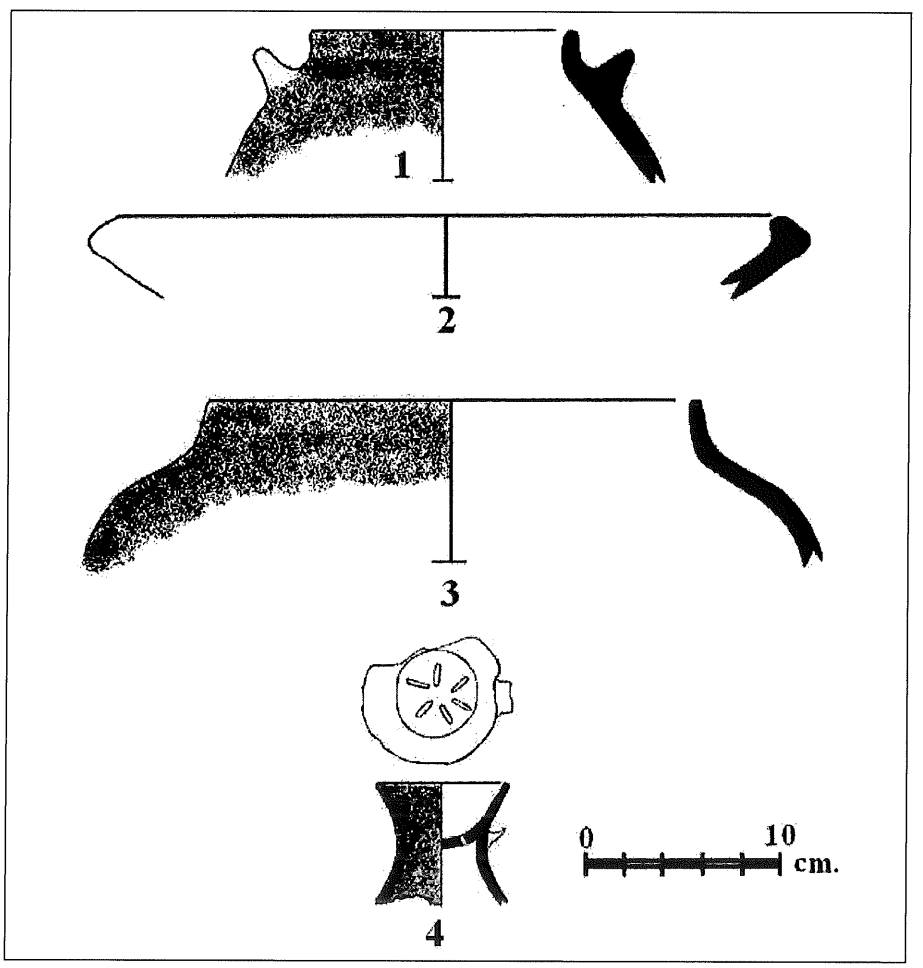
A whole Abbasid period lamp and 8 lamp fragments were found in course of the 2005 excavation at Shuqayra al-Gharbiyya. Preliminary investigation shows that they belong to the same ware family. All are mould made, white-to-buff in color and decorated with floral designs of grape clusters. The intact example bears a bird, probably a dove on the shoulder. These vessels have almond-shaped bases and are provided with tongue-handles.

Middle-Late Islamic (Ayyubid\Mamluk-Ottoman) Pottery (**Fig. 8**)

The Middle-Late Islamic period is represented by nearly 12 % of the pottery assemblage. Sherds were found usually in the upper levels of the site. As noted, occupation of Shuqayra during this time period seems to be ephemeral. The pottery, utilitarian in function, is mostly handmade, mottled due to uneven firing and sand or chaff-tempered. Forms range from basins with in-turned thickened rims to medium-sized jars with simple rims and straight necks and cooking pots with a band of knob handles on the shoulder. The known Mamluk handmade geometric painted ware of the fourteenth and fifteenth centuries is conspicuously absent. Most of the Ottoman pottery sherds belong to the village-ware category. The shapes include cooking pots and juglets provided with strainers. These vessels have thick bodies and are slightly fired.

Other Finds

Non ceramic finds were scant in the 2005 excavation at Shuqayra al-Gharbiyya. The collection consists of marble, glass and steatite fragments, some metal objects and a few beads all dated by context to Phase III (Early Islamic). A pilaster of marble was uncovered in Loc. 10 within Square A G2. Clearly it was in a secondary archaeological context, and it must have



8. Middle to Late Islamic pottery from Level III.
- *8.1. Square A G2; locus 11. F. Crater: Des. Simple-rounded rim, and a band of knobs on shoulder, C: Pale red (2.5YR.6.2), tempered with chaff and calcite, MT. handmade.*
- *8.2. Square D I3. F. Plate: Des. In-turned, thickened rim, C: Pinkish gray (7.5 YR.7.2), Glazed green paint mainly inside and it stretches to the outside. Tempered with calcite grit, MT. wheel made.*
- *8.3. Square A H2; locus 14. F. Crater: Des. Simple rounded and vertical rim; C. Pale brown (10YR. 7\4) tempered with chaff and calcite, MT. handmade.*
- *8.4. Square A G2. F. Spout of a juglet. Des. Spout with strainer. C. Pinkish gray (7.5YR.7.2); tempered with course calcite grits. MT: handmade.*

been brought from elsewhere at the site. The pilaster seems to have belonged to a church. Other marble fragments are all plain, i.e., they carried no decoration. Marble is a relatively precious stone and its existence indicates that parts of the building were decorated with this stone.

Metal objects consisted mainly of corroded nails. These items were mostly found near doors, probably indicating that they had been used in door fittings. One find of special importance is a lamp-like copper object found in Loc. 07 in Square D I3. The object consists of a basin with a vertical plate, on one side probably part of a handle, and a channel-like spout on the opposite side. Glass fragments are too small to reconstruct their forms and function. Three beads were recovered, including one carnelian. Only three fragmentary steatite objects were retrieved.

Concluding Remarks

The site of Shuqayra al-Gharbiyya has imposing architecture remains dating from the Early Islamic period. Some architectural features exposed in Phase III of Building A suggest a comparison with the Early Islamic *quṣūr* in the region. For examples, the protruding gate delineated by semi-circular towers is known at the palace of Minya on Lake Tiberias and Qaṣr al-Kharāna in the Jordan Bādiya (Creswell 1989: 92-97). Almost all known *quṣūr* are laid on a *bayt* system. Vestibules with benches are known in the Qaṣr of Khirbat al-Mafjar in the northern Jordan Valley (Hamilton 1959) and in the Umayyad palace complex at the 'Amman Citadel (Almagro and Olavarri 1982). Chevron-incised plaster is documented in the Qaṣr al-Muwwaqar, southeast of 'Ammān, and at al-Ḥallābāt, northeast of az-Zarqā', which is dated to the Umayyad\Abbasid period (Bisheh 1989; Waheeb 1993). Although it might have been built on top of earlier, probably Nabataean, remains, the uncovered structure may have belonged to a public building. Further excavations should clarify the function and precise date of these remains.

Acknowledgments

We would like to thank Dr. Fawwaz al-Khraysheh, Director General of the Department of Antiquities of Jordan for granting us permission to conduct our excavations at Shuqayra al-Gharbiyya. Mr. Ali Syriani acted as the Department's representative. Our gratitude goes to Professor Sulaiman Arabiyyat, President of Mu'tah University for his enthusiastic support. Mr. Adib Abu Shmais from the Department of Antiquities, gave the pottery readings. We appreciate the effort Dr. Rebecca Foote, from the American Center of Oriental Research, put into proofreading this report.

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THE INTERNATIONAL WĀDĪ FARASA PROJECT (IWFP) PRELIMINARY REPORT ON THE 2005 SEASON

Stephan G. Schmid and André Barmasse

Introduction and Acknowledgments

The field season 2005 of the International Wādī Farasa Project (IWFP) lasted from August 14th to September 1st. The IWFP 2005 was carried out by the Association for the Understanding of Ancient Cultures (AUAC: www.auac.ch), based in Basel (Switzerland) and the University of Montpellier III (France) and was generously sponsored by Wirth and Wirth Architects (Basel, Switzerland). 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. Fawzi Zayadine ('Amman), Prof. David Graf (Miami) and Dr. Bernhard Kolb (Basel), for their continuous interest in the project.

The following people participated in the 2005 season of the IWFP: the archaeologists Stephan G. Schmid (director), André Barmasse, MA (Basel), Aurélien Amour, BA (Montpellier) and Lucy Wadeson, MPhil (Oxford), the restorer Urs Lang, BA (La Chaux-de-Fonds), the architect Pascal Wirth (Basel) and the software engineer Dominik Wirth (Basel). The representative of the Department of Antiquities was Tahani Al-Salhi, whose help and advice were much appreciated. Eleven workmen and one teawoman from the Bdool tribe were employed. We would also like to thank IFPO, 'Amman and especially its director Jean-François Salles for lodging the team during its stay at 'Amman.

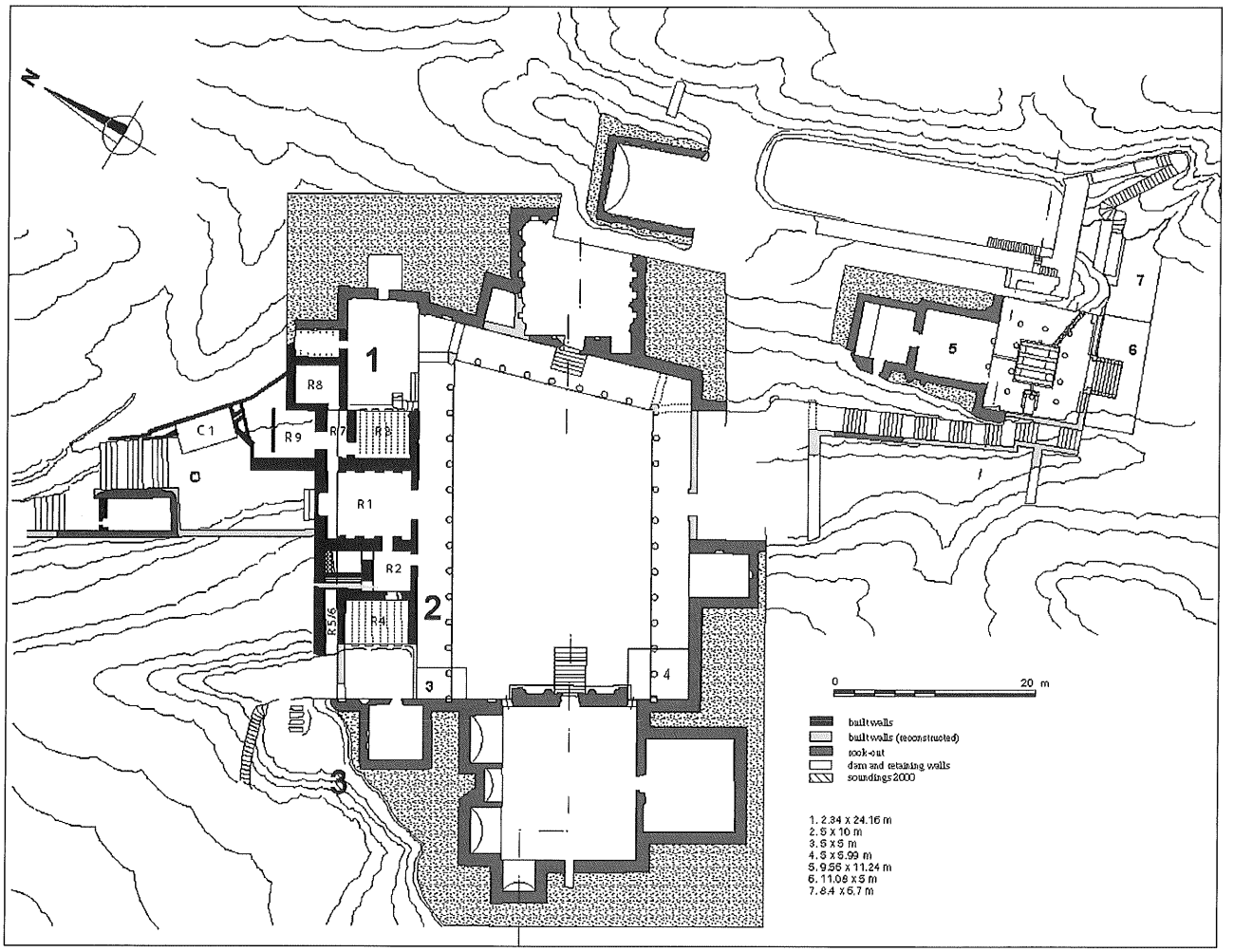
Following the results of the previous campaigns of the project (cf. Schmid 2004 for the results of the previous season as well as for further bibliographical references), the following trenches and soundings were opened (cf. **Fig. 1**): The rock plateau at the NE end of the huge entrance building, that was partially exposed last year, was completely excavated (no. 1 on **Fig. 1**). Within the northern portico of the complex a trench measuring 5m x 5m was opened behind room 2, in order to expose the next couple of columns and to allow the temporary construction of a wall in order to canalize the water and sand brought into the complex by winter rainfalls (no. 2 on **Fig. 1**). The rock plateau around the western corner of the complex was cleaned and the structures that were discovered were excavated (no. 3, **Fig. 1**)

NE-Corner of Complex

In 2004 the cleaning of the rocky outcrop of the Soldier Tomb's complex was begun. In 2005 this area was completely exposed (**Figs. 2, 3**; cf. **Fig. 1** for location), revealing a small room measuring 6.0m x 4.6m, built haphazardly with reused stones and containing an important amount of the so-called Ayyubid-Mamluk pottery, dating to the 11th to 13th centuries AD. During the Nabataean period, the entire rock plateau probably formed one single room, with some of the rock carvings from the positioning of the lateral walls still being visible. From this room an opening in the sandstone, probably related to a natural crack but enlarged by human activities, leads downwards into another room, completely cut into the rock. Excavation of this room was begun from the SE side, i.e. from the northern portico. From this area, two openings give access to the rock cut room, although it is not yet clear whether they are both of antique origin. So far, only about half of the sandy fill has been cleared, not revealing any information as to the function and use of this room, measuring 3.6m by 3.5m.

Northern Portico

A trench measuring 5m x 5m was opened in



1. Wādī Farasa East, general plan of the Soldier Tomb's complex (A. Barmasse after Bachmann and Watzinger and Wiegand 1921).

the northern portico, adjacent to room 2 (**Fig. 4**; cf. **Fig. 1**). As could be expected, the next two columns of the portico were found, confirming the basic dimensions of this architectural feature, as found in previous years, that is a standard *intercolumnium* of 187cm, a bay of 247cm and the width of the portico as 3.65m. As previously observed, most of the original floor slabs had been taken away, most probably in antiquity. Since most of the fallen column drums and other architectural members were standing or lying on several centimeters of earth, accumulated directly on top of the foundations of the slabs, the must have been removed before the columns collapsed. Several bronze coins from that general area belong to the late Roman period, more specifically to the period from 337AD to 361AD, thereby confirming that the complex collapsed during the 363AD earthquake.

Following the results of our 2004 and 2005 campaigns, some additional reflections as to the roofing construction of the portico can be added. In 2004, the upper part of a column including a capital and the following stone were found aligned, following the earthquake that destroyed the entire complex of the Soldier Tomb's. The stone above the capital turned out to be the starting point for a double arch, of unequal width (or height) on both sides. The situation of the find, strongly suggests that these parts once belonged to one of the central columns, flanking the main entrance into the porticoes from room 1 (cf. **Fig. 1** for location). As we discussed in last year's preliminary report (Schmid 2004), it was not immediately clear whether the arches indicate a kind of an arcade, i.e. one single row of columns supporting arches, or whether we have to suppose the existence of a second colonnade. Further reflections are now likely to clarify this point.

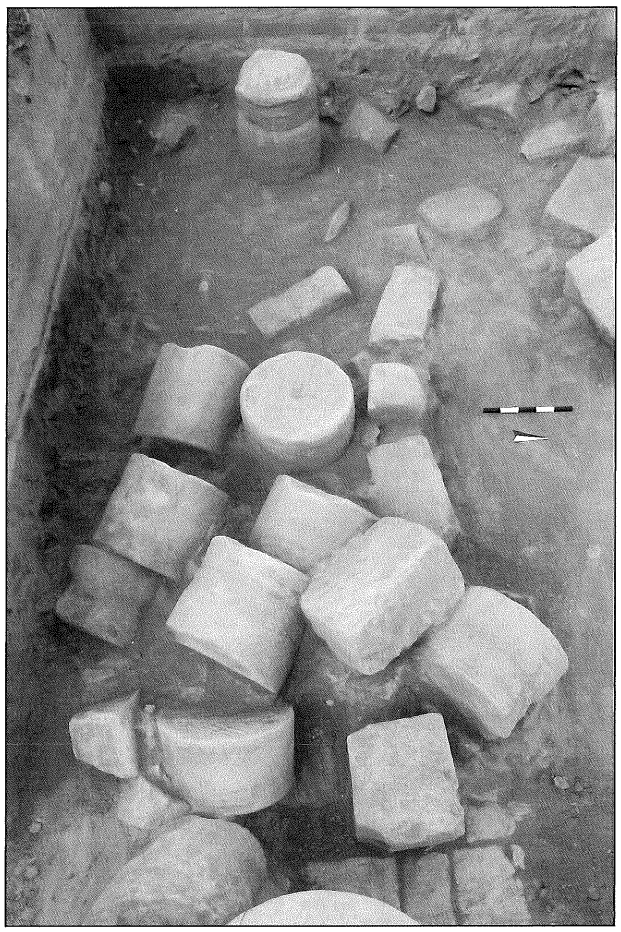


2. *Wādī Farasa East, Medieval room on rocky outcrop in NE corner of the complex (Schmid).*



3. *Medieval room on rocky outcrop in NE corner of the complex (Schmid).*

First of all, a double portico covered by arches would create a significant technical problem, the point where the pressure of the second arch met the second colonnade would be at risk of collapsing, since it would have no counterpart. The positive evidence of a reconstruction, with one portico in the shape of an arcade, is offered by the rock cuttings of the first half column of the northern portico. Therefore it can be seen to be the same structure that we discussed in the



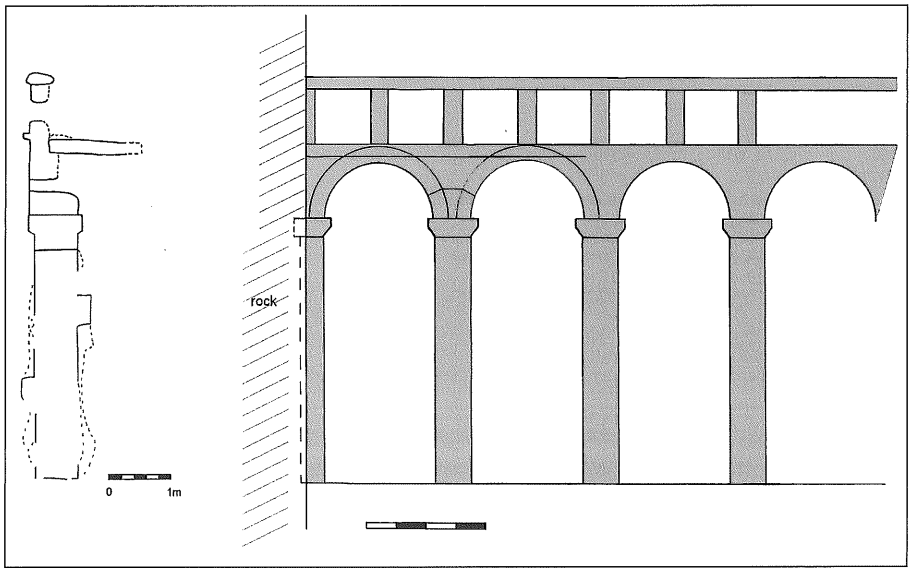
4. Wādī Farasa East, northern portico adjacent to room 2 during excavation, with fallen column drums (Schmid).

reports of our survey season and of our first field season (cf. Schmid 1999, 2000) and also the same structure that led the "Deutsch-Türkische Denkmalschutzkommando", in 1916, to the first reconstruction of the complex (Bachmann, Watzinger and Wiegand 1921; cf. here left on **Fig. 5**).

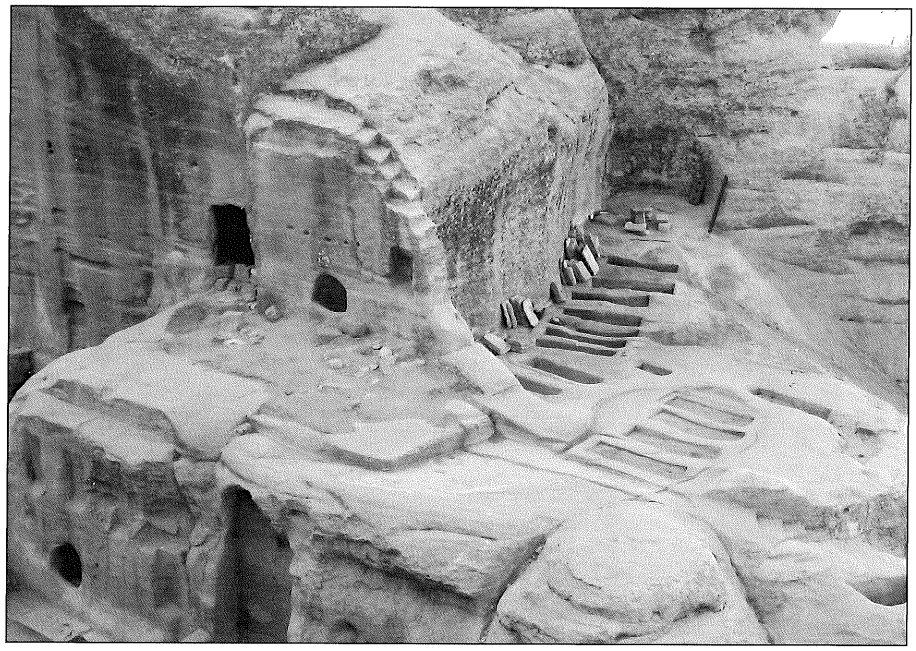
The carving of the roof of the portico (**Fig. 5** left on top), is located more than one meter above the top level of the capital. On the one hand, this situation is difficult to explain in the case of a flat covered roof. On the other hand, immediately above the capital, the beginning of a curbed carving is clearly visible. In other words, this must have been the beginning of the first arch, that was directly set into the rock carvings for the half column and, therefore, the pressure did not create a problem. Therefore, we are able to propose a reconstruction of the colonnade as shown in figure 5 (right), combining the information obtained by the rock-cuttings, with the architectural elements found during excavation.

Western Corner of the Complex

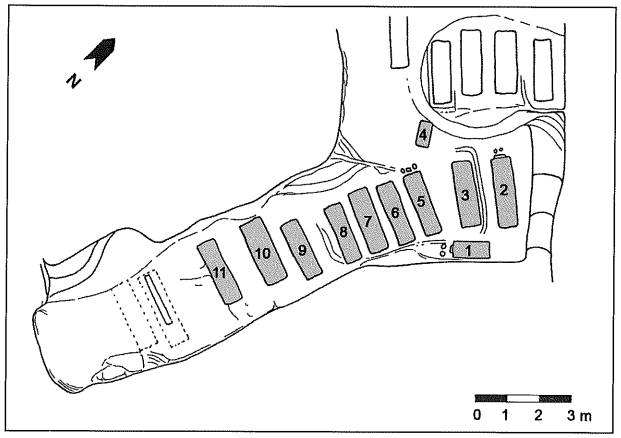
Initially, it was planned to expose only the area related to the construction of the entrance building to the Soldier Tomb's complex. Cleaning of the adjacent area revealed a small necropolis containing 11 shaft graves (**Figs. 6, 7**). Four more shaft graves, cut into a rounded rock cut structure were visible, that had not been noted in the first plan of the area was established (Bachmann and Watzinger and Wiegand 1921) and were reported being to have been looted during the interim. The additional eleven graves had not been previously investigated, but it soon became clear that they must also have been looted,



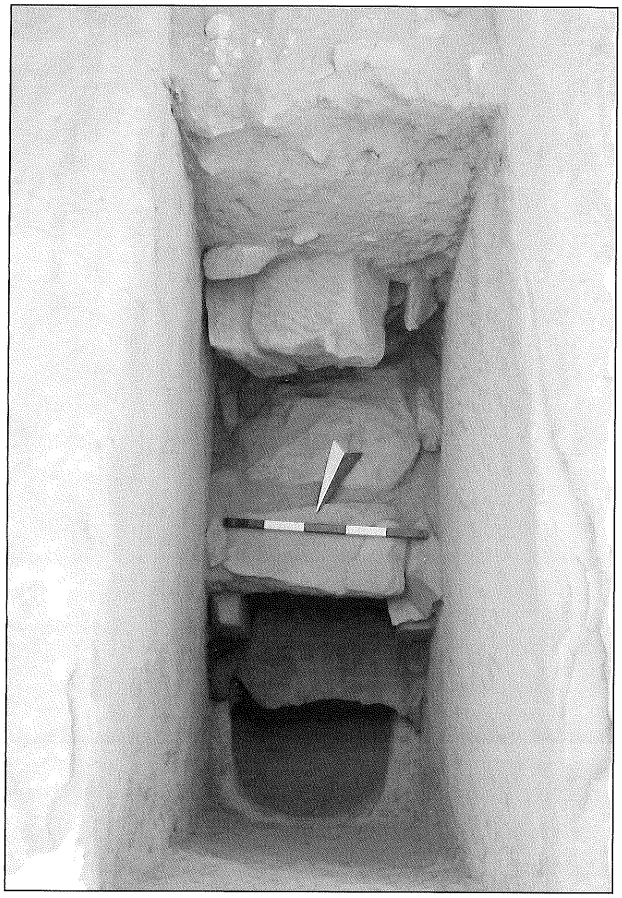
5. Wādī Farasa East, rock carvings for half column, beginning of arch and roof of northern portico, drawing with tentative reconstruction (Schmid).



6. Wādī Farasa East, rocky outcrop in W corner of the Soldier Tomb's complex with small graveyard (Schmid).



7. Wādī Farasa East, plan of small graveyard adjacent to the Soldier Tomb's complex (Schmid).



8. Tomb 2 after cleaning of looters excavation (Schmid).

at least partially. Nevertheless, the information obtained from these burials is interesting and deserves further study.

Most of the graves showed a part of their original upper fill still *in situ,* but usually over only about one half of the grave' s surface. The same was true for the covering slabs of most of the single burials (**Figs. 8-10**). This reveals the tactics of the looters, who in most cases seem to have been quite experienced: they presumed that offerings (pottery, coins etc.) and jewellery (earrings, necklaces), were usually displayed around or at the head of the deceased. Since some of the graves show circular and rectangular rock cuttings at the top of the structure, the looters appear to have supposed that these were the respective areas of the heads and concentrated their efforts on those parts. This can be seen clearly on figures 8 to 10 and 14. On figure 8, the two lowest burials of tomb 2 were looted, simply by lifting the uppermost covering slabs, i.e. precisely the head area. As a consequence,

in such cases the respective skeletons were rather well preserved, but with their heads missing (**Fig. 9**). The same is true for the uppermost burial in tomb 10, where an excellent preserved but headless skeleton was found (**Fig. 10**). As we shall see, different elements led to the idea that most of the tombs had already been looted during antiquity or at least during the Medieval period. There is, however, one exception provided by tomb 11 (**Fig. 11**). It had been almost completely emptied with only some covering slabs remaining inside the shaft. Furthermore, about 1.2m below the surface and at the presumed head end of the tomb, a metal headpiece of a *mudjarfa* was discovered (top center on **Fig. 11**), clearly indicating modern looting. Another



9. Tomb 2 with remains of second burial (Schmid).



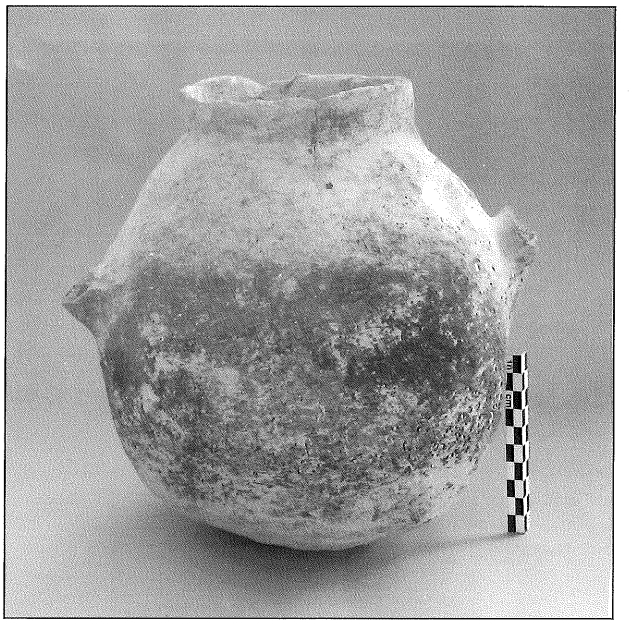
10. Tomb 10 with remains of last burial (Schmid).

indication of the date of the looting, is provided by tomb 7 (**Fig. 12**). No element of the initial covering slabs or of the burials themselves were discovered. The entire tomb was densely filled with Medieval pottery (**Figs. 12, 13**) and animal bones, clearly indicating it's function as a rubbish pit during that period and, therefore, necessarily a contemporary or earlier looting of the graves.

Nevertheless, several interesting pieces of information and new elements, concerning Nabataean burial practices and the construction techniques used in such tombs, were obtained. First of all, with the exception of two smaller graves, probably used for children (nos. 1 and 4 on **Fig. 7**), all the shaft tombs excavated to

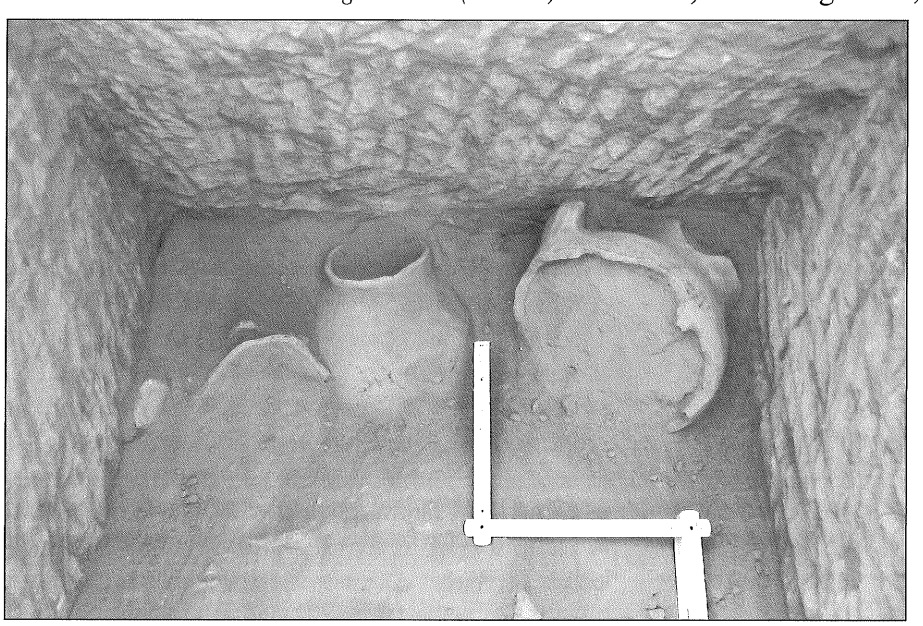


11. Tomb 11 with modern looting evidence (Schmid).

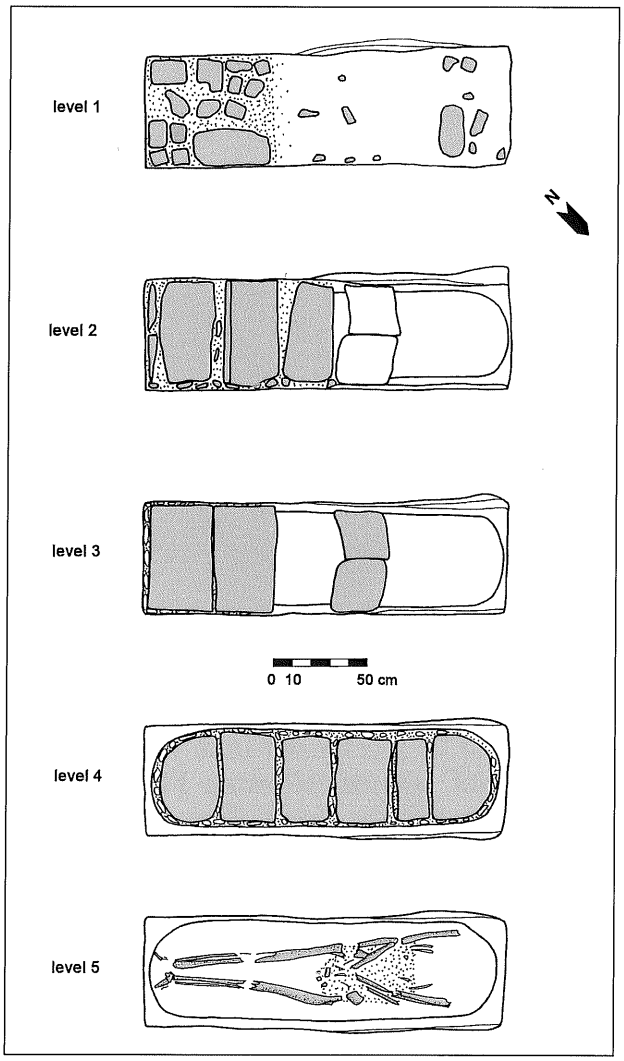


13. Tomb 7, Medieval pot (Schmid).

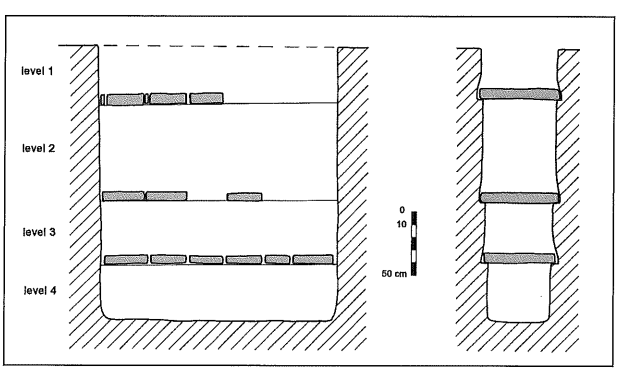
date were used for several burials; up to three as far as could be ascertained from the preserved evidence (cf. for the following **Figs. 14, 15**). This means that the shafts show considerable depth, in most cases slightly more than 2m, usually with a width of about 60cm. While at least the lower burials – in some shafts even all of them – were covered by slabs placed on rock cut shoulders (visible on **Figs. 8, 10, 11, 16-18**), some of the burials located higher up in the shaft were constructed using vertical slabs for the sides and horizontal slabs for the covering (**Fig. 9**). In shaft grave 5, after having cleaned the dis-



12. Tomb 7 with Medieval fill (Schmid).



14. Tomb 9, different levels of coverings and burials (Barmasse and Schmid).



15. Tomb 9, section (Barmasse and Schmid).

turbed upper levels, intact and perfectly sealed covering slabs appeared (**Fig. 17**), a clear indication that the lower burials of that tomb had not been disturbed. As a matter of fact, there were two intact burials, beneath the first preserved one, other intact covering slabs appeared (**Fig.**



16. Tomb 9 with different burials (Schmid).

18). The results obtained from the excavation of these two burials were somewhat surprising. In the upper one initially nothing was found (**Fig. 19**), not even skeletal remains and yet the covering was perfectly preserved. The careful sifting of the entire contents revealed that there were different layers within that grave. The upper layer consisted of very fine sandy earth that was completely sterile. Then followed a sandy layer containing ashes and other small remains, like fish and bird bones, burnt plant remains as well as some potsherds. The lowest layer offered a surprising picture: the entire surface of the grave was covered with small clusters, of what at first sight seemed to be hydraulic mortar as used in later Nabataean and Roman times, that is a mixture of lime, sand and charcoal or ashes. Unusually, in this case there were a significant number of bone fragments added to the mixture.



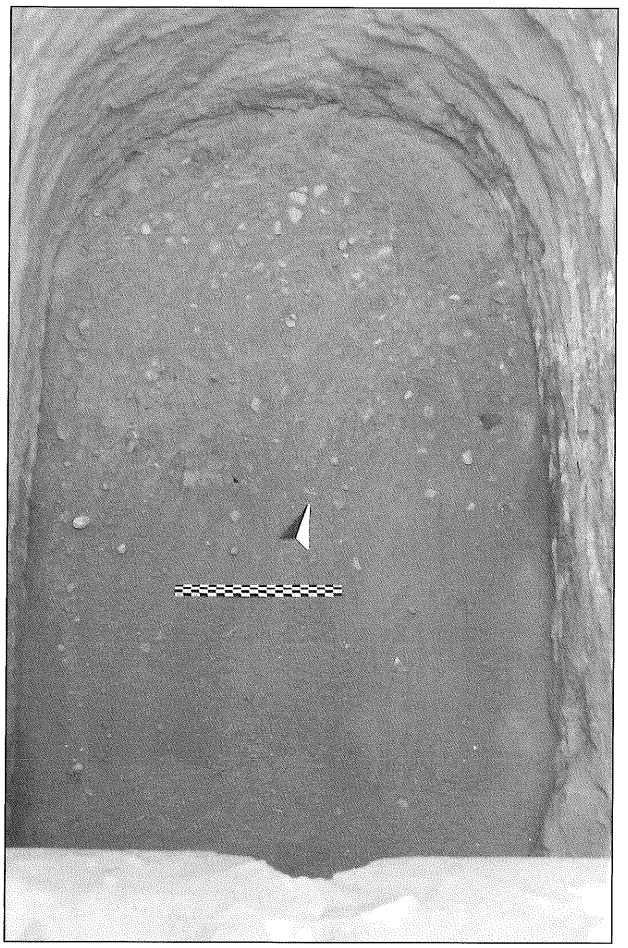
17. Tomb 5 with covering slabs of second burial (Schmid).



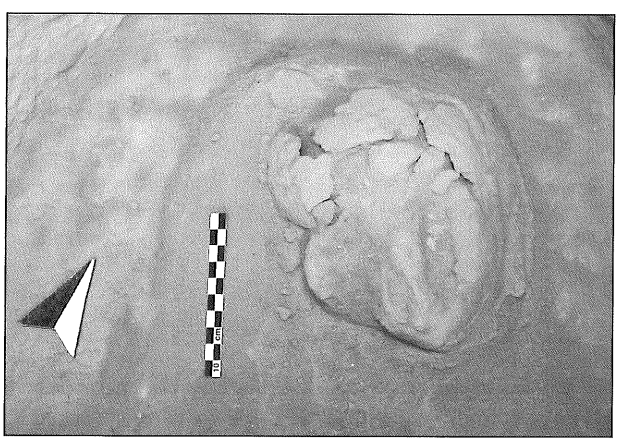
18. Tomb 5 with covering slabs of first burial (Schmid).

The bones collected must have been human remains, since there are clearly identifiable skull fragments mixed with the plaster. This strange observation recalls the description of loculus 3, in tomb 813 (Zayadine 1974: 144f.), and of a similar burial in the "Triple Dushara" tomb (Horsfield 1939: 108ff.). However, more investigation and scientific analysis of the collected organic material will be necessary in order to establish the exact procedure performed used in that burial. From the small amounts of pottery found by sifting, a date within the last quarter of the 1st or the very beginning of the 2nd century AD can be proposed for this burial.

The lowest burial in tomb 5 provided a slightly different picture. In contrast to the case just described, tomb 5 contained an inhumation, though the skeleton was badly preserved. Only the more substantial bones, such as the skull (**Fig. 20**) and parts of the legs were recognisable, the rest had completely disintegrated. More surprisingly, there were no offerings



19. Tomb 5, remains of second burial (Schmid).



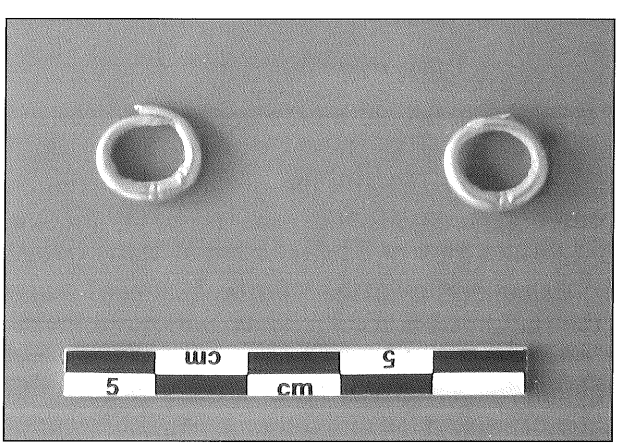
20. Tomb 5, skull of first burial (Schmid).

identifiable; such as complete pottery etc. Careful sifting of the complete content of that burial revealed organic material and small potsherds, indicating a chronological frame of the second and third quarters of the 1st century AD for the burial. Finally, from the lowest and undisturbed burial in grave 3 came a pair of small golden earrings (**Fig. 21**), only 3g each, found on both sides of the skull. Despite the earrings, no other offerings were found in the grave and the small potsherds found within indicate a date of around AD 100 for this burial.

From collected evidence that has already been studied, the graveyard was probably first in use during the second half of the 1st century AD and remained in use until the early 2nd century AD. Three coins were found from different burials and will hopefully provide further chronological evidence.

After detailed archaeological, anthropological, archaezoological and botanical study, the information concerning the burial practices at Petra, collected during this season and during the 2003 excavation of the shaft graves within the Renaissance Tomb (Mohammed al-Bdool and Huguenot and Schmid 2004), will provide an important insight in to the way the Nabataeans treated their dead. A detailed study dealing with these issues will be part of the first monograph devoted to the results of the International Wādī Farasa Project.

Already it becomes clear that the Nabataeans used several forms of burial custom. Beside "normal" inhumations, there appears to have been burial practices where the deceased were either put in a layer of quick lime and/or were subject to secondary burial; as has been highlighted by A. Negev (Negev 1986: 71-84; cf. Hackl and Jenni and Schneider 2003: 96-98). The Nabataeans obviously practice a form of bone collection and secondary burial. Several years ago, it was suggested that this could be a way to explain the strange passage in Strabo's *Geography* (16, 4, 26 [C 784]; cf. Wright 1969; Hackl and



21. Tomb 3, golden earrings from lowest burial (Schmid).

Jenni and Schneider 2003: 616-617), according to which the Nabataeans did not respect their dead and buried even their kings next to dung heaps. It is true that exposing the dead – if really practiced by the Nabataeans – and subsequently collecting their bones must have seem a rather unusual practice to the Greeks and Romans. It does, on the other hand, correspond to similar practices within Zoroastrianism (Grenet 1984). Further studies need to be carried out in order to verify whether there is any possibility that the Nabataeans were influenced by such customs; perhaps through contact with the Parthians (as was suggested by Wright 1969).

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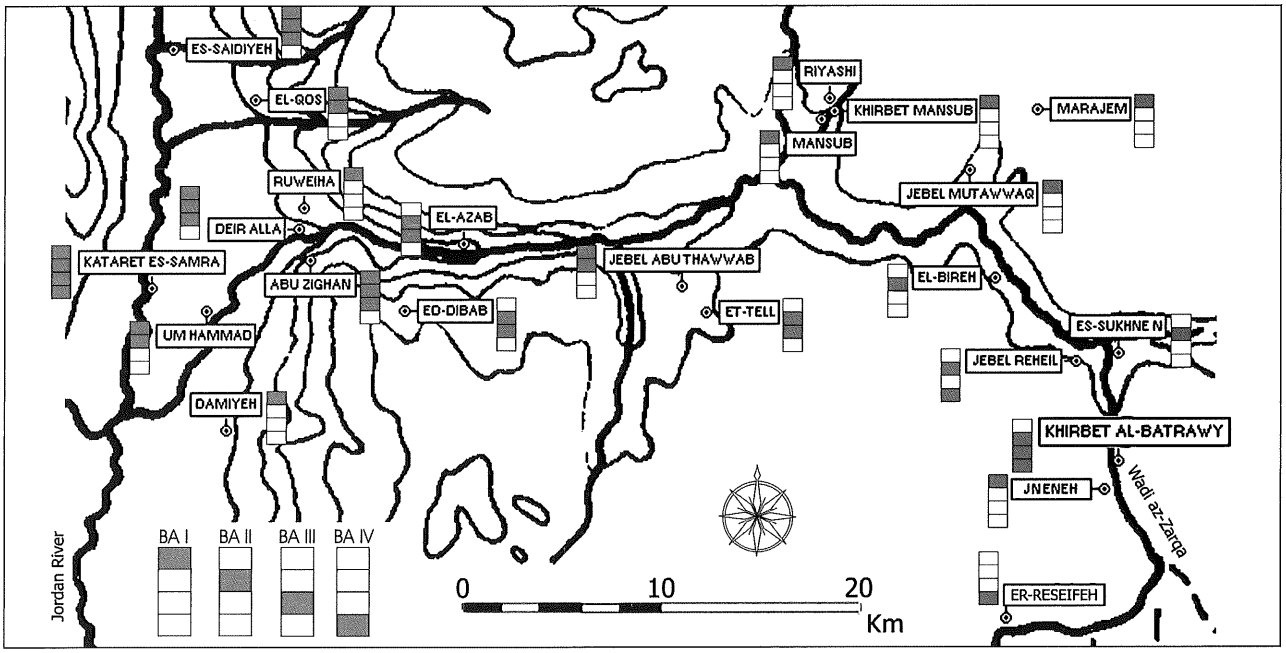
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PRELIMINARY REPORT OF THE FIRST SEASON OF EXCAVATIONS BY THE UNIVERSITY OF ROME "LA SAPIENZA" AT KHIRBAT AL-BATRĀWĪ (UPPER WĀDĪ AZ-ZARQĀ')

Lorenzo Nigro

Introduction

The expedition carried by the University of Rome "La Sapienza" in Jordan[1] resumed its archaeological activities in the Upper Wādī az-Zarqā' after a five-year hiatus[2] with a systematic excavation conducted under the auspices of the Department of Antiquities of Jordan at the Early Bronze Age site of Khirbat al-Batrāwī, in the northern district of the Hashemite Kingdom of Jordan (**Fig. 1**)[3]. Excavation expenses were



1. The main EBA sites in the Wādī az-Zarqā' Basin and the middle Jordan Valley.

1. The Rome "La Sapienza" team during the first season included: L. Nigro, Director; A. Berti, Architect; A. Polcaro, Area B Supervisor; M. Sala, Area A Supervisor; G. Marinelli, Area B; M. D'Andrea, E. Gallo, D. Montanari, V. Tumolo. The representative of the Department of Antiquities, who gave invaluable support to the expedition, was Inspector Romel Ghrayib.
2. The University of Rome "La Sapienza" worked in Jordan from 1987 to 1999 on a series of archaeological surveys and soundings focused on Wādī al-Yābis, Wādī az-Zarqā' and Wādī aḍ-Ḍulayl under the scientific coordination of P. Matthiae, and the field direction of G. Palumbo, which identified more than 300 previously unknown sites with a chronological span ranging from prehistory to the Islamic period. A major aim of the expedition in the 1990s was the safeguarding of archaeological heritage, which was epitomized in the catalogue of archaeological sites of Jordan called JADIS (Jordan Archaeological Databank & Information System: Palumbo ed. 1994), which remains a fundamental tool in the management and protection of the country's archaeological heritage. On the Wādī al-Yābis survey see: Palumbo and Mabry 1988; Palumbo *et al.* 1990, 1993; on the Wādī az-Zarqā' and Wādī aḍ-Ḍulayl surveys see: Palumbo *et al.* 1996, 1997; Caneva *et al.* 2001.
3. The expedition wishes to express deep thanks to Dr. Fawwaz al-Khraysheh, Director General of the Department of Antiquities of Jordan, for his support, as well as to the Academic Authorities of the University of Rome "La Sapienza", the Vice Rector Prof. Paolo Matthiae, the Dean of the Faculty of Humanistic Sciences Prof. Roberto Antonelli, the Director of the Department of Historical, Archaeological and Anthropological Sciences of Antiquity Prof. Clementina Panella, who strongly sustained the expedition.

covered the University of Rome "La Sapienza", the Italian Ministry of Foreign Affairs, and the Italian Ministry of Education – University and Scientific Research[4], with the cooperation of the Queen Rania Institute of Tourism and Heritage of the Hashemite University of Zarqa[5].

Renewed excavations were conceived as a deepening of previous research activities in the Wādī az-Zarqā' basin, for which the site of Khirbat al-Batrāwī, a fortified town of the Early Bronze Age with almost no successive superimpositions or interventions, was chosen as the key site of the upper valley for the study of the origins, development and trends of early urbanisation in this region of Jordan[6].

The first season of excavations took place in May-June 2005 and was aimed at investigating the main topographical and chronological features of the site. The survey carried out in the 1990s by the University of Rome "La Sapienza" in Wādī az-Zarqā' and Wādī aḍ-Ḍulayl identified a series of Early Bronze Age sites all along the valleys up to the Jordan River (**Fig. 4**)[7]. Computer-aided examination of satellite and aerial photos, as well as a preliminary survey of the site in December 2004, led to the identification of Khirbat al-Batrāwī as a fortified town of the Early Bronze Age, lying almost completely untouched on the top of a cliff dominating the Upper Wādī az-Zarqā'. The presence of a massive fortification system all around the site as well as its prominent location and the fact that the whole hill was densely inhabited in the Early Bronze Age, with nearly negligible overlaps and recent interventions (such as shepherd enclosures and some modern pits), make Khirbat al-Batrāwī one of the more promising sites of the region for the study of Early Bronze Age urbanisation in Jordan.

The site was also chosen because it was deemed to yield high archaeological potential, due to the monumentality of its defensive structures and its location in the north-western periphery of the city of az-Zarqā'. As it lies within a modern urban area but on an isolated hill, this made feasible its valorisation with the creation of an archaeological park[8].

Aims and Methodology

The excavation at Khirbat al-Batrāwī was planned as a holistic project, aimed at both uncovering archaeological features and enhancing tourism through the restoration of the most prominent monument at the site as well as rehabilitation of the khirbat area, which offers a wide panorama of the modern city of az-Zarqā' and the Zarqā' River valley.

The scientific aims of the project are:

- Study of the process of formation, flourishing and collapse of a major urban centre at the time of early Jordanian urbanisation during the 3rd millennium BC, situating it in the general framework of the dawn of ancient Near Eastern urban civilization; archaeological periodisation of the site and reconstruction of its occupational history;
- Study of the topographical, spatial and architectural organization of the town with respect to the social structure of the inhabiting community;

4. The author would also like to thank the Italian Embassy in Amman, in the persons of H.E. Gianfranco Giorgolo, Ambassador of Italy, and Dr. Marco Canaparo for their cooperation, and the Italian Ministry of Foreign Affairs – General Directorate for Cultural Promotion and Cooperation, Office V.

5. Students and scholars of Queen Rania Institute of Tourism and Heritage of the Hashemite University participated in the dig under the direction of Dr. Khaled Douglas, with the support of the Dean of Faculty Prof. Sultan Maani. The Queen Rania Institute of Tourism and Cultural Heritage team also included Dr. Fardus Ajlouni and Dr. Bilal R. Khrisat.

6. Due to its climatic and geographic characteristics, this area is highly promising for studying the origins and diffusion of the earliest urban civilization in the Southern Levant. Indeed, it lies at the fringes of three different ecological systems: the central Transjordanian hills, crossed north-south and east-west by Wādī az-Zarqā'; the semi-arid steppe; and the basalt desert, at the south-western edge of the great volcanic plateau. It offers a favourable context for the study of urban development, adaptive strategies of local communities, and relationships between natural resources and urban features during the pre-classical periods.

7. Khirbat al-Batrāwī was surveyed and identified as an Early Bronze Age site, but was not investigated; it was noted in *JADIS* by the place-name "Jreyyeh" (site n. 2516.011, p. 2.172).

8. The north-eastern flank of the hill of Khirbet al-Batrāwī is cut by a large abandoned limestone quarry. Much of the nearby hill to the north was in fact removed around 15 years ago by the same quarry, which has modified the landscape in the proximities of the site, but still represent a suitable area for the future development of an archaeological park. Moreover, the site itself is heavily threatened by modern building activities.

- Study of the material culture from a socio-economic perspective, exemplifying the strategies of adaptation developed for the sake of urban life, and the relationships between natural resources and socio-economic features;
- Comparison and correlation between means of production, lifestyle and subsistence resources (also on the basis of paleobothanic and zooarchaeological data);
- Examination of cultural and commercial interactions through the - Study of finds related to craft production and trade;
- Study of the ideological framework within which the social and economic structure of the al-Batrāwī urban community was embraced.

The preliminary approach to the stated scientific aims and operational goals[9] during the first season of excavation consisted of the following:

- Archaeological survey of the site with the identification of periods of occupation and of the main topographical, archaeological and structural features (including topographic grid and mapping of the site);
- Excavations at two selected areas of the site for the establishment of stratigraphic sequence and the investigation of a dwelling quarter (Area A) and of fortifications (Area B).

With regard to stratigraphy and documentation, the expedition adopted the following criteria.

Stratigraphic units (loci) were numbered in sequence; numbers 1-99 and 201-299 were attributed to Area A and 100-199 to Area B. *Loci* were preceded by capital letters, indicating in a highly schematic way the nature of the archaeological feature[10]. Each locus was documented horizontally by its overlay and vertically in sections, and recorded in a CAD system. Stratigraphic sequences were formed by grouping coherent loci (such as a wall and the floor linked to it) into activities, each illustrating a macro-event (e.g. for a building: foundation, utilization, destruction/collapse), and classifying activities together in order to illustrate main historical phases (such as the entire life of a building). Loci are usually are placed in squares[11], while activities and phases are established for areas and ultimately linked to the site periods (see below)[12].

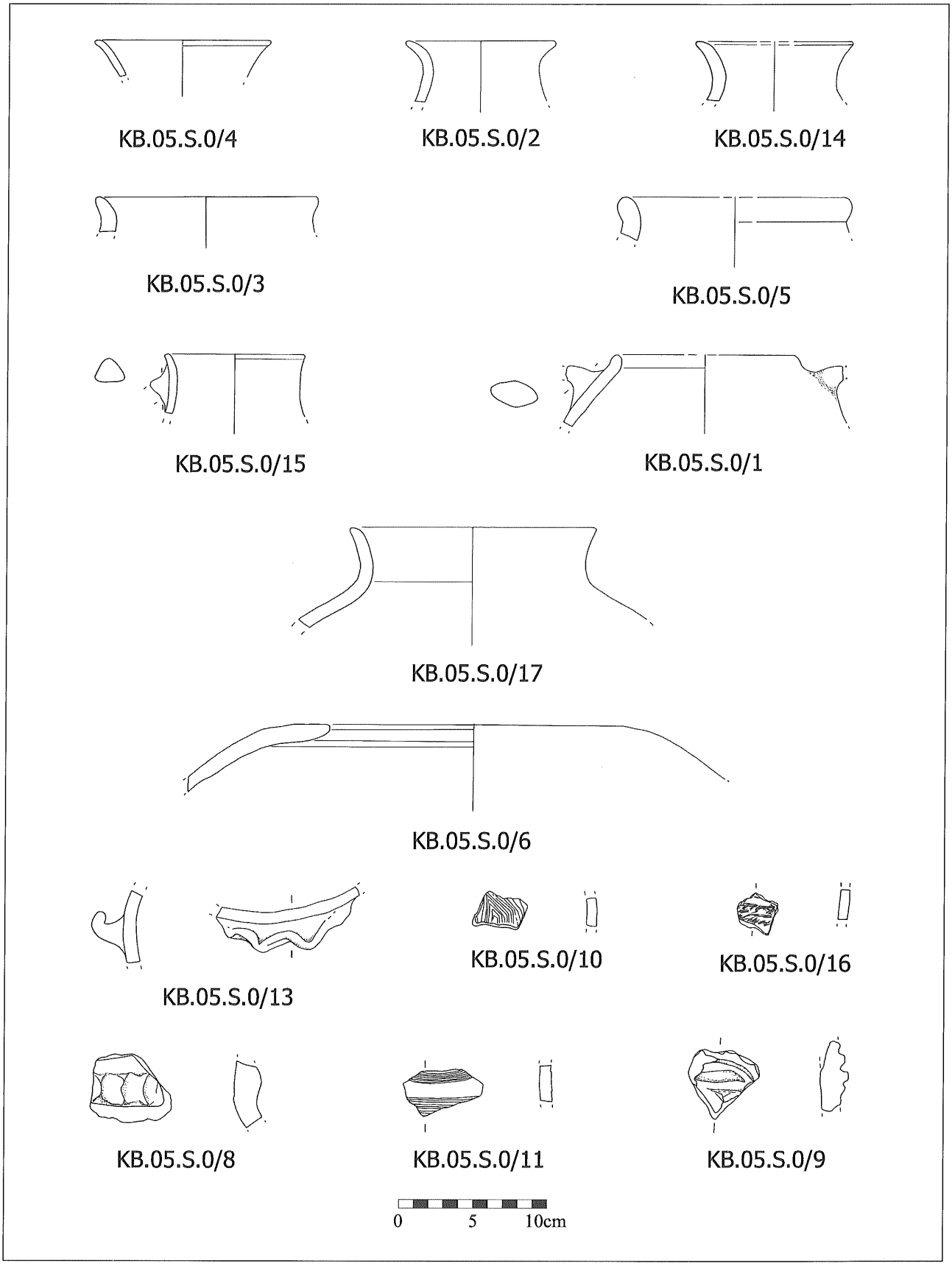
Stratigraphy and Preliminary Periodisation

Ceramic materials recovered from the surface of the khirbat appeared basically related to three periods: Early Bronze II, III and IV (**Fig. 2**). While EB II and III (with a remarkable prevalence of the latter period), were present everywhere on the site, EB IV pottery was mainly concentrated on the uppermost terrace, probably reflecting the last occupation of the mound. These initial observations were confirmed by systematic excavations, which involved EB III and IV occupational layers on the Acropolis and on the northern side of the khirbat, without yet reaching underlying deposits of the Early Bronze II.

Two stratigraphic sequences were established in Areas A and B, which have been matched with the results of the survey in order to illustrate the following preliminary archaeological periodisation of al-Batrāwī (**Table 1**).

The chronological definition of stratified cultural horizons (= periods) cannot, at the present moment, be corroborated by means of radiocarbon dating, and the proposed periodisation (**Table 1**) has been set preliminarily based on the examination of material culture remains. It will therefore be checked further in subsequent seasons[13].

9. The scientific aims of the project were drawn from the following operational goals of the expedition: a) legal and physical delimitation of the site and inscription in the department catalogue; b) establishment of a databank for the finds and archaeological documentation produced by the expedition; c) development of a website (www.lasapienzatojordan.it) to make the expedition results available to a wide public; d) initiation of the first restoration interventions both on the site (path for easier access) and on finds, in view of the creation of an antiquarium.
10. The following letters are used to categorize loci: W = wall; B = bench; T = tannur; P = pit; F = filling, layer, deposit; D = deposition, burial; C = drain, cistern, well; L = floor, paving, but also the name of a room/space.
11. Note that named structures maintain the same name in different squares where physical continuity is evident.
12. Documentation and study of pottery, objects, organic samples and other archaeological materials were carried out through interactive databases which collect and correlate all information concerning finds and their archaeological context (comprising graphic, photographic and tri-dimensional documentation).
13. In particular, the duration of each suggested Batrawy period is therefore to be considered highly tentative and conventional, also based on the chronology commonly adopted in the region (Stager 1992, Volume I, 28-39, Volume II, fig. 16; Mazar 1992, 108-109, tab. 3; Philip 2001, 168-169).



2. Sporadic pottery sherds from the surface of the khirbat.

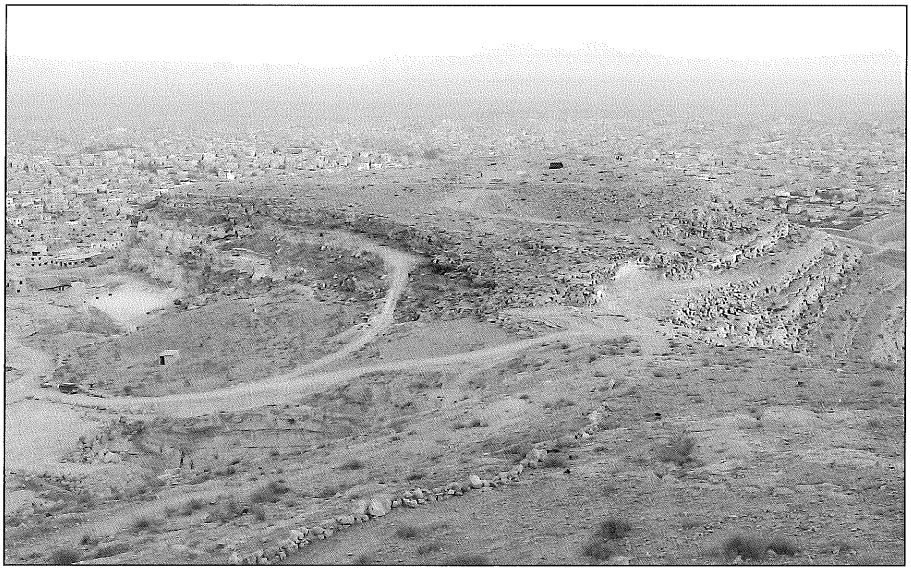
Table 1: Preliminary periodisation of occupational phases at Khirbat al-Batrāwī.

Archaeological Period	Absolute Chronology	Site Period	Area A Phases	Area B Phases
Early Bronze I[14]	3400-3000 BC	Batrawy I	-	-
Early Bronze II	3000-2700/2650 BC	Batrawy II	-	-
Early Bronze IIIA	2700/2650-2450 BC	Batrawy IIIa	-	Phase 4
Early Bronze IIIB	2450-2300 BC	Batrawy IIIb	Phase 4b-d	Phase 3b-c
Early Bronze IVA	2300-2200 BC	Batrawy IVa	Phase 4a	Phase 3a
Early Bronze IVB	2200-2000 BC	Batrawy IVb	Phase 3	Phase 2
Later periods	2000 BC-1900 AD	Batrawy V	Phase 2	-
Modern frequentation	1900-2005 AD	Batrawy VI	Phase 1	Phase 1

Early Bronze Age III (Batrawy III) structures and materials were recovered in Area B, where a 20m stretch of the fortification wall was brought to light (see § 6), and from certain points on the Acropolis (Area A) underneath the final EB IV occupation. The Early Bronze Age IV (Batrawy IV) settlement has been investigated mainly on the summit (Area A), where houses and domestic installations were uncovered, and has also been identified to some extent in the area of the northern city wall (Area B) as well as in certain other places[15]. Nonetheless, the interest of Khirbat al-Batrāwī lies mainly in the fact that the site was exclusively occupied during the Early Bronze Age for a chronological span ranging approximately from the beginning to the end of the 3rd millennium BC.

Survey and Topography of the Site

The site of Khirbat al-Batrāwī (Lat. 32°05' N, Long. 36°04' E) measures four hectares and has a roughly triangular shape, with its base along the western side where it overlooks Wādī az-Zarqā'. Khirbat al-Batrāwī lies on the top of a rocky hill[16] at an average elevation of 660 a.s.l.[17], from which it dominated a large part of the Upper Wādī az-Zarqā' (**Fig. 3**). A series of Bronze Age sites were, in fact, identified in the

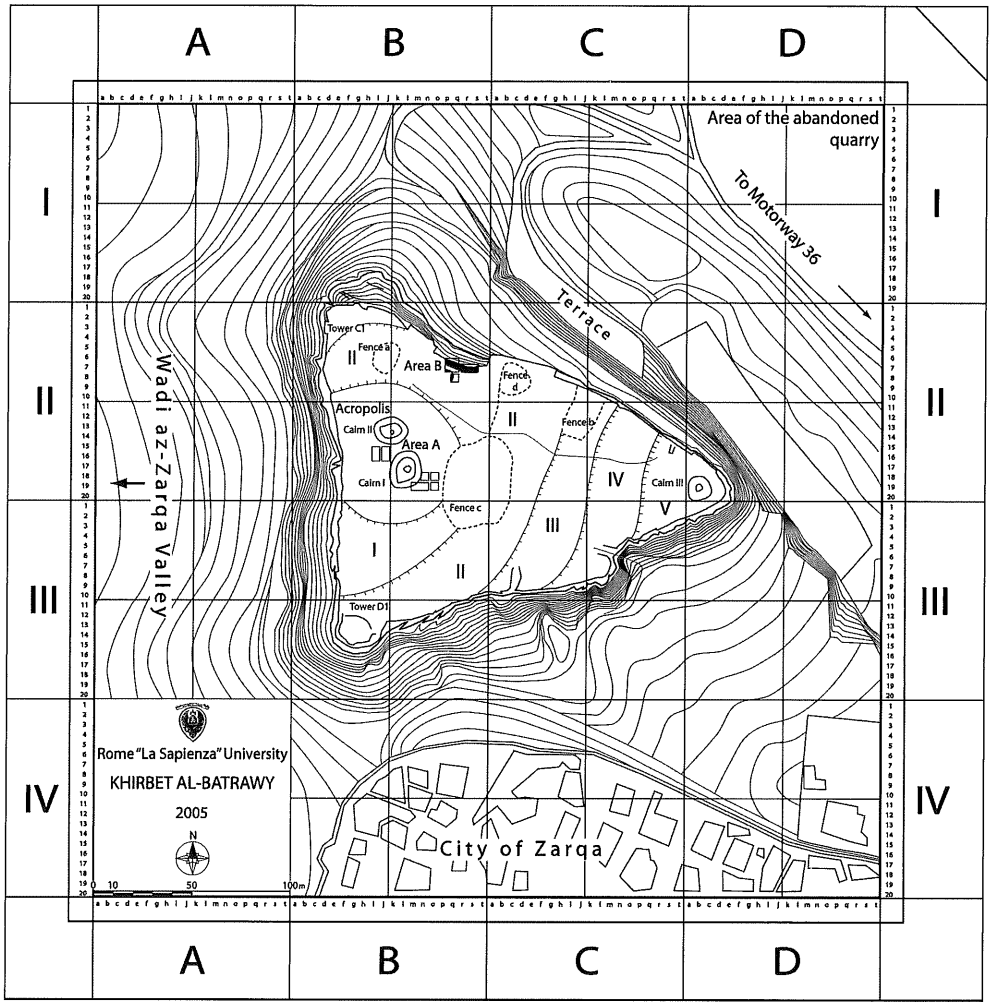


3. General view of the site of Khirbat al-Batrāwī from north. To be noted the characteristic triangular shape of the khirbat, isolated and protected on the top of the natural rocky hill.

14. Neither structures nor materials of this period were found on the site, though possible occupation of the Khirbat during the Early Bronze I must be tested.
15. This is perhaps the case of jar-burial D.200, sunk into the ruins of the south-western tower.
16. Khirbat al-Batrāwī is the southernmost of a series of rocky hills bordering to the east Wādī az-Zarqā', beginning at the point where the *wadi* crosses more sharply the mountains of the Jordan highlands.
17. The highest point of the site is 676 a.s.l.

valley (**Fig. 4**)[18], which was one of the main ancient routes connecting the Jordan Valley to the desert; this indicates that this district offered a favourable geo-economic environment for the development of an early town.

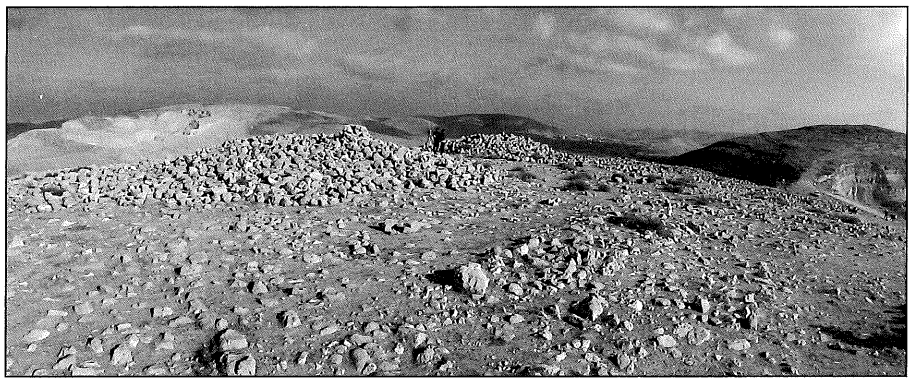
The topography of Khirbat al-Batrāwī was mapped and the ancient fortification wall emerging at its edges was detected and documented all around the rocky hill (**Fig. 5**). A topographic grid based on 5×5m squares was established[19],



4. Topographical plan of Khirbat al-Batrāwī at the end of the 2005 season of excavations.

18. Wādī az-Zarqā' is a permanent water course that, with its 96km of length, represents the second tributary of the Jordan river, after Wādī Yarmouk, and constitutes the natural border of the central Jordan highlands controlled by Amman (Rabbat Ammon in the Iron Age, Philadelphia in the Hellenistic and Roman times). The river rises near Amman and runs at first north-east for around 30km, while in the Zarqā' plain it bends north-west and crosses the mountains, connecting with Wādī aḍ-Ḍulayl. Correspondence to this connection, the valley was large and well irrigated, and the rural village of Tall as-Sukhna North (Palumbo ed. 1994, site nr. 2517.027; Chesson *et al.* 1995; Palumbo *et al.* 1996: 385-386, 401-403, tab. 6; Palumbo *et al.* 1997: 14) exploited this extremely favourable environment. The river proceeds 5km north-west, a stretch controlled by the centre of Tall al-Bīra (Palumbo ed. 1994: site nr. 2417.021; Glueck 1939: 213-214), possibly a fortified settlement; the river then descends steeply westwards, flowing into the Jordan south of Dayr 'Allā (the last 10km turning towards southwest), describing an overall arc of around 270°. Today the river is dry for most of the year south of the confluence with Wādī aḍ-Ḍulayl, but this is a recent phenomenon brought about by use of the springs in the area between the cities of Amman and Zarqā'; until a few years ago, it was possible to fish in Wādī az-Zarqā', even in summer.

19. The grid is divided into 100x100m squares, indicated by capital letters on the west-east axis (A-D) and by Roman numeral (I-IV) on the north-south; each 100x100m square is further subdivided into 400 5x5 squares, indicated by lower case letters on the west-east axis and Arabic numerals on the north-south axis. Each square takes the name of the north-east peg; this method allows for a distinct name for each square in the grid, maintaining the indication of the larger sector provided by the capital letter and the Roman numeral.



5. Cairns I and II on the top of the Acropolis of Khirbat al-Batrāwī, and general view of the eastern sector of Area A (squares BnII18 and BoII18) before the beginning of the excavations, from south-east.

and detailed documentation of some of the utmost visible architectural features of the site was made, including the towers in its north-western (Tower C1) and south-western corners (Tower D1; see below), and the emerging structures in the north-east (L.330).

The ancient town was structured on five sloping terraces from west to east, delimited by battering walls, which regularized the natural crests of the hill from the Acropolis on the summit of Terrace I, to the eastern edges of the khirbat. Nowadays, the surface of the site is entirely covered by rocks and erratic stones deriving from the collapse and destruction of Early Bronze Age buildings and, especially, fortifications, and by the remains of these terrace walls[20].

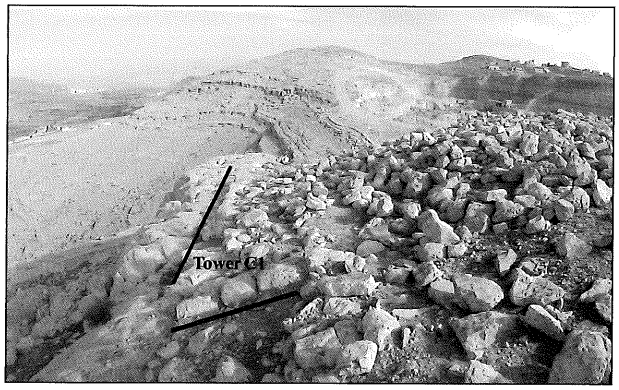
Terrace I occupied the central part of the western top of the site, where the Acropolis of the Early Bronze Age town was located and where two cairns (I-II) were built successively over the ruins of the latter. The second terrace has a crescentic plan and encircled Terrace I to the north, east and south, incorporating the south-western corner of the hill. Terrace III has a relatively limited average width (around 20m) and crosses the site north-south in the middle[21]. The walls separating terraces II, III and IV were clearly visible on the surface on the northern side of the site. Terrace IV is twice as wide as the previous one, and has apparently preserved archaeological remains in a fairly good state. The fifth and lowest terrace occupies the eastern corner of the hill; in the middle a large building was recognized on the surface, with at least three walls delimiting a courtyard with a major installation in its south-eastern corner; a third cairn (III) was erected at the eastern end of the same terrace.

Fortifications and the Entrances to the Town

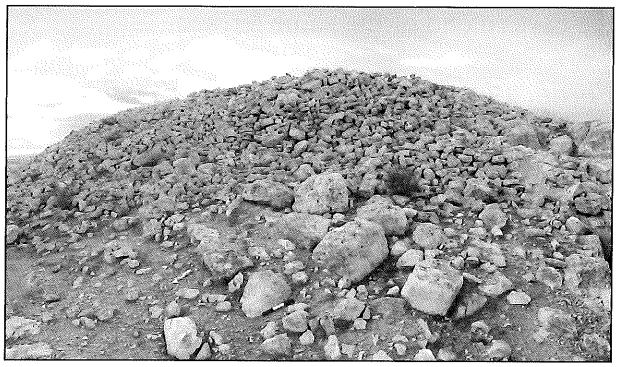
The defensive system of the town of al-Batrāwī was built all around the rocky hill by exploiting any cliff and spur. The main fortification work was a solid stone wall from which bastions and towers projected at irregular intervals, depending on the natural conformation of the edge of the khirbat. Due to the triangular shape of the mound, the main pinpoints of the defence were, of course, the corners, where huge tower-fortresses were located. The line of fortifications is illustrated clockwise starting from the north-western corner.

The north-western corner (Area C) hosted a rectangular tower (Tower C1; **Fig. 6**) with two protruding bastions, one abutting towards the west (W.301)[22] and the other towards north (W.303), built directly on a rock terrace with large unworked limestone blocks. Further to the east, a major wall (W.305) projected north-west from the line of fortifications up to the very edge of the spur (**Fig. 7**), possibly in order to protect an entrance to the city, not far from the saddle, which represented the easiest access to the site (**Fig. 3**). An advanced line of fortification was also indicated by wall W.307, a NW-SE structure detected on the lowest step of the north-western spur towards the northern saddle.

20. Four modern stone enclosures are present on top of the hill: one to the north-west (a); a second (c), which is the largest, between Terraces I and II; a smaller third one (d) just east of Area B; and a fourth further to the east (b).
21. Some walls emerge visibly from the ground on the ground on Terrace III, which, based on preliminary observation of their building technique may be tentatively attributed to the period Batrawy III (Early Bronze Age IIIB).
22. The western bastion offsets 1.9m and was 6.3m long on the north-south axis.



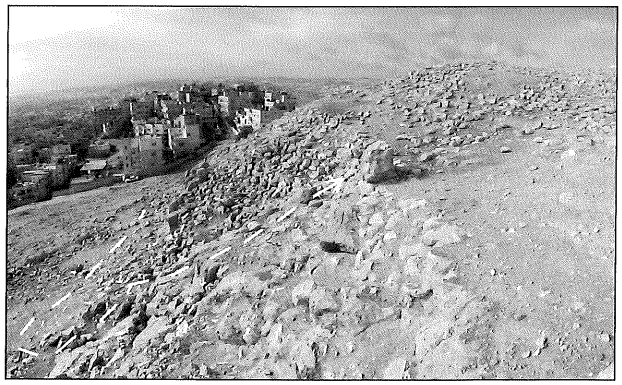
6. The stone basement of the rectangular tower erected in the north-western corner of the site (Tower C1), from south.



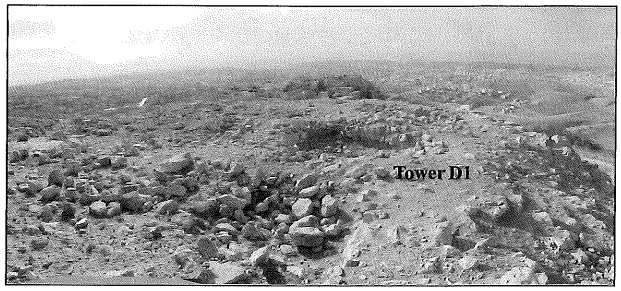
7. The advanced defensive wall W.305 nearby the north-western corner of the site, from north-west.

Roughly at the middle of the northern side, a recess in the outer face of the city wall corresponds to a shallow depression where Area B was opened (see below). Just to the east of Area B, the city wall again projects, presumably due to the presence of a huge rectangular bastion, protecting the eastern half of the northern side. In the eastern corner, the city wall followed the circular line of the spur.

Roughly 45m west of the eastern corner on the southern side, a ravine in the edge of the hill indicated the location of a gateway, of which only some large pier blocks were preserved, and which was approached through a passageway running south-west/north-east at the foot of the cliff and turning left to the north-west into the city (**Fig. 8**)[23]. This entrance in particular was defended by the structures built over the spur to the west, which was distinctly higher than the



8. The entrance placed across the southern side of the city, from east.



9. The semicircular tower (Tower D1) erected in the south-western corner of the site, from north.

ramp of the passage itself. From that point onwards the city rose again up to the south-western corner. Here (Area D), a huge round tower (Tower D1; **Fig. 9**) was detected on the ground, controlling the Wādī az-Zarqā' Valley at a strategic turn, which offered a wide panoramic view[24].

The western side was best protected by virtue of the steep cliff and at least two projecting terraces which hosted offsets or protruding towers built with large boulders set directly over the bedrock, aimed at allowing alert lookout over the edge of the hill towards the valley. The town of Batrāwī during the Early Bronze III thus featured a highly articulated defensive system, which attests to its urban status.

Area A: Early Bronze IV village on the Acropolis

Area A was opened on the summit of the Acropolis, where alignments of stones on the surface suggested substantial occupation. Two

23. It seems reasonable that from this entrance a street climbed the side towards the Acropolis.
24. The collapsed remains of the tower were used for jar burials during the Ancient Bronze IVB, when the inhabited area of Khirbat al-Batrāwī was reduced to the only acropolis; one of these burials, a simple burial in jar (D.200) was identified and excavated.

separate sectors were investigated to the south-east (Area A East)[25] and to the north-west (Area A West)[26] of Cairn I (**Fig. 5**) respectively.

Stratigraphy of Area A

Four stratigraphic phases have been provisionally distinguished in Area A. Phase 1 includes modern ephemeral frequentation of the hill (see **Table 1**), illustrated by various features such as shepherd fences, fireplaces and modern burials and pits[28]. Phase 2 covers the time span from the definitive desertion of the Early Bronze Age settlement up to the Islamic and modern periods, alternating with long periods of abandonment; the two cairns were erected during this phase.

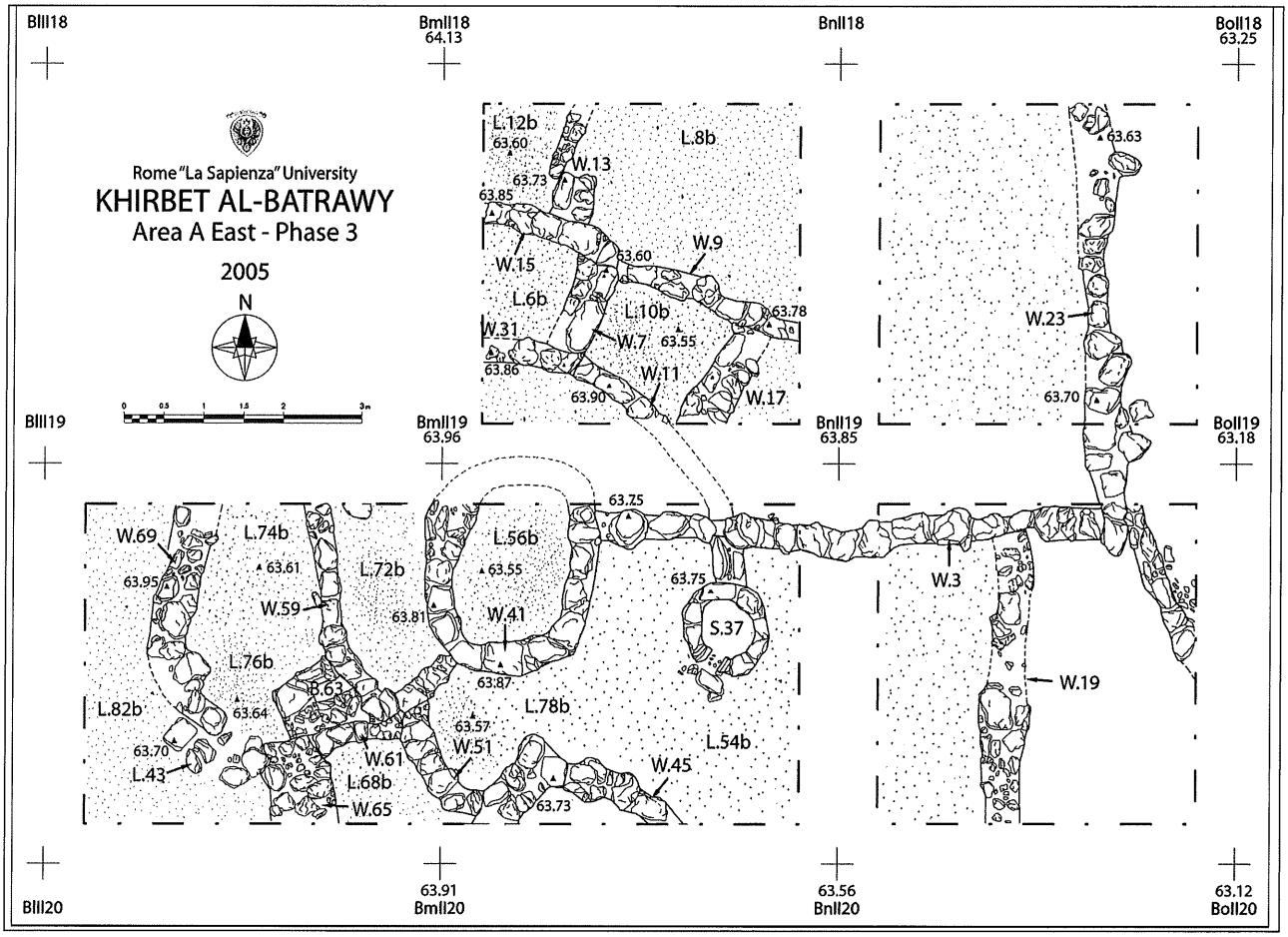
Phase 3 represents the final sedentary occupation of the khirbat in antiquity, when a rural village stood on the summit of the Acropolis and several domestic units were grouped around open areas with various devices and installations. The ruins of this village were filled with an overall stratum of collapsed stones (Activity 3a) and flimsy sandy soil resulting from prolonged abandonment. After its removal, various architectural features emerged (Activity 3c, see below).

Phase 4 groups archaeological deposits and a few substantial structures belonging to Early Bronze III buildings, to date reached only in limited points of the Area[29].

The Village of Period Batrawy IV (Early Bronze IV)

Two separate quarters of the Period Batrawy IV (Early Bronze Age IV) village were uncovered in Area A East and West, respectively. In Area A East (**Fig. 10**) a distinctive feature was wall W.23+W.5[30], a boundary wall which delimited the village to the east in squares BoII18 and BoII19 by terracing the collapsed remains of the underlying town (**Figs. 11 and 12**)[31]. The dwellings consisted of domestic units with main living rooms and several annexed spaces which hosted installations for food preparation and storage such as silos, working platforms, benches and other devices (**Fig. 13**). Distinctive features of these structures were their irregular arrangement around courtyards and lanes, the curvilinear layout of annexes in relation to the main rooms, and the use of single line walls built from irregular fieldstones patched together with mud mortar and limestone chops. In squares BmII19+BnII19 a main domestic unit (L.74b+L.76b) had the entrance opening south-west with a threshold consisting of two juxtaposed slabs (L.43); this was characterized by the presence of a raised flat stone platform to the right of the entrance (B.63). To the east, a series of circular subsidiary rooms, possibly used as storerooms and pens, were grouped between the main domestic unit (L.57) and a courtyard (L.54b+L.78b), where a circular silo (S.37) with a diameter of 86cm, made of stone slabs and dug into the underlying layers, was revealed (**Fig. 14**). The silo opening consisted of two vertical limestone slabs, preceded by a third flat stone embedded in the floor in order to facilitate the filling and emptying of the installation. S.37 leaned on a demarcation wall (W.3), stretching west-east up to W.23. Pottery retrieved in these units (**Fig. 15**) included cooking and preservation wares (hole-mouth jars), distinguished by characteristic enveloped ledge-handles, plastic rope decorations, irregular combed and band-combed decorations, as well as domestic tools (two basalt and flint blades, two spindle whorls

25. Excavations began in Area A East in squares BoII18, BnII18 e BoII19, and were successively extended in squares BnIII19+BmII19.
26. Excavations in A West included the southern half of squares BiII15 and BjIII15, and squares Bi II16 and BjII16; the east-west baulks BiII15/16 and BjII15/16 were removed at the end of the season.
27. For a more detailed presentation of the 2005 excavation results see Nigro 2006.
28. In the last quarter of the 20th century the city of az-Zarqā' expanded to encircle the site on the southern and eastern sides, while a vast limestone quarry was excavated on the hill to the north.
29. The Early Bronze Age III structures were exposed in squares BoII18 and BoII19.
30. In square BoII19, the remains of another sustaining wall (W.19) were uncovered, which was shifted 1m inwards to the west and exhibited the same north-south orientation of wall W.23, though preserved mainly just in the cobble preparation for the foundation of the wall itself. This wall retained a filling (F.18) which provided Early Bronze IIIB and IV pottery materials.
31. Inside this terrace wall there was a filling (F.26) in which Early Bronze Age III and IV pottery materials were found (see *e.g.* amphoriskos: KB.05.A.26/1) as well as three pierced seashells (inventory numbers: KB.05.A.29, KB.05.A.30, KB.05.A.36; Fig. 12).



10. Plan of domestic structures and installations of the Batrawy IV (EB IV) village excavated on the Acropolis of Khirbat al-Batrāwī in Area A East (Phase 3).

and a grinding stone)[32].

North of wall W.3, in square BnII18, there was another dwelling unit with a row of small square chambers (L.6b, L.10b, L.12b) flanking an open space (L.8b; Fig. 16). Cooking and preservation vessels were also found in these units, along with a limestone pestle[33].

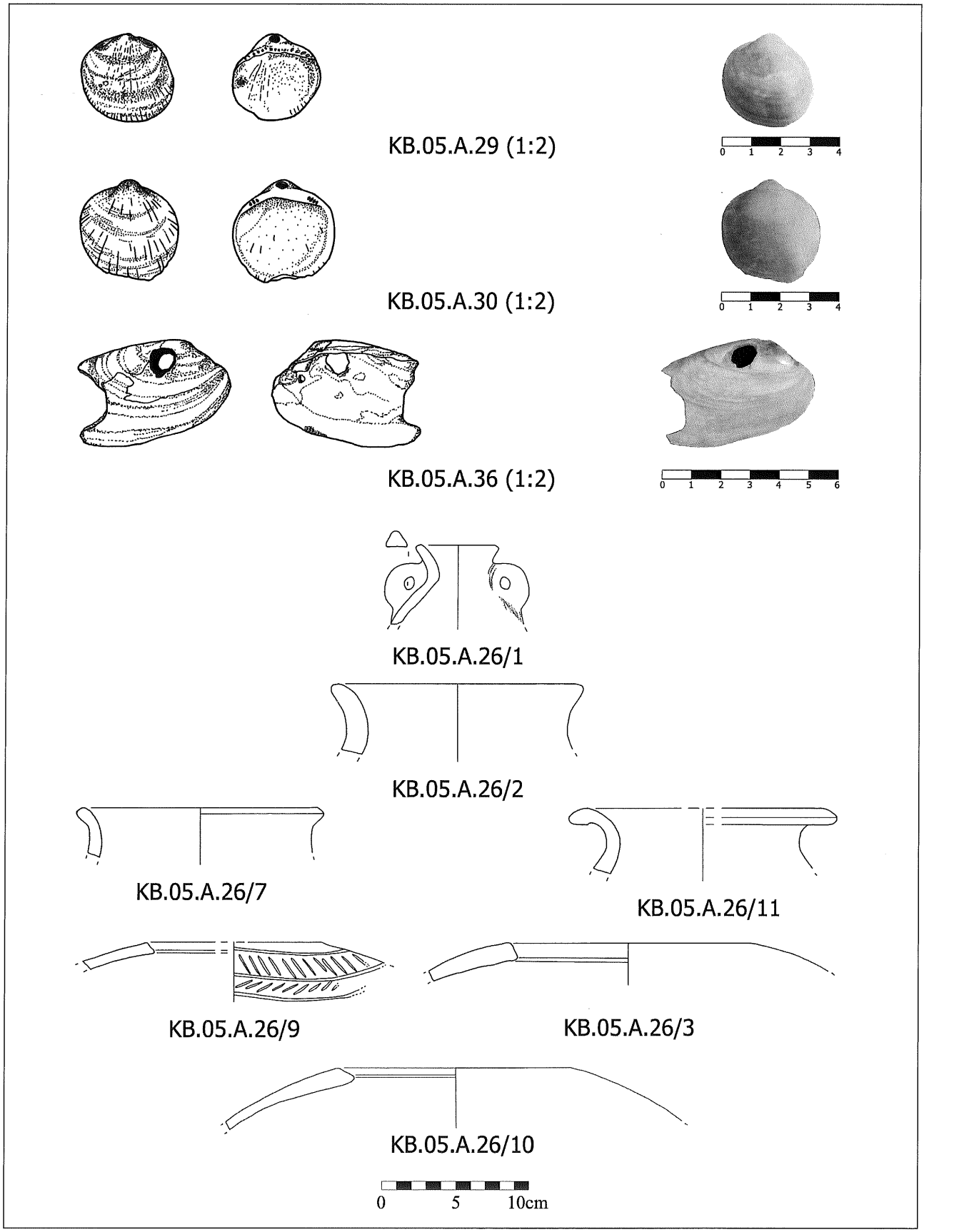


11. The terrace wall W.23 excavated on the eastern boundary of the Batrawy IV village in Area A East (squares BoII18 and BoII19), from north.

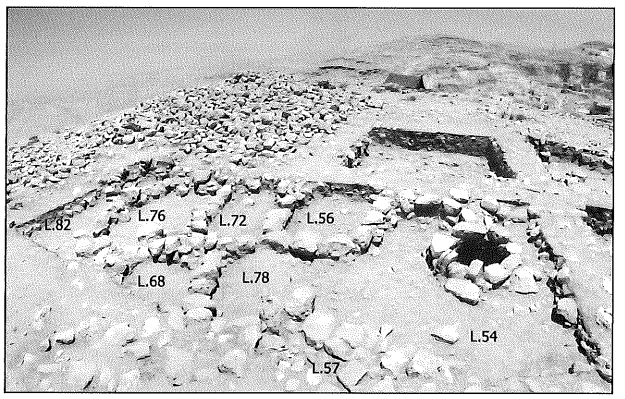
In Area A West (**Fig. 4**) another portion of the Batrawy IV village was excavated in a similar stratigraphic situation (**Figs. 17-18**), including a rectangular (5.80-2.70m) house (L.20) oriented south-east/north-west, with the entrance on the short side (L.226). The walls of L.20 were made of large fieldstones displaced in a single line with their long side across the width of the wall itself. Against the southern wall (W.81) of this house a triple installation was located with two juxtaposed square basins/cists (S.207, S.209) made of vertical limestone slabs, and a third parallel stone to the west. One cist was paved with two flat stones, while the second had a mortar fixed

32. Respectively, KB.05.A.62, KB.05.A.43, KB.05.A.49, KB.05.A.56, KB.05.A.50.

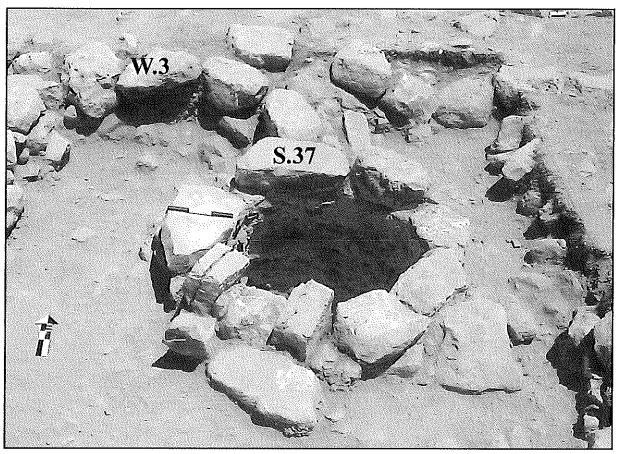
33. KB.05.A.12.



12. The EB III-IV materials retrieved in filling F.26 inside the terrace wall W.23 (Phase 3d).



13. General view from south of the domestic structures and circular devices in the eastern sector of the Batrawy IV (EB IV) village on the Acropolis of Khirbat al-Batrāwī (squares BmII19+BnII19; Phase 3).



14. Silos S.37 in the courtyard L.78b+54b, from south.

into the floor (**Fig. 19**); the third was presumably used to host a vat or other vessel, thus suggesting a tripartite food transformation activity. The western part of L.20 was raised due to the presence of a platform (B.214) introduced by a stone-lined step, with a large big jar smashed over it[34]. In front of the entrance to L.20, a small yard (L.30) introduced the door of another possible unit (L.50). Roughly at the middle of L.30, in front of L.226, a mortar[35] was embedded into the floor. Nearby in the same courtyard a basalt grinding stone and grinder were found[36] along with fragmentary pots and jars with combed decoration. A third house (L.60)[37] was entered through a lane (L.40)[38] and apparently had the same orientation of L.20; the entrance was marked by a stone paved threshold (L.208). Two other rooms were identified to the west: L.70, which was delimited by a major wall (W.213) to the south and by a stone alignment (W.211) which leaned on W.81; and L.80, a curvilinear structure, flanking the rear wall of L.20.

The overall picture provided by Area A is that of a relatively small village with rectangular houses flanked by courtyards and subsidiary structures (many of which are curvilinear in plan) in use for a single constructive phase.

The investigation of lower layers (Phase 4) was carried out in very limited spots of Area A East and revealed the presence of substantial structures of Early Bronze III (Batrawy III), which will be further explored in the next season.

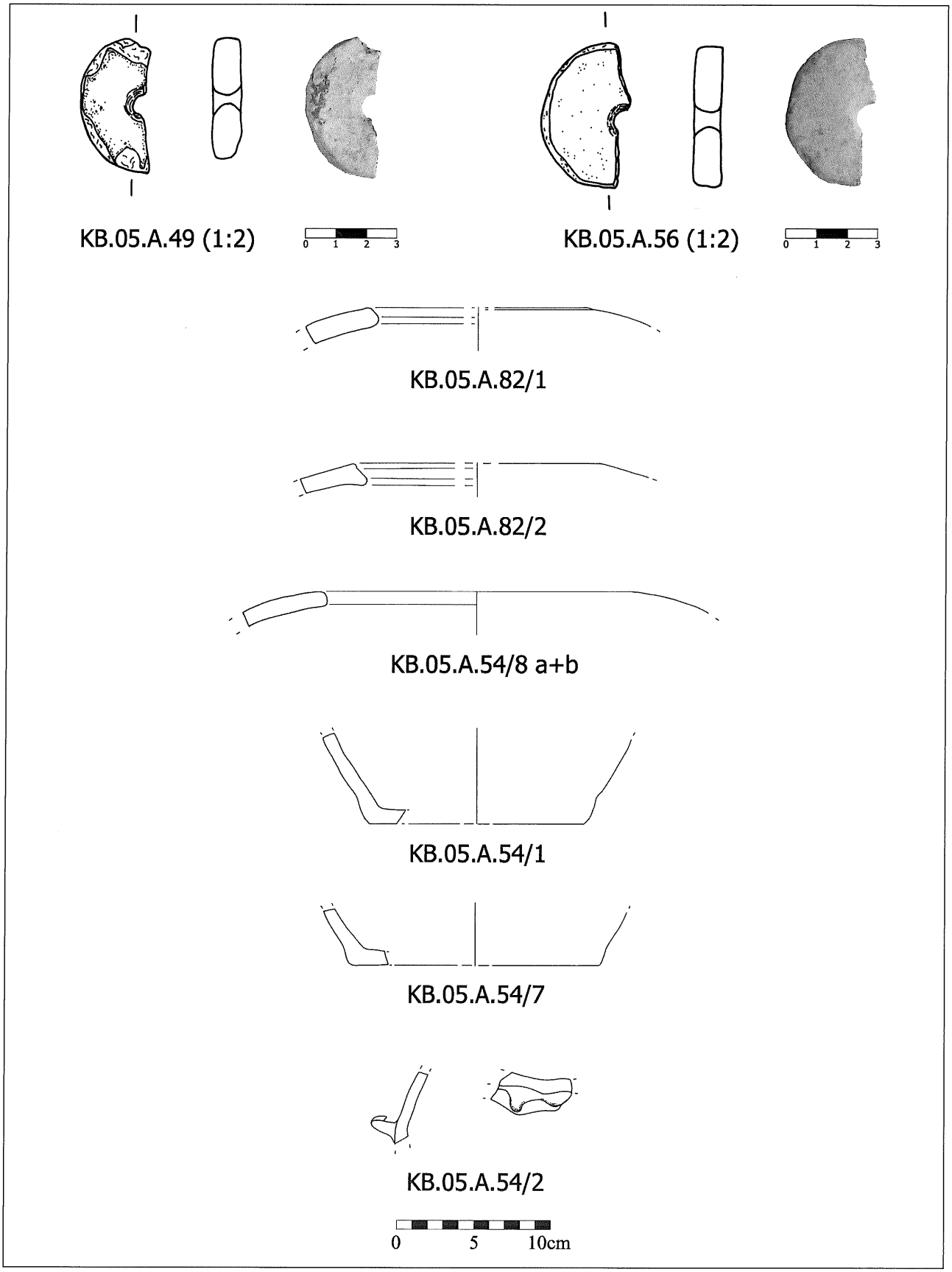
Area B: the Early Bronze III City Wall

Area B was opened on the shallow depression at the centre of the northern edge of the site (**Fig. 5**), where the gentle slope of the bedrock facilitated access to the town and where the city wall seemed preserved at a higher elevation, due to deep accumulation. One trench was excavated across the city wall in squares in BpII6+BqII6 and BpII7+BqII7[39]; a square (BqII8) was investigated to the south inside the city wall, and another couple of squares (BrII7+BsII7) were opened to the east on the outer face of the latter (**Fig. 20**).

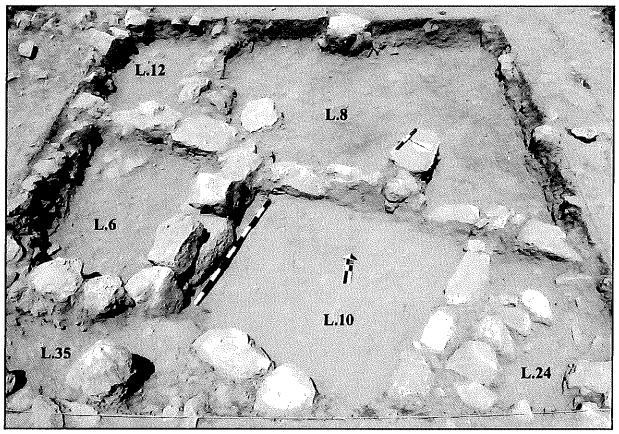
Stratigraphy of Area B

Four stratigraphic phases have been distinguished preliminarily in Area B. Phase 1 illustrates a long period of abandonment during which erosion and windblown activities accumulated a soft stratum of dust (topsoil). Phase 2 includes the foundation, use and collapse of a major Early Bronze IV structure, identified in

34. In L.20 a basalt pestle (KB.05.A.78) has been retrieved, as well as cooking and preservation wares, with plastic rope decorations and enveloped ledge-handles.
35. KB.05.A.69.
36. KB.05.A.57 and KB.05.A.63.
37. A basalt grinding stone (KB.05.A.68) was retrieved in room L.60.
38. A stone pestle (KB.05.A.61) and two combed pottery sherds were found in lane L.40.
39. Due to the thickness of the city wall, the areas actually excavated resulted to be the south-eastern quarter of square BpII6 and the southern half of BqII6 to the north of the wall, and the eastern half of BpII7 and square BqII7 to the south of it. The baulks in between these squares were removed at the end of the season for the sake of a better reading of the major structure.



15. EB IV materials retrieved in rooms L.54b+L.78b, L.56b, L.74b+L.76b and L.82b, squares BmII19+BnII19 (Phase 3b).

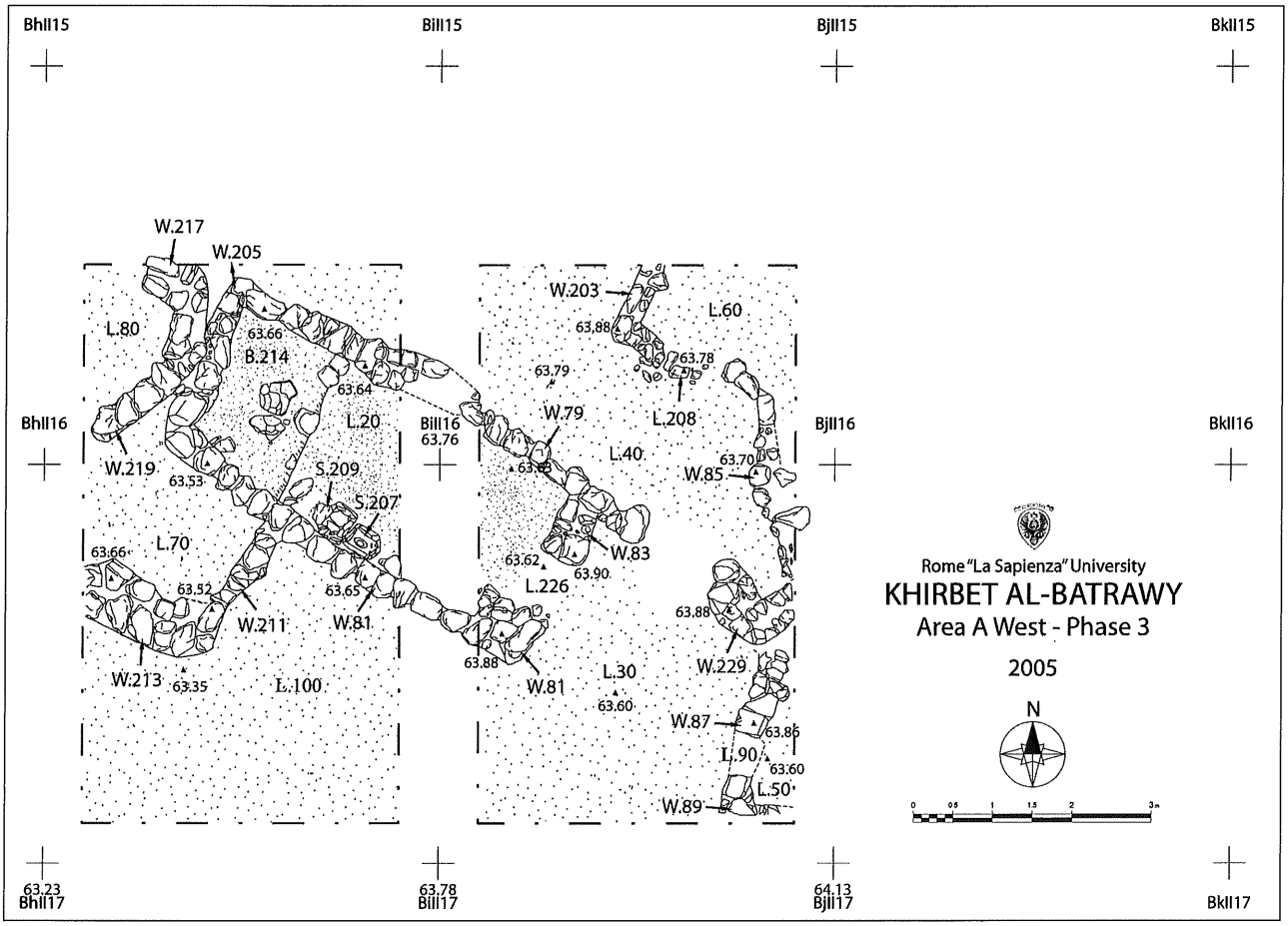


16. The small rectangular rooms of the Batrawy IV village in BoII18, from south (Phase 3).

BqII8, as well as two somewhat earlier pits dug against the inner face of the city wall in BqII7. Phase 3 corresponds to the latest reconstruction (Activity 3c) and use (Activity 3b) of the city wall before the definitive abandonment of the EB III town (Activity 3a). Finally, Phase 4 illustrates the earliest use so far identified of the city wall (Activity 4c), as well as its demise, indicated by a violent destruction (Activity 4b) of which visible signs were detected inside the city.

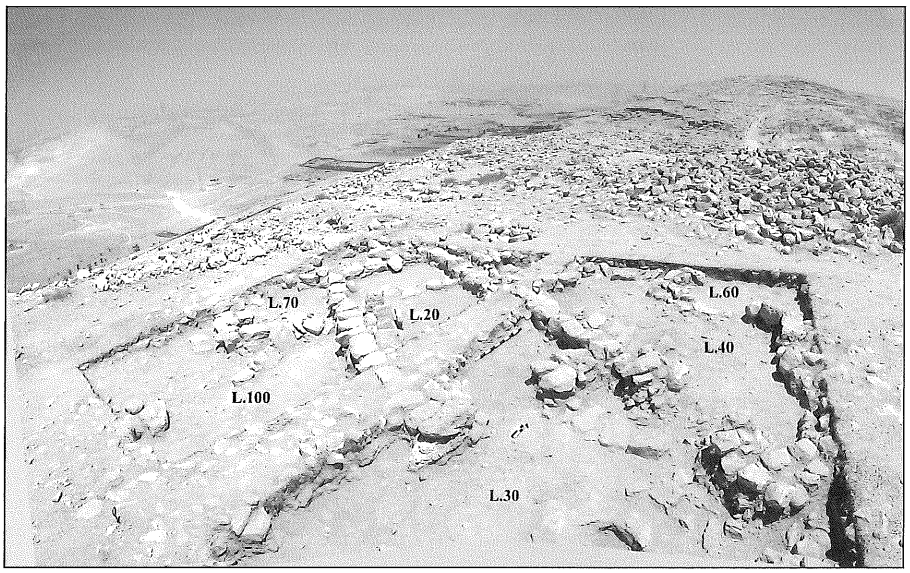
Fringes of the Period Batrawy IV Village (Early Bronze IV)

The uppermost layer of occupation in Area B was represented by the corner of a building built just inside the previous collapsed city wall in square BqII8 (**Fig. 21**), which showed relatively solid field-stone masonry (W.117), and a rectangular stone-paved installation (S.127) within. While inside the building, which extended towards the east, a floor of beaten earth was identified (L.122), and an open area outside to the west with only partially preserved stone-flagged pavement (L.152) had been badly ravaged by later pillage activities[40]. Further to

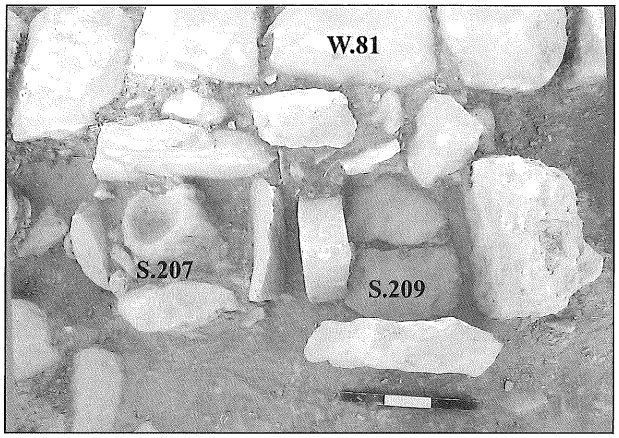


17. Plan of domestic structures of the Batrawy IV village excavated on the Acropolis of Khirbat al-Batrāwī in Area A West (Phase 3).

40. In the south-western corner of the square a curvilinear structure (W.123) may belong to a fence or subsidiary room similar to those excavated in Area A.



18. General view from south-east of the western sector of the Batrawy IV village; at the center, house L.20 and court-yard L.30; on the right, lane L.40 and room L.60 (Phase 3).



19. The two square cist-installations S.207 and S.209, built against the southern wall W.81 of house L.20.

the north-west in square BqII7, two pits (P.129, P.130) were cut against the inner face of the collapsed city wall, probably for use as refuse pits[41]; one was eventually sealed with a pile of stones (F.113; **Fig. 22**).

The City Wall of Period Batrawy III (Early Bronze III)

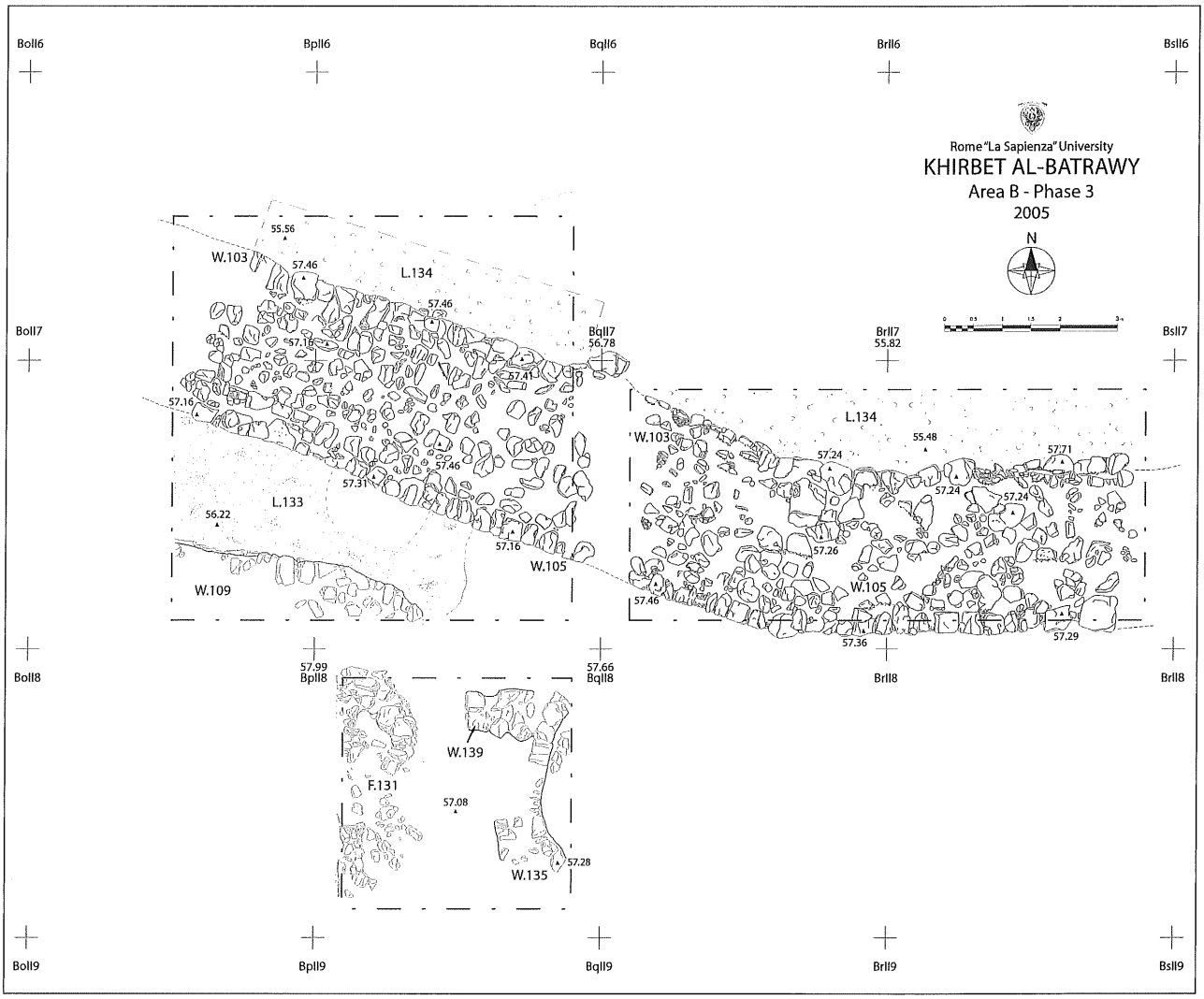
The main feature so far identified in Area B is the massive stone-built city wall, which has been brought to light in two stretches. The city wall was WNW-ESE oriented in the westernmost stretch in BpII6+BqII6+BpII7+BqII7, and turned straight to the east in BrII7+BsII7. The wall was built with slightly battering outer faces made of large boulders in the lower courses, and large stones in the upper ones, blocked with limestone chops and cobbles. The core of the wall was filled in with layers of middle-size stones set in mud mortar. Both on the inner and outer face of the city wall vertical partitions are visible, indicating that it consisted of juxtaposed blocks — typical of defensive architecture of Early Bronze Age Southern Levant in order to withstand earthquake effects. The width of the wall varies from 2.90 to 3.20m, and its preserved height reaches 2.0m. It shows at least one major reconstruction of the elevation, when the inner partition in separated blocks was abandoned (**Fig. 23**).

In BpII7+BqII7 another massive structure (W.109) was revealed and preliminarily interpreted as a wall parallel to the city wall, turning south (inside the city)[42]; the corridor between the two walls was filled in with layers of compacted earth and collapsed stones (F.106, F.118) from the superstructures of both the city wall and wall W.109 (the latter collapsed northwards). Under this stratum of stones, a layer of destruction (F.124) covered an earthen floor (L.133), illustrating the later use of these structures (Phase 3; **Fig. 20**).

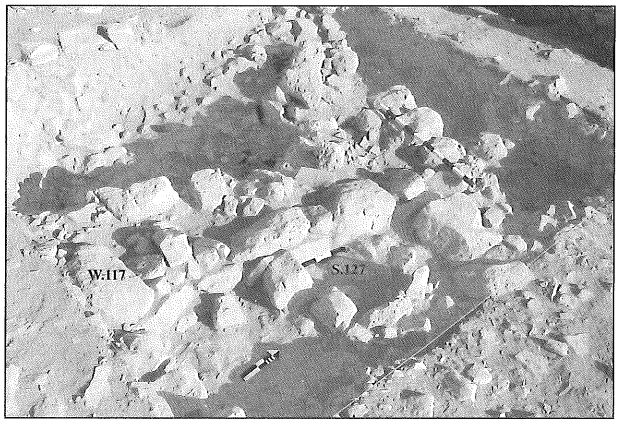
The removal of floor L.133 led to identification of a destruction layer (F.136, F.146) which was basically composed of sandy soil with ash

41. Ceramic materials from these pits resulted from the underlying earlier layers of Batrawy III; pottery sherds were highly fragmentary.

42. The collapsed prosecution of W.109 in BqII8 shows very clearly that the wall turned decisively southwards.



20. Plan of the fortifications and structures of Phase 3 (Batrawy IIIb) excavated in Area B.



21. The fringes of the Batrawy IV (EB IV) village in Area B, with building W.117 and the stone-paved installation S.127 in BqII8 (Phase 2), from south-east.

and charcoal, thus attesting to the fierce fire which brought to a violent end the life of Phase 4 city. The layer of destruction covered a fine plastered floor (L.148) which at the present state of investigations is the earliest floor brought to light inside the city (Phase 4, **Fig. 24**).

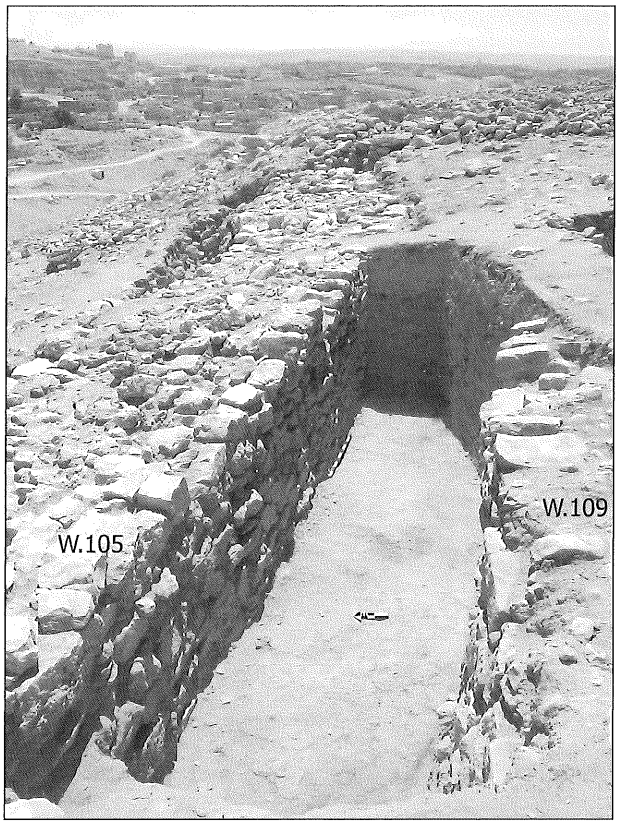
Archaeological deposits outside the city wall were investigated in BpII6+BqII6 (west) and in BrII7+BsII7 (east). In the former trench the heap of collapsed stones (F.111) was higher and thicker than inside the city wall, thus demonstrating that the latter collapsed northwards; the largest boulders, fallen from the outer face of the wall, were found at the bottom of the heap, while small and medium size stones were on top. A thin layer of soil (F.112) was accumulated below the stones, corroborating the observation that the city wall fell abruptly northwards; beneath F.111 and F.112 there was a floor of beaten earth (L.134) laid upon a preparation of



22. *The two pits (P.129, P.130) cut against the inner face of the collapsed EB III city-wall in BqII7 (Phase 2), from east.*



23. *General view of Area B from west with the EB III fortifications and the structures of Phase 3 excavated in BqII8.*



24. *The earliest fine plastered floor (L. 148) excavated inside the EB III city-wall in BpII7+BqII7 (Phase 4), from west.*

limestone chops (F.140; **Fig. 25**)[43], which presumably represents a major constructive phase (the last?) of Batrawy III defences. Underneath the layer of fragmentary stones there was a grey sandy filling (F.138) which covered a packed stratum of reddish clayish soil (F.142), including scattered pottery sherds. This stratum was laid upon a gritty chalk plastered floor (L.144) resting directly on the bedrock (**Fig. 26**).

In BrII7+BsII7 the same stratigraphy was encountered. The uppermost heap of collapsed stones (F.107, F.110) covered the eastern prosecution of floor L.134, resting on the preparation of limestone chops F.140. Excavation along the outer face of the city wall revealed the lowest courses of boulders of this imposing structure founded on the bedrock and slightly abutting off in order to strengthen its outer foot.

The overall plan and elevation of the city wall in Area B exhibit a massive stone structure with an articulated layout, including changes in orientation and offsets, depending both on the orography of the khirbat and on defensive purpose, which can be compared with the fortification of a series of hilly urban centres of Southern Levant such as Khirbat az-Zayraqūn and Tall al-Ḥuṣn (Pella) in Transjordan, or Khirbat al-Makhruq, Tall ('Ayy), Tall Ta'annek, and Khirbat Yarmouk in Palestine.

Structures Inside the City Wall of Period Batrawy III (Early Bronze III)

In BqII8, Period Batrawy III was represented

43. The layer of small limestone fragments was exposed for a too restricted area to establish if they actually represent a regularization of collapsed stones, or a real preparation for floor L.134.

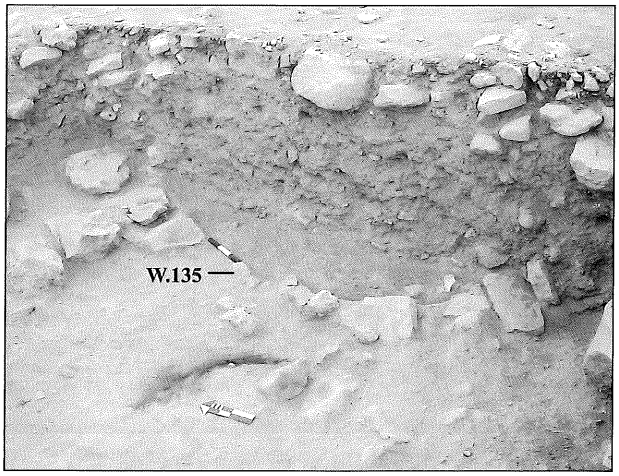


25. *The preparation of limestone chops F.140 of the floor of beaten earth L.134, excavated outside the city-wall W.103 in BpII6+BqII6 (Phase 3), from west.*



26. *The chalk gritty plastered floor L.144 excavated outside the city-wall W.103 in BpII6+BqII6 (Phase 4), from north-west. To be noted the lowest courses of boulders of the city-wall founded on the bedrock and slightly projecting off.*

by the southern collapsed prosecution of W.109, and by a round structure W.135 (**Fig. 27**) discovered in the eastern half of the square, which was characterized by an 8cm thick, well-refined plaster inside (a silo?). No floor has yet been reached in this square, and various ceramic materials were found in the filling (F.132; **Fig. 28**).



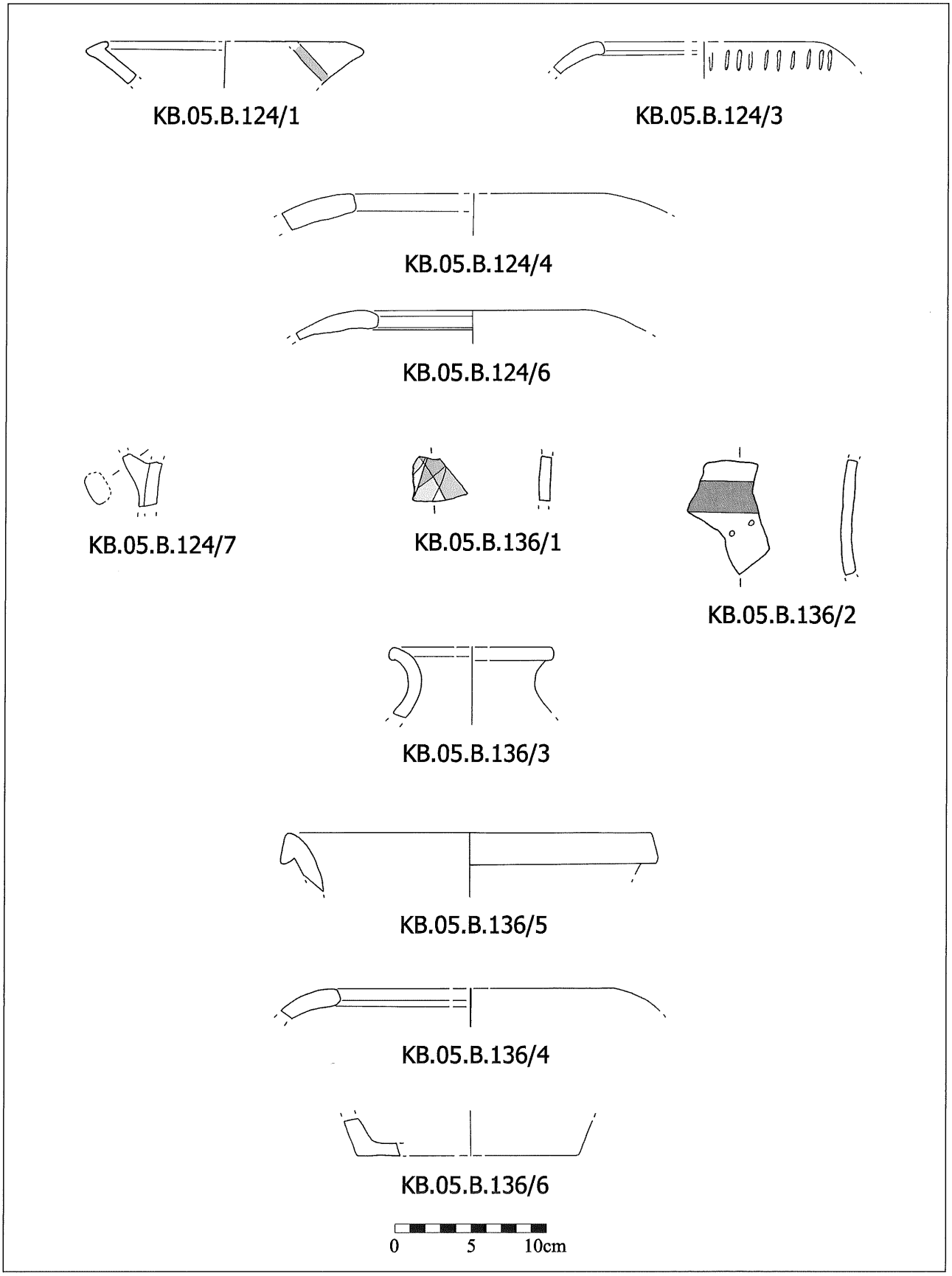
27. *The semicircular structure W.135 in BqII18 (Phase 3), from west.*

Conclusions

The first season of excavation at Khirbat al-Batrāwī confirmed that this site was a major Early Bronze Age centre of the Upper Wādī az-Zarqā' basin, occupied by a fortified town in the Early Bronze III and reoccupied by a village in the Early Bronze IV with almost no successive superimpositions or occupations[44].

Located on the roadway connecting the Black Desert of basalt stone (and the caravan tracks crossing it north-south towards Arabia and Syria, and west-east towards Mesopotamia) of

44. It is to be noted that of all the EB II sites of the az-Zarqā' Valley (Jabal Ruhayl, Tall as-Sukhna North, Tall al-Bπra), Khirbat al-Batrāwī is at the moment the only one which shows the presence of EB III materials and structures, very rare in the surrounding area (Jabal Ruhayl, for instance, was occupied in the EB II, and then abandoned and re-occupied in the EB IV; Palumbo *et al.* 1996: 385-386, 393-401).



28. EB III ceramic materials retrieved in the filling F.132 in BqII8 (Phase 3).

north-eastern Jordan to the trails of the az-Zarqā' and Jordan Valleys, al-Batrāwī controlled a strategic junction at the time of the earliest urban development of this region, while at the same time being centrally situated with respect to the Upper Wādī az-Zarqā' basin, a fertile ecological niche at the fringes of the semi-arid steppe. The site thus seems highly promising, especially since it flourished fully during the Early Bronze III, thereby filling a certain gap in the archaeological information so far available from the region. Deeper and wider investigations are of course needed to confirm the preliminary data illustrated in the present contribution. In any case, the systematic excavations begun the University of Rome "La Sapienza" in cooperation with the Queen Rania Institute of the Hashemite University of Zarqa, under the aegis of the Department of Antiquities of Jordan, will hopefully not only contribute to thorough knowledge of its history and material culture, but also offer the opportunity to rehabilitate it for tourism valorisation of the area.

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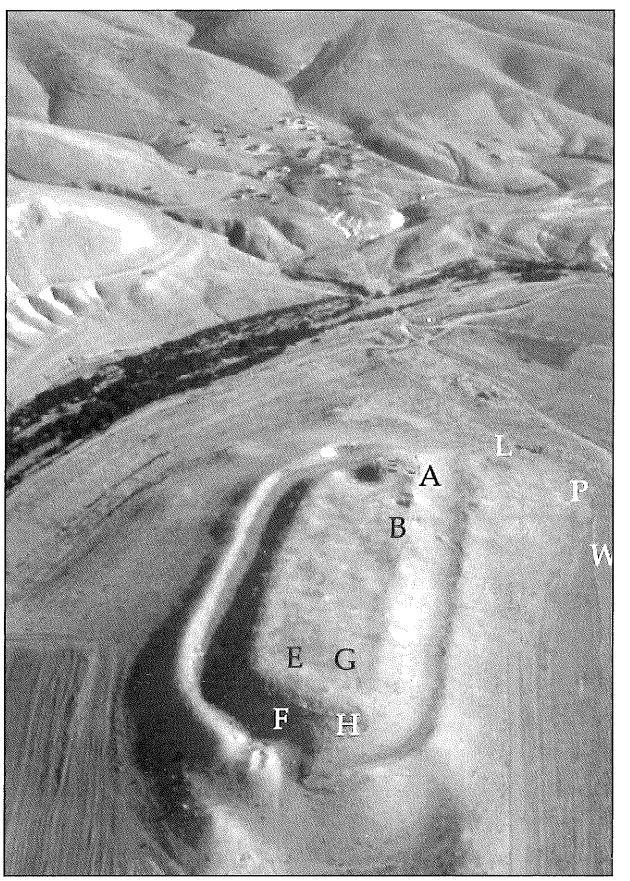
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EXCAVATION AND SURVEY AT KHIRBAT AL-MUDAYNA AND ITS SURROUNDINGS
PRELIMINARY REPORT OF THE 2001, 2004 AND 2005 SEASONS

P. M. Michèle Daviau, Robert Chadwick, Margreet Steiner, Michael Weigl, Annlee Dolan, Zoĕ Mcquinn, Noor Mulder-Hijmans, Margaret A. Judd and Jonathan Ferguson

Introduction

As part of its regional study of the Wādī ath-Thamad drainage area, archaeological excavation was carried out at both the fortified Iron Age town and the Nabataean-early Roman settlement at Khirbat al-Mudayna from July 1–August 10, 2001, June 28-August 6, 2004 and June 20–July 28, 2005. The project was directed by Dr. P. M. Michèle Daviau with Robert Chadwick, Assistant Director. Team members included scholars, volunteers and students from Canada, the United States, Mexico, the Netherlands, Austria, Germany, Iran and Jordan. Eighteen local workers also assisted us with our work each season[1]. This report will present the results of excavation in Fields A+C (north), A (south), B and E on the mound, and of work in Fields L, P, and R+W at the foot of the site (**Fig. 1**), along with a report on two survey projects including documentation of cemeteries and burials, and mapping az-Zūna and Qaṣr az-Za'faran. A note on a special find completes this communication.



1. Khirbat al-Mudayna, looking northeast; courtesy of Kennedy and Bewley APAAME 34/19.

Fields A + C North (Robert Chadwick)

The past seven seasons of excavation at the north end of Khirbat al-Mudayna can be divided into two phases: during Phase I (1996-1999) a six chambered gate (North Gate 100; Chadwick *et al.* 2000: 257-270) was completely excavated, along with two towers, and a plaza with a gate shrine; in Phase II (2001, 2004, 2005), five stone silos (Daviau 2006), a stone-lined drain, and six retaining walls were exposed to the north and east of the gate.

Structures north of the North Gate 100

The principal research goal in Field A during Phase II was to locate the road that enabled people to reach the summit of Khirbat al-Mudayna from the wadi some 30.00m below. To the north of the gate entrance, the topography of the mound[2] drops vertically nearly 20.00m over

1. The Wādī ath-Thamad Project is sponsored by Wilfrid Laurier University, Waterloo, ON, Canada, and funded in part by the Social Sciences and Humanities Research Council of Canada. Additional funding is provided by friends and colleagues and by the volunteer programme.

2. Although it contains several phases of human occupation, Khirbat al-Mudayna is not a *tāll* in the traditional sense of the word, but a geological formation which has several occupation layers dating from at least the end of the 9th century BC.

a short horizontal distance of only 24.00m. Because of this steep slope, a pedestrian access or vehicular roadway directly in front of the gate appears unlikely. The area immediately east of Tower 1013, particularly where the vertical drop is less pronounced[3] and there is access to the surrounding moat, appears more promising.

Structures below the Vorplatz Surface[4]
Immediately north of Gate 100 is a Vorplatz or forecourt area, ca. 8.50 x 13.50m in size, with a stone threshold (A4:23) and door jamb (A4:24), all elements of a single construction phase. Beneath the beaten earth and cobble surface (A4:30) of the forecourt, which extends in front of East Bastion 1000 and West Bastion 1500, an earlier horizon (Stratum IV) was exposed with the discovery of five stone-lined in-ground silos. Although vertical in spots, the silo walls were slightly battered from 7° to 18° towards the interior of each structure. The number of preserved stone courses varies from 12 to 14, with a maximum depth of 2.36m. Although the topmost stones of all five silos (S4, S17, S20, S50, S59) were exposed in 2001, only one quarter of Silo 50 was excavated because part of it is situated under Threshold A4:23. In subsequent seasons, three other silos (S4, S17, S59) were completely excavated, studied and refilled[5].

Silo 4 (**Fig. 2**): Silo 4, located 1.00m north of Bastion 1500, abuts Western Tower 1519, part of which forms its western wall. The uppermost stones of the rim of Silo 4 touch/abut the top stones of nearby Silos 50 and S59. This seems to indicate that most of the silo walls were in-



2. Stone-lined silos outside Gate 100; Silo 4 (background), Silo 59 (foreground).

tact when found. In 2004, Silo 4 was excavated to bedrock; the interior wall surfaces contained patches of mud and chaff plaster (C93:10) that was probably intended to be rodent and insect proof[6]. This plaster was harder than the more common lime plaster[7] on wall surfaces in the gate and the industrial buildings at the site. In the silo, the fill layers contained pottery earlier in style than that of Gate 100, along with a limestone fragment containing an inscription (Weigl 2006).

Silos 17 and 20: (**Fig. 3**) Silo 17, located 3.50m north of Threshold A4:23, has an interior diameter is ca. 3.50m. Silo 17 was completely excavated to bedrock (2005). This silo and S20 to the east were both constructed prior to retaining Wall 1046 which runs over these silos.

Silo 59: Directly south of Silo 17 is another silo

3. However, despite the reopening of five squares on the northeast, no evidence of a roadway was found by end of the 2001 season.
4. Square supervisors were Ian Baird (2001), Faith Boughan (2005), Lars Christensen (2001), Christina Craig-Paul (2001), Kendra Drever (2004), Steven Edwards (2004, 2005), Adrienne foster (2005), Amleet Mangat (2004), and Tracy Scott (2004).
5. Part of a sixth silo was discovered in Field C at the end of the 2005 season, and plans call for it to be excavated in 2006.
6. The silo mud based plaster contains a mostly chaff and sand as temper (with the occasional very small pebble). The phasing of Tower 1519 in relation to the silo seems to indicate that west Tower 1519 was built before Silo 4. However, Square Supervisor Amleet Mangat notes in her final report; "the plaster may support the idea that the silo was built at a later date because the plaster (C93:10) on the north and south walls continues onto the west wall (Tower 1519) in the places that the walls abut. Therefore, it appears that C93:10 is a plaster layer that is earlier than the plaster layer on tower 1519 (C93:17) as it appears to overlap C93:17 in the two places the north and south walls abut the west wall."
7. In this report, the terms mortar and plaster will be used in the following manner: mortar is a mud based material containing organic and or non-organic temper such as chaff, sand or gravel, used to bond stones or mud-bricks together, plaster may have the same ingredients as mortar but includes lime and is used to cover and seal surfaces such as walls and floors. It should be noted, however, that it is not of the same composition as the waterproof plasters used in Building 200 of Field B, which are specifically hydrofuge in nature, and were used to control and contain the flow of liquids.



3. Plan of North Gate 100 with silos and retaining walls.

(S59). In 2001, half of this in-ground structure was excavated to bedrock. The boulder-and-chink walls were standing 12-14 courses high and are battered 18 degrees from the vertical; they consist of one row of medium cobbles and small boulders. The silo contained several layers of ashy soil, some mud material, animal bones, clay oven fragments, and 556 Iron Age II potsherds. The interior dimensions of Silo 59 vary from 3.30-3.80m wide by 2.47m deep at its deepest point. Total estimated capacity is approximately 22.00m^3.

Silo 50: Silo 50 was also located underneath the hard forecourt surface suitable for pedestrian traffic. This silo measures ca. 3.50-3.75m in diameter; the exposed portion that is not under the entrance ramp extends north 2.15m forming a three-quarter circle while the southern part extends under Threshold A4:23 and the benches (B1517+B151) north of Bastion 1500. Comparable to the other silos, the wall of Silo 50 was constructed of a single row of medium to large cobbles, 12-13 courses high. Because it was footed on sloping bedrock, the number of courses varied with fewer on the south side and more on the north. Inside the silo, a hard mud plaster (A4:56) sealed the gaps between the stones. About one quarter of Silo 50 was excavated to bedrock reaching a depth of 1.63-1.83m. Tilt lines indicate the direction from which soil and ash with some mud inclusions and broken pottery was dumped into the silo. However, there was no preserved evidence for any kind of cover or roof structure over the silos, leaving it unclear whether or how they were sealed.

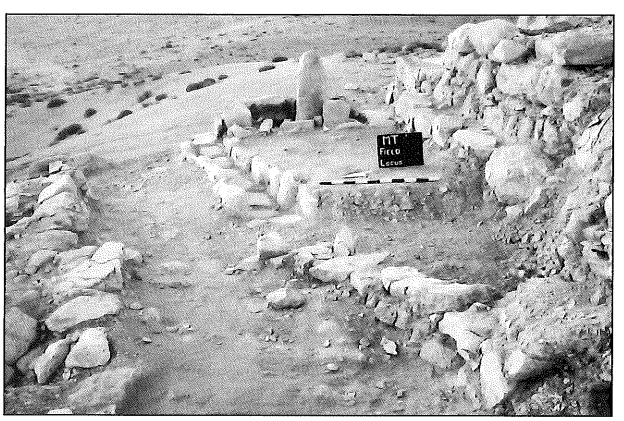
The four silos excavated to date all follow the same construction techniques and were footed on bedrock resulting in irregular bottom surfaces that conformed to the slope of the mound. Oven fragments found in Silos 59 and S17 suggests that one of these silos may have been vacant for a time, since the silo wall served as a windbreak. Eventually all the silos were filled in preparation for the beaten earth and pebble Vorplatz surface (A4:30) and the beginning of a new architectural phase (Stratum IIIB) on the mound at Khirbat al-Mudayna.

Between the silos, a section of drain (A12:13) associated with the Vorplatz runs parallel to

the front of Tower 1013 for 4.50m, stopping abruptly just before the terrain drops off east of the tower (**Fig. 4**). This drain segment does not connect with Drain 104c which runs along the central road through the gate, making it unclear what happened to the water after it passed under Threshold A4:23. At the same time, Drain A12:13 flanks a small plaza directly in front of East Tower 1013. Here was a bench and a niche that supported a pair of standing stones, (loci A12:28, north, and A12:17, south), preserved 0.60 and 1.05m high respectively. The two vertical stones abut a large, 1.30m long, horizontal monolith (A12:16). In their form and location in front of the tower, these standing stones resemble massebot found elsewhere in the Levant (Zevit 2001: 256-262) and suggest a cultic function.

Retaining walls east of Tower 1013

East of Tower 1013 is a series of three retaining walls (W1049, W1050, W1051). All three are dry-laid, boulder-and-chink construction. Because Tower 1013 is located at the summit of a steep 22–25° slope, it is clear that these stone retaining walls were designed to stabilise the tower as well as to control erosion. To the south, Wall 1052 runs in a straight north-south line, east and below outer Casemate Wall 2001. Wall 1052 was positioned very close to the steep (up to 25°) slope of the mound to the east of Casemate Wall 2001 that curves sharply to the south around the gate. Wall 1052 is 2-3 courses high and 2 rows wide, built in dry-laid, boulder-and-chink construction.



4. Gate shrine and drain to the left of Tower 1013; W1046 on the left; after Daviau and Dion (2002).

The Pedestrian[8] Vorplatz

Features north of Gate 100 and contemporary with it (Stratum IIIB) include the beaten earth and gravel surface (A4:30) which sealed against the main entrance, Threshold A4:23. Similar surface material, found sealing against east and west Bastions 1000 and B1500, is consistently found on top of a 0.20 to 0.30m thick layer of angular pebbles and small cobbles, footed on a layer of yellowish brown (10YR 5/6) or reddish (10YR 6/8) soil. Running east-west along the north edge of the Vorplatz is a dry-laid boulder-and-chink wall (W1046) consisting of 2-3 rows and at least two courses of large cobbles and small to medium boulders; Wall 1046 varies from 1.00-1.25m in width and is battered on its northern edge about 5°. A small portion of this wall was first exposed in 1999, with wider and longer sections exposed in subsequent seasons. The stones of Wall 1046 were built up and over the wall of Silo 17 on both sides. In order to strengthen the perimeter wall inside Silo 17 and to act as a support for Wall 1046, the northern half of the silo was filled with large cobbles and boulders. Wall 1046 served as a retaining wall built to support the soil and fill of the Vorplatz area. This wall and the beaten earth and pebble surface it retains are lower than the entrance to North Gate 100, meaning that the surface in front of the gate sloped gently towards the north.

Northeast Pavement and Stepped Stone Structure

Beginning at the east end of W1046 is a paved surface (A22:5+A21:3), 5.08m long x 1.08-2.28m wide that slopes to the north on a 16-20° slope. At its south (upper) end, this pavement begins north east of the cultic niche, while down slope to the north it ends abruptly at Bedrock A21:4, which continues west for over 14.25m across much of the northern end of the mound. Pavement A22:5 seals against a parallel north-south retaining wall (W1059), which begins at the same point as the pavement and continues

8. This surface is referred to as "pedestrian" because Threshold, A4:23 contains horizontally laid monoliths (forming door jamb A4:24) which extend for 3.73 m across the entrance of North Gate 100 between Walls 1001 and W1501; among these monoliths, Door Jamb A4:24 stands vertically up to 0.25m above the entrance surface. This would have prevented wheeled traffic from entering the town.

for almost the same distance down the slope. Retaining wall 1059 was made of small and medium cobbles and remains standing 0.15-0.78m in height and 5.38m long. Both the pavement and the retaining wall are dry-laid, boulder-and-chink construction and are situated 2.65m northeast of the egress of Drain A12:13, and it may be that they fulfill some kind of combined architectural function.

It is tempting to conclude that the sloping pavement is a section of the long sought-after roadway leading to the gate. However, there are problems with this interpretation since the excavated section of pavement is short and does not continue west towards the main gate entrance, which is more than 8.00m away. In addition, the lower or northern end of the pavement does not continue either east or west at the bottom of the mound; it simply ends on bedrock. Finally, with a declination of between 16 to 20°, the pavement appears to be too steep to be practical for a roadway.

The Stepped Stone Structure and its Retaining Walls: To the west of Wall 1059 (in Square A11) are two parallel retaining walls (W1057 and W1058) which extend west ca. 10.00m. Wall 1057 is only one row wide and from 1-3 courses high in some sections; its height varies between 0.15-0.78m. On both sides of this wall is a massive stone fill (A2:11) or capping designed hold the slope in place and to prevent erosion[9]. Farther to the north is the second retaining wall (1058) composed of rectilinear stones that appear to have been placed just above bedrock. Like Wall 1046 on the crest, these retaining walls, the pavement and Retaining Wall 1059 form a complex of installations designed to support the built up earth/cobble layers in front of the gate and prevent erosion. At the same time, this support structure does not appear to have fulfilled any defensive role. This system seems to have worked well over the millennia since the plaza has maintained its shape with only minor damage from erosion until modern times.

Area A Inside the Town (Margreet L. Steiner) In 2001 and 2004, the area behind the gate (Squares A7-10, 17-20) was explored further and parts of Courtyard 150, Temple 149 and Building 140 were excavated to bedrock[10].

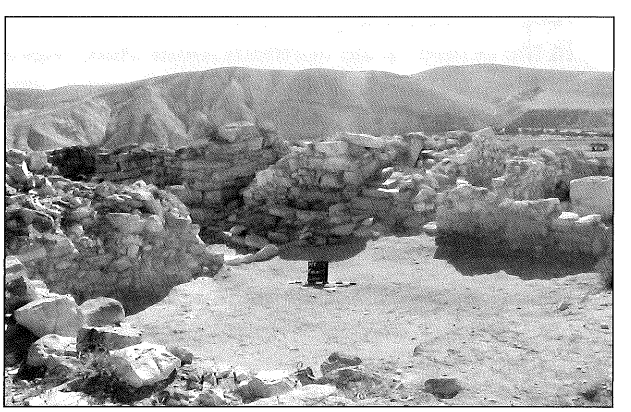
Courtyard 150 (**Fig. 5**)

Four surfaces were exposed and their relationships with architectural features of the gate and with Temple 149 were clarified. In our description, each surface constitutes an occupation phase.

Phase 1: The first phase on the west was the construction of Surface A7:38/39 in Courtyard 150, sealing against west Wall 1511 and possibly gate Wall 1505. Two benches were found in front of these walls. Surfaces and architectural features were built partly on bedrock and partly over a fill immediately above bedrock.

Phase 2: On top of a second surface (A7:33) were south Threshold A7:20, directing water into Drain 104c inside the gate, as well as the lowest step A7:40 of the staircase (or of an earlier staircase that lead to the upper storey room above Gate Room 103), and east Wall 1053. This surface also sealed against Walls 1511 and W1505, as well as the benches in front of them.

Phase 3: Superimposed Surface A7:30 is connected with a raising of the south threshold



5. Courtyard 150, looking east with Gate 100 on the left.

9. These stones appear to have been tossed haphazardly down the slope, although others are clearly in place above the soil of the mound itself. Disturbance of these stones may have been the result of the collapse of the upper stories of Gate Building 100 at the time of its destruction.

10. Margreet Steiner and Christopher J. Gohm were Field Supervisors in 2004; Square Supervisors were Annlee Dolan (2001), Denise Duling (2004), Paige Glenen (2004), Christopher Gohm (2001), Julie Parent (2004), Susanne Scott (2004), Dyan Semple (2004), Elod Hodossy-Takacs (2001).

(A7:20) of Gate 100 and of Bench 1011 in the central road (S104), and the building of north-south Wall 1036 (above W1053). This surface sealed against Walls 1505 and W1511, but ran over the courtyard benches.

Phase 4: The highest courtyard surface found was A7:13, sealing against the west wall (W1036) of Temple 149 and against the threshold and staircase of the gate, and of course against Walls 1505 and W1511.

The building of Temple 149 and Alleyway 109 (Daviau and Steiner 2000: fig. 2) in the third phase caused a major refurbishing of Courtyard 150 as well, with a raising of the threshold in the gate, the disappearance of the benches against Walls 1511 and 1505, and the building of a new staircase with a new bench against it.

Building 130 (**Fig. 6**)

Work started under the temple by digging through Floor A17:80 and the construction surface (A17:82) below it. The remains of earlier walls and surfaces of Building 130 were then exposed in the northern half of Square A17. Here several sub-phases could be discerned as well.

1) Above the bedrock and subsurface levelling, the earliest surface of consists of a beaten earth floor (A17:111) that seals against north Wall 1056 (under staircase Wall 1032) and against inner Casemate Wall 2002[11]. East-west Wall W1054 was built on top of Surface A17:111 separating the area into two "rooms". In the centre of the northern room there was a stone working platform (A17:124) and a clay bread oven (A17:116). On the east, a stone-lined bin (A17:121) was built up against the casemate wall, while Surface A17:111 extended west into Courtyard 150 (as Surface A7:38). Above this floor (A17:111), there was a superimposed beaten earth surface (A17:108) which was subsequently covered by a fill layer (A17:103).
2) Fill A17:103 is a layer of brown pebbly earth on which two north-south walls were built, west Wall 1053 and central Wall 1055, which divided the northern area into two rooms (R111, R112); southern Wall 1054 remained in use. Above the fill layer, a beaten earth surface (A17:103+105) was laid, that sealed against all walls, including northern wall (W1056). On top of Surface A17:103, a new surface was laid on both sides of Wall A17:86: A17:84 and 88/100.
3) The walls of the second phase were levelled and only one course of both Walls 1055 and W1053 remained. A new surface of beaten earth (A17:82) was then laid, sealing up against the casemate wall and against north Wall 1056. This layer was used as a construction surface for the building of Temple 149. The north wall of the temple (W1033) and the pillars were built on this surface, as was western Wall 1036 (above W1053). The southern temple wall (W1035) seems to have been already in existence as part of Building 140 and was re-used for the temple building.
4) Phase 4 represents the use phase of Temple 149 and of Alleyway 109, giving access into the north room (R110) of the temple. Over time, a series of superimposed surfaces built up in Alleyway 109, with the result that there were two stairs leading down into Temple 149. Alongside north Wall 1032 there is a 20.0cm wide strip of loose earth with a limestone water channel (A17:33) embedded in it to collect water from above, possibly from the roof of the staircase at the south side of the gate. This drain directed this water westwards, possibly into the drain through the gate.

Building 140 (**Fig. 6**)

In 2001 and 2004, the area south of Temple 149 and Courtyard 150 was intensively investigated and a complete building (B140) was exposed; only the plan of the final phase has been retrieved. This plan revealed a building measuring 10.00 x 6.50m, with floors of beaten earth. It was entered from Courtyard 150 through an L-shaped stone ramp. This ramp overcomes the difference in height between the level of the uppermost surface in the courtyard and the floor in Corridor 113 (**Fig. 7**), which provides access to two large rooms (R114, R115) on the north, and a series of smaller rooms on the south. These an-

11. A doorway between Wall 1056 and the casemate wall led into Alleyway S107 which gave access to Casemate Room 106. However, this doorway was already blocked in this phase.

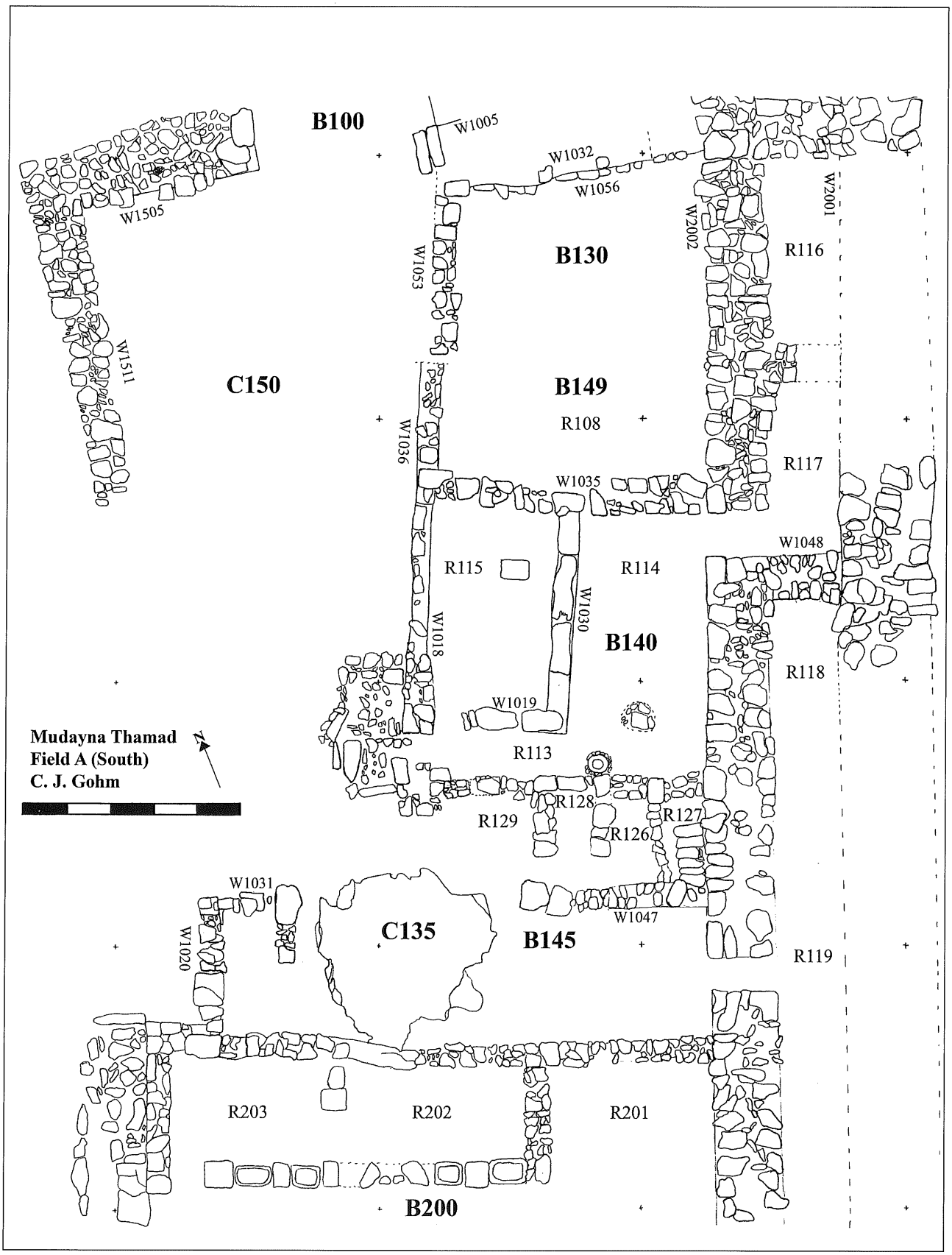


Fig. 6. Plan of Field A-south, showing Courtyard 150 and the area (B130) below Temple 149. Buildings B140 and Cistern 135 are to the south.



7. Field A-South, Building 140, Corridor 113 with boulder mortar; Storage Bin R128 to right of mortar.

nexes on the south side include Staircase R127 leading up to an upper storey or the roof, and a small Room (R126) leading to a large stone bin (R128). Thus Corridor 113 led into every part of the building as well as into Casemate room R118. Only storage bin R128 could not be reached from Corridor 113. The eastern end of Corridor 113 is actually part of Room 114. On the uppermost floor was a stone working platform (A19:54) and a large limestone mortar (A19:52), embedded in the floor.

Room 114: Room 114 was excavated down to its lowest floors and two probes were made alongside the walls to check the underlying debris layers. From R114 one could enter the hallway R113, the western room of building R115 and, at the north end, Casemate Room R117. The lowest surface (A18:51 /A19:64) consisted of an extremely hard lime plaster surface. No pottery was found on this surface and it seems to have been kept very clean. Several successive floor layers yielded some animal bones and pottery, but there was no mendable pottery. The uppermost floor (A18:40) extended into hallway R113. A small square working platform (A18:47) of flat stones was embedded in the floor and a reused saddle quern had been placed on its side to serve as a wind-break for a hearth. Up against the casemate wall were two bread ovens; the clay liner, (A18:34) of the larger oven (**Fig. 8**) was footed on a foundation of small cobbles. The smaller



8. Clay oven (A18:38) in place against the inner Casemate Wall in room 114.

oven to the south (A18:41) had a reused pot as its liner, which was placed directly on the floor.

Room 115: Room 115 measures ca. 5.00 x 2.50m; its west wall (W1036) was 0.70m thick and bonded with Wall 1035, the southern wall of Temple 149. The eastern wall (W1030) consists of four pillars topped with large lintel stones. In between the northernmost pillars were three linking walls. A 1.50m wide doorway south of the third pillar led into Room 114. A small doorway (0.60m) opens into corridor 113.

Several objects were recovered in this room, including a nearly complete ceramic lamp, a stone pestle, an iron blade, iron arrow heads and several basalt grinders. The latest surface yielded sherds of several large storage jars. This room seem to have been used for storage, at least in the latest phase.

Casemate Rooms: On the east side of Buildings 130 and B140, three casemate rooms were excavated in part. Room 117 was accessible from Room 114 through doorway A28:26. Room 118 on the south had two surfaces of hard packed soil with plaster inclusions footed on a fill of cobbles and boulders. The uppermost surface (A28:12) was heavily burnt with ash and charcoal. Finds include predominantly storejars and jugs, smashed *in situ*.

Field B (Michael Weigl)

Excavation in Field B during 2001, 2004 and 2005[12] uncovered an extensive complex of pil-

12. Margreet Steiner was Field Supervisor in 2001. Square Supervisors were Colin Cadieux (2005), Margaret Cohen (2001), Carmen Dalhke (2005), Dominik Elkowitz (2004), Rainer Feldbacher (2005), Kate Johnston (2004, 2005), David Kapala (2004), Heather-Jane Maurice (2001, 2004, 2005), Julie Witmer (2005).

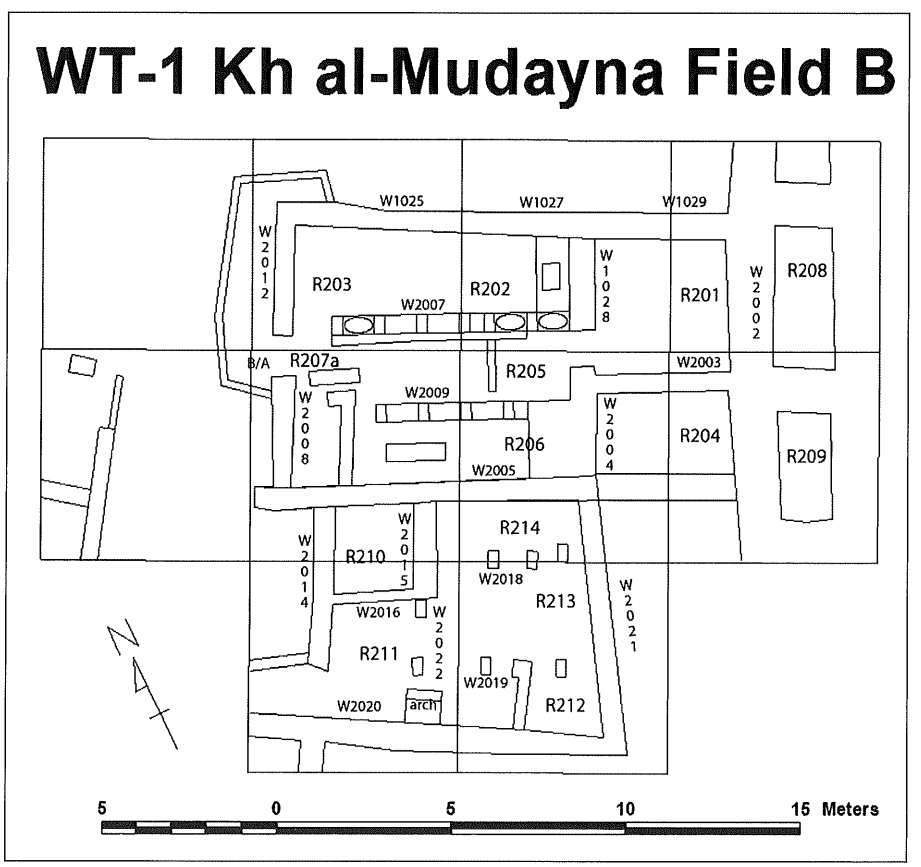
lared buildings (B200, B205) located south of Building B140. Both buildings are oriented east to west and abut the western face of Inner Casemate Wall 2002 on the east. The following description will first discuss the general architectural layout of each building, and then give a more detailed description of individual rooms, starting with the central roadway (S220).

The Central Roadway (S220): To the west of B200 is the central road (S220) which runs from north to south through the centre of the site. The surface of the roadway (D91:6) represents the latest layer of occupation and has been exposed for a length of 12.0m; the road is ca. 4.50m wide. The southern half of this surface consists of beaten earth, pebbles, cobbles and some small to medium boulders embedded in the surface. The deposition immediately above the road consists mostly of rubbly and ashy soil with large concentrations of pottery, animal bones, iron fragments, and grinding stones. Above it was a substantial layer of rock tumble (cobbles as well as medium to large boulders), most likely collapsed debris originating from the west walls of B200 and B250; within this debris layer was a limestone altar (MT 1333-7/6).

A stone-lined ramp extends south along the east side of the road and seals against the west face of B200[13]. At the north end of the ramp is a large threshold stone, serving as a barrier to water or sewage flowing down the stairs of the ramp, since at this point, the road runs at a much higher level than the south end, where the ramp turns east through Doorway B/A. This doorway opens into a small vestibule (R207a) between Rooms 203 and R207.

Building 200 (**Fig. 9**)

Building 200 was a rectangular structure measuring ca. 7.40 x 12.5m. The north wall (W1025, W1027, W1029) is partially destroyed while the



9. Plan of Building 200 and Building 2005.

13. On its western side, the roadway seals against a north-south wall, consisting of two rows of medium boulders that were visible above topsoil. On its northern edge, an upright stone and a large flat-lying boulder that may have functioned as a threshold stone mark the entrance to another building west of the road (B250).

south wall (2005), shared with Building 205, remains standing 2.30-3.31m high. This major boulder-and-chink wall is only one or two rows thick (ca. 0.65m). The central space consists of three rooms (R202, R205, R206) divided by two parallel rows of limestone pillars and rectangular basins (previously described in Daviau and Dion 2002: 32, 35). The northern row (W2007) is built on a plastered bedrock bench, whereas the southern row (W2009) is footed directly on bedrock; other surfaces were covered with beaten earth. The plan of Building 200 includes a small square room on either side of the central vestibule (R207, R203), three parallel rooms divided by two rows of pillars and limestone basins (R202, R205, R206), and two square rooms (R201, north and R204, south) built up against the inner casemate wall.

North Rooms 201 and R202: The walls of Rooms 201 and R202 are footed on bedrock which has been sculpted in Room 201 to form both the floor and a bench. Items in use in this room include pottery (a cup with textile fragments, storage jars and juglets, grinding stones, stone tools, a low work-table, loom weights and pieces of red mineral. In Room 202, a stone working platform, and a group of stone tools, an oversize basalt grinding quern (MT 160-1/160) and a loaf-shaped millstone (MT 155-1/155) suggest industrial activity, rather than a typical domestic assemblage. Artefacts associated with this platform include loom weights and hand grinders (MT 54-1/54), a rectangular mortar (MT 104-1/104), and a limestone roof roller (MT 105-1/105). Fragments of two limestone basins fallen from Wall 2007 were on top of this equipment.

Room 206: The central room on the south was entered from R205 through Vestibule 207a. The deposition above the floor consisted of a thick ash and charcoal layer mixed with burnt ceiling material. It included debris originating from the final occupation and destruction of B200. A total of 35 loom weights, a spindle whorl, broken pottery and animal bones were recovered from this layer. A burnt beam embedded in the debris along with a considerable amount of charcoal may represent the remains of a loom. Above this burnt material, a layer of hard packed ceiling or floor/roof plaster, as well as reddish brick fragments and mortar, indicates the collapse of a second storey floor. This debris contained another 26 loom weights as well as a carved ivory spindle fragment, a stone pounder, utilitarian pottery and fragments of red mineral.

The Eastern Rooms (R201 and R204): Both Rooms 201 and R204 are square rooms built up against the inner casemate wall (W2002). The party wall (W2003) between them was of poor construction and was covered with a layer of lime plaster that bore the marks of intense burning. This stain marked the place where the upper storey burned and collapsed from north to south.

The living surface of R201 was founded on bedrock which drops off sharply to the east and is partially covered with plaster and hard packed soil. Astragali (talis bones of sheep/goat), some pottery, a large limestone stopper, seven loom weights, and a piece of uncharred wood are among the artefacts associated with this floor. The deposition immediately above this living surface consists of: wooden beams and large chunks of ceiling plaster, as well as objects in daily use; a large amount of pottery, pieces of red mineral, textile fragments, more astragali, a pestle, two grinders, eight loom weights, a scale weight, and a large limestone basin fragment. Given the amount of charcoal, wooden beams, loom weights and textile fragments, it seems plausible to suggest the existence of a loom in this room.

There was clearly a second storey room that also appears to have been a work area. Its destruction debris accumulated in a second debris layer and contained thick (15.0-20.0cm) chunks of ceiling material with reed impressions, brick material, a large quantity of charcoal, and burned wooden furniture with bronze fittings. Pottery (especially a pithos and a large ceramic basin), a low stone table, some loom weights, fragments of a woven reed mat and of textiles, metal objects (bronze pins, furniture fittings, iron hooks and rods), a large perforated bone, chert pounders, basalt hand grinders and querns, and pieces of red mineral were also present. A mixture of wall tumble, particularly of very large boulders fallen from Inner Casemate Wall 2002 and boulders fallen from W2003 covered this layer of

deposition.

R204: At the time of its construction and use, R204 was connected to Room 201 by Doorway D in the northwest corner. The entrance itself is of bedrock which had been worked in order to create a step up from R204. The floor/living surface of R 204 is made of a very hard beaten earth surface, as well as larger, flat lying stones above bedrock. All four walls were footed on bedrock that slopes downwards from the walls toward the floor. The amount of bedrock exposed in the western half of the room and the obvious chisel marks indicate that the bedrock sloped was very irregular and had been worked to form the floor.

The objects had were above this living surface contained pottery, including some intact vessels standing on the floor itself, textile fragments, chert pounders, a spindle whorl, a mortar and stopper, and a basin fragment. On top of this debris layer, the collapse of a second storey was deposited, containing ceiling material, white plaster and limestone chips. The roof plaster itself was approximately 15.0-20.0cm thick. It had a flat surface and a very crude and pebbly underside. Undoubtedly, it once formed the floor of a second storey room. Most importantly, there was a large wooden beam (1.80m long) and a section of floor plaster (50x13x3cm), both fallen in a north-south direction in the west half of the room along with an almost complete vessel. Lumps of very hard reddish-brown clay with impressions of oleander(?) wood as well as charcoal deposits indicate that the upper storey was burned in a conflagration. Artefacts in the collapse include two stone work tables, one richly decorated on all sides, a jar stopper, and a basalt hand grinder.

Casemate Room R208 Excavation of Casemate Room R208 resulted in a better understanding of the fortification system and its relation to Building 200. The outer casemate wall (W2001), composed of 4-5 rows of very large boulders (ca. 2.50m thick), and the inner casemate wall (W2002) 2-3 rows of large boulders (ca. 1.50m thick), enclose Room 208. Two parallel east-west walls (W2011, north, W2010, south), each 1.30-1.60m thick form a room ca. 4.00m long and 1.70m wide. All inner faces of these walls (except for W2001) were covered with plaster[14]. The same pattern of collapse seen inside building 200 was also encountered in Casemate Room 208.

Building 205 (**Fig. 9**)

To the south of B200, a sister building (B205) was almost completely excavated as during the 2004 and 2005 seasons. Only the eastern rooms along the casemate wall and the west association Roadway S220 remain to be determined in future seasons. Building 205 was oriented west-to-east and shared party Wall 2005 with Building200. The state of degradation of W2005 made it impossible to determine the exact number of rows of the uppermost courses.

The southern wall (W2020) of Building 205 that runs almost parallel to W2005 was partially defined along its northern face. The same is true of the easternmost wall (W2021); only its western face has been exposed. The floor level of Building 205 is higher than that of Building 200, but so far, there is no compelling evidence for the existence of a second storey. A doorway in the southwest corner is at the top of a flight of steps leading from the floor of Room 211 to the street. Although not completely exposed, the building plan consists of rooms separated by pillared walls in a slightly different arrangement from Building 200.

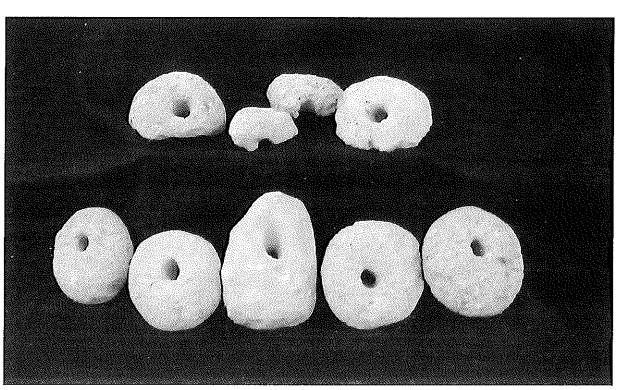
Room 211: Rectangular Room 211 in the southwest corner has a floor composed of flat-lying stones and beaten earth, joined together in some places by plaster. The preserved part of the floor was covered with ash pockets, containing a large quantity of bones, burnt stones and some pottery. Two door sockets (MT1239, MT1242), a basalt millstone (MT1251) and a large spherical stone bowl (MT1205) were on the floor. In the compact soil above the floor, pottery was frequent and artefacts included a zoomorphic ceramic figurine (MT1114), a limestone spindle whorl (MT1148), two basalt grinders (MT1149, MT1175), a millstone (MT1250), a limestone basin (MT1207) and a number of loom weights.

14. Although the construction phases have not yet been clarified, there was a single doorway (0.65m wide) through Inner Casemate Wall 2002 that was intentionally blocked at some time during occupation.

In the eastern part of R211 the debris of the first deposition was sealed by a large chunk of extremely firm and dry intact ceiling/roof plaster, measuring 1.78 x 1.27m and 0.16-0.20m thick. The rest of the room was filled with several large stone slabs that obviously broke through the ceiling/roof when it collapsed. The debris that accumulated on top of the plaster ceiling was a mix of soil, burnt mudbrick fragments and rock-fall. Most importantly, an assemblage of more than 40 loom weights was recovered (**Fig. 10**) indicating the production of textiles on the roof or in an upper storey room.

The eastern limit of R211 is a north-south wall (W2022) which contained a limestone pillar topped by a large square boulder (B2:22). To the south of Wall 2022, an intact arched doorway, formed of limestone and chert boulders, and a corbelled lintel stone, connected Rooms 211 and R212 (**Fig. 11**). Although the arch was intact, the large upper lintel (1.25 x 0.37 x 0.22m) had fallen onto the floor.

Room 210: A small, almost square room (R210; 2.46 x 2.33m) located North of Room 211, most probably served as an area for storage. The living surface was a beaten earth floor, covered with some small ash deposits. Some objects were associated with this floor (pounders, a polishing stone and an iron arrowhead), as well as an assemblage of very large vessels (pithoi and kraters). When the building collapsed, the floor of Room 210 was covered with a thick layer of debris that contained significant amounts of broken pottery (large vessels) and 5 iron arrowheads with bent points. In a second layer of debris on top of the ceiling/roof collapse, there was another stone work table along with more iron arrowheads[15].



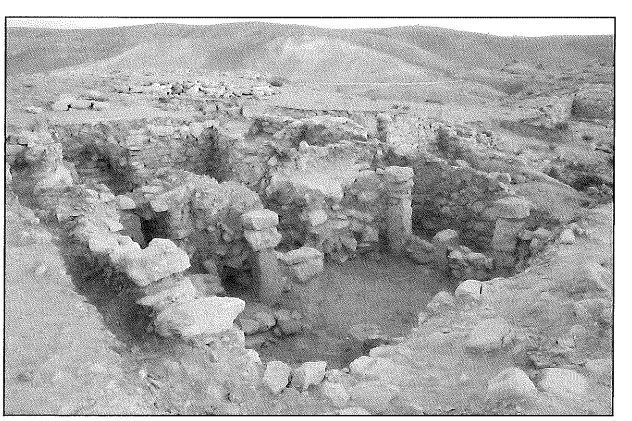
10. Loom weights from R211.



11. Field B, Pillared Building 205, looking east, with arched doorway on the right, attached to W2022.

Rooms 214, R213, R212: In the centre of Building 205, three parallel rooms are divided from each other by two rows of pillars (**Fig. 12**). At its western and eastern ends, the northern row (W2018) consists of two intact pillars with square boulders on top of each pillar; the middle pillar collapsed into R213 in the final destruction. Four low linking walls connected these pillars. The southern row (W2019) is made up of three more pillars with their top boulders in place, as well as a fourth pillar embedded between the doorways leading to Room 211. Boulder-and-chink Wall 2020 is the southern wall of the building.

A sub-floor was the foundation of both the walls and floors of Rooms 214 and R213. In



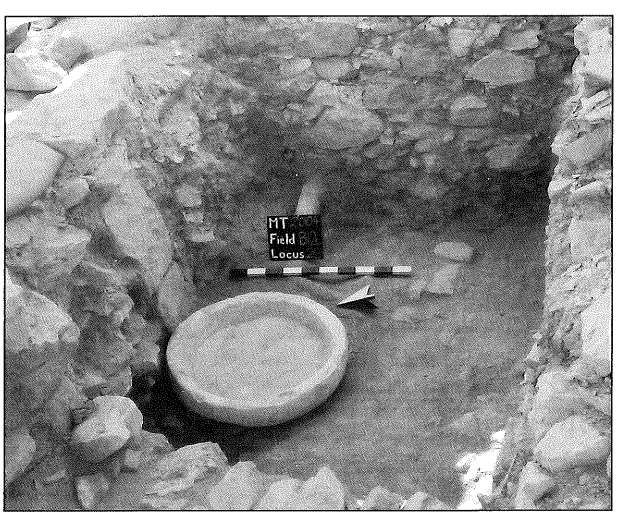
12. Building 205, looking west into Room 213, with pillared walls.

15. To the west of R210, a very large chunk of thick, multi-layered roof or ceiling plaster (1.20 x 0.90m) with a smooth surface and a layer of crude clay material with pebble inclusions on its underside was sitting on top of all depositional layers at ground level. Outside of Room 210, was (missing text).

central Room 213, two tabun-shaped clay ovens were built above the sub-flooring. The eastern oven (B12:47) was probably built first. It was footed on a layer of cobbles and surrounded by two layers of plaster. The oven to the west (B12:38) was also footed on cobbles, and its side walls were covered with a layer of plaster. The principal floor (B12:38) with which both ovens were associated, was built up in stages. As it became too ashy, clean soil was applied to flatten and clean it. This accounts for several stratified thin layers in the floor material[16]. At the same time, ash residue was building up inside the ovens.

Debris inside the room included collapsed roof/ceiling material, pottery (mostly storejars broken *in situ*; 615 sherds), ash pockets, burned wood, charcoal and some unburned wood, one bead (MT1434), 2 grinders (MT1435, MT1496), one stopper (MT1472) and two lintel stones. Several layers of collapsed debris contained lintel stones, pounders, grinders and querns, stoppers, polishing stones and sling stones, along with some bronze, an iron arrowhead, a ceramic figurine some jewellery (beads and a pendent) and a shell.

Southern Room 212 was entered through the corbelled doorway and was divided into two parts by a north-south line of stones held together by mortar and faced with plaster. The floor of Room 212 is a cobblestone pavement. At the eastern limit of the room (**Fig. 13**), an rectangular installation composed of limestone and compacted earth abuts W2021. It was covered with dry and crumbly mud plaster. Probably the installation served as a kind of bin. The easternmost pillar was associated with a large shallow circular limestone basin (MT 1025; diameter, 0.90m; height, ca. 0.20m). Around the basin were basalt hand grinders, a millstone (MT1113), and chert pounders. These objects are of an industrial nature, probably related to the loom weights and the production and processing of textiles. The pattern of destruction in all of these rooms is comparable to that seen in Room 211 and in Building 200. So too, the ceramic repertoire of the two buildings is homogeneous (**Fig. 14**).



13. Room 212 with Basin MT 1025

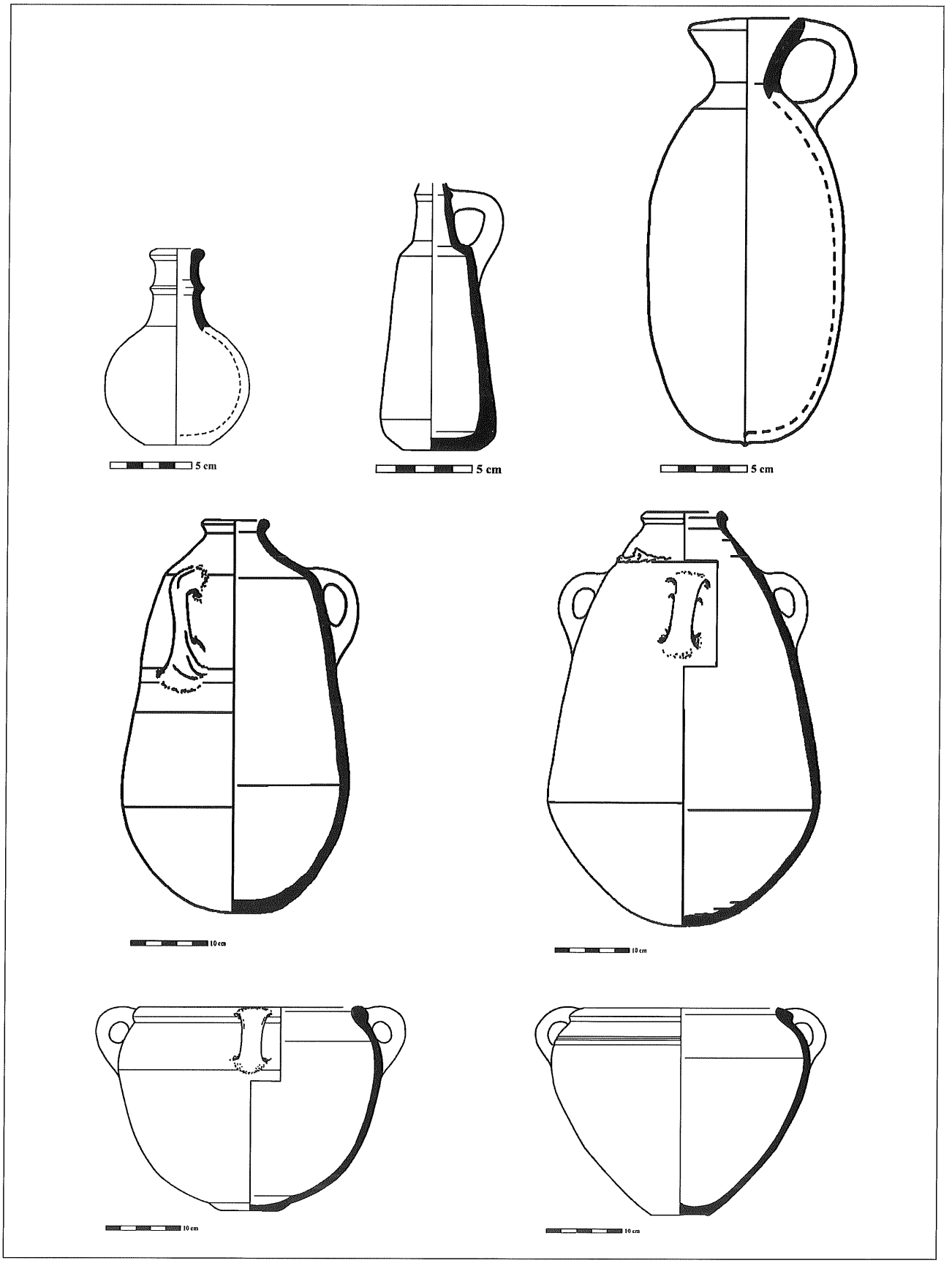
Field E Excavations (Annlee Dolan)

Field E is located at the south end of Khirbat al-Mudayna inside the line of the casemate wall system. Excavations began in five squares in Field E and Field F (E79, E80, F71, F72 and F73) in 2001 when a 2.00m wide trench was cut from the top of the site down to the surrounding moat. This limited probe revealed a casemate room and a structure built up against the fortification system, indicating the need to continue excavations in Field E[17].

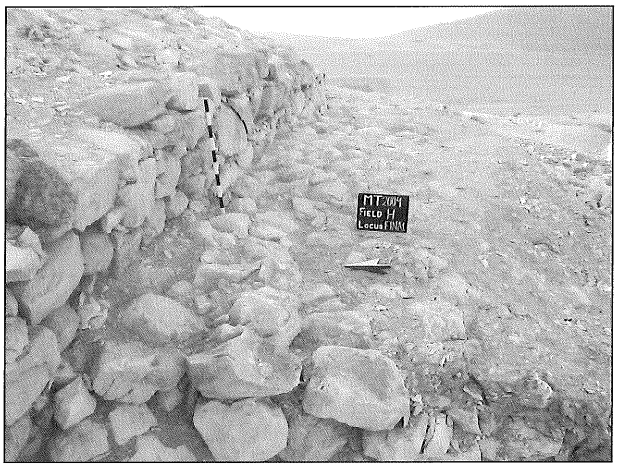
In the 2004 season, five 6.00 x 6.00m squares (E79, E80, E89, E99, G9) were opened; three squares ran east from the 2001 trench and revealed the continuation of the casemate fortification system along the south end of the site. As well, several rooms of Building 400 were opened although the full extent of the structure has not been fully delineated. Also at this time, a clearing operation in Field H (**Fig. 15**); was carried out along the southern (outer) face of the outer casemate wall (W2001).

Although it is evident that there are several phases to the occupation in this area, this phasing was unclear in the 2004 season and further excavation was needed to clarify them. The major walls, initially excavated in the 2001 or 2004 season, were further exposed in 2005 and one new square (E78) was opened to the north. It is now possible to distinguish two main field phases, the first of which can be further divided into three sub-stages.

16. The same sequence was seen in Gate Room 153 where ash built up against two ovens.
17. Andrew Graham was Field Supervisor in 2004; Square Supervisors were Melodee Dagenais (2004), Amanda DiLoreto (2004, 2005), Robert Stark (2005), Susan Tector (2004).



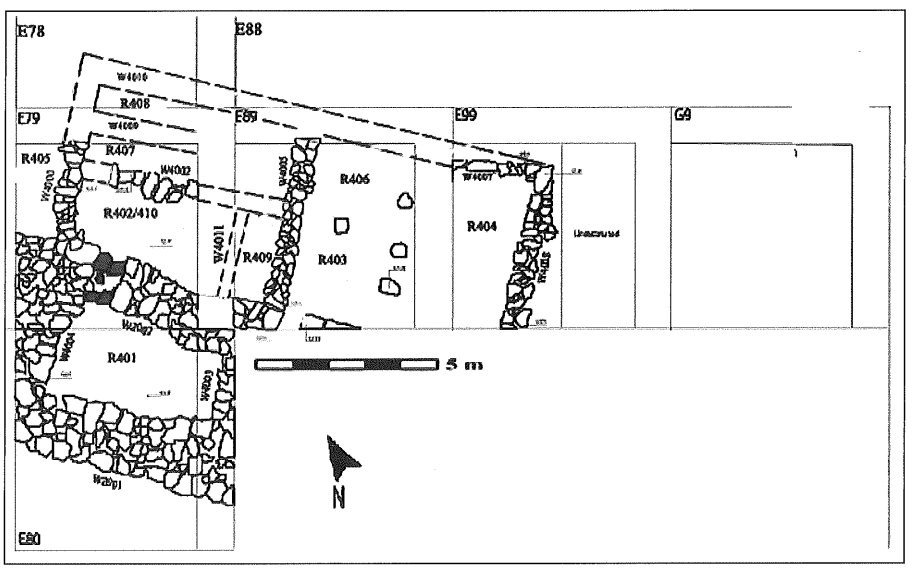
14. Pottery from Building 200; 1-2, juglets; 3, jug; 4, three-handled storejar; 5, four-handled storejar; 6-7, kraters.



15. Outer Wall 2001 at south end of site (Fields F–H).

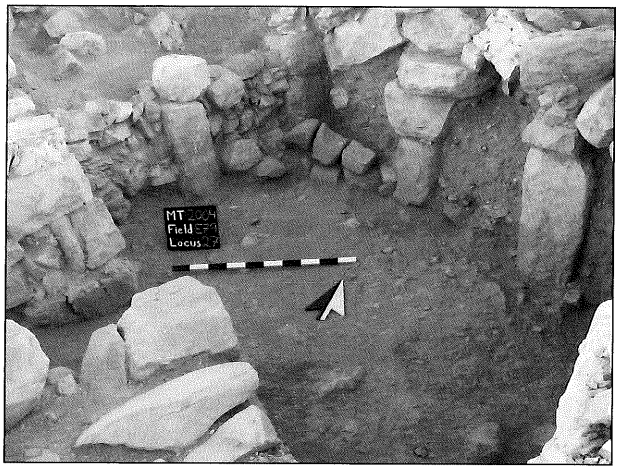
Field Phase 2c (**Fig. 16**): Construction began in Field E with the erection of the casemate walls, whose dimensions are consistent with those on the east side of the site; the inner casemate wall (W2002) measures ca. 1.50m thick and the outer casemate wall averages 2.20m (W2001). Two cross walls (W4003, W4004) form a trapezoidal casemate room (R401), which measures ca. 4.50m in length and ranges in width from 1.80-2.80m, due to the contours of the site, the edge of which turns sharply north (west of Square E80). Casemate Room 401 could only be entered from the north and was not linked to rooms on the east or west. Both cross-walls (W4003, W4004) are constructed of semi-hewn limestone boulders and cobbles, with an average thickness of 2.00m.

Field Phase 2b: Following the construction of the casemate system, Building 400 was built; using the inner casemate (W2001) as its southern wall, with Wall 4001 forming its western extent and W4008 its eastern perimeter. The building is bisected in the middle by W4005, and all three of these north-south walls are ca. 0.65-0.70m thick and abut the inner casemate wall. Both W4008 and W4005 are boulder-and-chink construction and ca. 5.50m long, whereas W4001 is only 5.00m long and has two large stacked stone pillars (E79:18, E79:21; the latter is also integrated into W4002); between the pillars are low, boulder-and-chink linking walls (E79:34, 35)[18]. The earliest surface (E79:33) uncovered in Room 402 seals against the linking walls between the pillars making it is clear that west Wall 4001 was constructed as a unit, instead of being blocked up at a later time (**Fig. 17**). This construction technique is also evident at Tall Jāwā, Tall al-'Umayrī, Saḥāb and Hazor, and functioned to make walls more secure (Daviau 1999:118–121). The north wall of Room 402 is an east-west line of four pillars (E79:11, 12, 20, 21=W4002) capped by a row of lintels (E79:10), and footed on a line of foundation stones (E79:36). Here too, there was a low partition wall (E79:40; maximum height of 0.40m) between pillars E79:11 and E79:21. Wall 4002



16. Plan of Building 400 in Fields E and G, with Pillared Room 402 and Casemate Room 401.

18. The full extent of Building 400 on the west is not yet known. However, it is unlikely that W4001 was in fact the outer wall given its style of construction.



17. View of Room 402, looking northwest.

separates Room 402 from Rooms 407 and R408 to the north.

The northern wall of B400 (W4007+W4010) has a total length of 13.10m, bonding with W4008 and W4001. This boulder-and-chink wall is ca. 0.70m thick and serves as the north wall of R408. Based on what is currently known, the dimensions of Building 400 are approximately 13.50 x 5.0-5.5m.

Excavations in the 2005 season confirmed the presence of a second storey in Building 400, with intact wooden beams recovered west of W4001 and on the floor in Room 405. On the last day of excavation in E78, the discovery of a staircase ascending to the south provided additional evidence.

Excavation in 2004 and 2005 revealed six superimposed surfaces in R402; these surfaces were also located in R409 (east of partition Wall 4011). It is suggested here that the "upper" surfaces (E79:60, E79:63, 64, 67) may represent collapsed debris from second-storey Room 410, above R402. Excavations east of W4005 in Room 403 also revealed a series of superimposed surfaces, although these were at a greater absolute depth than in E79. However, the remains in Room 403 have a different depositional history than Room 402, with nearly 2.00m of collapsed limestone debris and nari. It is likely that when Building 400 was destroyed, many of the walls tumbled into Rooms 403 and R406, and in so doing may have compacted the existing surfaces. Alternatively, a second storey may not have existed in the rooms east of W4005.

Installations which were associated with this phase include a rectangular limestone basin (E89:20) situated between pillar E89:17 and W4005 and a plaster installation (E89:36) ovoid in shape suggesting domestic use.

The finds associated with the surfaces of Building 400 suggest a domestic, with textile production likely taking place here as well. Artefacts recovered west of Wall 4005 include a copper earring, a cowrie shell, a seal, a bead, a perforated shell pendant, a stone vessel, an animal figurine, 6 pounders, a limestone tool, 16 loom weights, 2 spindle whorls, 6 grinders, 7 millstones, a stone weight, a limestone basin fragment, 11 basalt tools, a polishing stone, 3 saddle querns and 4 mortar fragments. In Room 403, there were 8 grinder fragments, 3 stone weights, a scarab in a gold setting (see below, Z. McQuinn), a stone vessel, ceramic legs of a figurine, 5 mortar fragments, 3 pieces of worked bone, a limestone basin fragment, 6 millstone fragments, 9 pounders, an iron point, 3 spindle whorls, a stone pestle, an iron sickle blade, a wooden spool, an animal figurine fragment, a lamp fragment, a stopper, a spatula and a loom weight.

Field Phase2a

There is also evidence for another phase of occupation in Building 400. North-south partition Wall 4011 was a later addition, running between W4002 and the inner casemate wall (W2002). It is ca. 2.50m long with a width of 0.35-0.54m. This wall, with W4005 on the east, forms Room 409 to which there appears to be no entryway. Installation E79:65, which is a U-shaped stone structure 4-5 courses thick on its north side, abuts the east side of W4011. Within this installation is a limestone basin (E79:81) was positioned on its long side. There were 2 loom weights found inside the basin and two more in the soil surrounding it.

Field Phase 1

The latest phase in this Field is represented by the Medieval (?) burials which were located in E99 and G9 (see below, M. A. Judd).

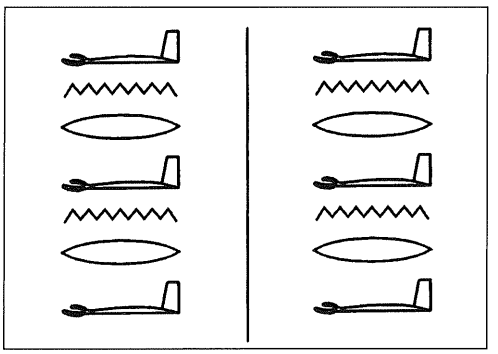
Outer Casemate Clearing Operation: In 2004, a clearing operation took place along the outer face of Outer Casemate Wall 2001 in order to better understand the construction techniques which were employed in building the fortifica-

tion system[19]. Due to the curvilinear nature of the southern end of Khirbat al-Mudayna a revetment was necessary to support the fortifications. The clearing operations along the outer wall (extending west to east from E100/F91 through H1, H11/G20, up to H21/G30 and likely also into G29 and G39) revealed a tightly packed layer of cobbles, located at a consistent depth, sealing against the outer casemate wall (W2001). Apparently this rubble fill was placed against the outer casemate in order to maintain the structural integrity of the fortification system. That is, the curvilinear nature of the south end of the site would project outward pressure and this revetment would give extra support to the outer wall. No clearing occurred in the south-west sector of the site and it is unclear if the revetment continues in that area.

Although the results in Field E are still preliminary, it is clear that the monumental fortification system which has been uncovered in Field A on the north continues around the south end of the site. Future research will focus on extending this area northward and determining the relationship of Building 400 to the rest of the site.

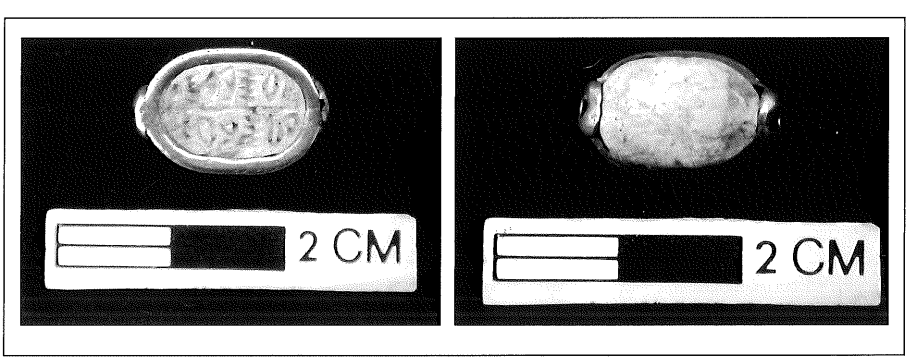
What's a scarab like you doing in a place like this? An "Anra" Scarab in an Iron Age Context (Zoë McQuinn)

In 2004, during the sixth season of excavations at Khirbat al-Mudayna on the Wādī ath-Thamad, a scarab was discovered in Building 400, located at the south end of the Iron Age settlement. The oval-shaped scarab seal (MT 979-6/60; **Fig. 18**) is approximately 1.66cm in length, made of steatite and enclosed in a gold setting for a metal ring. The back of the beetle scarab shows the head and clypeus clearly. A short, rounded notch on each side of the beetle demarks the point of division between prothorax and the wing-case. The base of the scarab is divided vertically by a single line and on each side of the division are identical hieroglyphs:



The three signs repeated in the inscription, a (D36), n (N35) and r (D21)[20], indicate that this seal belongs to a group collectively know as Anra scarabs, first identified by Weill (1918:193). The Khirbat al-Mudayna scarab is classified as an Anra scarab with a vertical bipartite division, Type C(i) according to Richards' typology[21].

The nature and meaning of this combination of hieroglyphs (a, n, and r, which identifies and defines Anra scarabs) have been a subject of much debate. This three-hieroglyph combination has been interpreted in a number of ways: as the name of an unknown Hyksos Prince (Weill 1918: 193); in a variety of meanings associated with the god Re, including as an epithet dw.n.ra "gift of Re" (Petrie 1917: 46) and as a theophoric name ra.n.ra "Re gave" (Petrie 1925: 17; Rowe 1936: 327); as originating from the Neferzeichen patterns of the Middle King-



18. Scarab MT 979-6/60 from Room 403.

19. Excavation in Field E and the investigation of the Outer Wall in Field H was carried out under the direction of Andrew Graham.

20. Signs are identified according to Gardiner 1999.

21. For the full and comprehensive typology of *Anra* scarabs, see Richards 2001.

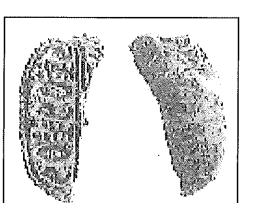
dom[22] (Stock 1942: 24; Hornung and Staehelin 1976: 51); as the name of the Canaanite god, 'El (Pieper 1930: 190; Richards 2001: 150); and as being complete nonsense (Giveon 1985: 18). Though this issue is unresolved, the unique inscriptional patterns found on Anra scarabs are highly identifiable and thus their pattern of manufacture and use is well established. Anra scarabs first appeared in the 13th Dynasty (or possibly the late 12th Dynasty), but were in use primarily through the 15th Dynasty, until fading out in the early New Kingdom (Richards 2001: 33). This would suggest that our Anra scarab was manufactured in the Second Intermediate Period or Middle Bronze IIB/C.

The material and stylistic features of the Khirbat al-Mudayna scarab support this proposed date for its manufacture. Steatite was the most common material used in the manufacturing of scarabs from the 12th to the 20th Dynasties (Newberry 1908: 84; Haynes and Markowitz 1991: n.p.; Ben-Tor 1997: 165; Richards 2001: 6). Thus, it is not surprising that most Anra scarabs appear to be made of steatite[23]. However, it is often difficult to perceive whether a scarab in its whole and glazed form is made of steatite or faience[24]. Neutron diffraction, a new method of scientific analysis, has recently been tested and has successfully determined the composition of materials without destroying the objects (Richards 2001: Appendix A). The inscribed scarab features of the Khirbat al-Mudayna scarab also determine a relative date of manufacture. The scarab has a smooth stylized back with notched delineation of the prothorax and wing-case, which are stylistic traits found on scarabs dating predominately from the 15th to 17th Dynasties and correlate to the MB IIB/C period in the Levant (Newberry 1908: 72; Petrie 1917: 6-7; Niccacci 1980: 17).

Anra scarabs are commonly associated with the Hyksos and are found in Syria, Palestine, Egypt and Nubia (Richards 2000: 11). It has been noted by Fiona Richards that of Anra scarabs found in an archaeological context 70 % were found in Palestine, while only 20 % were found in Egypt, with a further 8 % being found in Nubia and 2 % in Syria. The high distribution of scarabs found in Palestine seems to strongly suggest that these scarabs were manufactured locally (Richards 2001: 162; Ben-Tor 2004: 5). Of those scarabs found in Levantine contexts, 90 % of the sites lie either on the coast or on the inland trade routes of the MB IIB/C (Richards 2001: 117). Anra scarabs are found in a variety of different contexts at Levantine sites. Primarily found in MB II tomb deposits, Anra scarabs are associated with funerary practices and can be defined as having élite status (Richards 2001: 136).

Having thus quickly surveyed Anra scarabs in general and described the Khirbat al-Mudayna scarab, an immediate question springs to mind. Given that both the stylistic and inscription evidence point to a MB IIB/C date of manufacture for the Khirbat al-Mudayna scarab, what is an MB IIB/C scarab doing in an Iron Age context? No similar scarabs have been found in such a late context[25]. A clue may lie in studying Middle Bronze examples of Anra scarabs found in proximity to Khirbat al-Mudayna.

There are three sites found in close proximity to Khirbat al-Mudayna where Anra scarabs have been found, namely the sites of Jericho, Pella and 'Amman. The site of Jericho is one of the few sites that provide any contextual evidence for the Anra scarab. Forty-three scarabs were found in tombs at Jericho and of these, twenty-two were found in secure archaeological contexts. (Garstang 1933; Kirkbride 1965: ??). The closest parallel to our scarab is found at Jericho. Discovered by Garstang in Tomb 5, the right side of the scarab is damaged but the left side remains intact. The inscription is presented as the mirror image to the



From Rowe 1936: no. 226.

22. *Neferzeichen* patterns were symmetrical designs that depicted correct hieroglyphic signs yet were nonsensical. Though *Neferzeichen* patterns are untranslatable, they seem to reflect royal power or blessing (Ben-Tor 1997: 168).
23. Scarabs were fired during the glazing process, converting the steatite into enstatite, a harder material (Richards 2001: 6).
24. Scarabs and amulets from sites in Palestine are usually white or buff, and nearly devoid of glaze, though the reason for this is unclear (Haynes and Markowitz 1991: n.p.).
25. The latest Anra scarabs found date to Dynasty 18 or Late Bronze contexts (Richards 2001:111), until the discovery of this scarab from Khirbat al-Mudayna.

Khirbat al-Mudayna scarab with the hieroglyphic signs a repeated twice, n twice and r twice. At the site of Pella, five Anra scarabs were found in MB II Tomb 62 (used consecutively for about 200 years; Richards 1992: 3-4). On the 'Amman Citadel, an MB tomb (partially disturbed in at least three later phases, including Iron Age II, Hellenistic, and Roman periods) contained one Anra scarab (Najjar 1991: 105).

A pattern emerges at these localities; tombs with Anra scarabs have been at least partially disturbed by successive phases. Given the élite status assigned to seals as both social emblems and status symbols (Richards 2001: 123), it seems most likely that either the scarab at Khirbat al-Mudayna was a prized heirloom that was misplaced or, after looking at the nature of the archaeological contexts of other Anra scarabs found in the area, the scarab was recovered from a MB II tomb and brought to the site as a treasure.

There are great difficulties involved in dating scarabs. As seen with the Anra scarab uncovered at Khirbat al-Mudayna, the date of deposit can post-date the date of manufacture. Due to the portable nature of and status assigned to scarab seals, it is not beyond the realm of possibilities that an MB IIB/C, Egyptian influenced but locally manufactured Anra scarab such as this would end up within an Iron Age context.

Fields L, P, R and W (Noor Mulder-Hijmans)

In the 2001, 2004 and 2005 seasons, work continued in the large Nabataean-early Roman reservoir, Building 700 (Daviau *et al.* 2000), located at the foot of the Iron Age mound, and traced a series of water management installations extending to the east in Fields P, R and W. Several features of the reservoir itself were investigated in detail, particularly the construction techniques under the floor, and the evidence for secondary use[26].

Field L (Reservoir 700) **(Fig 19)**: In 2005, the remaining balk along the south wall was removed to more completely expose the face of South Wall 7005. Due to severe erosion along this wall, a stone cut channel (A34:13) plastered into the lower courses of the southeast corner could not be connected to a comparable section of channel located in the southwest corner where it was fitted into the top course of west Wall 7006 and south Wall 7005. The face of Wall 7005 was coated with lime plaster that continued below the level of the plastered floor surface. In the 2001 and 2004 seasons, a probe was made through the floor (L13:23) of the reservoir, beginning at Wall 7005 and extending north as far as Piers 8 and 9. Under the cement-like floor, three more sub floors (L13:24, 33 and 35) were found, consisting of stones and a very hard mortar in between the stones. The lowest



19. Reservoir 700 in Field L.

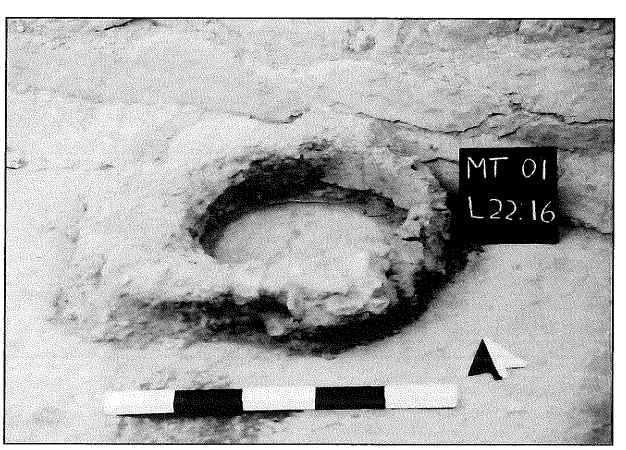
26. Square Supervisors were Sarah Bryant (2004), Kelly Glover (2004), Anna Labarius (2005), Travis March (2005), Michele Murray (2004), M. James Szudy (2004), Katrina Urban (2004).

sub floor rested on the virgin soil that consists of a very firm, brownish red coloured clay. The total depth of the three sub floors is ca. 0.60m. The lowest sub floor (L13:35) seals against three partly excavated foundation stones (L13:36) of Wall 7005.

The plaster of the uppermost floor sealed up against the four walls of the reservoir, at the point where a curb of plaster, containing small stones, sealed the join between the walls and the floor. The walls themselves were made watertight by three layers of hydraulic plaster, as hard as cement.

In the northeast corner of the reservoir and adjacent to the staircase, a large north-south balk was remove to better reveal the easternmost pier and expose addition evidence for the re-use of the building. Under the balk was a bread oven with an inside diameter of 0.30m, which had been constructed on top of a newly repaired plaster surface **(Fig. 20)**. Only the ceramic liner of the base of the oven with some small stones packed onto the outside was still *in situ*. Roman style cooking pots and Nabataean painted potsherds were found around it, along with ash lenses that spread across the plaster floor.

In 2005, a second north-south baulk still standing in the west part of the reservoir was excavated to provide a check on the phasing of the remains in the reservoir. The lowest layer excavated, directly on top of the plastered floor, consists of firm clayish soil (L12:4), containing some potsherds, mainly of Nabataean and early Roman date. The remains of two more bread ovens were found here. On the floor a tumble with collapsed architectural stones was excavated, revealing the pattern of destruction of the walls and piers of the reservoir.



20. Base of clay oven (L22:16) footed on plaster surface in Reservoir 700.

It is clear now that the reservoir at Khirbat al-Mudayna has two phases of use. After it had gone out of use as a water reservoir, a new building was constructed, using the walls and floors of the reservoir. A row of ten piers, each about 0.65m apart, was constructed down the centre of the reservoir, on top of the floor of the reservoir, dividing the building into a south and a north half (Daviau, Mulder-Hymans and Foley 2000: fig. 4). These piers were built in header-stretcher technique and seem to be part of a large arch support system for a stone ceiling. The ceiling was further supported by pairs of opposing arches that extended from the central piers and rested on top of the perimeter walls. The piers were preserved 2-3 courses high, ca. 1.00m. No traces of plaster could be found on any of the piers, indicating that the building was no longer used as a reservoir. Between the piers low stone walls were erected, probably as an extra support for the piers to carry the heavy weight of the arches and the ceiling. The only opening between the piers was at the east side, where a staircase, excavated in 1996, descended. After repairing the plaster floor, the bread ovens were constructed and the building served a domestic purpose.

Field P: A probe, measuring 2.00 x 6.40m, was dug in 2001 in Squares P26-P27 to investigate a long stretch of wall line visible on the surface. This wall (W7025) runs from Site WT-4, Features A-C, toward Reservoir 700. The reason for opening this probe was to see how this wall was built, its width, depth of stone courses, and its structure, since the wall stretches through agricultural fields. The goal was 1) to be able to describe the full structure of the wall, and 2) to decide if it was contemporary with Reservoir 700, and 3) to describe the function of this feature in the landscape. The excavation was limited because the wall line (P26:2) was accompanied by a stone platform, and it was clear that additional excavation would be needed to understand these features.

The lowest loci were P26:7 and P26:4, which are located on either side of Wall 7025 (=P26:2). The wall was exposed for a length of 1.75m and a width of 0.80m. To date, three courses are preserved with a height of 0.80m. Wall 7025 consists

of 2 rows of limestone boulders with packed soil and cobble-size chinkstones. Soil layers P26:3, 5, 4 (on the south) and P26:6, 8, 7 (on the north) seal against the wall. Soil layers P26:4 and 7 are the soil in narrow trenches immediately against the south and north faces of the wall. For the most part, there are few stones and only 3 potsherds in these loci. Above P26:4 is a layer of chert fragments, cobblestone size, with patches of hard mortar in between the stones.

In order to better understand this wall and its relationship to Reservoir 700, excavations were undertaken in Squares L43–44, L53–54, and L64 and at the east end of the wall in Field R+W. Wall 7025 continued west from Field P into Field L where it was cut through its width by shallow drains and where it was associated with a series of parallel and perpendicular walls. The first of these walls is W7013, coming from the north-east side of the reservoir and extends east toward W7025. Wall 7013 is constructed of two rows of small boulders, cobbles and chinkstones; between the outer wall faces is a rubble fill. Along its length, W7013 is also cut perpendicularly by a drain (L53:4). Neither of these walls actually reached the east wall (W7004) of Reservoir 700, although they may have both served to channel water toward drain L33:20 through the wall.

At the opposite end of Wall 7025 is a small group of structures identified as Site WT-4, with three features (A-C). In 2004, excavation of the southernmost feature was undertaken (in Fields W and R). A single, two-room structure measures 10.50m long and 4.53m wide. The walls themselves vary in thickness from is 0.70-0.90m. A north-south wall divided the structure into two discrete rooms with no entrance between them. Certain inner wall faces were coated with greyish coloured plaster, although it was only preserved on the lower courses of stone. Almost all these walls were in a bad state of preservation; many friable stones and large boulders had tumbled down alongside the walls as if an earthquake had shaken them. The principal function of this structure remains unclear, although it may have been used for water storage and/or as a water settling tank (Daviau and Foley 2007).

The Cemetery Survey: Excavation and Bioarchaeology (Margaret A. Judd)

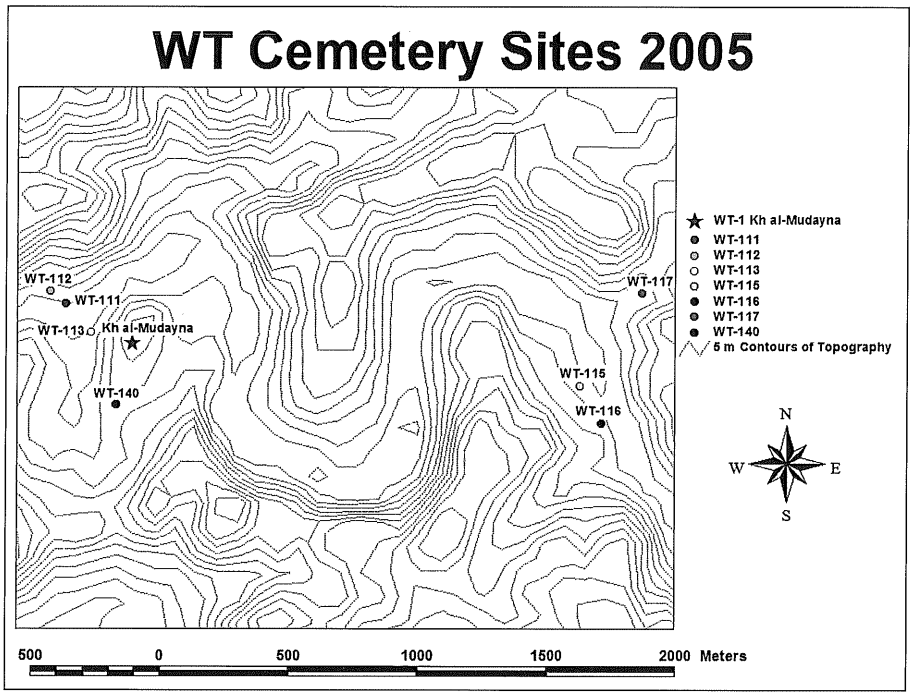
The primary bioarchaeological goals for 2005 were to conduct a pedestrian survey along the sides of the Wādī ath-Thamad and its environs situated beside the Iron Age fortress of Khirbat al-Mudayna, record the tombs or cemeteries found, and assess the logistics of their excavation for the following year. If time permitted a sample burial excavation from each cemetery was conducted. Numerous new cemetery sites were located, but more significantly the mass looting of ancient as well as Islamic cemeteries was exposed. Other cemeteries and/or sites containing graves were discovered or revisited and recorded by the Survey Team directed by Jonathan Ferguson (see below). The funerary sites reported by the Survey Team included: WT-124, WT-127, and WT-128. With the exception of WT-17 (Khirbat al-Ḥiri), the new sites described below were recorded by the Bioarchaeology Team. GPS (WGS84) positions and elevations are stated when available and unless indicated otherwise, elevations listed were taken by GPS.

Cemeteries West of Khirbat al-Mudayna

During the first week of the 2005 season, a walking survey[27] was conducted along the wadi that runs along the bottom of the western slope of Khirbat al-Mudayna and extends south towards an irrigated area. Three sites were identified as cemeteries due to the presence of linear and circular stone features typical of Levantine grave superstructures (Bloch-Smith 1992; Yassine 1984). Each cemetery was located at the most southerly tip of a 'finger' or 'bench' formed by erosion that projected into the wadi; ploughing had been avoided in these areas by the local people.

WT-111 (UTM 775648 3498608, Elev. 593m) is located west of the wadi between the wadi 'low' road and 'middle' road, which extends into the irrigated fields about 300m southwest of Khirbat al-Mudayna (**Fig. 21**). The site is narrow and rectangular running about 50m north-south and 10m east-west. It is surrounded by plough zone in the west, north, and east borders while the south edge erodes into the wadi. At least 40

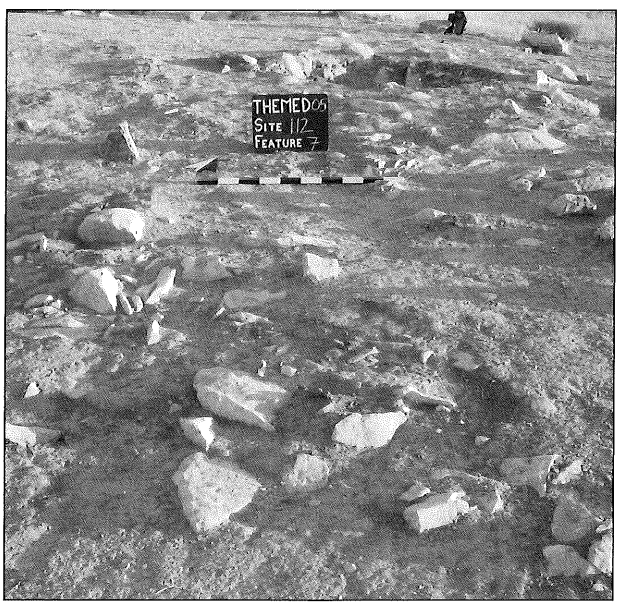
27. The bioarchaeology team included M. A. Judd, Michael Malloy, Melanie Grant and Khalid.



21. Map of cemeteries to the west and east of Mudayna.

graves of varying shapes and sizes were present. Some of the graves were marked by borders of medium sized stones, while others were infilled with medium sized stones; large isolated square stones were also observed in this landscape. Two features were measured: Feature 1 (1.70m east-west, 2.20m NS, 160°) and Feature 2 (1.50m east-west, 2.00m NS, 180°). One feature was looted on the very south edge of the site, so that it was not immediately visible from the main section of the cemetery. A sequence of stones runs along the east side of one of the larger graves and may be the remnants of an early low wall that marked the limits of the cemetery. The survey produced two Roman period potsherds.

WT-112 (Elev. 601.56m from Total Station) is located approximately 400m from the southwest end of the Khirbat al-Mudayna and was selected for excavation. It was identified as a cemetery due to the circular and linear clusters of medium sized stones in addition to two robbed burial areas and three possible robbed graves (**Fig. 22**). The judgment of the grave robbers, however, was as misguided as was ours in our selection of 'burial' features for excavation. In Field A two undisturbed graves deemed not to be Islamic were excavated to depths of over 1.50m but produced no human remains, although there is a possibility that these empty tombs were cenotaphs. The skeletal remains of at least three individuals were recovered from the more southerly robbed area of Feature 1 in Field B. It is unknown whether these individuals were interred within the same grave or were interred originally in nearby robbed graves identified by depressions and associated spoil heaps overgrown with grasses. Future excavation of the area east and west of this feature would ascertain the presence of additional structures, while a deeper probe into the hillside may reveal earlier periods of use. A preliminary walking survey of this site, the excavation of two robbed features and the



22. Stone circles at WT-112.

excavation of two suspected burials produced numerous potsherds ranging from the Iron Age, Hellenistic, Roman and Byzantine periods.

WT-113 (UTM 775747 3498499; Elev. 597m) is situated south of three irrigated fields between the west side of the main tell and WT-112 at the fork of the 'lower' wadi road. The site is triangular in shape with its western apex at the junction of the wadi roads and its base (12.00m) parallel to the tell where a local water collection point is located. Remnants of a stone wall or terrace run along the north border of this site for about 30m and may continue south of the road. The area north of this stone wall/terrace is ploughed land that runs to the wadi. The features on this site are delineated by medium sized stones forming round circles or rectangles. The site was divided into Field A (southeast) and Field B (northwest) and at least 10 probable burials were observed. Two features were selected for sample measurements: Feature 1 measuring 1.50m east-west x 1.25m north-south (220°) and Feature 2 was 2.40m east-west and 1.00m north-south (270°). None of the features were disturbed and no potsherds were recovered.

Cemeteries North and East of Khirbat al-Mudayna

A second pedestrian survey north-east of Khirbat al-Mudayna revealed isolated and clusters of suspected burial features.

WT-114 spans about 20.00m east-west and 10.00m north-south and lies northeast of Khirbat al-Mudayna. A freshly robbed grave (Feature 1) was situated right beside the road. Medium to large sized stones remained on its northern perimeter while the robber spoil and other structural stones were tossed to the south. Portions of the original cut were visible and it is possible that this was a shaft tomb. Feature 1 measured 1.50 north-south x 0.80m east-west and was oriented 180°. Only two potsherds were recovered from a quick investigation of the robber spoil heap. Feature 2 was a robbed round shaft measuring 0.75 north-south x 0.6 east-west and was cut into the bedrock. Bedrock features resembling WT-140, which revealed a burial when excavated, covered the 10.5m expanse between Feature 1 and Feature 2 to the north. Feature 3 was a chasm extending north into the bedrock. It was 7.80m west from Feature 2, aligned at 150° and measured 2.30 x 0.70m wide east-west. Disturbed fill was deposited on the north side of the feature and large cobbles were in disarray within the chasm. A single triangular potsherd was recovered south of this feature and all potsherds dated to the Roman-Byzantine period.

WT-115 (UTM 777645 2498294, Elev. 606m) is a flat-topped bench of land by the wadi road that overlooks the wadi 1.2km east of Khirbat al-Mudayna. This cemetery measures about 12.00m north-south x 13.00m east-west and consists of assorted grave shapes delimited by medium sized stones; two of these graves were robbed and evidence of 'pot-hunting' with a metal detector was ubiquitous. Surface finds included Hellenistic, Nabatean, Early Roman and T.S potsherds.

WT-116 (UTM 777727 3498149, Elev. 613m) is south of WT-115 and is surrounded by worked wheat fields and an Islamic cemetery to the north-east. WT116 measures about 27.00m north-south x 18.00m east-west. Graves were identified by round or rectangular outlines of stone and Islamic graves were interspersed among others. Small patches of recent fires and extensive metal detector exploration were noted. Pottery associated with this site included Iron Age, Nabatean, Early Roman dominant and terra sigillata; one decorated stone bead (WT 701) was found near the fire patch and robbed grave. Four inscriptions were observed on randomly placed stones within the burial installation structure.

WT-117 (UTM 777887 3498650, Elev. 613m) is an expertly robbed cemetery which is visible from the hills surrounding it. It is positioned on the brow of a slope overlooking a road that travels north from Wādī ath-Thamad. The site measures 27.50m north-south and 40.00m east-west. Two small fire patches were noted in the southwest and northwest corners. Twenty-seven graves were visible, the majority outlined in large stones and linear running east-west, although there were many exceptions. Our worker maintained that these were 'Romani' burials, meaning that they were non-Islamic. Of these

burials, 16 were looted recently and six likely had been looted in the past and were distinguished by a 5.0cm soil depression, while the rest remained untouched; the eight graves that were round in outline were undisturbed. Robber spoil heaps were predominantly along the south, north and east sides, indicating an approach from the south edge of the pit, which was neatly cut and many of the balks were perpendicular. Grave robbers excavated the burial pits to about 1.15m in depth. The spoil heaps of WT-117:1, 2, and 3, which are located in diverse sections of the cemetery, were examined and no potsherds or other artefacts were recovered; one weathered fragment of human pelvic bone was found. One undisturbed burial at the south-west tip of the site was selected for test excavation, but no skeleton had been exposed by the time the 1.50m level was reached.

Other cemetery sites[28]

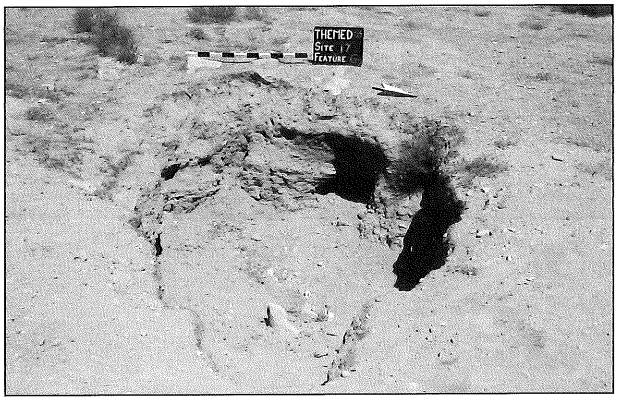
WT-140 (Elev. 613.68m-Total Station) rests at the southern tip of Khirbat al-Mudayna immediately south of an Umayyad building (Field U) and large cemetery thought to be Bedouin (WT-35). The site is delineated by a soil depression (8.00 x 10.00m north-south) surrounded by bedrock with narrow slits about 20.0cm wide that offered a glimpse into the earth below. Because rock-cut tombs and cave burials were the preferred burial styles in the highlands of Jordan, particularly during the Iron Age (Bloch-Smith 1992), this feature was selected for test excavation.

A skeleton was recovered about 1.25m from the earth's surface immediately under the roof of the 'cave'. Two artefacts near the skeleton included an iron tip of a spear (?) (WT 718) found north of the skull and a round wood linear object (lower spear? WT 724). The absence of clearly datable artefacts did not permit a temporal assignment, but the use of bedrock 'caves' as funerary chambers was confirmed.

WT-17 Khirbat al-Ḥiri (UMT 774458 3502213, Elev. 766m). Previous project surveys at Ḥiri[29], the most prominent site in the region, noted a heavy scatter of potsherds on the fortress' northeast slope. The project visit this year revealed that this potsherd scatter, attributed predominantly to the Iron Age, covered an estimated 50 ancient burials and that many of these graves had been recently robbed. Five robbed graves were photographed and human remains were recovered from the robber spoil heaps (**Fig. 23**). The demographic spectrum included males, females and children, and it is possible that one burial contained two individuals. The landscape of Khirbat al-Ḥiri's north and west sides reveals a network of caves and cisterns. Since natural and rock-hewn caves were a common and preferential burial method among the people of the highlands, a systematic survey may ascertain whether these features were tombs that may possibly have escaped the notice of grave robbers. A similar network of caves existing at Za'faran I (WT-34) also warrants attention.

The Burials

Buikstra and Ubelaker (Buikstra and Ubelaker 1994) summarized and illustrated five key macroscopic features of sexual dimorphism for each of the adult skull and innominate. Each feature was scored from '1' to '5' with '1' being most feminine; the scores were averaged for each bone and biological sex assigned. Those scoring '3' were sexually ambiguous at the biological level. Morphological features observed on the skull included: the robusticity of the nuchal crest; the robusticity and inclination of the mastoid process; the definition of the supraor-



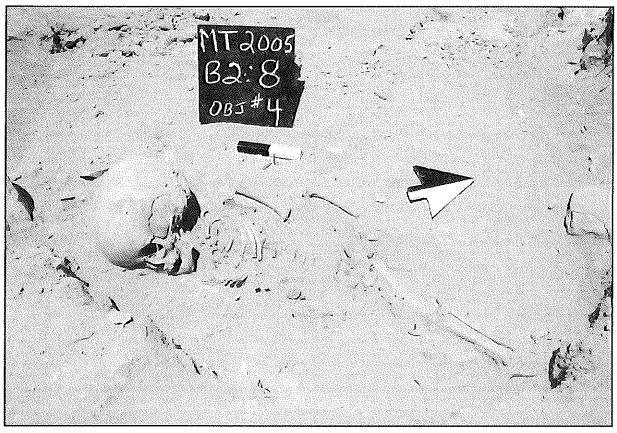
23. Looted grave at Rujum al-Ḥiri (WT-17).

28. Additional cemeteries were noted (not assigned a site number) on a return visit to Sites WT-115 and WT-116 on the last day of the season; these sites will be recorded in more detail next season.
29. Rujum al-Ḥiri was visited by J. A. Dearman, Wādī ath-Thamad Survey Director in 1996.

bital margin (blunt vs. sharp); the distinctness of the supraorbital ridge; and the projection of the mental eminence (chin). Features observed on the innominate were: the presence of a ventral arc (female); the angle formed by the subpubic concavity; the morphology of the ischiopubic ramus; the angle formed by the sciatic notch; and the presence and depth of the preauricular sulcus.

The assignment of the age-at-death of an individual decreases with age, and therefore, the assignment of a smaller age range is possible among subadults. The dentition of nonadults is the most accurate method of determining age, with the eruption sequence illustrated by Ubelaker (Ubelaker 1978) universally employed. In cases where dentition was absent, long bone measurements were taken with sliding callipers and age was determined from growth charts presented by Scheuer and Black (Scheuer and Black 2000). Epiphyseal fusion and development of secondary ossification centers aid in establishing the age of children and adolescents, but are less precise when compared to dental eruption (Scheuer and Black 2000). Optimal methods of age determination include the degenerative changes to the pubis (Todd 1921a, b); changes to the auricular surface of the innominate (Lovejoy *et al.* 1985); and sternal rib end modification (Loth and Iscan 1989). When all elements were present, the ages determined by each method were averaged.

Stature was calculated from inserting the postcranial measurements described below into regression formulae developed for European males and females (Trotter 1970). All of the long bones and many smaller bones of the extremities may be used to determine stature, however, the combination of the left femur and tibia is preferred and was used if possible.



24. Infant burial in Building 205.

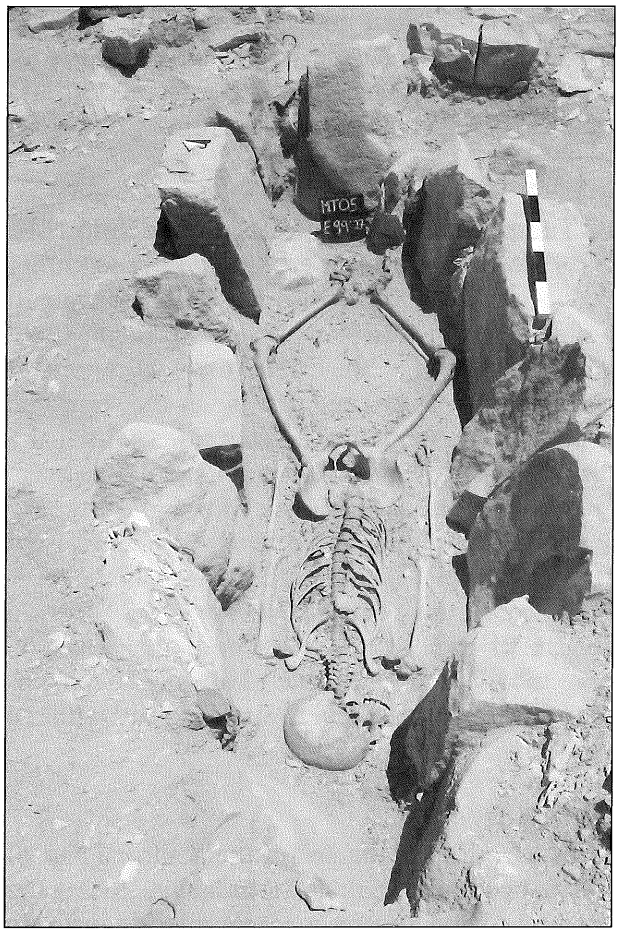
MT B2:9 (**Fig. 24**)

The skeletal remains of a young child (MT B2:9) were interred on the step within Building 205, Room 210. The child was fully articulated and laid partially on its right side so that the body was oriented at 220°. The skull was turned to the right so that it faced the rise of the step. The arms were extended on either side, so that the left forearm was pronated and the right forearm was supinated. The right leg was slightly bent to about 150° and the left leg was crossed over the right lower leg. The complete skull and the most of the postcrania were recovered aside from a few hand and foot bones. The dental eruption sequence indicates that the child was 18 months +/- 6 months. No artefacts were interred with the child.

MT E99:27

Square E99 is located at the southern end of the main site of Khirbat al-Mudanya. During the previous 2004 season a circular stone installation (E99:24), typical of funerary architecture, was discovered in the eastern balk of E99, straddling and intruding into Square G9. The excavation of the installation produced a burial pit lined with standing stones (E99:24) that surrounded a fully articulated adult skeleton (E99:27; **Fig. 25**), a configuration that is similar to the Caesarean graves described by Chase (1996). The skeleton was oriented to 150° in a supine position with the head turned to the right so that the skull faced east. The arms were extended at both sides with the forearms pronated so that the right hand lay beside the right innominate and the left hand lay underneath the left innominate. Both legs were positioned unusually so that the knees were directed laterally to create a medial angle of about 150° between the femur and lower leg of each appendage. The heels were drawn together and the left foot rested on a stone that was embedded in the floor of the burial. No artefacts were interred with the burial, however, two bracelet fragments (MT 808-6/2 and MT

30. Comparable glass bracelets have been reported from numerous tombs, some dating as early as the late Roman period.



25. Grave in Field E.

809-6/3) dated to the Ottoman period (13th-17th centuries)[30] were recovered during the previous 2004 season. The individual was assessed as a male about 24-25 years of age who stood about 169.93 +/- 3.94cm. This young male suffered from a minor periosteal infection on two hand phalanges and slight dental calculus. Habitual squatting that resulted in the toes being dorsally flexed was indicated by the presence of facets on the heads of the left and right first metatarsals of the foot (Lai and Lovell 1992).

In addition to E99:27, isolated bones of an infant were recovered just north-east of the feature in the approximate location where a cluster of commingled adult and infant bones (G9:4) had been excavated at the end of the 2004 season. A few adult bones were found east of E99:27 where additional adult bones (G9:6) were recorded in 2004. It is suspected that the partial remains of G9:6 conjoin with the adult bones of G9:4, but this will be determined when the skeletal remains from the two seasons are examined together.

WT-140:3

The skeleton (WT-140:3) recovered from the shallow bedrock cave was supine with the left leg slightly flexed laterally but extended (**Fig. 26**). The right leg was sharply flexed at the knee to 90° so that the lower leg crossed the left leg at the left knee. A wooden circular linear object (WT 724), possibly a staff, rested alongside the left tibia. The left arm was flexed at the elbow so that the forearm crossed the abdominal area at 90°. The right arm was not visible and although we were able to remove all of the soil from behind the body and underneath it the arm was never recovered. The body was oriented at about 220° and faced SSW to the right. WT-140:3 and was identified as a young male less than 25 years of age with no perimortem trauma or active lesions. The majority of the elements were recovered with the exception of the right patella, arm and numerous hand and foot phalanges. During his life this individual experienced a fracture of the first proximal foot phalanx that split the distal condyle. Nonspecific infection was present on the right tibia. Vertebral lesions were congenital and included spondylolysis of the



26. Cave burial at Site WT-140.

fifth lumbar and a partial cleft of the first sacral lumbar. Although little dental wear was present, this person suffered from extensive dental disease including dental calculus, periodontitis and antemortem tooth loss, which is unusual for such a young adult.

Taphonomic factors explain the absence of the left and right hand bones, and patella, particularly as there was faunal activity (pit vipers and toads) during the excavation of the feature. The absence of the right arm may be the result of post-mortem accident or surgery, but this cursory examination of the bones did not reveal any evidence of trauma or surgical intervention. The isolated human (female?) fibula recovered from WT-140:5 remains a mystery, but the extension of the excavation area may reveal the associated skeletal remains.

WT-112:13, 16, 19

A rectangular area 3.00 x 6.00m delimited the robbed area (WT-112:1) in Field B/112 to contain it and the southerly expanse of the robber spoil heap. A hard-packed threshold contiguous with that of the interior of the grave floor identified the original entrance. A cluster of commingled bones, predominantly those of the lower body of one individual (WT-112:19), were located outside of the threshold. About 1.00m south of this group was a second bone cluster that consisted primarily of this individual's upper body bones and a mandible. The bones of at least one additional individual were intermingled among these clusters and distributed throughout the disturbed fill. The minimum number of individuals was two adults (one male and one female) based on the presence of two left and right humeri and two right mandibles. An infant fibula and scapula fragments from the more southerly bone cluster indicated that at least one infant (WT-112:13) was interred with the adults. The distribution of the disarticulated bones within the spoil heap suggests that the adult male (WT-112:19) was the first body removed, while an infant (WT-112:13) and female (WT-112:16) were more inaccessible —either further back within the tomb's recess or perhaps they were from another nearby tomb subsequently robbed.

Conclusion

It is evident from this preliminary pedestrian survey and excavation that funerary structures and cemeteries are not as enigmatic in central Jordan as previously believed, although the discovery of Iron Age tombs and cemeteries continued to elude us. Nevertheless, the potential bioarchaeological data from the temporal range of human habitation (Neolithic to Byzantine) that is present in the Khirbat al-Mudayna region offers an exciting opportunity to evaluate and understand how environmental pressures and technological innovations influenced the health, diet, behaviour and migration patterns of past peoples in the Madaba region. The looting of the cemeteries jeopardizes this opportunity and is now endemic within this region where it previously was not a problem. The recently initiated year-round protection and the authorized systematic excavation of these cemetery sites by bioarchaeologists will preserve the integrity of ancient people in an ethical manner, while at the same time perpetuate the biocultural history of the Madaba region.

Wādī ath-Thamad Regional Survey 2005

(Jonathan Ferguson)

Introduction (Fig. 27)

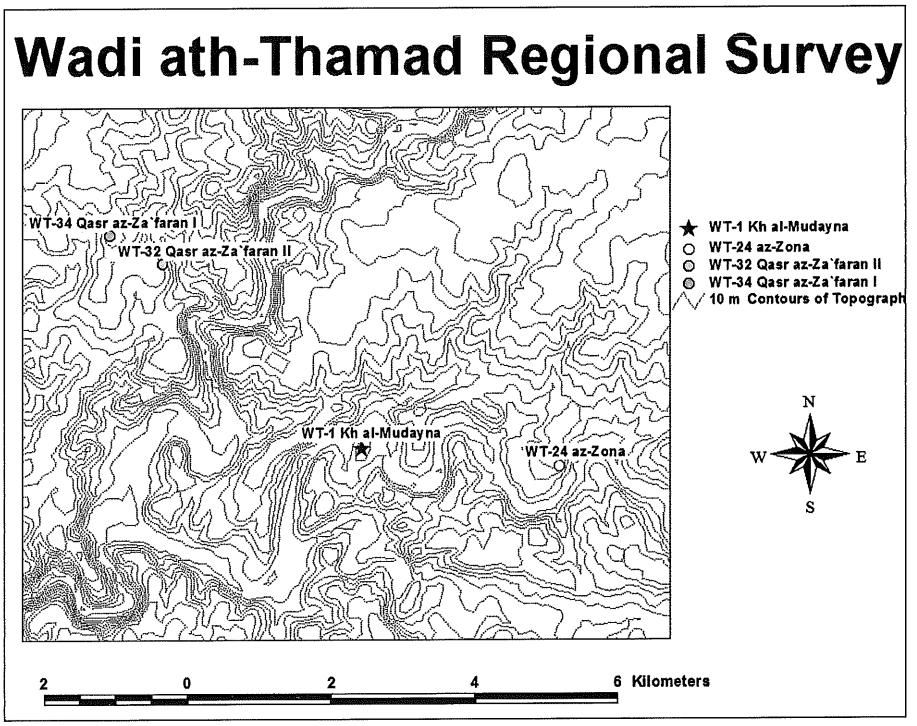
The 2005 Survey team worked at 23 sites within the Wādī ath-Thamad drainage basin; this number includes eleven previously undocumented sites (WT-120 through WT-129 and WT-131)[31], as well as twelve known sites which were revisited for further research, most notably Qaṣr az-Za'faran I (WT-34), Qaṣr az-Za'faran II (WT-32) and Khirbat az-Zūna (WT-24). In order to supplement previously published material, these last three sites will be the focus of this report.

WT-24, Khirbat az-Zūna (Fig. 28)

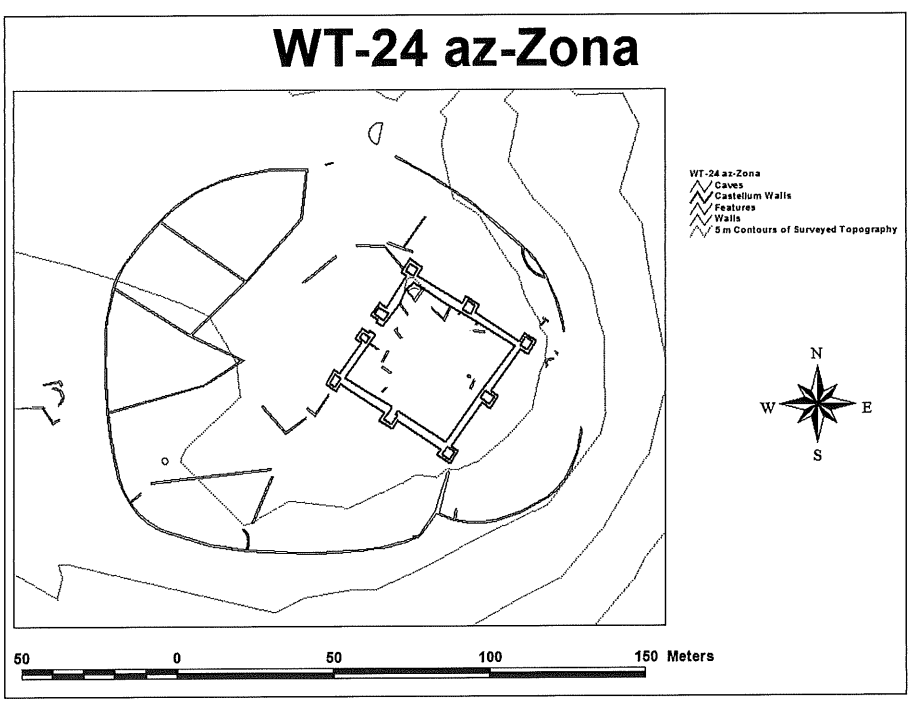
UTM: 778661E 3498204N 650m ASL; Bearing: 2.72km at 294°M to Khirbat al-Mudayna; JADIS: 2311.008 (Palumbo 1994: 2.133).

Khirbat az-Zūna is a Roman castellum located on the high (46.0m) western bank of the Wādī ath-Thamad, almost 3.0km east of Kh-

31. A Leica TCR705 total station was used for surveying, supplemented by a Magellan 2000XL handheld GPS receiver for site location.



27. Wadi ath-Thamad Survey area; map by J. Ferguson



28. Plan of az-Zūna (WT-24) and surrounding features; J. Ferguson.

irbat al-Mudayna. According to Brünnow and von Domaszewski (1909: 335), the site was then known as "ez-Zânije," while the 1997 Wādī ath-Thamad Regional Survey team reported that local inhabitants call it "Khirbat al-Mudayna East" or "Rujum of the Wells." Although located on a high plateau with commanding views down into the wadi, the castellum's placement southeast of the hill's summit reduces its visibility to the north and west.

The castellum at Khirbat az-Zūna is square, with a strong perimeter wall, four corner towers and interval towers on all sides except the northwest, where two smaller towers flank a gateway. The castellum is almost square, and measures approximately 47.8m per side, including the corner towers, or 42.7m without them. These four corner towers average 4.80m square, projecting

2.60m from the perimeter wall. The three interval towers are of similar size, at 5.00m wide and 2.90m deep, while the two gate towers are smaller, measuring 4.30m by 2.60m. The walls of the towers themselves are each about 1.00m thick. The perimeter wall averages 2.40m thick and stretches 16.80m between towers, except on the northwest, where it is 12.00m long between the corner and gate towers. Between the gate towers, 0.80m long wall stubs leave a passageway measuring 3.50m wide that gives access to the castellum's interior. The fort's perimeter wall is built of 3 rows of stones with rubble fill between them[32], while the towers were built of ashlar blocks. The presence in the towers of some stones with tooling marks, and one bossed stone in the eastern corner tower, suggest that the castellum may have been partly built with reused masonry from an older structure in its vicinity.

Walls could be followed in places inside the castellum, but because of the profusion of later graves (some looted), no recognizable pattern could be discerned. However, most of these 15 wall lines appear roughly parallel to the castellum's perimeter. A particularly thick wall section is located just inside of the south-eastern interval tower. A decorated masonry block suggests that this rear tower may have extended into the fort, perhaps as a principia, as seen at Qaṣr Bshir in Jordan and ad-Diyatheh in Syria (Kennedy 2004:148-151, 219). Ceramic water pipe fragments, some with plaster wall facing still attached, were found in and around the castellum, but particularly in the north-central portion of the fort's interior. Thus, it appears that the castellum's garrison may have had not only a headquarters, but perhaps a small bathhouse.

Outside the fort are a number of features contained within a large, oval enclosure wall, which encompasses a space 126.0m north-south and 153.0m east-west. Except on the western side, this wall follows the edge of the hilltop's slope down into the wadi below. Although substantial gaps now exist in the wall to the northwest and northeast, its circumference can be clearly followed elsewhere, and is best preserved in the southeast, where it curves inwards towards the castellum, intersecting with another wall section. This stretch includes a course of one or two rows of horizontal stones, against which is placed a row of vertical stones along its inner face. Half of a limestone column drum, with clear tooling marks, was found reused here, built into the enclosure wall (another possible column drum was observed in the wall's southwest section). Unfortunately, the enclosure wall's generally poor preservation has obscured the oval's function and the location of any gates through it.

Within the enclosure wall are a number of other wall lines, particularly to the west and south of the castellum, where the outer wall extends farthest from the fort. On the west, a number of walls at right angles enclose large areas, perhaps used as animal pens. As in the fort's interior, there were a number of graves (both intact and looted) within the enclosure, clustered around the castellum's east and west sides. One grave is within the oval wall and another is at the wall's edge to the north. A few short walls west of the oval enclosure may represent an extramural building.

In his report of the site (his site 70) Glueck (1934: 27, 30, 90) mentions the corner and interval towers[33], but underestimates the fort's size at only 30m square, without the corner towers. Glueck also does not indicate the gateway on his plan, saying that it "was not clearly defined" (1934: 30). Khirbat az-Zūna was also visited by Parker (as his Site 16), which he reported to be built "on a man-made platform" (1979: 77) although no evidence for this could be found in 2005. Parker produced a plan of the fort measuring 44.0 by 40.0m, which he states "supersedes that of Glueck, which is somewhat inaccurate" (1979: 78), although in a later publication he reverts to Glueck's 1934 plan (1986: 45-46). Parker's description and plan of the castellum at Khirbat az-Zūna include a main gate at the midpoint of the southeast wall and a smaller postern doorway next to the southwestern interval tower. A gate in the southeast wall is supported by Kennedy on the basis of an aerial photograph (2004: 133). While the presence of Parker's postern gate has not been ruled out, no evidence for this gate in the southeast wall was apparent in

32. Cf. Parker (1979:78), who identified two rows with rubble fill.

33. Brünnow and von Domaszewski (1905: 335) mention Khirbat az-Zūna, but give no further details.

2005. In fact, the castellum's gateway was clearly identified on the fort's northwest side, so that Parker's 1979 plan must be rotated fully 180° to coincide with the features observed in 2005.

Glueck collected Roman, Byzantine and Islamic sherds from Khirbat az-Zūna (1934: 30), while Parker (1979: 78, 304-305) found pottery from Iron Age II (few), Late Roman, Early Byzantine (dominant) and Late Byzantine periods. The 1997 Wādī ath-Thamad Regional Survey also collected Late Roman and Byzantine sherds. The 2005 Wādī ath-Thamad Regional Survey collected 818 sherds, with preliminary readings of Iron Age II (few), Roman (dominant), Late Roman and Byzantine.

Iron Age ceramics recovered from the site support a pre-Classical occupation at Khirbat az-Zūna (cf. Kennedy 2004: 134), although no architectural remains have been found dating to this period. The reuse of decorated masonry and column drums suggests that the castellum may have incorporated an earlier structure on the site, although no Early Roman or Nabataean pottery was identified during the 2005 survey. Based on the surface pottery and the fort's quadriburgium design, Parker concluded that the castellum of Khirbat az-Zūna was founded in the late 3rd or early 4th century AD, together with a chain of other such castella, watchtowers, and the fortress at Lajjun, east of the *Via Nova Traiana*. However, while most of these other sites were abandoned by the late 5th century, Khirbat az-Zūna appears to have been garrisoned to protect the caravan route throughout the Byzantine period, as late as the Muslim conquest in the early 7th century (Parker 1979: 80, 1986: 45).

WT-32, Qaṣr az-Za'faran II

UTM: 773138E 3500998N 681m ASL; Bearing: 294°M to WT-34 (Qasr az-Za'faran I); JADIS: 2311.007 (Palumbo 1994: 2.133)

Site WT-32 is the smaller of two qusur near the village of Za'faran, above the Wādī az-Za'faran, and is generally known as Qaṣr az-Za'faran II or B, or locally as "Little Za'faran." The larger Qaṣr az-Za'faran I is located uphill, to the west[34]. The qasr structure of WT-32 has its corners pointed to the cardinal directions and measures 19.7m northwest-southeast by 15.5m northeast-southwest and still stands to a height of 10 courses (4.50m). These dimensions conform very closely to the description and photograph by Glueck (1934: 30-31)[35], so it appears the qasr has fared relatively well over the past seventy years. There is no apparent doorway, although the northern corner appears to be a good possibility. A possible window was observed towards the eastern end of the southeast wall, where a gap in the wall stones appears to extend through the width of the wall. The outer walls are built of large boulders and average ca. 2.20m thick. Unlike at neighbouring Qaṣr az-Za'faran I, no substructure or foundation was evident for these defensive walls.

The internal arrangement of the qasr is difficult to discern, but at least three northwest-southeast walls and 4 northeast-southwest walls could be identified. Glueck's claim that Iron Age foundations could be distinguished among the interior walls of the Nabataean qasr (1934: 30) could not be verified. Some limited digging has recently taken place within the qasr, inside the northeast wall.

Compared to WT-34, Qaṣr az-Za'faran II has a paucity of outlying remains, contrary to Glueck's claim that "various ruined houses and foundation walls are visible around the Qasr" (1934: 30). Near the western corner of the qasr is a large elliptical ring of stones, apparently a grave. About 25.0m down-slope to the southwest is a rough wall of large stones running parallel to the building. Its ends turn towards the qasr, but these wall lines cannot be followed very far in that direction. Much farther down the slope, in the same direction, was found a smaller wall stub aligned roughly north-south, although this feature may be unrelated to the qasr.

A number of inscriptions were carved or pekked into the walls of Qaṣr az-Za'faran II. Several inscriptions along the northeast and southeast

34. References by Brünnow and von Domaszewski (1905:326) and Musil (1907: 245) suggest that WT-32 may also have been known as "Qasr al-Komrok." Qasr az-Za'faran II (the "kleinerer Sigalturm,") was visited by Brünnow and von Domaszewski (1904:26), Glueck (Site 71, 1934: 30), Parker (Site 11, 1979: 73-76) and by the Wadi ath-Thamad Regional Survey in 1997 and 2005.
35. Glueck's photographs of WT-32 and WT-34 are reversed (i.e., Qasr az-Za'faran II is his figure 13d, rather than 13c).

walls are clearly Arabic, while others may be in Thamudic script. One clear Thamudic inscription with at least six lines of small, thin, pecked characters was discovered on the southeast wall, just left and below a possible window. Two gaming boards are visible on the upper course of wall stones in the qasr's northern corner. One consists of four rows of eight round holes, while the other has two sets, each with two rows of eight holes (cf. Glueck 1934: 30).

The dating of Qaṣr az-Za'faran II is problematic because of the low frequency of sherds. Glueck (1934: 30) reported Nabataean sherds to be dominant, with Byzantine and Early Iron I periods also represented. Parker (1979: 76, 303) collected predominantly Iron II sherds, with some Late Roman and Early Byzantine examples. The 1997 Wādī ath-Thamad Regional Survey found mostly Iron II sherds, with a few Ayyubid/Mamluk examples. The 2005 survey team also recovered mostly Iron II pottery, although the late Hellenistic or Nabataean periods are also represented.

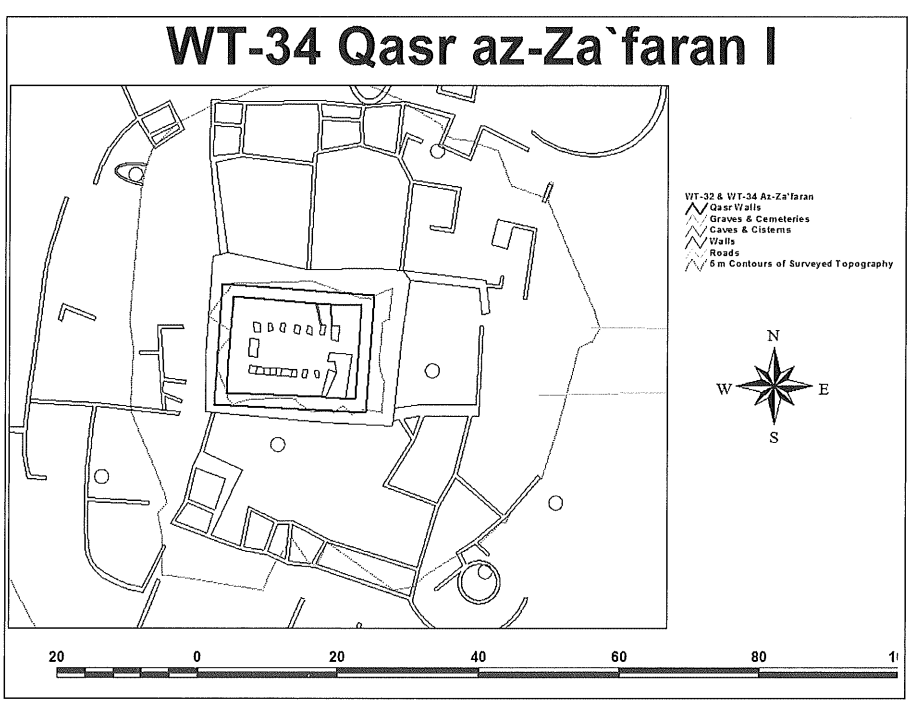
The function of Qaṣr az-Za'faran II remains unclear, since its strong defensive architecture seems at odds with its inferior strategic location vis-à-vis WT-34. Located off the top of its hill, WT-32 has poor visibility to nearby hills and watchtowers, although it has good views down into the Wādī az-Za'faran, to which Parker credits its raison d'être (1979: 74).

WT-34, Qasr az-Za'faran I (**Fig. 29**)

UTM: 772408E 3501402N 714m ASL; Bearings: 65°M to WT-17 (Khirbat al-Ḥiri); 173°M to WT-18 (ar-Rumayl); 114°M to WT-32 (Qasr az-Za'faran II); JADIS: 2311.001 (Palumbo 1994: 2.133)

WT-34 is the second qasr-centred site near the village of az-Za'faran, but includes a much larger number of outlying features than its counterpart, WT-32. Its location on a hilltop is also more strategically advantageous, with clear views to other watchtowers, such as ar-Rumayl (WT-18) and Rujum al-Ḥiri (WT-17). The site is commonly known as Qaṣr az-Za'faran I or A, or colloquially as "Big Za'faran."

WT-34 was visited by Brünnow and von Domaszewski (1904: 26-27), who described the ruins and drew a plan with the qasr and a large structure immediately to its south[36]. Glueck's description of his Site 72 (1934: 30-31) matches the 2005 Wādī ath-Thamad Regional Survey's observations at Qaṣr az-Za'faran I[37], but the Nabataean house Glueck describes east of the qasr could not be located, but must be in the area of



29. Plan of Qaṣr az-Za'faran (WT-34) and surrounding features; J. Ferguson.

36. The qasr was also noted by Musil (1907: 106, 245, 296).

37. However, it must again be pointed out that the photographs for his figures 13c and 13d have been reversed (see the discussion above for WT-32).

the modern school and house across the road[38].

The qasr at the centre of WT-34 measures 16.80m north-south and 21.70m east-west. The main walls are average 1.70m thick, standing to a maximum of height of 16 courses (6.20m). These walls were built above a 1.28m high podium (partially visible on the east, west and south) that is identified with Glueck's "earlier substructure" (1934: 30). Parker (1979: 74) reported that the qasr was supported by a round platform measuring 30.0m diameter, which was surrounded by a retaining wall. The 2005 Wādī ath-Thamad Regional Survey's work found that Glueck had better described the extant architecture, whether or not his chronological argument is correct. This substructure projects an uneven distance from the qasr's walls, from 1.60m on the west and south sides to 4.30m on the east[39].

The interior arrangement of the qasr forms another rectangle within the structure's outer walls. Most striking about this design is a series of 6 square pillars on both the north and south sides. Wall sections can be seen between 4 pillars on the west end of the southern side, but are not visible elsewhere. A thick rectangular wall fills most of the space between the westernmost pillars. At the eastern end, walls connect to the north and south qasr walls, forming an interior east-west doorway. This internal arrangement suggests that the qasr's entrance was on the narrow, eastern side, which is poorly preserved and covered with collapsed stones.

A large number of ruined walls, caves and debris cover the large terraces and hill slopes around the qasr (283m north-south x 146m east-west)[40]. Some of these walls appear relatively modern and makeshift and may be animal pens made by shepherds exploiting the site's ready supply of stone. Other more substantial walls appear to be permanent constructions connected to the qasr's occupation. The best preserved of these is a building to the southwest, which Glueck describes as "a series of courtyards and rooms" (1934: 30), and which were mapped by Brünnow and von Domaszewski (1904: 27). While many of the walls run parallel to the qasr, some substantial walls are at entirely different orientations and may represent earlier occupation.

There is a curved defensive wall that is best preserved along the terracing west of the qasr. Glueck (1934: 30) also identified a "megalithic" perimeter wall on the north that was tentatively relocated by the 2005 survey team, together with a possible southern segment.

At least 22 caves and cisterns were examined at WT-34 in 2005, including a natural cave at the site's northern limit and a well-carved cistern just northeast of the qasr. A concentration of caves, many with lintels, entrance walls and smoke-holes appears to form a troglodyte village at the site's southern end. Some of these caves appear to be used as sheep pens today.

A cemetery southeast of the qasr has rings of stones similar to those seen at other sites. Some of these graves appear old and overgrown, while others are obviously modern, with cinderblocks substituted for stones. One area showed signs of digging, possibly representing looting or a more recent burial.

Glueck (1934: 31) reported collecting a large number of Nabataean sherds along with Early Iron I–II ceramics, the latter especially on the site's southern slope. Parker (1979: 74, 302-303) recorded a few Iron I, Iron II, Early Roman/Nabataean (dominant), Late Roman and Umayyad sherds. The 2005 Wādī ath-Thamad Regional Survey recovered Iron II, Early Roman/Nabataean, Umayyad and Ayyubid sherds (Pails 309, 311, 312). The high concentration of Iron II sherds on the south slope suggests that this was the location of a midden. Islamic pottery was also collected from this same area.

Based on its design and inter-visibility with other sites such as ar-Rumayl and Khirbat al-Ḥiri, it appears that Qaṣr az-Za'faran I functioned primarily as an Iron Age watchtower and defensive fortification. Its role in Early Roman/Nabataean times may have been similar, but surface finds appear less frequent. Parker (1979: 76, 1986: 45, 145) suggests that both qusur at az-Za'faran were garrisoned until the 4th century, as detachments from the castellum at Khirbat az-Zūna. However, the settlement which grew

38. Parker also studied Qaṣr az-Za'faran I (as Site 10) in his dissertation (1979: 73-76).
39. The northern side of this podium is not visible amid the tumbled stones, and has been extrapolated on the 2005 plans to the intersecting walls.
40. For a good view, see the aerial photograph in Kennedy 2004: fig. 12.11C.

around the qasr may have outlasted the site's military function.

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FROM 'GUARD HOUSE' TO CONGREGATIONAL MOSQUE: RECENT DISCOVERIES ON THE URBAN HISTORY OF ISLAMIC JARASH

Hugh Barnes, Louise Blanke, Kristoffer Damgaard, Ian Simpson, Mette Low Sørensen and Alan Walmsley

Introduction (AW)

The large Umayyad-period congregational mosque at Jarash, first definitively identified by excavation in the summer of 2002, seriously questions the way past scholarship has interpreted the structure and role of towns in Early Islamic Bilād ash-Shām. Often erroneously regarded as insignificant when compared with their predecessors dating to the age of Roman (1st-3rd centuries AD) and Byzantine (4th-6th centuries AD) control, the recent work at Jarash – when combined with other recent discoveries at other sites such as Pella, 'Ammān and Mādabā – now demonstrates conclusively that the early Islamic towns of Jordan prospered as social, political and economic centres of regional importance, and served a crucial role in the maintenance of administrative systems under Umayyad hegemony. Cognizant of the implications resulting from the identification of a large mosque, the Islamic Jarash Project seeks to document the Islamic heritage of Jarash in the widest terms – archaeologically, architecturally, numismatically, culturally and politically – in close collaboration with the Department of Antiquities of Jordan. We especially thank HE Dr. Fawwaz al-Khraysheh, Director-General of the Department of Antiquities, and our three DoA representatives to date: Mrs. Samia Khouri (2002), Dr. Rafe Harahesheh (2003, 2004 – second session) and Mr. Abdul Raheem Hazeem (2004 – first session), and the invaluable help of Mr. Abdul Majid Mejali who willingly offered logistical and technical support. Thanks also to the staff at CBRL 'Ammān for further logistic support and equipment, the German Protestant Institute, and last – but certainly not least – HE Mr. Tawfiq Kawar, the Danish Honorary Consul General in 'Ammān.

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Background (AW)

The discovery at Jarash of a sizable Friday mosque belonging to the standard early 'courtyard' ('Arab') style shows that the Roman and early Christian town was also a primary Islamic centre and hence, in addition to the mosque, other important buildings can be expected. The shortage of reliable data and the misleading conclusions deduced from earlier, erratic, archaeological discoveries have created a generally negative impression of urban life at Jarash in the early Islamic period. For instance, the highly respected historian Hugh Kennedy describes the civic standing of Islamic Jarash thus, in the widely circulated and well regarded reference volume *Late Antiquity: a guide to the postclassical world* (Bowersock *et al.* 1999):

'The mosque at Jarash (Gerasa), a town of

some prosperity in the Muslim Umayyad period, was little more than a large room with a miḥrāb in the shadow of the giant remains of antiquity and large numbers of Christian churches'. (Kennedy 1999: 229)

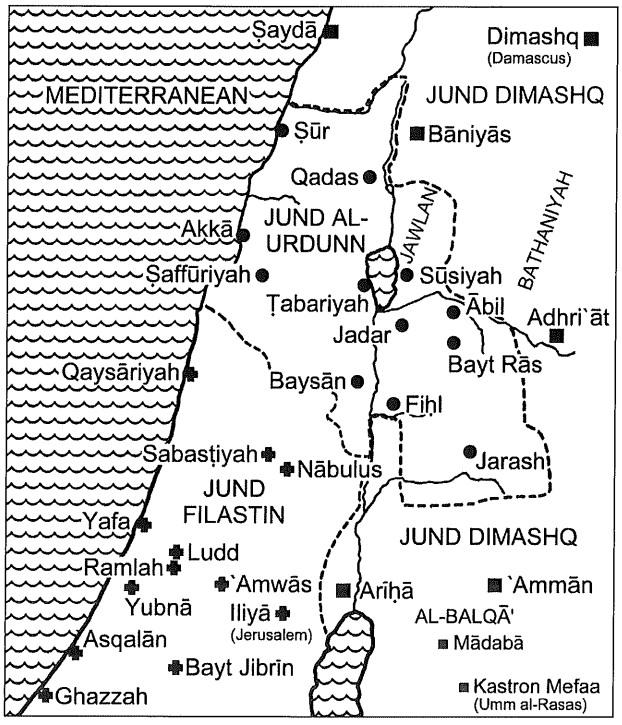
In this passage, Kennedy is referring to a very small, mosque-like structure located north of the Artemis Propylaeum and to the east of the cardo. Excavated in 1981 (Naghawi 1982), there is doubt if the structure ever was a mosque, and if it was it probably dated to later times. It needs to be noted that Kennedy is rare amongst historians of Islam because he eagerly uses archaeological data in his studies, but must rely on archaeologists for the accuracy of their material; regrettably, it is often the shortfall in his sources that leads to the type of understatement quoted above.

Other writers have similarly opted for a minimalist view of Jarash as an urban centre during the late antique – early Islamic transition. To W. Liebeschuetz, Jarash's urban tone as a post-classical town was simple functionality: 'the city had gradually become more utilitarian in appearance, and it continued to evolve in the same direction', so – not surprisingly – only a 'small' mosque was built (Liebeschuetz 2000: 47-50, 56). A. Northedge was likewise convinced of Jarash's social and economic irrelevance as an early Islamic centre, barely equipped with the most basic of mosques and with a small Muslim population at most.

The evidence of the excavations at Jarash and Pella, or Baysan on the West Bank ... has shown considerable continued small-scale construction and many finds under the Umayyads, but little monumental construction and no large mosques. The picture reflects the accounts in the historical sources of heavy taxation, and probably demonstrates that these cities remained largely non-Muslim until their abandonment (Northedge 1999: 1083-85).

How reliable is this image of a diminutive Jarash in the Umayyad period? At issue, in general terms, is the accuracy of current interpretations of urban life in early Islamic Bilād ash-Shām, and specifically the situation at Jarash. Was it a town of just 'some prosperity', or were conditions better (or maybe worse) than that? Was the urban expression of a new Islamic presence at Jarash solely to be found in little more than a few shuffled Roman-period stones? These are the sort of questions currently being addressed through a program of research and excavation by the Islamic Jarash Project (IJP).

Why should have Jarash been equipped with a Friday mosque in the Umayyad period? We know from a selection of third/ninth century Arabic sources on the geography and history of Bilād ash-Shām that Jarash was a district capital within the Jund al-Urdunn (**Fig. 1**), occupying the south-east corner of the province and strategically positioned between the agricultural riches of the 'Ajlūn highlands to the west and the pastoral potential of the Jordanian bādiya to the east. In the Umayyad period the town acquired sufficient administrative importance to mint both pre-reform (Justin II and Sophia type only) and post-reform coins, closely matching in style the more prolific mint of Baysan, seemingly Jarash's 'sister city' (Album and Goodwin 2002: 82, 84-85, 89-90; Naghawi 1989). In addition to the written and numismatic sources, excavations over the last 75 years at many different places within the antiquities site have revealed evidence for a booming industrialised economy in late antique and early Islamic times. An economy that threatened to overwhelm the formalized, but perhaps impractical, urban ideal encapsulated in classical-period Jarash (Walms-



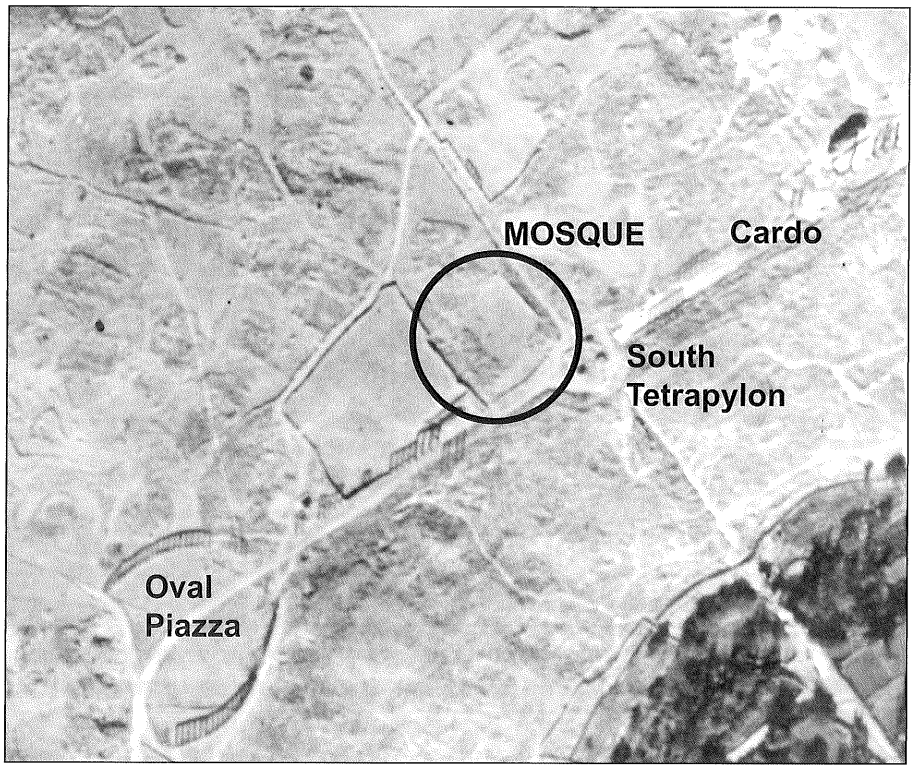
1. Map of southern Bilād ash-Shām in early Islamic times.

ley 2003). When considered as a whole this evidence, especially the coins, suggested the presence of an Islamic administration at Jarash, one of sufficient standing that it would have required the construction of a social, political and religious centre, focusing on a mosque. This was the building we needed to find to demonstrate conclusively a major Islamic settlement at Jarash.

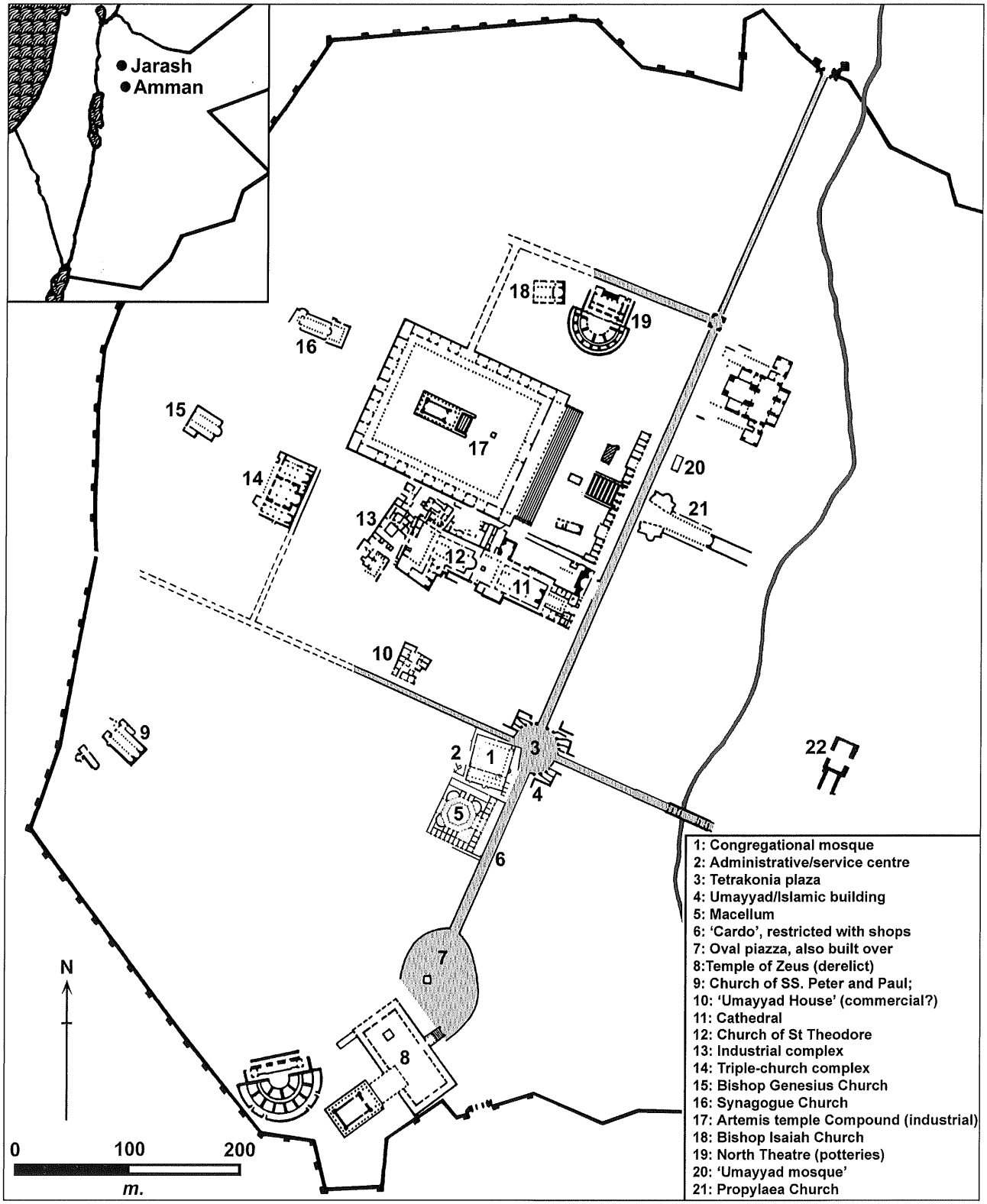
Locating Jarash's Mosque (AW)

The geographical centrality of the mosque in the first Islamic cities has been known for a long time, and once convinced of the necessity of a mosque at Jarash it was just a matter of looking for it in the right place, and with the right encouragement. In this matter I am especially grateful to Dr. Ghazi Bisheh, who also suspected that there was a mosque at Jarash located in a prominent, central location. Once becoming convinced of the necessity, discovery was not especially difficult. The mosque was first positively identified on an old aerial photograph of the archaeological site taken in the late 1920s. Scanning and enhancement of the original photograph early in 2002 revealed a large rectangular enclosure to the southwest of the South Tetrakonia piazza, and partially impinging on it. From the photograph a building measuring roughly 43.32 by 38.4 metres in size could be identified, with good evidence for a substantial tower at its northeast corner (**Fig. 2**). Along the south wall the remains of a separate room could be discerned, running the full width (east-west) of the structure, seemingly the *qiblat* (prayer) hall of the mosque. Especially revealing was the orientation of the building, which intentionally diverged from Jarash's Roman-period grid in favour of another, more pressing, social requirement: orientation towards the *qiblat*.

Additional examination of the aerial photograph revealed that the mosque was only part of a much larger Islamic urban core at Jarash, which can be mapped provisionally (**Fig. 3**). Immediately to the west of the mosque a further area of ruins could be recognized, perhaps the governor's quarters or another administrative building. Also clearly visible were more structures flanking the colonnaded south decumanus and continuing further up the slope to the west. This street seemingly served as a major arterial route for Islamic Jarash, as the paved street surface seems to have been unencumbered, whereas access along the south cardo was restricted by structures, almost certainly commercial in function. One of the buildings along the south de-



2. Detail of the mosque area at Jarash from an aerial photo of ca. 1930, on which the rectangular enclosure wall and northeast tower are clearly visible.



3. Preliminary plan of Jarash in the early Islamic period (eighth century AD).

cumanus was excavated in 1982-83 by a Polish mission (Gawlikowski 1986, 1997). It appears to have been an important unit within Jarash's commercial and market complex, comparable in function to that excavated in the 1990s at Baysan (Scythopolis) and dated to the reign of Hisham by a mosaic inscription in Arabic (Khamis 2001; Tsafrir and Foerster 1997).

As tempting as these many structures are, the first seasons of the Islamic Jarash Project were devoted to positively identifying and fully investigating the mosque prior to restoration, as all of the above deductions are dependent on properly recognising this the most critical feature of an early Islamic urban centre. However, it was found that the area immediately southwest of the tetrakonia was relatively disturbed by a series of events, firstly by agricultural activity involving field terracing, next excavations of the Yale Joint Mission (1928-34) and, finally, more recent archaeological soundings undertaken in the 1990s. Most significant was the work of the Yale Joint Mission, whose exposure of the circular plaza around the south tetrakonia in 1929 and 1934 partially uncovered, in the southwest quadrant, a 'well built Arabic edifice ... laid out in the form of a hollow square with at least one corner tower and colonnaded porticoes' (Kraeling 1938: 114). It was suggested that this strategically-located structure was a guardhouse, a rather implausible explanation. What they had uncovered, in fact, was the northeast corner of the mosque, including the corner tower visible in the aerial photograph.

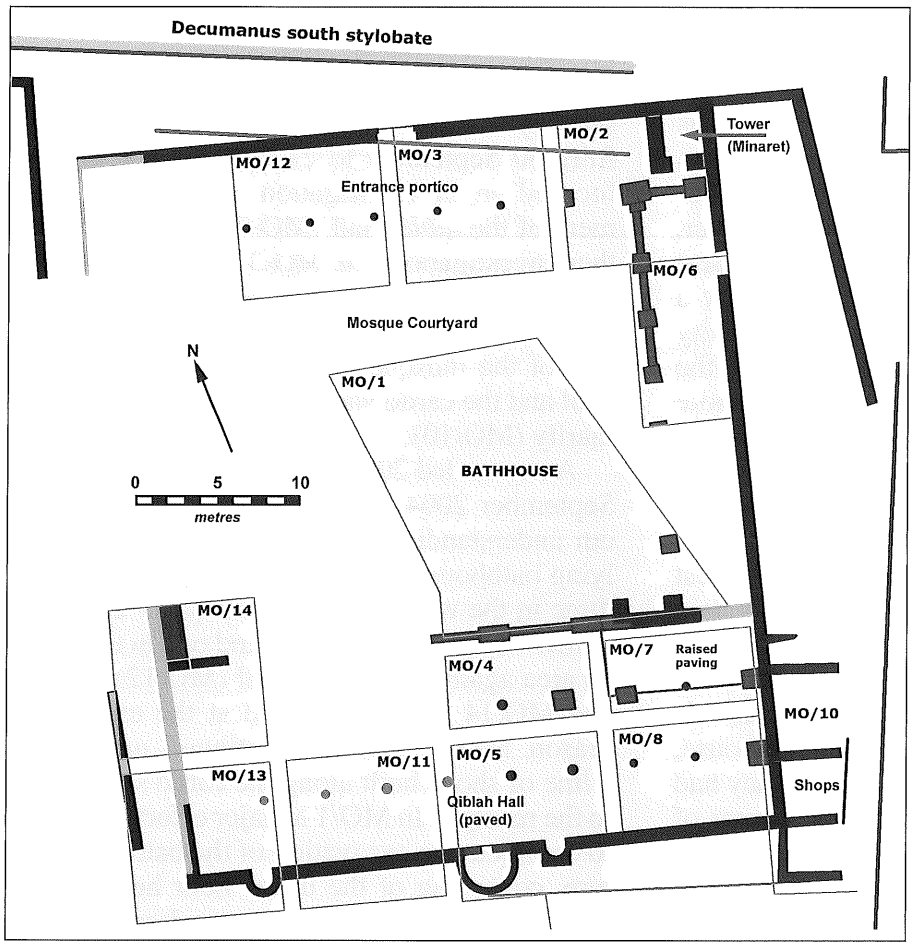
Renewed excavations in 2002, which lasted from 11 August to 12 September, sought to locate the main attributes of the mosque, especially the enclosure wall, *qiblat* hall and a *miḥrāb*, the latter a critical feature if a mosque was to be proven. To begin an excavation grid was laid out over the area of the mosque, its alignment being determined by the north and east enclosure walls that had already been exposed by earlier work. The whole area was designated MO, a double-letter title being used to avoid duplication of single-letter alphabetical area designations previously used by many other missions at Jarash. Excavation units fitting a ten by ten metre grid were strategically located in potentially vital areas, especially at the axial entrance, over the *qiblat* hall, and at the place where a *miḥrāb* could be expected (**Fig. 4**, units MO/3-MO/5). The area of the tower, reburied in recent times (the discovery of a 'Tulip'-brand tin can that once contained Danish corned beef seemed especially appropriate), was also reinvestigated (MO/2). An area of earlier excavations, opened in 1998 and still exposed, was reinvestigated (MO/1), revealing – somewhat surprisingly at the time – the foundations of a bathhouse that existed on the spot before the erection of the mosque.

A more limited season, reduced due to the security situation in the region, was undertaken from 30 September to 21 October 2003. Work focused on an investigation of the eastern segment of the *qiblat* hall (MO/7-MO/8), with further investigations in MO/3 and a new probe south of the tower inside the east wall of the mosque (MO/6). The area immediately to the east of the mosque between the east enclosure wall and the cardo was also investigated preliminarily (MO/10).

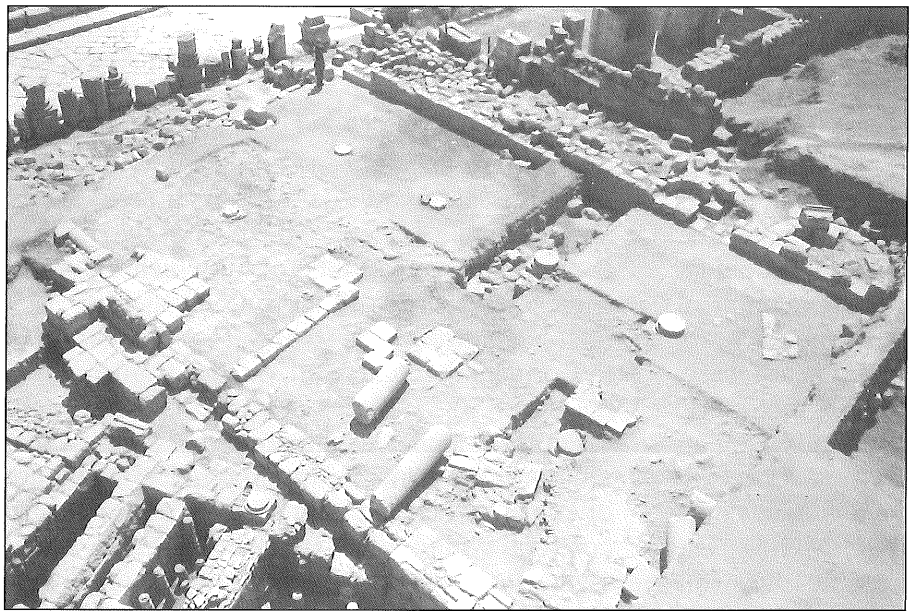
An extended 2004 season from 17 July to 12 September 2004 resulted in major advances in our understanding of the mosque and the underlying bathhouse. Four new squares were begun, three in the western half of the *qiblat* hall (**Fig. 4**, MO/11, MO/13, MO/14) and one in the portico area against the north wall (MO/12). MO/13 and MO/14 were unfinished at the end of the season. MO/10 was also continued, uncovering a line of shops built along the cardo subsequent to the mosque. In MO/1 a major effort was made to complete the excavation of the bath substructure, consisting of the under floor heating system that once warmed the rooms demolished to make way for the mosque (**Fig. 5**).

General Layout of the Mosque in Area MO (AW)

By the end of the 2004 season, a detailed plan of the mosque had been completed with the exception of the west enclosure wall area. While approaching a rectangle, the plan of the mosque is an irregular quadrilateral, in which the north enclosure wall of the mosque, measuring 38.9 metres, is well over two metres longer than the principal *qiblat* wall on the south, which measures 36.57 metres (**Fig. 4**). The east wall, set at right angles to the north and south walls, measures 44.5 metres in length. The walls are of stone, twin-faced with a rubble and red earth core and with a width of 70 centimetres. Many of the stone blocks used in the wall were recycled from earlier structures, the most obvious being large architrave blocks taken from street colonnades. As a rule, no mortar was used in the construction of the walls; however, a projecting mortar edging, decorated with incised lines in a herringbone pattern, concealed the joints be-



4. Plan of the mosque, showing excavated areas to 2004.



5. Overview of the mosque area at the end of the 2004 season, showing the central qiblat hall with central miḥrābs and a section of the earlier bathhouse to left (compare **Fig. 11**, *below).*

tween the wall stones on both façades. No other plastering or decoration is apparent on the extant walls.

The major features incorporated in the walls are narrow doorways, one each in the north and east walls, and three niches (*miḥrāb*, pl. *maḥārīb*) in the *qiblat* wall on the south. A deep *miḥrāb*, 3.5 metres in diameter, was axially located in the *qiblat* wall and structurally formed part of the building in its original form (**Fig. 5**).

Associated with this large *miḥrāb* was a smaller one at the western end of the *qiblat* wall, which perhaps was intended for the resident governor of Jarash. Later in time the main *miḥrāb* was blocked off, leaving only a narrow doorway for an unknown purpose. Perhaps at this time a smaller *miḥrāb* with a diameter of 1.65 metres was inserted into the *qiblat* wall immediately to the east. Unlike the circular external wall of the two first niches, this *miḥrāb* had a heavy square salient that projected some 80 centimetres from the external surface of the *qiblat* wall. Furthermore, the second *miḥrāb* was built using a quite different mortar, a white hard lime mortar in place of a light grey ashy mortar with black specks used for the original axial niche.

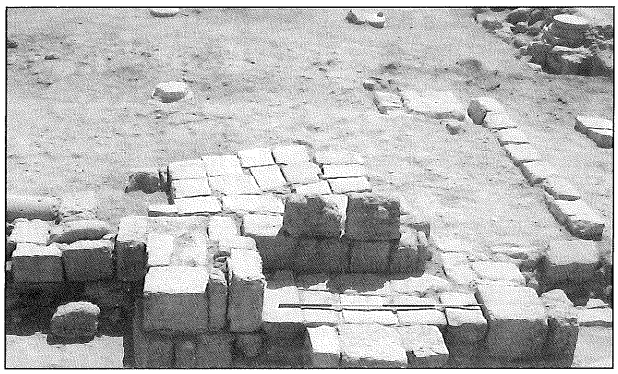
The difference in length between the north and south walls explains the irregular axial symmetry of the building. It was noted in 2002 that the entrance doorway in the north wall and the main *miḥrāb* of the mosque were, unusually, out of alignment, even though both features are located exactly in the centre of their respective walls, as they should be. However, because of the greater length of the north wall the doorway is offset to the west, and as the south, east and north walls lie at right angles the correction for this irregularity must be in the western wall, as yet largely unexcavated.

Because of the necessity to orientate the mosque towards the direction of the *qiblat* (at Jarash 160 degrees southeast), the building had to be set at an angle to the original Roman-period grid. The displacement of the building is particularly apparent with the north and east walls, which face out to the south decumanus and cardo respectively. In the early Islamic period the outfacing (entry) wall of a mosque was consistently built parallel to the *qiblat* wall to preserve symmetry, and hence at Jarash had to be offset from the decumanus. Nevertheless, even this twisting of the building's axis failed to properly align it to the *qiblat*; interestingly, if the cardo axis is taken as indicating north (which it does not), the mosque is then roughly aligned 160 degrees SE. Perhaps this was seen as acceptable.

Internally, the mosque featured a spacious but mostly unpaved courtyard. On the north, east and probably west sides stood porticoes 4.8 metres deep, made up of a single row of columns beginning at solid corner piers. The spacing between the columns on the east side was 3.5 metres, and that on the north a slightly wider 3.8 metres. Whether arches or flat lintels spanned these portico colonnades is unclear; only one displaced voussoir has been identified. The open centre of the courtyard measured 28.2 metres E–W and 24.6 metres N–S, the latter measurement assuming the absence of a portico in front of the *qiblat* hall façade. In the northeast corner, at the junction of the north and west porticos, there once stood a 4.5-metre square tower, almost certainly an early type of minaret (on the early minaret see Bloom 1989). To carry the greater weight of a tower, its internal walls were of thicker construction, about a metre instead of the standard 70 centimetres of the enclosure wall, and were built on solid foundations that stepped out a further 10 centimetres on each side. These internal walls clearly butt up to the enclosure wall, suggesting a later construction date. The tower could be entered from the east portico through a small doorway in its south wall, the threshold of which survives.

On the south side of the courtyard once stood the central feature of the mosque: the *qiblat* hall, which probably extended the full width of the building and had a total depth (N–S) of 13.8 metres. Excavation of the *qiblat* hall has identified two parallel colonnades in front of the *qiblat* wall, with an open entrance from the courtyard (*Ṣaḥn*) featuring arches on solid piers. Their deep and substantial foundations indicate they were designed to carry the considerable weight of a tiled roof. Many fragments of ceramic tiles have been recovered, and in total over five tonnes of smashed roof tiles have been excavated within the *qiblat* hall area. A most interesting and unusual feature is the discovery of evidence for solid walls at the point where the east and west courtyard porticos joined the façade of the hall. They probably helped to support the porticoes, which were also tiled, at their south ends. On the east, the wall was pierced with a doorway, the threshold of which survives. That doorway led to an enigmatic raised paved platform in the northeast section of the *qiblat* hall (**Fig. 6**).

The arrangement and function of buildings adjoining the mosque have been considerably clarified by the three seasons to date, but with more yet to be done. Excavation along the outside of the east wall of the mosque has exposed

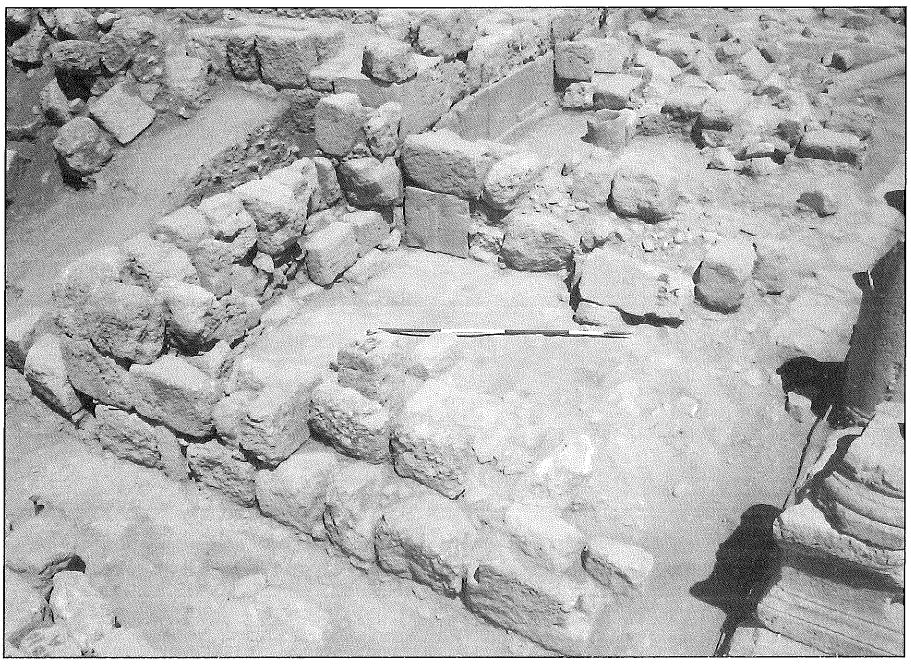


6. Platform area in the northeast quarter of the mosque's qiblat hall. In foreground, to left: east portico-qiblat hall doorway; centre-left: T-shaped pier of portico arcade; right: surviving segment of courtyard pavement; middle ground: surviving elevated qiblat hall paving with, to right, stone edging for the paving. Note the sub-paving packing terminates at the first line of the hall arcade (middle distance).

a row of shops (**Fig. 7**). These projected south of the *qiblat* wall, but were aligned with the lane that ran between the mosque and the macellum, along a line drawn from the main *miḥrāb* to the south wall of the shops. The shops were built to butt against the mosque's east and south walls, and faced eastwards out onto the cardo. Their eastern limits are not preserved, and seem to have been removed when the cardo was cleared in the earlier part of the twentieth century. To the northwest and the north of the mosque, elevated terraces originally gave access to the doorways of the mosque. While evidence for this has largely gone on the north side, due to earlier twentieth century clearing, some features can be identified revealing the importance of this approach to the mosque. Notably, the northern platform could have only existed if the south colonnade of the decumanus had been dismantled, for it ran over the stylobate of the colonnade.

Evidence for at least two large buildings located in a level area west of the mosque is just beginning to be revealed. Of these two buildings, the southern one might well be the governor's palace, given its proximity to the *qiblat* hall and, especially, the positioning of a *miḥrāb* at the western end of the *qiblat* wall. Both buildings were separated from the mosque by a roughly 2.5 metre-wide laneway, which linked the lane between the mosque and the macellum with the south decumanus to the north.

In order to understand the history of this pivotal area of Jarash before the construction of the mosque, much effort has been directed at excavating the earlier underlying bath complex that was demolished to make space for a new public building in Jarash. Work has focused on four large hypocaust chambers, with evidence of a makeshift refurbishment after the collapse of some of the floor supports. Subsequently, all of the sub-floor hypocausts were filled in with building debris, including a great deal of broken roof, floor and wall tile. Pottery finds would suggest a date in the first decades of the eighth



7. View of the shops east of the mosque, looking northwest.

century for this fill. Following the in-filling of the complex's hypocaust system, small basins were constructed in the rooms. These appear to have been for industrial purposes, as the hardened residue from the waste drains suggest. As the entrance piers of the *qiblat* hall were dug into the hypocaust fill, the industrial conversion of the bath house must have predated the construction of the mosque.

The Qiblat Hall (IRS)

The *qiblat* hall (prayer hall) was laid out to an oblong plan, bounded on the south by the principal *qiblat* wall, which is 36.57 metres in length, in front of which once stood two parallel colonnades, each made up of a row of eight columns (**Fig. 4**). The *qiblat* hall opened from the courtyard or Ṣaḥn behind an entrance façade of piers standing in front of the double colonnade, giving the hall a depth of approximately 12 metres. The outer walls of the *qiblat* hall were made from moderately well-dressed limestone blocks, each course containing a double row of interlocking stones with mortar pointing and a *terra rosa* earth fill. At the west end of the *qiblat* the wall remains standing at three to four courses above floor level reducing in height to the east until only wall foundations have survived.

As part of the main *qiblat* wall, excavation has uncovered three *miḥrāb*(s) (correctly, *maḥārīb*): a large central *miḥrāb*, a smaller second *miḥrāb* immediately to its east (**Fig. 8**), and a third *miḥrāb*, slightly larger than the eastern one and situated towards the end of the *qiblat* wall some twelve metres west of the central *miḥrāb*. The central and western *miḥrāb*(s) each have a round salient, while the small *miḥrāb* east of the central axis has a square external projection. The central *miḥrāb* – originally the main *miḥrāb* – was blocked in a later phase, leaving a small doorway within the blocking. This change may suggest the use of the *miḥrāb* as a place of storage. It is logical to suggest that this modification was made at the same time as the eastern *miḥrāb* was inserted into the *qiblat* wall. The western *miḥrāb* appears to be contemporary with the original building. It is separated by some distance from the other *miḥrāb*(s), pointing to differential use of space at this end of the *qiblat* hall. If an important building is located west of the mosque it may have had direct access to the *qiblat* hall or courtyard via an entrance in the western wall, although no evidence of this has been found so far. The *miḥrāb* recesses do not appear to be framed in any way. No evidence of a *minbar* has been found, but if there had been one it is likely that it was made of wood and has not survived.

The whole area inside both the courtyard and the *qiblat* hall was graded in order to provide a level base on which to construct the floor. The bed laid down was extensive since it had to



8. The primary axial miḥrāb and a secondary (substitute?) miḥrāb to its east.

compensate for the camber of the area, which falls to the east, and to raise the mosque floor level above the remains of earlier structures. In the *qiblat* hall the floor was then paved with smooth flagstones, which survive today only in patches. The column bases of the colonnades are generally below floor level and rest on deeper stone-block foundations. Accordingly, only the columns themselves would have been visible, rising up from the floor as the bases served as foundations for the columns and were not intended to be decorative in purpose. Most of the column bases are still *in situ* but all the colonnades have collapsed. While several column drums have been found in the *qiblat* hall, presumably from the colonnades, excavation has not provided evidence for whether they carried arcades, although this is likely. The colonnades terminated at stone piers that projected out from the east and west walls of the hall.

The entrance façade to the hall was made up of a line of piers one of which, that at the west end of the entrance façade, has been preserved to first course level. It is very solid and built from better dressed stone than the mosque walls. The pier preserves a plaster facing, indicating that the entrance façade was perhaps plastered in its entirety. Unexpectedly, the west wall of the mosque butts the north face of this pier and until further excavation the exact construction and plan of the west wall is unclear.

The piers stand on a substantial foundation wall that runs the full span of the mosque (**Fig. 9**). The foundation wall is made up of pier bases that run four courses deep and are slightly larger in plan than the piers, with lengths of shallower foundation bracing walls between the bases. The piers at the east and west ends of the entrance façade have a short buttressing wall on their courtyard face, meaning these two piers have a T-shaped plan. The buttressed piers are located at the two points where the portico colonnades of the courtyard join the piers at either end of the hall entrance façade, and the buttressing is thus designed to support the end of the porticoes. The substantial foundations and sturdy build of the piers show that they were designed to carry the weight of a tiled roof over the *qiblat* hall. Excavation has also revealed that the colonnades inside the *qiblat* hall were also built on sizeable foundation bases.



9. Foundations of the load-bearing façade of the qiblat hall.

At the east end of the façade to the *qiblat* hall are the remains of a doorway leading from the east portico into the hall (**Fig. 6**). One half of a stone threshold remains, behind which there is step structure consisting of a half-buried column piece laid horizontally flanked by stones. The doorway appears to be part of the original building design, and led to an area of paving that appears to have been part of a raised platform in the northeast corner of the *qiblat* hall. About 20 stone flags of the paved platform remain, elevated slightly above the level of the few other remaining areas of paved floor in the *qiblat* hall. The surviving paving of the raised floor clearly continued over a larger area, the western limit of which is delineated by a single row of building stones oriented north-south. This feature ends at the first (northern) colonnade in the *qiblat* hall, suggesting the raised floor terminated at this line of columns. Further evidence for the area covered by the elevated floor was found in the form

of an area of compact yellowish clayey packing surrounding the raised paving and continuing underneath it, probably laid down as bedding for the paving. The bedding layer fades out to the south and drops slightly in height around the first colonnade, confirming that the raised floor probably ended at that point.

The raised floor would seem to be part of the original mosque design, creating an area that was, to some extent, separated off from the rest of the *qiblat* hall. To the north of the platform an infilling wall was built, presumably as a later addition, running between the first and second piers at the east end of the entrance façade to the hall. The doorway entrance suggests complete bounding off of this platform space and control of access, otherwise a doorway in the entrance façade would seem pointless without also dividing off the area from inside the *qiblat* hall, which otherwise had open access from the courtyard. Thus a wooden screen, similar to a *maqṣūra* screen, may have been used to divide the platform area from the rest of the hall. The purpose of this area is not clear, but perhaps functioned as the madrasa of the mosque.

At the other end of the entrance facade of the *qiblat* hall, in MO/14, there is another infilling wall that runs between the outer mosque wall and the first pier, similar to the wall between the piers at the east end. The west infilling wall is a later addition but it is presently unclear whether it was built to brace the pier or to modify use of the space in some way. Further excavation should clarify this. Certainly, the raised platform at the other end shows that the *qiblat* hall acted as a multifunctional space in the mosque. In front of the west infilling wall in the entrance façade layers of a hard clay floor were found that appears to be the floor surface of the portico, which perhaps extended throughout the courtyard.

So far over five tonnes of roof tile pieces have been found within the *qiblat* hall. The oblong plan of the hall, with its *qiblat* wall, the double colonnade and the row of entrance piers, suggests a long triple-gabled roof covered the *qiblat* hall. The tile fragments have mostly been recovered from a thick dark layer that is largely uniform throughout the *qiblat* hall. No complete roofing tiles have been found, probably because any roof tiles that had not smashed were taken for reuse elsewhere after the initial collapse of the roof. Other salvageable building materials were also taken and only a few small areas of the paved floor remain. Post-collapse salvaging activity would explain the disturbance of the collapse layer.

There is a great deal of stone tumble lying outside the mosque walls from the collapse of the *qiblat* hall. Much less stone is found inside the hall, which shows that the walls fell outwards, pushed by the force of the heavy roof. The pattern of the fallen outer walls, the uniformity of the collapse layer and abundance of roof tile fragments indicate that the roof and some of the mosque walls collapsed in one event.

The North Portico of the Mosque and Underlying Workshops (KD)

The northern part of the mosque has been explored in two specific areas: the northeast corner structure (*manārat*) including the old Yale trench, and the north wall and portico, which has been excavated in two units: MO/3 and MO/12. The main function of these units has been to ascertain the existence of the mosque's northern *riwāq*, and to explore the relationship between the planning and construction of this portico, the north wall and the *Ṣaḥn*.

Unit MO/3

This excavation unit was opened in the first season of the project and was excavated in the following 2003 and 2004 seasons. The original intention of this square was to undertake a cross-section of the blocked entrance in the north wall of the mosque, and to investigate which type of surfacing would have extended into the mosque from the doorway. A more long-term goal is to examine the circumstances under which the mosque was constructed, and hopefully to contribute to the establishment of a firmer date for the mosque.

Among the earliest discoveries in MO/3 were a number of large worked stone blocks scattered south of mosque's northern wall. These appeared to be tumble from the collapsed north wall, since the compact *terra rosa* used as filling in the outer walls of the mosque was discovered both among and on top of the ashlars. A large amount of fragmented roof tiles was also discovered on top, among and underneath this collapse.

Immediately south of the blocked doorway

another area of tumble was identified; however, its separate placement in relation to the wall tumble in an area of loose greyish soil allowed us to deduce that this tumble must have originated from the blocking of the north entrance. In other words, the entrance was blocked after the original construction and use of the mosque, but seems to have suffered the same fate as the walls upon the building's destruction.

Although a yellow-white clayish soil with plaster inclusions was discovered in parts of the square, no immediately obvious surface was identifiable below the tumble. This is probably because the original surface would have consisted of earth, and it is possible that the collapse, followed by looting and centuries of disturbance due to plant roots seriously damaged this flimsy surface, making it difficult to discern.

Among the most important features to be discovered in the first season were two well-dressed column bases, presumably part of the northern portico; a column drum lying horizontally; and a large stone block used as the foundation for one of the column bases. Upon closer inspection, it was determined that the large block was Roman spolia, as it contained a well-preserved Latin inscription in which a father honours his fallen son. Excavation of the sondage in 2003 and 2004 revealed that this block extended deeper into the ground than expected, and its exact dimensions remain unknown.

With the intention of attaining a stratigraphic profile of the blocked doorway, a 2.5 by 2.5 metre sondage was laid out in the north-western corner of the excavation unit. In the following two seasons, this sondage was extended both horizontally and vertically in order to investigate the area's history immediately prior to the construction of the mosque. The remains of a low wall running east-west were discovered in the first season, followed by more extensive remains in the following year, when the sondage was extended southwards to span the entire length of the square.

In the north-western corner, not far below the estimated floor of the mosque, a small stone basin was unearthed. An area of grey ashy soil extended eastwards from this point and both in and around the basin a high density of metal slag was found, indicating the presence of a metal workshop or blacksmith. The space was enclosed by three walls, which seemingly delineated the workspace. Finds included numerous iron nails, perhaps being produced in this workshop, a copper buckle and an early Islamic post-reform coin, the latter seemingly in the room fill following its demolition. In the southern most end of the sondage, two floors, one atop of another, were exposed. The original flooring, revealed only in a small area, consisted of a yellowish monochromatic mosaic. Laid on top of this, and marking a subsequent phase of construction, were the remains of a ceramic tile floor.

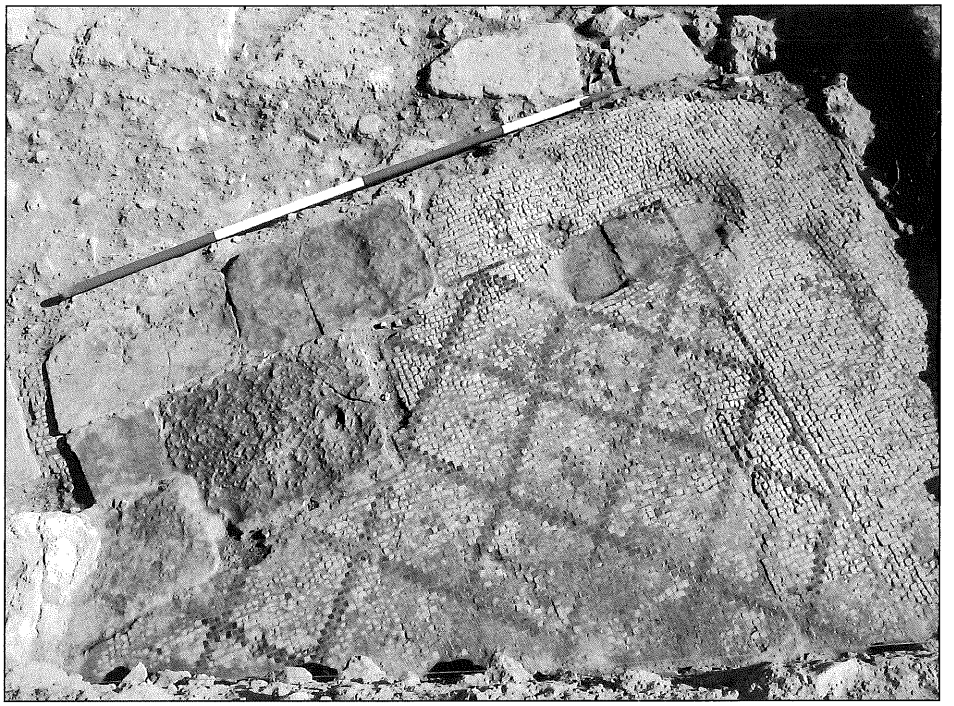
In 2004, the sondage was extended eastwards in the northern end of the excavation unit in order to investigate how far the two floors extended to the east. Surprisingly, most of the northern end contained well-preserved remains of the mosaic floor, whereas little evidence of the ceramic tiling was discovered. What in 2003 had consisted of a few small patches of monochrome mosaics, in many places covered by the mortar setting for the tile floor, was in 2004 shown to be a much more spectacular discovery. Yellow, red, orange and brown highlighted this section of the mosaic floor, which had been laid out in a pattern of geometric motifs (**Fig. 10**). Whether further excavation will reveal more of this mosaic and to what extent this floor is related to the bathhouse in MO/1 and the construction of the mosque, are among the important questions which will be explored in coming seasons.

Unit MO/12

Unit MO/12 was not opened until the beginning of the 2004 season. It was laid out as ten by ten metre square in alignment with the overall grid, and was placed directly west of MO/3.

The square did not reach a considerable depth in 2004. The most significant discoveries were: three further column bases in perfect alignment with the two discovered in MO/3; some stone tumble presumed to originate from the north wall (but not nearly as substantial an amount as was found in MO/3); and an architectural element, which proved to be a fragment of the carved door-casing of the blocked doorway.

As in MO/3, the upper strata yielded substantial amounts of fragmented roof tiles, which are presumed to derive from the roofing of the portico. Similarly, chunks of yellowish-white plaster were among the tiles, and it is preliminarily sug-



10. Mosaic panel in the south of the sondage in Unit MO/3.

gested that these are the remains of the mortar applied in the construction of the roof.

In the north-western corner of the square a section of the wall was revealed, which appeared to comprise another blocking. This blocking was clearly visible in the north face of the wall, and it was tentatively concluded that it constituted an access point to a drain leading from inside the mosque (or bathhouse) to the sewer of the Decumanus.

Finally, it should be noted that a modern cable trench running east west cut both MO/3 and MO/12. This trench was approximately half a metre below the surface, and consisted of a ditch lined with concrete slabs, and including an electric cable set in a filling of red sand. This feature was easily discernable, and was removed without problems in both squares. The electric cable itself remains in place for the time being.

MO/6: A Section through an Old Yale Baulk (IRS)

In the northeast area of the courtyard, in Unit MO/6, we identified within recent refill an earth wall left standing from excavations of the South Tetrakonia conducted by Yale University between 1928 and 1934. Yale plan drawings show that the line of this baulk was delimited by a buttressing wall that ran east to west between a pier base of the east portico and the east wall of the mosque. According to the plan the buttressing wall appears to be only one course and was apparently removed during the Yale work. With the exception of the old Yale baulks the other deposits in MO/6 postdate the Yale excavations. Since the old Yale baulk represents the original foundation fill of the mosque, a section was excavated along its length to examine this fill material.

The stratigraphy of the section suggests two possible building phases for the east wall of the mosque. A clear cut-line could be seen running through the foundation fill material from the surface of the old baulk to end against the east outer mosque wall. Interestingly, the cut meets the wall at a point slightly below where the coursing changes from uneven faces without mortar to courses with smooth faces and mortar pointing. This may represent a cut that was made into the foundation fill to build a second phase of the outer wall, marked by the corresponding change in the coursing. An initial phase would have preceded this in which the lower, less even courses of the superstructure were built and the bedding of fill was laid. Alternatively, the cut may not be a real cut but an apparent unconformity that formed because fill material was never deposited in the first place along this surface represented by the 'cut'. This would be possible considering how quickly and unevenly foundation fill mate-

rial may have been moved in.

Excavating the section through the old baulk also exposed the lowest level of the mosque outer wall and courtyard foundations. The foundation fill deposits in MO/6 contain numerous plaster inclusions and some stones with plaster facing – an assortment resulting from the levelling of earlier structures on which to build the mosque foundations. Earlier structures were only completely removed where the outer mosque walls were built, whereas the trend inside the mosque was to build foundations on top of existing solid structures, thereby integrating them where they coincided with the planned mosque foundations, even though their orientations differed. Finds were few in number and almost all were pot sherds.

The inner face of the east outer wall of the mosque was exposed to its base level where it sits directly on the South Tetrakonia plaza. Below the base of the outer face of the wall the outline of an entrance to a room behind the earlier circular façade of the South Tetrakonia is clearly visible in the plaza paving. On the old Yale plan the outline of this earlier structure is drawn where the mosque wall is standing. Excavation in 2003 showed that the stone threshold is missing from the entrance to the room below the base of the mosque wall, and it is most probable it is this threshold that was removed and installed in its current position in the east outer wall of the courtyard as an entrance to the mosque. According to the Yale plan, the previous excavators drew the same conclusion, although they thought the building was a fort, not a mosque. Outside the entrance in the east wall of the mosque, built on the plaza of the South Tetrakonia, is a small outer mosque enclosure wall that may be the edge of a platform that led up to the east entrance.

MO/10: The Cardo Shops (ML)

In the 2004 season, a new focus of work turned to the area immediately east of the mosque, more precisely to the area between the mosque's eastern enclosure wall and the Cardo. The excavations produced further details about the eastern enclosure wall of the mosque and uncovered other structures, identified as shops, built between the mosque and the cardo (**Figs. 4, 7**).

Exposure of the eastern enclosure wall revealed it to be a two faced construction 70 centimetres in width and with a central packing of compact *terra rosa* soil, as elsewhere with the mosque. The variety in the quality of the stone blocks and the presence of fitted column fragments in the wall construction indicate that the enclosure wall was, at least in part, constructed using recycled building material. The use of hard mortar in the wall construction was only present on the edges of the very largest of the stone blocks. However mortar, with incised lines in a herring bone pattern, was commonly used to conceal the joints of the stone blocks, both on the inner and outer facade.

During the 2004 season the foundation course of the mosque wall was reached. A sondage in MO/10 on the east side of the wall revealed the foundation stone course along with a foundation trench, which consisted of a layer of red-brown medium compact silty clay. The visible limestone blocks were roughly cut and measured ca. 40 by 35 centimetres, which is roughly the same size as the average excavated stone blocks originating from the wall. At the end of the 2004 season the eastern enclosure wall consisted of five courses standing to a maximum height of 2.6 metres.

New Discoveries Abutting the Eastern Enclosure Wall of the Mosque

During the removal of stone tumble originating from the east enclosure wall of the mosque, new walls appeared. These walls (Walls 4, 5 and 6), running E-W, all butt the enclosure wall. They were two faced constructions with occasional bridging stones intended to stabilise the construction. The central packing of the walls consisted of yellow clayish soil with small stone inclusions, thereby differing from the *terra rosa* packing used in the construction of the mosque enclosure wall. Two already exposed walls, one running N-S to butt the mosque's SE corner (Wall 2) and the other bonded to the first and running E-W towards the Cardo (Wall 3), marked the southern limit of the structures to which the newly excavated walls belonged.

No noticeable difference could be observed in the quality of the stone blocks used in the abutting walls to the quality of the stone blocks used in the mosque's eastern enclosure wall. How-

ever, comparing the colour of the wall packing with the colour of the soil in the stone tumble layers, it would seem that the walls butting the mosque collapsed prior to those of the mosque, as the stone tumble layers with *terra rosa* soil were superimposed on the yellow clayey soil stone tumble layers. The time span that separates the two events is unclear.

The walls would seem to belong to shop enclosures. A total of five units were identified along the south part of the mosque's eastern enclosure wall stretching approximately fifteen metres and approximately five metres E-W towards the Cardo. Excavation was concentrated on the two southernmost units, shops A and D.

The excavation of Shop A revealed a considerably larger amount of roof tiles than found in the other enclosures. Underneath this layer of collapsed roof, fine stone fragments remained from what seems to have been the paving of the shop. Several fragments were found, one *in situ* superimposed by an up-right stone, probably part of some sort of feature used in the shop. Two stones situated next to it could be associated with this feature. Finding only fragments of the paving may suggest that the shops were abandoned before the walls collapsed. The fine stones were probably removed in antiquity and reused somewhere else prior to the collapse of the roof and the walls.

Shop D revealed several interesting features. The floor level in the back of the shop was elevated and this platform was lined by a row of stones. An *in situ* stone jar was excavated on the elevated bench.

Unfortunately no specific features or finds could help us identify the type of shops recovered. The lack of finds though confirms the assumption that the shops were abandoned before the walls collapsed.

A fragmented mosaic floor was carefully excavated in MO/10. It was detected in the area close to the stylobate abutting the western edge of the Cardo and on the lower plateau in Shop D. It continued underneath Wall 4, the dividing wall between Shop A and D, which led us to believe that the mosaic floor was the remains of an earlier period, buried with the construction of the shops. The mosaic lay under the shop's floor level, and was covered by a sub floor packing consisting of a layer of compact yellow clayey silt and a layer of small stones and pebbles.

Viewing the cityscape of Early Islamic Jarash, shops were not uncommon features. Along the South Decumanus, a line of shops were excavated in front of the so called Umayyad House (Gawlikowski 1986: 113, 1997). During the clearing of the area by the South Tetrapylon northeast of the mosque, a black smith's work shop and housing were likewise unearthed (Kraeling 1938: 105). Buildings, perhaps more shops, were also present in the area overlaying the Cardo (Harding 1949: 19). Hence, the location of the shops butting the mosque and positioned next to the Cardo fits very well with the existing evidence of urban activity in the area surrounding the mosque in Jarash during Early Islamic Period.

Comparisons and Implications (AW)

The Jarash mosque shares many attributes with the Friday mosques identified at Ruṣāfa, 'Ammān (downtown) and Qaṣr al-Ḥīyr al-Sharqī, all built during the productive two decades of the caliph Hisham ibn 'Abd al-Malik (724 -743AD). That at Ruṣāfa, Hisham's chosen abode, is very close in style to the Jarash mosque, although it measures 40 percent larger as would fit the role of Ruṣāfa as a caliphal capital. A courtyard mosque, it originally featured single-colonnaded porticos on the north, east and west sides and a triple-bay *qiblat* hall to the south, open to the courtyard and with a triple-gabled roof running parallel to the *qiblat* wall (Sack 1996). A combination of columns and piers were used in the construction of the *qiblat* hall and porticos, which were roofed with tiles. Proportionally, the Ruṣāfa mosque is longer than the Jarash one (at 1:1.39 or ca. 5:7 compared to 1:1.14 or ca. 7:8 for Jarash). Similarities with the downtown 'Ammān mosque, as researched by Alastair Northedge (Northedge 1989, 1992: 63-69), are also apparent, although at 1:1.42 (ca. 5:7) the 'Ammān example is again appreciably longer than it is wide. Otherwise it presents much the same general plan: court, porticos and *qiblat* hall, the latter with two (perhaps originally three) lateral colonnades. Further discussion of the shared architectural traditions of the Jarash mosque with other mosques of the eighth century will, of necessity, have to await the positive location of the building's west wall.

MO/1: The Late Antique Bathhouse (LB)

Introduction

The excavation of the Byzantine bathhouse (designated MO/1) was initially begun in 1998 by the late Mr. Ali Musa and a team from the Department of Antiquities. Sadly, due to the sudden death of Mr. Ali Musa, the results from the excavation were never published. Therefore, when the team of the first Islamic Jarash Project arrived in Jarash in summer, 2002, the existence of a bathhouse in the middle of the area to be excavated came as something of a surprise to the project participants. It became this author's assignment to supervise the work in the bathhouse, with the primary objective of sorting the building sequences without any knowledge about the previous excavation methods or aims. During the years since the work of Ali Musa, nature had reclaimed the area of MO/1, and only after clearing and much cleaning did the central features of the bathhouse became visible.

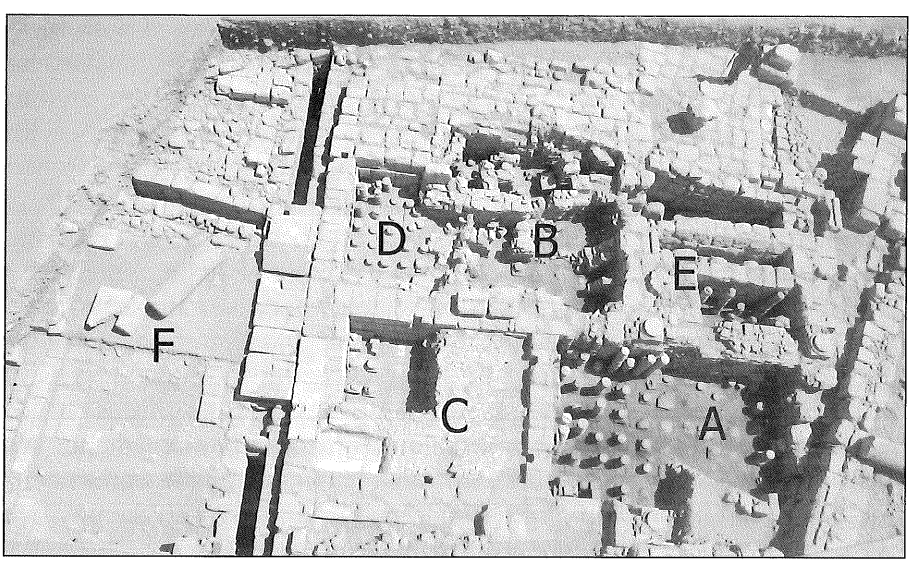
These main features of the bathhouse are as follows (**Fig. 11**):

- An east-west running wall in the northern part of MO/1 that continues into the west baulk;
- A north-south running wall in the centre of MO/1 which butts the east-west wall;
- Lined against the north-south wall are five underground rooms, all part of the bath's hypocaust, each of which were given a letter (Sectors A-E) according to their position in the hypocaust system;
- Components of a sewage system in the northernmost part of MO/1, designated as Sector F.

Evidently, no superstructure is left since the mosque was located directly over the bathhouse. The building material was most likely removed and reused when the mosque was built. The only preserved architecture that originally was above ground is three column bases in the southwestern part of MO/1 and three basins, which are spread throughout the building; additionally, we must assume that the highest preserved part of the walls were originally at floor level.

Unit MO/1 was excavated over three seasons: 2002 and the two sessions of 2004. The primary objective has been to uncover the hypocaust system and, in so doing, establish the construction phases and the use of the bathhouse. Secondly the drainage system has been partly investigated.

Generally, the bathhouse consists of single-row limestone walls. Most of the hypocaust rooms (Sectors A, B, C and D) are lined with wall tiles, while all the rooms contain floor tiles and round ceramic hypocaust pillars made of stacked tiles. In order to connect the rooms for heat circulation, brick arches were built into the limestone walls. Except Sector D, tile constructions were erected in order to support the weight of the *suspensura*, these constructions consisting of *tegulae* (flat rectangular tiles), *pilae* (solid round tiles) and square bricks. *Tubuli* (box flue tiles) were found *in situ* in Sector E and in the filling of Sectors A, B, and C. In the following each area will be described in detail, before any comparison is undertaken, in order to establish a



11. Overview of the bathhouse, showing sector designations.

building sequence in terms of use and construction.

Sector A

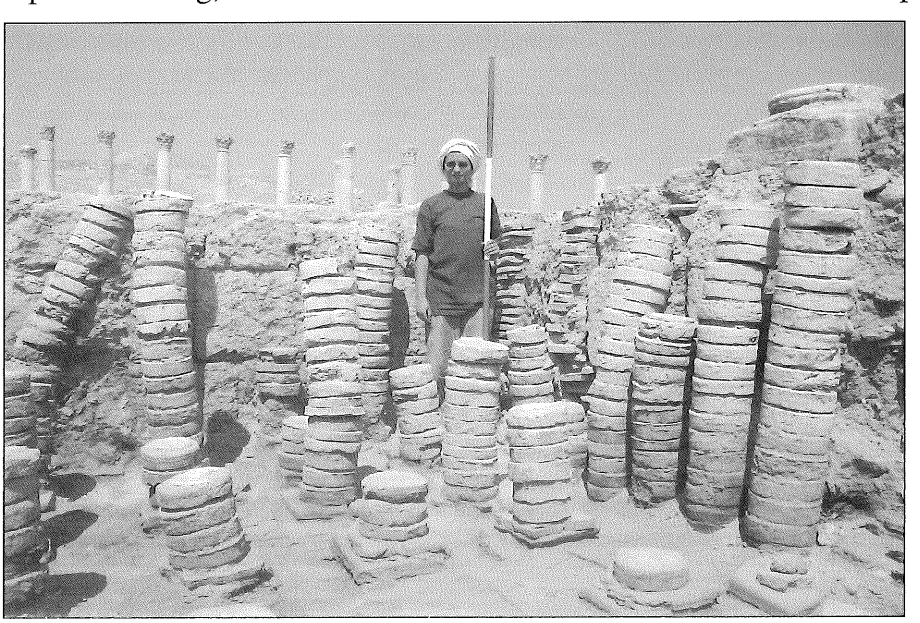
The room in Sector A is located in the south-western part of MO/1, and it is by far the largest room in the hypocaust. It is rectangular and contains approximately ten by six *pilae* and two tile constructions, of which only some *pilae* remain standing at the north end (**Figs. 11A, 12**). To the north the room is defined by a limestone wall, which separates it from the room in Sector C. It butts the north-south running central wall to the east where three brick arches connect it to Sector E and one to Sector B. To the south it is connected to an unexcavated area by two brick arches, and to the west it is defined by a solid lime stone wall. Three limestone columns are associated with Sector A. These are surrounded with *in situ tubuli*.

The excavation of Sector A demonstrated that it was filled at one time when the room went out of use. This assumption is based on the content of the filling, which mostly remained the same from top to bottom; there is however a large concentration of tiles near the bottom of the filling. This is due to the collapse of the *pilae* when the room in Sector A was filled up; most of the tiles lay in rows where they had fallen or were scattered in the lower part of the filling. It seems that the Sector A room was the last one that went out of use, since no paving was constructed on top of the filling, which was the case in the rest of the hypocaust rooms. This could indicate that this room kept functioning until the mosque was erected.

Sector B

The room in Sector B contained only four standing pillars, impressions of several pillars that no longer exist and several floor bearing tile constructions of a different date (**Fig. 11B**). Originally Sector B was divided by two north-south running tile constructions each containing an arch. Furthermore, an east-west running tile construction, also containing an arch, connected Sector B to the northern Sector D. The three original tile constructions consist of small bricks. Towards the west, Sector B butts the central north south running wall, which is interrupted by three tile arches, one connects the room in Sector B to A; while the others lead to Sector C. To the south and east limestone walls define Sector B. At some point several floor bearing constructions were added to the room in Sector B; the reason for this could be that the *suspensura* had become unstable. This assumption is based on the fact that these tile constructions consist of several different tiles, contrary to the ones described above, namely of *pilae*, bricks, and *tegulae*; furthermore, they are not in line with the rest of Sector B, but are contrarily scattered with only a functional relation to the original walls and tile constructions.

When the excavation began, Sector B was covered in a thin plaster layer, most likely rep-



12. View within the hypocaust room in Sector A of MO/1.

resenting the remains of paving. After removing this, the filling was identical to the bottom. It mainly consisted of numerous broken tiles, both *tegulae* and *pilae*, and sheds from broken pottery. It differed from the filling of the room in Sector A and it is therefore assumed that the two rooms were not filled at the same time.

Sector C

This part of the hypocaust is positioned directly north of Sector A; it is defined on all sides by limestone walls (**Fig. 11C**). It is connected to Sector B through two tile arches in the eastern wall. Sector C has not been completely excavated, but a probe was made in the north-eastern corner. An upper paved surface in Sector C consisted of small tiles and plaster, associated with which was a basin in the north-western corner of the room (**Fig. 13**). Excavation of the room revealed that this surface was laid over a homogeneous fill very similar in character to the filling found in the room of Sector B. Most probably the two areas were filled up at the same time.

Furthermore, the probe in Sector C revealed a few *in situ pilae* and floor tiles. These were identical to the ones in Sectors A and B both in technique and type of material. This indicates that the three areas were constructed at the same time and all were part of the first bathhouse phase. Sector C contained six chimneys carved into the limestone walls. These chimneys were responsible for drafting the hot air through the hypocaust.

Based upon the composition of the room filling, Sectors B and C were almost certainly filled at the same time, whereas Sector A did not finally go out of use until the mosque was built. Therefore, another solution had to be sought in order to draft the hot air through the hypocaust, as will be considered below.

Sector D

This room is situated to the east of Sector C and directly north of Sector B (**Fig. 11D**). It is connected to the rest of the *suspensura* through the tiled arch connecting the rooms of Sectors B and D. The room originally consisted of approximately 25 tile pillars. As this part of the hypocaust system had already been excavated by Mr. Ali Musa, no conclusions can be made about the filling and paving, if any, that were originally there. The Sector D room is raised, compared to the rest of the area, by approximately 0.5 metres. Furthermore, while the rooms in Sectors A,



13. Basin and upper paved surface in the room of MO/1 Sector C.

B and C consist of tiles, which were constructed by several potters (judging by the potters marks), only one workshop was involved with the construction of the Sector D room. While the tiles in Sectors A, B and partly C were very decayed, due to the constant exposure to heat, this was not the case in Room D, where all tiles are still intact. This could indicate that Sector D was a later addition to the bathhouse, but further examinations must take place in order to make any final conclusions.

Sector E

The last addition to the bathhouse was, according to the existing data, the hypocaust room in Sector E. Sector E is situated east of Sector A (**Fig. 11E**), and in its present state it is a very small room consisting of only seven tile pillars and one floor supporting tile construction, but it has gone through a major alteration. When the excavation of the area began, the only indication that this was once part of the hypocaust were three tile arches in the eastern wall in Sector A. Sector E itself was covered with several different architectural features, among these a basin and a threshold. In the south eastern corner of the basin a drain was found, but at some point it was blocked by a large square stone, a plaster layer covered the stone and created a frame for the basin, in that way it was still usable, though in a very diminished form, and without the possibility of drainage. When the basin and threshold were removed a tile floor revealed. This consisted of eight large square tiles laid in two courses. After removing the tiles the hypocaust pillars appeared directly below. This may indicate that the tiles were part of the original *suspensura* above the hypocaust, and that they were removed in order to fill up the hypocaust and thereafter put back in place. The floor underneath the *pilae* is very different compared to the floors in the rest of the hypocaust. Firstly it consists of much smaller tiles and secondly these are laid out diagonally to the rest of the room, contrary to the floors in the other hypocaust rooms, which are aligned with the defining walls.

At some point the room was reduced in size because, in its current state, one of the arches that connected the rooms in Sectors A and E became blocked, leaving only two functioning (**Fig. 14**). Furthermore, the room was truncated on the east; where a wall was built running parallel to the existing wall. The reasons for this reduction in size are, so far, unknown.

Sector F

Sector F is situated in the northernmost part of MO/1 north of the east-west wall of the bathhouse (**Fig. 11F**). So far the work in this area has focussed on the easternmost and the westernmost part. The most noteworthy architectural find in this area comprises parts of the sewage system, sections of which have been excavated in both the eastern and western parts.

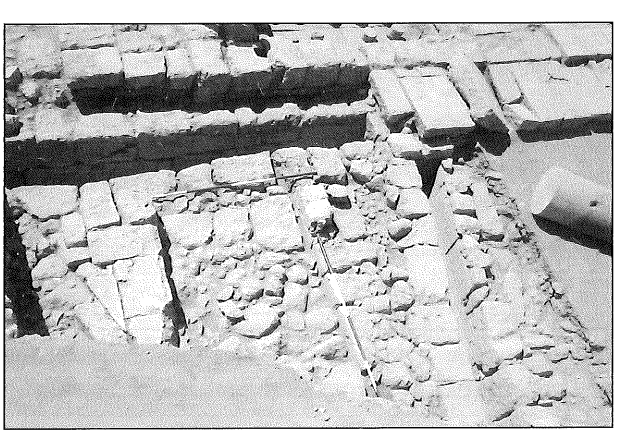
The excavation of the eastern part of Sector F has revealed a small section of the city's sewage



14. Arched vents connecting the hypocaust rooms of Sectors A and E (the fill in the vents has be retained to support the arches).

system (**Fig. 15**). Two drains were uncovered, one running east-west against the east-west bath wall and the other, a later addition, running north-south and connecting to the first. Both drains are constructed from limestone blocks with cement bottoms. The east-west drain has been identified in both the eastern and western part of MO/1, where it continues into the baulks. Large stone slabs, still *in situ* in the centre of Sector F, were originally used to cover the drain. The excavation of the east-west drain revealed several interesting issues. Firstly, it was discovered that several large stones were deliberately placed in order to block the drain at the junction with the north-south drain. This could indicate that the east-west drain went out of use at the same time as the north-south drain was constructed. Furthermore, the excavation revealed that the east-west drain was completely blocked by a wall at its easternmost visible end. The top of this wall is at the same level as a paving, consisting of plaster and fist size stones, which was constructed between the two drains and the wall. Obviously this wall was constructed at a time when the east-west running drain was no longer in use and most likely after the north-south running drain replaced the first. Finally, the east-west running drain was filled up in one event, according to the finds from the filling.

The construction of the north-south running drain differs from the construction of the original drain, which is both wider and almost one metre deeper. Furthermore, the north-south drain produced some very interesting finds. Near the bottom of the drain, numerous potsherds, nails, coins, beads and rings were found, seemingly not part of the filling but naturally deposited, which means that they were washed into the drain at some point.



15. Stone-lined drains in Sector F of MO/1.

The excavation of the western part of Sector F also revealed interesting issues, both architecturally and in the way of finds. Firstly, as stated above, the east-west running drain was also uncovered in this part of Sector F. The excavation revealed that it was at some point markedly modified. The western part was blocked with large stones while in the eastern part the floor was raised to the same height as the north-south running drain. Furthermore, the finds in the fill in the eastern section of the drain were identical with the filling in the north-south drain, clearly indicating that the two parts were filled simultaneously. Likewise, the finds in the raised section of the east-west drain matched those in the north-south drain.

As described earlier, a basin was located in the north-western corner of Sector C. From the northwest corner of this basin, an outlet led into the raised (western) part of the east-west drain. Deposited in the outlet as it flowed into the drain was a thick, multi-layered lime deposit, similar to that found inside the northern wall of the basin. The discoveries in the drain and basin clearly indicate that the northern part of MO/1 stopped functioning as a bathhouse and supported instead some sort of industry in the last period of use, a change of use noted at other sites in late, such as Baysan/Scythopolis (Tsafrir and Foerster 1997).

Summary

So far it has been stated that several construction and repair phases are present in the bathhouse. From the archaeological information recovered so far it can be suggested that the original construction of the bathhouse consisted of the two central walls and rooms in Sectors A, B and C. Due to the position of the room in Sector D it would be most likely that this was also part of the original bathhouse, but if this is the case it must have gone through a total rebuild at some point. This assumption is based on the current state of preservation of Sector D compared to the decay in Sectors A, B and C. Furthermore, the east-west drain in Sector F must, necessarily, be part of this first construction phase. At some point the northern part of the bathhouse went out of use, documented by the simultaneous filling

of Sectors B and C (and probably also D) while the room of Sector A was still in use. The filling of Sector C disabled the system that drafted the hot air through the hypocaust; therefore, a new draft had to be created. This was achieved by inserting four columns with *tubuli* on three sides, which were connected to one or more chimneys. These were all inserted around the room of Sector A, at the same time the Sector E room was built; but why this was later reduced in size is uncertain. Lastly, Sector E's room went out of use and a basin was constructed over it.

So far it has not been possible to differentiate between the caldarium and the tepidarium (if any) in the bathhouse; furthermore, the frigidarium or lounge-apodyteium has not been uncovered.

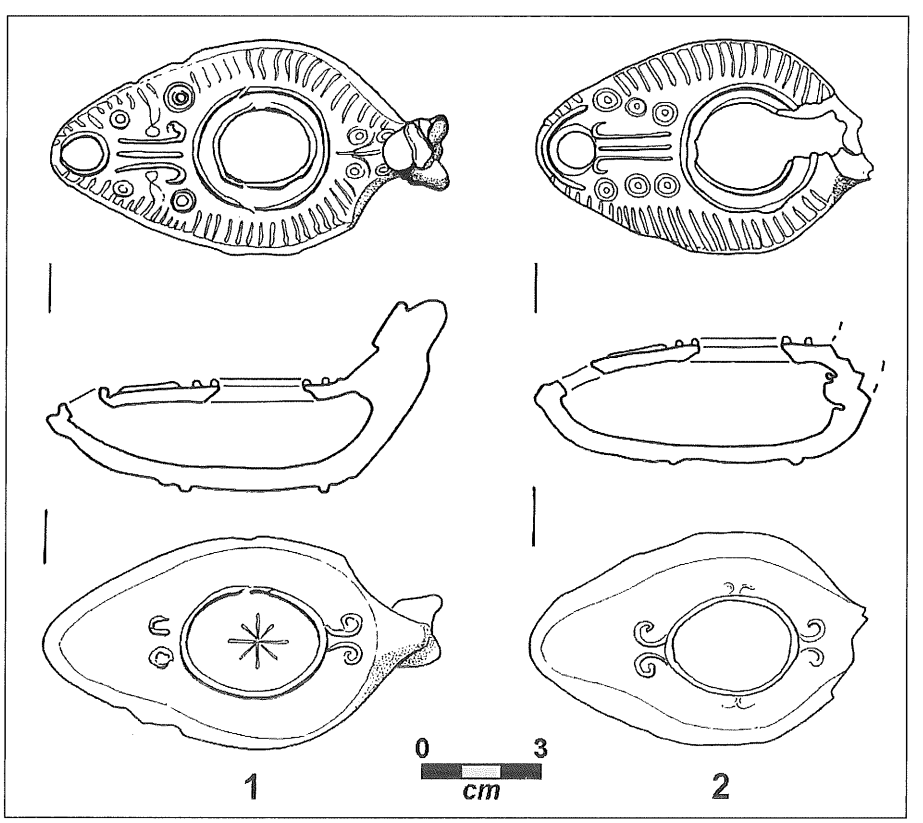
A major objective in future seasons is to locate the bathhouse furnace, which is most likely situated to the south of Sector A. Furthermore, the western part of Sector F needs additional examination. Moreover, the connection between the bathhouse and the surrounding excavated architecture needs to be established, which will be attempted by making strip trenches to the north and east.

Finds from the Excavations (MLS and AW)

Ceramic Oil Lamps

A complete ceramic oil lamp (IJP-PCN 1, **Fig. 16.1**) and a nearly complete lamp, missing only the handle (IJP-PCN 2, **Fig. 16.2**), were recovered in the 2002 season from unstratified topsoil and an in-filling deposit of the Byzantine bathhouse respectively. Other oil lamp fragments were recovered from the mosque excavation.

All the oil lamp specimens belong to the well-known Jarash lamp type. Lamps IJP-PCN 1 and IJP-PCN 2 are tear-drop shaped with a central filler hole in the top and a wick hole at the pointed end, made in a mould in two halves and joined at the outer edges. The decoration on the top part of both lamps consists of three straight parallel lines between the wick nozzle and the filler hole. The outer two lines end in hooks at the filler hole. Three dotted circles flank the three lines and striations are running around the upper edge of the lamps top. At the wider end of Lamp IJP-PCN 1 is a tall arched handle with a finger-moulded top, finished off by pinching, which make it look zoomorphic. The base of both lamps has a round ringed foot,



16. Two 'Jarash Lamps' from the mosque excavations. 1. IJP-PCN 1; 2. IJP-PCN 2 (drawings by Judith Sellers).

consisting of a centrally placed large open circle with two outward facing hooks on the long axis of the lamp. Lamp IJP-PCN 1 has an asterisk in the centre of the circle.

The typological and stylistic characteristics of Lamp IJP-PCN 1 suggest it belongs to the Zoomorphic handle variant of the Jarash lamp types. Similar decorated lamps of the Zoomorphic handle variant have been dated from between the first half of the seventh century to the middle of the eighth century (Scholl 1986: 163). Similar lamp types have been found at Jarash in deposits dated to the late Byzantine and early Islamic period, for instance at the Hippodrome (Kehrberg 1989: 89, fig. 5.25), in the area of the North Decumanus (Kehrberg in Ball *et al.* 1986: 367 pl. V.20) and in the cistern of the Zeus temple (Rasson in Seigne 1989: 146 fig.14.2). Kilns and moulds for the production of these oil lamp types have been found at Jarash on the terrace of the Artemis temple (Pierobon 1983-1984: 95).

Ceramic Tiles

During the excavation seasons 2002-2004 a large volume of roof tile fragments, amounting to over five tonnes, was recovered during excavation, the majority of which consisted of building material from the destroyed mosque. The two types of roof tiles are the *tegulae*, a flat slab with flanged rims on the two long sides, and the *imbrex*, a curved semi-circular tile intended for covering the seam between two tegulae. Further analyse will result in the division of these two broad types into sub-groups.

Excavation of the bathhouse recovered a large number of tiles, notably *tegulae*, square tiles and circular hypocaust tiles (*pilae*), as noted earlier in this report. These tiles were used in the construction of the hypocaust system, the arches in the hypocaust system and stacked to support the floor of the bathhouse. Furthermore, the floors and walls were covered with ceramic tiles.

The excavation of the Church of Bishop Isaiah at Jarash, west of North Theatre, has revealed similar roof tiles, both the *tegulae* and *imbrices*, in the destruction layer of the church dated to the earthquake of 749AD (Clark *et al.* 1986: 313). The *tegulae* of the church were of a gritty dark ware, made in moulds, and they often had a wavy finger impression on the surface and are similar to the ones recovered at the mosque (Clark *et al.* 1986: 317 pls. X.19, XIV.28). Similar roof tiles have been found elsewhere in Jordan and Palestine, like at Umm Qays where both *tegulae* and *imbrices* were recovered on the terrace (Area I and III) by the church and the basilica, which both presumably were destroyed at the 749 earthquake (Vriezen and Mulder 1997: 323).

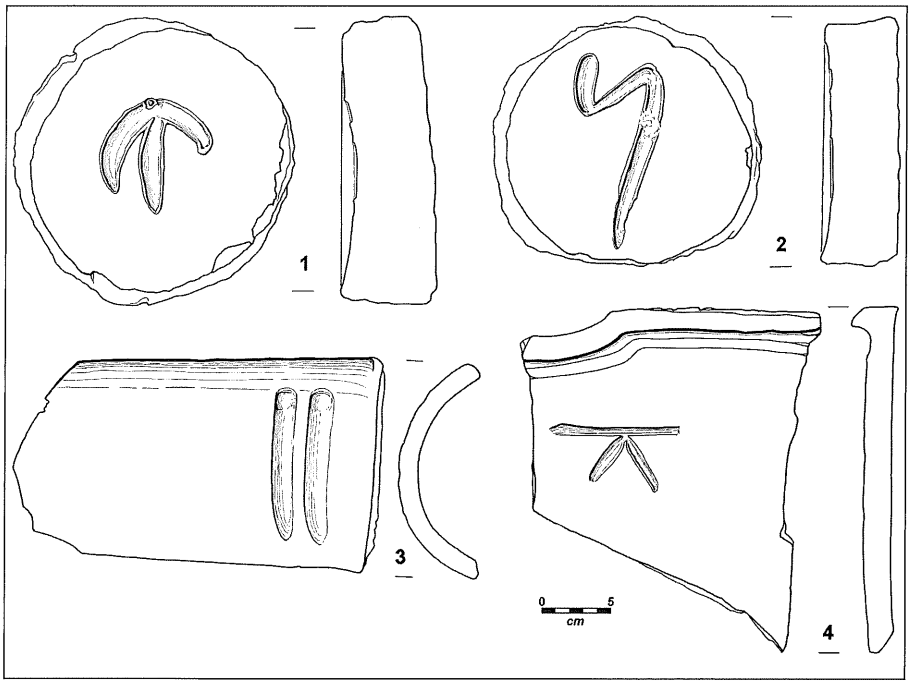
Some of the roof tile fragments of the mosque, along with construction tiles from the bathhouse, are incised with potters' marks. The marks include wavy finger impressions, crosses, straight lines and incised Greek letters (**Fig. 17**). The marks are similar to those found on tiles from the Civic Complex church in Area IX at Pella, also dated to before the earthquake of 749AD (Smith and Day 1989: pl. 28.A-C). Like at Jarash, the tiles recovered from the church at Pella were found in fragments, which could indicate that the complete tiles were carried away after the destruction of the church for reuse (Smith and Day 1989: 40).

A large reduction kiln for production of these roof tiles has been discovered at Jarash in the area of the North Theatre. These kilns are dated to the early Islamic period, specifically the eighth century (Schaefer and Falkner 1986: 429).

Coins

During the 2002 to 2004 seasons, a total of 579 coins were found during the course of the excavation, 432 of which were recovered from the area of the bathhouse (MO/1). All but one, which was silver, were copper alloy issues. Many of these coins, indeed the majority, were small coppers, often 12 millimetres in diameter or less. These are the ubiquitous AE4 Roman type, not only common at Jarash but also other classical sites in the Middle East, for instance Pella (Carson in Sheedy *et al.* 2001: 33-37). Often severely worn through an extended period of circulation and badly corroded, due to soil conditions, these coins are usually difficult to identify and can only be roughly attributed to the fourth and fifth centuries.

Better preserved and often identifiable after cleaning, are the coins of the sixth to eighth centuries, belonging to the three broad categories of early Byzantine, Arab-Byzantine (pre-Reform Islamic) and post-reform Islamic issues that typified the period (**Fig. 18**). The predominance of



17. Potters' marks on tiles from the bathhouse (1, 2, 4) and mosque (3) (drawings by Judith Sellers).

Justin II and Sophia folles among the Byzantine coins, already noted at Jarash, Pella and other north Jordan sites (Walmsley 1999), continues with the IJP coin corpus, as do the local imitations of these minted in Scythopolis/Baysan and Gerasa/Jarash itself, produced ca. 660-680 (Album and Goodwin 2002: 81-91; Foss 2004: 760 – Foss' date is preferable). Post-reform coppers include a good specimen from the mint at Ṭabariyya, the capital city of the Jund al-Urdunn, featuring a palm tree on the reverse (**Fig. 18.3**). Images of animals also occur on the reverse of Ṭabariyya coins, including lions and birds (possibly an eagle), the symbolism of which are yet to be explained.

To date, coins dating to the pre-reform Islamic series have been found in the fills of the bathhouse that underlie the mosque, whereas post-reform issues mostly come from levels above the mosque. The exception is two post-reform coins in MO/3, which seem to belong to constructional fill levels for the mosque. Preliminarily, therefore, the numismatic evidence confirms a construction date for the mosque after the coinage reforms of Abd al-Malik at the end of the seventh century, and probably some decades into the first half of the eighth century.

Area GO: first investigations in the zone west of the mosque (KD)

From the outset of the Islamic Jarash Project, it seemed quite likely that the area immediately west of Area MO should contain significant structural remains contemporary with the mosque. Nevertheless, it was not until the 2004 season that this area was explored to any extent. The first major task was to clear the area of growth, at least two large spoil heaps and a substantial layer of very recent topsoil, in some places around a metre thick. At least two of the later identified architectural features (Walls 1, 3) were visible before any work was commenced in this area; however, further investigation was definitely necessary before any relationship (whether chronological or geographical) between these walls and the mosque could be established. Both visible features seemingly belonged to some form of enclosure wall, but whether this was part of an actual building or some form of perimeter walling also required further investigation. This meant that even though it was clear to us that no actual excavation of this area would take place in the 2004 season, there remained a number of issues to be explored.

During the 2004 season, most of the area termed GO was cleared and the modern, and highly contaminated, topsoil removed. The recent date of these deposits was relatively easy to establish, since it consisted mostly of the red sand not naturally occurring in this region and well known as a modern deposit, which in connection with the annual Jerash Festival is observable



18. Three coins from the mosque/bathhouse excavations at Jarash. 1. IJP-FCN 70, surface find, follis of Justin II and Sophia minted at Constantinople, officina 'B', dated to Year 12 (576/7) (Bellinger 1966: 213.42b); 2. IJP-FCN 354, MO/1.108, fals of the 'Pseudo Damascus Mint', ca. 660-680 (Album and Goodwin 2002: 87, pl. 39); 3. IJP-FCN 173, MO/3.9, fals from the mint of Ṭabariyya, undated, ca. 700-750+ (Walker 1956: 269.898).

throughout the site. Upon clearing away the modern deposits, we discovered a number of other features, mostly walls, strengthening our suspicion that one or more significant structures once stood here. From the hitherto collected evidence (i.e. aerial photos and the exposed architectural features), the possibility of substantial remains of at least two large buildings in this area; one in the northern section of GO, and one in the southern section (with a potential third structure even further west), seems quite promising.

An important factor in identifying the southern GO-structure was actually established in the south-westernmost excavation units of the mosque (MO/13, MO/14), where a narrow laneway (ca. 2.5 metres) separating a wall parallel to the western mosque wall, was unearthed. In conjunction with the presence of a third mihrab in the westernmost end of the *qiblah* wall, the discovery of what appears to be a discrete entranceway into the GO structure substantiates our notion that this was the palace of the local Muslim elite, and that the entire area west of the mosque was presumably reserved for high-status buildings; such as a gubernatorial residence and/or local administration.

In addition to the lane, wall and doorway uncovered in MO/13 and MO/14, a total of ten architectural features, of which four were clearly identified as actual walls, were discovered while clearing GO/0. These features can be described as follows:

Feature number	***Wall number***	***Description***
01	01	A series of worked ashlars running N-S in the north-easternmost section of GO/0 (planned).
02	02	A series of worked ashlars running approximately E-W in NE section of GO/0 (planned).
03		2 worked stone ashlars, which are seemingly laid as a corner between two walls. Remain unexcavated and unplanned.
04		Stone tumble, possibly deriving from the collapse of Wall 4 (unplanned).
05	04	A series of worked stones running NW-SE in the SW section of GO/0 (planned).
06		Stone tumble running E-W along the west end of the north edge of GO/0 (sketch-planned)
07		A line of three stones crossing the presumed path of Wall 1. Only further excavation will be able to determine whether this feature is connected to Wall 1 or is an independent feature/wall. (East GO/0).
08		A seemingly semi-circular installation that may be a doorjamb. Located in eastern GO/0, directly across from the doorway identified in the eastern mosque wall. This could possibly be another entrance into one of the buildings in the GO area, and may be related to features 7 and 9.
09		A horizontally placed column drum positioned against an upright standing flagstone on either side, and seemingly set in a mortar foundation.
10	03	A row of five worked stones extending E-W along the southern slope of the southern Decumanus. Partially visible before the 2004 season commenced, this feature is tentatively suggested to constitute the remains of a perimeter wall separating the compound/complex in the GO area from the public space of the Decumanus.

The clearing of the GO area did not yield very many significant finds. Among those worth mentioning are four unidentified coins, a polished stone bead with drill hole and a pierced piece of mother of pearl. Furthermore, a large number of ceramic sherds; including a lamp fragment with an Arabic inscription, considerable faunal remains (bones) and some pieces of ancient glass were retrieved.

Observations Concerning the Street Surfaces in Jarash (HB)

Both the via Decumanus and via Cardo have been completely excavated by various excavators over the past 80 years, some almost as clearance work in which no records were kept and others as recorded excavations. As is usual with excavation records it is mainly those things which failed to be recorded, or which were deemed as of no interest at the time, which are now posing problems in their absence.

The following observations, although worth making, are based only on the construction and condition of the Roman road surfaces of the via Cardo and via Decumanus currently being recorded in detail by the Islamic Jarash Project, so as to place the mosque, and surrounding buildings, within their urban context. Unfortunately, no stratigraphic evidence can now be brought to bear on these theories, since the later deposits, including walls and other structures, have already been completely removed. They are thus, in most cases, only being put forward as unverifiable theories, although they may well have been voiced or considered by previous archaeologists.

The Mosque

The mosque is situated at the south west corner of the crossing of the via Cardo and via Decumanus where Tetrakonia occupy the centre of the circular crossroads. As already noted, the mosque has frontages which are not oriented exactly on the lines of either street.

The exterior wall surrounding the courtyard, where it faces the via Decumanus, has a doorway whose sill is some 1.5 metres above the Roman street surface, with a drain outlet to the west slightly above the level of the door sill. The area between this wall and the Roman street is unfortunately already excavated to the level of the Roman colonnade stylobate. Several entablature blocks are visible, used (along with packed earth and other stones) to act as foundations for the deposits which must have formed the path to the door. Due to the door sill and the slightly higher drain outlet, it seems as though there was a platform running the length of the building, and rising to the west to cover the drain outside the mosque. This platform would have extended over the broken bases of the columns and out into the street. This and the drain trench fill (see below) suggest that the street in use during the Islamic period was considerably narrower than the Roman paved street now visible. The only possible evidence of how far it extended is a post hole block set into the runnel which surrounds the circular junction of the via Cardo and via Decumanus. This block is six centimetres above the street surface and makes the runnel useless for rainwater runoff. It is certainly later than the Roman street and may possibly mark the corner of the platform which would have projected in front of the courtyard wall. It would have left the covers of the street drain (which was obviously still in use) in and not very far below the Islamic street surface. Given the orientation of the mosque it is more than likely that the Islamic street was oriented on the courtyard wall, maintaining a roughly parallel course, thus running slightly across the line of the Roman road. As the length of the road would have run between the surviving columns, this would have meant that the street not a straight line, unlike the typical Roman street. This is consistent with the Middle Age practice, of making buildings rather than thoroughfares the defining elements in town planning.

Via Cardo

This street, heavily worn and damaged prior to excavation (very much more heavily damaged than the via Decumanus), shows signs of deep rutting, caused by the transport of heavy goods on carts with a uniform axle width of ca. 1.48 metres. The weight of the loads, the uniformity of axle width, the almost identical route taken by the carts and the fact that it all occurred after the street surface ceased to be maintained suggest that this was not due to normal daily traffic of a city. These ruts extend from the Oval piazza to the North gate, through which they turn uphill to the west, with some detours along the way to the north theatre and eastwards down

the street opposite it. Despite similar ruts on the steps of the bridge crossing the wadi on the via Decumanus, there are only comparatively faint signs of similar rutting on the surface of the via Decumanus itself. Starting at the South gate there are similar ruts on the block forming the sill. The ground from here to the Pizza has been too heavily disturbed to leave any traces. The ruts appear only very faintly across the surface of the Piazza leading from the temple of Jupiter to the via Cardo (suggesting that there existed another surface above the stonework when the transportation took place) but suddenly become very deep and pronounced when they enter the via Cardo. Here the route of the ruts divides, one entering a large area of collapsed drain (which has since been restored in order to create a surface for visitors) the other clearly avoiding this area by passing on to the other side of the street. The ruts run over a space in the centre of the via Cardo leading into the crossroads with the via Decumanus, which once obviously held a street dividing post. This has been removed and neatly filled which was therefore done when the street surface was still being maintained. In general they follow a course which leaves the central drain between the wheel ruts, though in some areas they appear to be avoiding collapsed drains, obstacles or insecure ground. The ruts also vary greatly in depth along the length of the street. At the south end of the via Cardo and at the north gate they are worn up to six centimetres deep into the solid stone blocks and yet almost disappear between the crossing to the north theatre and the north gate, an area thought to be little used in the later periods. As the rutting becomes only gradually less pronounced rather than abruptly (as would be the case with a repair) this would seem to be due to some other deposit being present on the road surface such as mud or silt, debris or rubbish. This traffic appears to have caused a great deal of damage to the road surface which was not repaired.

Both the discontinuity of the depth of the ruts (which suggests deposits being present on the street surface which protected the stone blocks) and the amount of unrepaired damage suggest a period some time after the surface had continued to be maintained. This traffic could thus, at least partially, have been the removal of the stonework from the temple of Jupiter and its transportation along the via Cardo and out of the north gate, turning up the hill and through an entrance in the west city wall (the newly excavated west gate does not show signs of such heavy traffic), to be used as building material for the ecclesiastical complex containing the Church of St. John the Baptist, for instance (Welles 1938: 376-78). Other stone robbery, done on a lesser scale, must have taken place in the city and the fainter ruts on the via Decumanus could be the result of this.

The Via Decumanus

In Jarash, unlike in the traditional Roman city plan, this street does not, at the moment, appear to extend all the way to the west gate. What is at present visible, was mostly cleared in unrecorded clearance of surface deposits. All the less substantial street surfaces which would have existed were removed and the Roman, stone paved street surface left undocumented. It rises gradually from the Tetrapylon towards the west.

During clearance work, due to the construction of later buildings along the sides of the street, they were unable in some cases to find a clear edge to the paving and when they came across large entablature blocks lying along the edges of the street they appear to have left these relatively in place. It is possible that they pushed to one side some of these blocks from the street surface itself , but the blocks may also be parts of later raised platforms outside buildings, as is the case in front of the mosque. The pillars now standing on the edge of the mosque are reconstructions and would not have been present when the mosque was in use. Although this may be true for other Byzantine/Islamic buildings along the street, there are some columns which are still in their original position, although broken and some on the north side of the street still bearing their entablature blocks.

During the season the west end of the via Decumanus, from the crossroads to the end of the clearance work (ca. 63 metres), and the via Cardo in front of the mosque site (ca. 30 metres) were drawn at a scale of 1:50. These slightly overlap and verify the partial drawing of the paving of the crossroads published in Kraeling (1938). It appears to have remained in fairly good condition since its excavation, despite repair work which lifted some of the stones from the partial-

ly collapsed drain and cemented them in place to create a walkable surface for visitors.

The stones are generally laid in rows at a slight angle to the colonnades. For ca. 25 metres at the west end of the street, the paving blocks immediately in front of the columns on the side of the street are not present, whether this was part of the initial construction, or whether they have later been removed is impossible to say. It was suggested that they may be where statuary has been removed or they may have been for plants climbing the columns.

There are a series of drain covers, circular blocks, which are constructed into the paving pattern and are thus probably contemporary, providing an entry to the drain running down the middle of the street. Two 'new' inlet drains from buildings on the south side of the via Decumanus clearly break the pattern of the paving and are thus considered to be from a later period. One of these leads from the mosque, the replaced paving stones being rather haphazardly packed into the construction ditch, not covering the complete area and unlevelled, indicating that the paving stones in this area were probably not being used as the street surface at the time (see above). The drain entry into the outside wall of the mosque is visible and is some six metres distant from and at least two metres higher than the drain itself. The second 'new' inlet leads to an as yet unexcavated area to the west near the end of the via Decumanus.

Significance and Implications of the Excavations (AW)

The highly visual construction of a large congregational mosque at the central crossroads of Jarash brought it into line with an established Islamic urban tradition of the Umayyad eighth century. A strategically placed mosque became one of the defining features of civic life under the Marwānid Umayyads, as most clearly seen in the new towns of 'Anjar in Lebanon, Ayla (al-'Aqaba) in Jordan and ar-Ramla in Palestine. The recent work at Jarash demonstrates that existing towns were also reconfigured on a large scale to meet new requirements, with new buildings being sympathetically accommodated within the prevailing urban plan. Nonetheless, the insertion of a mosque at Jarash would have resulted in significant upheaval to the late antique town – both physically and socially – and which would have made quite clear the growing permanency of Islamic rule in the local district, more broadly in the Jund al-Urdunn, and Bilād ash-Shām generally.

The erection of a mosque at Jarash was only one part of a wider program of urban renewal in Bilād ash-Shām initiated by the Marwānids. The new town of 'Anjar was very much part of that program, as was the market complex at Baysān and, on a grander scale, the 'Ammān Citadel development featuring a huge governor's palace, a market square and a mosque. At Jarash, the construction of the mosque was accompanied, as it would seem, by the total redevelopment of the south decumanus, which thereafter functioned as the principal thoroughfare for the early Islamic town. Apart from the mosque at the cardo junction, a line of other public buildings flanked the decumanus including, possibly, an administration building next to the mosque and an extensive market place (*sūq*). Many of these buildings await full investigation, an exciting prospect for future seasons, that will be devoted to the exploration of Islamic Jarash in all its facets.

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RECONSTRUCTING MANUFACTURING LANDSCAPES AT EARLY BRONZE AGE AL-LAJJŪN, JORDAN: THE FIRST SEASON (2003)

Jennifer E. Jones

Introduction and Research Goals

In 2003 the University of Minnesota Duluth — Early Urbanism Project (UMD-EUP) began a long-term research project to examine the location of craft and agricultural production across the landscape near the Early Bronze Age site of al-Lajjūn in south-central Jordan. The 2003 field crew counted pottery, chipped stone and ground stone artifacts along transects in four areas at the site to test whether the final stages of production were nucleated or dispersed. Determining the location of production for a variety of crafts in one community will foster a more nuanced understanding of the organization of production rather than assuming a single mode of production prevailed for all crafts. The density of chipped stone debitage provided the best intrasite evidence for the location of the final stages of tool production. Present in low numbers in all of the surveyed locations, the quantity of debitage spiked in two transect areas. This pattern suggests that low intensity chipped stone tool production occurred across the site in conjunction with more intense production episodes.

This field season established that a multifaceted research design of excavation and targeted, intensive off-site surveys will be required to illuminate the locations of craft and agricultural production that occurred in and around al-Lajjūn. Off site survey, particularly of basalt flows and clay sources, will clarify where the initial stages of raw material acquisition for these crafts took place. In all cases, though, the acquisition of raw materials and their transformation into tools occurs in a variety of locations across the landscape and requires the productive unit to balance a variety of scheduling demands. The presentation that follows briefly introduces the background and theoretical orientation for this research and then describes the location of al-Lajjūn and the results of past archaeological work at the site. A review of the survey methods used to quantify artifact densities is then followed by the results of the data collection. A discussion of future work planned at the site concludes this article.

Background and Theoretical Orientation

A period of disaggregation and abandonment in the southern Levant (Palumbo 2001) followed a time of population aggregation during the Early Bronze Age (Philip 2001). Excavations (Amiran 1978; de Miroschedji 1999; Rast and Schaub 2003), synthetic analyses (Chesson 1999; Esse 1991; Joffe 1993; Philip 2001), studies of craft production and exchange (Falconer 1987; Jones 1999; Schaub 1987; Watts *et al.* 2004), and survey data (Betts 1998; Broshi and Gophna 1984, 1986; Falconer and Savage 1995; Gophna 1995; Greenberg 2001; Harrison 1997; Ibrahim *et al.* 1976, 1988; Mabry and Palumbo 1988; Mattingly 1996; Miller 1991; Palumbo *et al.* 1990) have incrementally added to our understanding of the Early Bronze Age.

The broad research goal of the University of Minnesota – Duluth Early Urbanism Project (UMD-EUP) is to examine the location of craft production at a variety of geographic scales from the intrasite to the wider landscape. While balancing the demands of making an economic living in fields and homes, population aggregation and the construction of fortification walls likely necessitated changes in the organization of labor and the scheduling of tasks. At the same time, people moved across the landscape to tend annual and orchard crops, herd animals, acquire raw materials for craft production, exchange goods and visit other settlements. This pattern of

intensive human investment in a localized area and land use at varying distances and intensities requires a landscape-based approach that takes into account intra and intersite locations of productions.

During the Early Bronze Age, people made pottery, chipped stone tools, copper tools and grinding stones, herded domesticated animals, and grew annual crops and orchard trees. The material left behind from these tasks varies based on the type of activity, the durability of the waste material and the intensity of the modifications to the landscape (**Table 1**). Depending on the primary or secondary nature of the depositional environment, the distribution of artifacts, manufacturing debris and architecture indicates where stages of craft and agricultural production took place.

The southern Levant is an ideal region in which to examine the transformations in craft and agricultural production that accompanied population aggregation. The presence, pace and timing of economic changes in the Early Bronze Age are subjects of debate. Specialists in nucleated workshops are argued to have produced a subset of items, while other crafts continued to be produced in dispersed locations by households. Increasing specialization of ceramic production is alluded to at this time based on the production of multiple ware types (citation). Despite these suggestions for pottery, we do not fully understand the role played by specialists in other crafts or at different stages of production for a given craft type. The inaugural season of the UMD-EUP focused on the intrasite component of production, testing whether people made crafts in dispersed or nucleated contexts at al-Lajjūn. Foundational to this line of inquiry is the premise that the concentration of production will likely differ among various crafts at al-Lajj-

Table 1: Stages of Manufacturing Expected Near al-Lajjūn, Jordan. (1)

Craft Type	Expected Evidence of Production Loci
Pottery	Potential sources of clay in sediments and geological strata. Vessels damaged/bloated during firing. Ashy soil from fuel used to fire pottery. Kilns or burned earth.
Chipped stone (cutting tools – sickles, knives, scrapers)	Potential sources of chert – in nodules lodged in geological beds. Flakes characteristic of the first stages of chert tool reduction. Round hand-sized rocks used for shaping and sharpening (battering damage distinguishes these stones from non-utilized rocks).
Grinding stones (for grinding grain)	Large flakes of stone from the initial shaping of grinding stones. Round hand-sized rocks used for shaping and sharpening (battering distinguishes these stones from non-utilized rocks).
Agriculture	Terraces and check dams (previously identified in Levant) Gravel pavements and rock piles (possible)
Animal Husbandry	Stone pens (lowest course of stone – pens are used to keep sick or expecting animals safely away from the main herd..
Copper tools(2)	Ashy soil from fuel used to fire pottery (possible) Kilns or burned earth (possible) Smelting vessel fragments (possible)

(1) Limited to items that might be preserved on the surface.
(2) The location of copper production is unresolved. Copper ore is not available near al-Lajjūn so manufacturing stages should be limited to repairing broken tools and smelting ingots into finished tools.

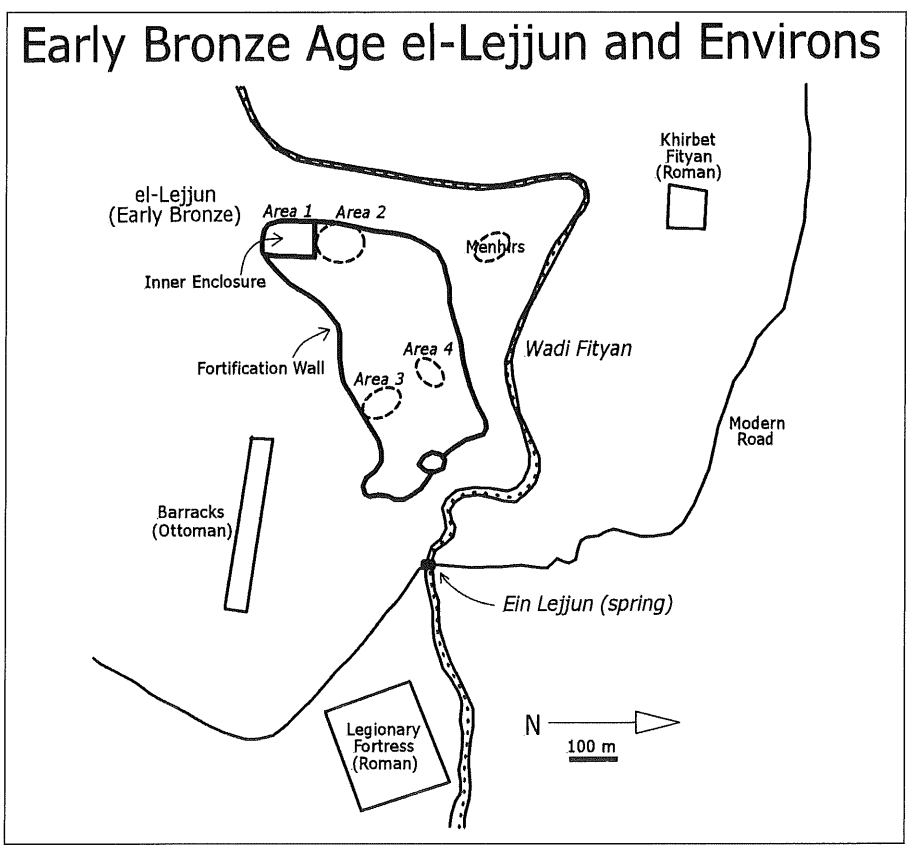
ūn or for individual stages in the production of a particular category of craft item (Costin 1991). Distinguishing between nucleated and dispersed production will allow us to specify with greater accuracy the changes in productive relationships that occurred with the Early Bronze Age population aggregation.

Location of al-Lajjūn and Archaeological Work

The environment and post-occupational history of al-Lajjūn present an opportunity to identify production loci across the landscape, as no subsequent occupation buried the site and the area today is sparsely populated and not vegetated. The town (JADIS #2307-001) is located on the Karak Plateau in south-central Jordan between modern day Karak and Qaṭrāna (UTM East: 772300, UTM North: 3459600) **(Fig. 1)**. The settlement sits atop a ridge along a precipitous drop to Wādī Fityān and near a perennial spring and small creek to the northeast **(Fig. 1)**. Current estimates of the size of al-Lajjūn vary from 14 hectares in JADIS based on previous survey estimates, to 10-11 hectares estimated by Chesson *et al.* (2005: 24) from a GPS generated map. The area has attracted settlement intermittently over the millennia as Paleolithic flints, a Roman/Byzantine legionary fortress, Ottoman period barracks and modern era burials occur in the near vicinity.

The architecture at Early Bronze Age al-Lajjūn includes a fortification system, an inner enclosure wall in the southwestern corner of the site, discontinuous wall segments and a line of 17 menhirs on the slope northwest of the site. The fortification wall is a substantial feature, preserved several courses high in sections along Wādī Fityān **(Fig. 1)**. It includes an approximately 3.00m thick stone encircling wall with a series of projecting rectangular towers. Spaced at irregular distances along the wall, the towers varied in width with two adjacent ones along the southern side of the wall measuring 7.70m and 10.40m wide. No gates were visible although erosion gullies and soil deposition obscure the wall's course along the spring side of the site.

Visible on an aerial photo (Parker 1987: fig 20, p. 189) and noted by successive archaeological teams (Albright 1934; Glueck 1934; Miller 1991; Musil 1907), the 1.00-2.50m wide inner enclosure segregates a 0.5 hectare area within



1. Map showing the area around Early Bronze Age al-Lajjūn and the location of transect survey Areas 1-4 inside the fortification wall.

the southwestern corner of the fortification wall **(Fig. 1)**. Although this feature has been referred to as the boundary of an "acropolis" (Albright 1934: 14; Glueck 1934: 44; Miller 1991: 102), determining the function of this area will require excavation to gain additional information on associated artifacts.

A number of discontinuous wall segments and rock alignments lie along the ridgeline north of the inner enclosure wall. Construction details, namely the smaller stones used and the single stone width differentiate these segments from the fortification system and inner enclosure and suggest that they may mark domestic structures.

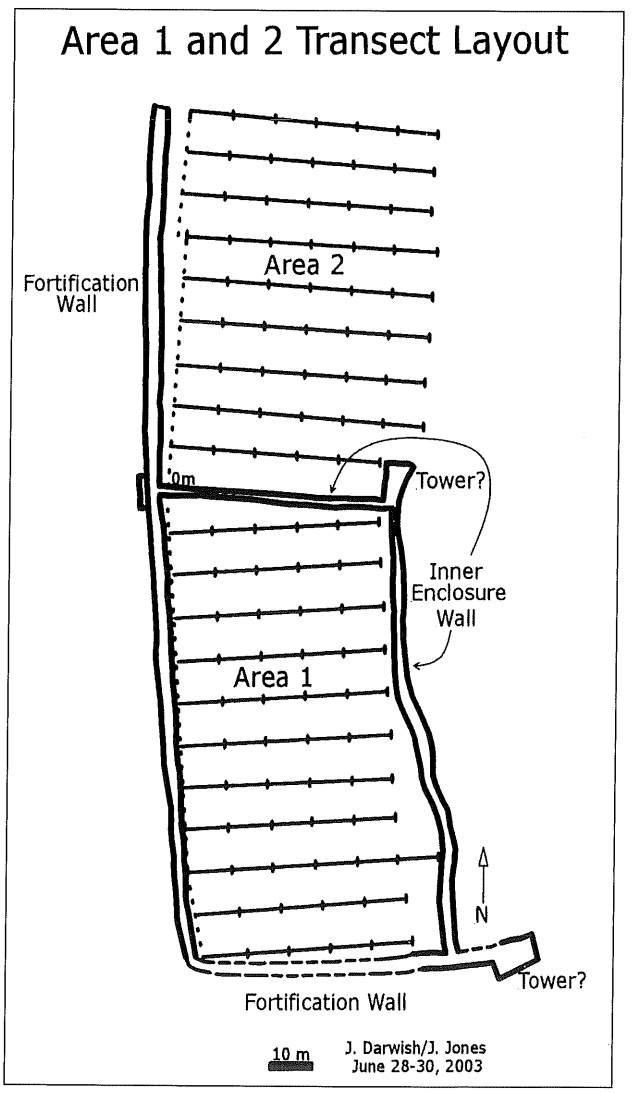
The menhir line at al-Lajjūn contains seventeen stones, 11 of which stand upright, arranged in a north-south line outside the fortification wall. Photographs of the menhirs taken during Glueck's survey show the same stones as were intact in 2003, indicating that the line has not been altered for al least eighty years (Glueck 1934: fig. 19, p. 45).

Published records of Early Bronze Age al-Lajjūn date back at least to 1896 and 1897 when Simeone Vailhe and Germer-Durand noted the menhir line and the similarity of the stones to nearby geological strata (cited in Brunnow and Domaszewski 1905: 38). Musil (1907: 36) visited the menhirs in August 1896 and professional interest continued through the years with visits from Glueck (1934), Albright (1934), Parker (sherd collecting in 1987), Miller (1991), and Chesson *et al.* (2005). The first excavation at al-Lajjūn occurred in 2000 and in three test units revealed archaeological deposits approximately 0.40-0.60m deep (Chesson *et al.* 2005). Two radiocarbon samples taken from a floor in one of the test units yielded calibrated dates in the EB II period, 3088-2919 and 2923-2884 respectively (Chesson *et al.* 2005: 30).

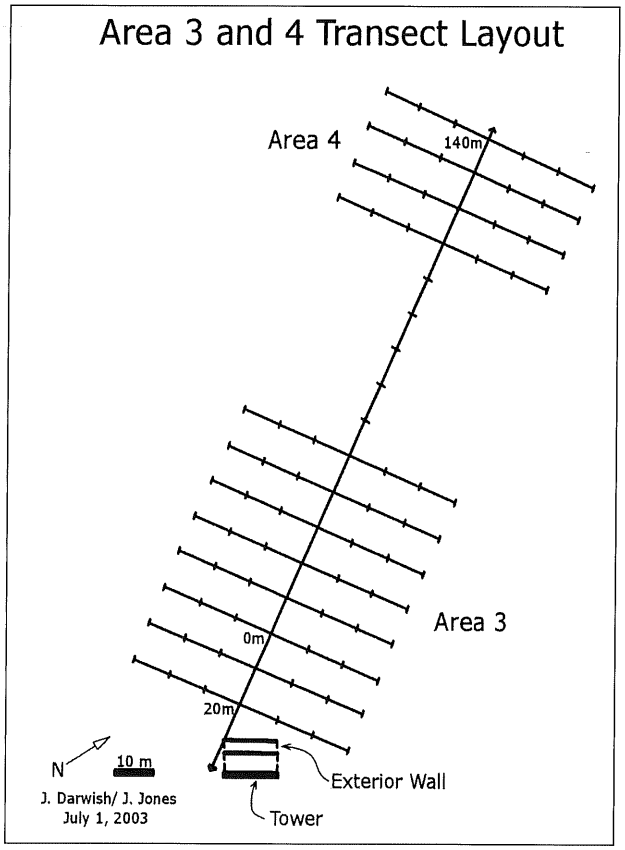
Survey Methods

The 2003 field season began with a non-random inspection of al-Lajjūn to ascertain the visibility of architecture and of ceramic, chipped stone and ground stone artifacts. Ascertaining whether production was nucleated or dispersed at the site required us to calculate artifact densities to accurately compare quantities of items across the site. To calculate these densities, we counted artifacts in four areas, numbered 1-4 **(Fig. 1)**. Areas 1 and 2, in the south western corner of the site contained a number of discontinuous and narrow stone walls, presumably from domestic structures, and contrasted with Areas 3 and 4 which had very few stone walls of any size. The size of each transect area was determined by the time allotted to the survey work.

The generally low density of artifacts on the surface, compared to other Levantine sites of this size, and the single period of occupation allowed us to count artifacts larger than 1cm in size within our survey areas. The two person planning team of myself and Department of Antiquities Representative Jihad Darwish counted on each side of transect lines spaced 10m apart, restarting our tallies at 10m intervals along each line **(Figs. 2 and 3)**. Approximately 2.5m of



2. Location and layout of survey Areas 1 and 2.



3. Location and layout of survey Areas 3 and 4.

ground was visible on either side of a given transect, yielding 50m^2 of coverage per each 10m segment. The square meters covered and an assessment of the visibility of the ground surface within each transect area are listed in **Table 2**. A total of 9,100m^2 or 6.5% - 9.1% of the surface area of this 10-14 hectare site was surveyed using these methods **(Table 2)**.

Results

We were unable to locate the surface remnants of production areas outside the town walls because later disturbances from the Roman through modern eras have altered the ground surface. The intramural deposition of artifacts likely resulted from a combination of use, disposal and production contexts. Disentangling these contexts is challenging based on surface collected material but the artifact counts indicate that certain parameters can be narrowed. For example, the lack of ceramic production debris and ground stone shaping flakes within the transect areas suggests that these items were not produced on-site and that the distribution of the artifacts present reflects a combination of use and/or disposal activities rather than production.

Pottery

Heavily eroded diagnostic and non-diagnostic sherds from utilitarian and burnished ceramics lay within the transect areas. The predominance of body sherds suggests that collecting by previous survey teams has reduced the number

Table 2: Transect Areas, Square Meters Covered, and Transect Visibility.

Area	Square meters covered	Visibility
Area 1	2800m^2 (10 transects of 50m and 1 transect of 60m * 5m of visible area)	Moderate. Ground heavily covered with stones 0.10-0.20m in size. Possible domestic architecture present.
Area 2	2700m^2 (9 transects of 60m each * 5m of visible area)	Good. Some coverage of stones 0.10m in size but less densely than Area 1. Possible domestic architecture present.
Area 3	2400m^2 (8 transects of 60m each * 5m of visible area)	Good. Some coverage of stones 0.10m in size, especially in southern half of transects. Little domestic architecture.
Area 4	1200m^2 (4 transects of 60m each * 5m of visible area)	Very good. Light coverage of naturally occurring chert gravel but few larger stones. Little domestic architecture.

of diagnostic pieces in the surface assemblage. Nearly all of the ceramics date to the Early Bronze Age, although Miller (1991) noted the presence of Early Bronze IV sherds and Chesson *et al.* (2005) identified two Iron Age II and two Byzantine sherds, one of which was Late Byzantine.

Chesson has suggested that the paste and temper of ceramics from al-Lajjūn is different from other Early Bronze Age sites she surveyed on the Karak Plateau (2005: 24). Specifically, her impression is that the fabric of pottery from al-Lajjūn is finer grained and the temper is smaller in size. If compositional testing can verify these differences, they may assist in identifying ceramic exchange on the Plateau.

No ceramic production waste was identified in the surveyed areas at al-Lajjūn. Similar densities of sherds prevailed across all of the areas. For example, the densities varied from a low of 0.22 sherds per m^2 in Area 2 to a high of 0.30 per m^2 in Area 3 **(Table 3)**.

Ground Stone

The ground stone tools within the survey transects were produced from black vesicular and non-vesicular basalt rather than the locally available fossiliferous and chert-rich limestones. Known local sources of these types of basalt include an area near Jad'a on the King's Highway, approximately 19 kilometers northwest of al-Lajjūn (Koucky 1987: 38), and flows that lie 3.5-12 kilometers west of al-Lajjūn (Shawabkeh 1991: see map insert). Ongoing compositional analysis of artifacts and samples from similar flows on the Karak Plateau will play an important role in determining the source or sources of the querns fragments at al-Lajjūn (Watts *et al.* 2004).

The size of al-Lajjūn and its location near a spring would suggest an agricultural subsistence economy, yet the only complete tools among the 120 ground stone artifacts were a hand stone and one small quern. Other intact specimens may have been scavenged from the site over the centuries, or the number of such tools at al-Lajjūn was lower than we might assume. The ground stone counts from each survey area are shown in **Table 4** with the densities transformed by multiplying by 400 to yield more comprehensible quantities. The transformed densities range from lows of 1 and 1.32 fragments per $400m^2$ in Areas 4 and 3, to highs of 4 and 12 fragments per $400m^2$ in Areas 2 and 1 respectively **(Table 4)**.

Chipped Stone

Chipped stone material including flakes, utilized flakes, flake tools, blades and debitage constituted the most abundant artifact class at al-Lajjūn. We differentiated between utilized flakes and flake tools because a large number of flakes had few or no retouch scars. For this analysis, a flake was considered utilized, rather than as a tool, if it had three or fewer retouch scars. Similar suites of cutting and scraping activities likely required both types of flakes and more retouch scars could be evidence of longer use, the need for a sharper tool or cutting harder substances. Triangular in cross section, blades represented 39% of the utilized flakes, or 150 out of a total of 381. Debitage included a range of pieces from flakes lacking a bulb of percussion to shatter.

Table 3: Count and Density of Ceramics by Area.

Area	Ceramic Count	Ceramic Density	Ceramic Density per $100m^2$
Area 1	770	$0.28/m^2$	28
Area 2	581	$0.22/m^2$	22
Area 3	711	$0.30/m^2$	30
Area 4	326	$0.27/m^2$	27
Total	2388		

Table 4: Count and Density of Ground Stone Artifacts by Area.

Area	Ground Stone Count	Ground Stone Density	Ground Stone Density per $400\ m^2$
Area 1	81	$0.29/m^2$	12
Area 2	28	$0.10/m^2$	4
Area 3	8	$0.033/m^2$	1.32
Area 4	3	$0.025/m^2$	1
Total	120		

The following analysis focuses on the density of debitage as a key indicator of the location of production. Although formation processes are difficult to specify from surface assemblages, the likelihood that debitage distributions are indicative of productive rather than disposal contexts is outlined elsewhere (Jones in press). Debitage accounts for the vast majority of chipped stone artifacts, comprising 76%-85% of the assemblage in Areas 1-4 (**Table 5**). The density of debitage was lowest in Area 1 with a transformed equivalent of 8 pieces per 100m^2 and highest in Areas 3 and 4 with 31 and 21 pieces per 100m^2 respectively (**Table 5**). The density of utilized flakes, blades and tools was low in all transect areas, equivalent to 3-7 pieces per 100m^2 (**Table 5**).

Discussion and Conclusions

Though based on surface data from a portion of al-Lajjūn, the distribution of debitage suggests that the production of chipped stone tools occurred in both dispersed and nucleated contexts. Higher densities of debitage in Areas 3 and 4 suggest that a greater intensity or duration of production in these locations was layered over a broadly based pattern of dispersed production seen across the site. Alternative possibilities include functional differences in the activities carried out within the surveyed portions of the site or chronological differences in the occupation of these areas. Testing these alternatives will require broad-scale excavations. The possibility that chipped stone tool production occurred in both nucleated and dispersed locations at al-Lajjūn caution against assuming a linear association between population aggregation and the presence of specialized craft production. Greater specification of the timing and pace of the adoption of specialized production and the variability in the degree of specialized production across a variety of crafts will require excavation at al-Lajjūn as well as material resource surveys around the site.

The Early Bronze Age site of al-Lajjūn holds considerable promise for understanding the intra-site location of production via architectural and artifact patterning. The shallow deposits identified by Chesson *et al.* (2005) may compromise the preservation of floral and faunal remains, but the lack of post-Early Bronze Age occupation will allow for the excavation of broad exposures. Future investigations into the location of craft production at the site will require different strategies for each artifact class. The initial stages of ground stone shaping likely took place in off-site areas near raw material deposits. The archaeological visibility of these locales will depend a great deal on the intensity with which stone was harvested from an individual location and on subsequent geologic depositional processes. Periodic sharpening of ground stone

Table 5: Count and Density of Chipped Stone Artifacts by Area.

Area	Count of Utilized Flakes, Blades and Flake Tools(1)	Debitage(2) Count	Total Lithic Count	Density of Utilized Flakes, Blades and Tools per 100m^2	Density of Debitage per 100m^2	Density of Total Lithics per 100m^2
Area 1	73	226	299	3	8	11
Area 2	87	369	456	3	14	17
Area 3	176	749	925	7	31	38
Area 4	45	255	300	4	21	25
Total	381	1599	1980			

(1) Blades, flake tools and utilized flakes were combined into a single category for this analysis since their distribution represents use and disposal contexts rather than production contexts.
(2) Unutilized flakes and all other debitage combined.

tools likely occurred on-site but the presence of hammerstones will not conclusively indicate the sharpening of querns since hammers are used for a variety of battering tasks. Sourcing of clay and temper may narrow down the number of locations where potters gathered these materials. Excavation may reveal evidence of wasters or ceramic production debris, but the forming and firing stages of pottery production are not apparent from the surface material. The locations of the stages of chipped stone production will be best explored by broad excavations in a variety of areas across the site and the careful analysis of debitage. In this regard, wet-screening for micro-debitage would also aid in identifying the final stages of production or tool sharpening.

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DÉCOUVERTE DE NOUVEAUX BLOCS DE BASALTE SCULPTÉS À 'AYN AS-SAWDĀ (AZRAQ AL-SHĪSHĀN), JORDANIE

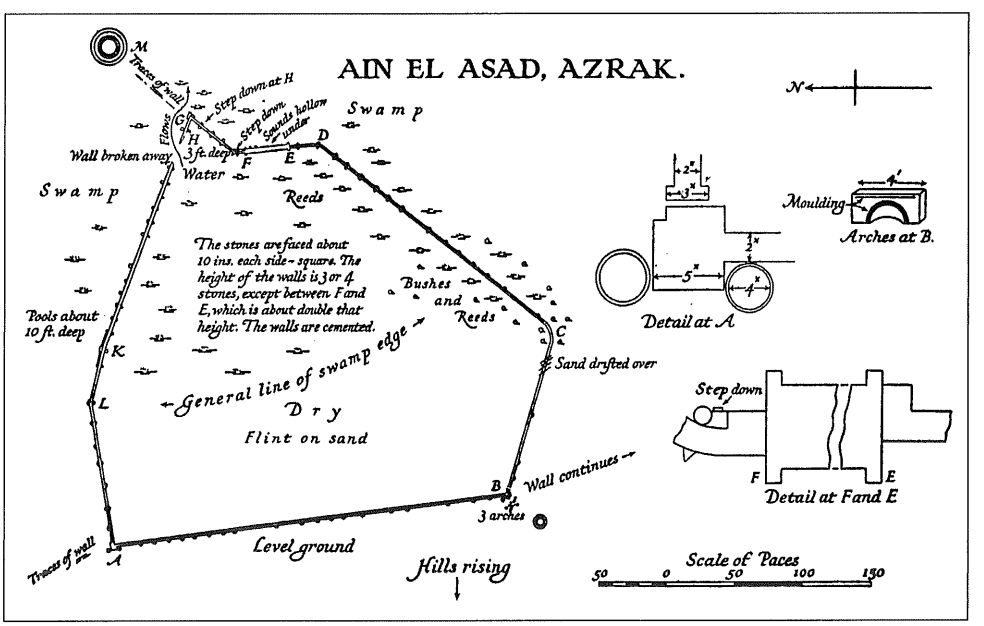
Claude Vibert-Guigue

Summary

In June 2004, a survey has been conducted along a large platform built in the buttressed-wall of a monumental reservoir at 'Ayn as-Sawda (south al-Azraq). In 1983, when the water was at a lower level, 35 basalt carved stones were discovered by the Department of Antiquities. Since the reservoir is totally empty, more stones appeared. The 2004 campaign surveyed half part of the surface on the west side of the platform. We collected new carved stones (32 at the total) and during the careful cleaning, small white stones, broken basalt stones with lugs, ceramic, bones and glass bracelets have been found. Some planks and stakes used for the building of the foundation in a water context are still *in situ*. The surface of the stones cleaned this year does not bring evidence to understand the shape of the ornamental structure. Everything is mixed, without evidence of the collapse. From an iconographical point of view, the stones belong probably to the Umayyad period, considering the mixed motifs: water horse, siren, griffon (senmurv). Water and hunting topics are the most important. The problem is the shape of the structure holding this wall which probably includes a kind of arches. This unique collection of more than 60 carved stones and the new field indications reopen the discussion about the Umayyad period in al-Azraq and how this architectural monumental style appeared.

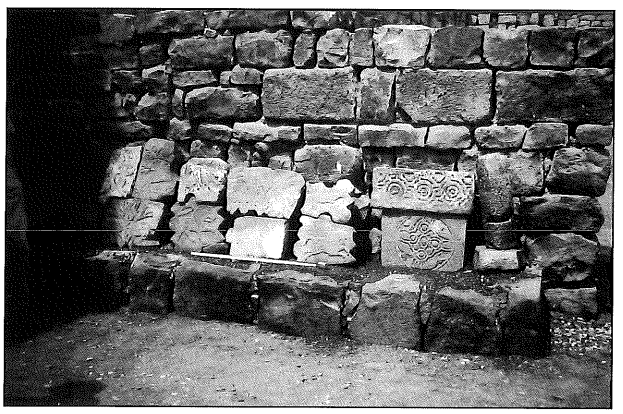
Introduction

En juin 2004, un dégagement archéologique de surface a été réalisé en contrebas d'une plateforme de 30,50m de long par 6 m de large qui constitue un des sept côtés d'un réservoir monumental localisé à 'Ayn as-Sawda (Azraq ash-Shīshān), au sud de l'oasis d'Azraq **(Fig. 1)**. Observée lors d'un passage de Musil au début du XX^{e} siècle,



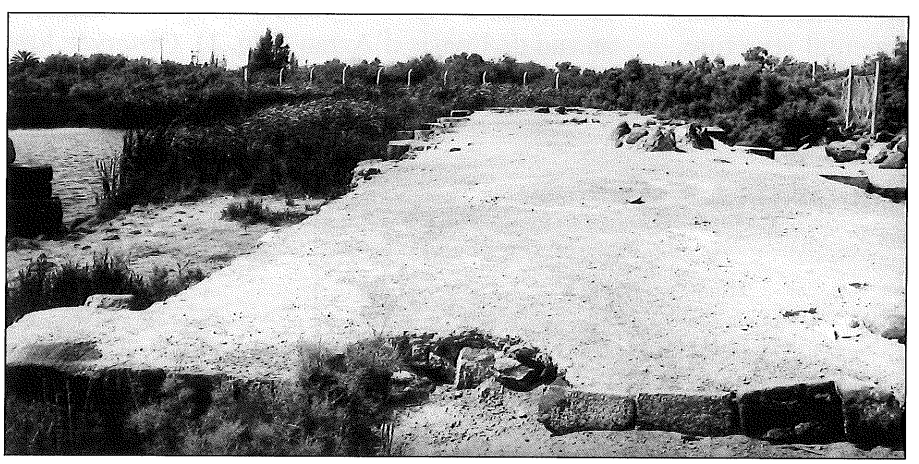
1. Plan de Rees (Rees 1929 : 1). La zone étudiée est entre F et E.

cette structure a fait l'objet de quelques études et sondages (Musil 1927 ; Rees 1929 ; Kennedy 1982 ; Watson, Burnett 2001). C'est à l'automne 1983, à l'occasion d'une consolidation des vestiges par le Service des Antiquités de Jordanie, qu'une étonnante série de blocs de basalte sculptés a été trouvée en contrebas de la plate-forme. Une baisse du niveau d'eau les avait fait apparaître du côté ouest. Trente-cinq blocs ont été dégagés et publiés par Ghazi Bisheh (Bisheh 1986) auquel il faut ajouter un trente-sixième bloc trouvé par la suite[1]. Les reliefs représentent des figures (personnage princier, danseuse), des animaux (quadrupède, serpent, poisson), des animaux mythologiques (Pégase et un griffon inspiré du *senmurv* sassanide) de la végétation (arbuste, rinceau) et des motifs géométriques à base de cercles **(Fig. 2)**. En 1991, nous avons eu l'occasion de photographier la plate-forme, alors que le niveau d'eau continuait de descendre **(Fig. 3)**. C'est en 2002, lors d'un passage sur le site asséché,[2] que d'autres blocs décorés, perdus dans une épaisse végétation de roseaux, sont apparus[3]. Le Service des Antiquités a alors jugé nécessaire une intervention avec notre aide, avant toute remise en eau du bassin.



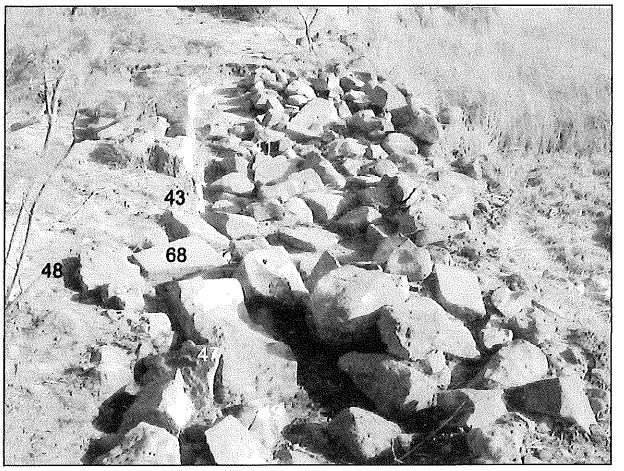
2. Les blocs trouvés en 1983 présentés à la citadelle d'Azraq (cliché Cl. Vibert-G.).

Si en 1983 le ramassage s'était déroulé les pieds dans l'eau, l'intervention de 2004 a porté pour la première fois sur un terrain complètement sec qui a facilité les observations **(Fig. 4)**. La plupart des blocs sont à l'ouest de la plate-forme. Durant cette campagne 27 ont été dégagés, auxquels il faut ajouter 2 autres blocs anciennement déplacés aux alentours de la plate-forme et 3 autres déposés près de la station de pompage. Soit 32 blocs recueillis cette année[4]. Le nombre total de blocs, vus d'une manière ou d'une autre, est donc de 68. Ils présentent deux caractéristiques: leur découpe est ornementale et les reliefs figurés couvrent un large répertoire iconographique en bonne partie inspiré de l'Antiquité. Le thème de l'eau et de la chasse s'affirme, mais nous verrons que d'autres types de scènes sont apparus. Des motifs similaires à ceux de la série de



3. Vue de la plate-forme vers le nord en 1991. Le gisement de pierre est entre le plan d'eau à gauche (disparu depuis 1993) et la plate-forme. On note l'absence d'arbre dans tout le secteur (cliché Cl. Vibert-G.).

1. Il s'agit d'un bloc représentant un cavalier chasseur. Un autre bloc, que nous ne comptabiliserons pas ici, présenterait une composition de cercles sécants (Watson, Burnett 2001 : 75).
2. Sur le site, un panneau d'information indique un tarissement de la source en 1993 après 20 ans de pompage.
3. C'est dans le cadre d'un programme international de coopération scientifique (PICS CNRS-DoA) placé sous l'autorité de Fawwaz al-Khraysheh, directeur général des Antiquités et Musées de Jordanie, et dirigé par Frédéric Imbert, que cette visite avait eu lieu en compagnie de Ghazi Bisheh. Le programme avait permis entre 2000 et 2002 de dessiner et photographier l'ensemble des blocs trouvés par le DoA et exposés à la citadelle d'Azraq, à l'écomusée de Shawmari et au Museum of Jordanian Heritage à l'université du Yarmouk à Irbid (cf. Cl. Vibert-Guigue 2001-2002).
4. Précisons que quelques numéros correspondent à des éclats de blocs sculptés non figurés qui recollerons peut-être ensuite avec d'autres vestiges.



4. Le tas de pierre en cours de dégagement en 2004, vue du nord vers le sud. N° 41, senmurv, n° 43, vase globuleux, n°47, félin, n° 48, cervidé (?), n°49 et n°68 sans décor (cliché Cl. Vibert-G.).

1983 prouvent des répétitions. Par exemple, le *senmurv* ne doit plus être considéré comme un motif unique. On doit aussi envisager une symétrie dans l'organisation des pierres. Des formes de blocs, crénelées en particulier, soulèvent de nouvelles interrogations quant à leur usage. Le nettoyage de la partie basse de la structure a par ailleurs dégagé des matériaux en bois utiles à l'édification d'une maçonnerie dans un contexte aquatique.

La diversité des sources iconographiques des reliefs sculptés suggère la période omeyyade (660-750) plutôt que romaine, alors que la datation du réservoir n'est pas certaine : romaine, byzantine ou omeyyade ? En réalité, aucun indice archéologique ou épigraphique ne permet de trancher. Selon Ghazi Bisheh, l'hypothèse d'une plate-forme décorée, d'où sur des sièges on assistait à des jeux nautiques, est envisageable. L'image peinte du prince trônant sur une frise marine dans les bains de Quṣayr 'Amra constituerait un parallèle iconographique intéressant (Bisheh 1986 : 7-8).

Précisons que depuis plusieurs dizaines d'années les vestiges environnés d'eau et de végétation sont protégés par une clôture qui englobe une station de pompage d'eau. La *Royal Society for the Conservation of Nature* (RSCN) a aménagé un centre d'accueil à vocation scientifique et pédagogique à l'entrée de la réserve écologique et du parc archéologique. Un cheminement qui suit en partie le mur du réservoir permet de découvrir à l'ombre d'arbres et au milieu de roseaux une flore et une faune remarquables. Ce cadre naturel exceptionnel a connu une occupation dès la préhistoire. Entre cette période et celle qui nous occupe, aucun autre aménagement n'est attesté. On passe de l'une à l'autre en se déplaçant de quelques pas sur la zone étudiée[5].

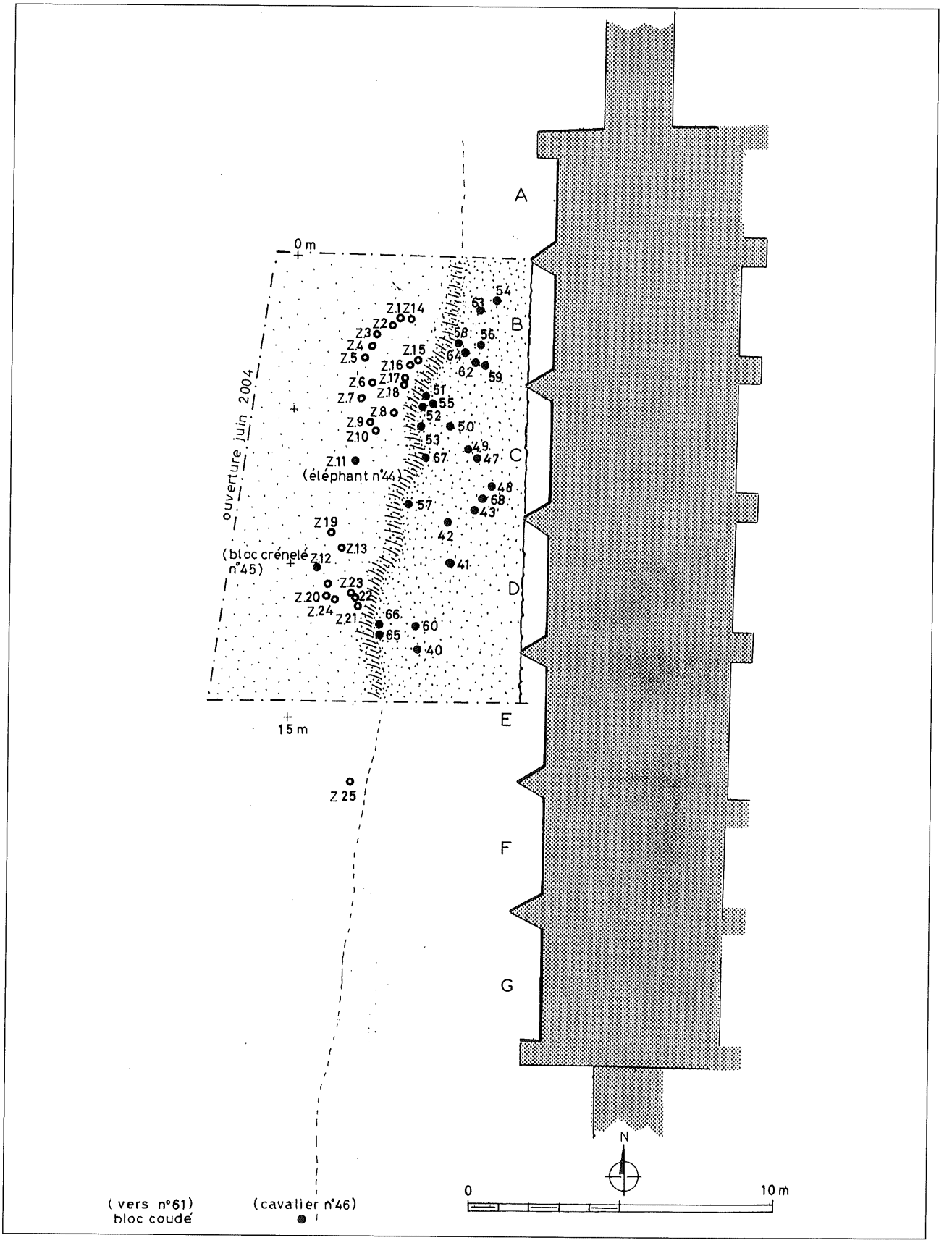
Cet article préliminaire présente les résultats du dégagement réalisé en 2004 dans la continuité de celui de 1983. Quelques caractéristiques du décor et de sa structure nous ont amenés à proposer des restitutions. Provisoires, elles rappelleront le caractère unique d'une telle découverte.

Localisation de l'intervention et options de dégagement

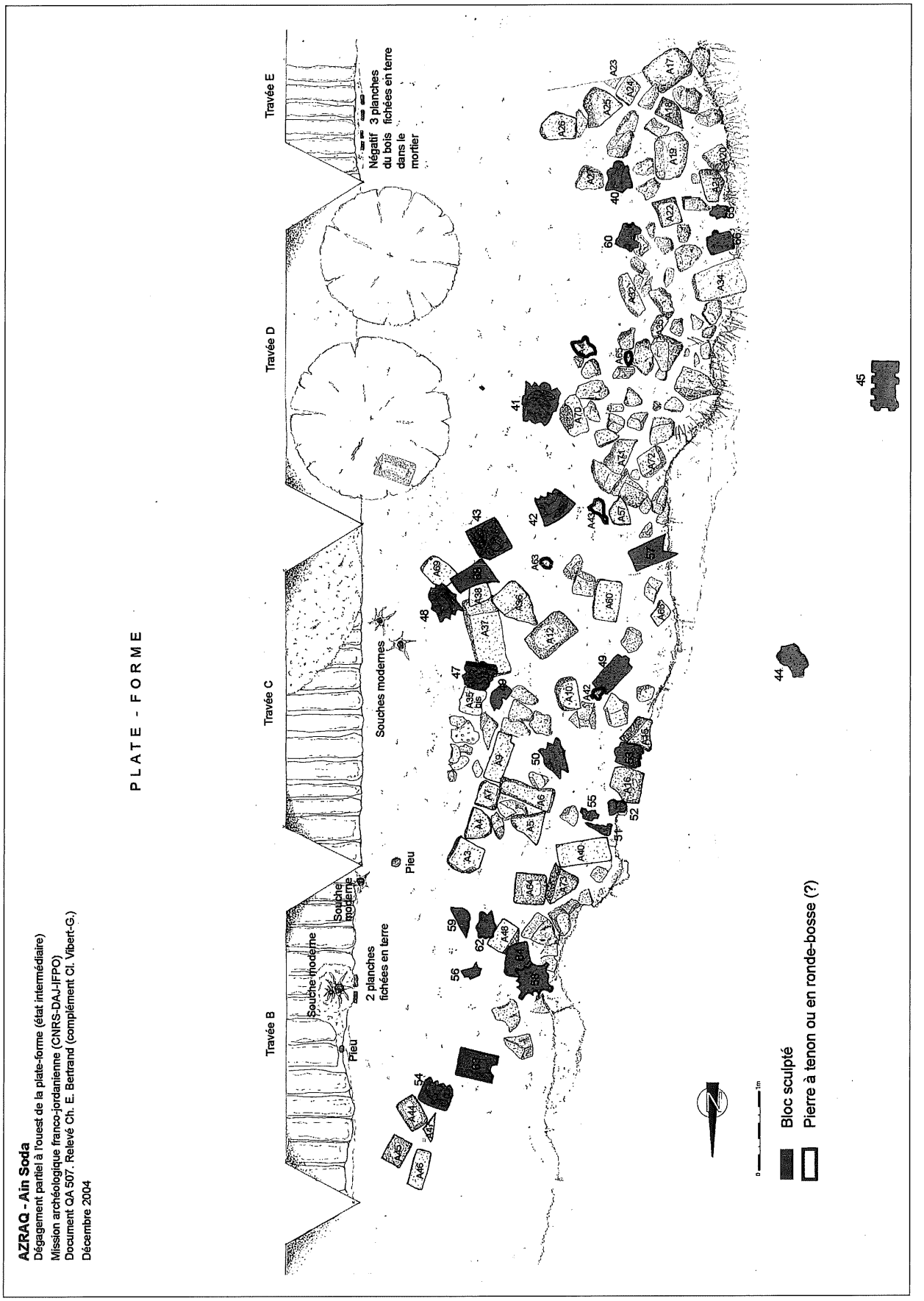
La plate-forme consiste en un massif allongé bordé sur ses deux longs côtés de huit contreforts carrés à l'est et de huit autres, triangulaires ou carrés, à l'ouest **(Fig. 5)**. Elle présente une surface en plan maintenant égalisée, comme celle des murs de 2,20m de large qui se poursuivent de part et d'autre. Le dégagement archéologique s'est limité à une zone longue de 15m et d'une largeur qui variait entre 3 et 5m selon l'emprise de la berme en contrebas de la structure. Cette berme moderne et artificielle longe les côtés conservés du bassin. Dans la mesure du possible, et avec l'avis des écologistes de la réserve naturelle, les arbustes ont été préservés. En revanche les roseaux ont été coupés sur toute la zone, ainsi qu'en contrebas de la berme afin de découvrir des blocs éboulés et d'ouvrir une zone de parking pour les pierres.

Un des objectifs était de vérifier s'il s'agissait d'un effondrement *in situ* d'un décor architectural, d'une zone où les blocs auraient été jetés, ou bien encore d'une forme de remploi de ces derniers. Un relevé topographique du terrain a été réalisé par Charles-Edouard Bertrand, architecte à l'IFPO. Ce relevé a permis de localiser les différentes découvertes **(Fig. 6)** et de dresser un état du dégagement en fin de campagne. Une numérotation des blocs a été établie pour chaque type de découvertes. Un dessin en coupe

5. L'importance du site est confirmée depuis plusieurs années par la découverte de vestiges fouillés par les préhistoriens que nous avons rencontrés sur place (Rollefson *et alii*. 2001).



5. Plan schématique de la plate-forme, du départ des murs et de la zone dégagée avec le système de numérotation des blocs (schéma Cl. Vibert-G.).



6. Plan de l'état des découvertes en milieu de chantier (topographie, relevé Ch. E. Bertrand ; infographie Cl. Vibert-G.).

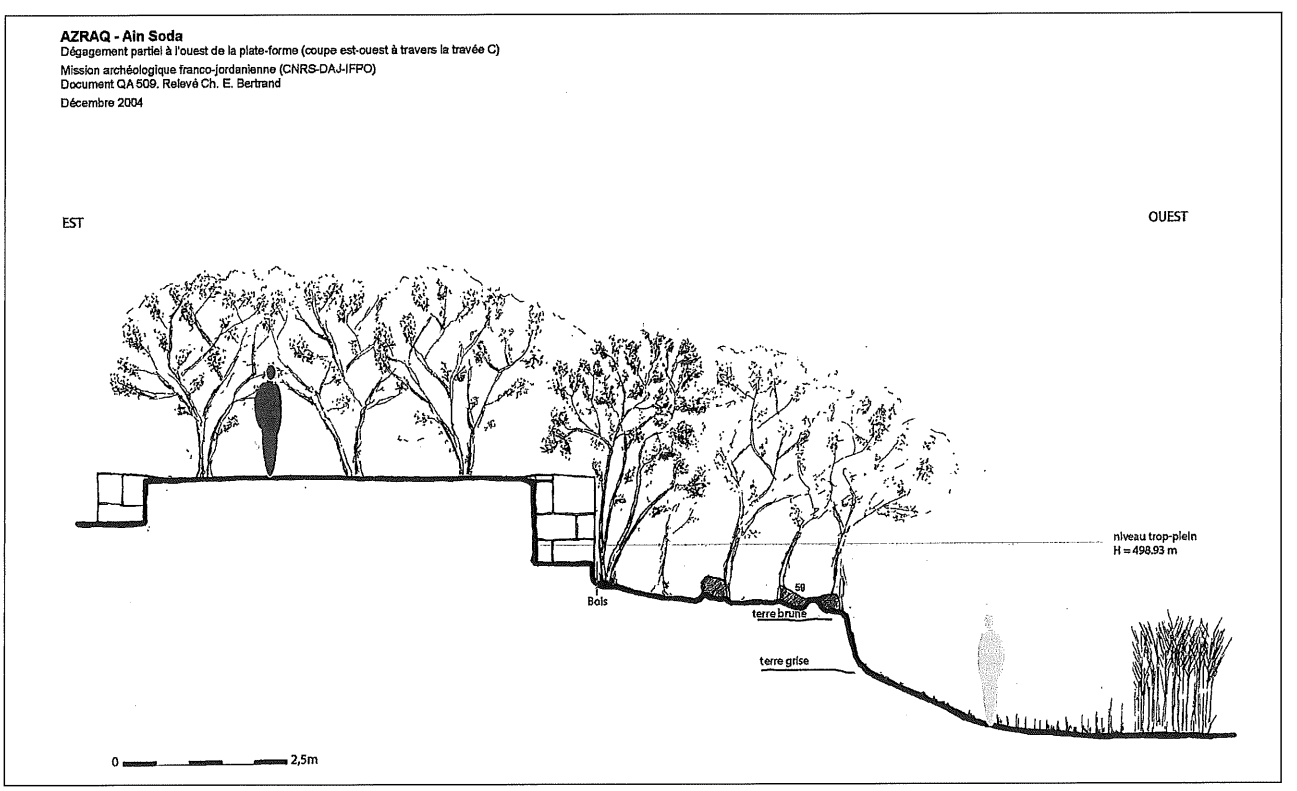
représente l'emprise de la plate-forme et le profil de la berme artificielle avec son tas de pierres **(Fig. 7)**.

Le décapage

Un alignement qui semblait composer une assise de mur à deux parements a été étudié en premier lieu. Cet agencement moderne avait sans doute été prévu en réserve d'une restauration des parements du bassin. Une fois démonté, le décapage a pu commencer et révéler que la zone empierrée se situait plus du côté de la berme qu'à l'aplomb même de la plate-forme. Rapidement, il s'est avéré que nous étions devant un mélange de pierres de toutes sortes[6], sans connexion physique – aucun bloc encore emboîté à un autre n'a été trouvé – et sans lien avec des couches stratigraphiques.

Tous les blocs sont de basalte, mais de petites pierres blanches, informes, douces au toucher, peu solide ont aussi été ramassées. Des pièces de bois en place fichées en terre et assez bien conservées ont été dégagées. Certaines ont servi de coffrage à la construction, d'autres ont servi de pieux. Un peu de matériel archéologique a été ramassé, mélangé à la terre brunâtre associé au niveau des pierres. Une terre grise plus claire, de type argileuse, marque une différence à l'approche de la plate-forme. Il n'est pas impossible que cette même couche se poursuive sous le « pierrier » partiellement dégagé durant cette campagne. Un lit d'éclats de pierres de basalte, plus ou moins plates, marque une limite entre ces deux couches **(Fig. 8)**. La stratigraphie est simple, puisque le sol sur lequel repose les pierres serait celui du fond du bassin.

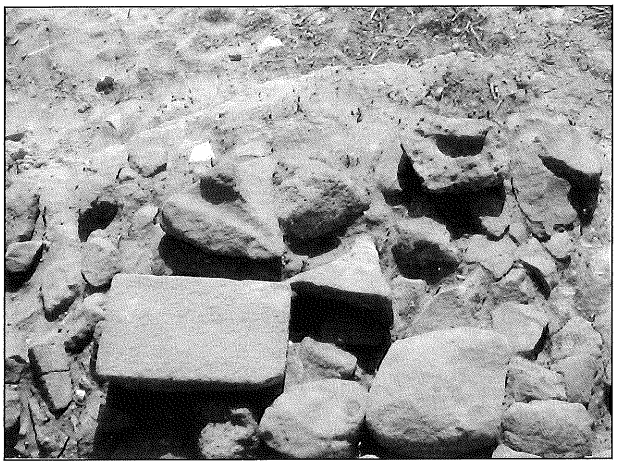
Une importante quantité d'éclats de pierres informes ou de simples cailloux constituent l'essentiel de la zone. Parmi eux, se trouvent des blocs décorés ou non et plus ou moins ouvragés sur les côtés. Les premiers ont été trouvés peu enfouis. Ils se présentaient à plat (ou quasi à



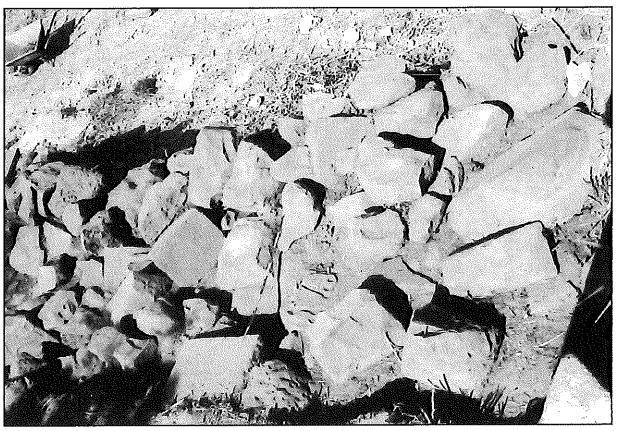
7. Coupe sur la plate-forme et la zone décapée (topographie, relevé, dessin Ch. E. Bertrand).

6. Classement par grosseur de blocs (avec quelques références de pierres) ; A- les gros blocs, difficilement transportables à deux personnes (A 36: 68 x 49, pr. 43cm ; A 37: 44cm, x 42, 5, pr. 106); B- les moyens, bien taillés, profond, transportables à deux (A 16: 52 x 44 x pr. 38cm); C- les décorés, peu profonds (20cm); D- les éclats à tenons, petits ou plus gros, tenons plus ou moins en saillie; E- les petits modules, bien dressés; F- les reliefs suggérant une décor en haut relief (A 58: 52 x 32, pr. 28cm).

plat) vus de face ou de revers, plus rarement à la verticale (n° 49, 47, 54 et 59). Le décor était face apparente ou non, sans raison d'être semble-t-il **(Fig. 9)**. Dans l'état actuel du dégagement, on observe une dispersion non significative des blocs décorés. Aucun indice ne révèle leur position d'origine, pas plus que leur agencement. En limite de berme, une attention particulière portée à une suite de blocs serrés les uns contre les autres n'a pas révélé de connexion. Un relevé à l'échelle 1/1 a néanmoins été fait **(Fig. 10)**.



8. Lit de pierres plates sous les blocs travaillés en limite de berme (cliché Cl. Vibert-G.).



9. Position des blocs travaillés (ici le n° 54 est bien visible) à un moment du dégagement (cliché Cl. Vibert-G.).

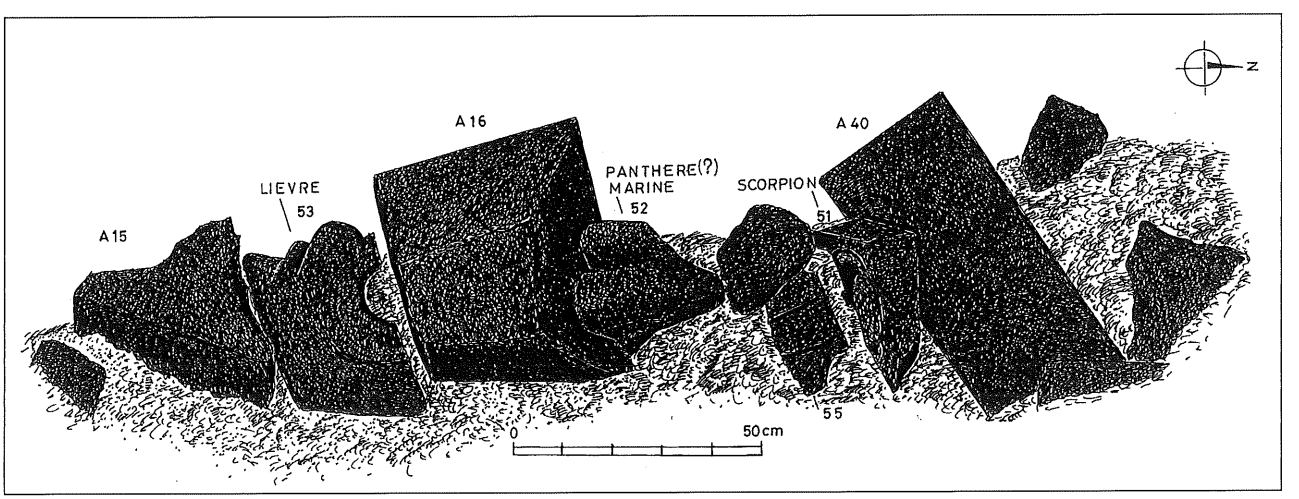
Le bas de la berme correspondant au secteur dégagé a fait l'objet d'une prospection de surface après un fauchage des roseaux réalisé par un ouvrier agricole spécialisé. C'est ainsi qu'un bloc orné d'un éléphant et un autre crénelé, déjà observés lors de notre passage en 2002, ont été recueillis. De même pour un bloc orné d'un cavalier, brandissant une lance et un volatile sur son bras, ramassé 8m plus au sud en contre bas de berme (n° 46). Un autre sans décor (n° 61) a été pris à quarante mètres au sud de l'extrémité de la plate-forme. Enfin, toujours hors contexte, signalons trois blocs lisses et anciennement déposés près de la station de pompage (n 37 à 39). La berme a pu être photographiée sur sa longueur **(Fig. 11)**.

Parmi les autres découvertes lapidaires, il faut noter des éclats de pierre qui présentent un petit tenon sans fonction architecturale **(Fig. 12)**, des bossages, des creux linéaires. D'autres morceaux évoquent de la sculpture en ronde-bosse, peut-être un oiseau dans un cas **(Fig. 13)**.

Les blocs décorés ou ouvragés

Inventaire

La numérotation suit celle commencée en 2000 sur les blocs anciennement découverts. Les lettres entre crochets renvoient à la désigna-



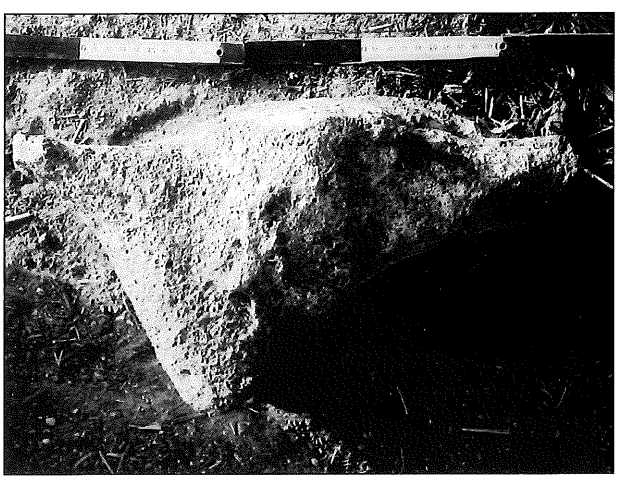
10. Relevé détaillé d'une proximité de certains blocs au moment de leur découverte (relevé, dessin Cl. Vibert-G.).



11. Vue panoramique de la berme (clichés et montage Cl. Vibert-G.).



12. Éclat de bloc avec tenon (cliché Cl. Vibert-G.).



13. Sculpture en ronde bosse ? (cliché Cl. Vibert-G.).

tion des «travées» constituées par les contreforts ouest de la plate-forme (ou à une autre localisation). Les blocs sont de forme radiale lorsqu'ils appartiennent à des arcs pleins. Une planche regroupe le dessin au trait des blocs **(Fig. 14)**. Les dimensions entre parenthèses signalent la longueur, la largeur et la profondeur des blocs. Les interprétations ne sont pas définitives.

N° 37: bloc trapézoïdal à deux petits tenons sur les deux longs côtés (brisés sur celui de droite), sans décor (34 x 27 ; pr. 20cm) [*bloc anciennement déplacé vers la station de pompage*].

N° 38: bloc rectangulaire, conservé en deux fragments, avec de longs côtés crénelés et un petit côté concave, sans décor (54 x 37; pr. 15cm) [*bloc anciennement déplacé vers la station de pompage*].

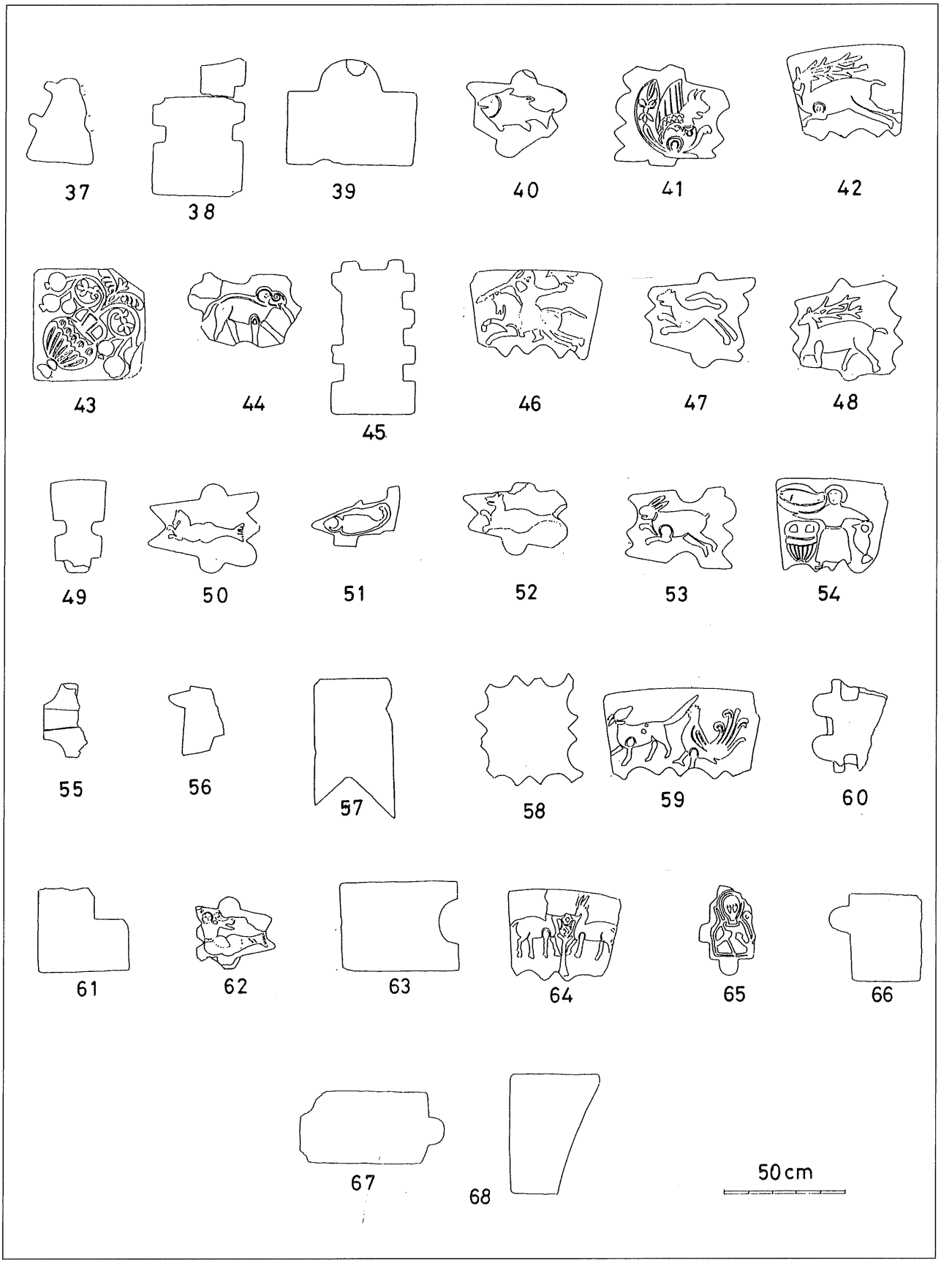
N° 39: bloc rectangulaire, surmonté sur un des longs côtés par une surface demi-circulaire, sans décor (51,5 x 43; 18cm) [*bloc anciennement déplacé vers la station de pompage*].

N° 40: bloc radial (d'apparence asymétrique ?) à deux tenons ronds sur les longs côtés, le haut est dentelé, le bas se termine pas deux pointes en équerre, décoré d'un poisson à deux nageoires dorsales et ventrales (36 x 42; 14,5cm) [D-E] **(Fig. 15)**.

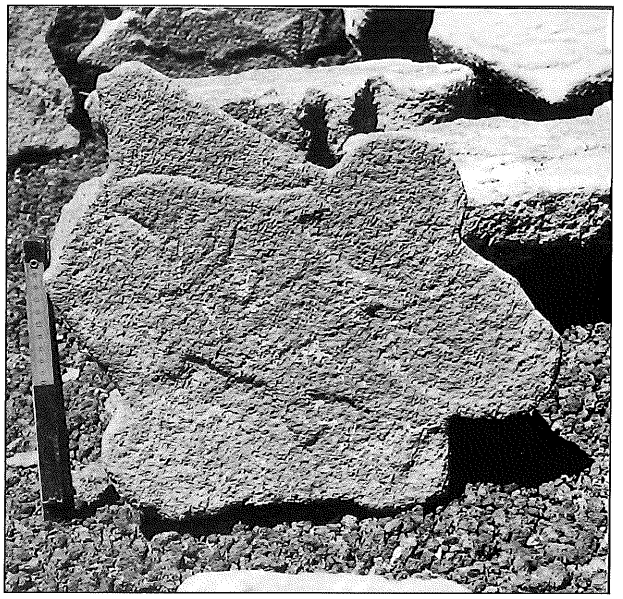
N° 41: bloc radial, à tenons quadrangulaires sur les longs côtés et dentelures sur les côtés du haut et du bas, timbré d'un griffon (*senmurv)* tourné vers le petit côté (47 x 42; 18,5cm) [D] **(Fig. 16)**.

N° 42: bloc radial, lisse sur trois côtés, celui du bas étant dentelé, celui du haut cintré, orné d'un cervidé avec de longs bois, galopant sur la gauche (48 x 38; pr. 11cm) [C-D] **(Fig. 17)**.

N° 43: bloc carré dont un angle a été volontairement tronqué (légèrement concave), avec un vase godronné (à pied et deux anses) qui donne naissance à deux rinceaux de gre-



14. La série de blocs (dessins au trait Cl. Vibert-G.).



15. Bloc n° 40 au poisson (cliché Cl. Vibert-G.).



17. Bloc n° 42 au cervidé (cliché Cl. Vibert-G.).



16. Bloc n° 41 au senmurv (cliché Cl. Vibert-G.).



18. Bloc n° 43 au vase à rinceau de grenades et palmette (cliché Cl. Vibert-G.).

nades et à une double palmette sommitale d'où surgit un fleuron (45 x 45; pr. 18cm) [C] **(Fig. 18)**.

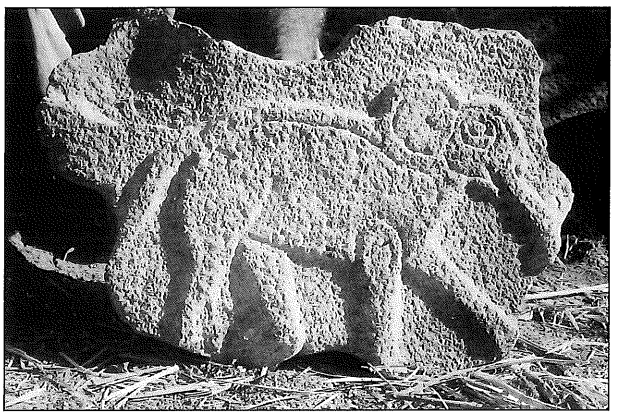
N° 44: bloc aux côtés endommagés, probablement de forme radiale, présentant un éléphant à petite oreille ronde avançant sur la droite (47 x 30; 11cm) [en contre bas de berme, C] **(Fig. 19)**.

N° 45: bloc rectangulaire sans décor, dont les deux longs côtés présentent un crénelage quadrangulaire ainsi que sur un des petits côtés (62,5 x 34; pr. entre 17 et 19cm) [en contre bas de berme, D] **(Fig. 20)**.

N° 46: bloc radial, lisse et très légèrement cintré sur le haut, dentelé au bas, avec un cavalier brandissant une lance et de l'autre bras un oiseau (faucon ?) orientés vers la gauche (55 x 47 ; pr. 16 cm) [*trouvé hors contexte, au sud de la plate-forme*] **(Fig. 21)**.

N° 47: bloc radial, deux tenons arrondis sur les longs côtés, dentelée sur les plus petits avec un félin (panthère ?) orienté vers le plus petit côté (41 x 38; 14cm) [C] **(Fig. 22)**.

N° 48: bloc radial, muni de deux tenons arrondis sur les longs côtés, dentelé sur les petits cô-



19. Bloc n° 44 à l'éléphant (cliché Cl. Vibert-G.).



20. Bloc n° 45, crénelé et sans décor (cliché Cl. Vibert-G.).

tés, orné d'un cervidé (?) avec de longs bois (ou rubans ?), orienté vers le plus petit côté (41 x 45; pr. 15cm) [C].

N° 49: bloc radial, sans décor, aux deux longs côtés échancrés, un des petits côtés a un tenon quasi quadrangulaire, l'autre est légèrement cintré (37 x 23; pr. 16cm) [C].

N° 50: bloc radial, avec un tenon arrondi sur les longs côtés, dentelé sur le côté supérieur, en



21. Bloc n° 46 au cavalier à la lance et faucon, face et revers (clichés Cl. Vibert-G.).

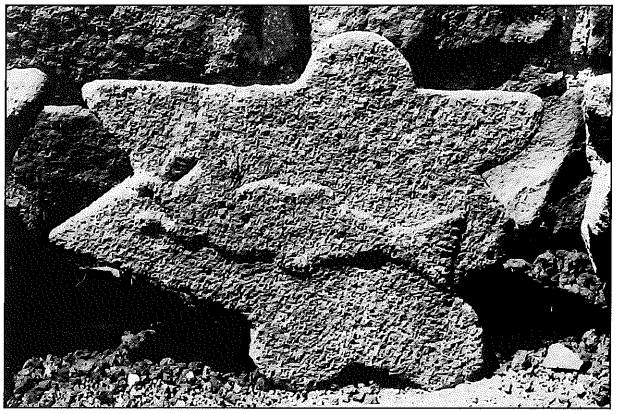


22. Bloc n° 47 au félin (cliché Cl. Vibert-G.).

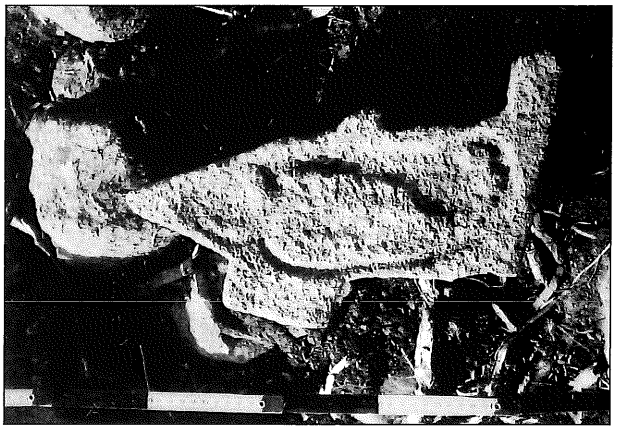
équerre sur celui du bas, décoré d'un cheval marin orienté vers le plus petit côté (46 x 36; pr. 16cm) [C] **(Fig. 23)**.

N° 51: petit bloc de forme triangulaire allongé, à échancrure et tenon quadrangulaire sur les longs côtés, à associer à la série de formes radiales, orné d'un scorpion pris dans un cadre qui borde le contour du bloc (36 x 26; pr. 13cm) [C] **(Fig. 24)**.

N° 52: bloc radial, avec un tenon plus ou moins arrondi sur chaque long côté, dentelé sur le côté du haut, en équerre sur celui du bas,



23. Bloc n° 50 au cheval marin (cliché Cl. Vibert-G.).

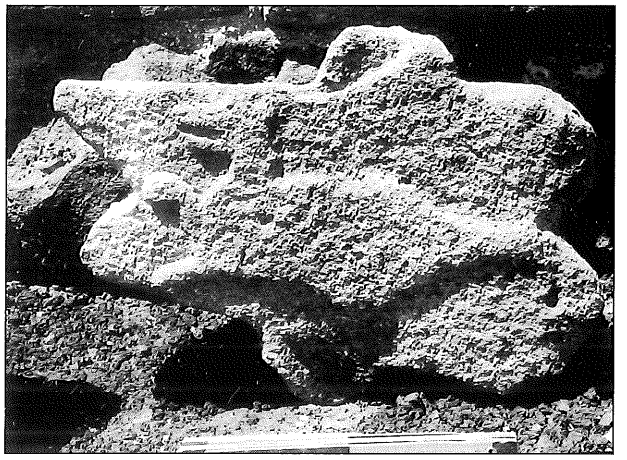


24. Bloc n° 51 au scorpion (cliché Cl. Vibert-G.).

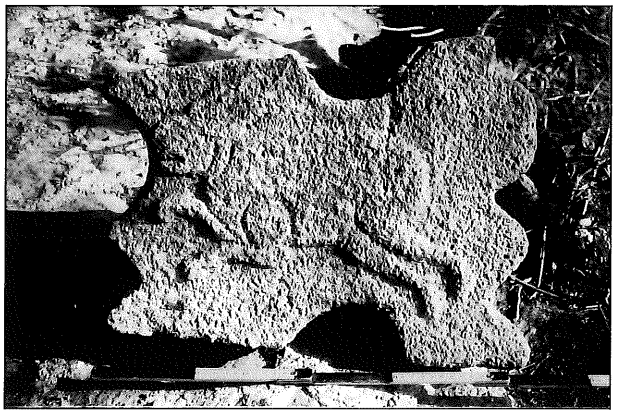
orné d'un félin marin à queue de poisson orienté vers le plus petit côté (45 x 29; pr. 15cm) [C] **(Fig. 25)**.

N° 53: bloc radial, avec deux échancrures arrondies sur les longs côtés et dentelé sur les deux petits, décoré d'un lièvre bondissant orienté vers le plus petit côté (45 x 34; pr. 14cm) [C] **(Fig. 26)**.

N° 54: bloc radial, lisse sur trois côtés, celui du



25. Bloc n° 52 au félin (?) marin (cliché Cl. Vibert-G.).



26. Bloc n° 53 au lièvre (cliché Cl. Vibert-G.).

haut étant légèrement cintré, et le côté du bas dentelé, décoré d'un personnage entier, vêtu d'une longue tunique (seul le pied gauche est visible) et ceinturée à la taille, près d'un vase globuleux, à col étroit et à deux anses, tenant une cruche de la main gauche et soutenant de l'autre un plat ovale (à poisson ?). Le bas du décor est mangé par la découpe dentelée du bloc (48 x 38; pr. 20cm) [B] **(Fig. 27)**.

N° 55: éclat de bloc décoré, avec deux angles concave et un départ de deux lignes gravées (29 x 18; pr. 14,5cm) [C].

N° 56: éclat de bloc avec un tenon triangulaire (28 x 24; pr. 15cm) [B].

N° 57: bloc quadrangulaire avec sur un petit côté une échancrure en équerre asymétrique, non décoré (56 ou 52 x 31,5; pr. 18cm) [C].

N° 58: bloc quadrangulaire, muni exceptionnellement de quatre bords dentelés, non décoré (55 x 55; pr. 15cm) [B] **(Fig. 28)**.



27. Bloc n° 54 au personnage à récipients et plateau (cliché Cl. Vibert-G.).

N° 59: bloc radial, au sommet légèrement cintré, seul le côté du bas est ouvragé (dentelure) avec une scène de genre réunissant un coq et un canidé (renard?) tournés vers la gauche (65 x 36; pr. 20cm) [B] **(Fig. 29)**.

N° 60: bloc brisé, aux longs contours crénelés et avec sur le petit côté conservé deux tenons (dans les deux cas, les parties sont ici évidées en biais), non décoré (37 x 32; pr. 20cm) [D].

N° 61: bloc formant un coude, non décoré (34 x 37,5; pr. 19cm) [*trouvé hors contexte, sur la rive sud du bassin*].

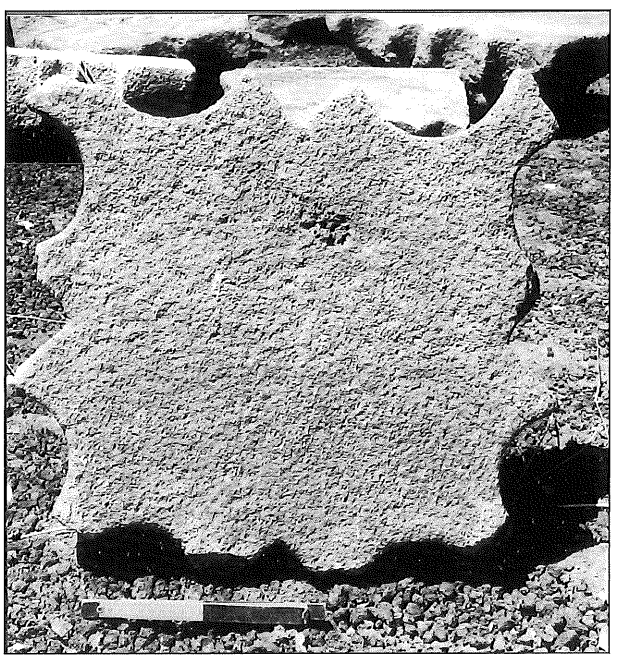
N° 62: bloc de forme radiale, à un tenon arrondi ou quadrangulaire sur chacun des deux longs côtés, dentelé sur le côté du haut, en équerre émoussé sur le bas, décoré d'une forme humaine se terminant en queue de poisson (sirène ?) et tenant quelque chose dans les mains (39 x 34; pr. 15cm) [B] **(Fig. 30)**.

N° 63: bloc quadrangulaire, seulement muni d'une échancrure en demi-cercle sur un des petits côtés (48 x 36; pr. 15cm) [B].

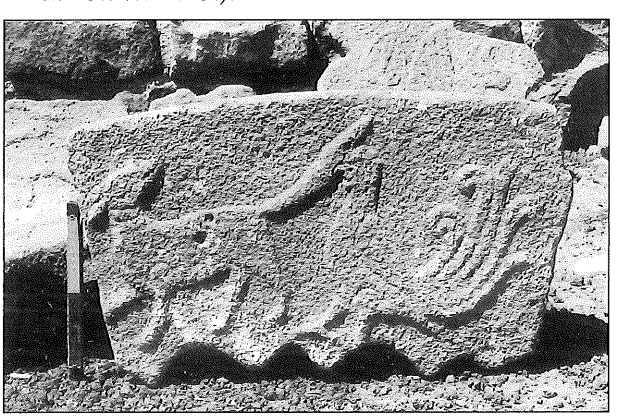
N° 64: bloc radial, avec un sommet légèrement cintré, seul le côté du bas est dentelé, avec deux gazelles en vis-à-vis séparées par de la végétation (celle de gauche à sa tête endommagée) (47 x 36; ép. 18cm) [B] **(Fig. 31)**.

N° 65: petit bloc en partie brisé, probablement quadrangulaire, avec un tenon arrondi sur un côté et quasi arrondi sur un autre perpendiculaire, un buste d'homme vu de face et tenant un attribut en biais sur sa poitrine, présence d'un cadre (37 x 23; pr. ?) [D] **(Fig. 32)**.

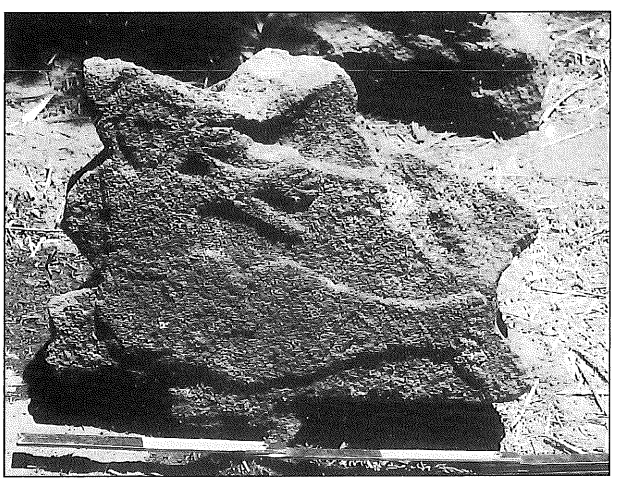
N° 66: bloc quasi quadrangulaire, muni d'un tenon arrondi décentré sur un des longs côtés 35 x 29; pr. 23cm) [D].



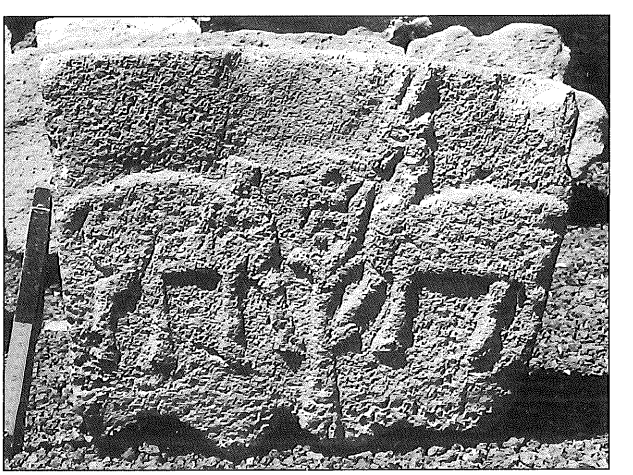
28. Bloc n° 58 sans relief et aux quatre côtés dentelés (cliché Cl. Vibert-G.).



29. Bloc n° 59 au coq et canidé (cliché Cl. Vibert-G.).



30. Bloc n° 62 à la « Sirène » (cliché Cl. Vibert-G.).



31. Bloc n° 64 aux deux gazelles de part et d'autre d'un arbuste (cliché Cl. Vibert-G.).



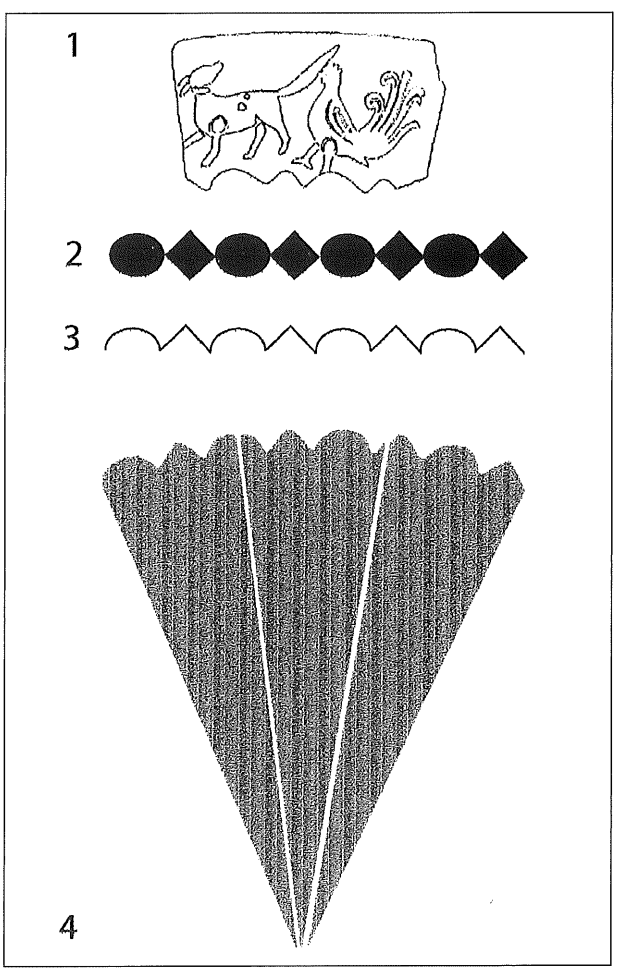
32. Bloc n° 65 au petit buste d'homme (cliché Cl. Vibert-G.).

N° 67: bloc rectangulaire, tenon arrondi sur un des petits côtés (deux angles sur le petit côté opposé sont détruits) (58 x 29; pr. 21cm) [C].

N° 68: bloc quadrangulaire arqué un long côté (49 x 20,5 et 37; pr. 20cm) [C].

Quelques caractéristiques structurales

La longueur des blocs varie de 35cm à 65cm, la largeur de 25 à 45cm et l'épaisseur de 11 à 23cm, soit des écarts presque de l'ordre du simple au double. Il n'y a pas de face de pose ou d'attente bien horizontale. Les côtés partent bien taillés sur quelques cm pour finir à l'arrière d'un bloc qui n'est pas équarri. Il n'y a pas de trace de mortier de jointoiement, de trace de fixation métallique ou de marque de pose à même les pierres. Tenons ou échancrures, dentelures caractérisent les contours des blocs. Le système de dentelure est plus déroutant. La diversité de formes des blocs, comme la taille plus ou moins régulière des creux et pleins, compliquent l'analyse. Les tailleurs de pierre ont fait du «sur mesure», à l'image de l'appareil syro-phénicien caractérisé par de nombreux décrochements. Néanmoins, des blocs (n° 50 et 58) attestent une simplicité de mise en œuvre : la ligne de découpe se compose d'une forme arrondie flanquée de deux pointes vus en creux ou en positif. Les profils les mieux conservés montrent que cette ligne dentelée peut avoir été inspirée par une suite en alternance de carrés sur pointe et de formes ovales coupées horizontalement en leur milieu. Des différences apparaissent dès lors que cette séquence est décalée par rapport à la longueur disponible : une forme arrondie peut être coupée, la suite reprenant sur le bloc suivant, de même pour les pointes. Ces variations sont dues à des longueurs de côtés variables pour diverses raisons, iconographiques, par exemple, dans le cas d'un motif très grand ou lors de la présence de deux figures sur un même bloc. Nous avons tenté de retrouver le cheminement (ici en 4 points) ayant probablement conduit à ce décor **(Fig. 33)** : 1 - le bloc n° 59, l'un des plus larges,

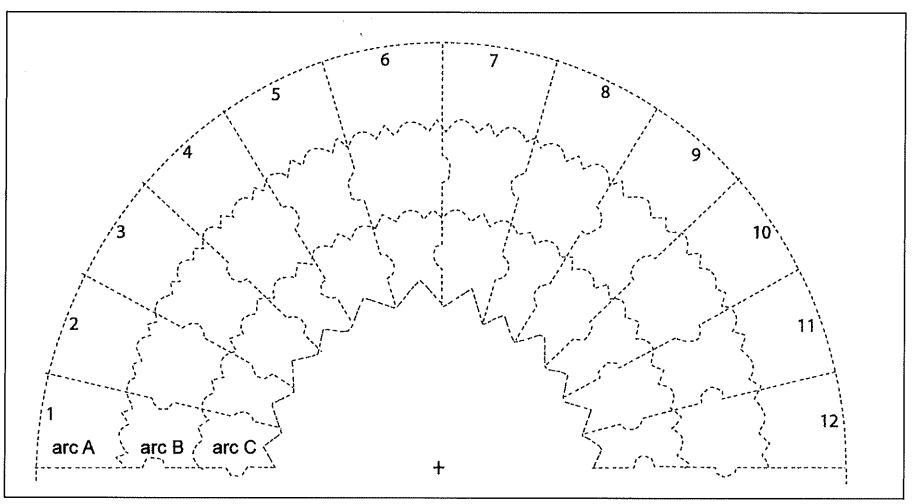


33. Analyse théorique du motif dentelé de découpe des blocs (schémas Cl. Vibert-G.).

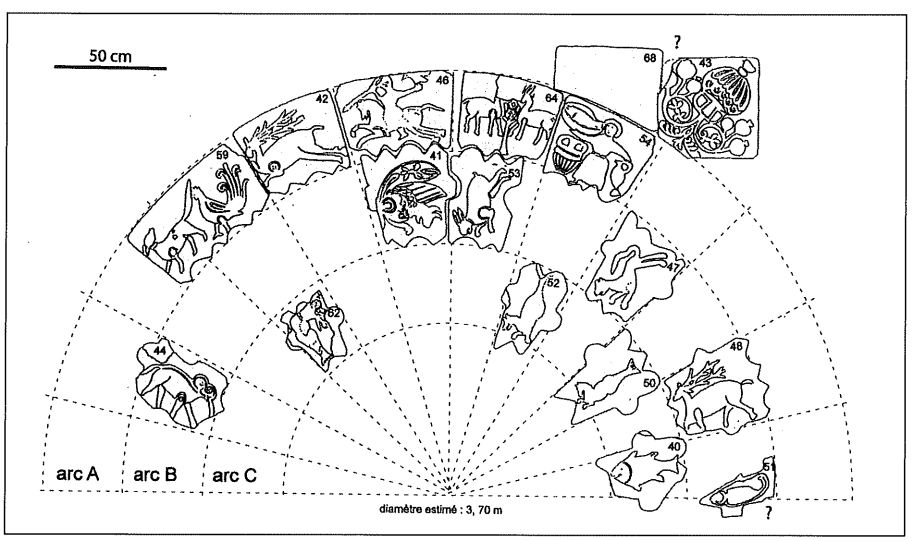
sert de référence ; 2 - sa ligne dentelée permet d'extrapoler un motif décoratif théorique à base de carrés sur pointe et de formes quasi rondes ; 3 - en ne conservant qu'un des profils du motif plein, on obtient une ligne sinueuse proche de celle du bloc ; - un léger cintrage et un amollissement des angles permet encore mieux de se rapprocher de l'original, des rayons montrent alors que les sculpteurs, face à la complexité de la mise en œuvre, n'ont pas chercher à respecter un même nombre de pointe ou de creux pour chaque bloc, ceux-ci ayant par ailleurs des largeurs différentes.

Composition circulaire et en assise

Une typologie des différentes et nombreuses formes est en cours, avec les anciens blocs découverts, soit 67 blocs au total sur 68[7]. Un groupe se détache parmi la série. Il correspondrait à une composition de type demi-circulaire de 3,70 m de diamètre environ, justifiée par la restitution de trois arcs de cercles concentriques (**Fig. 34**). A titre hypothétique et provisoire, afin de suggérer un modèle d'emboîtement de certains des blocs de forme radiale, ou en périphérie, une restitution est ici proposée à partir des blocs trouvés en 2004[8] (**Fig. 35**). L'hypothèse de travail actuelle repose le principe d'un tympan de 36 blocs (3 arcs x 12 blocs). Le centre de la composition pourrait rester vide dans l'état des découvertes. Le passage ainsi ouvert serait de 1,50m. Les deux massifs latéraux, porteurs



34. Modèle de composition théorique d'assemblage des blocs de forme radiale (étude et infographie Cl. Vibert-G.).



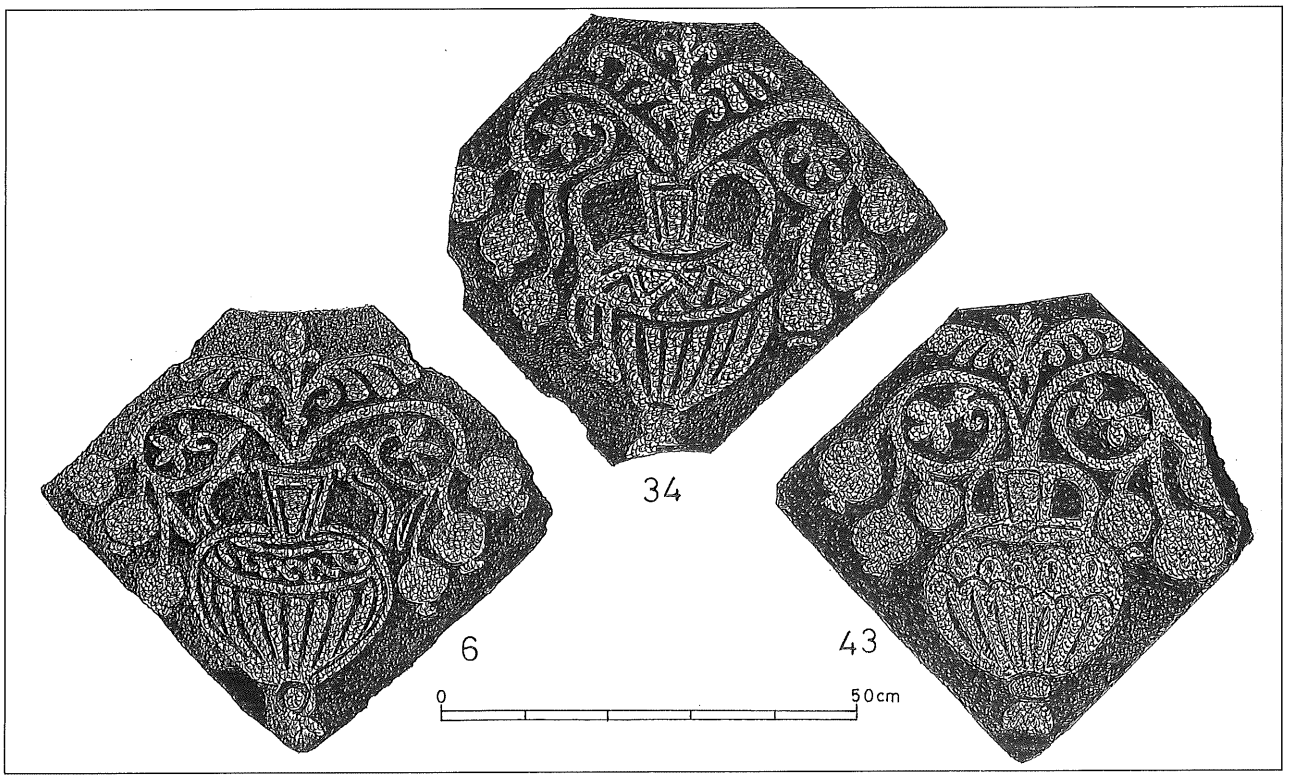
35. Essai d'assemblage à partir du dessin de quelques blocs sur un modèle de composition (dessin, étude, montage infographique Cl. Vibert-G.).

7. Un des blocs publié en 1986 n'a pas été retrouvé. En forme de T, il est décoré d'un oiseau.
8. Un moulage des blocs permettrait de tous les regrouper et de les manier plus facilement afin de chercher les meilleurs rapprochements.

de la surface tympanale, feraient alors 1,10m de large, offrant ainsi des surfaces susceptibles d'être décorées de blocs quadrangulaires disposés en frises ou isolés.

L'arc du haut (arc A) est composé de blocs dont le côté supérieur lisse est légèrement cintré. Les côtés latéraux, rectilignes, sont également lisses. Seul le bas du bloc est dentelé en négatif. La longueur de certaines pierres permet de caser deux figures. Ce décor tourne vers la gauche ou bien est frontal. En dessous, se fixe un deuxième arc (arc B), composé de blocs un peu plus petits et dont le décor (un motif seulement) est dirigé, vers un point central, tête en bas donc, mais avec un sens de lecture gauche/droite qui peut-être inversé. Les points d'accrochages se font sur les quatre côtés : latéralement par un tenon ou une échancrure, sur le haut et le bas à l'aide d'une ligne dentelée en positif ou en négatif. Logiquement, des blocs présentent des échancrures sur les côtés afin de pouvoir s'encastrer avec ceux qui ont des tenons latéraux[9]. Un troisième arc (arc C) conviendrait aux blocs présentant des caractéristiques identiques à celles du rang précédant, mais plus petits. Deux pointes en équerre taillées à la plus petite des extrémités caractérisent ces blocs. Restitué de manière théorique, ce système associerait au minimum trois arcs en demi-cercle de 12 blocs chacun.

La composition tympanale ici proposée restitue un vide central dont le contour en zigzag peut être décoratif. Ce motif est bien connu dans l'art omeyyade, sur la base de motifs en chevrons (frise sculptée du *caldarium* de Quṣayr 'Amra) ou de triangles (façade de l'enceinte de Qaṣr al-Mushatta, corniche de piliers à Qaṣr al-Kharrāna). Ce vide pourrait tout aussi bien être comblé. Du côté de l'extrados, on est tenté de rattacher à cette composition des blocs quadrangulaires, décorés ou non. En effet, certains d'entre eux ont un de leur côté (ou un seul de leur angle) avec une courbure qui pourrait épouser le côté cintré des pierres du premier arc. Le bloc lisse n° 68 conviendrait alors, ainsi que le n° 43, timbré d'un vase globuleux à pied et ouverture étroites, muni de deux anses. Ce dernier est d'ailleurs semblable à deux autres exemples trouvés en 1983. On soulignera ici une réelle convergence entre le type de décor (vase à acanthe), une forme de bloc (carrée) et un indice architectural (un angle légèrement brisé en quelque sorte) **(Fig. 36)**. Ce type de vase appa-



36. Comparaison entre trois blocs du même type (vase à rinceau) (dessin Cl. Vibert-G.).

9. Le ramassage de 1980 en avait trouvé plus que lors de cette mission.

raît aussi sur le bloc au serviteur n° 54.

Le principe de « tympans » composés d'une succession d'arcs imbriqués par les côtés et les sommets des blocs, à l'exception du dernier rang du haut, est ainsi envisageable. La disposition d'un tel décor reste à trouver. Peut-on le restituer au sol selon un cercle complet ? Une maçonnerie en pente, en « glacis » est aussi envisageable. Le lien avec la série de blocs quadrangulaire, souvent sans décor, muni d'une échancrure ronde ou carrée, quelque fois crénelés, reste aussi à trouver. Contrairement au groupe précédent, ces blocs moins nombreux ne peuvent pas être rapprochés de manière logique. Chaque découverte apporte un modèle différent sans que des assemblages soient possibles. L'hypothèse d'inclusion de pièce de bois, voire de passage creux (passage d'eau, filtre hydraulique, percée de lumière ?) sont même provisoirement envisagés. Enfin, le bloc carré dont tous les quatre côtés sont dentelés intrigue (n°58) **(Fig. 28)**. En général, ce type de découpe est associé à un arc et à des blocs de forme radiale qui présentent alors des dentelures que sur un ou deux côtés, les autres étant soit lisses, soit munis d'une échancrure ou d'un tenon.

Quelques caractéristiques iconographiques

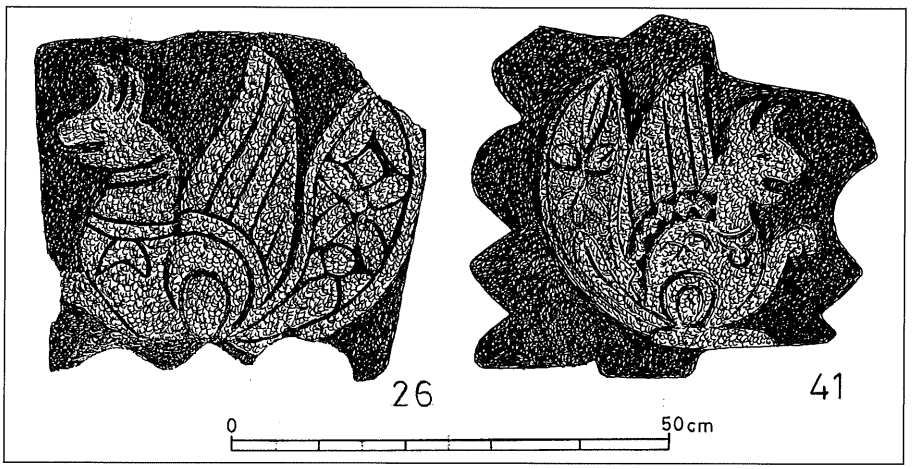
L'arc 1 se présente en couronne, avec des motifs qui se suivent comme s'ils constituaient un bandeau décoratif cintré. Personnages et animaux se retrouvent dans une disposition alignée. A l'exception des blocs avec une disposition centrée (animaux en vis-à-vis), les figures sont présentées tournées sur la gauche. Les arcs 2 et 3 ne présentent que des animaux dont le sens converge vers le centre du cercle, un peu comme des rayons. Les têtes sont orientées vers le bas, avec un effet de lecture gauche ou droite qui permet de les regrouper selon des quarts de cercles. Le bloc à la Sirène, mi-humaine, mi-poisson, fait exception, la tête se trouvant en haut du bloc. Cette particularité pourrait s'expliquer par la surface en forme d'équerre qu'occupe le personnage. Seuls deux blocs présentent une bordure qui suit les contours de la figure (n° 51 et 65). Ce détail était plus présent dans la première série de pierres trouvées.

Parmi les blocs décorés les plus intéressants, on trouve des animaux marins (cheval et félin ?) **(Figs. 23, 25)** et le personnage dont le corps se termine en queue de poisson **(Fig. 15)**. Sa tête est vue de face, le visage légèrement orienté vers la droite. Deux mains pataudes, mais dont le sculpteur a voulu détailler les doigts, sont du même côté : une très en avant et à l'horizontale, l'autre plus haute, mais collée au visage. De cette dernière part une forme linéaire qui se poursuit sous le bras de l'autre main. La figure mythologique et la position des mains suggèrent un instrument de musique. Plutôt qu'à vent – l'extrémité n'est pas dirigée vers la bouche – l'instrument se rapprocherait de la lyre. On notera encore le traitement en écaille de la queue de poisson et, semble t-il, quelque chose d'attachée à la taille. Des usages à la cour, on retiendra un serviteur près d'un vase globuleux à étroite ouverture[10], tenant une cruche (œnochoé ?) et portant un plateau garni. Le cérémonial du banquet, avec boisson et poisson, relance ici le thème d'un mode de vie attribué aux souverains omeyyades **(Fig. 27)**, de même celui de la chasse au faucon **(Fig. 21)**. Un petit buste, tenant un attribut, rentre dans une autre série connue par des blocs trouvés en 1983, non sans présenter une inspiration byzantine **(Fig. 32)**.

Les animaux confirment des thèmes ou en livrent de nouveau. Le motif royal sassanide (*senmurv*) **(Fig. 16)**, similaire à celui anciennement trouvé, exclut l'idée d'un motif unique dans le décor **(Fig. 37)**. La disposition du motif est cependant différente. Si le premier découvert est sur un arc supérieur (du type arc A), le second est sur un arc intermédiaire (du type arc B) et il est orienté vers le centre de la composition **(Fig. 37)**. Il faut ajouter un coq repoussant un chien ou un renard (scène de genre) **(Fig. 29)**, un éléphant (à petite oreille ronde) **(Fig. 19)** et un scorpion **(Fig. 24)**. Ce dernier, et petit bloc, pourrait être le symétrique d'un modèle similaire trouvé en 1983 et qui présentait un serpent. Si une telle disposition était confirmée, un caractère apotropaïque aurait été donné à la composition.

Précisons que le relief du décor est peu épais, moins de 1cm. Les conditions d'éclairage sont donc essentielles pour rendre lisible le motif. Il arrive ainsi de percevoir des détails de facture ou

10. Il est difficile d'y voir un cratère antique, tant l'ouverture est étroite.



37. Comparaison entre deux blocs à griffon (senmurv) (dessin Cl. Vibert-G.).

iconographique sur un bloc alors que l'on croit avoir fait le tour de la question. La taille peut paraître naïve, mais le sculpteur a souvent eu le souci de signifier des traits spécifiques au motif. On remarque néanmoins que le décor peut disparaître au contact des côtés dentelés ou non. Ainsi en est-il des pattes de l'éléphant, du sommet du cavalier au faucon, du bas de la scène au serviteur, etc. On s'interroge sur ce phénomène qui ne présente pas une grande importance, mais qui pourrait montrer que des blocs déjà sculptés ont été plus ou moins rognés afin de mieux s'emboîter. L'autre aspect de la question est celui de l'orientation du parement sculpté afin que la lumière puisse mettre en valeur ce dernier le plus longtemps possible dans la journée.

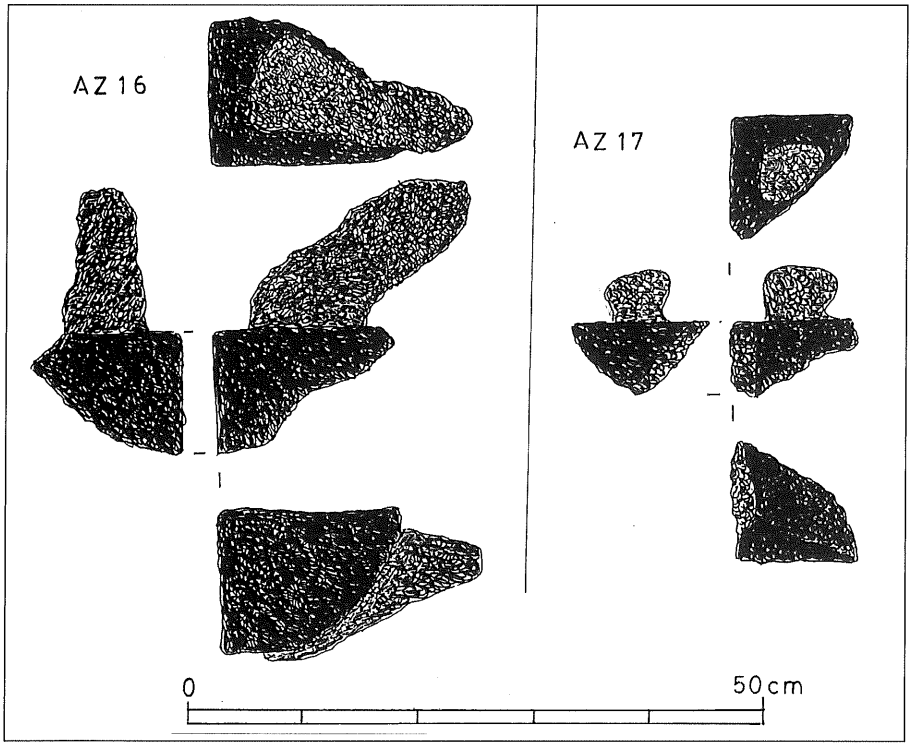
Un graphisme a été mis au point pour nos relevés détaillés de blocs. D'abord, il était important de rappeler la couleur noire du basalte, ensuite il fallait pouvoir différencier les parties creusées de celles en surface et, enfin, les parties cassées ne devaient pas se confondre avec les précédentes indications. Les reliefs sont donc légèrement plus clairs que les creux, et les parties cassées sont franchement pochées en noir. Le graphisme utilisé restitue aussi l'aspect plus ou moins troué de la surface de basalte. Nous n'avons pas poussé le réalisme à rendre les parties blanchâtres qui peuvent correspondre à des remontées de calcite. Rappelons qu'aucune trace de mortier de pose ou en surface, pas plus que de peinture, n'ont été décelées.

Autres types de bloc

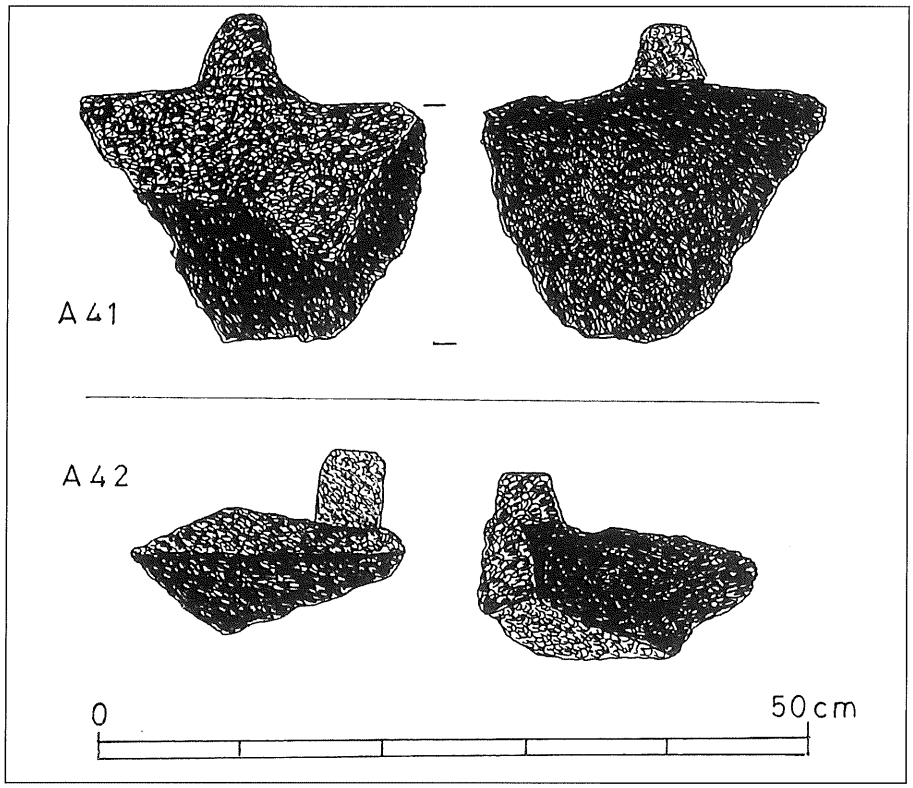
Des blocs peuvent appartenir aux contreforts triangulaires de la plate-forme. D'autres pierres, dressées et équarries, peuvent venir de la plate-forme elle-même, à condition de considérer au moins une assise supplémentaire à l'état actuel. Mais nous n'avons aucune certitude à ce sujet et l'hypothèse d'une élévation qui ne serait pas construite en dure est également envisageable. La fouille a par ailleurs livré un bloc de section courbe à rattacher aux contreforts circulaires présents sur les autres murs du réservoir et absents de la plate-forme. On ne peut donc pas exclure un mélange de blocs. Une pierre présente une feuillure (piédroit de porte ?). Les éclats de blocs qui présentent des éléments en saillie sont plus difficiles à interpréter. Certains ont des protubérances coudées (**Fig. 38**, gauche), d'autres rondes (**Fig. 38**, droit). Le contexte incite, de manière hypothétique, à imaginer un système d'amarrage à l'aide de cordages. Dans d'autres cas, il s'agit de petits tenons droits et plats, bien taillés, dont la destination est moins claire (**Fig. 39**).

Matériel archéologique

Une quinzaine de fragments de bracelets en pâte de verre (noir, bleu, translucide, lisse, torsadé) a été collectée. À ces parures, ajoutons deux perles de collier (noire et ronde, bleu-gris ovale, orange et rectangulaire) ainsi qu'une petite pierre de pendentif vert (trouvé à côté du n°31, dimensions, 5,9cm par 2,2cm, 3 à 5mm d'épaisseur). Sans doute s'agit-il d'un même collier. Quelques fragments de verre utilitaire (vert translucide) ont également été ramassés. Une monnaie en bronze très corrodée (1,5cm de diamètre actuel) a été trouvée sous le bloc au scorpion, entre le bloc quadrangulaire n°40 et un éclat de pierre. De petits éclats de bronze, plats, non identifiables, ont été collectés, sans



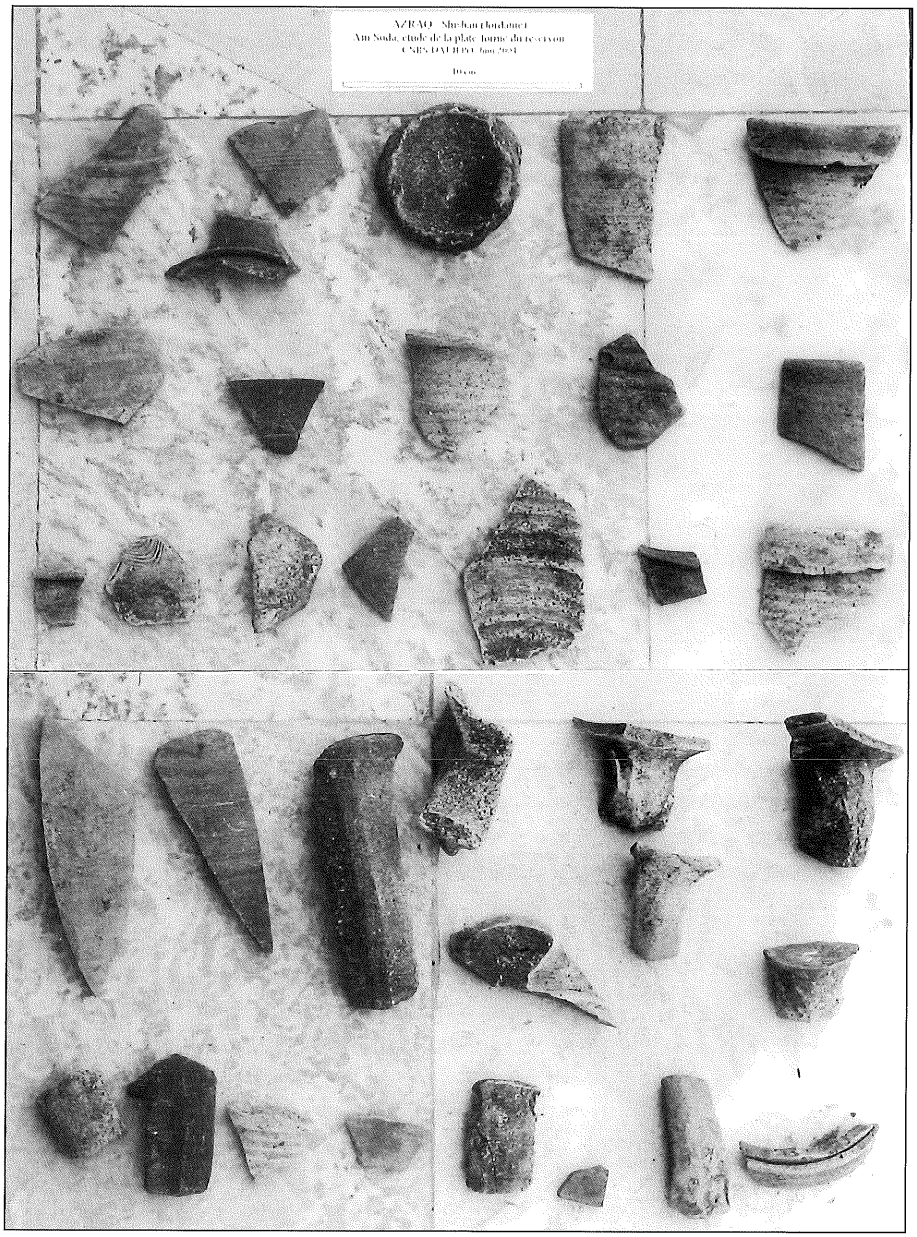
38. Blocs à crochets de pierre coudés ou ronds (cliché Cl. Vibert-G.).



39. Blocs à crochets de pierre sous la forme de petits tenons droits (cliché Cl. Vibert-G.).

que l'on puisse les rattacher à quelque chose.

Des tessons de céramique témoignent de vaisselle utilitaire (**Fig. 40**). Sa quantité n'est pas importante au regard de la surface dégagée. Cette céramique pourra se révéler intéressante d'un point de vue chronologique, dans le sens où elle aurait peut-être été jetée à l'eau à diverses époques. Des anses, des morceaux de panses, des bords, des surfaces côtelées ou lisses attestent une certaine variété avec des pâtes grises, blanche ou jaune, dans des tons plus ou moins clairs. L'absence de pâte claire décorée de lignes



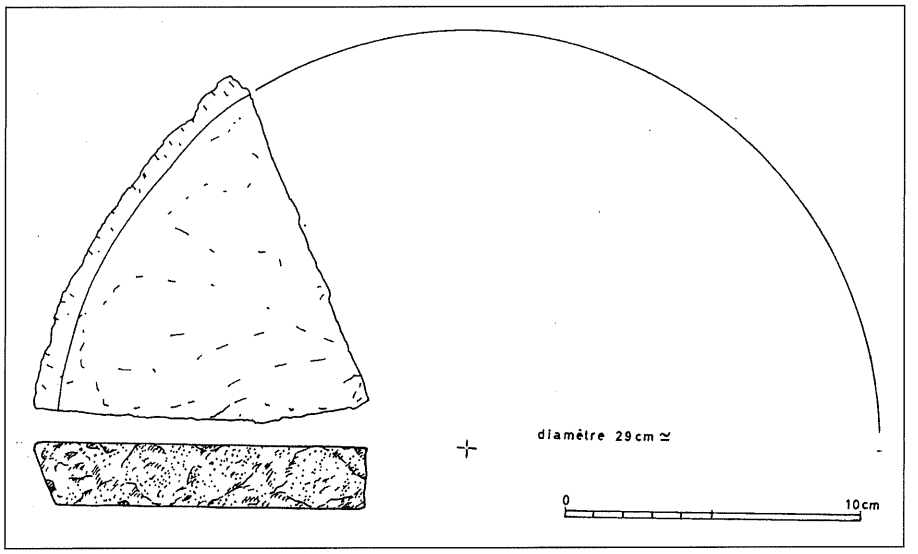
40. Tessons de céramique (clichés Cl. Vibert-G.).

rouge, caractéristique de la période omeyyade, est à confirmer.

De la rocaille se présente sous la forme naturelle de boules hérissées, plus ou moins grosses et régulière, extrêmement solides. Quelques silex taillés ont été ramassés dont une lame. Du silex en formation naturelle, caractérisé par un cortex irrégulier, un peu en branche de corail, plus ou moins cassant, s'est également présenté. Ajoutons une pierre dure, noire et lisse (non basaltique), avec un bord chanfreiné circulaire (29cm de diamètre restitué, 2,2cm d'épaisseur) **(Fig. 41)**, provenant peut-être d'un *opus sectile*. Un bois utilitaire, bien conservé (29cm pour 4,5cm de diamètre) mais très léger, présente une légère courbure à l'une de ses extrémités, brisée de ce côté, droite à l'opposé. Un manche d'outil est envisageable. Quelques ossements d'animaux sont apparus : une grande et petite mâchoire, quelques osselets.

Observations sur la plate-forme

Le nettoyage entre les espaces qui séparent les contreforts triangulaires a fait apparaître dans chacun d'eux un alignement d'une quinzaine de boutisses de basalte solidement maçonnées et formant une sorte de banquette **(Figs. 42** et **43)**. Sur certains secteurs, elles sont recouvertes par un mortier dans lequel des petits cailloux ont été soigneusement incrustés **(Fig. 44)**. Cette maçon-



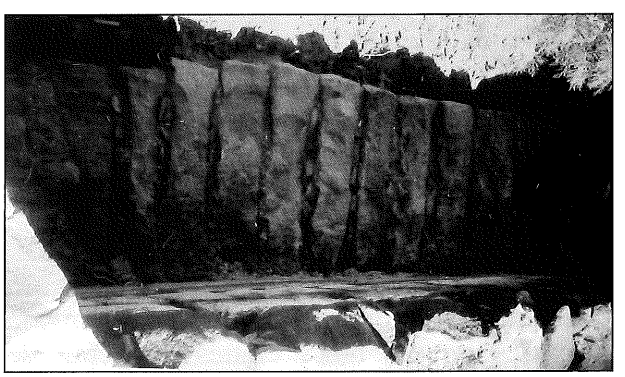
41. Fragment de pierre plate circulaire (dessin Cl. Vibert-G.).



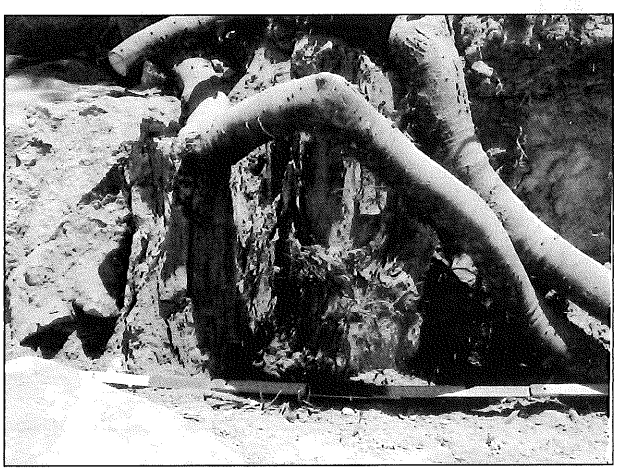
42. Banquette de boutisses de basalte (travée D) (cliché Cl. Vibert-G.).



44. Détail d'une banquette de boutisses partiellement protégée par un mortier garni de cailloux (travée C) (cliché Cl. Vibert-G.).



43. Boutisses de basalte en fondation (travée C) (cliché Cl. Vibert-G.).



45. Vestiges de planches de coffrage en partie cachés par des racines modernes (travée B) (cliché Cl. Vibert-G.).

nerie, de fondation (?) ou protectrice, doit être mise en relation avec des pieux et planches encore fichés à la verticale dans la terre argileuse. Trois morceaux de planches fichées dans le sol sont apparus le long de la banquette E **(Fig. 45)**. Un petit résidu saillant de mortier sur la gauche conservait, en outre, le négatif d'une planche.

Ces indices prouvent qu'une partie de ce bois a pu coffrer ou délimiter la zone à construire. Un pieu de 11cm de diamètre a été dégagé devant la pointe de l'éperon séparant les travées B et C **(Fig. 46)**. Deux autres planches et piquets ont été trouvés devant la banquette B.

À plusieurs endroits, la terre s'effondrait le long des banquettes. Un vide semble d'être formé là où du bois aurait pourri et disparu. Celte observation pourrait correspondre à l'indication « Sounds hollow under » fléchée en direction du côté est de la plateforme représentée sur le plan de Rees (Rees 1929). L'absence d'enduit mural en place est confirmée sur l'ensemble dégagé. Aucun morceau d'enduit ayant chuté n'a été trouvé.

Constatations, hypothèses

Les blocs décorés reposeraient en partie sur une couche de déchets de taille. Aucun bloc en liaison avec un autre n'a pour le moment été trouvé. L'hypothèse d'un effondrement d'un ensemble décoratif à l'ouest de la plate-forme n'est pas confirmée en l'état des découvertes. Du moins, l'état au sol du tas de pierres n'est pas révélateur de la structure d'origine. Les blocs semblent plutôt avoir été jetés à l'eau. L'idée de



46. Pieu en place (cliché Cl. Vibert-G.).

frise clavée en arc décoré se confirme. Les blocs quadrangulaires, aux côtés lisses ou garnis d'un tenon ou d'une engravure, accompagneraient ce type de composition, soit de manière isolée, soit selon des sections d'assise. On note le faible nombre de blocs d'architecture qui auraient pu accompagner cette composition décorative. Des éclats de pierre taillée encore munis de petits tenons ou de crochets de pierre constituent une nouveauté. L'hypothèse de sculpture en ronde bosse ou à haut-relief est à confirmer. La principale difficulté tient au fait que nous faisons face, non pas à un décor de palais, de thermes, d'habitat ou de toute autre construction urbaine ou élevée dans la steppe, mais, dans l'état actuel des choses, à un décor de réservoir[11]. C'est du côté des structures hydrauliques décorées qu'il faut se tourner, mais les exemples connus n'offrent aucune technique semblable. Seuls des fragments mutilés de tableaux de stuc, représentant des scènes de chasse et trouvés en contrebas des tourelles latérales au barrage de jardin de Qaṣr al-Ḥayr al-Gharbi, présentent un parallèle de situation (un contexte hydraulique), un rapprochement thématique (la chasse) et une technique artistique similaire (le décor en relief) (Schlumberger 1986: 5). Par ailleurs, des comparaisons placent la plupart des figures dans une série de représentations connues au Proche-Orient. Le motif sassanide du *senmurv* est habituel à l'époque omeyyade en peinture, stuc et relief[12]. L'éléphant est attesté en relief de chapiteau à Pétra, sur des mosaïques byzantines dans la région de Madaba et même sur un moule de bronze trouvé dans le palais omeyyade de Mafraq. Les monstres marins son attestés à toutes les époques dans divers contextes: maisons antiques, églises, Qaṣr et bains omeyyades[13].

Comparaisons élargies au monde médiéval[14]

Inconnu jusque-là des vestiges archéologiques de l'Antiquité et du Haut Moyen-âge, le mode d'imbrication des blocs cintrés trouverait de nombreux parallèles postérieurs dans les grandes

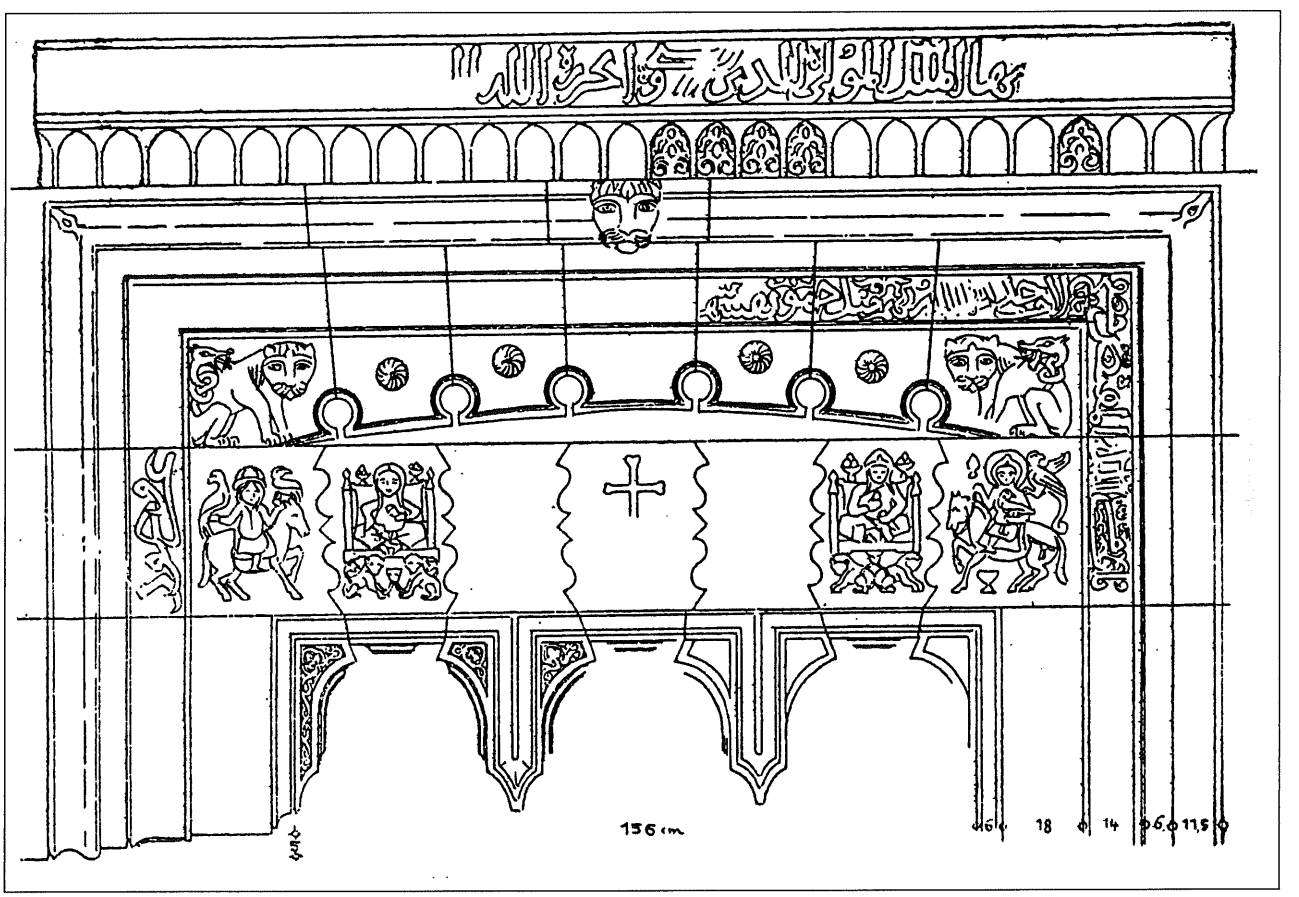
11. D'où la nécessité de vérifier si oui ou non un petit Qaṣr omeyyade n'aurait pas existé à proximité du site, comme quelques indices semblent l'indiquer.
12. Respectivement Qaṣr al-Hallābāt et Qaṣr al-Ḥayr al-Gharbi ; Khirbat al-Mafjar ; Qaṣr al-Mushatta.
13. Pour l'époque omeyyade, on se réfère à Quṣayr 'Amra (coupole du caldarium, paroi du fond de l'espace du Trône, etc.) et Qaṣr al-Ḥayr al-Gharbi (une des peintures de sol).
14. Dans le cadre de cet article, il est impossible de développer tout le champ comparatif, celui relatif à la découpe des blocs comme celui de la figuration. Les recherches sont en cours.

cités médiévales arabes, mais sans décor figuré, en façade de monuments publics religieux ou non et privés. Il suffit de circuler par exemple à 'Amman, Damas, Jérusalem ou au Caire pour s'en rendre compte. Les motifs en cercle ou en bandeau droit ou cintré sont composés par de plus ou moins savants emboîtements, un peu comme de la marqueterie à grande échelle. Il faut ajouter une bichromie (pierre blanche et noire), voire une variante avec des blocs rouges, absentes à Azraq, puisque tous les blocs connus sont en basalte.

L'unique parallèle trouvé à ce jour, et qui ouvre une piste de recherche, est celui d'un décor sculpté dans la basilique de Mâr Ahûdemmeh à Mossoul datée du XIII[e] siècle (Sarre, Herzfeld 1911: fig. 281). Un linteau de porte est composé d'un emboîtement de claveaux aux contours ornementaux (**Fig. 47**). Le relief sculpté aligne des figures trônantes et des cavaliers fauconniers de part et d'autre d'un motif de croix[15]. Le décor trouvé à Ain Soda conserverait ainsi une des premières tentatives de ce type d'assemblage de blocs décorés et cette précocité n'est pas sans rappeler les voussoirs à boudin des fenêtres de la mosquée de Qaṣr al-Hallâbât. Il s'inscrit aussi dans les premières formes d'un type de bestiaire sculpté qui ornera nombre de monuments musulmans médiévaux, de l'Anatolie jusqu'au Sinaï.

Conclusion

Exceptionnelle à biens des points de vue, la découverte d'Ain Soda à Azraq relance le débat de l'occupation du site à l'époque omeyyade, avec une émergence architecturale décorative dont il reste à trouver la fonction et le commanditaire. La suite du dégagement solutionnera peut-être l'une et l'autre. En attendant, les blocs sculptés ont été sortis de la zone fouillée et



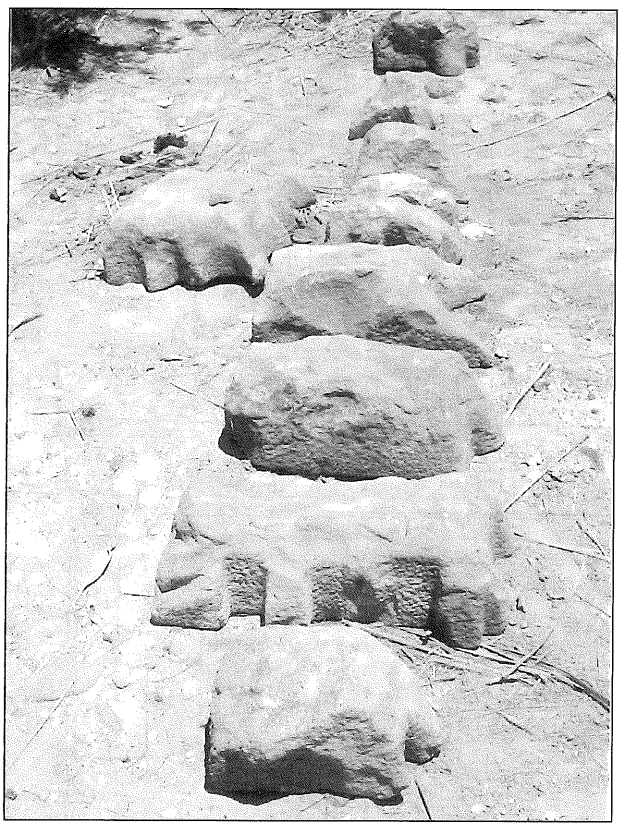
47. Comparaison avec un décor dans la basilique de Mâr Ahûdemmeh à Mossoul, daté du XIII[e] siècle (Sarre, Herzfeld 1911 : fig. 281).

15. A l'époque, le commentaire des auteurs était : « Il faut penser que l'iconographie n'a rien de typiquement chrétienne mais remonte bien aux arts mineurs islamiques » (Sarre, Herzfeld 1911: 294).

précautionneusement transportés à la citadelle d'Azraq (**Figs. 48, 49, 50**) où les plus grands sont provisoirement exposés à proximité des précédentes découvertes.

Remerciements

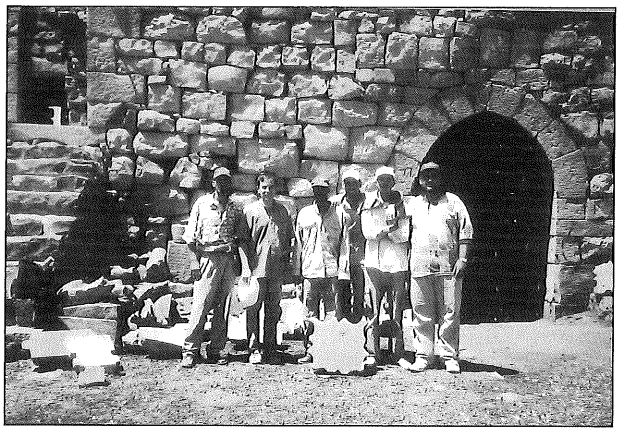
Mes remerciements s'adressent au Docteur Fawwaz al-Khraysheh, directeur général des Antiquités et Musées de Jordanie pour son aide apportée au projet ainsi qu'au Docteur Ghazi Bisheh pour son soutien. Salem Dhiab, inspecteur à Azraq, a contribué au bon fonctionnement de la mission. Sami Tarabih, responsable de l'écotourisme à la RSCN, a accueilli l'équipe franco-jordanienne au sein du parc naturel et facilité les travaux. Je remercie également l'IFPO pour avoir soutenu ce projet. Bertrand Lafont, directeur scientifique, a bien voulu mettre à la disposition de la mission un architecte-topographe, Charles-Édouard Bertrand, et Jean-François Salles a tout fait pour faciliter la mise en place et le fonctionnement de la mission qui a bénéficié d'une subvention du Département des Sciences de l'Homme et de la Société (CNRS).



48. Revers de blocs en cours d'évacuation (cliché Cl. Vibert-G.).



49. Chargement des blocs à transporter et protégés par des bottes de roseaux (cliché Cl. Vibert-G.).



50. Photo de fin de campagne à la citadelle d'Azraq. Au premier plan, le bloc n° 58 (cliché pris par le gardien).

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CHALLENGES IN THE FIELD: THE BROWN UNIVERSITY 2005 PETRA GREAT TEMPLE EXCAVATIONS

Martha Sharp Joukowsky

The Luther I. Replogle Foundation, the Brown University Exploration Fund, the Joukowsky Family Foundation, and several private donors support archaeological research at the Petra Great Temple. The 13th excavation season by Brown University archaeologists took place from June 11 to August 4, 2005. To better understand its stratigraphy and phasing, excavations continued in all sectors of the Great Temple—Propylaeum, Lower Temenos, Upper Temenos and the Great Temple proper.

This campaign would not have been possible without the generous assistance of the Jordanian Department of Antiquities, Fawwaz al-Kraysheh, Director, and Suleiman Farajat, Director of the Petra National Park and the Department of Antiquities Representative. We are also grateful to Department of Antiquities Representative Samia Fallahat, and the American Center of Oriental Research, Pierre M. Bikai, Director. We would also like to express our thanks to Brown University for making this season possible.

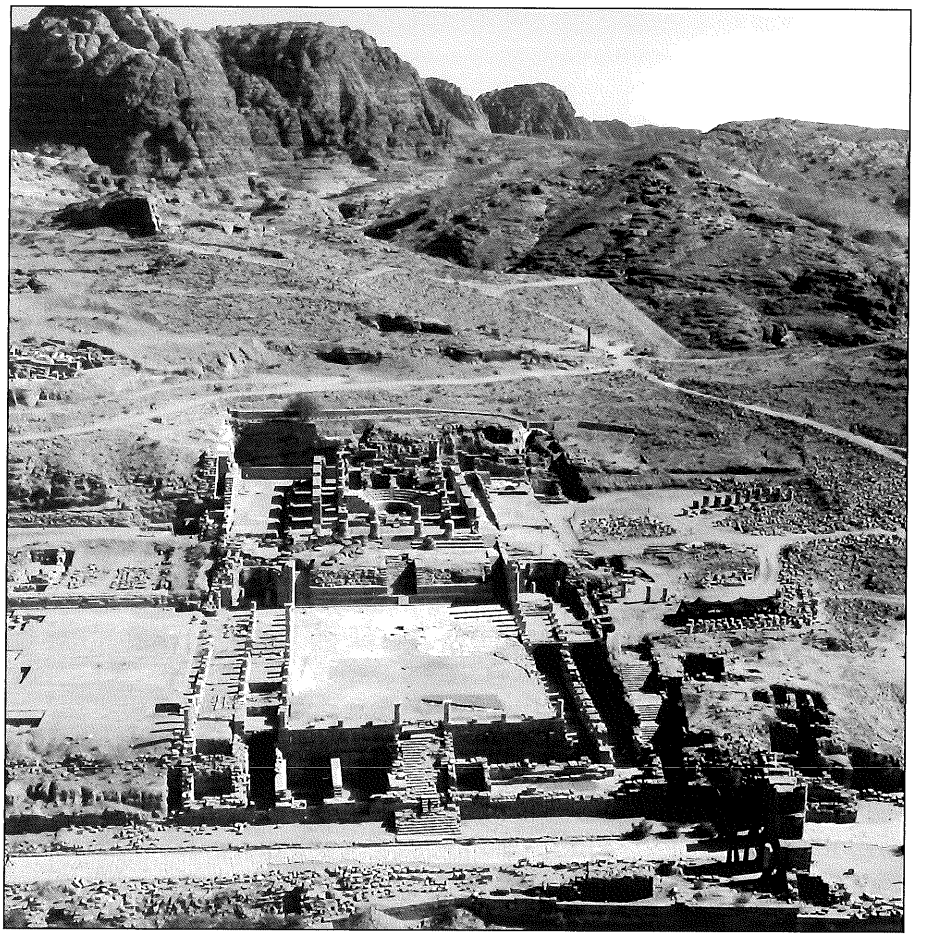
Brown University archaeologists included Martha Sharp Joukowsky, Director, Artemis W. Joukowsky, photographer[1], and five supervisors served as most valued staff members, including Emma Susan Libonati, Marshall Agnew and Eleanor A. Power, (Surveyors), Tarek M. Khanachet, and Christopher A. Tuttle. Deirdre G. Barrett expertly processed the finds as our Registrar-Cataloguer and lamp analyst, and Christian Augé analyzed our coins. We were supported by a work force of 50 devoted Bedouin, directed by Dakhilallah Qublan, Foreman. Rune Frederiksen spent two weeks at the site as our Theater Consultant. Our discussions revolved around the study of and future publication on the Petra Great Temple Theater.

The Petra Great Temple occupies the site on a south slope south of the Roman Road just east of the Temenos Gate of the Qaṣr al-Bint. Founded in the last quarter of the first century BC, the Great Temple is the result of a great urbanization program undertaken by the Nabataeans. Located in the heart of the city, the Great Temple is one of the monumental complexes of Petra, and because it houses a theater in its center, appears to celebrate civic as well as a religious functions. As seen today, the temple is a freestanding tetrastyle in antis building in an elevated Upper Temenos[2].

Fieldwork 2005

The 2005 site plan is presented in **Fig. 1**. Figure 2 illustrates the four divisions of the precinct — the Propylaeum, Lower Temenos, Upper Temenos and the Great Temple proper. The site plan outlined with 2005 projects is illustrated in **Fig. 3**. Four large trenches and eleven Special Projects are excavated to demystify stratigraphic problems. The phasing and dating of the site[3]

1. All photographs are to be credited to Artemis W. Joukowsky.
2. Large-scale annual excavations carried out by Brown University archaeologists since 1993 have exposed the architecture of the Great Temple, and our research has concentrated on recording the site plan and on conservation of the site, (see Joukowsky annual reports in *ADAJ*). For a complete bibliography please refer to our web page http://www.brown.edu/Departments/Anthropology/Petra/.
3. We cannot fix the architectural events to absolute dates — thus our chronology is relative. The Petra Great Temple Site Phasing is comprised of 15 phases, as follows: Pre-Site Phase I-Early first century BC (perhaps earlier); Phase I-Early to mid-first century BC; Phase II-first century BC; Phase III-Minor damage; Phase IV-the "Grand Design," last quarter of the first century BC to AD first century; Phase V-late AD first century; Phase VI-AD early to mid-second century; Phase VII-AD mid second century, Roman period; Phase VIII-abandon-



1. Aerial view of the Petra Great Temple to south at the completion of the 2005 excavations.

will be employed in our discussion of each 2005 trench or Special Project development. This 2005 report summarizes the excavations and phasing as well as the artifact repertoire, and concludes with the consolidation and restoration measures undertaken.

Propylaeum

The 2005 campaign comprised three important trenches in the Propylaeum East, Center, and West. Activities in the Propylaeum and Lower Temenos are illustrated in **Fig. 4**.

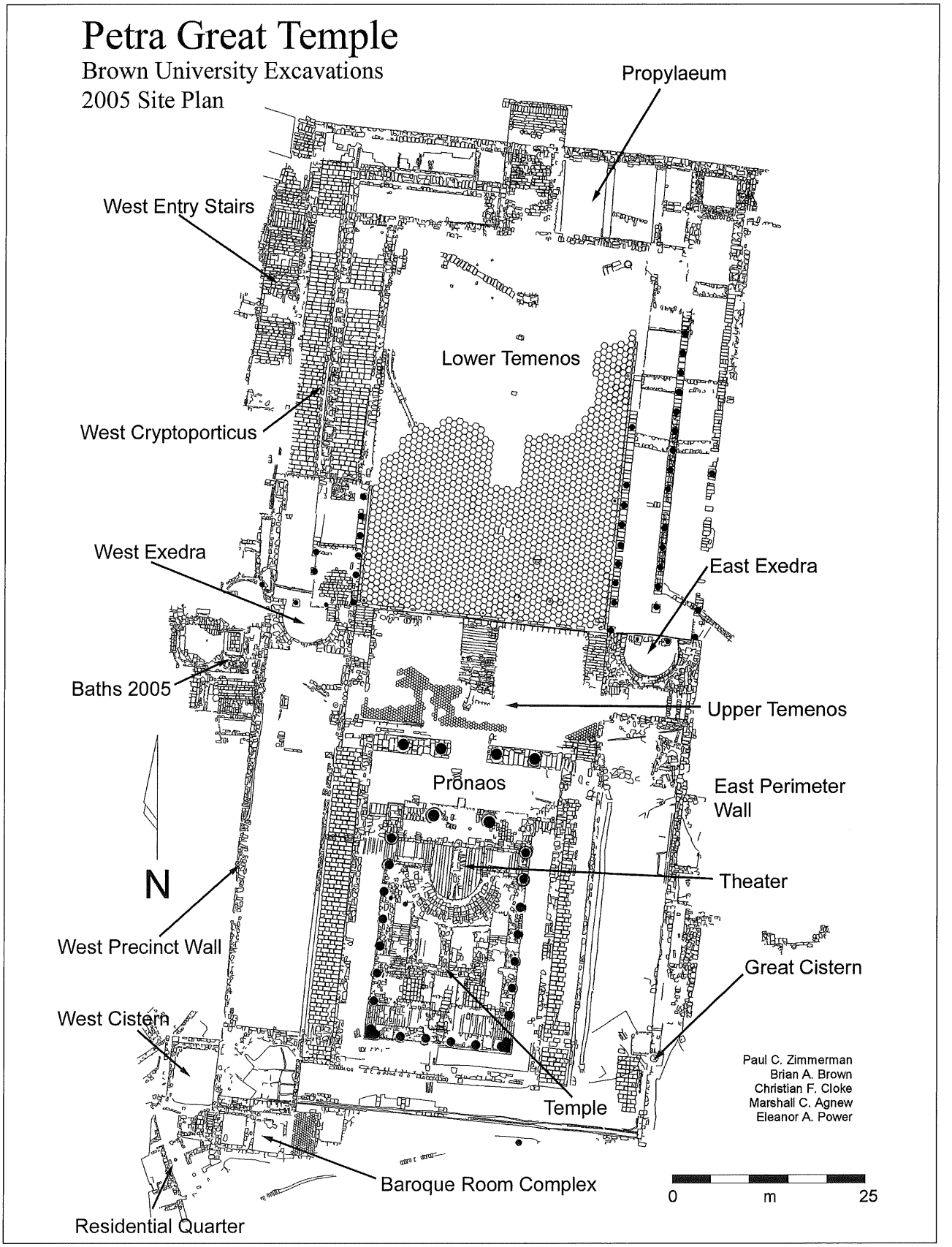
Propylaeum East

In 2005 the excavation of Special Project 150, a 2.30-by-2.30m sondage, supervised by Christopher A. Tuttle, reveals an assemblage of architectural features at a shallow depth below the floor level in East Propylaeum Room 2. The complexity of these features is not completely understood. The earliest stage encompasses the early wall constructions found in the sounding, although it is not at all certain that these architectural features are contemporary, or even interrelated.

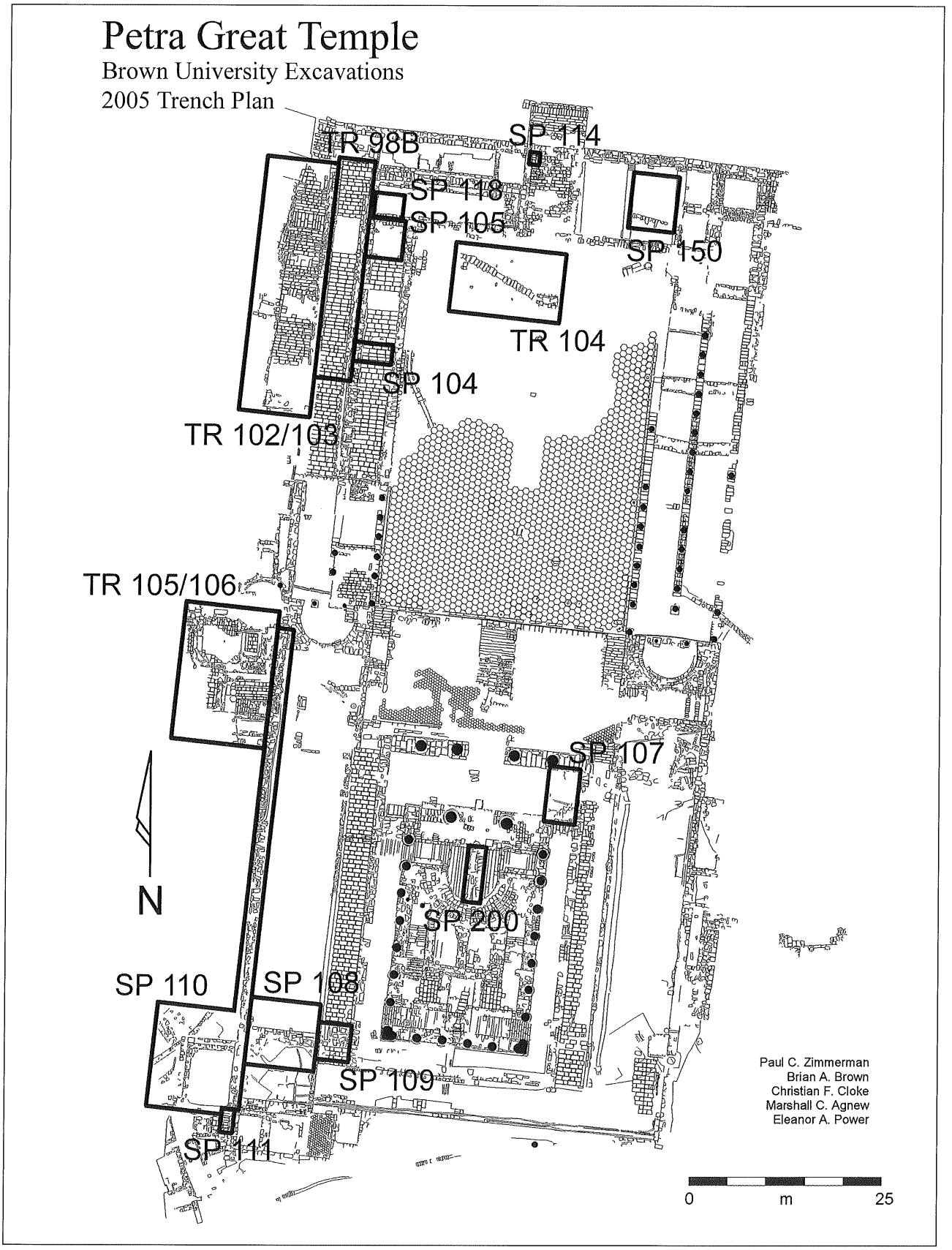
Propylaeum Central Stairs

In 2005 a small probe 1.20-by-1.20m, supervised by Tarek M. Khanachet, at the bottom of the earlier stairs adjacent to the Room 1 landing in Special Project 114 confirms that at the entry to Room 1, the ballista ball assemblage is not found under the stairs, so the ballista balls used as rubble fill and leveling for the flooring of the Propylaeum West do not continue under the landing pavers for the earlier steps. This leads us to conclude that the ballista balls predate both staircases. Thus, two possibilities emerge: if the

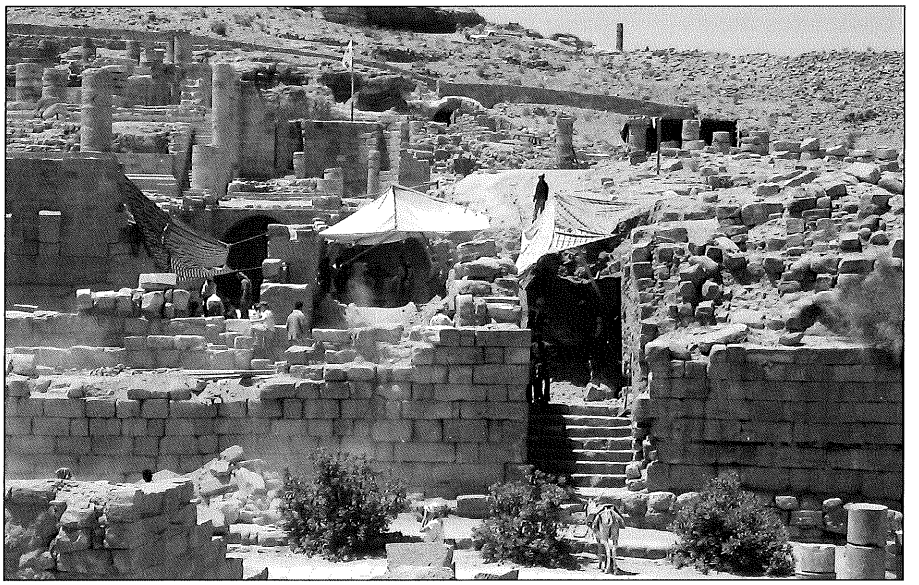
ment and robbing; Phase IX-363 AD earthquake; Phase X-abandonment, Byzantine period, AD late fourth through fifth centuries; Phase XI-post AD fifth century, perhaps result of 512 AD earthquake? Phase XII-robbing and abandonment; Phase XIII-major collapses that continue into the Islamic period; Phase XIV-modern period, Bedouin activities and accumulation of debris.



2. Plan of the Petra Great Temple precinct with areas identified (Paul C. Zimmerman, Brian A. Brown, Christian F. Cloke, Marshall C. Agnew, and Eleanor A. Power).



3. Petra Great Temple Site Plan showing the positions of the 2005 Trenches and Special Projects (Paul C. Zimmerman, Brian A. Brown, Christian F. Cloke, Marshall C. Agnew, and Eleanor A. Power).



4. Great Temple to south with 2005 excavation activity in the Propylaeum and Lower Temenos.

current date for the ballista balls is correct (Site Phase VII, AD mid-second century), then both the early and later stairs are from the Roman period; alternatively, the ballista balls could be earlier and the early steps are from the Nabataean period. A careful analysis will shed more light on the dating of this area.

West Propylaeum South Gallery

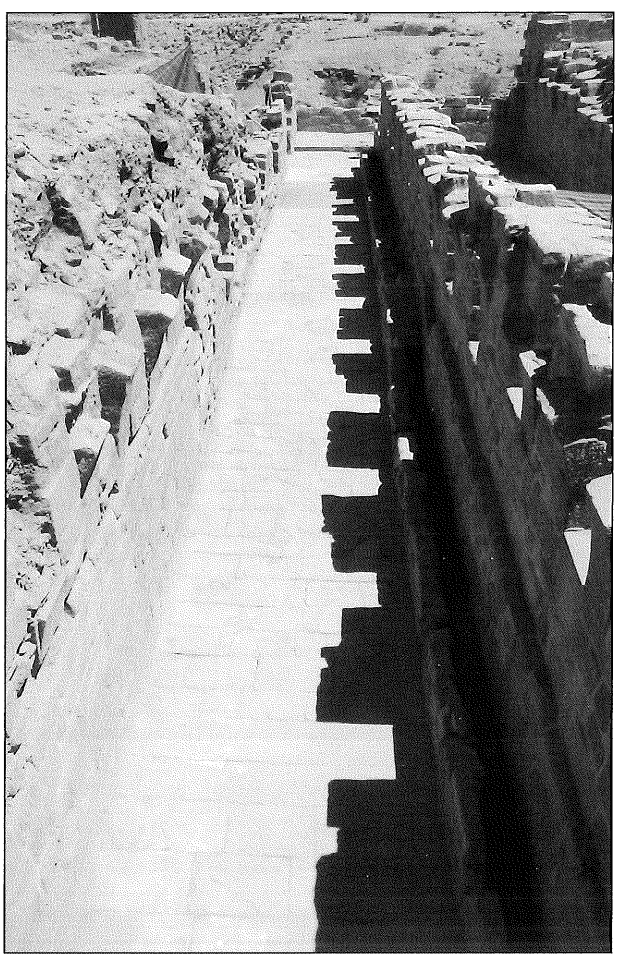
In 2005 Special Project 118 was undertaken by Christopher A. Tuttle to clarify the nature of the access into the West Cryptoporticus East from the south gallery of the Propylaeum West — this was not evident from earlier excavations[4]. The awkward height difference between the south gallery floor level and the cryptoporticus would have been well served in antiquity by stairs. This 2.35-by-3.00m sondage succeeds in clarifying the nature of this access, indicating that stairs are non-existent at the time of the destruction event(s), and suggesting that the West Cryptoporticus East ceases to function before the collapse occurs.

Lower Temenos

Five 2005 projects were carried out in the Lower Temenos — three projects in the West Cryptoporticus, a probe for the canalization system, and the West Entry Stairway.

West Cryptoporticus

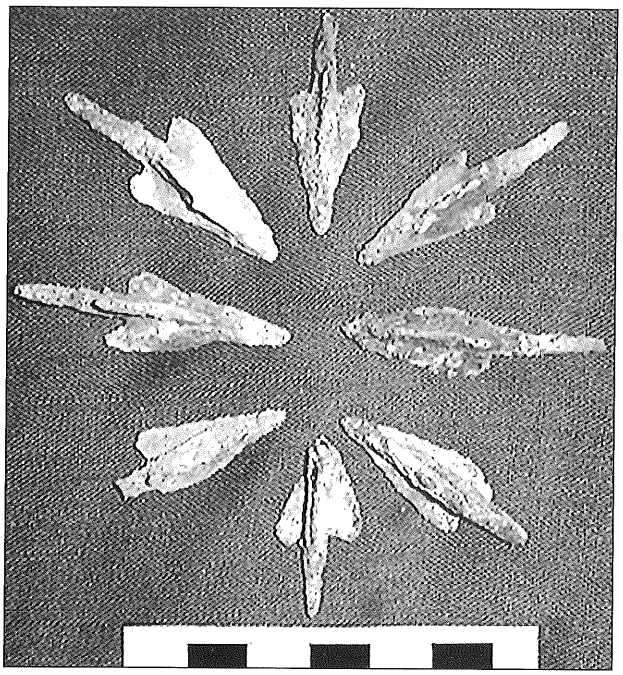
Trench 98B uncovers the west gallery of the West Cryptoporticus, as can be seen in **Fig. 5**. Excavated by Tarek M. Khanachet, Trench 98B,



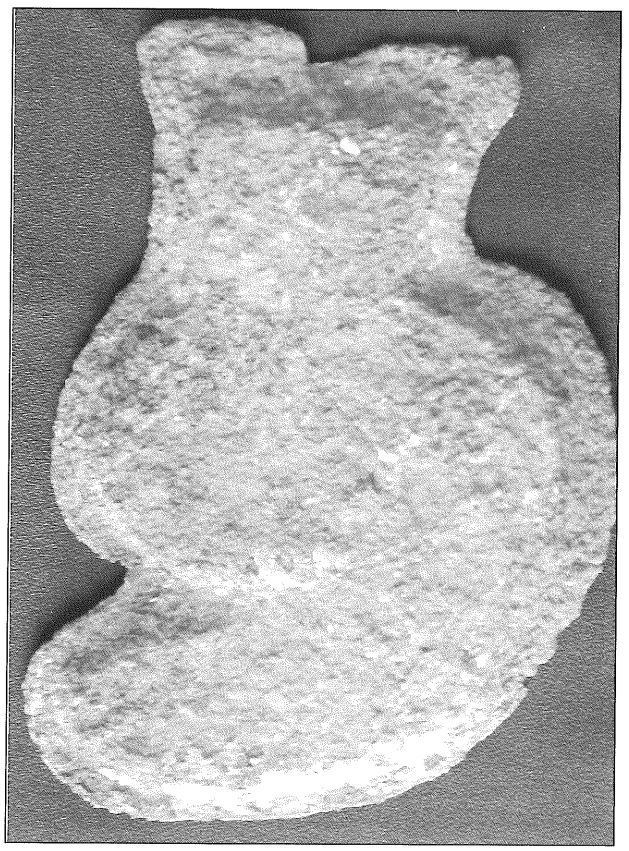
5. Lower Temenos West Cryptoporticus east gallery, completed excavation to north.

4 .Trench 97 in 2004 or Trench 69/Special Project 70 in 2000.

measuring 17.21m-by-3.93m, completes the excavations to the west gallery paved floor. Martial artifacts continue to be recovered. Figure 6 is a collection of arrowheads and **Fig. 7** is a cheek piece from a helmet.



6. Arrowheads from the West Cryptoporticus excavations.



7. Cheek piece from the West Cryptoporticus excavations.

During the 2005 season we wrestled with an important question: What lay below the pavement of the West Cryptoporticus galleries? In 2005 we decided to remove a section of flagstone pavement and excavate a 4.00-by-4.30m sondage below the east gallery floor. Supervised by Christopher A. Tuttle and known as Special Project 104, 13 stages in the stratigraphy are identified, beginning with a Pre-Site Construction Phase I from the earliest pottery assemblage to range between 125 BC and 50 BC. The stratigraphy reveals a complex sequence of natural and human events. Beneath the Lower Temenos is at least one earlier period of architectural development and the course of the Wādī Mūsā likely flowed further to the south prior to the construction of the artificial terracing for the precinct. The presence of two early activity strata also raises the intriguing possibility of tent habitations in the area dating from the elusive period of Nabataean history before permanent architecture is constructed. Bedrock is not reached. The Cryptoporticus galleries are constructed over earlier remains; however, the pavement is laid after 50 BC. But how long after? This poses an interesting question.

To better understand the stratigraphy of the West Cryptoporticus east gallery, Special Project 105 was also excavated in 2005; a 1.50m-by-4.30m probe, supervised by Christopher A. Tuttle, was placed in the east gallery of the West Cryptoporticus. Here terracing underlies the preparatory construction for the gallery, and there are four stages in the construction sequence of the West Cryptoporticus East — under terracing, preparatory constructions, wall constructions and floor leveling. Concentrating on the phasing of the area, the excavations disclose the area's later uses and ultimate collapse. The lowest layer is associated with Pre-Site Phase I and Site Phases I and II are from the Special Project 104 sounding, supra, with its various strata: sedimentation, habitation and pre-construction preparation. Above this is Site Phase IV Grand Design when the West Cryptoporticus is constructed with the insertion of vaults. In Site Phase V, the vaults are blocked when the floors of the Cryptoportici are laid, and repairs take place in the center cryptoporticus wall that supports the vaults extending to the east and west.

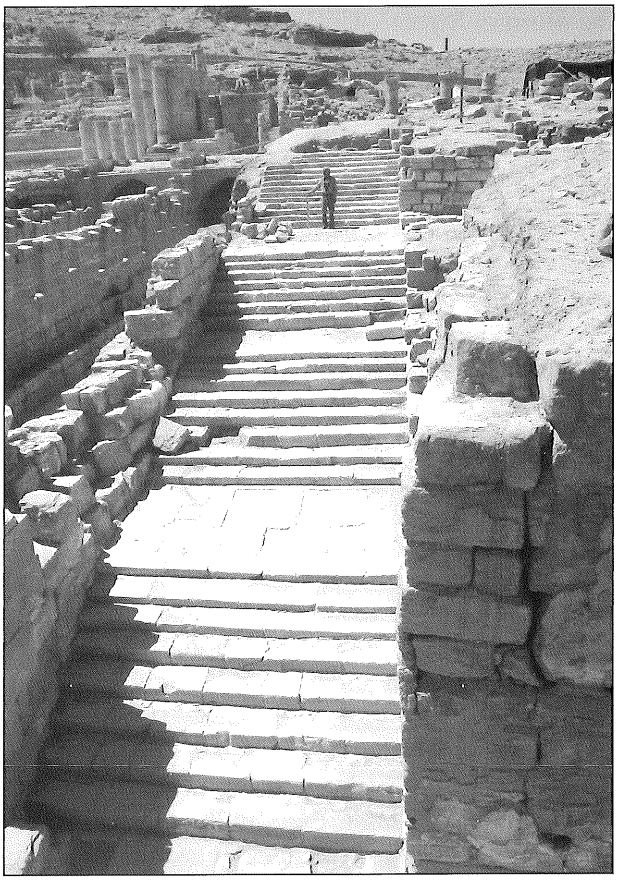
Tarek M. Khanachet excavated Trench 104, an 8.00m-by-10.00 m trench. Expecting to find a cistern-like feature revealed by the 1995 Ground Penetrating Radar, we uncovered a mysterious extension of the canalization system which does not appear to be functional. Pictured in **Fig. 8**, it may serve as an overflow for the central subterranean system.

West Entry Steps[5]

Located at the extreme west of the Lower Temenos in the 2005 excavations of Trenches 102-103, this grand stairway, pictured in **Fig. 9**, is a continuation of the West Entry Stairs excavated in Trench 88, 2002. Findings from this earlier recovery made clear that the stairway might continue up to the Upper Temenos. To bring this concept to reality, the 2005 excavations, including the removal of mountains of rubble, enabled us to interrogate the data. The final dimensions of the 2005 trenches are 30.75m north south-by-4.00 to 4.55m in width. Now that we have completed the West Entry Stairway, the following discussion includes details of the entire feature.



8. Lower Temenos Trench 104 canalization capstones to southeast in situ.



9. 2005 West Entry Stairway to south.

This West Entry Stairway follows the slope of the Great Temple precinct that falls away at a dramatic angle from the Lower Temenos to the Roman Street. Composed of five stair flights it is interrupted by four platform landings set at irregular intervals creating an entry passage totaling 40.85m in north south length. It is probable that more steps exist at the top of the stairway, but from the stratigraphy there is scant evidence for them. It is a comfortable south to north descent from the Great Temple to the West Baths[6] or from either of those features to

5. Technically these stairs are located in the Lower Temenos; they are a continuation of the steps that originate in the Propylaeum West.
6. The West Baths (not to be confused with the 2005 Great Temple Roman Baths of the Upper Temenos) were previously excavated by the Jordanian Department of Antiquities some 20 years ago. Were the West Baths constructed at the same time as the Petra Great Temple? We believe they were constructed later. Is their layout part of a single architectural program? If it is, the architects realized they had to change the orientation of the West Baths either to conform to the Roman Street or to re-orient the West Entry Stairs to a building pattern that had already been laid out, and the orientation of the two complexes had to be justified. What appears clear is the West Stairway entry and the lower courses of their construction were oriented to the Great Temple. This would suggest that the west wall would have been constructed at a slightly later time than the entry walls below the entry platform. The continuation of this wall to the south above the entry platform seems to be later because the ashlars are smaller in dimension. This might be a difficult assertion to accept — it is such a monumentally high wall that this idea can only be accepted as conjecture at this point. It is only to the south of the main Platform-Landing which serves as both the entry into the West Cryptoporticus as well as to the as yet unexcavated stairs to the West Baths that there is a change in orientation. Would those who were using this stairway even take

the Roman Street[7]. Collapse covers all the features including the tops of most of the walls. As a result of destruction and collapse, the soil is a dusky red 2.5YR ¾ Munsell color, composed of a sandy sedimentation with small stones on the surface bleeding into a more homogeneous soil with some inclusions including roof tiles, mortar (either in clumps or facing from walls) and collapsed large ashlars. Few carved decorative elements are present. Intermittent episodes of burned debris probably from wooden support beams are also found above a layer of sterile sandy soil that covers most of the stairway architecture. Had it not been for this cushion of sand, greater attrition of the step architecture would be present.

The inner and outer faces of the walls are constructed of dressed ashlar masonry, each course averaging 0.40m in height. The ashlars are set into mortar in both the vertical and horizontal joins. The east wall stands 1.73m above the platform landing at the bottom of the steps. At the south, the entry is composed of four courses of well-hewn diagonally dressed sandstone ashlars in the Nabataean casemate system with fill. At some point in antiquity this section of wall collapses, and is subsequently rebuilt with roughly hewn ashlars above one course of rubble fill 0.50m in height. Some plaster, however, still adheres to the west face of this poorly executed wall indicating that it is hidden behind a plaster surface. To the south of this portion of wall is a vertical split between the ashlars that are slumped to the south. This suggests that the rubble fill, middle bonding course has pulled away from the wall matrix and collapsed[8].

In the north, the west wall is thirteen courses in height, and constructed with well-dressed sandstone ashlars, many are also slumped out of position. On a platform to the west, there is as yet an unexplored doorway leading to the West Baths that undergoes modifications — the lower courses of this wall's east face exhibit ancient repairs.

From the evidence we cannot assume the stairway is unroofed. The distance between the east and west walls is between four to five meters, which is a reasonable span for wooden beams to support roof tiles, and fragments of covertile and pantiles were found in the collapsed debris, so we assume it is roofed.

The well-preserved stairs are characterized by large impressive well-dressed ashlars set into mortar built from the bottom to the top. These exceptional steps are expertly laid and in many cases are bonded to the east and west walls with plaster; they are constructed as a single unit to abut the sidewalls. Although each flight of steps and platforms differs in dimensions, the platforms stabilize the steps by providing a secure foundation between flights. The platforms are composed of well-laid plain white limestone flagstones with tightly fitted blocks affixed with mortar. In view of the preservation of these features, it is worth noting that ancient Nabataean stonemasons had a developed, exceptional technology in their design.

Underlying debris collapse and fill off to the west between the two uppermost stair flights is a terraced platform landing measuring 4.97m north south-by-4.35m east west. The platform elevation averages 896.500m, and it is bordered to its east with smoothed blocks measuring 0.25m to 0.32m in size. Behind this platform to the west is a narrow corridor leading to the West Baths. Resting on this platform, just below the

note of the change in orientation? It is difficult to say. In appearance, the west wall has had its north south orientation compromised in antiquity and it leans to the west, pulling away from the staircase. The Nabataean builders may have had a problem with orientation and the orientation of the Great Temple precinct with the West Baths. As can be seen from the aerial photograph in **Fig. 1**, the axis of the two sectors is appreciably different, and yet this stairway served both areas. Its west wall is intentionally compromised and oriented more to the west to serve both precincts. This evidence suggests that the city plan may have been modified with the construction of the West Baths, but this is conjecture. I speculate that the West Baths were part of a complex that may originally have served as a palace.

7. The question also has to be posed as to whether the upper flights of steps were constructed at the same time as the lowest flight of entry steps from the Roman Road. Because they are of different architectural styles, presumably the lowest flight of steps is re-laid, using larger ashlars (not conforming to the upper four flights' design, riser height or depth).

8. This wall and its secondary wall repair are placed in the same construction phase, although the repaired section is noticeably different from the original wall construction. As we cleared the platform landing we also realized that the collapse had compromised the east wall, which had tumbled into the West Cryptoporticus. Ashlars and caution tape were put in place in the affected area to provide a barrier to discourage visitors from using this point as a lookout over the West Cryptoporticus, which is more than a 5.00m precipice.



10. 2005 West Stairway to west with the nefesh and betyl in situ.

corridor doorway, pictured in **Fig. 10** is found a *nefesh*[9] accompanied by a *betyl*, positioned behind an ash-discolored deposit. This *nefesh* is a white limestone/sandstone slab with an incised obelisk carved above a squared cut betyl block, which is removable[10]. The block itself measures 0.78m in height-by-0.57m in width. The carved obelisk is 0.19m in height-by-0.135m in width and the small nefesh betyl measures 0.135m wide-by-0.13m in height. Besides the nefesh and the betyl are prolific collapsed ashlars numbering in the 900s. Little pottery, some bone, glass and metal are found, but of note are a bronze lance head and four coins. Since this area has been subject to erosion over the millennia, the artifact repertoire does not originate from sealed deposits; thus little dating can be ascribed to the artifact record.

There is an important west access to the Petra Great Temple — an access contemporary with its Grand Design in Site Phase IV. The date of its final use we ascribe to Site Phases XII-XIII or to post-date the 512AD earthquake, after which the West Entry is covered with a massive collapse fill, suggesting the West Entry Stairs are in use for approximately 500 years. We speculate the upper stairs are destroyed by natural causes; nonetheless it is clear that connecting walls provide a link between the West Stairway and the West Baths.

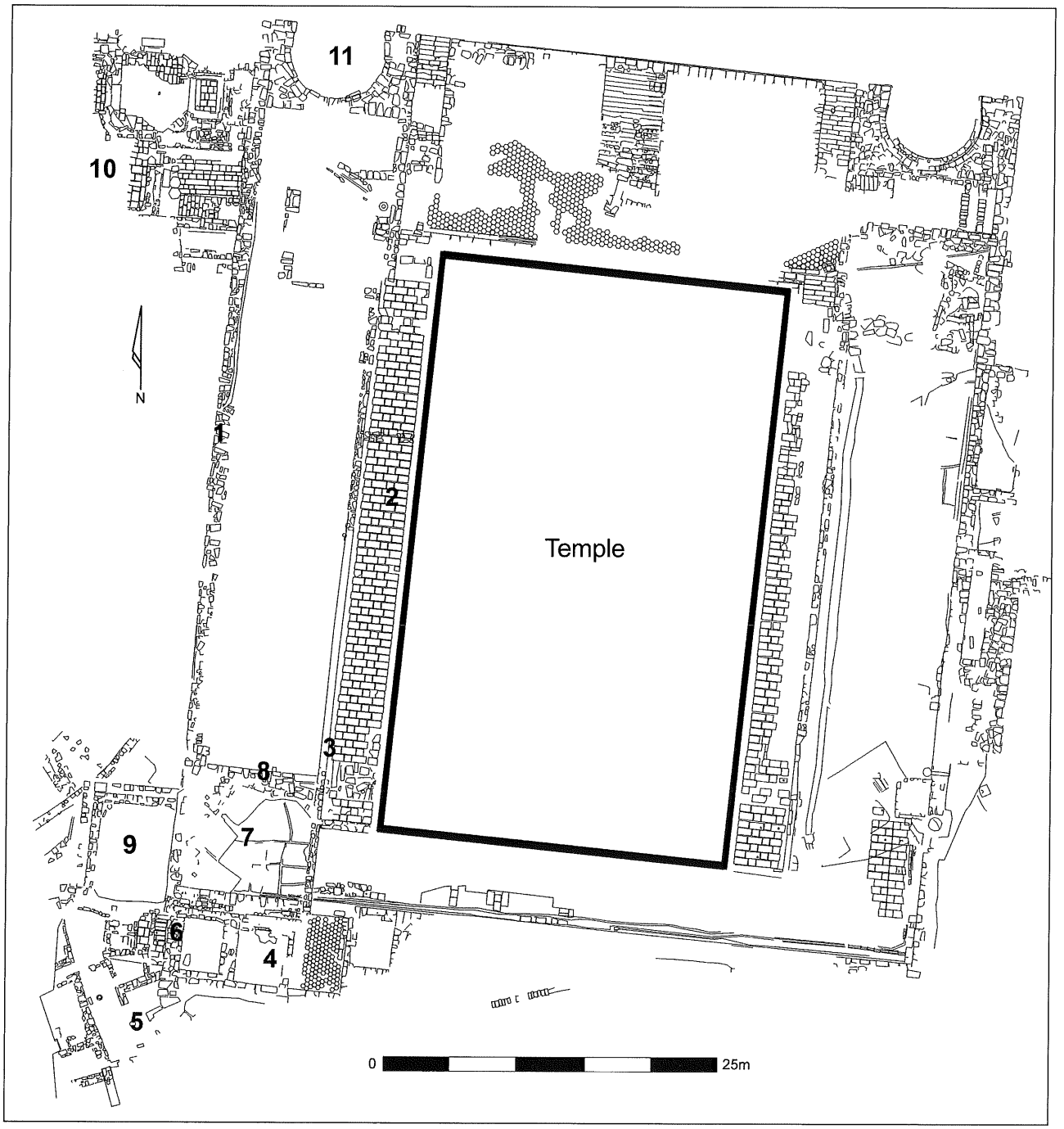
The Petra Great Temple has regained a remarkable and yet puzzling monumental stairway, which is clearly a product of desired access, providing a direct approach to the Great Temple Upper Temenos from the Roman Road while bypassing the Lower Temenos. Integral to the precinct, it exists independently and/or interdependently with the Great Temple and the West Baths. This stairway is one of the most impressive flights of stairs so far found associated with freestanding buildings in Petra. Indeed, it gives us a fascinating insight into the Nabataean understanding of structural engineering. In addition to the architectural remains is the *in situ* discovery of the nefesh stele and the accompanying betyl, which certainly is one of the most spectacular finds of the Great Temple excavations. This roughly carved, freestanding bas-relief placed on The West Stairway raises several questions. What was the compelling rationale for this memorial monument's placement? On stylistic and iconographic grounds, why does our nefesh contain both the betyl and an obelisk with a separate freestanding rectilinear betyl placed next to it? Robert Wenning, in his 2001 article, "The Betyls of Petra," in *BASOR* 324: 79-95, states that the nefesh is commonly found along the "paths of the city." This suggests that the placement of our West Stairway is an important city artery. Obviously, the monuments on this platform are significant religious commemorative installations, indicating that some ritual is performed here—some Nabataeans 2000 years ago expressed a dedicatory tribute both to the god and probably to a person of considerable influence.

Upper Temenos

The plan of the Upper Temenos is shown in **Fig. 11** with major features numbered. The 2005 excavations continue between the Great Temple West Walkway Wall and the West Precinct Wall, and from the West Precinct Wall further to the west. The West Precinct Wall divides the two areas. Each unit is discussed separately beginning with the previously unexcavated strip 40.00m north south-by-11.00-12.00m east west between the West Walkway and West Precinct Walls. This includes the West Precinct Wall, the Residential Quarter Steps, the West Plaza Bedrock Installations and the East West Support Wall. The dis-

9. A *nefesh* is a sacred Nabataean commemorative monument, a stele. It was carved to consecrate a person or a family, and to be the receptacle of the soul. Often there is no burial associated with it, as in the case at the Great Temple. It serves as a witness to a Nabataean shared belief.

10. For safekeeping the *nefesh* was moved from the site; a 1:1 reproduction will be placed in its original position. When the small *betyl* block was removed from the slab, it was found that the slab had been completely carved through, and the betyl had been affixed to a square "window" in the block. Originally it had been set into the window with white mortar (which we removed for sampling).



11. Upper Temenos plan with major features numbered: 1. West Precinct Wall, 2. West Walkway, 3. West Walkway Wall, 4. Baroque Room Complex, 5. Residential Quarter, 6. Residential Quarter Steps, 7.West Plaza Bedrock, 8. East West Support Wall, 9. Cistern-Reservoir, 10. Roman Baths, and 11. West Exedra (Marshall C. Agnew, Eleanor A. Power).

cussion of these features follows.

West Precinct Wall

Located in the west temple precinct is the West Precinct Wall. The length of the West Precinct Wall is cleared in trench Special Project 110 in 2005, supervised by Eleanor A. Power and Marshall A. Agnew. Extending 62.00m in north south length, we predict its original depth at 899.747 elevation, or to be approximately 3.28m in preserved height. As yet this badly eroded wall's excavation is not completed.

Inside the West Precinct Wall are the Residential Quarter Steps linking the Residential Quarter to the Settling Tank of the Baroque Room complex. Special Project 111 involves

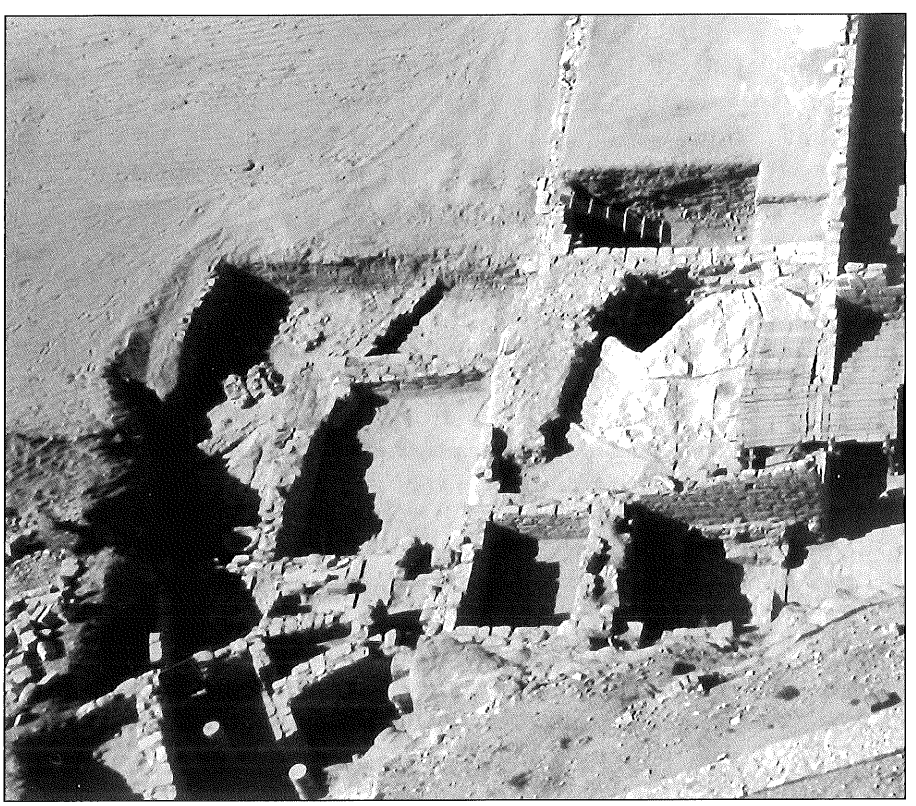
the removal of the steps to test the stratigraphy. Under the supervision of Tarek M. Khanachet, it was concluded the Residential Quarter steps are built on layers of rubble and soil fill with layers of wadi mud directly beneath. Pottery is also recovered that confirms their construction to Site Phase IV.

West Plaza Bedrock Installations

Special Project 108, excavated in 2005, is located in the southwest corner of the Great Temple precinct in the West Plaza. Figure 12 provides an aerial view of the West Plaza with the recovered architecture. Measuring 12.40-by-5.00m in the west-by-9.20m in the east and supervised by Emma S. Libonati, most striking are the quarrying cuts on an elevated bedrock plateau. Immediately west of the quarrying cuts are a group of intriguing features — three bedrock caves. Aligned north to south, the three caves hug the edge of the bedrock plateau, each opening to the west. Like the caves of the Residential Quarter, these caves show evidence of human manipulation. In the floor of the south cave are two square cuts, one near the cave's entrance and a smaller cut in the rear north corner, presumably used to anchor posts to support either a doorway or a ceiling. In the central cave, a bedrock partition wall is chiseled down to form a doorjamb. In the north cave a carved ledge is visible, presumably to support a roof. This evidence of chisel working combined with large quantities of ceramic and bone material, sheds light on the early use of the southwest area of the precinct prior to the Great Temple's construction. In antiquity, once plans for the temple are approved and quarrying begins, the caves are shaved back and purposefully filled with large unhewn stones; the north cave, however, is carefully fitted with stacked hewn sandstone ashlars.

East West Support Wall

During the excavations of Special Project 108 it becomes clear that the West Plaza architecture is much more extensive than we expected. Set on bedrock, the East West Support Wall opens at a 904.849m elevation and closes at an elevation of 901.549m; it is 12.00m in length-by-2.00m in width, and 5.10m in height. Illustrated in **Fig. 13**, this wall is composed of five to eight ashlar courses, with the lowest two courses potentially from an earlier building phase. The East West Support Wall, which in itself is a monumental construction, is designed and constructed with



12. Aerial view of the West Plaza.



13. View of the East West Support Wall abutting the West Precinct Wall to southwest.

the express purpose of providing an artificial platform for the temple. From the exposure of the juncture between the West Precinct Wall and the East West Support Wall, it is clear that both walls are originally constructed in Site Phase I and therefore are intrinsically linked.

Its discovery clarifies the west support for the temple. Hitherto we were uncertain as to how the temple architecture is supported on the west, assuming that where the bedrock falls away, fill is brought in to build up the founding level. Once the temple architects choose the specific location and plan, they manipulate the landscape to bring their architectural concept to fruition. In creating this massive wall, they support the structure by using enormous stones and supportive retaining walls for the substructure.

Now we turn to features beyond the West Precinct Wall further to the west — the Cistern-Reservoir and the Roman Baths.

The Cistern-Reservoir[11]

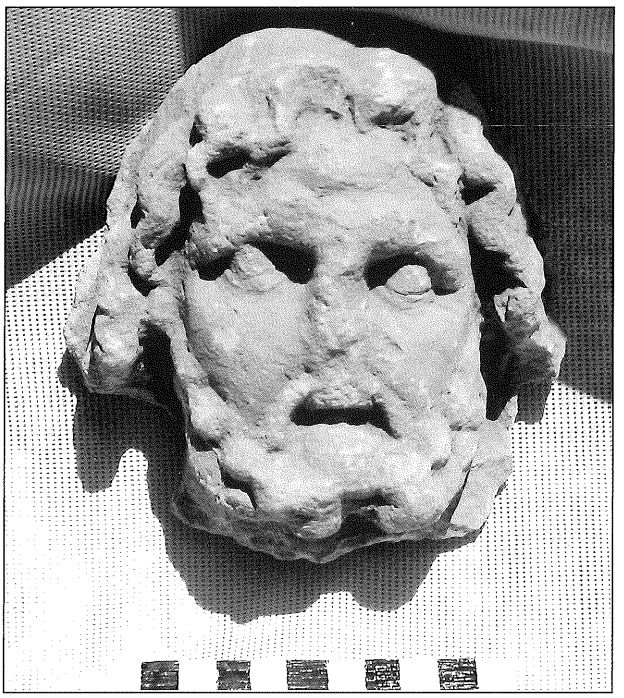
In 2005 the West Precinct Wall was further examined to the south of Special Project 110. This project, supervised by this author with the aid of Elizabeth A. Smolenski, involves the discovery and excavation of a Cistern-Reservoir (**Fig. 14**) extending to the west just below the Residential Quarter. Trench measurements average 11.85m north south-by-9.20m east west. On the north the trench is bordered by unexcavated fill, on the south it abuts bedrock and the excavated Residential Quarter, to the east it rests against the southernmost extension of the West Precinct Wall and bedrock, and on the west it abuts an unexcavated fill deposit. This monumental cistern-reservoir measures 38.8 square meters-by-an average of 1.96m in depth, and holds approximately 19,571.97 gallons of water. On the north and west are walls repaired in antiquity, and resting beside the west wall is a monumental stone basin.

Also important is the discovery of a series of pre-cistern-reservoir walls indicating how the area is manipulated and used by earlier builders. In its pre-Cistern-Reservoir days, the carved out bedrock features and built walls indicate that it serves as a residential area. Material culture is prolific, particularly with the recovery of bones and ceramics. Noteworthy is the sculpted head of a deity, (**Fig. 15**) found among the collapsed ashlars of the West Precinct Wall. Other artifacts

11. It might be questioned why we combine the terms "cistern" and "reservoir" for this feature — "Cistern-Reservoir". According to Bellwald 2003:137, *The Petra Siq: Nabataean Hydrology Uncovered*, a "cistern is a closed storage for runoff water, not spring water," and a reservoir is a "closed (i.e. covered) tank for storing drinking water from a spring". In actual fact we are not sure if our feature is one or the other or can be defined as either of these structures. As a matter of fact it may be a detention storage control basin for storm water run off. Unfortunately, at this point in our investigations we have little idea of how the water is collected or dispersed.



14. Cistern-Reservoir to south with the Residential Quarter behind.



15. Head of a deity found in the collapse of the West Precinct Wall.



16. Hedgehog found in the lowest deposits of the Cistern-Reservoir (Scale: 5cm).

include a recumbent animal spouted vessel, a bone pin with a bronze ring, five coins and a ceramic infant feeder/lamp filler in the shape of a hedgehog (**Fig. 16**).

There are questions that may never be answered. How was this structure roofed? Was it a flat roof or are the ashlars seen on the west for an arched structure? In its collapse did it bring down arches that spanned from east to west? How did water enter the Cistern-Reservoir? What is its relationship to the Residential Quarter? We assume that it is in use at the same time; however, access to the Residential Quarter is difficult given that the cistern is there[12].

Discussed from earliest to latest: Pre-Site

12. Other questions involve an understanding of how the water is dispersed. Did it travel along and/or over the West Precinct Wall? There are no openings in the cistern itself evident from the excavated evidence. Why is this Cistern-Reservoir installed? The Great Cistern in the East Plaza excavated in Special Project 85 in 2001 measures 389.844 cubic meters holding 102,985 gallons of water, whereas this facility measures 74.088 cubic meters and holds 19,571.979 gallons. In comparison the Great Cistern is significantly larger. Why were two such entities totaling 122,556.97 gallons of water required for the Great Temple and its environs?

Phase I is the manipulation of the bedrock. The cutting away of bedrock, we assume, predates the subsequent building of the temple. Chisel marks on the east and south walls attest to this premeditated plan. In Site Phase I are the construction and use of early installations, as well as the building of the West Precinct Wall. The shelf of bedrock continues at a high elevation on the southeast where it drops off and is cut back for the cistern-reservoir construction. Subsequently in Site Phases III and IV the early Cistern-Reservoir is built. Site Phase VI, brings fire and collapse to Cistern Reservoir walls, which are repaired in Site Phase VIII (and are seen today). In Site Phase IX is the collapse of Cistern-Reservoir and subsequent abandonment. In Site Phase X are signs of continued abandonment, but the water systems may be repaired and still in use. Site Phases XI-XIII show no signs of use, but in Site Phase XIV there is the construction of a Bedouin Wall over the Nabataean wall and perhaps reuse of this water system on a limited scale for the watering of Bedouin fields.

The Roman Baths

Figure 17 is a plan of the Roman Baths with the various features and **Fig. 18** gives an aerial view of the baths. Trench 105-106 is located just to the west of the West Precinct Wall, to the southwest of the West Exedra. Bounded on the west by the West Precinct Wall and on the north by the north wall of the 'reception room' and the north wall of the frigidarium, the extensions of the trench to the south and to the east are not defined by architectural features but rather by balks created during the course of the excavation and left intact[13]. Supervised by Eleanor A. Power and Marshall C. Agnew,

The final dimensions of Trench 105-106 are ca. 18.00m north south at its largest-by-ca. 12.00 m east west. The first features uncovered are the 'bathrooms' (lavatories), with two semicircular and two rectangular niches visible in **Fig. 19**. To the south of the bathrooms is the 'hypocaust room,' so-named because it is full of dumped hypocaust and flue tiles. In the east is a frigidarium with a small pool shown in **Fig. 20**, and to the west is an elegant marble-floored reception room with four semicircular features at its four corners. This excavation is to be completed in 2006.

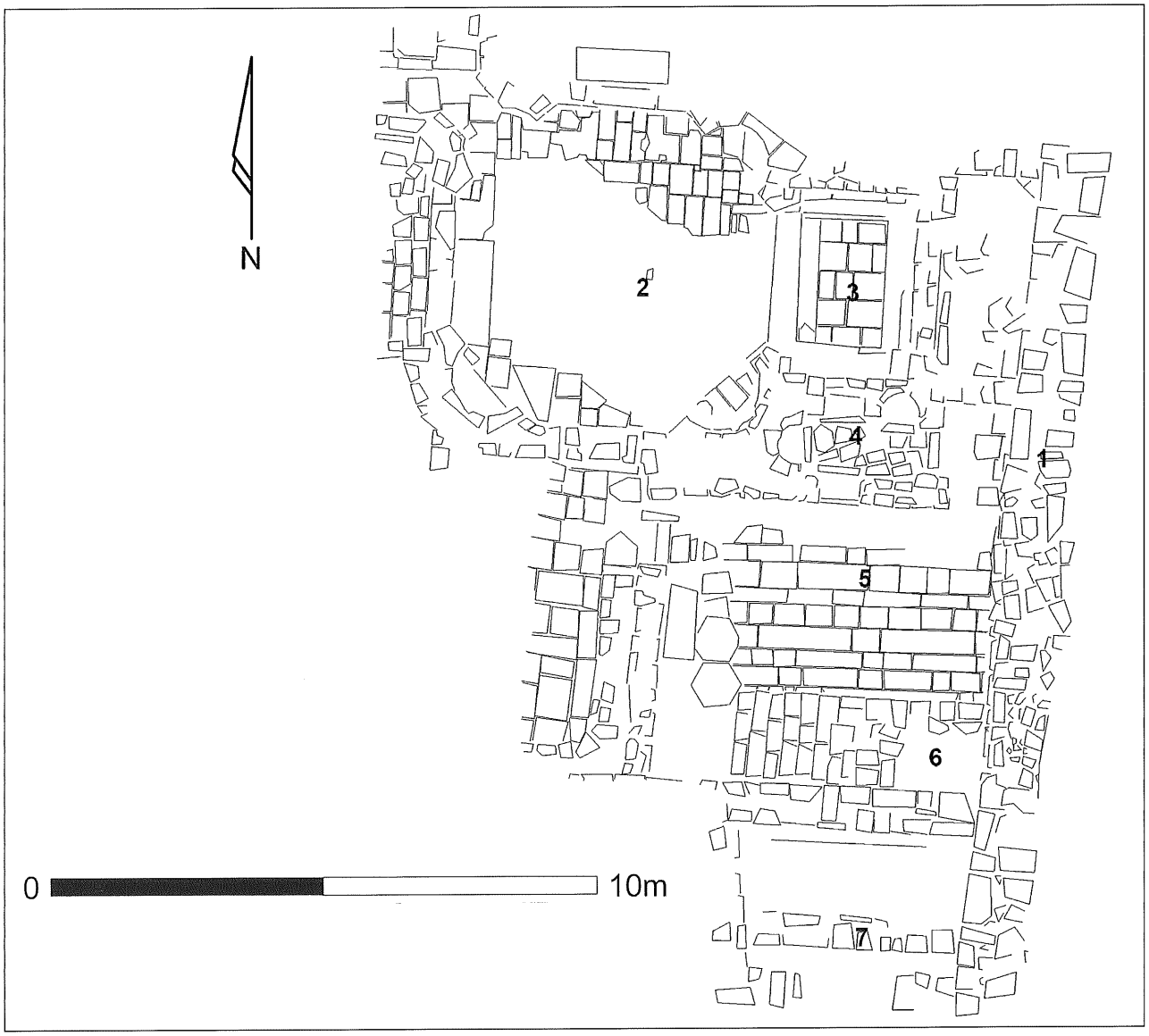
Besides the obvious importance of the architectural features that are revealed in the Roman Baths, there are a number of interesting artifacts recovered — 1,092 architectural fragments and 61 special finds. Most of the architectural fragments are ashlars and marble tile fragments found in the collapse layers. Of the special finds, 24 are coins and there are more than 20 glass beads, in addition to two complete Byzantine lamps. Most important of the special finds, however, are two marble Greek inscriptions[14] both dating to the AD second and third centuries. Illustrated in **Fig. 21** (Seq. No. 105623, Catalog No. 05-S-7) is a two-line inscription of five letters in the first line with a second line of two words and 12 letters bearing the Homeric word "prudent" (Tryanos) and may have been written in hexameter. The second inscription (Seq. No. 106238, Catalog No. 05-S-11), with four letters, is not as yet translated but may well be part of the same A style inscription.

Of primary importance is establishing a chronology for the construction and destruction events that shape the bath remains. The earliest event is the construction of the West Precinct Wall, which is part of the site preparation in Phase I (first century BC). This massive wall defines the extent of the temple. The next stage of construction is an east-west wall in the south of the trench (numbered 7 on the **Fig. 17** plan). This wall, which clearly abuts the West Precinct Wall, is large and well built, and extends across the bath perimeter, continuing further to the west. It is unclear why it is constructed but seems to belong with Site Phase IV of the Great Temple phasing as part of the Nabataean Site Phase IV Grand Design. This suggests that the scope of the Grand Design extends beyond the confines of the West Precinct Wall and possibly connects it with other structures and as yet unexcavated complexes further to the west.

With the annexation of Nabataea by the Romans in 106AD new architectural concepts and

13. Trench 31, undertaken in 1996 by Butler and Goldstein and located just to the north of Trench 105-106, exposed features likely related to this bath complex.

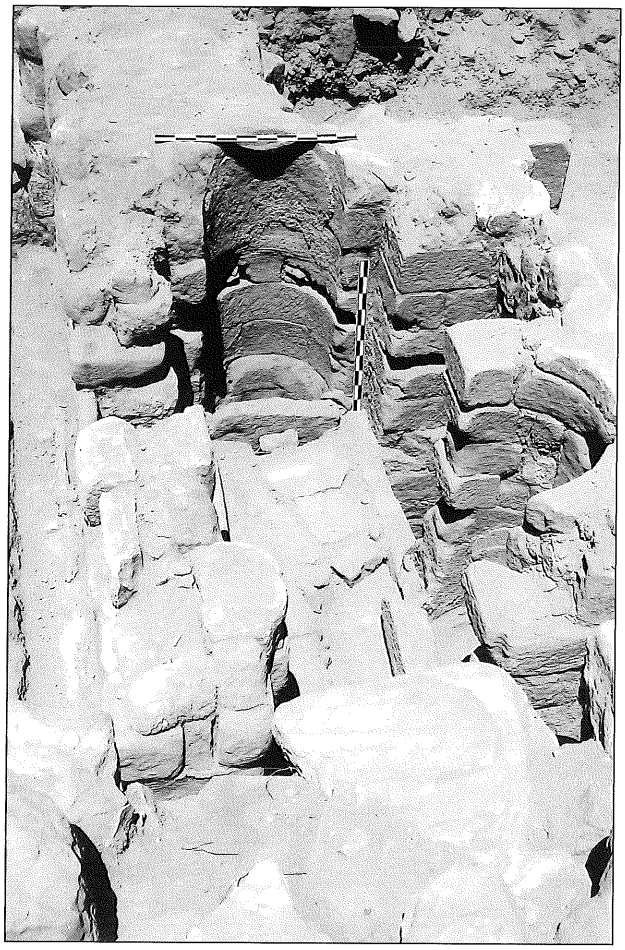
14. We are grateful to Trainos Gagnos of the University of Michigan for his preliminary assessment of this inscription.



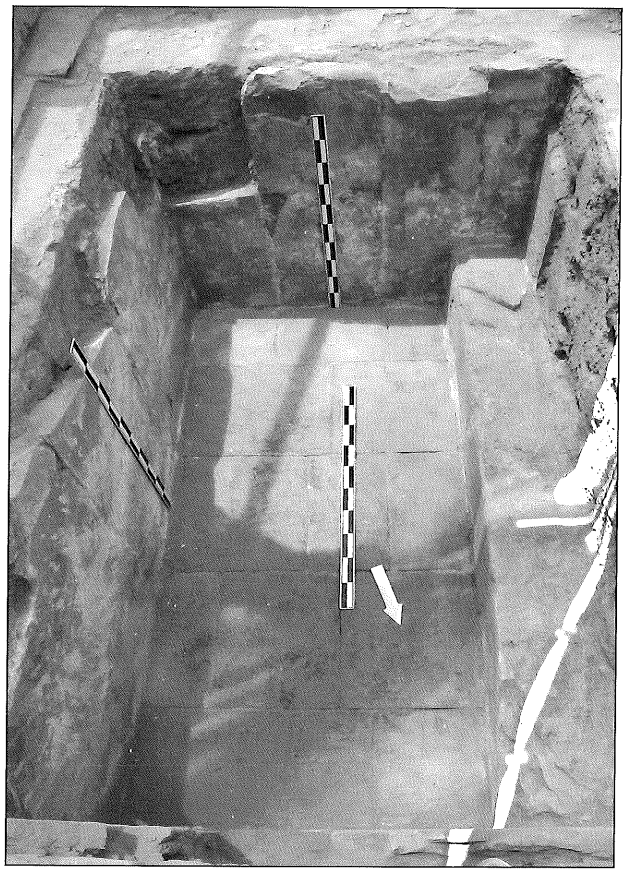
17. Plan of the Roman Baths. 1. West Perimeter Wall, 2. Vestibule, 3. Frigidarium, 4. Lavatories Bathrooms, 5."Hypocaust Room," 6. Steps, and 7. East West Wall (Marshall C. Agnew and Eleanor A. Power).



18. Aerial overview of the Roman Bath Complex.



19. Lavatories-bathrooms, 2005 Roman Baths to north.



20. 2005 Roman Baths, frigidarium to south.



21. Marble inscription (Cat. No. 05.S.7) from the Upper Temenos Roman Bath. Length 19.45cm, W. 9.14cm, Th. 2.56cm.

social norms arrive in Petra, poignantly demonstrated by the construction of the bath complex. This is a grand undertaking, the extent of which is still not fully revealed. In comparison with Nabataean masonry the workmanship is generally mediocre — further support for the Byzantine date for the finds above the floor.

Following the construction of the bath complex, there is a stage of reconfiguration occurring during Phase VII (AD mid second century). Abutting the West Precinct Wall, stairs in the "hypocaust room" are added, using robbed-out column drums and ashlars; the pavers of the "hypocaust room" floor extend underneath the stairs. This raises the question of a redirected access into the bath complex; with the addition of the stairs, traffic flow changes, potentially suggesting a change in use of the space. Site Phase VIII is a relatively short period of sedimentation seen just above the floor in the "hypocaust room". This is the first sign of disuse of the bath complex and an abandonment of its original purpose. Following this also in Site Phase VIII, there is the purposeful dumping in the "hypocaust room". The massive quantity of hypocaust and flue tiles suggests that this debris is from a caldarium, most likely near by. This dumping is Byzantine, indicated by the extraordinary quan-

tity of Byzantine glass and lamps.

The full collapse of the bath complex and the West Precinct Wall is part of the major 363AD collapse (Site Phase IX) of the Petra Great Temple. This is a cataclysmic event, with much of the West Precinct Wall falling into the bath complex and whole sections of architecture being dislodged and collapsing. Following this event, the area is fully covered by wash and overburden[15].

With this broad chronology established, we can now look at some of the interesting questions that stem from the discoveries and interpretations of the baths. Of significance to the entire Petra Great Temple, perhaps, is the shift in our understanding of Site Phase VI. It now appears that this period, which covers the annexation of Petra by the Romans and the resulting Romanization of the site, is much more active than previously thought. More than just a period of minor collapse and repair, there appears to be more large-scale construction, including the bath complex and possibly other features. There is clearly a reuse of the Nabataean Great Temple for secular purposes, and the presence of something as public as a bath highlights this alteration. This new purpose continues the use of the Petra Great Temple as a public space, although the bath has no religious or civic purpose beyond being a gathering point for its clientele. It is also interesting to question who the clientele are. A small bath complex, especially with the West Baths just to the northwest, would seem to have a restricted membership. Are these people a Byzantine elite? A resident family?

The excavation of Trench 105-106 is much more complex and informative than we could hope. The unearthed remains give us insight into a later period of history in Petra and, just as importantly, show us the impact of Romanization on Nabataea. With further study and excavation we can learn even more from this small but significant structure.

Temple

In the Great Temple three Special Projects were excavated; West Walkway Special Project 109, the East Pronaos Special Project 107 and a sondage below the orchestra floor of the Theater Special Project 200.

West Walkway Sondage

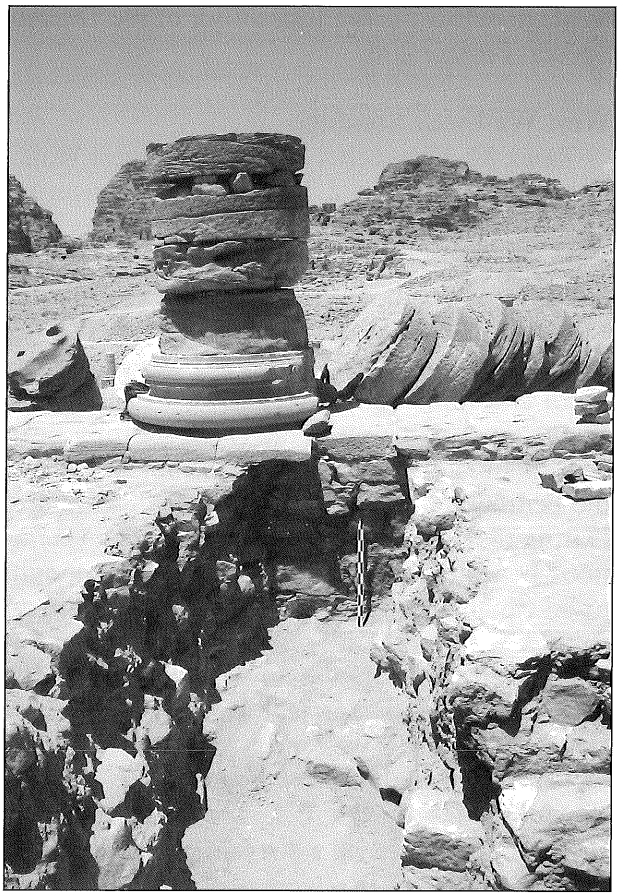
Tarek M. Khanachet excavated a West Walkway sondage, Special Project 109, measuring 3.30-by-3.63m, in 2005. The West Walkway Wall abuts the East West Support Wall and the temple platform with rubble fill beside it. The previous excavations prove that the bedrock on which the temple is constructed slopes off steeply to the south and immediately to the west of the West Walkway. A platform is then purposefully built up with monumental ashlar and rubble fill above the bedrock, as part of the temple substructure. During the course of the excavation, a gap is noticed beneath one of the ashlars that is thought to be canalization, but is found to be a vertical shaft down into the fill created by the space left between layers of monumental ashlars when the substructure is constructed. Therefore, the West Walkway and the west portion of the temenos platform are built up by enormous rough-cut ashlars resting on bedrock; the West Walkway Wall is constructed on a dirt and soil foundation, approximately 0.40m west of the original platform edge. The East West Support Wall (see the Upper Temenos discussion) abuts the platform construction and rubble/ashlar fill to support the monumental platform construction.

Temple East Pronaos

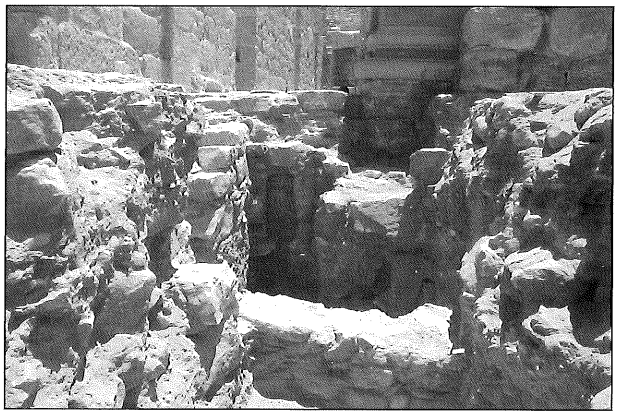
In 2005 Special Project 107, a 6.40-by-3.55m sondage supervised by Emma S. Libonati at the east end of the East Pronaos, proves that at least a portion of the Pronaos and tetrastyle in antis porch are later additions to the original distyle in antis façade. In the sondage, shown to the north against the stylobate and East Anta in **Fig. 22**, and to the south against the East Corridor and the East Distyle Anta in **Fig. 23**, two very important structures are unearthed: an early stuccoed platform/wall and an early east west canalization system. **Fig. 24** shows the stuccoed platform set between the walls of the Pronaos.

A vertical water system located directly below the distyle in antis foundation wall may be part of an installation built around a bedrock

15. During the course of the Petra Great Temple excavation, an exposed upper portion of the West Precinct Wall was consolidated, which has been labeled as belonging to Site Phase XIV.

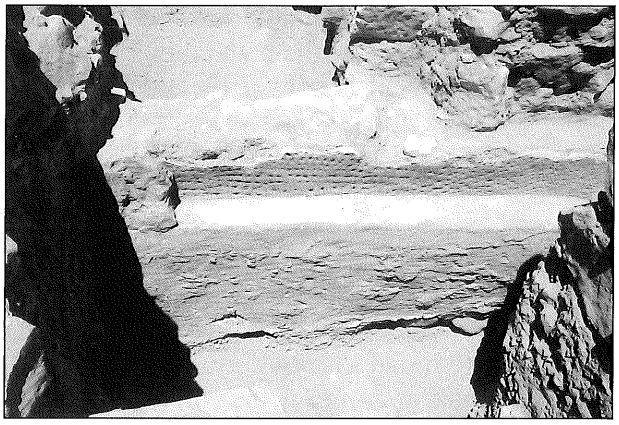


22. *Pronaos sondage to north against the Porch stylobate wall.*



23. *Pronaos sondage to south against the East Corridor Wall and the Distyle Column.*

spring, but there is no connection between it and the East Plaza artery (and we are unsure if it flows into the Central Artery of the subterranean canalization system). It is also difficult to phase it adequately. The stuccoed platform/wall is located north of the water system at an oblique



24. *Pronaos sondage, detail of dimpled platform to east.*

angle to the distyle in antis foundation wall, and it is difficult to determine both its function and its overall size as only one side is exposed. The ledged platform south face is covered by thick gray white stucco decorated with dimpled finger impressions. In association with this platform are Hellenistic and Early Nabataean ceramics and quantities of bone.

The site phasing for these features is dependent on the early platform-wall; is it associated with the Great Temple or is it a structure from the site's previous incarnation? The sondage in the Pronaos reveals a more intricate architectural phasing for the Great Temple complex and earlier and potentially greater information for the development of Nabataean architecture. The purpose of the platform may be the south wall of a side altar. The platform and the material remains associated with it create problems for the overall chronology and architectural plan of the Great Temple by placing the distyle in antis temple structure at an earlier date than our site phasing hitherto has indicated. It is conceivable in an earlier temple phase this platform was visible as part of the distyle in antis temple, and if so, prior to the Grand Design of Site Phase IV, the Pronaos encompasses a more extensive area[16].

Theater Sondage

In our attempt the better understand the Great Temple Theater, Rune Frederiksen undertook a research visit to the site. Dr. Frederiksen will be publishing the results of his research in Volume

16. It is also possible that this structure was the altar for an earlier sacral site, and that underneath the central section of the building is the footprint of a much earlier shrine.

III of the Great Temple publication series. His preliminary assessments of the theater can be found in the note below[17].

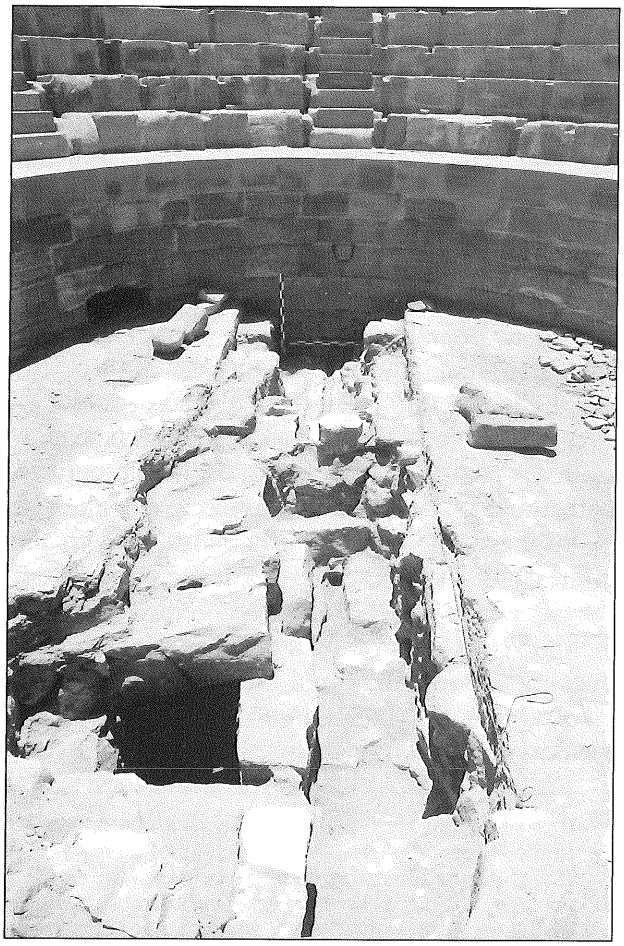
With the encouragement by Rune Frederiksen to investigate the Theater orchestra, Special Project 200 was excavated. Supervised by Emma S. Libonati, a 6.96-by-1.96m sondage below the theater orchestra floor helped us analyze the Theater construction and recover datable material remains. Figure 25 shows the orchestra with the sondage against the theater wall, and **Fig. 26** is the sondage to the north against the Pulpitum wall. The uncovering of a central pivot drum (**Fig. 27**), 0.38m diameter, is presumably used for laying out the apsidal structure of the Theater; it is an unusual feature to find *in situ*, with both horizontal and vertical pivot points. The horizontal pivot stone is a common feature in Hellenistic theaters, suggesting architects from the Greek East are influenced more by structures from Hellenistic theater cities rather than the Roman theater cities.

There is a possibility that when the Theater was placed in the temple that a small colonnade or decorative structure was dismantled and its parts reused as fill or as portions of buildings. In other places in the Great Temple there are reused smaller column drums with roughly the same diameter. Likewise, the reused pieces of stucco in the fill suggest that some orchestra fill originates from a period of redecoration.

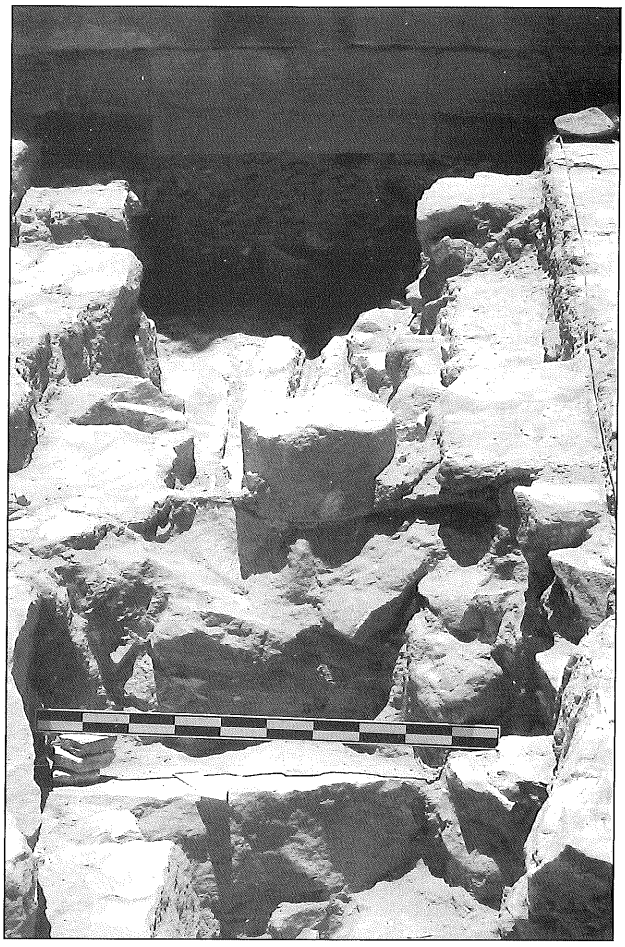
Just as puzzling is the discovery of the subterranean canalization system extending below the orchestra floor. There is a discrepancy between the orchestra wall and height of the canalization's central artery capstones. In comparison with the East Vaulted Chamber where the top of the capstones was at 905.341m, and in the orchestra itself where the north the top level of the capstones is 905.146m, the orchestra floor is at 905.526m, suggesting a build-up and leveling during the construction of the theater area.

Study of the canalization system under the theater structure, stage and Pronaos (between

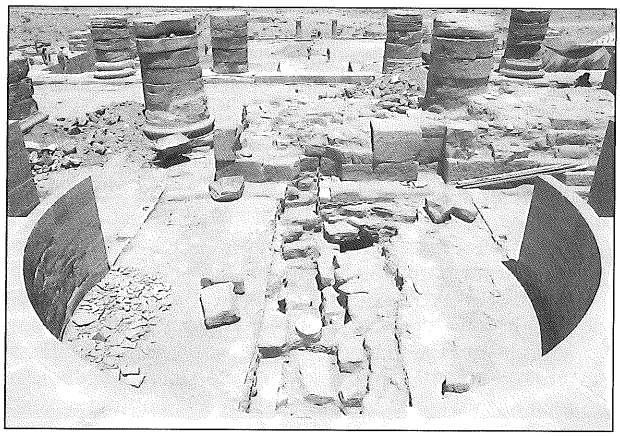
17. Rune Frederiksen: Report on research visit to Petra 12th to 24th July 2005.
"The purpose of my visit was to do an autopsy of the architectural remains from the theatron in the Great Temple, to understand the relationship between these two structures, to study architectural elements and fragments found during the excavation of the theatron and to suggest what remains of archaeological investigation before the theatron part of the Great Temple can be said to be fully explored.
I spent the 12th to the 18th getting a sense of the site for a general overview of the site which included studying the architecture and comparing it to the data from the trench reports. This exercise was not expected to bring about any new observations but was necessary to fully understand the vast amount of material data from the excavations. I found that the basic elements of the theatron are comparable directly to Greek Hellenistic theatre structures rather than assembly buildings of other kinds like *bouleuteria*, *dikateria* or *odeia*. An interpretation of the primary function of the structure — which determined its architecture in the first place — as anything other than a space for dramatic performances must be based on new evidence from the building itself rather than on speculations of assembly needs that may have existed contemporaneously with the theatron. The building may have been used for a number of activities, as other ancient assembly buildings were, but this is an issue which should not be confused with the identification of the primary function of the building as a theater space.
Of further interest to my study are the other theatrical structures identified in Petra and other Nabataean sites. Apart from the great theatre at the mouth of the Sīq there is a structure next to the Temple of the Winged Lions and one at nearby Wādī Ṣabrā. For further study are Herodian and Nabataean comparisons in the Negev, the Ḥawrān and the site of Delos.
It was decided to excavate in the centre of the orchestra area in order to investigate the construction of the orchestra floor and to check for structures predating the existing theatron. This sounding was particularly rewarding. As expected the construction of the floor can now be fully described and it was found that there were no earlier phases from the theatron in this area. It was found that the monumental canalization structure that enters the Great Temple from the south continued through the Temple. Particularly important for our understanding of the theatron was the unexpected and sensational find of a column drum placed precisely in the middle of the orchestra but below the pavers and therefore not visible when the construction of the floor was complete. This was used — we believe — as the central point for laying out the orchestra and the semicircular rows of seating of the *koilon*. This is important new evidence and helps tremendously in our attempt at understanding how Nabataean architects worked, but also in general to understand how ancient architects worked; very often we have nothing but the ruins themselves to interpret from.
I spent the 19th through the 23rd of July studying architectural fragments from the theatron. The purpose of this exercise was to separate fragments from the theatron and from those of the Great Temple and to choose objects for further analysis, publication drawing and photography. 975 fragments were removed from the depot east of the Lower Temenos to a temporary depot just west of this. The westernmost pile of fragments is from everything but the theatron. The middle pile is fragments with no numbers, and the easternmost two piles are from trenches 62 and 47. July 23rd 2005".



25. Theater sondage through the orchestra floor to south.



27. Theater sondage, detail of column drum to south.



26. Theater sondage to north of the Pulpitum wall.

the two previous sondage explorations)[18] shows that the central canalization artery accumulated a tremendous amount of sediment, requiring repairs in antiquity for flushing it out. The reexamination of the Central Arch portion of the subterranean canalization system in Special Project 120, 2004 proves that there is no south inlet for the central artery but that it is constructed in the earliest architectural site phase of the complex. The artery in the Theater confirms this.

With few exceptions the capstones of the central artery are cracked in the middle; whether this results from earthquake damage or is prior to the abandonment of the temple is difficult to say, but clearly the structural integrity of the system is not flawless and might bring about the abandonment and general rebuilding of the water systems in the Great Temple precinct. There are arteries from the west and east adjacent to the central staircase that are the viable water carrying systems in the first phase of canalization construction[19].

Of particular note for the canalization construction is the progressive narrowing in the

18. Trench 55a, 1999 (East Vaulted Chamber) and Special Project 4, Part II 1994 (in the center of the Pronaos).

19. Or the central artery may be a builder's folly or an overflow valve for the entire water system.

area underneath the pulpitum and the distyle in antis foundation wall. The west wall of the canalization consistently slopes westward, while the east wall narrows at roughly 2.00m intervals and banks gently to the west. The result is a gradual narrowing of the canalization; the width at the north of the orchestra is 0.76m while at the north prior to the blockage in the Pronaos it is 0.56m. The most significant narrowing is at 3.80m from the canalization opening in the Theater where the distyle in antis foundation wall intercepts the canalization. From an examination of the construction technique, the distyle in antis foundation wall is built together with the central canalization and may be a contributing factor to the westward swing of the canalization.

The canalization follows a fairly linear route slightly east of the center axis of the building itself, except in the temple Pronaos where it is directed westward before swinging eastward again to flow underneath the central staircase between the Upper and Lower Temenos; this linear route continues through the Lower Temenos. This pattern, however, is disrupted in the temple Pronaos by the westward bend, which leads to some architectural questions. Was it necessary for the builders to avoid the Pronaos center because of a pre-existing architectural feature or could this section be rebuilt when the tetrastyle in antis is added? Either an early east west water canalization with a westward jog does exist in the area of the Pronaos, or there is a lower, earlier water system in place.

Artifacts 2005

The 2005 Great Temple catalog includes 167 objects of which 78 are coins, 10 are of bone, 18 of faïence, 7 of glass, 20 metal objects including arrowheads (**Fig. 6**), 16 objects of pottery, plus 6 lamps and 12 stone artifacts, including the head of a deity (**Fig. 15**). Our databases of 13 years of excavation continue to swell with architectural fragments bringing the total to 16,883. There are also considerable cultural materials, numbering 38,763 for the 2005 season, bringing the overall total to 386,763 artifacts (fragments of pottery, bone, metal, glass, etc.) in our Grosso Modo database.

Consolidation and Preservation 2005-2006

Consolidation and restoration are conducted under the direction of Dakhilallah Qublan and include numerous projects involving the pointing of walls in all areas affected by the 2005 excavations. There is particular urgency to point the West Entry Stairway, which is in a state of collapse and requires stabilization. The Cistern-Reservoir also requires the pointing of its north and west walls.

The disturbed uppermost section of the West Stairway excavation is to be covered with clean sand and a platform with a railing for support. For ease of passage, an east west bridge was constructed between the Upper Temenos and the Lower Temenos Triple Colonnade. As for the Roman Baths, many small projects are underway, such as the reinsertion of the limestone curved wall elements that had tumbled out of the Roman toilets, the replacement of a lintel. Additionally, the north, east and south walls are to be reconstructed to the same height as the north wall and door, and the frigidarium entry is to be built to one level with white mortar and/or limestone slabs. The full exposure of the pipe around the base of the bathrooms requires mortar support, but the major project is attending to the West Precinct Wall — to move the slumped ashlars and replace them with new blocks.

In the Great Temple several projects have been undertaken, including the construction of a frame around the excavated Temple Theater orchestra so that the stratigraphy can be viewed. Old and new pavers are to be intermingled and set to cover the Great Temple Forecourt (leaving the subterranean canalization system open). As for the Central Stairs, three sets of stairs in limestone are to be restored — two upper steps, two middle steps, and two lower steps — leaving the stair bedding open on the remaining steps. Limestone is to be used to mark the difference from the sandstone east and west stairs that are later additions. As for the artifacts, all the metal artifacts including the coins are in 'Amman for restoration by Naif Zaban at the American Center of Oriental Research, after which they will be analyzed and returned to the Petra Museum. A copy is to be made of the nefesh with one *in situ* on the West Stairway where the original is found; the original will be safeguarded by the Petra Museum.

At Home Research 2005

At least four months are dedicated to the

drafting of measured drawings[20], updating the records of all project areas and the Great Temple web page. These projects range in complexity from scanning and digitizing illustrations to updating our extensive computerized site databases. A great deal of time is to be spent in the preparation of The Petra Great Temple Volume II, a summary of our excavations since their inception. Vol. II is part of our planned publication series which is set to go to press in 2006, and Volume III will be devoted to specialist studies of the excavations, including submissions by Rune Frederiksen, Joseph J. Basile (who continues work on the sculpture), Sarah Whicher Kansa (who continues to analyze our bone corpus) and David S. Reese (who is studying our shell remains), among other researchers.

In April 2005 I was honored to lecture in Grand Rapids, Michigan for the "Experience Petra Exhibition", and in May I lectured at the American University of Beirut Museum. In September I was most privileged to celebrate the 20th anniversary of the Anthony McNicholl Visiting Lectureship[21] in Australia and presented a series of lectures in Sydney, Adelaide, Melbourne, Canberra and Perth.

Conclusion

The remarkable portfolio of 2005 projects at the Petra Great Temple reveals the results of entrenched archaeological questions, as well as our consolidation and preservation of the site. Our discoveries offer an unparalleled view into the quintessential fabric of Nabataean architectural and cultural heritage. Our 13th campaign has resulted in a vast compendium of challenges that we are excited to address in 2006. I am grateful to my team and share their enthusiasm and pride in the uniqueness of the Petra Great Temple, which we have been entrusted to excavate.

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20. Our Wall Drawer program developed from our U. S. National Science Foundation grant continued to serve us well. (NSF Information Technology Research [ITR #0205477] Grant of $2 million for four years).
21. Dr. Anthony McNicoll, after whom the lecture is named, was senior lecturer in Middle Eastern Archaeology at the University of Sydney from 1976 until his untimely death in 1985. He delivered a series of outstanding courses while co-directing with Prof. J. Basil Hennessy the University of Sydney's excavations, first at Tulaylāt al-Ghassūl and later at the major site of Pella in Jordan.

TABULAR SCRAPER QUARRY SITES IN THE WĀDĪ AR-RUWAYSHID REGION (N/E JORDAN)

Bernd Müller-Neuhof

Introduction

Tabular scrapers (or fan scrapers) belong to the most characteristic lithic tools of the Chalcolithic and Early Bronze Age period, even though they already appear in Late Neolithic lithic assemblages (Rosen 1997: 75). They have a distribution over a broad area, including Egypt (Rizkana and Seeher 1985), North Africa (Roubet 1979), Sinai (Milshtain 1981: 119ff), the Levant (e.g. McConaughy 1980; Khalil *et al.* 2003; Rosen 1997), southeastern Anatolia and northeastern Syria (Algaze 1989: 581; Schmidt 1996: 85ff.) and the Middle Euphrates (Müller-Neuhof n.d.; Schmidt n.d.). There are also some hints on the utilization of these tools in Southern Mesopotamia in the Uruk period, equivalent to the Late Chalcolithic period in the west (Müller-Neuhof 2000: 144, Taf. 110).

Tabular scrapers are characterised by their more or less hand-sized flat appearance and a more or less full cortical cover on the dorsal side. The plans of these tools range from fan-shaped towards more circular to elongated oval or tongue-shaped plans. Retouch caused by knapping or utilization can be observed on all edges.

The function of these tools is seen in the context of caprine pastoralism. It is expected that hide-working and shearing are activities for which these tools were used (Henry 1985: 372), although butchering activities are also proposed (Rosen 1997: 74 quoting McConaughy 1979: 304).

Despite the appearance of tabular scrapers in several Chalcolithic and Early Bronze Age sites in the Near East, the origin of the blanks and the way they were produced remained unclear for a long time. Neither tabular scraper cores nor traces of primary production in order to produce tabular scraper blanks were detected in excavated settlements.

Some small quarry sites with scattered finds of flint nodules with negative scars on their surface, bearing the shape of tabular scrapers, were found in the Negev and Sinai (Rosen pers. comm. June 2005 and Rosen 1997: 75), and these discoveries gave a first impression how these tools were produced. But these few finds of "tabular scraper cores" never explained the large number of tabular scrapers in Chalcolithic and Bronze Age settlements, especially west of the Jordan River.

After Gary Rollefson first noted tabular scraper cores at the Jafr basin in the late 1970s early 1980s (Quintero *et al.* 2002: 18 quoting Rollefson 1980: 14), it was in 1997 and 1999 when Leslie Quintero and Phil Wilke discovered several quarry sites with an enormous number of tabular scraper cores on the northeastern ridge of the al-Jafr Basin in southern Jordan. This was a discovery that resulted in the recognition of the great importance of these artefacts for the Chalcolithic and Early Bronze Age period (Quintero and Wilke 1998; Quintero *et al.* 2002). Parallel to their discoveries, Sumio Fuji discovered two comparable quarry sites in the northern area of the al-Jafr Basin, where he also undertook some excavations (Fuji 1998-2003).

With these discoveries it became clear that the largest part of tabular scraper blank production occurred on large quarry sites in nearly "industrial" dimensions, in view of the number of produced blanks, which were traded over long distances as valuable goods.

Comparable sites were not known in other areas. But it should be mentioned that scattered finds of few tabular scraper cores are known from the Wādī Jīlāt area in Northern Jordan, discovered in the 1980s (Baird 2001: 649). This situation changed in 2000.

The ar-Ruwayshid Project

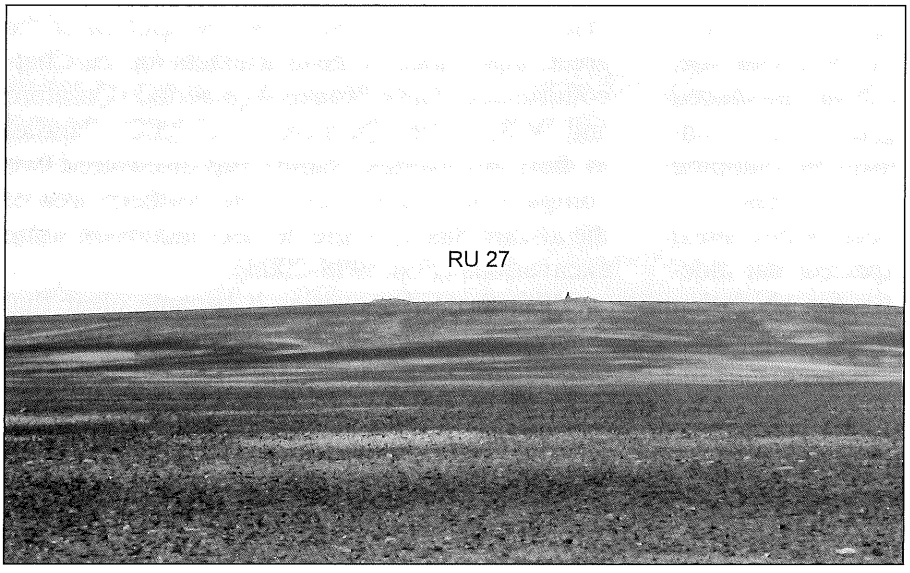
In the framework of a joint cooperation project between the Department of Antiquities (DoA) and its Director-General Fawwaz al-Khraysheh and the Orient Department of the German Archaeological Institute (DAI) in Berlin with its director Ricardo Eichmann, a brief two-day survey in the Basalt Desert (al-Ḥarra) and in the area of the Wādī ar-Ruwayshid (al-Ḥamād) in northeastern Jordan was carried out in 2000 in order to check the archaeological potential in this area for future projects[1]. During this survey a large area covered with large fragments of flint nodules bearing negatives of tabular scraper blanks was discovered on top of an elevation in the Wādī ar-Ruwayshid area. It became clear that this site, named RU 27[2], is a quarry site for obtaining tabular scraper blanks. This is the first known large quarry site for tabular scrapers in northeastern Jordan. The short stay did not allow a detailed analysis, therefore another visit for an intensive documentation of this site was planned. This was carried out in February 2006 with a small survey within the same co-operational framework[3].

Location and Description of RU 27

The site RU 27 (**Fig. 1**) is located east of the town ar-Ruwayshid (H4) (**Fig. 2**) on top of a ca. 1km (aerial distance) long curved ridge or butte bordered by wadis, being part of the ar-Ruwayshid wadi system, in the north (Wādī Umm Qunayna) and south. Geologically the buttes are characterised by Eocene / Palaeocene limestone layers with embedded chert layers (Bender 1968: Map). A *rujum*, possibly a grave or landmark cairn, close to the western edge of the elevation was chosen for defining the site coordinates, which are N32°29'16.4 "E038°30'46.4" (WGS 84) (measured by GPS). According to a topographical point in the centre of the butte this point lies 802m asl.

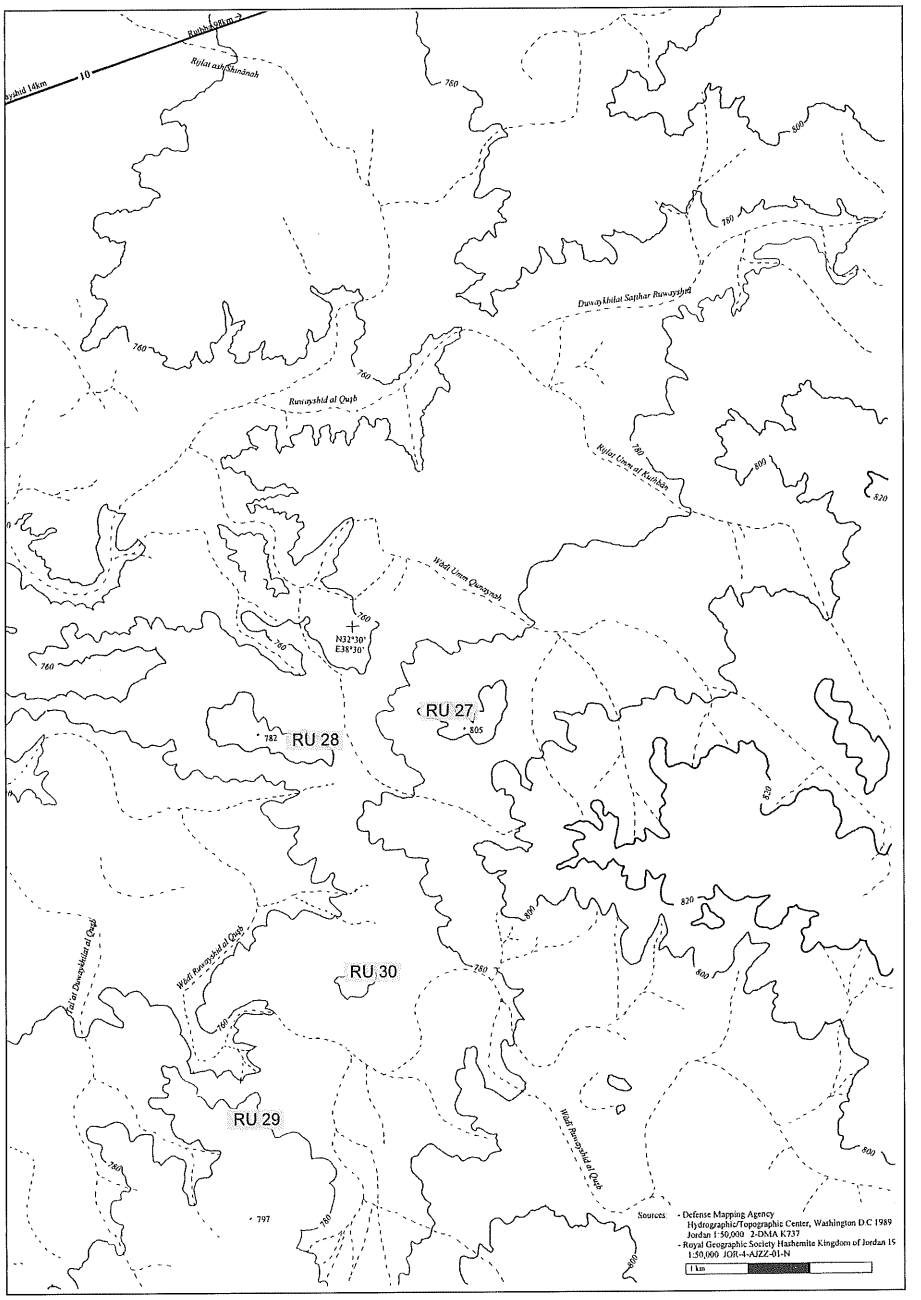
On our first visit in 2000 we stayed just on one of the ends of this prominence where a quarry site is located. On the 2006 survey we could observe that about 10 quarry sites were located on the top of the ridge close to its edges. The borders of these sites are more or less clearly defined. Compared to the surrounding flat "Hamada-surface" these quarrying areas are characterised by a rough surface comprising a concentration of white limestone blocks in the centre (**Fig. 3**) and large tabular scraper cores represented by pieces of broken flint nodules bearing several negative scars of tabular scraper blanks (**Fig. 4**).

The extension of the production areas are defined by the absence of, or very little evidence for, tabular scraper blank production between the different production areas, which in some



1. View on RU 27 from north. On top two 'rujums' are visible.

1. Participants were Salem Diyab (DoA), Ricardo Eichmann (DAI) and Bernd Müller-Neuhof (DAI).
2. The numbering of the sites (e.g. RU27) is based on co-ordinates of archaeological sites and specific topographical features taken with the GPS in 2000.
3. Participants of the 2006 season were Hussein Askar (DoA) and Bernd Müller-Neuhof (DAI).



2. Map of ar-Ruwayshid area with the surveyed quarry sites RU 27 – RU 29 and the Neolithic 'burin' site RU 30.

cases complicated a proper identification of the limits of these production sites. Therefore the mentioned number of ca. 10 different production areas is an approximate quantity. The production areas have different expanses, some are more than 100m long[4], others just ca. 30m. The width is always around 30m, which seems to correlate with the occurrence of usable flint-nodules cropping out at the edges of the elevation below a specific layer of smaller sized limestone blocks (**Fig. 5**).

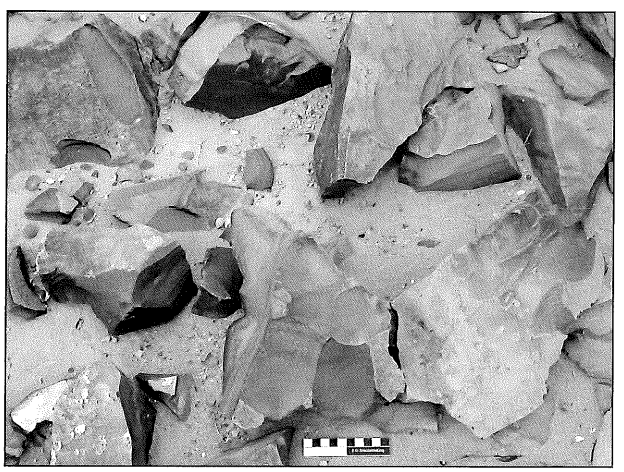
Methods of Raw Material Extraction and the Character of Primary Production.

The extraction of raw material occurred on the edges and on top of the butte close to these edges by digging out more or less block-shaped pieces of limestone of the upper matrix covering the lower lying flint-nodule layer. After this was done the flint-nodules were extracted in larger pieces (between ca. 30 and 80cm length) (**Fig. 6**). It can be assumed that a combination of horizontal quarrying from the escarpment and ad-

4. All measurements were taken with the GPS.



3. *RU 27: tabular scraper quarry site. The white area in the centre of the area shows the concentration of limestone.*

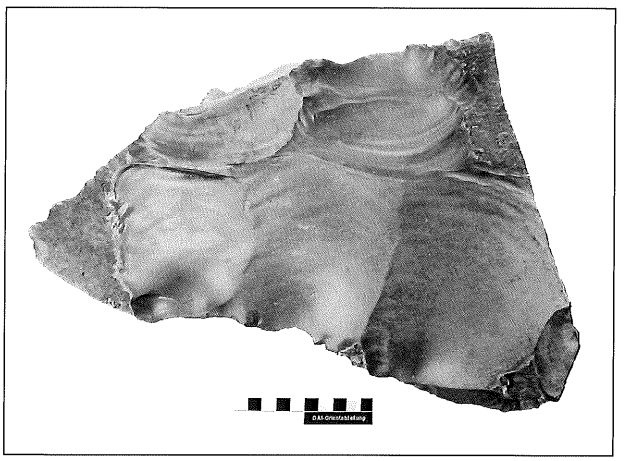


4. *RU 27: broken flint-nodules bearing tabular scraper blank negatives.*



5. *RU 27: outcropping flint-nodules and overlying smaller sized limestone blocks.*

ditional "harvesting" was undertaken to obtain the raw material. Interestingly, a lower (older) limestone layer, cropping out on the lower parts of the slopes of the butte, characterised by large



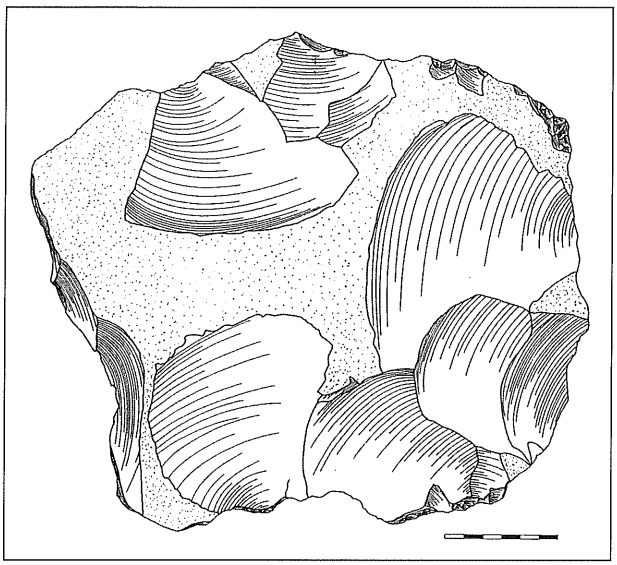
6. *RU 27: Flint-nodule bearing tabular scraper negatives.*

round limestone nodules (**Fig. 7**) covering a tabular flint layer does not show any evidence of fan-scraper blank production.

Tabular scraper cores were found abundantly (**Fig. 8**), and several tabular scraper blanks were found too (**Fig. 9a-b**). Some of them can be classified as "waste" due to their atypical thickness and irregular shape. Others showed rough traces of (use-) retouch (**Fig. 9c-d**). In some parts within the production areas the floor was also covered with small flakes stemming from blank production as well as core preparation (**Fig. 10**). Besides the products of tabular scraper blank production, several large and thick blades were observed that had intentional or use-retouched lateral edges (**Fig. 11**). It seems, contrary to the tabular scraper blanks, that these blanks were not designated for export. They were used as tools on the site.



7. *RU 27: lower limestone layer characterised by large limestone nodules.*



8. RU 27: tabular scraper blank core on a flint block (Thickness: 3,5cm).

Economic Output of the Quarry Sites on RU 27

In order to evaluate the economic output of the tabular scraper blank production on RU 27, two tabular scraper blank production areas were chosen for counting the negative flake scars on the cores. All production areas are characterised by a high concentration of tabular scraper cores which suddenly drops at the edges of these areas. The first area (area A) had an area of ca. 4,000m^2, the second (area B) of ca. 800m^2.

Within area A altogether 5 squares (2x2 metres) for counting negatives were defined. They were located in the centre, half way between the centre and the edge, and on the edge of the production area. Within these squares all negatives were counted. The number of negatives was between 10 and 40 negatives per square (per 4m^2, or 2.5 to 10 negatives per m^2), which makes an average of 6.25 negatives per square metre. Therefore we can assume that at least 25,000 tabular scraper blanks were produced in area A.

The same sampling procedure was applied for area B, again in four squares (2x2 metres) located in the centre, half way between the centre and the edge, and at the edge of area B. The number of flakes scars per square in this area was between 10 and 21 negatives per square (2.5 to 5.25 per m^2), which makes an average of 3.8 per m^2. Therefore we can assume that at least 3,000 tabular scraper blanks were produced in the much smaller area B. These are just two examples of the production areas on RU27, keeping different concentrations of negatives on the other production areas on RU27 and their different sizes in mind (some are smaller but others are even larger), it is possible that at least several 100,000 fan-scraper blanks were produced on RU 27.

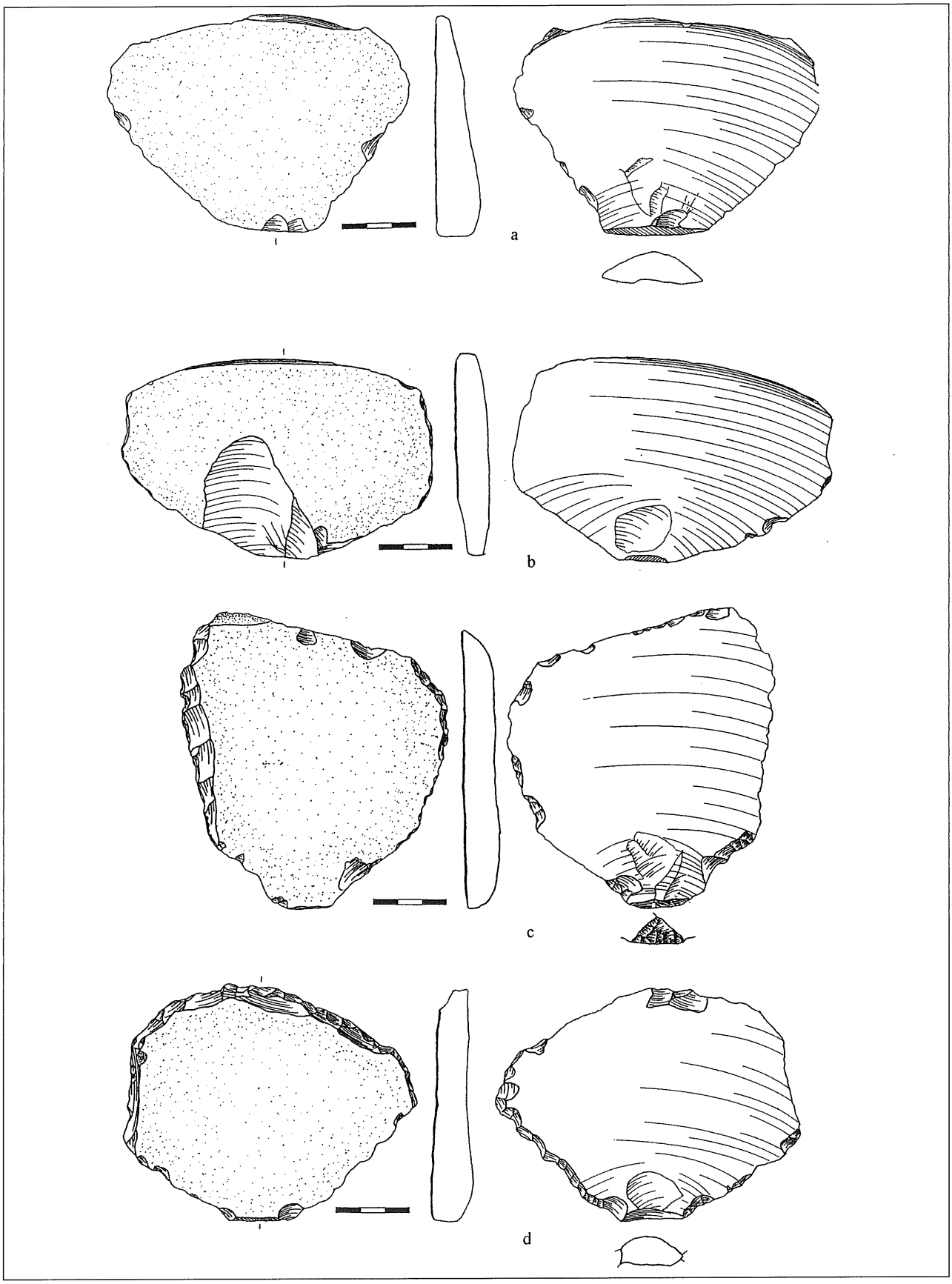
Identification of Other Tabular Scraper Quarry Sites in the Vicinity

During a tour in the vicinity of RU 27, three other archaeological sites on neighbouring buttes were discovered. Two of them (RU 28 and RU 29) are also tabular scraper quarry sites, and the third one (RU 30) is a small Neolithic burin site.

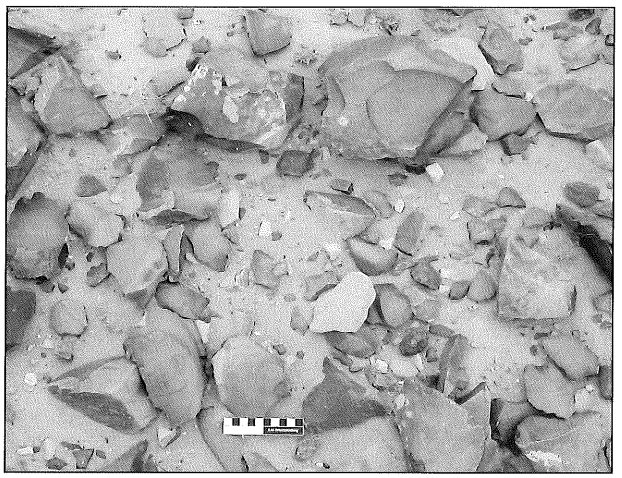
The site RU 28 (N 32°28'55.5" E 038°29'43.9"; ca. 782m asl.) is located on the opposite site of the wadi, west of RU 27 (**Fig. 12**). This butte has also a *rujum* close to its southern end. The same situation concerning the evidence for tabular scraper blank production as at RU 27 could be observed here. Here also production areas are located on top of the butte close to the edges and in contact with outcropping flint-nodules (**Fig. 13**) partly covered by a layer of block-shaped limestone. Due to the short time a detailed documentation of this and the following sites was not possible. Our impression is that tabular scraper blank production on RU 28 resembles the production on RU 27, although it appears that the concentration of tabular scraper cores on RU 28 is somewhat lower. Besides the evidence for tabular scraper blank production, some burins were also found on RU28, giving a hint to the utilization of this site in the Neolithic (PPNB-PN).

South of RU 27 and RU 28 on the other edge of Wādī Ruwayshid al-Quṣb, another butte was located and named RU 29 (N 32°27'48.9" E 038°31'41.5"; ca. 780m asl.) (**Fig. 14**). Three *rujums* occur on this elevation close to its northern edge. In the area around these *rujums*, close to the edge of the butte, traces of tabular scraper production (**Fig. 15**) and the same geological situation as at RU 27 and RU 28 was noted (**Fig. 16**). Here the concentration of fan-scraper cores also seems to be lower compared to RU 27.

The impression gained on RU 27 that the production of tabular scraper blanks was linked to a specific layer of flint-nodules covered by a layer of block-shaped limestone was confirmed



9. RU 27: not used tabular scraper blanks (a-b) and retouched tabular scraper blanks (c-d).



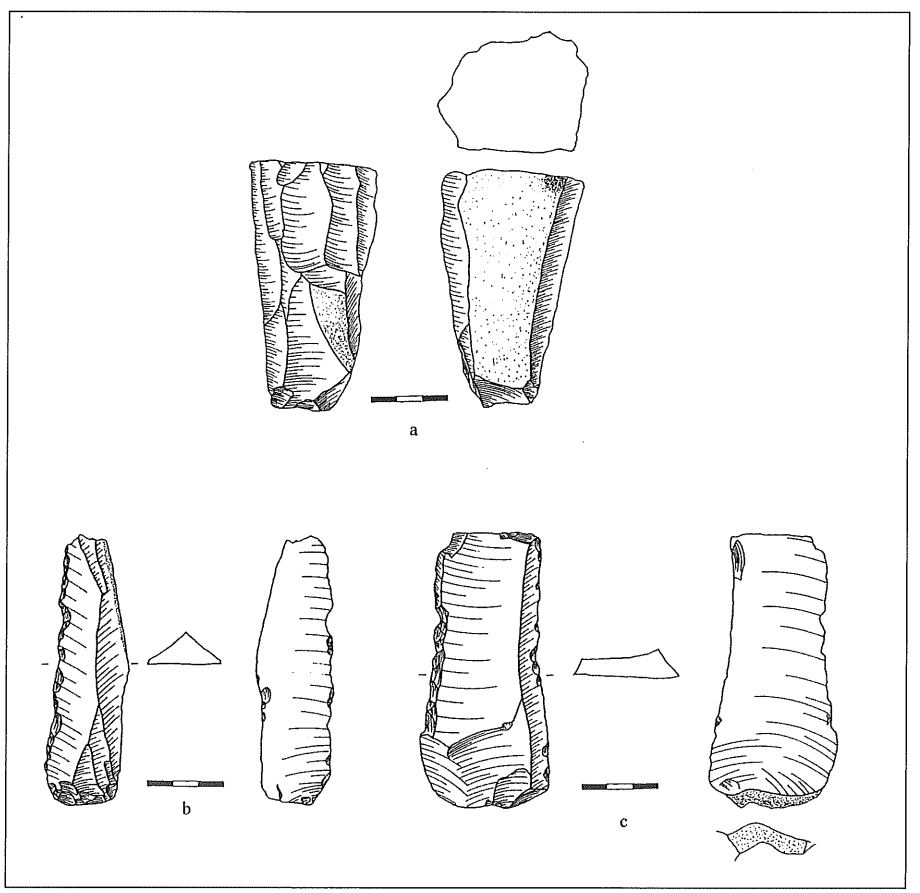
10. RU 27: flaking area on tabular scraper blank production site.

on the sites RU 28 and RU 29. All the quarrying and production activities were carried out on top of the buttes close to the edges and a few metres downhill in the area of the outcropping layers of block-shaped limestone, overlying a layer of flint nodules. In the vicinity of nodule shaped limestone, cropping out on the lower parts of the slopes, no trace of tabular scraper blank production was observed.

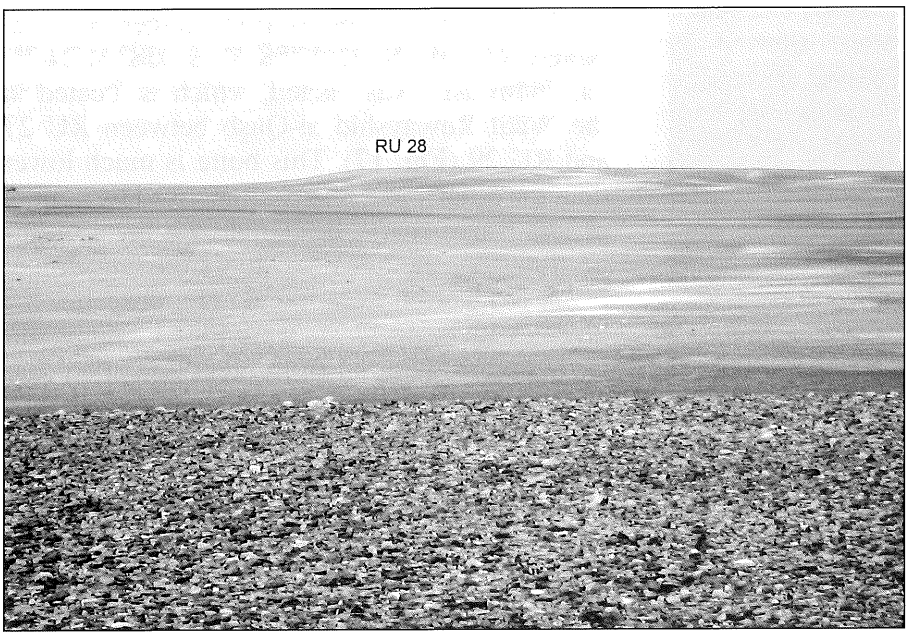
To confirm this observation another butte, labelled RU 30 (N 32°27'58.3" E 038°31'24.7"; ca. 765m asl.) was visited, which is located in the Wādī Ruwayshid al-Quşb between RU 27 and RU 29 (**Fig. 17**). This butte is much lower than the others, and it is characterised by a more or less round shape, bordered by a band of large limestone nodules. No hints on fan-scraper blank production were found here, instead some blades with burin-facets were found, comparable to similar material from other so called 'burin-sites' in the eastern desert (e.g. Betts 1987), which gives a clue to date the utilization of this site in the Neolithic period (PPNB – PN).

Dating and Conclusion

These sites are difficult to date due to the fact that the utilization of tabular scrapers reaches chronologically from the Late Neolithic to the Early Bronze Age (see Rosen 1997: 75), but it is possible that the exploitation of the flint layers on these sites, which shows a sort of industrial standard, occurred in the Chalcolithic to EB III period (ca. 5000-2700BC). During this period tabular scrapers, especially fan-shaped tabular



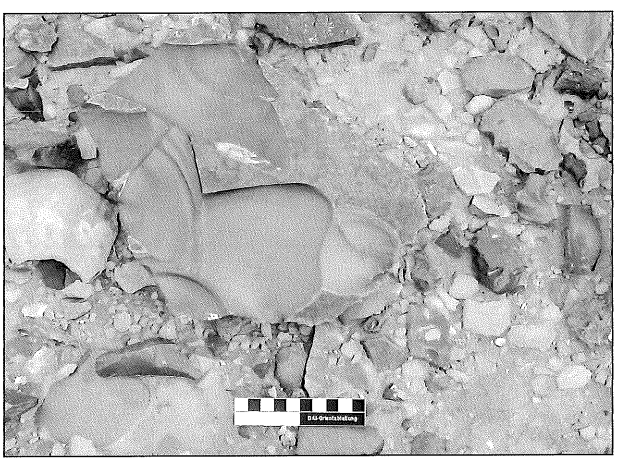
11. RU 27: blade core (a) and large irregular retouched blades (b-c).



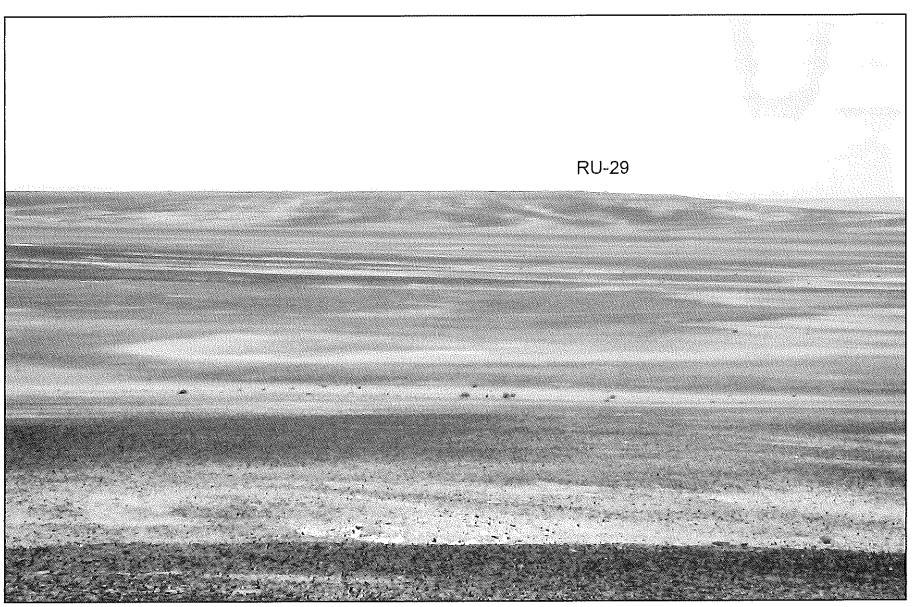
12. View on RU 28 from east.



13. RU 28: outcropping flint nodules and traces of tabular scraper blank production.



15. RU 29: tabular scraper blank core and flakes.



14. View on RU 29 from north.



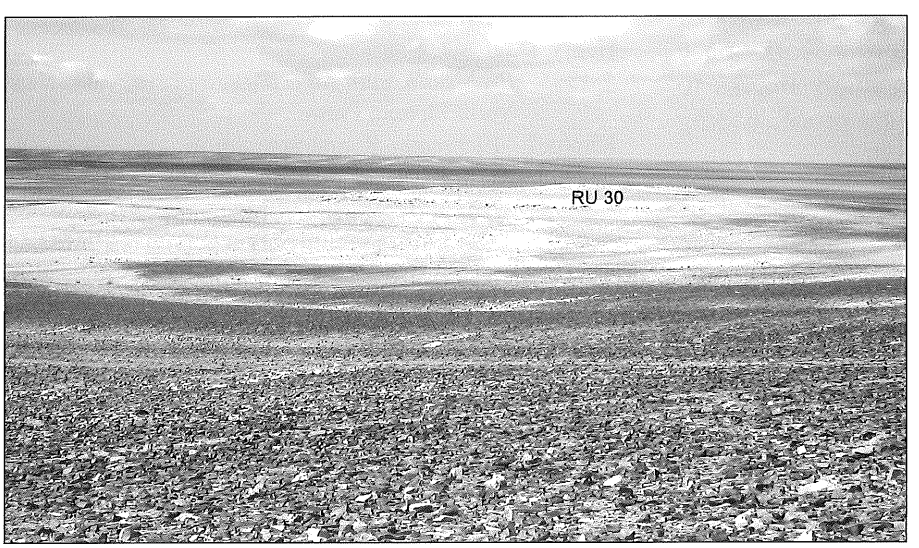
16. RU 29: outcropping flint-nodules below a layer of small limestone blocks.

scrapers, are common in excavated settlements of this period in the west, illustrating their high economic value, which is also characterised by the utilization of specific sorts of high quality flint for the production of these tools.

It is most probable that the production and trade of these items occurred within a pastoral economy that also used the steppe and desert regions in the east during their annual shifts of pastures. The wadis around the quarry sites offer very good pastures in springtime, even at present. During visits to these pastures, tabular scraper blanks were produced and afterwards, while moving with the herds, they were transported over long distances towards settled areas, for example towards the west.

The al-Jafr and the ar-Ruwayshid sites probably represent only a small part of all quarry sites for tabular scraper blank production. Several more sites like these can be expected to be located in the deserts of Jordan and neighbouring regions, where hundreds of thousands of tabular scraper blanks were produced. This raises the question: where did all these tabular scrapers go? The number of tabular scrapers found in towns and rural settlements is surprisingly low, forming just a tiny fraction of all tabular scrapers that presumably were produced on quarry site like these.

The assumed close relationship of these tools with animal husbandry, especially wool shearing, butchering and hide working, gives us a possible indication of the whereabouts of most of these items. It might be that tabular scrapers, especially worn and broken examples, could be found in great numbers in campsites of Chalcolithic and Early Bronze age pastoral nomads, where butchering, shearing and hide working activities occurred. Sites like these existed in the arid regions, but they are difficult to date. Additionally, camp sites of pastoral nomads also existed close to rural settlements and towns especially in the west, where these groups remained with their herds for a specific time in the year during the annual movements among pastures; not least because pastoral nomads also relied on goods from sedentary societies, especially agricultural products, which they received in exchange for such animal products as wool, skin and meat. For logistical reasons, because it would have been beneficial to maintain close proximity to potential customers of the animal products in the towns, it is expectable that activities producing these animal products for exchange mostly occurred close to these settlements, which means that ta-



17. View on the 'burin' site RU 30 from south (from RU 29).

bular scrapers and their remains should appear there in greater numbers.

It becomes clear that the research on tabular scraper quarry sites is just at its beginning. More quarry sites must be discovered, including in other regions, and the relationship of the cores to specific flint layers should be determined geologically and geologically, whilst palaeontological (e.g. microfossil analysis) methods have to be developed in order to identify the geological deposits of tabular scrapers found in settlements. All of this would lead to new possibilities for examining prehistoric trade networks.

Additionally, archaeological work in Chalcolithic and EB rural settlements and towns should focus on their surrounding areas, in the close vicinity, in order to locate the existence of possible camp sites and tabular scraper remains.

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